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Modeling Micro-Economic Resilience and Restoration After a Large-Scale Catastrophe: An Analysis of the Gulf Coast After Katrina

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SERRI Report 80041-01

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

BLS	Bureau of Labor Statistics
CARRI	Community and Regional Resilience Initiative
CGE	Computational General Equilibrium
CPS	Current Population Survey
CST	Central Standard Time
DCI	Disaster Composite Index
DHS	Department of Homeland Security
EBT	Electronic Benefit Transfer
FEMA	Federal Emergency Management Agency
GDP	Gross Domestic Product
GIS	Geographic Information System
HSSAI	Homeland Securities Studies and Analysis Institute
HWM	High Water Marks
IDV	International Development Doctoral Program
IO	Input-Output
IRB	Institutional Review Board
LAU	Local Area Unemployment
MDA	Mississippi Development Authority
MEMA	Mississippi Emergency Management Agency
MGCCC	Mississippi Gulf Coast Community College
MPH	Miles Per Hour
NOAA	National Oceanic and Atmospheric Administration
OHS	Okuyuma, Hewings, and Sonis (2004)
OLS	Ordinary Least Squares
ORNL	Oak Ridge National Laboratory

PTSD	Post Traumatic Stress Disorder
QCEW	Quarterly Census on Employment and Wages
QDA	Qualitative Data Analysis
SAM	Social Accounting Matrix
SBA	Small Business Administration
SERRI	Southeast Region Research Initiative
UI	Unemployment Insurance
USGS	United States Geological Survey
USM	The University of Southern Mississippi
2SLS	Two-Stage Least Squared

SOUTHEAST REGION RESEARCH INITIATIVE

In 2006, the U.S. Department of Homeland Security commissioned UT-Battelle at the Oak Ridge National Laboratory (ORNL) to establish and manage a program to develop regional systems and solutions to address homeland security issues that can have national implications. The project, called the Southeast Region Research Initiative (SERRI), is intended to combine science and technology with validated operational approaches to address regionally unique requirements and suggest regional solutions with potential national implications. As a principal activity, SERRI will sponsor university research directed toward important homeland security problems of regional and national interest.

SERRI's regional approach capitalizes on the inherent power resident in the southeastern United States. The project partners, ORNL, the Y-12 National Security Complex, the Savannah River National Laboratory, and a host of regional research universities and industrial partners, are all tightly linked to the full spectrum of regional and national research universities and organizations, thus providing a gateway to cutting-edge science and technology unmatched by any other homeland security organization.

Because of its diverse and representative infrastructure, the state of Mississippi was chosen as a primary location for initial implementation of SERRI programs. Through the Mississippi Research Initiative, SERRI plans to address weaknesses in dissemination and interpretation of data before, during, and after natural disasters and other mass-casualty events with the long-term goal of integrating approaches across the Southeast region.

As part of its mission, SERRI supports technology transfer and implementation of innovations based upon SERRI-sponsored research to ensure research results are transitioned to useful products and services available to homeland security responders and practitioners. Concomitantly, SERRI has a strong interest in supporting the commercialization of university research results that may have a sound impact on homeland security and encourages university principal investigators to submit unsolicited proposals to support the continuation of projects previously funded by SERRI.

For more information on SERRI, go to the SERRI Web site: www.serri.org.

EXECUTIVE SUMMARY

Large-scale disasters cause lasting physical, economic, and social consequences for affected communities and populations. While preparedness is imperative to limiting the impact of disasters, it is not possible to prevent every potential disaster or consequence. Therefore, evaluating methods to minimize disaster impact and maximize response and recovery efforts is critical. This project assesses the effectiveness of disaster response through the examination of economic and social data, as measured by the restoration of micro-economies at the community level. Data are used to develop a quantitative model of community resilience and recovery following large scale catastrophe in an effort to analyze the efficacy of disaster response. Specifically, this project evaluates the impact severity and resilience of the southernmost Mississippi counties most heavily affected by Hurricane Katrina. Addressing how the Mississippi Gulf Coast communities and specific populations therein responded to Hurricane Katrina provides critical knowledge about potential efficacy of timely and targeted assistance to ensure the rapid and effective rebuilding of local economies. The result is the provision of models that facilitate an explanation of the micro-economic dynamics at the community level following a local disaster event; thus, in the event of a disaster, improving proactive planning for the efficient distribution of resources at the local, state, and federal level.

To this effect, this research takes place in five stages. Stages 1 and 2 analyze existing data to create impact and recovery indices. Stages 3 and 4 involve the collection of new data through 63 interviews, 14 focus groups, and 1,841 completed survey questionnaires. Finally, the data collected in the first four stages are used in Stage 5 modeling social and economic disaster and resilience recovery. Major findings from these five stages include:

- Noticeable and major differences in the level of physical impact from Hurricane Katrina among communities are seen using the Disaster Composite Index.
- Hurricane Camille (1969) served as the paragon of hurricanes to coastal residents before Hurricane Katrina. This provided a false concept of the worst-case scenario which Hurricane Katrina exceeded.
- Household and community needs in the immediate aftermath of the storm include necessities like food, water, gasoline, shelter, and access to medicines. Cash is also important as debit and credit card transactions cannot occur due to the lack of electricity and telecommunications. Long-term household and community needs include housing repair, daycare, employment, and prompt and just insurance and aid payout.
- Pro-social behavior occurred following the storm, as neighborhoods banded together and collectively found ways to solve problems and shared available resources.
- People define recovery in tangible, noticeable ways, such as population levels, infrastructure damage, economic activity, and building stock. The perception of members of the community is that recovery is occurring, but it has yet to reach pre-Katrina levels. A regression analysis of the survey data indicates females, older persons, and homeowners perceive greater recovery than males, younger persons, and renters, respectively. The percent Black, percent Hispanic,

and percent Asian in the zip code are negatively correlated with perception of recovery levels.

- Community business and political leaders (elites) often do not perceive there to be socially isolated groups within their community, while social leaders (elites) (churches, non-profits, etc.) perceive there to be isolated groups who are more vulnerable to disasters.
- Study participants gave high marks to the response by the non-profit sector, local government, and state government, but felt frustrated at the federal response.
- Post-Katrina insurance costs and a lack of insurance payouts from Katrina are two of the biggest factors impeding recovery of the Mississippi coastal communities.
- Large retailers had deeper pockets and assets outside the affected area, and could reopen faster. Over half of the survey respondents stated that big box retailers and building supply companies were the most helpful type of business after the storm.
- People rely heavily on social networks for information following a disaster. Word of mouth and churches ranked high as the source of information about disaster assistance.
- Hancock County returned to pre-Katrina service sector employment faster than Harrison County, though it received a more direct hit from the storm.
- Statistical modeling of unemployment duration finds that the harder impacted a community was by the storm, the longer the expected unemployment duration. Unemployment duration is higher for minority communities, as determined by percent Black, percent Hispanic, and percent Asian by zip code. Finally, the higher the payout from the Mississippi Development Authority homeowner grants, the lower the expected unemployment duration.
- The regression analysis using the survey data estimates that older workers, higher income workers, and homeowners are less likely to lose their jobs. Being Asian or Hispanic increases the probability of losing one's job. Pre-storm wages are negatively correlated with the number of months unemployed and percent Asian is positively correlated with the number of months unemployed.
- The regression analysis using survey data shows that the overall exposure to storm damage (as measured by the Disaster Composite Index) is the biggest factor in determining the probability of one evacuating from the storm. Socioeconomic factors were of lesser importance.
- Areas with higher home ownership and higher levels of income had greater property losses. Furthermore, communities with a higher percentage of their population being Black or Asian have increased property loss, when controlling for income and other factors.
- Timing of the storm making landfall, at the end of the month, influences people who are retired, on fixed income, and on public benefits since often they are nearly out of money at the end of the month and do not have cash resources to draw on to evacuate or recover after a storm.

1. INTRODUCTION

This project, taking place between June 2009 and December 2011, was funded to create a model of micro-economic vitality and resilience following a large scale disaster event. The researchers proposed to estimate how communities and specific populations within those communities respond to a disaster, providing critical knowledge about potential efficacy of timely and targeted assistance to ensure rapid response and the effective rebuilding of local economies. For the purposes of this project, the researchers use Hirshleifer's (1987) definition of *disaster* as "any substantial impoverishment due to an unusual source of stress that takes places within an economic system" (6).

This research falls into two Department of Homeland Security (DHS) Science and Technology Divisions, Human Factors and the Infrastructure/Geophysical Divisions. The Human Factors Division focuses on the application of social and behavioral sciences to improve detection, analysis, and understanding and response to homeland security threats. The Infrastructure Protection and Disaster Management Division's mission is to strengthen the security of America's critical infrastructure from acts of terrorism, natural disasters, and accident. Moreover, they focus on state and local preparedness and response. By employing social science methodology, specifically mixed methods employing qualitative techniques and quantitative data analysis, to analyze the factors associated with speed of recovery, this project contains elements that are central to the DHS mission.

Model building requires a collection of a large number of data and subsequent analysis to understand the relationship between key variables. Given the time and resources afforded to the researchers, analysis was limited to the states of Mississippi and Alabama and to a single event, Hurricane Katrina, for the initial data collection and model building project. This study examines the communities between Waveland, Mississippi, and Orange Beach, Alabama, including the coastal counties and one county inland. We exclude the cities of New Orleans in Louisiana and Mobile in Alabama from this study, because incorporating either of these two large metropolitan areas would increase the complexity of the data collection and model building process exponentially. This increase in complexity would not allow the project to be completed within the project window.

The researchers have paid particular attention to minority and immigrant communities throughout this research. These populations are important, as they are often the most economically vulnerable and may be the last micro-economy to recover from a disaster, if ever.

1.1 Project Stages

The project was undertaken in five stages. The first two included an analysis of existing data sets to create indices for categorizing and understanding (1) the impact of and (2) the speed of recovery from large scale disasters. Stage (3) collected extensive data through field research on community-level factors that influenced the speed of recovery. Stage (4) entailed the collection of other data sets to add to the model. Stage (5) built a social-economic model of resilience and recovery in order to better understand local variance in recovery outcomes (see Figure 1.1).

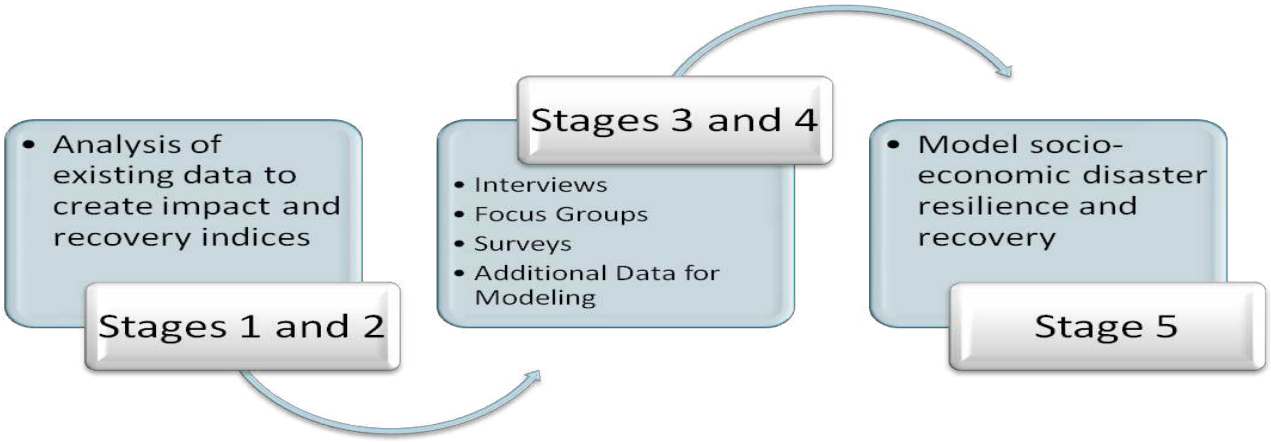


Figure 1.1: Stages of Research (Source: Authors 2011)

1.1.1 Hurricane Katrina as a Localized Disaster

The unit of analysis for this project is the community. The research team (herein referred to as "the Team") presents the reader with a measurement of the impacts of Hurricane Katrina on the economic vitality of the Mississippi Gulf Coastal communities. The researchers utilize the concept of "localized disasters" which are "usually due to some specific event: tornado, explosion, air raid and so on" (Hirshleifer 1987, 7). With its focus on local communities following Hurricane Katrina (see Figure 1.2), this research addresses the effects of and recovery from localized disasters.

The Team hopes to plug the gaps in the literature on modeling resiliency. While Hurricane Katrina struck an entire region, its impacts varied greatly by community. By studying the impacts on the community level, the Team formulates systematic means for disaster planners and responders to better grasp how communities, even adjacent ones, can be impacted differently by disasters. In addition the Team provides suggested ways of modeling those impacts.

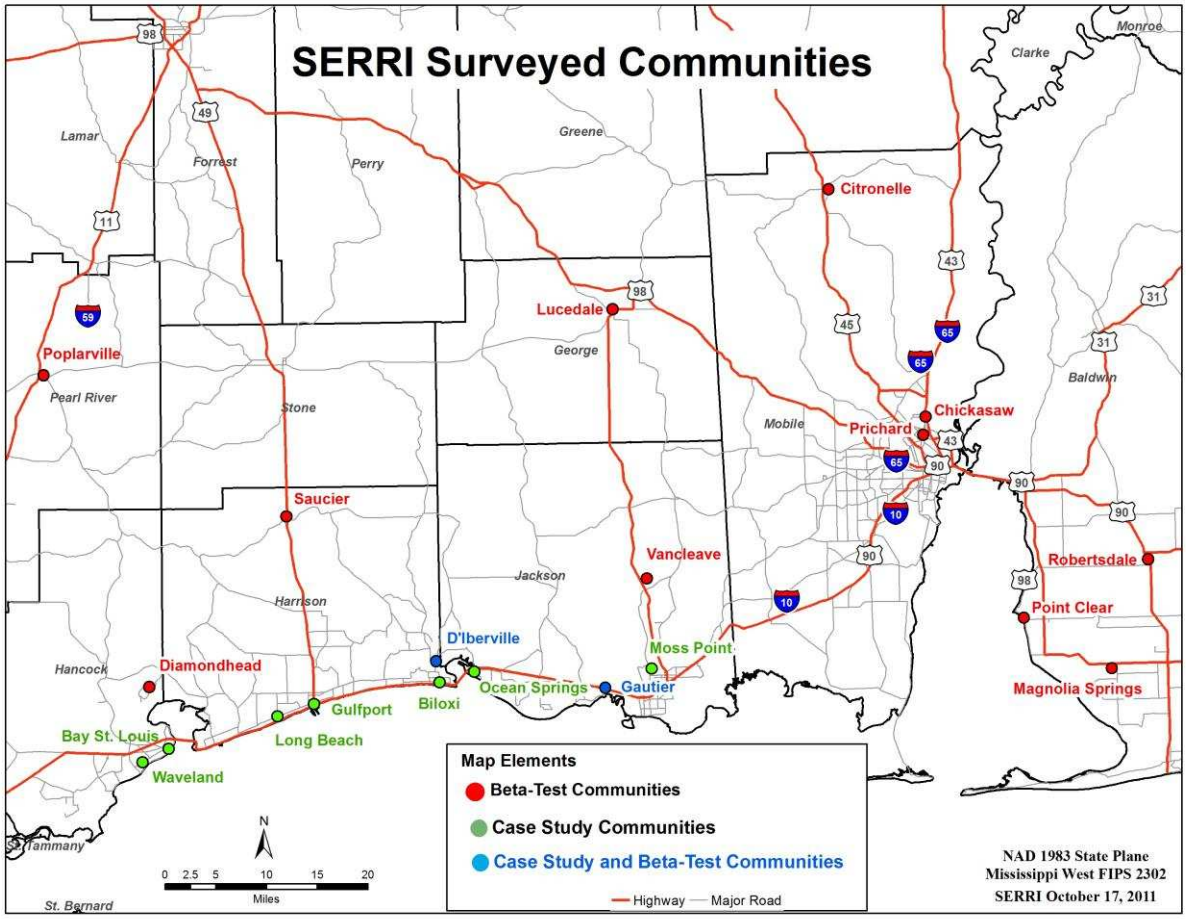


Figure 1.2: SERRI Researched Communities (Source: Authors 2011)

1.1.2 Field Collection of New Data

Research Stages 1 and 2 analyze existing data. Stages 3 and 4 employ the field collection of new data through interviews, focus groups, and a survey. With the data, we answer "how and why" questions related to economic community resilience and recovery. This data is then used to determine "what" happened, while uncovering the cause of the response. Why did some communities recover more/less quickly than did other communities when many had the same level of social-economic impact from Hurricane Katrina? During economic recovery of a community, the literature articulates that there are two types of forces at work, exogenous and endogenous (Vigdor 2007; Durlauf 2004; Dolfman, Wasser, and Bergman 2007; Jensen and Harris 2008; Hirshleifer 1987). Exogenous forces are those that influence the community from the outside— external forces upon the local economy. Examples include the arrival of aid, money, and human capital. Endogenous forces are those coming from within the community during economic recovery. For instance, the existence of the gaming industry on the Gulf Coast of Mississippi and the efforts by these individual firms will be seen as an endogenous response to the disaster. Negative endogenous factors can include the breakdown of a local monetary system, lawlessness, and deterioration in the communities' faith in previously established leaders. The forces that economically change

the landscape are examined through these two lenses to determine if a community's resilience and recovery lies inside, outside, or with a balance of the two.

To determine what endogenous and exogenous forces were at work post-Hurricane Katrina, primary field data was collected in communities through interviews, focus groups, and a survey- commonly known as mixed methods or triangulation (Perecman and Curran 2006; Creswell and Clark 2007; Creswell and Clark 2008). Interviews are a key data collection tool in that the researcher listens to "what people themselves tell about their lived world, about their dreams, fears and hopes, hear their views and opinions in their own words, and learn about their school and work situation, their family and social life" (Kvale 2007, 1). This type of data cannot be captured in a classic quantitative survey and does not exist in available data sets.

Focus groups complement the interview data collection method in that "they not only allow analysis of statement and reports about experiences and events, but also of the interactional context in which these statements and reports are produced" (Barbour 2007, 1). Given the social nature of disasters, the impact is not only at the individual level (interviews), but also collectively on groups and community, thus suggesting the need to utilize a method to capture this type of group experience (Berg 2007). Focus groups are the preferred method to extract this type of data at the community level.

A survey is the most common method of collecting data from a large group. Surveys allow a sampling of a large group of people on the same subject nearly simultaneously. The advantage of a survey is in its ability to collect a large number of data over a population (Fink 2003; Berg 2007). Combined with interview and focus group methods, a survey can help to round out a thorough understanding of a social-economic event like Hurricane Katrina. Report Sections 4, 5, and 6 provide the results for the interview, focus group, and survey portions of this research, respectively.

1.1.3 Modeling

In Report Section 7, the researchers use available data sets and field data to estimate relationships between social-economic factors, speed of recovery, and resilience in communities. The model consists of three separate parts: 1) an empirical model using ordinary least squares (OLS) estimates of the effects of individual, neighborhood, and regional characteristics on individual outcomes over time, 2) a hazard model of the speed of recovery, and 3) a simulation model that estimates the impact of hypothetical disasters using the underlying parameters estimates from (1) and (2).

The neighborhood characteristics are determined by using both existing data sets (2000 US Decennial Census) and our original survey data. These variables include, but are not limited to, local labor market characteristics, average homeownership rates, and average rates of single-parent households within a community. Individual-level variables include standard socio-economic measures of human capital (education and work experience), household capital (wealth, housing status) and demographic variables (race, gender, age). The Team used parameter and speed of adjustment estimates to create an analytical model that estimates the recovery from hypothetical future disasters.

1.2 Research Significance

The innovative aspect of this research project is in the modeling of local community economic systems. To date, no researchers have modeled the local micro-economies found

in communities following a disaster. This fact makes the project innovative and unique as a tool for community leaders, as well as for its addition to the academic literature. The end product of the research is a model that helps explain the dynamics of a local economy in a community following a local disaster event. Once created, the levels of the variables of this model can be changed to project new scenarios. It is within this power of these models that this research brings to the DHS the ability to more fully understand the dynamics and interactions of local communities and thus better plan for the distribution of resources following a local disaster.

1.3 Policy Implications

This research builds a model of micro-economic vitality and resilience following a large scale disaster event, Hurricane Katrina. The research involves one of the largest and most comprehensive qualitative data collections on the Hurricane Katrina disaster, providing valuable insights from those who experienced the storm and watched their communities pursue recovery. The model reveals important aspects of resiliency. For example, younger workers, renters, and lower-income wage earners have higher probability of losing employment due to a large-scale disaster. The Disaster Composite Index provides planners with a way of systematically measuring damage on the community level. Index scores can be used, in conjunction with the results of the model, to project when levels of economic activities will return to normal within a community. The qualitative data captures the experiences and perspectives of the storm victims, such as the importance of cash after the disaster since credit and debit card transactions cannot occur without electricity and telecommunication infrastructure. The Disaster Composite Index and modeling conclusions can be used to assist leaders from the community, state and federal levels to ensure that the resources available are targeted toward the key locations to ensure maximum results in community economic rebuilding.

Building upon past scholarship on economic rebuilding post disasters, the Team paves new ground in developing a model examining social-economic resilience following a major disaster. Literature to date explores the concept of community resilience from a descriptive point-of-view (Benson, Charlotte, and Clay 2004; Hirshleifer 1987). Besides a thin literature linking disasters and economics, Yezer (2002) states that "these individual approaches to the economics of natural disasters often bear little relations to one another because they proceed from very different assumptions and analyze different aspects of the relation between disasters and the economy" (212).

Policy makers are already taking steps to implement these and similar policy implications. This list does not imply such efforts are not underway; rather, it merely offers recommendations based on the numerous interviews, focus groups, and a survey conducted in 2010 and 2011. Hurricane Karina teaches many lessons, and this list should not be considered exhaustive as many implications abound. The broad policy implications are:

Disaster policy makers and responders must recognize that different groups have different levels of vulnerability.

The literature demonstrates that vulnerability has geographic proximity as well as socioeconomic factors. This study finds political and economic elites within the case study communities do not always recognize the existence of socially isolated groups along the Coast who have different levels of vulnerability. For example, social elites who work with

non-English speaking populations recommended that disaster information be made available in other languages. People in the lowest-income neighborhoods needed longer to return to employment following Hurricane Katrina. Older workers, higher income workers, and homeowners were less likely to lose their jobs because of Hurricane Katrina than their counterparts. These are but some of the vulnerability issues confronting disaster planners and responders.

The solution to this issue lies in a concerted effort by emergency management and disaster planning officials to educate local leaders in group vulnerabilities. Disaster conference planners should issue calls for papers on this topic as well as offering workshops to promote awareness of this topic. Federal and state authorities should require that the identification of vulnerable neighborhoods and populations be modeled into emergency management plans on the local level.

Until help can arrive, victims must be prepared to seek help from one another.

Pro-social behavior increased in the aftermath of the storm, and some even thought of Hurricane Katrina as the great socioeconomic equalizer. The Team heard stories, especially during the focus groups, of how neighbors banded together and shared resources such as food or water. A big box retailer, for instance, allowed non-profits to take needed items and to simply write down on a piece of paper what they took for later billing- a level of trust unlikely to occur during normal times. Disaster planners should seek ways to instill the notion of neighborhood-level self-reliance as part of resiliency. Survey responders reported that word of mouth, neighbors, and churches were three of the main sources of aid information. The next stage of this research project involves a social network analysis that will explore and test the role of social networks in disaster recovery using the BP Deepwater Horizon oil spill event as the case study. More such studies are needed to improve how information flows among people during and following a disaster.

Residents of high-risk areas should be encouraged to be prepared for disasters. For example, in the wake of the 9/11 attacks, the federal government encouraged citizens to keep emergency supplies of food. Such encouragement should continue, but it needs to be updated to reflect lessons learned. For example, as of October 21, 2011, the Mississippi Insurance Commissioner's website has a section on disaster preparedness tips (www.mid.state.ms.us/disasters_storms/disaster_storm_preparation_recovery.aspx). The website recommends making sure one has a small amount of cash or travelers checks with them. In light of the Team's findings in the interviews and a survey, cash becomes the mode of exchange following a disaster, and such websites should be updated to encourage citizens to prepare for a cash-only economy following disasters. For example, the survey data reveals only one in five respondents claim they could use credit or debit cards within seven days after Hurricane Katrina.

Resiliency requires partnerships.

Churches became one of the first places people went for help following Hurricane Katrina, and this is reflected in Weil's (2010) research described in the literature review (Report Section 2). Study participants heaped praise upon church groups for providing items and volunteer labor in the wake of the storm. Churches became the perceived antithesis of FEMA as far as efficiency and effectiveness are concerned. Private groups move quicker and with fewer burdens than government. Active steps that can be taken to

foster public-private partnerships include requiring that disaster management plans on all levels call for making immediate contact with churches after a disaster. Groups of religious leaders should meet with local officials and disaster planners periodically, and religious leaders should be invited to offer resources such as use of their building or contact databases as part of the emergency response.

The sooner usual activities can occur; the sooner there is a sense of normalcy.

Church pastors explained the importance of resuming worship services as soon as possible, even if it meant holding them outside or at a government or community building. The ability to eat at a restaurant, attend school, attend a worship service, and so forth creates a sense of normalcy. Priority needs to be given to encourage and facilitate the reopening of schools. As established by the literature and verified by a Biloxi focus group, restoring the schools allows a sense of normalcy for children as well as continuing their education. Government and community centers need to offer their facilities to community groups whose normal meeting places were destroyed or rendered unusable. The survey revealed that respondents perceived the most beneficial type of business to have re-opened first is big box retailers, but this is not to say that small businesses do not matter or should not be aided. The interviews suggested large retailers opened first. Disaster responders need to triage businesses after a disaster and give priority to those most likely to re-open the quickest and provide the most basic services.

Citizens define recovery in terms they can visualize and measure anecdotally.

The study participants demonstrated the tendency to define recovery in observable yet anecdotal terms. For example, they defined recovery in terms such as the building stock, population shifts, and economic activities. If they continue to see destruction then they do not see recovery. Local officials can take several steps toward increasing the perception of recovery. When a large employer reopens, this event should be given as much positive media attention as possible. The press releases and statements made by local officials need to accentuate the concept of resiliency. When redevelopment proves to be lacking in certain areas, such as along US-90 in Mississippi, local officials should review why the development is not reoccurring and see what can be done about it. For example, is it possible that building codes adopted post-disaster impedes development, and if so, are there compromises that can be made? While the sustainable development paradigm in the literature review (Report Section 2) assumes permanent changes in economic activity to be disaster resistant, the qualitative data suggests that leaving areas in economic disarray sends the message that recovery is not occurring, sustainable or otherwise.

Permanent population shifts can and do occur following a disaster.

While the idea of resiliency often implies a return to the state of normal, certain aspects of the community change following disasters. The population in the case study communities south of the railroad tracks dropped, and study participants noted this. The recovery efforts brought in workers of Hispanic ethnicity, some of whom stayed in the area. This increases the need for disaster information in Spanish and the need for interpreters. Local planners need to recognize that population shifts do occur. They should actively identify such shifts before official Census data identifies them.

Insurance issues must be addressed and resolved.

Subject participants believe the major impediment to long-term recovery is the lack of affordable insurance and equitable insurance payouts. Development south of Interstate 10 substantially stalled due to the cost of insurance. Many participants in the study complained of needing to wrangle with their insurance providers to obtain what they felt was the justifiable amount owed. A need for a comprehensive overhaul of insurance regulations exists. Table 8.11 predicts less duration in days of unemployment for individuals in Bay St. Louis than Harrison County cities because of MDA homeowner grant payments. Being able to restore one's home frees one up to pursue work and other elements of recovery.

People desperately need to get in touch with loved ones following the storm.

Telecommunications infrastructure collapsed during the storm, and even cell phones did not work. The fate of loved ones weighs heavy in the minds of storm victims. One focus group brought up the system adopted at Keesler Air Force Base in Harrison County where personnel can check in with an out-of-area data center, which can then relay to relatives that their loved one at Keesler is safe. Systems enabling people to communicate with one another should be explored. Knowing the status of loved ones allows individuals to focus on other aspects of personal recovery, such as housing repair. They will also be less prone to wander around looking for loved ones, thereby lessening the burden on law enforcement and National Guard personnel who are trying to secure the area.

Shelter policies need to be reviewed

The Team heard stories of persons who drowned because they returned home during the storm since the shelter would not accept pets. Some of the study participants praised the reversal of policy by FEMA regarding animals in shelters. The Team also heard how Hurricane Katrina exposed problems such as how unprepared shelters were to handle special needs persons. The Team recommends that emergency management officials adopt policies from lessons learned during Hurricane Katrina. For example, a social elite in Biloxi commented about how area residents did not learn where the shelters would be until the last minute. Having codified, published policies regarding shelters alleviates the uncertainties residents have surrounding regarding where to go and what to do. Consideration needs to be made for special needs populations. For example, Pearl River County requires that a special needs person cannot be admitted to a shelter without a responsible adult with them. This remediates the problem the county shelter had with people using the shelter as a free day care for a special needs adult.

Aid distribution and policies need to be reviewed

Study participants complained that aid went to persons they did not perceive as needing help. For example, the Team heard statements of how some people spent aid money for non-essential items. The Team heard that aid centers started building databases on who had

already received aid, but only late in the process, due to multiple trips through the aid lines by individuals. A more pro-active approach to aid distribution policies and requirements is needed for future disasters. Study participants complained of not receiving enough useful things, while receiving large amounts of donations that were in excess of need. This suggests the coordination between charities was perhaps too haphazard. One example of a supply and need/demand disconnect was clothing, which some study participants stated arrived in unneeded quantity. While established groups such as the American Red Cross or church groups likely have policies that prioritize aid collection, it appears some of the make-shift collection drives may not have aligned with actual victim needs. Disaster responders should work through central nodes in the communities' social networks, such as churches, to learn what items are needed and what items are in overabundance. Such information can then be relayed through the press to the general public and placed on government websites.

Information on preparing for a disaster needs to be easier to access

Although there is extensive literature available on preparing for and responding to disasters, much of the information is only accessible online and/or in English. This creates numerous problems of access. First, less than half of all Mississippi residents have internet access in their home (US National Telecommunication and Information Administration 2010). Furthermore, socioeconomic factors, such as income and race affect the likelihood that will be able to access website information. Second, although emergency information is available on many county and city websites, it is not always available in languages other than English, which limits the access of coastal Vietnamese and Hispanic populations. If non-English language material is available, links to it are most often in English. This research finds that the material is published, but access to it could be better facilitated. Based on these findings, possible outlets for disseminating this information include: providing the information and planning pamphlets to school children and asking them to teach their parents; providing links to non-English language literature in the same language as the literature; providing literature to outlets of special interest, such as making literature on preparing pets for emergencies available through local veterinary offices and making literature on preparing medical needs for emergencies available through pharmacies and doctor's offices. Television and radio commercials focusing on preparing for a disaster can be used to access audiences who do not use the internet or community facilities. Finally, minority organizations can be provided with literature to disseminate through established mediums of communication. Throughout these methods, it is crucial to consider language needs, including deaf, Vietnamese, and Hispanic populations.

2. LITERATURE REVIEW— LANDSCAPE ASSESSMENT

A rich body of literature exists on disasters, recovery, and resiliency. Within Katrina-related literature, however, the focus is often on New Orleans and Southeast Louisiana, thus neglecting Mississippi and Alabama, as demonstrated in a recently published collection of essays dealing with community resiliency in the wake of Hurricanes Katrina and Rita (Liu *et al.* 2011). Of the seventeen chapters in this compilation, only two are specifically about Mississippi.

Resiliency is often defined in ecological terms—as the ability of systems to respond to shocks and recover or adapt. Magsino (2009) defines resiliency as "the response to stress at individual, institutional, and societal levels categorized as the characteristics that promote successful adaption to adversity" (2). Allenby and Fink (2005) define it as "the capability of a system to maintain its functions and structure in the face of internal and external change and to degrade gracefully when it must" (1034). The last part of Allenby and Fink's definition differs from many others in that it introduces the possibility of fatalism into the notion of resiliency. Paton and Johnston (2006) note that the word "resiliency" originates from the Latin meaning *to jump back* and the word is often used vernacularly to mean *to bounce back* (7-8). Paton and Johnston comment that this usage fails to capture a reality of disasters— namely that changes in physical, social, and psychological realities of societal life prevent a return to the previous state of being. In other words, a new baseline of "normal" emerges as opposed to a return to the pre-disaster baseline.

The broad definitions used to understand resiliency complicate the task of its study. Klein, Nicholls, and Thomalla (2004) observe a tendency for the term resiliency to be used in the sense of system attributes that are desirable, but they argue such a notion is vague and cannot be operationalized as a meaningful policy or management tool. Instead, they suggest that the best two uses of the term resiliency is when it means "the amount of disturbance a system can absorb and still remain within the same state or domain of attraction" and "the degree to which the system is capable of self-organizing" (Klein, Nicholls, and Thomalla 2004, 11). Norris *et al.* (2008) make the interesting argument that resiliency is fundamentally a metaphor, as the term comes from the physical sciences to describe substances that can bend and bounce back. Just as in physics, it is not the strength of the disturbance, but the ability to recover to a state homeostasis that defines resiliency. The researchers make the point that resiliency does not mean an absence of discomfort or distress during or following a disaster, but it does entail that such discomfort or distress quickly dissipates.

Dovers and Handmer (1992) declare that systems, such as communities, must be conceived of as consisting of interrelated—as opposed to isolatable—parts. The researchers offer a categorization of resiliency. Type I resiliency involves resistance and maintenance, which are those systems that resist change and expend resources in maintaining the status quo. These systems are characterized by uncertainty-avoidance. Type II change at the margin. These systems change incrementally, but often the elites benefit from these changes and not the masses or biosphere. Finally, Type III refers to systems that are open and adaptable. Such systems are willing to challenge their own assumptions and institutional structures when needed; however, this change is often slow and painful. Colten, Kates, and Laska (2008) argue that resiliency includes the capacity to "*anticipate* significant multi-hazard threats, to *reduce* overall the community's vulnerability to hazard events, and to *respond* to and *recover* from specific hazard events when they occur*" (2).

* The italics are as provided by Colten, Kates, and Laska (2008, 2).

Studies of resiliency must consider varying degrees of vulnerability (Cutter *et al.* 2008; Cutter and Emrich 2006; Cutter, Mitchell, and Scott 2000; Morrow 1999). Vulnerability can be treated as an antonym for resiliency, and those with high vulnerability can be expected to possess low resiliency (Norris *et al.* 2008; Paton and Johnston 2006). Colten, Kates, and Laska (2008) argue that the key to resiliency is therefore to reduce vulnerability. Cutter *et al.* (2008) state that "vulnerability arises from the intersection of human systems, the built environment, and the natural environment" (3). Cutter's various publications show that vulnerability can be divided into social vulnerability and biophysical vulnerability. In the former, it is one's race, ethnicity, income level, education, and related characteristics that determine level of vulnerability. These socio-economic resources are often a factor in resiliency, as some groups have more resources at their disposal or available for their protection. People who are poor, for example, often live in feebly-built dwellings, making them more susceptible to loss (Morrow 1999; Mileti 1999). Cutter and Emrich (2006) provide that the vulnerability of coastal communities is exacerbated by the significant income inequality brought on by the large number of service sector jobs that exist to support the tourism industry. The latter type of vulnerability, biophysical, is a function of characteristics such as proximity to a body of water prone to flooding.

An example of vulnerability in Mississippi is found in Park, Miller, and Van (2010), who study the Vietnamese population of Harrison County, Mississippi. This insular, close-knit population relies heavily on fishing and shrimping for its livelihood, and some members of the older generation speak English marginally, if at all. Hurricane Katrina and the BP Deepwater Horizon oil spill have greatly threatened this seafood-dependent community economically, and the lack of English limits their economic options in an English-speaking community. Abramson *et al.* (2007) find that Mississippi residents with the lowest incomes are the least recovered from Hurricane Katrina. Furthermore, they find that children are especially vulnerable, as over half of the households responding to the survey report at least one child in the household having emotional or behavioral problems since Katrina. Additionally, they find evidence of high levels of school disengagement (absences) among Mississippi school-aged children and alarmingly high rates of children not covered by health insurance after the storm (Abramson *et al.* 2007).

Modeling resiliency and vulnerability has been advanced by Geographic Information Systems (GIS). Modeling resiliency includes establishing a baseline, which Cutter *et al.* (2008) state requires data inputs on social vulnerability, built environment and infrastructure, natural systems and exposure, and hazard mitigation and planning. Cutter and her co-authors demonstrate how these inputs can be overlaid in GIS. Cutter, Mitchell, and Scott (2000) demonstrate an innovative use of GIS to model areas most likely to be vulnerable to disasters. They start by defining an area, using the example of Georgetown County, South Carolina. Then they calculate the frequency of disaster occurrence as a ratio of times occurring to number of years, which is then overlaid with twenty-five different hazard zones (such as flood zones) to identify the portions of the county with the highest degree of biophysical vulnerability. Then socio-economic factors are overlaid, and finally, so are infrastructure points. The researchers find that the areas of greatest biophysical vulnerability do not necessarily intersect areas with the most social vulnerability. Instead, the areas with greatest vulnerability score medium on biophysical vulnerability and medium to high on social vulnerability. This case study demonstrates that even within a geographic area, such as a county, different areas have different vulnerability levels. Becker's (2009) study of Katrina's impact on the restaurant industry in Mississippi reaches comparable conclusions— sections of South Mississippi that were further inland had less infrastructure

damage and therefore could capture the restaurant market being neglected in the areas with greater damage.

Mapping vulnerability or resiliency requires data. Community-level data must be gathered from local sources rather than the major federal databases, such as the U.S. Census or Bureau of Labor Statistics. A problem that researchers often encounter is that these officials are preoccupied or short-staffed post-disaster, rendering less time and resources available for data gathering. Data that are available might not be in electronic form or may be in unsorted "data dumps," which require extensive sorting and organization. Researchers desiring to study New Orleans after Hurricane Katrina were left with minimal, even erroneous data. Furthermore, the demand for such data spikes after a disaster. The Greater New Orleans Community Data Center, for instance, received 80,000 website hits in September 2005 (Plyer and Ortiz 2011).

While the triggering event of a disaster is often natural, human actions can escalate disasters (Dovers and Handmer 1992). While people tend to think of large-scale disasters as acts of God, the disasters are increasingly man-made (Geis 2000). How society constructs buildings, neighborhoods, and cities and how resources are allocated pre- and post-disaster affect the extent of a disaster, whether man-made or natural. For instance, Eamon, Fitzpatrick, and Traux (2007) evaluate how residential and commercial structures and the physical infrastructure in Mississippi held up in Hurricane Katrina, and discovered most reinforced concrete structures fared well, but precast and wooden structures did not.

A theme across disaster, resiliency, and vulnerability literature is the notion of risk. All locations have inherent risks, be they natural or man-made, and reducing these risks increases resiliency (Colten *et al.* 2008). Federal programs have sought to reduce the risk of development in flood-prone areas, and the per-capita loss of floods from 1978 to 2002 has fallen as a result of such efforts (Burby 2006). Eamon, Fitzpatrick, and Traux (2007) recommend revisiting ordinances to keep certain types of structures out of areas with high disaster risk levels. Berke and Campenella (2006) advocate the federal government focusing on performance-based environmental risk reduction programs so that communities not making progress are cut off from funding. As part of the recovery of the Mississippi Gulf Coast, a series of charette* forums were held to address rebuilding in new urbanism (Evans-Cowley and Gough 2009; Kumar 2011), entailing high density land use to improve quality of life through smarter land use. However, Berke and Campenella (2006) fear a rise in new urbanism planning actually means higher density of structures in zones at high risk.

McIntire *et al.* (2002) claim there are three dominant academic paradigms in emergency management: disaster-resistant communities, disaster-resilient communities, and sustainable development and sustainable hazard mitigation. Disaster-resistant communities seek to minimize vulnerabilities and are the safest types of communities. The advantage of this approach is that it will presumably decrease loss from disasters; thus, communities that successfully pursue this paradigm are very marketable. Weaknesses of the paradigm include that it focuses on extreme environmental events and not the civil constructs that serve as triggering agents of disasters. While no example of this statement is given, presumably they are referencing problems that could exist such as affordable housing only being found in flood-prone parts of town. The paradigm focuses emergency management on mitigation and not response and mostly gives power to urban planners and engineers instead of a broad coalition of society. The paradigm appeals to urban planning,

* A "charatte" is a consensus meeting for drafting solutions to design problems and attended by a diverse group of designers and stakeholders in the process.

engineering, and geography, but has trouble incorporating other social sciences such as sociology and economics. Geis (2000) advocates for this paradigm by asking if it is preferable for disasters to not even reach disaster stage in the first place.

The second paradigm, disaster-resilient communities, focuses on the economic, emotional, and cultural aspects of recovery (*c.f.,* Paton and Johnston 2006). Its strengths include that it recognizes disaster events will occur and mitigation has its limits (McEntire *et al.* 2002). The paradigm incorporates the social variables ignored by the previous paradigm and addresses concerns posed by social science disciplines. However, McEntire *et al.* question if the paradigm is not also overly focused on natural disasters at the expense of civil ones. The paradigm is reactive instead of proactive and focused on normalcy instead of mitigating problems exposed by disasters. By focusing more on the social and psychological aspects of recovery, it fails to really incorporate fields like epidemiology into its realm.

Finally, the paradigm of sustainable development and sustainable hazard mitigation focuses on the interface between the earth and social systems (*c.f.,* Godschalk et al. 1999; Mileti 1999). This paradigm seeks resiliency by means of mitigation and capacity building (Godschalk *et al.* 1999). McEntire *et al.* (2002) write that a strength of the paradigm is that it recognizes the importance of the community factors in the level of resiliency. The paradigm explores linkages between recovery and resiliency, and it also focuses on how culture, environment, and economics come into play. Weaknesses include: it may over-focus on natural disasters; may be more relevant for some vested individuals rather than others; may not address all variables of disasters; and is over dependent on the academic disciplines of geography, urban planning, engineering, and environmental science. Finally, some critics argue that the paradigm is more ideological rather than scientific or practical.

McEntire *et al.* (2002) declare that the three aforementioned paradigms are not holistic. They suggest an alternative paradigm called "invulnerable development." This is development created in such a way to counter would-be vulnerabilities and involves liability reduction and capacity building. The authors argue the paradigm's strengths include that it focuses on vulnerabilities, tries to be holistic, and recognizes the relationship between vulnerabilities, disasters and development. Weaknesses are that the term "development" often implies economic growth and invulnerable may be misconstrued to mean disaster-free. The researchers propose redubbing the paradigm as "comprehensive vulnerability management" and redefine it as "a concerted effort to identify and reduce all types of disaster vulnerabilities" (McEntire *et al.* 2002, 273).

Lui *et al.* (2011) suggest that factors influencing resiliency are 1) strong, diversified economies with low income inequality; 2) the presence of skilled and educated workers who can adapt to change; and 3) wealth from various sources including public, private, and non-profit that can be invested into the recovery efforts. Boettke *et al.* (2007) assert that the key to recovery is robust political, social, and economic institutions in assessing the quandary caused by the lack of a free flow of capital and labor, public sector corruption, and unfavorable conditions for conducting business in the case of New Orleans. Furthermore, social factors, such as low education and low income, not only left many communities particularly vulnerable to being affected by Hurricane Katrina, but also hampered the recovery process. Such factors have proven to be a hurdle for the preparation for and the response to disasters in vulnerable communities. Furthermore, concern exists that public corruption escalates following a disaster, compounding these complications.

Mental health and psychological outlooks affect resiliency. The Rand Corporation released a literature review by Chandra *et al*. (2010) on resiliency through national health security. Ward and Shelley (2008) and Lee *et al*. (2008) explore the effects of Katrina on

Mississippi schools and argue that schools need to return to usual operations as quickly as possible to create a sense of normalcy. Schools can further advance resiliency by hiring counselors to help children cope with the trauma of disasters. Shehab, Anastario, and Lawry (2008) explore the mental health of those living in temporary trailers and cottages and find rising levels of mental illness and problems of access to health care. Aten *et al.* (2008) examine how storm victims viewed God in light of the disaster. While some disaster victims felt abandoned by a "distant God," others moved closer to God to garner strength to get pass the event. Additionally, people commonly noted that the disaster and events to follow were rewards or reprimand for the actions of the community. Galea *et al.* (2008) examine incidents of post traumatic stress disorder (PSTD) following Katrina to find that "the determinants of PTSD were female gender, experience of hurricane-related financial loss, post disaster stressors, low social support, and post disaster traumatic events" (357). Finally, Simon (2007) criticizes the media emphasis on violent crimes in the aftermath of Katrina because it interfered with recovery efforts by evoking a paralyzing sense of fear in people.

Government competency and capacity are factors of resiliency. Burby (2006) declares that what happened to New Orleans during and following Hurricane Katrina was predictable given the political situations and practices within the city. Magsino (2009) observes how a disaster might have minimal impacts one time on an area and devastating ones the next time, given dynamic variables. Berke and Campenella (2006) posit that local officials tend to see disasters as low probability events, failing to give it proper attention, and are then forced to hastily throw together plans post-disaster. The researchers recommend local officials attempt to incorporate a broad spectrum of local participation from the public in disaster planning, as one of the results will be a chance for local officials to better educate the public on disaster plans. The researchers also warn against plans developed entirely by outsiders who may be subject matter experts, but lack knowledge of local customs, practices, and values (Berke and Campenella 2006).

Not to be overlooked in its role in resiliency is the concept of social capital, which Lin (2001) defines as "investment in social relations with expected returns" (6). Weil (2010) describes how local government in New Orleans had to overcome its historic resistance to partnerships and alliances with community groups in order to facilitate recovery. Furthermore, Weil shows the importance of religious institutions in resiliency through their ability to be a conduit for social interactions. Rodriguez, Trainor, and Quarantelli (2006) argue there was substantial pro-social behavior in the wake of Katrina such as hotels from outside the affected region shipping their food to hotels within the affected region or neighborhood residents organizing into informal groups to find food for the neighborhood. Magsino (2009) discusses the potential of social network analysis (*c.f.,* Wasserman and Faust 1994) in helping planners build resilient communities. Modeling how individuals and groups are connected to one another can help with disaster mitigation. One means would be improving communications by knowing who is linked to whom. In terms of mental health and social capital, Galea *et al.* (2008) find higher rates of PSTD in persons with lower levels of social support.

Speed of response is critical as the faster people can flee a pending disaster and responders move in, the better the levels of recovery (Berke and Campenella 2006; Cutter Mitchell, and, Scott 2000). When disaster resources are themselves destroyed by the disaster, resiliency suffers (Norris *et al.* 2008). Keeping disaster plans relevant and current ensures greater resiliency (Lee *at al.* 2008; Burby 2006). Identifying bottle necks in the transportation routes can help speed up evacuations (Cutter, Mitchell, and Scott 2000).

Magsino (2009) suggests that the speed of a community's ability to mobilize depends on its ability to adapt to change.

The Mississippi Coast is tourism-dependent. Hystad and Keller (2003) suggest that communities with repeat natural disasters need to plan for ways to raise awareness of the area. The researchers study Kelowna, an ecotourism destination in British Canada. Kelowna experienced a major forest fire, and post-disaster advertising conveyed that the area was still open for business. Murphy and Bayley (1989) make similar comments when they write how the tourism industry can bring visitors back post-disaster who then testify that the affected areas are recovering and worth visiting.

Other notable studies on recovery of the Mississippi coast include a working paper released by RAND authored by Zissomopoulos and Karoly (2007). The researchers find that unemployment at the end of 2006 was higher in Mississippi than at the end of 2003, but all other Katrina-impacted states had levels similar to their 2003 levels. They do not find any noticeable differences in employment rates between evacuees and non-evacuees one year after the storm, but evacuees had higher levels of self-employment than non-evacuees during the first few months, with the rates equalizing by the end of the year.

Disasters— such as the attacks of September 11, 2001, Hurricane Katrina, and the Deepwater Horizon oil spill— have spawned new interest in resiliency studies. As new disasters expose flaws in current assumptions and practices, new ideas and theories are needed. The current body of literature on resiliency remains in its infancy, as much of the research and theory development has occurred only within the past two decades. While a proliferation of studies and research projects has occurred, many gaps still need to be addressed. Long-term observation (longitudinal studies) are needed to observe how well emerging ideas and practices work. This literature review provides a brief overview of current thought, with an interest in Hurricane Katrina and Mississippi. In the interest of space, the Team generally refrained, with a few exceptions, from writing about research specific to other disasters such as the Exxon Valdez in Alaska, but this should not be construed that lessons cannot be gleamed from those works.

The Team contributes to the literature in several ways. Most studies of Hurricane Katrina concern Louisiana, particularly New Orleans. These studies tend to ignore Mississippi, which was severely affected by the storm. Studies that do look at Mississippi tend to look at one specific item such as schools (*cf.* Ward and Shelley 2008). The Team undertakes an in-depth study of the Mississippi coastal counties, gathering volumes of primary data. This, in turn, allows the researchers to present the story of Mississippi in such a way that bundles insights from area residents with economic data. The primary data collected by the Team allows for a level of analysis about resiliency in the wake of Hurricane Katrina that had previously been unavailable. The Team adds to the literature on the use of GIS in disaster studies by utilizing the software to build the Disaster Composite Index. The literature suggests ways to use GIS to locate potential vulnerabilities, and the Team shows how it can be used to help model estimated levels of resiliency. The literature establishes how disasters are social constructs, and the Team validates this through its findings by finding relationships between storm impact, recovery time, and socioeconomic factors.

Modeling Disasters

In Okuyama and Chang's (2004) edited volume entitled *Modeling Spatial and Economic Impacts of Disasters*, the authors present a summary of the conceptual framework surrounding disasters, present alterations to the existing frameworks, and then include

research that extends these frameworks. The focus of this volume is the interaction of the economic systems and the devastation wrought by the human and natural disasters. In doing so, they extend the research, but only in a very specific direction that is similar to the most common forms of economic and spatial modeling. Specifically, they present research in this volume that starts from a standpoint of estimating the economic and physical impact of a disaster. This research typically uses a form of Input-Output (IO) or Computational General Equilibrium (CGE) economic modeling.

The basic structure of these models is explained in chapter two of this volume, "Economic Principles, Issues and Research Priorities in Hazard Loss Estimation," by Adam Rose. The title of the chapter is illustrative, as it contains within it the focus on loss estimation. Models that begin with the fundamental purpose of loss estimation can only be modified into a model of resilience and recovery with many structural assumptions about the economy.

Rose (2004) covers many of the basic economic issues that must be considered when estimating the cost of economic losses from a disaster including: the differences between stocks and flows, avoiding double counting, and direct versus indirect losses from a disaster. The key here is that Rose (2004) is attempting to give guidelines for tallying the total costs from a disaster, as that has been the main emphasis. Since policy makers and bureaucrats often depend on economists to produce "a number," it is critical to keep these factors in mind when trying to model the impacts that will produce such a number.

Importantly, Rose (2004) also considers the issue of "resiliency" as a major area of research in modeling the economic losses from disasters. The key element here is that some communities are able to blunt the impact of a disaster more effectively than others. Also, even if the initial impact is the same, some communities are able to put the local economy and community back together more quickly.

Finally, Rose (2004) reviews the three primary methods of loss estimation modeling: Input-output (I-O), Computational General Equilibrium (CGE) and regression. Generally the first two depend upon only aggregated data that have been collected from secondary data. The advantage of these techniques however is that the secondary effects of losses to a particular business are so large but diffuse, it is difficult for them to answer the question "What were your losses due to event X?" These types of modeling techniques uses equations that assume what the relationships are between sector Y and sector Z to estimate the effects. Econometric estimation, on the other hand, uses primary data, and therefore has the advantage of not having to assume the impacts of Y on Z. However, it is limited to estimating the effect of a disaster to understanding what is the appropriate counterfactual. In other words, only if a researcher knows what the economic environment would have been without the disaster, can they measure the impact of the disaster on the environment.

Okuyama, Hewings and Sonis (OHS)(2004) present a sequentially inter-industry model that attempts to get around some of the shortcomings of the standard input-output modeling of economic losses from disasters. Specifically, OHS (2004) focus on three weaknesses of input-output modeling that are found in most models include Hazus, which is a piece of software developed by the National Institute of Building Science and incorporates a Geographic Information System (GIS) interface as part of its many features. The problems, however, include that the dynamic nature of these models is still ad hoc, they do not integrate economic and engineering models seamlessly, and the interaction between space and time dimensions are not particularly appealing. Their application of the Sequential Interindustry Model (SIM) to Great Hanshin Earthquake helped highlight some of the curious findings directly after the 1995 earthquake. Specifically, the intra-regional

losses from the area hit by the earthquake were shown by most preliminary analyses to be less than the inter-regional losses from more distant areas. OHS (2004) show how the SIM modeling framework can be used to help refine the static quarter by quarter IO models. However, ultimately, the authors fail to show (as is standard for this literature) how well these models of recovery and rebuilding match with the actual data. In other words, while the authors show how one set of models compares to another, they rarely are able to compare the efficacy of the models in real world recovery. For this, one needs to depend upon econometric modeling.

3. DISASTER COMPOSITE INDEX

3.1 Purpose

The purpose of the Disaster Composite Index (hereafter DCI) is to create an accurate baseline for social and economic recovery from Hurricane Katrina in South Mississippi and South Alabama. Because not all areas, people, buildings, or sectors received equal damage from the hurricane, it is necessary to measure the extent of the damage received in each area in order to understand the speed and magnitude of recovery from the storm by area. For instance, a location that received thirty foot of storm surge, which is over the top of most houses and small buildings, might expect to recover more slowly than an area that only received five foot of storm surge. Therefore, to measure the level and speed of socio-economic recovery, the Team created the DCI to give every area an index baseline number by which the level of recovery can be measured.

The DCI is a unique method that the Team created. The idea was generated during a debate and conversation over accurate measurements for the project. No such model or measure existed in the literature. The Team has not yet published the DCI, but has disseminated the DCI through presentations and is currently working with the Homeland Security Studies and Analysis Institute (HSSAI), Business Enterprise Analysis Division, Resilience and Emergency Preparedness/Response Directorate out of Arlington, Virginia, to assist them to replicate the DCI in Louisiana following Hurricane Katrina, as developed by the Team for Mississippi.

3.2 Methods

The methods supporting the DCI focus on three primary forces of destruction from a hurricane: wind, rain and storm surge. Therefore, it is necessary to gather the most accurate and detailed information possible on each of these variables and then geo-reference this data within a geographic information system (GIS). By overlaying these layers, a composite map of meteorological damage from the storm can be created. To create this map the Team collected at minimum one, but up to three, sources of data for each of the three variables to geocode. The purpose for multiple sources of meteorological data was for validation and verification purposes since data during an intense storm event can become unreliable due to instruments exceeding tolerance limits. Initially, the Team believed that a federal agency, state agency, or contractor, would have produced such a map and associated analysis. Failing to find such an existing analysis, the Team sought out the primary data to create the Disaster Composite Index.

3.3 Meteorological Data

3.3.1 Rain

The first variable examined was rain. Two sources of data were found for rainfall: the National Oceanic and Atmospheric Administration (NOAA) and Weather Underground. The NOAA data is weather station point data and composite data from forecasted, as well as observed data, within each weather station. NOAA turned the weather station data into

polygons (see Figure 3.1 for point data and Figure 3.2 for smoothed point data). The Weather Underground data comes from 11 organization-owned weather stations in South Mississippi. The Team chose to use the NOAA data as the primary data for the index since it was the most complete. The Weather Underground data, though limited, was used to verify the NOAA data at specific points.

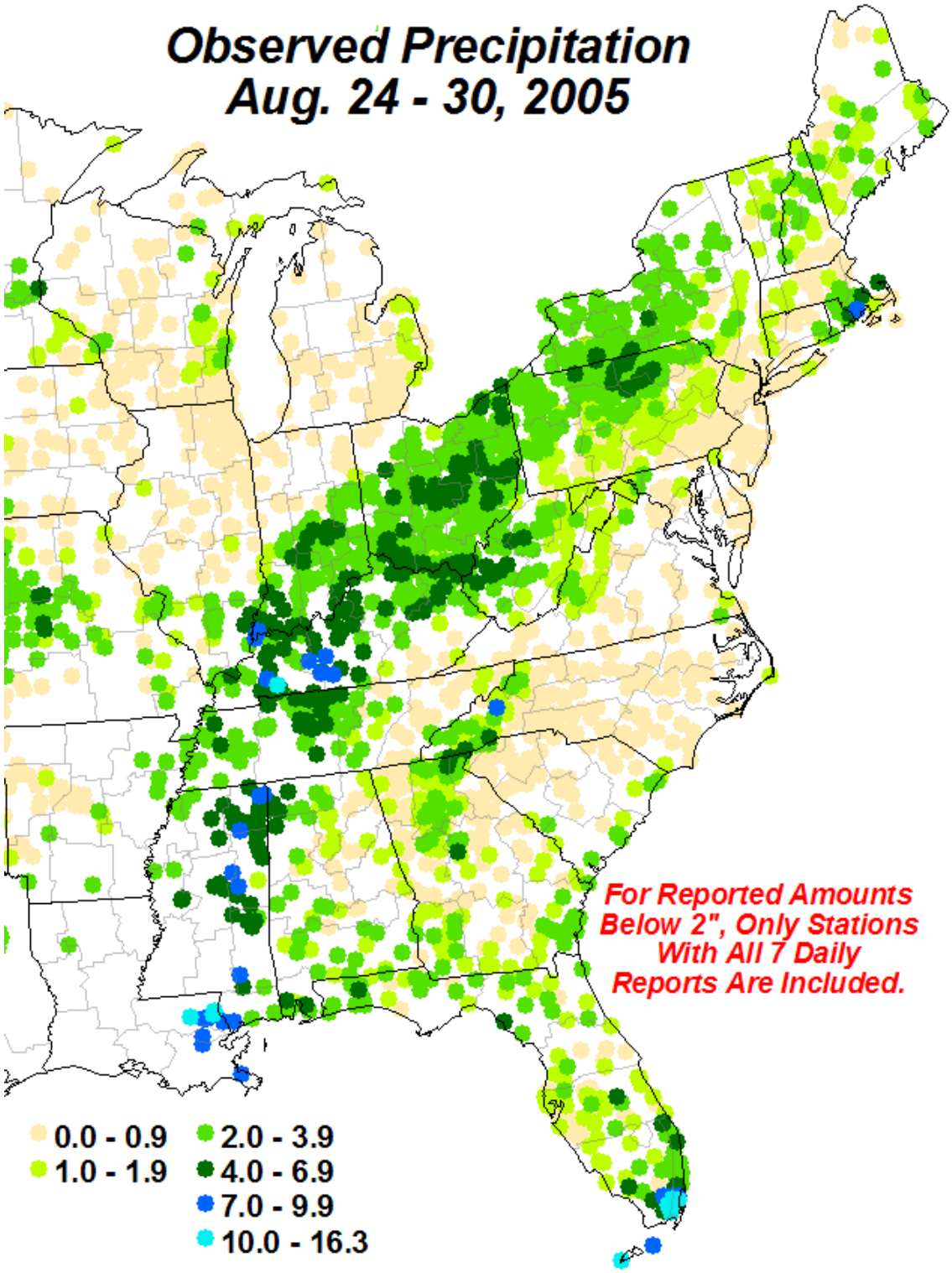
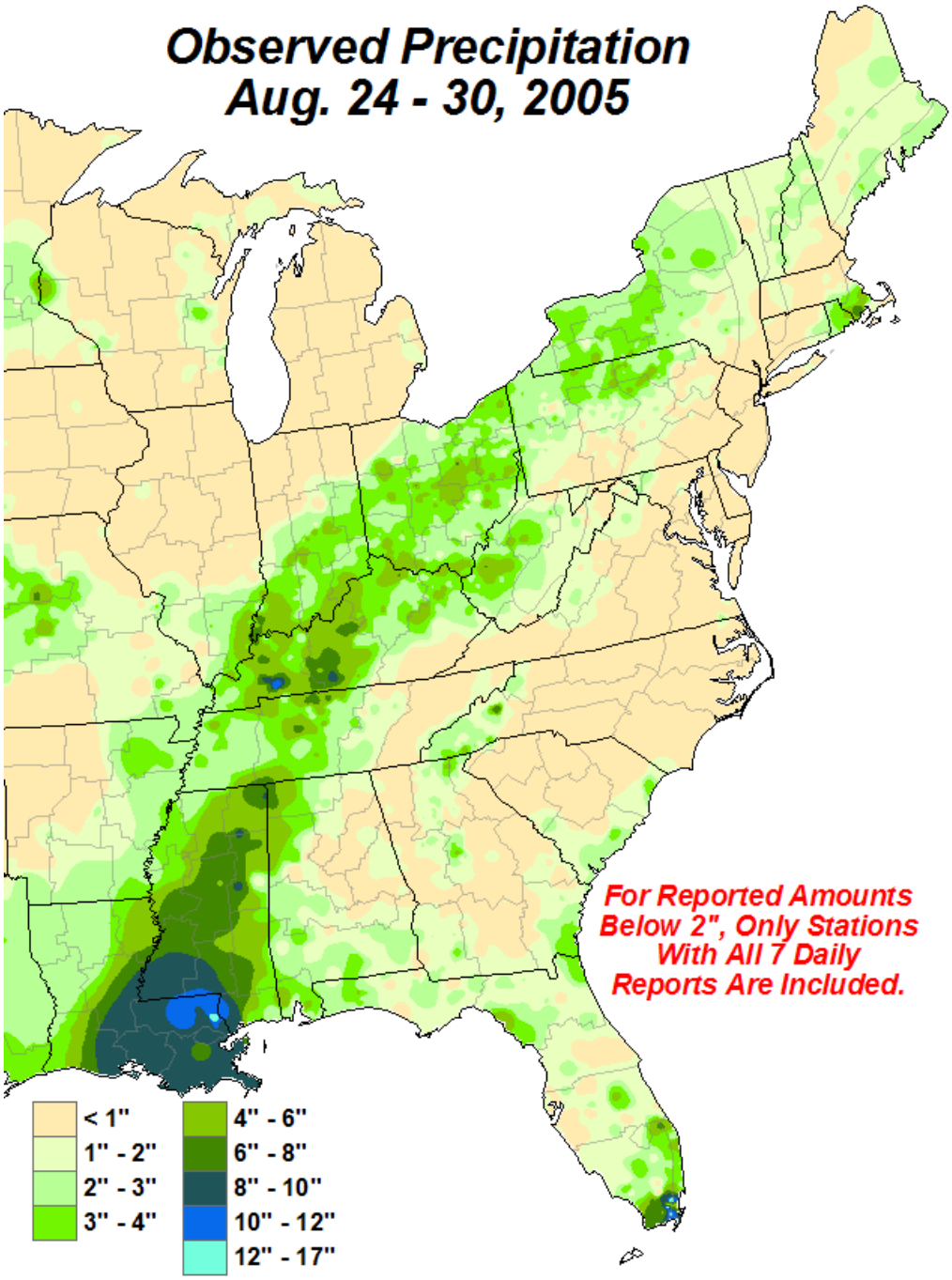


Figure 3.1: DCI Point Data Observed Precipitation August 24-30, 2005 from NOAA (Source: Authors 2011)



Source: http://www.ncdc.noaa.gov/img/climate/research/2005/katrina/katrina-prcp-anal.png

Figure 3.2: DCI Smoothed Point Data Observed Precipitation from NOAA (Source: Authors 2011)

After deciding to use the NOAA data, the image files from NOAA were imported into GIS and georeferenced by county boundary line. The images were then rectified and exported as a GeoTiff file for the states of Mississippi and Alabama. The GeoTiff files were then opened and zoomed in to be able to hand create polygon shapefiles over the existing image file. This process was then saved as a shapefile and each polygon was given an attribute. Then shapefiles were spatially joined with the census blocks from the year 2000

using a spatial join command. This created a census block shapefile with rainfall attribute data in each census block. Some census blocks had overlapping polygons with different rainfall amounts. A rule was created that stipulated that if a census block had over 50 percent of a dominate color coverage it became the dominant group. The final map for rainfall can be seen in Figure 3.3 below.

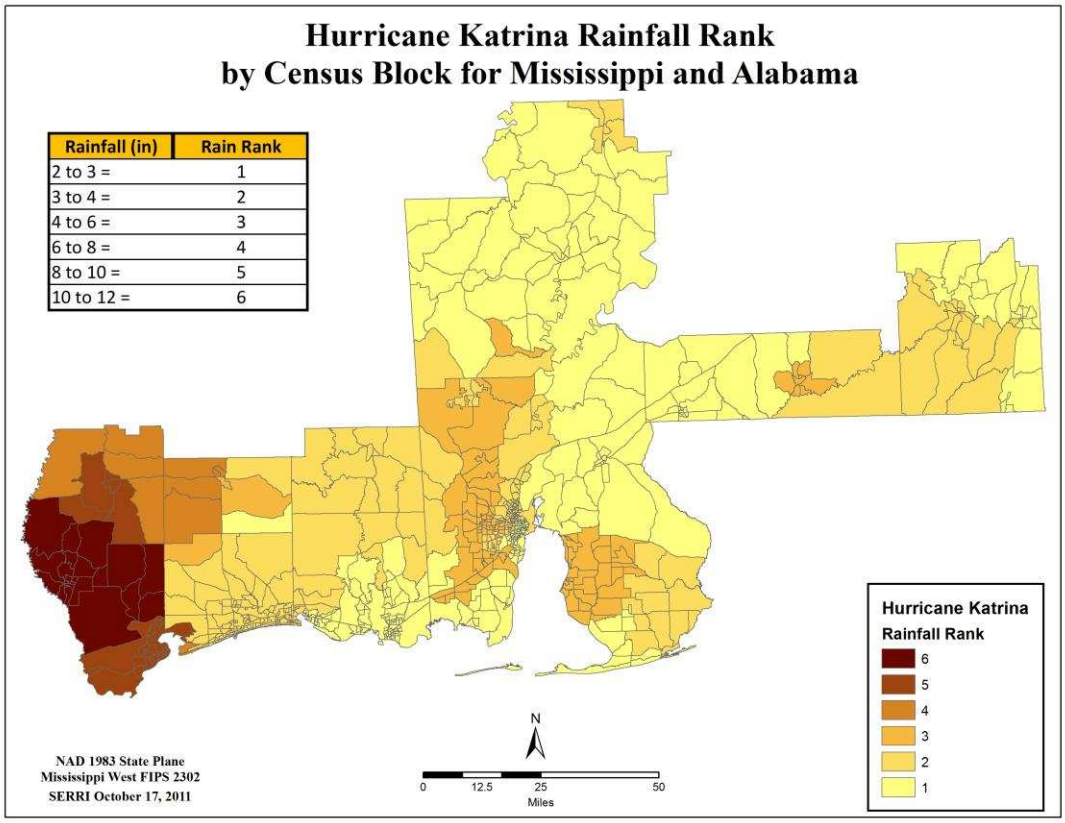


Figure 3.3: Rainfall by Census Block (Source: Authors 2011)

3.3.2 Wind

The Team searched for many sources for wind data but ended up with just one, a United States Geological Survey (USGS) map (see Figure 3.4). Radar data from the USGS was used to construct maximum sustained wind classifications for the study area. This was accomplished by first obtaining raw jpeg imagery of mapped radar data. The image files were then imported into GIS and georeferenced by county boundary line. The Team then rectified the images and exported it as a GeoTiff file for the states of Mississippi and Alabama. The GeoTiff file was opened and zoomed in so that the Team could hand create polygon shapefiles over the existing image file. The product was saved as a shapefile and each polygon was given an attribute. Then we spatially joined the shapefile with the census blocks from the year 2000 using a spatial join command. This created a census block shapefile with wind speeds attribute data in each census block (see Figure 3.5). Some census blocks had overlapping polygons with different wind speed amounts. As with rainfall, the rule followed was that if a census block had over 50 percent of a dominate color coverage it became the dominant group. Some partial NOAA imagery was used to verify the existing USGS map and boundaries associated with high or low wind speeds. The

validation/verification appeared to become less accurate moving north of the area of landfall.

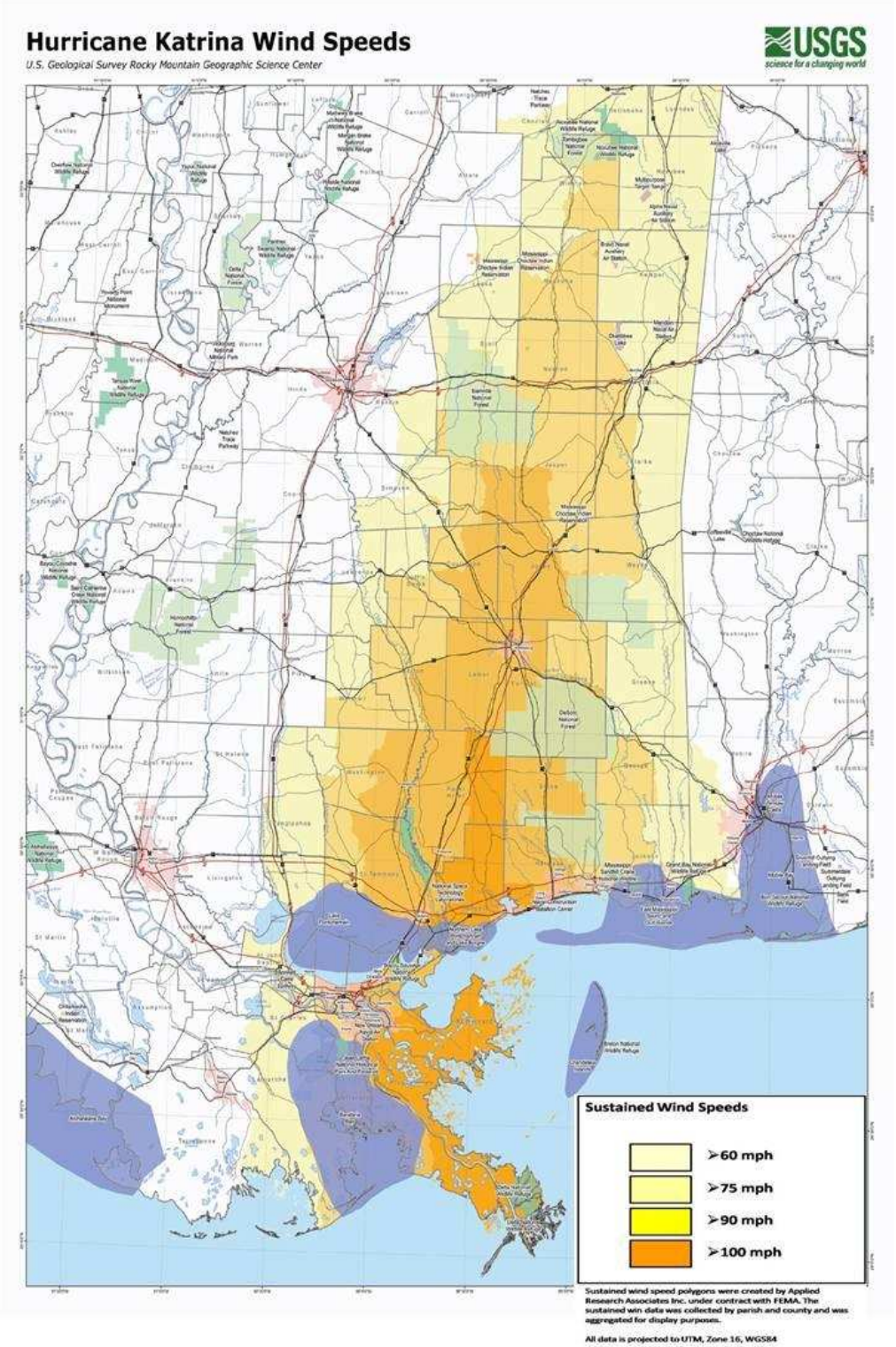


Figure 3.4: Winds Speeds (Source: USGS 2005, Modified by Authors 2011)

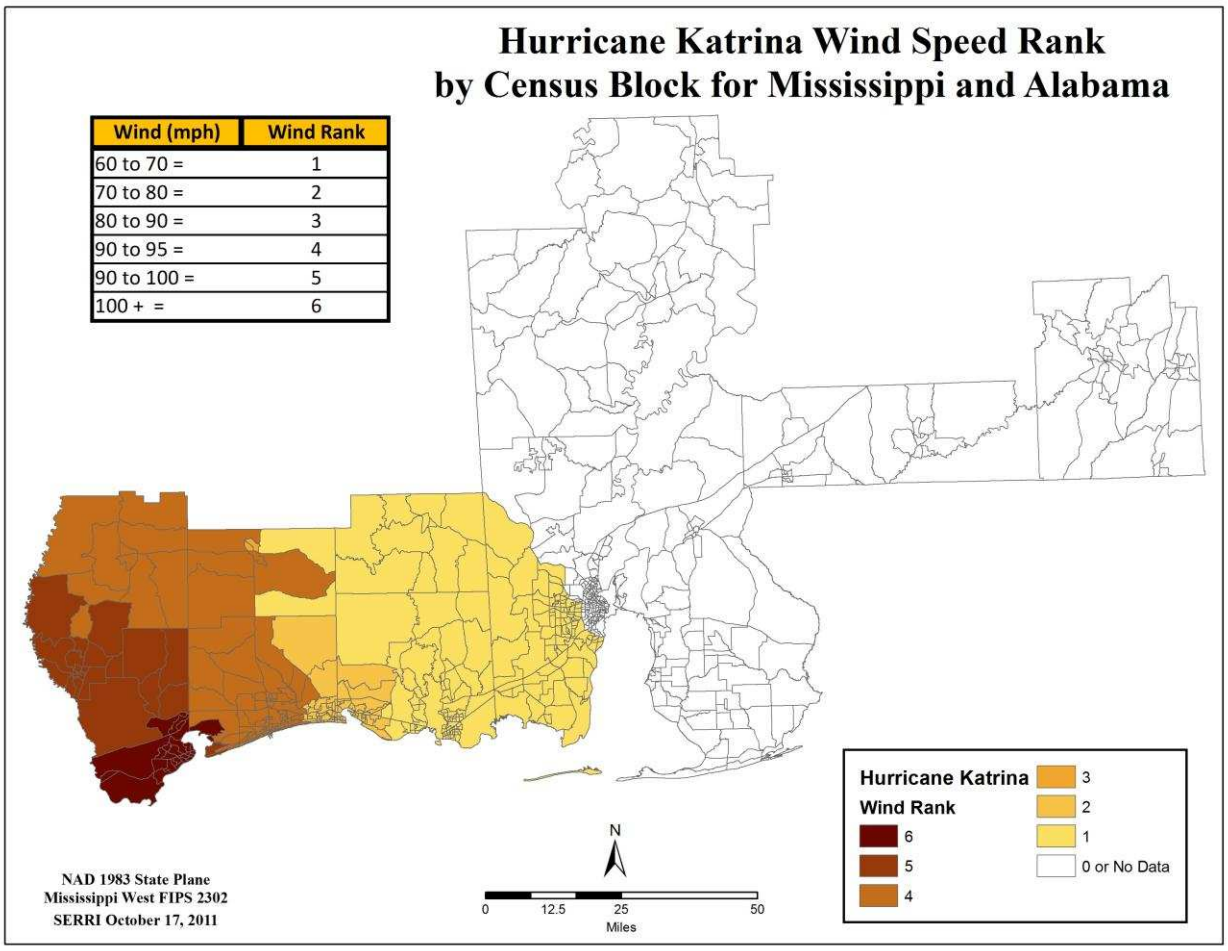


Figure 3.5: Wind Speeds by Census Block (Source: Authors 2011)

3.3.3 Storm Surge

There were two primary sources of data for storm surge: FEMA and NOAA. FEMA collected high water marks that were GIS ready with points (see Figure 3.6). The point data provided attribute data— location, height, and type of flooding (riverine, surge, wave run-up, etc.). All points other than storm surge and riverine were removed and all points within this group over 35 feet were removed because most of these points were found outside of the Waveland/Bay St. Louis area and north of the coastline. The Team excluded the data outside the states of Mississippi and Alabama. The NOAA data was imagery data of debris lines. Where the debris line ends is where the storm surge ended. The FEMA storm surge points paralleled that of the NOAA imagery map in terms of storm surge height and distance inland suggesting that the FEMA high water marks were accurate.

To create the map, the Team opened the GIS FEMA point map, cleaned out the points with over 35 feet. The points fall into a census block automatically within the system. The researchers then clicked on census block and manually entered the data from the point in that census block. If a census block had multiple high water points, a mean of the total points in that block was established and used for that census block number. If there were

zero high water marks in the census block, the census was left blank (zero=0) (see Figure 3.7).

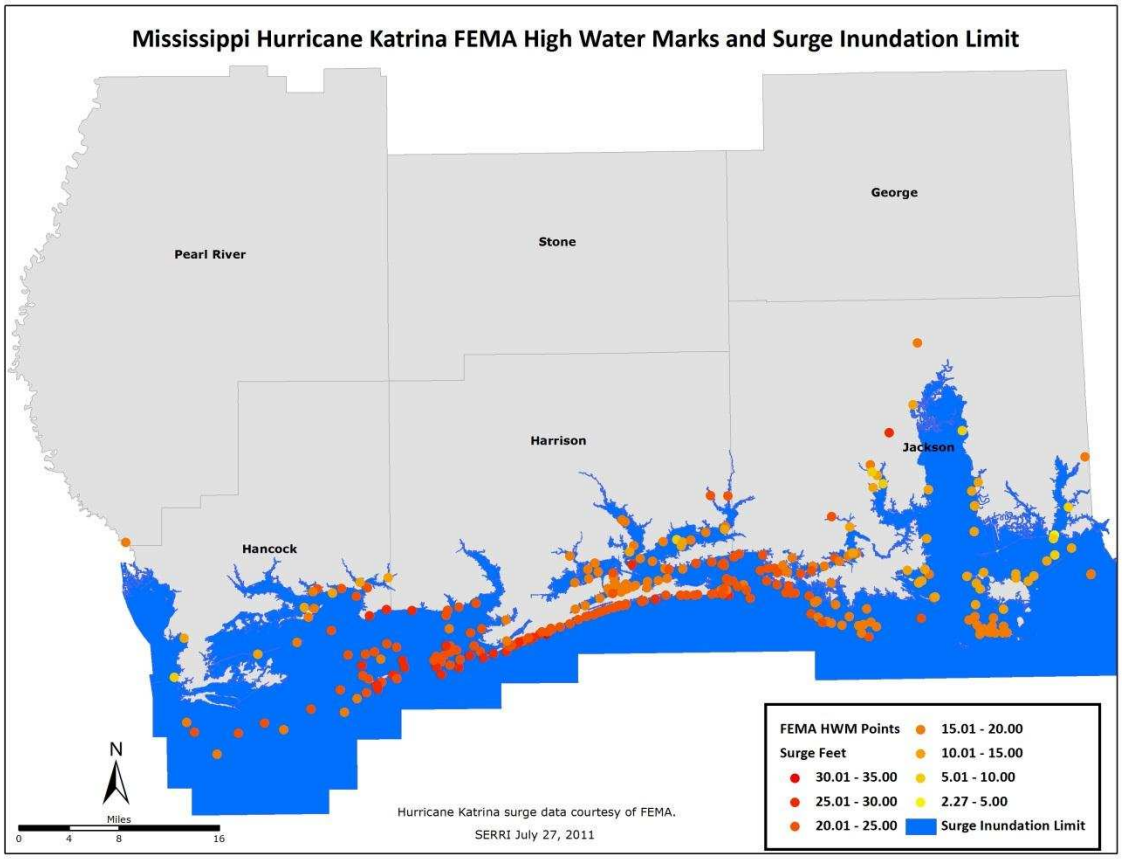


Figure 3.6: FEMA High Water Marks and Surge Inundation Limit (Source: Authors 2011)

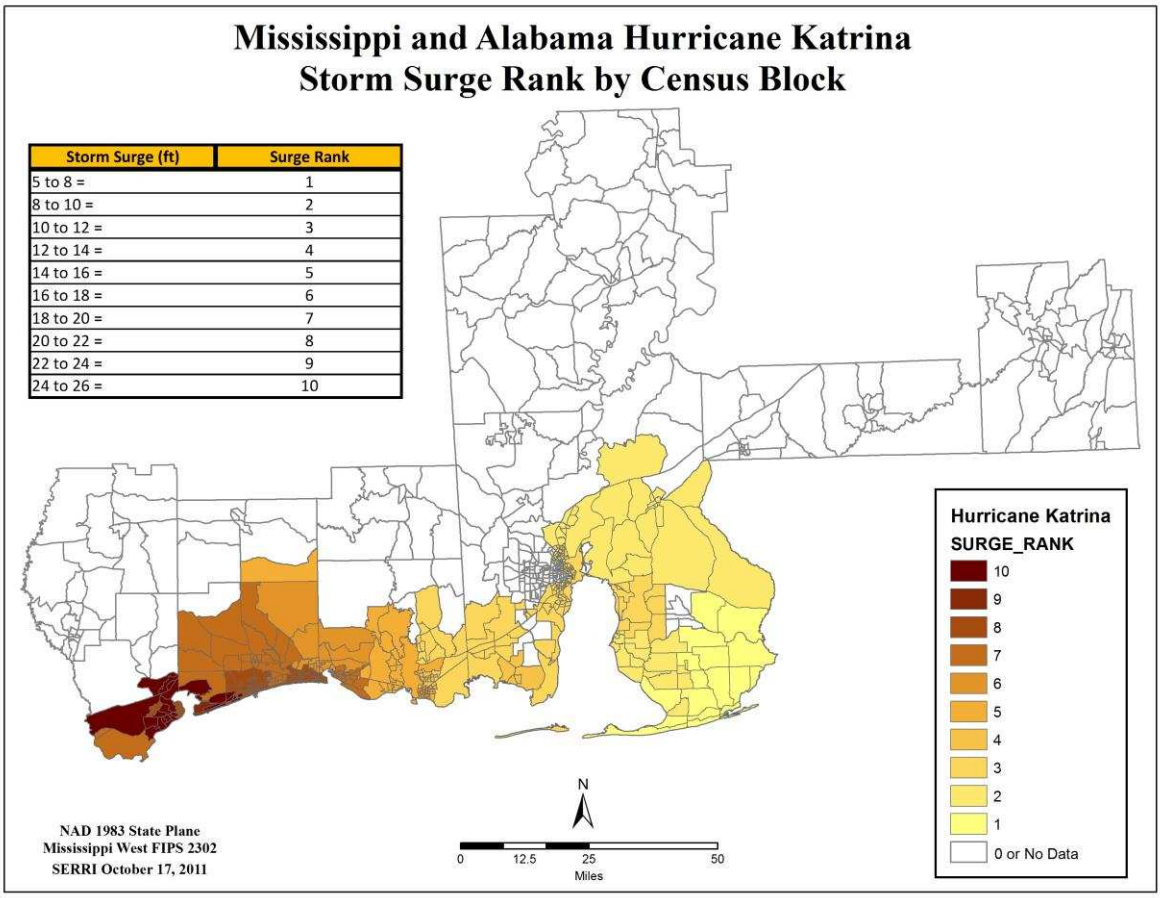


Figure 3.7: Storm Surge Rank by Census Block (Source: Authors 2011)

3.4 Weighting

To create a composite data image in Arc Info, these images were Georectified to the Mississippi and Alabama county outline maps. Once rectified, the images were exported in GeoTiff format. The GeoTiff images were then brought into the original boundary map and polygons were drawn by hand over the geo-rectified imagery. A ranking system, based on the USGS and NOAA source data, was assigned to each meteorological element classification for processing:

- Wind Speed classifications are as follows: $\geq$100 mph; 91 to 99 mph; 76 to 90 mph; 61 to 75 mph; and $\leq$60 mph and areas with no data received a zero classification.
- Rainfall classifications are as follows: 12-17″; 10 to 12″; 8 to 10″; 6 to 8″; 4 to 6″; 3 to 4″; 1 to 3″; and $\leq$1″. Areas with no data received a zero classification.
- Storm Surge rank classifications are as follows: 10 to 12'; 12 to 14'; 14 to 16'; 16 to 18'; 18 to 20'; 20 to 22'; 22' to 24'; and 24 to 26'. Areas with no data received a zero classification.

The Disaster Composite Index (DCI) is a combination of all three meteorological elements. A point of interest is whether or not all three elements and their numbers need to

be added together as equals or if each needed to be weighted based upon their strength, energy, or damage potential. Several different scenarios were examined including using physics to understand the total energy of each of these meteorological events. In the end, the physics of moving air around a building, the strength of rainfall being blown, and the total weight of water in a storm surge moving was too difficult to capture even by physicists consulted by the researchers. Instead we created a thought exercise where we adjusted one of the measures, such as wind, and left the other variables constant (un-weighted) (see Table 3.1). We first did this for each variable independently and then adjusting two variables and holding one constant. In the end, the weighting exercise was very fruitful in that it provided results valuable to the research. The Team concluded that storm surge was the most destructive force in Hurricane Katrina. This was exemplified by the damage along the coastline compared to areas just north of the storm surge area. Additionally, the exercise with physics was clear that a body of water has much more potential energy than does wind or rain. Based on this knowledge, the Team chose to weight storm surge as a 2x, 3x, and 5x that of the other variables. In the end, the Team found that if one weights storm surge at 2x or higher, the composite index looks the same. This results from the fact that areas with storm surge have 33 percent more variable numbers than those that did not receive the surge, which only have wind and rain data (66%). Therefore, weighting the storm surge as a multiplier did not change the overall ranking of damage by census block. Accordingly, the Team decided to keep the process as simple and replicable as possible by combining each of the meteorological variables at a ratio of 1:1:1 to produce the Disaster Composite Index.

Table 3.1: Differential Weights for Disaster Composite Index

Example Area	Rain	Wind	Surge	Composite Number
21191064	6	8	8	22

Rain	Wind	Surge	Example Area	Rain	Wind	Surge	Composite Number
1	1	1	21191064	6	8	8	22
1	1	2	21191064	6	8	16	30
1	1	3	21191064	6	8	48	62
1	1	4	21191064	6	8	192	206
1	1	5	21191064	6	8	960	974

Rain	Wind	Surge	Example Area	Rain	Wind	Surge	
1	1	1	21191064	6	8	8	22
1	2	1	21191064	6	16	8	30
1	3	1	21191064	6	48	8	62
1	4	1	21191064	6	192	8	206
1	5	1	21191064	6	960	8	974

Rain	Wind	Surge	Example Area	Rain	Wind	Surge	
1	1	1	21191064	6	8	8	22

1	2	1		21191064	6	16	16	38
1	3	1		21191064	6	24	24	54
1	4	1		21191064	6	32	32	70
1	5	1		21191064	6	40	40	86
1	1	1		21191064	6	8	8	22
1	1	2		21191064	6	8	8	22
1	2	2		21191064	6	16	16	38

3.5 Composite Index

With meteorological data on all three elements— wind, rain, and storm surge— gathered and the appropriate weights established, all three layers were georeferenced within the GIS system. A single shapefile was created with attributes containing information and variables from each element, classified at the census block level, allowing each census block to have a specific Disaster Composite Index score. The final index can be seen in Figure 3.8. The higher the score, the more damage received; the lower the score, the less damage received. Note that the map of the DCI closely parallels that of where the storm made landfall and its track north. With the DCI in place, these data can be used to determine if an area which was hit hard by Hurricane Katrina (dark) recovered more slowly than an area that was impacted less (light). This allows the Team to adjust for level of damage and recovery from this starting point to help determine if degree of damage is an indicator for economic and social recovery within the model.

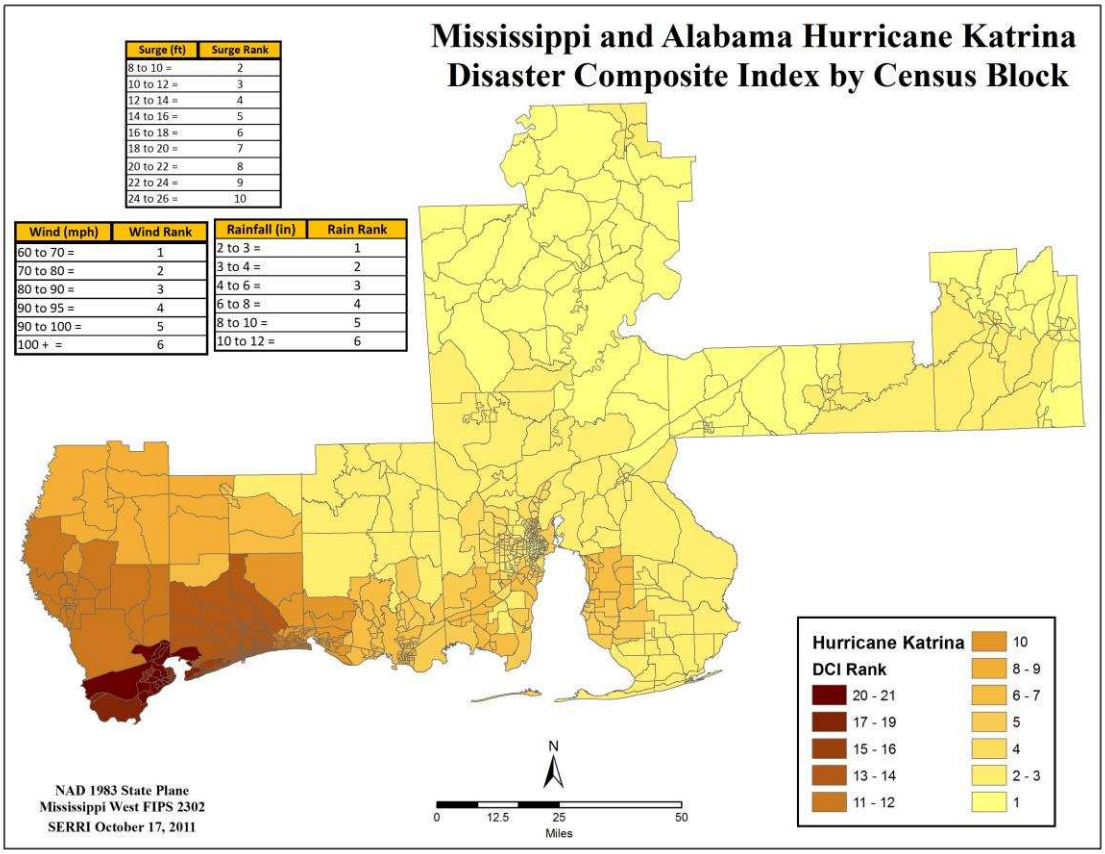


Figure 3.8: DCI by Census Block (Source: Author 2011)

4. INTERVIEWS

The first stage of qualitative data collection involved the interviewing of community elites. Dasgupta and Beard (2007) define local elites as those who are locally-based and possess disproportionate access to social, political, or economic power and a wider view of the community than others*. As a result these individuals are considered to have influence over the population, which Parsons (1966) identifies as a tool of persuasion. While there is a distinction between influence and power, it is blurred in perceptions of social phenomena as they relate to resilience and recovery. Social elites, for instance, are "ultimately responsible for the realization of major social goals and for the continuity of the social order" and are therefore of interest in this research (Keller 1963). The Team expected there should be observable differences in the perspectives of the elites by categories. It was expected that economic elites would have their fingers on the pulse of the economy and market activity, political elites would know the details of public policy and administration, and social elites would know the needs of different groups within the community. The Team conducted these interviews in the fall of 2010 in Mississippi coastal communities of Waveland/Bay St. Louis, Long Beach, Gulfport, Biloxi, D'Iberville, Ocean Springs, Gautier, and Moss Point. These communities met the criteria of having a mix of incomes, races and rates of recovery as measured by unemployment duration after Hurricane Katrina and were chosen as representing the full Mississippi coast most accurately. Supplementing these interviews are 41 beta test† interviews with community elites in other smaller non-coastal communities in Mississippi and Alabama that received lesser impact from the hurricane. The interview instrument used by the researchers contained 31 questions. The questions on the instrument solicit information on:

- Level of impact
- Level of perceived recovery, both personally and on a wider scale
- Leadership
- Group vulnerability
- Economic challenges pre and post (immediate and long-term) Katrina
- Population and demographic shifts and changes
- Preparedness

A total of 104 interview transcripts (63 in the case study cities and 41 beta interviews in the smaller communities) provide a treasure trove of information over approximately 1,000 pages of transcript material. The interview responses helped shape the focus group (Report Section 5) and survey instruments (Report Section 6). The main themes that emerged from the interview data are:

- Level of Impact

* Emergency planners were not interviewed in this research due its focus on economic resiliency and recovery.

† Beta tests are conducted to test the instrument by real-world exposure prior to developing the final instrument, but conducted only after internal pilot tests have been conducted. They are used to highlight minor problems exposed by participant observation.

  - Hurricane Katrina had a negative impact on the coast, with the storm surge causing the most damage.
  - Destruction is correlated to proximity to the storm and its epicenter. The less destruction, the faster the recovery on a community level. On a neighborhood level, affluence is also a factor in recovery as those with resources can rebuild quicker.

- Level of perceived recovery, both personal and on a wider scale
  - Recovery to pre-Katrina levels is on-going, but has not been achieved yet.
  - Individuals define recovery in visible, tangible ways, namely: population, infrastructure, economic activity, and building stock.

- Leadership
  - Many political and economic elites do not perceive there to be socially isolated groups within their community. Those who do recognize the presence of socially isolated areas note that poor, elderly, handicapped, and non-English speakers are potentially more affected by disasters than the general population.
  - Political leaders are the perceived community leaders in recovery. Following a disaster, good leaders are flexible and dynamic.
  - Generally, elites gave good reviews of local and state officials, but the elites are more critical of the federal response, which they described as slow and cumbersome.

- Group Vulnerability
  - Political and economic elites generally did not perceive there to be any specific population-specific vulnerabilities, while social elites did.
  - When vulnerable groups were identified, elites generally mentioned those with the least money.

- Economic challenges pre and post (immediate, and long-term) Katrina
  - The immediate economic challenges in the aftermath of the storm included survival and obtaining basic necessities. In the medium-term (2006-2008), the challenges included business closures, insurance, infrastructure, and restoring the local tax base. Challenges in 2010 include the same as the medium-term challenges, but are complicated by the national recession that struck when the subprime market collapsed, as well as by the Deepwater Horizon oil spill.
  - Active steps toward employment and infrastructure recovery include grants from state, federal, and non-profit entities. The reopening of the casinos beginning in December 2005 also helped.
  - Insurance was consistently mentioned in response to many different questions, but rarely mentioned in a positive context.

- Population and demographic shifts and changes
  - The population has shifted away from the beachfront to north of interstate 10.
  - The Hispanic population has noticeably increased.

- Preparedness
    - Communities were unprepared for a Katrina-like event. Hurricane Camille of 1969 was the yardstick being used in disaster planning.
    - Communities are more prepared, but not entirely so, for a Katrina-like event today.
    - Management competence in government and technical assistance (i.e. grant writing) to the public post-disaster is critical.
    - Businesses with deep pockets- namely casinos and big-box retailer- could reopen faster than small, local businesses.

This section summarizes the Team's use of interviews as a method to better understand the elite perspective of the Gulf Coast's social and economic recovery following Hurricane Katrina. Appendix A provides a literature review of the field research method of conducting interviews. Appendix B provides a thorough description of the instrument development and methods used by the Team to conduct the interviews. Section 4.1 provides the interview findings. Finally, Section 4.2 concludes with a general discussion of the findings.

4.1 Interview Findings

Interviews commenced on August 26, 2010, and concluded on October 22, 2010. Table 4.1 lists how many of each type of elite were interviewed for each category. The Team was unable to gain an audience for interviews with casinos in Waveland and Bay St. Louis, and there are no casinos in D'Iberville, Ocean Springs, or Moss Point.

City	Economic	Political	Social	Casino	Total
Gulfport	3	3	3	1	10
Long Beach	2	3	3	NA	8
Biloxi	2	2	3	2	7
Ocean Springs	3	2	3	NA	8
Moss Point	2	2	3	NA	7
D'Iberville	2	2	3	NA	7
Gautier	2	2	2	NA	6
Waveland/BSL	2	3	4	0	9
Total	**17**	**18**	**25**	**3**	**63**

Table 4.1: Elite Interviews by Category and City (Source: Authors 2011)

The respondents gave a mix of predictable and surprising answers. While the Team conducted 63 interviews, each time it conducted one, it learned something new. Some subjects tended to think internally about items, thus responding in terms of their own company's profitability as opposed to the overall level of economic health for the community. However, most respondents answered questions on the community-wide perspective as expected. The themes that emerged from those interviews are highlighted in the following report sub-sections: Impacts and Level of Destruction; Economic Landscapes

and Challenges; Recovery Steps; Isolated Groups; Leadership; Businesses and Resiliency; Population Changes and Shifts; Comparative Recovery; and Hindsight.

4.1.1 Impacts and Level of Destruction

The first question asked if Hurricane Katrina had a negative impact on the community. This served as a great ice breaker question. The general consensus is that Hurricane Katrina had a negative impact on the community. A few subjects responded that the storm had both a negative and a positive impact. The negative impact is the sheer destruction of the storm, but the positive impact is that it brought neighbors closer together. One political elite in Biloxi commented that many homes in Biloxi are at least 150 years old and not built to any code or flood elevations, and along those lines, one casino executive in Biloxi commented that the storm forced everybody to rebuild their houses and places of work to standards that can better withstand hurricanes. In the beta interviews, an Alabaman economic elite noted that the influx of refugees into his city actually created an economic boom, which is, of course, a positive impact. While the case study communities on the coast experienced a mass exodus, it is important to note that some of the beta test communities are far enough inland to have hosted large numbers of evacuees.

The Team asked elites to rank what was most devastating to the infrastructure: rain, surge, or wind. On average, elites ranked surge as most devastating, followed by wind, and then rain. Elites commented that there was not much rain, but it was the surge followed by wind ("tornado effect" was the term an economic elite from Biloxi used) that did the damage. For the elites who answered the question by giving a ranking, all but two placed surge as the most devastating. Of the two who did not, one was representing Moss Point and the other was representing Ocean Springs, both of which are in Jackson County, the furthest coastal Mississippi county from the landfall. Occasionally, elites would give a tie ranking to surge and wind. Additionally, one elite from Biloxi ranked them all as equally devastating. The interviews in the beta test communities show that wind is often the greatest cause of damage, but this is expected as these communities lie far enough inland from the Gulf of Mexico to be spared from the storm surge. One political elite in Poplarville, Mississippi, which is over 30 miles inland, noted that the only storm surge they had was isolated creek and river flooding.

The next question asked when the subject's community recovered to pre-Katrina levels or to the new normal. As demonstrated below, the answers varied greatly even within the same community.

- "Well, it took us- I don't know exactly how long, but probably, six to nine months to get this place cleaned out. You know, the debris out of here where we could even see where to start. So I would say that we reached any kind of normalcy within two and a half, three years." — Political Elite, Biloxi
- "Recovery is still ongoing. Maybe another ten years." — Economic Elite, Biloxi

The most common answer is some form of the statement, "Recovery is still on-going but is occurring." Some respondents provided a percentage of their community's recovery to pre-Karina norms. The answers are: 75% (D'Iberville), 40% (Biloxi), 95% (Ocean Springs –

specifically talking about business activity), 85% (Ocean Springs), 50%-60% (Biloxi), and 70% (Biloxi). Ocean Springs wasis arguably the least impacted by the storm due to their higher elevation and further distance from Katrina's landfall epicenter in Waveland. Therefore, it is not surprising that the two responses about Ocean Springs reflect a higher perceived percentage of recovery than Biloxi or D'Iberville. One economic elite in Ocean Springs responded that most businesses were able to open upon return of power. Oceans Spring has an additional geographical benefit in that its business district was not along the coastline as it was in many other cities and towns. Figure 4.1 shows the trajectory of recovery that communities can take.

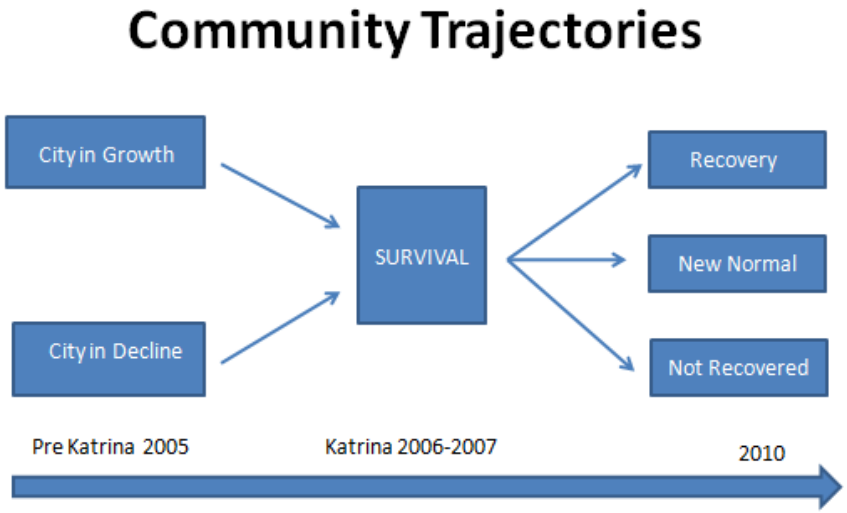


Figure 4.1: Community Recovery Trajectory (Source: Authors 2011)

Subjects were asked how they defined recovery. The overwhelming responses were that individuals define recovery by population levels, building stock, infrastructure capacity, and economic activity. This is true with both the Team's case study interviews and the beta interviews. These responses are visual, tangible concepts. The respondents placed less emphasis on intangible measures, such as community closeness or mental health. Furthermore, those who chose to provide intangible measures were more likely to provide personal anecdotes to explain recovery and support their definition. These individuals tended to be social elites. One social elite stated:

- "[O]ne measure that I would mention is the mental health… Post-Katrina, what we have discovered, is that a lot of the small fractures, under the surface struggles and issues within marriage, parent-child relationships, family relationships, financial health within the family, etc. Post-Katrina, those elements that were manageable began to fall apart, crumble, became, uh, overwhelming. They, the friendships, the social structures that they had where they found support sufficient to manage and maintain their sense of wholeness, etc., were gone. And the friends, the support elements were no longer present. We saw a tremendous increase in divorce, tremendous increase in bankruptcies, foreclosures on houses…"
—Social Elite, Long Beach

4.1.2 Preparedness

Three themes emerged from asking respondents if their community was prepared for a hurricane and asking if their community was prepared for a hurricane the size and severity of Hurricane Katrina. The first theme is that the respondents overwhelmingly agreed that their respective communities were not prepared for a hurricane the size and severity of Katrina, but in terms of preparedness for a hurricane of any size, the respondents were mixed as to if they thought their respective communities were prepared. The second theme is that it is just not possible to be totally prepared for a Katrina-like event, especially when one had not previously been experienced. The elites did not point fingers at individual leaders and say that it was entirely their fault that the community was not prepared. The third theme is that Hurricane Camille of 1969 was the standard that communities used for preparedness planning. One economic elite in Biloxi phrased it as, "[T]here had been so many people on the coast that had been through Hurricane Camille, they were just— everybody was just caught flat by the severity of (Katrina)." A political elite in D'Iberville remarked that anyone on the coast who claims to have been prepared for Katrina is lying. A Moss Point social elite spoke of not knowing they would need sandbags because they had previously never needed them. Several elites noted that Katrina changed the game:

- "There was an unwritten rule here that basically if it was a category one or two, just make sure you move everything, batten down, and we'll wait for it to blow over. A three, let's think about getting out the door, four, five— maybe a good idea to leave. The new rule is if it's a hurricane, think about getting the heck out of Dodge." — Social Elite, Biloxi
- "A lot of people who stayed for Hurricane Camille said, 'Well we didn't get any water or great damage so we will stay for Katrina, it cannot be as bad as Camille.' That was their measuring rod in a sense. But now because of their experience of both Camille and Katrina, they have no hesitation at all; they just are going to leave." — Social Elite, Waveland/Bay St. Louis
- "[E]veryone thought it could never be worse than Camille. I feel so sorry for people when they say 'Well, we'll never have one like Katrina.'" —Economic elite, Gulfport

The Team asked elites if they believe their respective communities are prepared for a Hurricane Katrina-like event today. Generally, the elites believed that their respective communities are more prepared, but not completely prepared. Katrina raised the bar that had been set by Hurricane Camille and communities now better understand what worked and what went wrong with Katrina preparedness. The elites generally question if it is possible to be completely prepared for a Katrina-like event. A political elite in Long Beach put it this way: "The buildings that have been rebuilt are stronger than they were before. Of course, if you have 28-foot waves, nothing [helps], you know, doesn't matter what you do." Some elites did not believe their community is prepared at all. A D'Iberville economic elite remarked that everyone is prepared mentally in that they know it could happen again, but the community is not prepared financially or economically. A social elite in Waveland/Bay St. Louis expressed worry that the further in the past Katrina becomes, the more complacent people will be about preparedness. Furthermore, a Gulfport political elite made similar comments and described it as "crying wolf." When warnings become false alarms, it builds a false sense of confidence.

4.1.3 Economic Landscapes and Challenges

The Team recognized the need to separate the effects of the recession that began in December 2007 from the effects of Hurricane Katrina as much as possible. The interview instrument specifically asks:

- How has the employment and economic landscape in your community changed since Hurricane Katrina, if at all?
- What were your main economic challenges pre-Katrina (January-August 2005)?
- What were your immediate economic challenges in the days following Katrina (September-December 2005)?
- What were your economic challenges after Katrina (2006-2008)?
- Do you still have economic challenges today that stem from Katrina?

Some elites noted the loss of businesses, but small businesses (Biloxi social elite) and industries (Long Beach political elite and Long Beach social elite) were particularly impacted. Others reported an increase in construction jobs (Gulfport political elite) or retail jobs (D'Iberville social elite) as a result of the recovery process. The economic elites tended to answer economic activity in terms of the success, or lack thereof, in their own businesses rather than a community-wide approach.

Pre-Katrina challenges were found to generally be reported as one of two opposites: 1) either things were going great and growth management was the challenge or 2) the community had lost jobs (particularly industrial jobs) over the years and was in decline even before Hurricane Katrina struck. An economic elite in Gulfport described pre-Katrina 2005 as the "Golden Years." In Biloxi, one casino executive stated that unemployment was low enough pre-Katrina that there was a scarcity of entry-level workers. The two exerts from the transcript are talking about Gulfport, where growth was a problem, and Moss Point, where the city was in need of growth according to the respective elites.

- "[The Gulfport economy] was flying. I mean you heard that from everybody. Of course, the condominium thing was just full press. And banking was just going a thousand miles an hour. Housing construction, retail, I mean it was all on fire. The biggest issue probably was probably trying not manage it, but direct it in an atmosphere that would be long-term beneficial for the city… And really we were having a hard time keeping up with the demand." — Political Elite, Gulfport
- "Our community was in a rebuilding mode even prior to the hurricane. Once an industrial job-based community, Moss Point had lost much of the industry that had given it its identity and the jobs that went along with it." — Political Elite, Moss Point

The responses regarding pressing economic challenges immediately following the storm were predictably similar. Survival is probably the best term to use based on the responses. Respondents speak of trying to purchase basic necessities like food and water, the lack of postal services, and supplies for stores to sell (see Figure 4.2). Economic elites, including casino executives, mentioned the need to get their businesses back open and running. Businesses that were able to open quickly had problems getting employees to come to work as employees needed to tend to their own families and personal recovery needs.

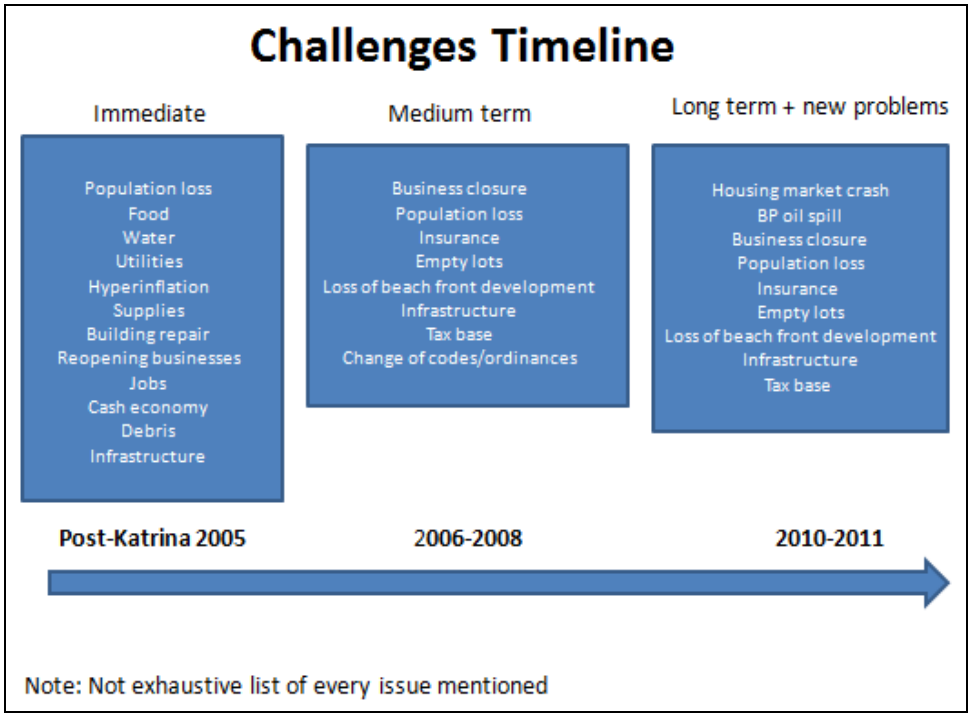


Figure 4.2: Timeline of Economic Challenges (Source: Authors 2011)

Moving beyond the initial few months, the responses began to diverge as to what were the challenges. A casino executive in Biloxi asserted that people thought the rebuilding would occur more quickly than it has. He blamed the delay on insurance and increased construction costs. Challenges that were mentioned the most include insurance, taxes, and building codes. A social elite in Waveland/Bay St. Louis states:

- "The challenges were if you had to rebuild: A) insurance. People in our position, whose houses were completely gone, most people, your flood insurance covered. But your wind policy, which contains, of course, your additional costs of living, your temporary living while you rebuild, was all denied. So people who had plenty of insurance found out that they were stuck. That was huge… What were the new standards, what were the new codes, what were the new elevations? How do we best do this? The cities were all in a flux, because they were trying to work with this massive bureaucracy of FEMA… FEMA people came in and whoever was in your community would tell you something and nothing was ever in writing, and then you would move on with that assumption and then somebody—they would be replaced, and somebody else would come in and say, 'No no no, that's not right, it's gotta be like this.' So it's like there were moving targets when you were trying to

rebuild. That was a huge problem." — Social Elite, Waveland/Bay St. Louis

When it comes to challenges in 2010, the responses were very similar to those of 2006 through 2008, *i.e.*, insurance, population loss, and tax revenues. However, the scene is complicated by the presence of the 2007 national economic recession and the BP Deepwater Horizon oil spill event, which was mentioned by seven of sixty-three elites. The oil spill, like Katrina, was seen as having both a positive and negative impact, as one social elite in Waveland/Bay St. Louis mentioned, the oil spill created jobs in the clean-up efforts.

4.1.4 Recovery Steps

According to the elites, the main obstacle to recovery is overwhelmingly the issue of insurance. There are two components of this issue: the cost and the lack of claims payouts. The word insurance was used by respondents 24 times in response to the question about economic challenges in 2010. Respondents expressed concern that insurance companies fought claims.

- "Immediately after the storm, you deal with food, shelter, and clothing. You're not worried about what to do about the insurance claim. Six months after that you begin to worry about that. Going through the paperwork, going through the—in some cases—the litigation because you can't communicate the settlement features. All of that is involved in that next phase, and it's a heavy frustration level, because you're tired. You've been working 24/7 for months and then you get this negative response from somebody and somebody being FEMA or insurance and that's debilitating because you're just plain wore out." — Political Elite, Gulfport
- "I think the first initial hurdle was the reality that the insurance that you had was not going to pay. That the loss of income insurance was basically worthless. You know, you pay money for insurance policies so that in the advent of a terrible horrific storm you would have income coming in. They declined payment." — Economic Elite, Long Beach

There was, however, one instance of insurance that served the City of Biloxi well. Prior to Hurricane Katrina, the city purchased a business interruption policy that provided much needed revenue in the aftermath of Katrina, especially during the period when the casinos were closed. One casino executive interviewed for the study reports that he was "impressed" that the mayor had made such a move.

Respondents were asked what active steps their community took to restore infrastructure and employment. Generally, the political elites gave more detailed answers as they were more involved in the policies intended to restore infrastructure and employment. Elites gave diverse responses that ranged from simply not knowing to specific infrastructure projects and grant monies. Several elites discussed the roles of leadership in response to this question. Four elites mentioned Mississippi Governor Haley Barbour in the context of helping communities receive money. Additionally, two elites mentioned Governor Barbour in the context of the charette planning process he implemented to help in the redesign of coastal communities post-Katrina. Some of the political elites mentioned grants for hiring. A political elite in Waveland/Bay St. Louis stated the city was able to keep its employees on payroll due to a federal grant and a political elite in Ocean Springs mentioned a Department of Labor grant allowed the city to hire needed positions like building inspectors. The Federal Emergency Management Agency (FEMA) was mentioned by some as a source of funding,

but one political elite also saw it as a source of bureaucracy. The casinos are one of the largest employers on the Mississippi Gulf Coast (see Table 4.2). The loss of the casinos from Katrina devastated the economy due to lack of jobs, lack of gaming revenue and tax revenue from gambling. When asked about active steps to restore employment, one casino executive in Biloxi stated, "I think certainly we were the leaders in that [we were] putting people to work."

Table 4.2: 2004 and 2005 Hotel and Casino Employment

	2004 Total Employment	2004 Accommodations Employment	2004 Percent of Total	2005 Total Employment	2005 Accommodations Employment	2005 Percent of Total
Harrison	95,270	26,940	28%	91,560	23,310	25%
Hancock	14,560	2,420	17%	13,480	2,070	15%
Jackson	49,520	4,050	8.2%	50,430	4,300	8.5%
Source: Mississippi Department of Employment Security: Food and Accommodations Sector						

The Team asked elites what sources and amounts of funds organizations received and what sources and amounts of funds individuals received. Many elites struggled to come up with an exact dollar amount. Some answered from the perspective of their own situation. For instance, one elite, who is a lawyer, spoke of receiving money from the Bar Association. A social elite in Biloxi estimated the city received between $70 million and $100 million in private foundational support. A political elite in Gulfport estimated the city received $500 million in total assistance. A political elite in Long Beach stated that much of the assistance to the city was in the form of FEMA and Mississippi Emergency Management Agency (MEMA) reimbursements. The Mississippi Development Authority (MDA), which granted up to $150,000 to homeowners, was often cited as a resource of assistance to individuals. Elites frequently mentioned Red Cross, Salvation Army, and other religious organizations as a source of aid.

There was also some concern over the efficacy and legitimacy of handling and distribution of funds. The need for better monitoring of aid distribution was mentioned by several elites. A social elite in Biloxi, for instance, noted what she perceived as a rash of 501(c)3 organizations that are no longer present. Some non-profit organizations were seen by the community elite as ill-intended, opportunistic, and/or unorganized. Elites commonly expressed the perception that these organizations were established following the storm and closed as disaster funds were no longer available to such organizations or were better monitored. An economic elite in Gautier commented on how anyone could walk up to a Red Cross aid station and walk away with money, regardless of actual need.

4.1.5 Isolated Groups

The coastal cities are not homogenous in terms of race, ethnicity, or household income. Disparities exist between neighborhoods (see Figures 4.3, 4.4, 4.5A, and 4.5B). For a community to be resilient, leaders and policy makers must recognize the disparities between neighborhoods and the specific needs unique to each one. The Team asked the subjects three questions regarding socially isolated groups: were there any efforts to incorporate

these groups before Katrina, after Katrina, and what recommendations do you have for future integration before the next disaster strikes? The questions were intended to identify which groups might have had limited information and resource access at the time of the storm, as well as what efforts were made and should be made to better incorporate these groups into the community. Some elites declined to answer these questions on the grounds that they just did not know. One casino executive in Biloxi responded that the question sounds like an "elected official question." An economic elite in Gulfport answered that she did not know because her focus is exclusively on business concerns.

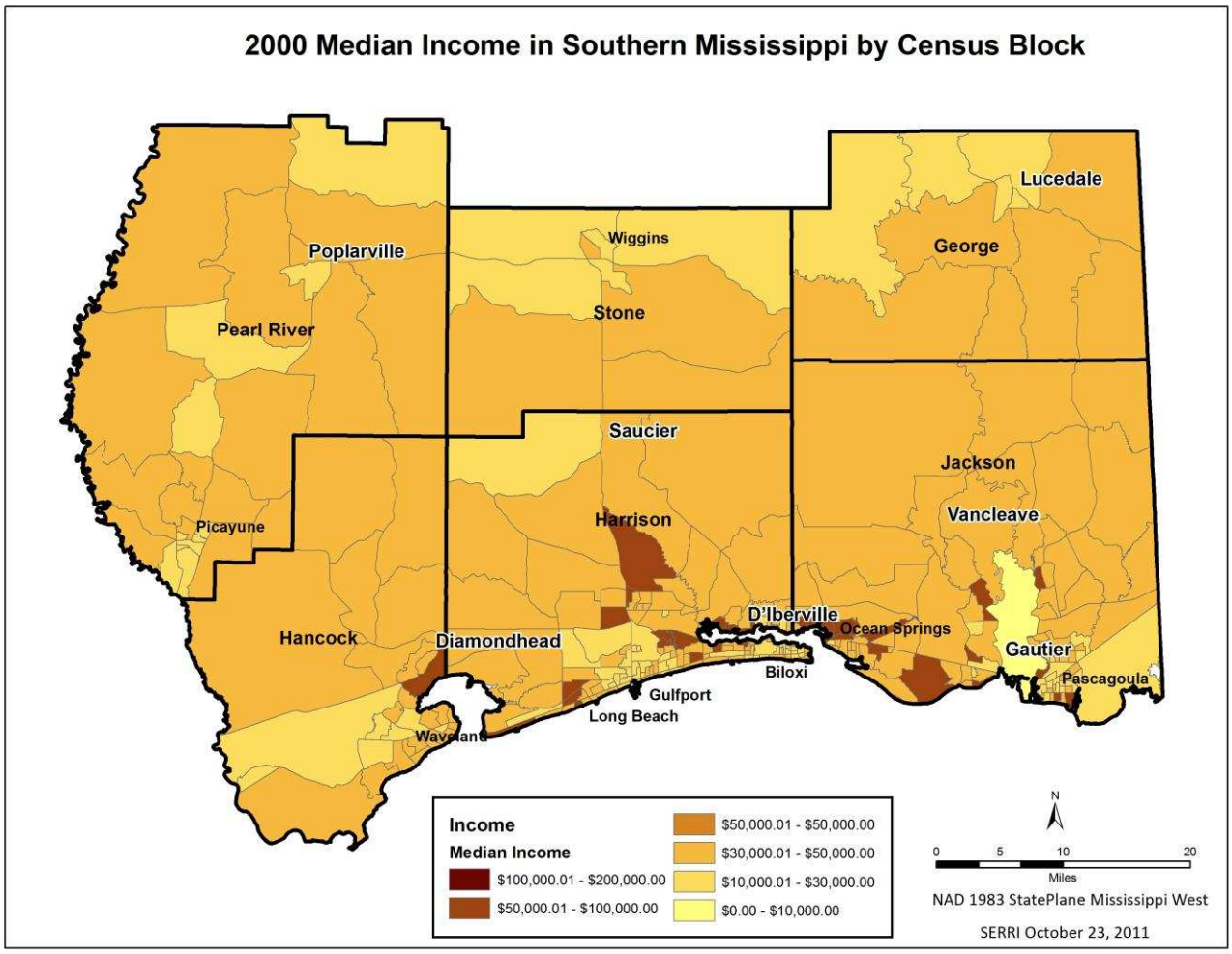


Figure 4.3: Southern Mississippi Median Income by Census Block (Source: Authors 2011)

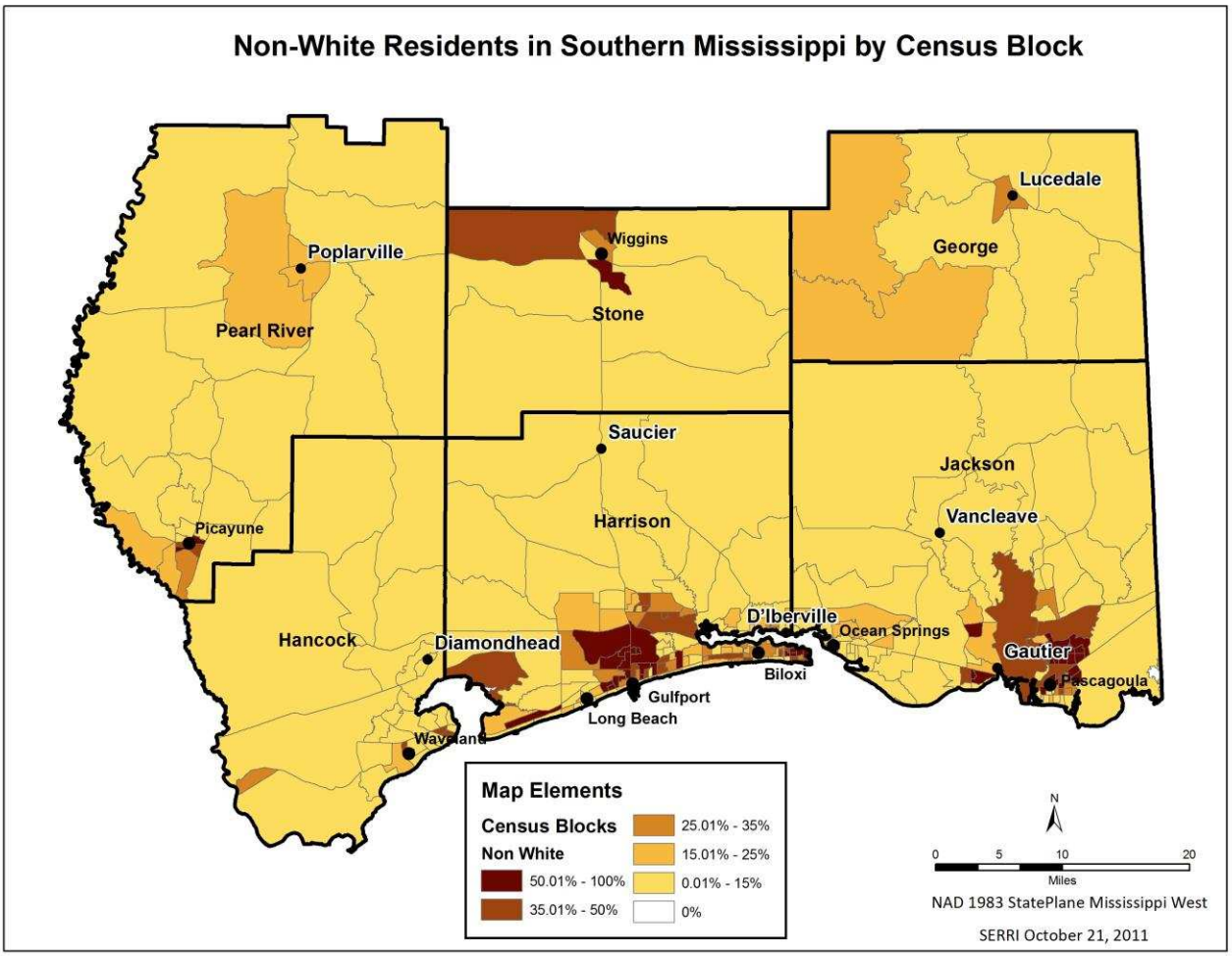


Figure 4.4: Southern Mississippi Non-White Residents by Census Block (Source: Authors 2011)

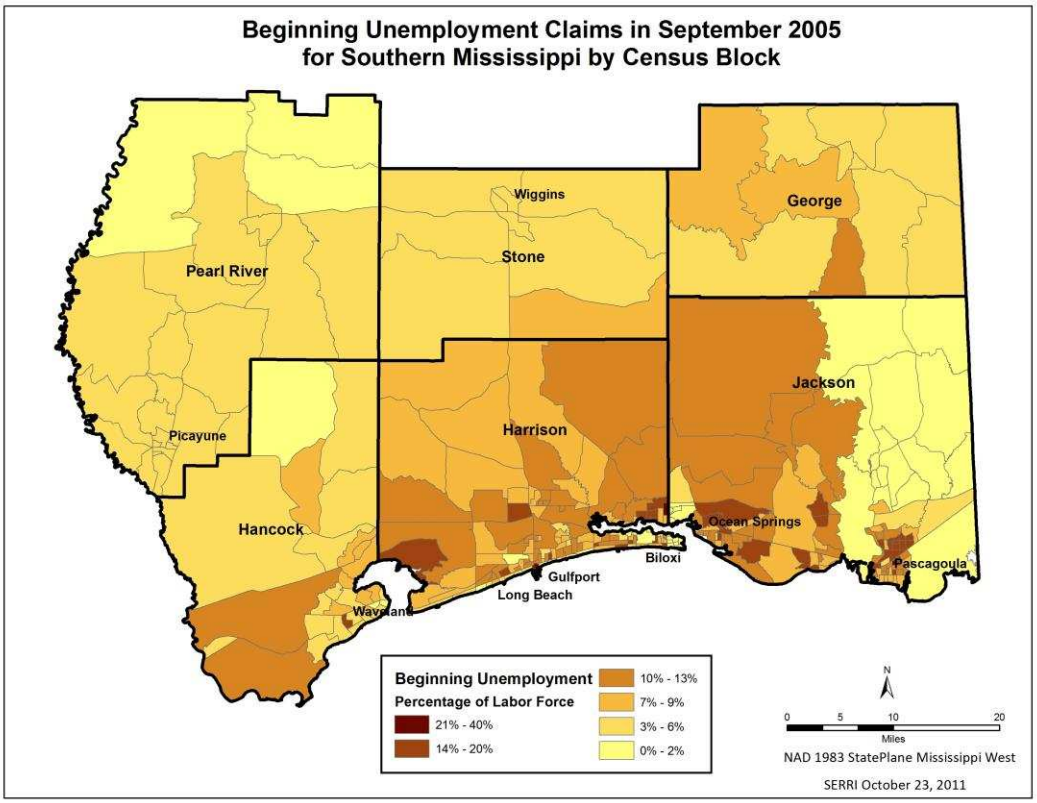


Figure 4.5A: Southern Mississippi September 2005 Beginning Unemployment (Source: Authors 2011)

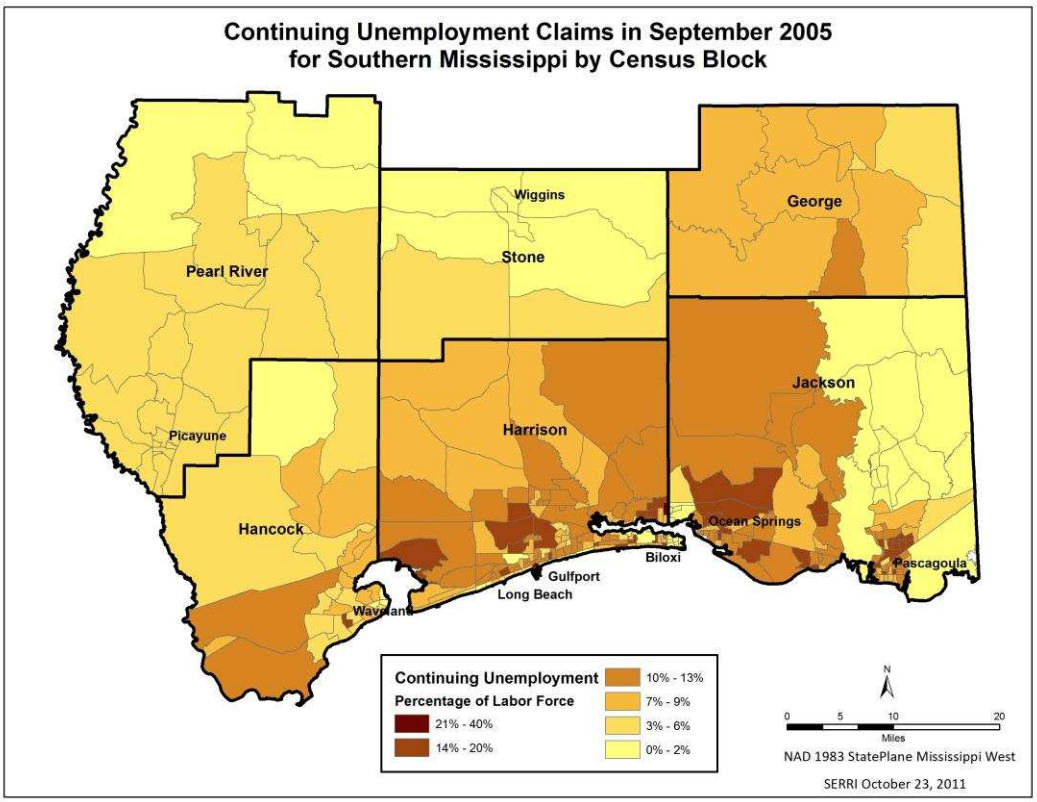


Figure 4.5B: Southern Mississippi September 2005 Continuing Unemployment (Source: Authors 2011)

There are three themes that emerge regarding socially isolated groups. The first is that, overall, most elites do not believe there to be socially isolated groups in the community. Many elites spoke highly of their community and how all groups are embraced. For example, an economic elite in Long Beach spoke of how smoothly the racial integration of the school system occurred as proof there are no socially isolated groups, and an economic elite in Biloxi describes the city as a melting pot. The second theme is that elites may not be aware that different groups are impacted at different levels by the same disasters. Tierney (1999) and Cutter, Mitchell, and Scott (2000) present evidence that the poor are disproportionally impacted by disasters. In fact, Cutter, Mitchell, and Scott show that socio-economic factors can be a greater determinant of impact levels than geographic proximity to the disaster.

Recovery policies that raise costs for individuals commonly disproportionately negatively impact the poor, as the affluent that are better able to absorb the costs. As quotes below, a social elite in Biloxi commented that the affluent do not appreciate the plight of the less affluent.

- "Why don't people have insurance? Well, because if it comes between— if you're on fixed income, and let's see, do I get my flood insurance or do I get my diabetes medicine. Hmm. I wonder which ones of those is gonna win out… Unfortunately, people who are more affluent sometimes don't really grasp the true nature of what it means to have trying to live off $20,000 a year versus $80,000 a year. Course I get my insurance. That's just part of what we do. We have a house, we have to insure that. Yeah, but you make $80,000 a year which means that your basics are covered in the first $20 to $30,000 of that, now you have this other disposable income." — Social Elite, Biloxi

The rise in insurance prices disproportionately affects the poor. An economic elite in D'Iberville observed that many of the houses in East Biloxi, which is predominately home to African-Americans and Vietnamese immigrants, are inherited and not purchased. The residents had no house payment. However, these households do not necessarily have the income to rebuild or afford the jump in insurance costs.

The third theme is that the social elites were considerably the most aware of the existence of isolated groups, which is not surprising given that many of the social elites are heavily involved in charitable organizations, including churches. Some elites who identified the presence of isolated groups in the community blamed the isolation on the group's choice, reinforcing the tendency for the elites to view their community as a melting pot. An elite in Ocean Springs complained that African-Americans chose to not patronize downtown restaurants despite the presence of African-American neighborhoods on the edge of downtown. A political elite in Gulfport blamed the isolation on disparities in education. Additionally, an economic elite in Waveland/Bay St. Louis stated that the poor got more money in assistance after the storm because they know how to "work the system." These statements serve to show that elites do not perceive there to be obstacles to integration of socially isolated groups, though other elites made it clear that language and finances are a barrier.

One social elite interviewed, a Vietnamese-American, provided insightful comments about how community leaders can better integrate the Vietnamese population. He stated that literature provided to the public about issues like disaster preparedness is rarely written in Vietnamese. The elite stated that there needs to be more workshops for the immigrant

community as many are ill-informed on key issues, such as what documents to bring with them after a storm. A political elite in Ocean Springs acknowledged more literature could be in Vietnamese and Spanish.

4.1.6 Leadership

Elites were asked to identify leaders instrumental to recovery. The answers are intriguing, as there are noticeable differences between the elite categories. Political elites were the most inclined to pay homage to their colleagues. Rather than declare themselves a leader, the political elites commonly declared their government agency a leader. Business and social elites were more likely to name specific individuals who tended to be political leaders. The mayors were mentioned as the leaders; aldermen were also mentioned, though usually as a collective group. Although the question asked for community-level leaders, respondents also cited Governor Haley Barbour, Congressman Gene Taylor, and Senators Trent Lott and Thad Cochran.

The Katrina event changed the leadership dynamics of the communities. One social elite stated:

> - "[T]here were people that I would consider leaders in ordinary times, but somehow couldn't— didn't have the skills that they needed in a disaster… And you need people that may have a book of procedures and policies and may follow it every day, and may have a crackerjack team around you, and you may have a meeting every Monday morning and divvy up tasks, and be well organized and that. But when you're confronted with Katrina, you don't have your little policy book… [W]ho are the people that you would want to have on your team if you had to survive somewhere where there was nothing. And those are the kind of people that really rose to the top, and that we really needed, and that were the ones that made the difference… " — Social Elite, Waveland/Bay St. Louis

The elites were asked to name organizations they consider to be instrumental to recovery. The responses were diverse, but disaster-response oriented groups, such as Red Cross and Salvation Army, were frequently mentioned.

4.1.7 Businesses and Resiliency

The Team asked elites if there were any specific types of businesses that made the community more or less resilient following Hurricane Katrina. The question was designed to ferret out how the economic structure of the community might have been helped or hurt based on how fast businesses could reopen, employ people, or sell needed items in the wake of the storm. Two themes emerge from the responses. The first is that respondents usually answer in terms of employment or the ability to purchase necessary goods. The second theme is that business with deep pockets, i.e., retail chains and those headquartered outside the affected area, had the resources to open quicker.

Moss Point and its neighboring city of Pascagoula are home to a Chevron refinery and a Northrop Grumman shipyard. As these industries dominate the employment scene in that area, the elites from Moss Point mentioned them, while elites in other areas tended to focus on retail and casinos. Respondents often mentioned the casinos as being a major factor of community resiliency based on their ability to put people to work. A casino executive

mentioned being able to host responders in his hotel. Retail centers were mentioned as sources of employment or places where people can replace items such as needed appliances. Hardware stores and food establishments and grocers were also mentioned. A social elite in Biloxi commented that small businesses are the least resilient because the owners also live in the community; the owners had to chose between restoring a house or restoring a business. An economic elite from Biloxi noted that the casinos are largely a subsidiary of Las Vegas enterprises that had the pockets to reopen quickly.

Elites were then asked if Hurricane Katrina equally affected businesses. The answers were mixed. Some see Katrina as an equalizer that shut everyone down without discrimination. Others see it in terms of what a business sold determined how it did post-storm. For example, business that sold rebuilding material suddenly found a large market for their goods.

4.1.8 Population Changes and Shifts

The Team asked the elites about population shifts and changes to gauge what the perceptions are among community leaders. While not every elite perceived a population change or demographic shift, most did. Three main themes emerge:

- The population on the coast initially fell sharply due to the evacuation.
- The rebuilding has been north of interstate 10.
- There are more Hispanic immigrants in the area post-Katrina.

Coastal communities lost population in the immediate aftermath of the storm. A political elite in Ocean Springs reported that school enrollment fell by 500 students, but the population was gradually starting to return. Specifically, communities south of interstate 10 have experienced a lag in returning populations. The rebuilding has been north of the interstate, as well as adjacent counties to the north. The elites attributed this to the cost of rebuilding, which includes insurance premiums. A social elite in Waveland/Bay St. Louis noted the loss of the structures along the bay that were predominately weekend homes to those in New Orleans and other nearby places, as they have not been rebuilt. Some elites mention the influx of Hispanic populations that came after the storm because there was work in the rebuilding.

An insightful remark about why people left and did not return came from a social elite in Waveland/Bay St. Louis.

- "[O]ur homeowners, they fought their way through all the paperwork to get whatever they got, and got jobs, got a house now. They're resilient. So, you can talk to them all day long, but who didn't make it? Who lost hope and faded? What's the difference … They found their own resiliency, and couldn't find it here. They knew enough to go." — Social Elite, Waveland/Bay St. Louis

4.1.9 Comparative Recovery

The Team asked elites two sets of questions concerning perceived differences in recovery. The first addressed what neighborhoods within their community recovered fastest and slowest and why. Likewise, the second set of questions was similar, but asked

about neighboring communities. The emerging theme is that the closer a community is to the storm, the more damage it received, and the more damage sustained means longer recovery (see Figure 4.6). It is not surprising, given Waveland and Bay St. Louis' position at the epicenter of where the storm made landfall, the elites tended to mention these two communities as the least recovered. When asked why, the answer is the level of destruction. Pass Christian and Long Beach, which are just to the east of Bay St. Louis in neighboring Harrison County were also mentioned as slowest to recover due to the level of damage. Ocean Springs was often cited as most recovered due to lack of damage. The city is at a higher elevation than most Gulf cities and far enough east of the epicenter that it did not sustain the level of damage that Hancock County communities did. Furthermore, the city's downtown retail area was not on the water, as was found in several case study communities. A political elite in Moss Point alluded to larger communities receiving more aid because of their population size.

Figure 4.6: Elite Perception of Recovery Differences (Source: Authors 2011)

In terms of neighborhoods within the elite's community, two themes emerge—an exogenous explanation and an endogenous explanation. Some saw the level of destruction as the explanatory factor, which is an exogenous factor. For instance, elites noted that East Biloxi suffered massive flooding from the Back Bay. Neighborhoods in Harrison County that are south of the CSX railroad tracks were also cited as less recovered due to the level of destruction. The other theme is that some saw affluence as the explanatory factor. If a neighborhood is more affluent, its residents can afford to rebuild, which is an endogenous factor. An economic elite in Moss Point notes that neighborhoods in which home ownership was higher, recovered quicker as renters can more readily walk away from their home and are less likely to have insurance. Figure 4.7 shows recovery as a function of the endogenous and exogenous factors mentioned by elites. While the slope line is shown here as a one-unit change being equal between the two factors for purposes of illustration, is the exact slope of the line is unknown.

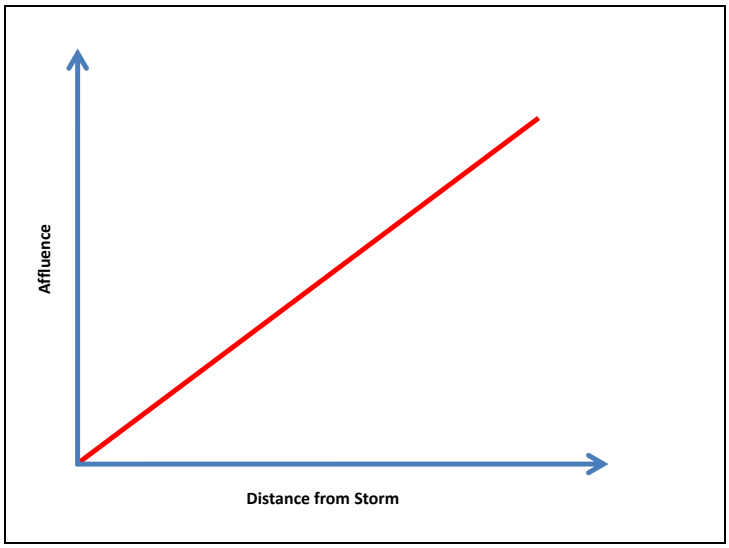


Figure 4.7: Recovery as a Function of Affluence and Location (Source: Authors 2011)

4.1.10 Hindsight

The Team asked the elites what could be done differently by local, state, and federal governments if another Katrina-event were to occur. Responses varied in tone. Some elites expressed that the government did as well as they could have under the circumstances, and that they are, therefore, generally pleased with the response from government.

- "State [government], I was very satisfied with that. Local, I was extremely satisfied with. I think FEMA obviously dropped the ball in Louisiana. Here, it wasn't so bad." — Economic Elite, D'Iberville
- "I personally think they did an outstanding job. Maybe they could have been in a little quicker. Maybe they could. I don't know. I can't visualize them doing any better than what they did." —Economic Elite, Ocean Springs

Others were not so sympathetic:

- "So all the money they spent on those trailers and hauling them in here and those FEMA cottages, they could have given every person in this town $200,000 that owned a home and everybody could have rebuilt, quick. They could have. If you look at the numbers of what was spent on those piece of [expletive] trailers, and what was spent on those cottages and how that money was wasted." —Economic Elite, Waveland/Bay St. Louis

There is little surprise that some elites mentioned insurance as a problem given it frequently came up in response to other questions. Elites who brought this up believed that steps need to be taken to sort out what they perceived to be a mess. An economic elite in Gulfport phrased it, "(F)ocus in on a uniform insurance policy. A catastrophic policy that would cover earthquake, fires, floods, wind damage, I mean the fact we still, five years later, still can't get insurance just speaks volumes of what the problem is." An economic elite in Gulfport stated his only insight as to what governments could do better is to address the problems related to insurance.

In terms of management, the need to make more localized decisions came up. Both a political elite and a social elite in Waveland/Bay St. Louis mentioned the need for a local command center where the officials have flexibility and the authority to make decisions. Elites from smaller communities frequently expressed concern over managerial capacities to handle a crisis of Katrina-magnitude. An economic elite in Moss Point found his city to be too dependent upon outside consultants, each with their own vision or something different to "sell." A political elite in Gautier mentioned the city's staff worked hard during the crisis, but there was a lack of college educated persons who could manage regulations and resource management. A social elite in Waveland/Bay St. Louis mentioned the need for fewer rotating of bureaucrats in and out of their assignments. Another social elite in Waveland/Bay St. Louis, as well as one in Biloxi, mentioned the need for more local input. In Biloxi, a social elite decried government as operating in a vacuum believing that it knows best, and he also criticized outside elitism:

> - "[You're going to] leave them [locals] out and you're going to walk in and then came up with a plan that said this: 'I know your property is damaged over there. I'll tell what we are going to do. You go and all of your neighbors, y'all give us your property, ok, and we'll bring in a developer. And he'll build some condominiums and then you can come and buy one of those condominiums.' Now if that doesn't sound like you know the biggest soothsayer kind of thing you ever wanted. People wondered like 'Do I really look that stupid? I know that they think I'm from Mississippi, and maybe I'm supposed to be that dumb, but we're not!'" — Social Elite, Biloxi

Also along the lines of management is technical assistance to the public. A social elite in Waveland/Bay St. Louis mentioned the need to help people ascertain the amount of loss they have to their property. A political elite in Moss Point stated:

> - "Number one would be to provide more technical assistance to rebuild. While on the surface the idea of rebuilding is very exciting and exhilarating and to have millions if not billions of dollars thrust on you to help you achieve that. In the end, it's a very daunting task because the people of a local community are butchers and bakers and candle-stick makers, they're not urban designers and planners and engineers who, for a living, go about the task of helping a community rebuild. And so while we had the opportunity and we had some of the financial resources, we didn't know where to begin. We didn't know how to start. We didn't know what resources we would need locally. We didn't know what safeguards needed to be in place." —Political Elite, Moss Point

4.2 Discussion

Interviews are a key data collection tool in that the researcher listens to "what people themselves tell about their lived world, about their dreams, fears and hopes, hear their views and opinions in their own words, and learn about their school and work situation, their family and social life" (Kvale 2007, 1). This type of data cannot be captured in a classic quantitative survey nor does it exist in available data sets. The 63 interviews conducted within this project provide rich insight into how some of the leaders on the Mississippi coast perceive Katrina impacts and recovery. As expected, there were differences between how

the three categories of elites— economic, political, and social— perceive recovery. Each have their own concerns and experiences. Taken as a whole, patterns and themes start to emerge that can be used to assemble the resiliency jigsaw puzzle.

The findings contained in this report are by no means exhaustive, but are intended to highlight themes that emerge. Perhaps the most disturbing finding is the lack of perception of socially isolated persons among community leaders. The implications are that community leaders may not have adequately integrated the needs of these groups into disaster planning. Additionally, efforts to reach them through routine communication channels may not be as effective as the elites think. Butler and Sayre have been awarded a phase II SERRI grant to expound upon resiliency research by exploring the social network component of preparedness and recovery, and the linkages between elites and socially isolated groups (poor, minorities, etc.) will be explored in greater detail.

The semi-structured approach to interviews served well as it afforded the researchers flexibility to probe and explore tangents as the conversation developed. At the same time, it also allowed for continuity among interviews for useful comparison. While Hertz and Imber (1995) argue that elites are often guarded as a result of having more to lose by upsetting the population, the elites interviewed by the Team wanted to talk. The coast is their home, and they were eager to get the story out about what happened, what should have happened, and the gap therein.

5. FOCUS GROUPS

The second stage of qualitative data collection involved conducting focus groups. The Team conducted these focus groups in the spring of 2011 in the Mississippi coastal communities of Waveland/Bay St. Louis, Long Beach, Gulfport, Biloxi, D'Iberville, Ocean Springs, Gautier, and Moss Point. These communities met the criteria of having a mix of incomes, races and rates of recovery as measured by unemployment duration after Hurricane Katrina and were chosen as representing the full Mississippi coast most accurately (see Figures 4.4-4.6B).

The goal of the focus group research phase portion of this project is to discover what people experienced and how they and their communities moved toward recovery in the aftermath of Hurricane Katrina. Components of this stage helps illuminate activities people conducted to recover; their perceptions of progress toward recovery; the helpfulness of other people, institutions and organizations; and what Hurricane Katrina survivors believe should be done in the event of another disaster. As the beta-test (Appendix B) interview process revealed that Alabama was not negatively impacted by Hurricane Katrina, the research for the focus group, survey and modeling focused on Mississippi exclusively after the interviews. The focus group instrument used by the researchers contained seven question sets. The questions on the instrument solicit information on:

- The community just before Hurricane Katrina made landfall
- The community just after Hurricane Katrina made landfall
- The needs of the community in the weeks after Hurricane Katrina
- The community's recovery from Hurricane Katrina
- What could be done in the event of "another Hurricane Katrina"
- The sources of funds and assistance provided to the community
- How the community has changed since Hurricane Katrina

A total of 14 focus group and 82 participants produced 352 pages of transcripts and provide broads themes to be ascertained through individual comments and group interaction on the communities. The focus group instrument was developed based on feedback and considerations from the interview instrument. The main themes that emerged from the focus group data are:

- Focus group participants believe that, although there is no way to completely prepare for a disaster such as Hurricane Katrina, individuals, institutions and groups responding before and after the storm could consistently apply additional elements of preparation to help hasten future recovery efforts
- Respondents overwhelmingly recognized the great difficulty of storm preparation and clean-up, universally expressing their gratitude for the positive contributions made by so many.

This section summarizes both positive and negative aspects that respondents encountered during the course of their recovery. Appendix F provides a literature review of the field research method of conducting focus groups. Appendix G provides a thorough description of the instrument development and methods used by the Team to conduct the focus groups. Section 5.1 provides the focus group findings. Finally, Section 5.2 concludes with a general discussion of the findings.

5.1 Findings

Sources of contact for focus groups were primarily community organizations such as churches and human services organizations selected from either a snowball processes through previously interviewed elites or from focus group participants. Fourteen focus groups were conducted in the target region (see Table 5.1). Given sampling requirements, snowballing did not always provide an adequate sample. In such cases, internet or yellow pages searches were conducted to find community organizations to contact.

City	Number
Gulfport/Long Beach	4
Biloxi	2
Ocean Springs	3
Moss Point	2
D'Iberville	1
Waveland/BSL	2
Total	**14**

Table 5.1: Focus Group Cities (Source: Authors 2011)

Several themes were evident throughout the focus groups conducted, which are summarized and placed into three general categories. These categories are 1) Preparations for and Storm Survival, 2) Challenges in the Immediate Aftermath of the Storm, and 3) Issues Surrounding Recovery.

5.1.1 Preparations and Storm Survival

Important items of preparation to consider prior to a future, major storm event

Hurricane Camille was seen as the yardstick by which hurricanes were measured. The level of damage from Camille was seen as what to expect from a bad storm. A focus groups participant in Ocean Springs states people were saying prior to Katrina, "I made it through Camille. I'm staying through Katrina!" Camille may have provided a false sense of the limits of destructions.

Preparations must be conducted with the thought in mind that the time spent away from home after an evacuation may be much longer than initially anticipated. Respondents suggested having important photos and documents in a single container that can be brought with a person in case an evacuation is necessary on little notice. Extra medicines should also be on hand. As part of the "evacuation box," it was suggested that people prepare a packet of information, perhaps burned on a compact disc, which will have medical information, prescription drug dosage and personal information.

Services may not be reliable in the aftermath of a storm. Cell phone service may not be available for extended periods of time. Residents must plan for an alternate source of communication. Banks may not be able to electronically access customer accounts due to lack of power. An alternate source of cash is suggested to be located ahead of time to allow for access to personal finances until local banks are able to release funds.

In case an evacuation is necessary or mandatory, highways are likely to be jammed. Evacuees must plan to leave as early as possible. Respondents suggested partnering with someone up north of the coast in order for one to have somewhere to evacuate to during a storm. Many evacuees have no choice other than to stay at hotels. Many focus group participants reported having become accustomed to contacting hotels in advance of a reported storm. If the storm veers away, hotel reservations were canceled. Those who are disabled particularly need to plan ahead or they may be evacuated to a place that may not be able to take care of or accommodate their particular needs.

With respect to communication of an impending storm, hurricane warnings need to come with rain, wind, and tidal surge estimates. The earlier a storm warning is provided, the better. Last minute pushes to evacuate leads to panic, traffic jams and people deciding to stay given the hassle. Use of close captioning and interpreters by television stations is very helpful for local deaf communities.

Evacuation is financially burdensome, forcing some to "ride it out"

It is expensive for people to evacuate. Gasoline, hotel room charges, food for family, and other related expenses can add up to a significant strain on a family's finances. Some responded that they will choose not to evacuate if they had recently spent their resources on a recent evacuation. Mandatory evacuations should be followed by financial assistance to those in need regardless of a storm actually making landfall or not. Money spent on evacuation may mean that less money is available to pay next month's bills. If there are no funds for evacuation after a false alarm, people can be in desperate financial need. Moreover, a large number of people in south Mississippi are on some form of fixed income or public assistance. These people are often paid monthly and by the end of the month the money is nearly exhausted leaving little available cash to be able to evacuate.

Problems with shelters

Some respondents noted family or friends who died in the storm after being turned away from full shelters. Families with disabled children may be separated from their children as special shelters may not have room for the parents. Respondents concluded that there were not enough shelters or shelter space to handle residents caught in the storm. The safety of shelters was also called to question. One respondent heard of predatory child abuse happening at one particular shelter.

Lack of knowing what to do in critical situations placed some people and property in danger

Many respondents concluded that survival skills are critical for those who choose not to evacuate. In some reported cases, common sense was ignored in the stress of the moment. Some people moved up to higher floors of their home to avoid rising flood waters. When they reached their attic they realized they were trapped. Some respondents reported knowing of people drowning in their attics. One respondent took their child up to their attic only to realize what they had done when it was too late. The respondent felt lucky to have survived given flood waters receded shortly after reaching their attic. "I don't think we realized the danger." Others may have placed sand bags around their home or at entry ways. If such homes flooded it took much longer for the flood waters to work their way out

of the home. National companies may not understand the nature of major storms and the need to evacuate. Some, up until the day before Hurricane Katrina made landfall, stated that their businesses along the Coast were to remain open. A day prior to the storm one national company changed its mind, stating the business would be closed for the day of the storm, opening the day after.

Pets

Some residents of the disaster area had a deeply felt sense of responsibility toward their pets. Many chose not to evacuate in order to care for their pets as there were no shelters for their pet and the resident had no means to evacuate with their pets. In some cases this cost the pet owner and their pets their lives. Some residents who left without their pets tied their pets up in their yards or locked their pets in their basement. In many such cases, these pet owners came home to find out their pets had drowned due to their confinement.

5.1.2 Challenges in the Immediate Aftermath of the Storm

Health risks were numerous in the aftermath of Katrina

Among health risks reported in the aftermath of Katrina the following were commonly noted by focus group participants: post traumatic stress disorder (PTSD); mold and mildew in homes; odors triggering respiratory stress; lack of health care in the affected areas; small infections left untreated led many to greater health problems, and for a few, amputations. These same health risks delayed the return of residents with health problems. The lack of a variety of available health care services as compared to before the storm also delayed the return of residents with existing health issues.

Aid distribution center challenges

Aid distribution centers sprang up in parking lots, at churches, in schools, and many other publicly accessible areas. Word of mouth was often the way many storm victims discovered the locations of these centers and what kind of aid was being supplied. Aid centers were challenged with the quantities of people asking for assistance. In the midst of crowds seeking assistance were some who obtained relief goods which they turned around and sold. Locals who distributed aid were more apt to pick out those who accepted aid as a form of black market profiteering from those they personally knew who needed assistance from their own neighborhoods and communities. Computerized databases and queuing lines proved to be good deterrents with respect to thieves.

Drug and alcohol abuse

Respondents noted increased alcohol and drug use. One hospital official noted the need to remove narcotics from pharmacies after Hurricane Katrina or any similarly devastating event. Pharmacies were targeted by drug dealers and users as a source of supply. The official relayed a story about a hospital administrator and local authorities who broke into area pharmacies to remove narcotics, centrally locating these narcotics under armed guard.

Desperately needed items in the wake of the storm (initially)

Fuel, water, food, and health care were the primary items most needed in the short term (see Figure 5.1). Medical supplies, such as ointments, were needed to take care of sores and skin irritations received from working in flood waters which were contaminated by rotting corpses, sewage and debris. Tetanus shots were needed for those having minor injuries. Given challenges with filling a prescription locally, victims of the storm were relieved to be able to have their prescriptions filled out of state. Out of area pharmacies were very flexible toward Coast residents who were in need of prescription refills. In some reported cases only an empty prescription bottle and personal identification was required to receive needed medication.

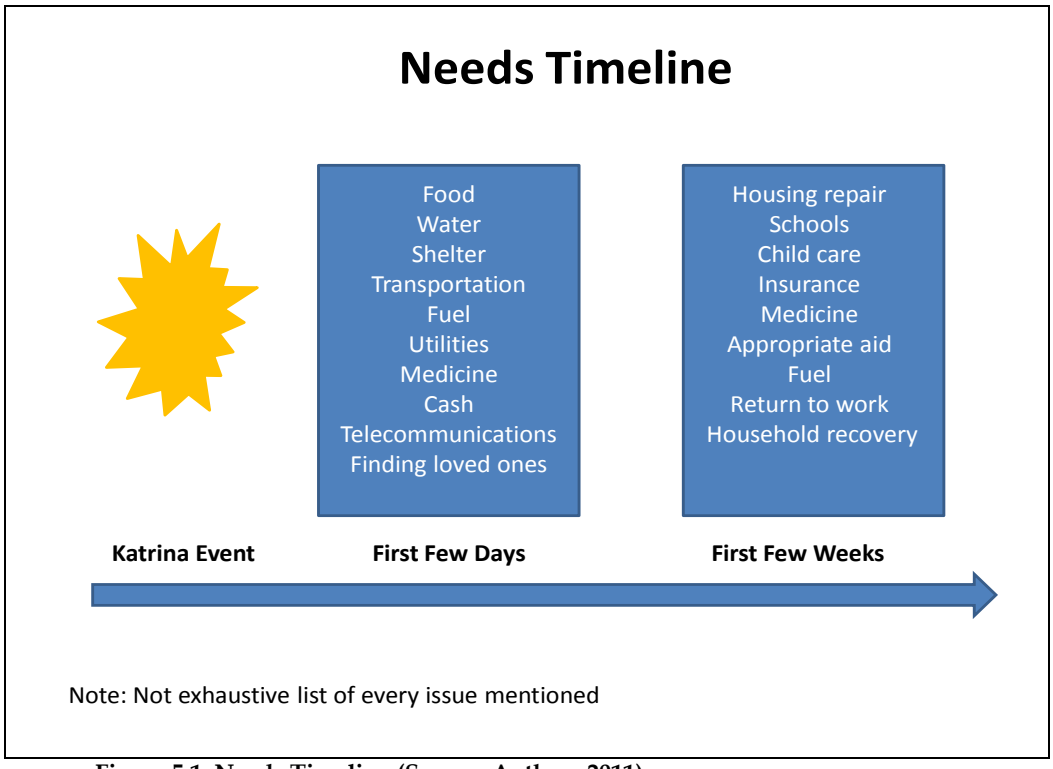


Figure 5.1: Needs Timeline (Source: Authors 2011)

Cash was also needed but in short supply. Respondents noted the need to have cash as credit and debit card could not be used until the power was restored. Respondents believed having $500-$2,000 would be necessary in the event of another Hurricane Katrina type disaster.

Respondents noted very long lines at gasoline stations. Many customers did not realize that credit cards could not be accepted given the lack of power at filling stations. Customers had to go get cash and get back in line. In response to turning many customers away, gas stations set up signage indicating their cash only status. Respondents discussed the need to always keep their fuel tanks at or above half tank in case of emergencies. With the fuel shortage some residents took to late night gas tank siphoning. Those with vehicles out in the open had to coordinate night watches so as not to lose their fuel.

Residents needed electrical power as soon as possible. This need was particularly crucial for running air conditioning units and for those persons in electric wheel chairs. Generators

were of particular value until public power was restored. They were, however, in short supply and more expensive to purchase just after the storm.

Focus group participants asserted that all relief supplies were greatly appreciated. Respondents noted, however, that there was an excess of donated clothing. Some clothing donations were dumped out in the open, increasing local relief agency burden to manage the excess.

Child care services were in urgent need after the storm. If schools were not open parents had to find alternative places of care for their children so they could get back to work. Not all local families had relatives nearby who could care for children in the disaster affected areas. Many people had to take children with them to wait in line for food and other aid as well as to meet with insurance adjusters which slowed the personal recovery process. Fortunately, organizations such as Chevron understood this need, investing immediately in the rebuilding of child care centers. Some children were enrolled in schools north of the disaster affected areas, increasing overall enrollments at these schools.

Individuals and small businesses benefited from having places to go where they could obtain telephone and internet communication services. In at least one community, these services were made available at a local chamber of commerce.

Media and government communication before and after the storm was very helpful

Given the lack of electricity, TV, internet and other common sources of information could not be utilized. Respondents noted that the media was of great informational assistance. Newspapers, for instance, provided lists of where one could go to obtain assistance. There was still significant dependency on word of mouth as not all people had access to radios or local newspapers. Respondents noted that many of their community leaders were instrumental in keeping information flowing.

Lack of cell phone service was problematic as people tried to connect with loved ones

People determined that they needed to get to high ground in order to connect through surviving cell phone towers. This drew many people to taller structures such as bridges that may not be safe. Most accepted such risks out of a psychological need to contact with loved ones to determine their status. A "panic mode" would set in if people could not reach loved ones. Cell phones networks were frequently jammed with callers, which made making collections with loved ones difficult.

Transportation was hard to come by

Many people had flooded out cars. Without reliable transportation people could not get to work. Debris on the road frequently caused tire damage disabling many vehicles that were mechanically functional. Even with reliable transportation, authorities would limit or turn away some residents from entering disaster areas despite the residents showing address bearing identification. Some roads and major highways had as much as six feet of mud. Forced to travel on foot through debris ridden areas, respondents noted that it took over an hour to walk a distance that took only five minutes before the storm hit.

5.1.3 Issues Surrounding Recovery

Faith based organizations were of significant help

Churches were an natural source of help to those looking for relief. Many became points of distribution thanks to outside and local suppliers of goods, services and finances. Along with the military, faith-based groups immediately worked to provide assistance after the storm. One of the reasons for the success of faith-based organizations was their national network. Many people within the United States desired to assist after Hurricane Katrina. Those churches with a national network allowed people from outside the area to donate cash and items to their local church with the confidence that the aid would make it to the local church in Mississippi. The overall conclusion of respondents was that faith-based groups were one of the most significant and reliable providers of assistance. These groups set up meal tents, provided assistance with home repairs, delivered food to the needy, supplied counseling, coordinated volunteers, cared for the needs of volunteers, and provided a host of other goods and services.

People helped each other

Homes that were still standing often became temporary shelter for locals who had lost their homes. Residents with cleared land opened their property to FEMA trailers and assisted the new community that cropped up with their living needs. Some privately owned lots had several FEMA trailers on them. Generosity sprang up. One land owner bought a washer and dryer for their new FEMA trailer guest community to use. Perishable foods kept in refrigerators that lost power were often emptied for use in neighborhood grill gatherings before the food spoiled.

Respondents commented that they felt a strong bond and positive spirit among their fellow survivors and neighbors. Even before the storm, neighbors spread the word of the coming storm and discussed plans to leave or stay.

- "The thing I remember was everybody got very patient. You could stand in line and people were patient. They weren't irritated. Even like weeks afterwards when the stop signs were not up, people would stop at stop signs and would patiently wait. I mean there wasn't any stop signs, but people would stop at intersections and patiently wait. Very politely let the other person go which we kinda forgotten to. It was a really neat feeling. I think this community really, really, really was—came together. I mean, it was, I thought it was phenomenal. I think it's the one thing we will all take away from it. It was, people really helped each other." —Focus Group Participant, Waveland/ Bay St. Louis
- "One's wealth or background didn't seem to matter. All were equal in everyone else's eyes. The storm was 'the great equalizer.'" —Focus Group Participant, Gulfport

There were some problems, however, reported between fellow survivors. For example, some looting was reported and frustrations were expressed with lines at places offering relief goods. The pace of a neighbor's recovery was a source of complaint for several focus group participants. White goods (items from a damaged home with value that are blown around), trash and physically damaged homes were an eye sore to neighbors. Some

neighbors complained to authorities about such eye sores which resulted in court dates being set for abatement. Such proceedings were a source of irritation for both parties.

Government assistance was in great need and greatly appreciated

One elderly respondent stated that he remembered receiving no assistance from government sources after the 1947 hurricane that damaged so much of the Coast. Governmental disaster assistance has gradually increased since that time. Another respondent commented that the government became better at responding to disasters particularly after 9/11. The government invested in significant infrastructure after 9/11 to help with large scale emergencies. People were grateful for government help but were concerned about the lack of organization in service delivery, accountability for funds distributed, and inequality with respect to those who were truly needy receiving available funds.

The Federal government hired people from outside the area to assist with urgent concerns and recovery. This help was greatly appreciated. Respondents believe, however, that the Federal government should allow local officials to hire local people to conduct recovery and disaster response work. Able workers were locally available but were without income. Some people grumbled about FEMA, but most respondents stated that without Federal and state government support, recovery would have been a significant burden.

Federal Emergency Management Agency

Specific to FEMA, trailer issues were the most often noted problem area. It was not always possible to find a place to park a FEMA trailer if one's property was a debris field. Negotiating trailer placement was reported to be a confusing process. Without professionals to hook the trailer up to utilities, many trailer recipients faced a waiting period before moving into their trailers. Such wait times were often very long.

FEMA's frequent rule changing made it difficult for people to understand what needed to be done to obtain assistance. Respondents noted it was difficult and time consuming to find answers to questions. FEMA left the impression of being disorganized. The provisioning of benefits was at times excessive, at times wasteful.

Many outsiders came to help

Respondents noted, and appreciated seeing, volunteers from around the country and even from other countries. Although residents were happy for the help there was some concern that outside assistance may have detracted from putting locals to work. At the extreme, some people coming into the area were "disaster gypsies" looking for work. They heard of all the money pouring into the area and determined that work could be found. When work was not found, some became part of the crowd seeking assistance.

Assistance Fraud

There were instances of where respondents were “ripped off,” partially paying for services of a contractor who never came to do the job to which they had agreed. Still many other contractors provided very shoddy workmanship.

What is recovery and how does one know if one is recovered?

Many respondents struggled with this question. Some stated recovery is not possible because residents will never have back what they once had. One focus group determined that recovery is defined as when a person or a population recognizes that they are in a state of a new normal. Others reported recovery to be a stabilizing of one's mental outlook and general happiness.

The elderly found it particularly difficult to recover

Many left the area to live with relatives and never came back, while others returned, but did not rebuild given the effort required was more than they had the energy to manage. They also had difficulty "navigating the system," knowing where to go to get assistance or a payout on their insurance policies. The information required by insurance policies to obtain a settlement was viewed by some as excessive. Some elderly were shut-ins or immobile, making relief supplies and services harder to obtain. Efforts that prevent the elderly from becoming a socially isolated group are important for the safety and recovery of that demographic in the event of another disaster. As a result of these challenges respondents stated that their neighborhoods "got younger" due to the many elderly residents who evacuated and simply gave up on the possibility of returning.

There was some inequality in recovery

One source of inequality people witnessed was the large amount of funds sent north to help out with lesser impacted areas. Many felt the response was disproportionate to the need. Respondents provided stories of some individuals who simply "got ahead" given the lack of accountability in the provisioning of financial assistance that others refused out of altruism. Those who refused assistance believed the pool of assistance funds would naturally be limited and believed that those entrusted with the funds would distribute them to those in greatest need, first. Examples of fraud, however, were frequently illustrated. For example, stories were told of some people accepting assistance from FEMA despite having insurance coverage.

- "But then when I come back, this little town that I come back, I looked at some of the places and some of the people I know and I, I, I don't begrudge them things but I wonder how a person that was living in a lower level, uh, $100,000 house is now living in a $300,000 house. How, how does this happen, you know?" —Focus Group Participant, Waveland/Bay St. Louis

The above quote highlights a common perception of inequality. Many respondents recognized that "squeaky wheels get the grease" when it comes to obtaining financial assistance for recovery and witnessed neighbors coming out with a standard of living far greater than before the storm. Notwithstanding the "double dipping" that some storm victims chose to engage in with relief agencies and their insurance, part of the misunderstanding related to concerns of inequality is not realizing what insurance had to offer victims who were properly insured.

- "[I]f you had to have wind insurance, the fire insurance, the water insurance, the hazard, hazard insurance, and everybody didn't have all those insurances and some people were assuming that one insurance would cover it all." —Focus Group Participant, Gulfport

If replacement value was part of a storm victim's insurance, better housing was a strong possibility if the original home was older. Given housing shortages, increased prices for housing drove the value of replacement structures even higher. This led to some feelings of inequality— that some people came out of the storm in far better financial condition than they were prior to the storm.

Insurance companies were seen as a hindrance to recovery

Insurance was often rated as the number one problem in recovery after the storm. High and unstable insurance rates are still making recovery difficult for many. Those on fixed incomes found it particularly difficult to continue with their insurance policies due to rate hikes. Because of high and increasing insurance premiums, an unknown but assumed large number of residents have chosen not to obtain insurance if they can avoid it.

Problems with insurance payout conflicts continue to this day. For example, in some instances respondents spoke of insurance company representatives handing out checks immediately after the storm without verifying their customers' policies. If the policies did not cover the money provided the customers were invoiced. This happened to people who did not have the needed flood insurance, but may have had wind insurance and significant need. Confusion and legal disputes followed.

Given the confusion, uncertainty about insurance reliability continues. Some respondents do not view insurance as the security blanket it was once considered.

- "There certainly was a lot of uncertainty about the insurance and what, how it was going to pay and what it was going to pay and not going to pay. And I think that continues. I think you could look at your policy now and the next storm we gonna wonder, what's going to be covered? What are they going to pay?" —Focus Group Participant, Moss Point

Many reported discontinuing insurance in order to have enough funds to simply live off of given the increased cost of living experienced since the storm.

Psychological issues surrounding recovery

After the storm people were wandering around in shock, not knowing what to do next. People wandering around just after the storm departed were described in one focus group as "zombies." Grief counseling for large groups of people was of particular need. Respondents reported knowing of suicides due to the shock and helplessness that some storm victims felt. For many, loss of natural beauty (i.e. trees, wildlife, sounds of crickets for example) was eerie and unsettling.

- " [T]here were no sounds, no birds, no animals running around and when you drive down the street there would be people standing on the side of the road just sort of

like you know, 'What, what am I gonna do? You know?" —Focus Group Participant, Waveland/Bay St. Louis

Respondents noted limited counseling after the storm. Psychological help, particularly grief counseling was in great need. Hurricane Katrina was a strain on physical health, mental health, and marriages. "Recovery tested one's religion and marriage." Some reported that they will never be the same emotionally. August, which is a peak month in the area's hurricane season, is a tense time for those who remember Hurricane Katrina.

Residents were not the only ones in need of psychological assistance. Law enforcement as well as search and rescue teams had difficulty psychologically handling the retrieval and management of the many corpses. Some had to return home.

On the positive side there was a great sense of patience and people helping people. Fewer neighbors were strangers compared to before the storm. Good will was reported to be a common element in communities along the Coast. Even though a better life in terms of physical goods and surroundings could be had elsewhere, people who had to leave the Gulf Coast due to Katrina still call the Coast home and desire to go back to the communities they left.

Housing became more expensive after Katrina

The price of housing itself increased drastically for both single family dwellings and apartments. One respondent reported a rent increase of 45 percent. Adequate housing was in short supply. The number of second homes in the area owned by out of town residents dropped noticeably given the cost to rebuild and insure, further reducing housing supply.

Rebuilding was slowed by planning and code issues

Building back bigger and better has its advantages but it also costs more in terms of periodic maintenance. Larger structures required more electricity, insurance, janitorial labor, etc. The "how should something be built back" and "in what form should it be built back" type of questions are as important as "what should be built back." Budget considerations are important when determining if the bigger and better structure is a wise investment for the long term.

FEMA, county officials, and city officials had differences of opinion regarding rebuilding code. Residents were caught in the middle. Inspectors would not agree on rebuilding standards. As a result, changes to rebuilt structures were required, further slowing recovery. Building codes need to be uniform between FEMA, the county and the city.

Some expressed concern as to the rush to rebuild. Some respondents stated that they felt communities were thrown back together without considering all options and all needs. Despite these difficulties, the many different sources of financial help made a difference in funding repairs to homes (insurance, grants, FEMA, MDA, etc.) Where funds were available, poor infrastructure and housing washed away by the storm were replaced by good quality housing and infrastructure.

5.2 Discussion

Focus groups complement the interview data collection method in that "they not only allow analysis of statement and reports about experiences and events, but also of the

interactional context in which these statements and reports are produced" (Barbour 2007, 1). Respondents had numerous comments about the generosity of a great number of organizations and individuals that assisted with recovery needs. FEMA, MEMA, SBA, the military and a wide variety of other governmental groups provided critical response and recovery goods and services. Respondents also noted volunteers and resources pouring in from the Red Cross, Salvation Army and numerous faith-based groups without whom recovery would have been much more difficult.

Respondents were deeply concerned about issues surrounding insurance. Insurance was clearly the number one concern on the minds of respondents. Confusion regarding insurance services seemed to abound with many believing that the purchase of one type of insurance product would cover them for all hazards. Clearly, insurance companies should be advised to make certain their customers understand coverage limitations. Regardless, the increasing cost of insurance has resulted in a great deal of uncertainty and financial hardship for residents along the Coast. An unknown number of residents cannot afford housing and insurance together, leaving many with the decision to either forgo insurance in order to continue living in the area or moving away from the area entirely. The potential number of uninsured residents will have enormous implications at the time another highly destructive storm moves through the area.

One of the biggest concerns with respect to preparation is that time will lull people into a comfort zone that will keep them from hurricane readiness. Respondents believe that living in the Gulf Coast means a measure of uncertainty with respect to storm related disasters. Residents must learn how to prepare themselves for disasters, know what their options for recovery are and pass this knowledge down to future Coast residents.

6. DESCRIPTIVE ANALYSIS OF SURVEY RESULTS

The third stage of data collection involved a non-random survey of Gulf Coast residents to collect data for modeling. The Team conducted these questionnaires in late spring and early summer of 2011 in the Mississippi coastal communities of Waveland/Bay St. Louis, Long Beach, Gulfport, Biloxi, D'Iberville, Ocean Springs, Gautier, ad Moss Point. A survey was used within this research to ascertain the effects of Hurricane Katrina through a series of questions seeking both qualitative and quantitative data regarding individual experience following the disaster. This method allows such information to be collected from large samples of people in comparison to the interview (Report Section 4) and focus group methods (Report Section 5). Survey questions solicited information from respondents regarding:

- Residence
- Preparation for Hurricane Katrina
- Recovery from Hurricane Katrina
- Employment and income
- General demographics.

A total of 1,825 completed questionnaires provide the data needed to model disaster resiliency and recovery (see Report Sections 7 and 8). The residence and employment questions were asked for each of three points in time: August 29, 2005 just prior to Hurricane Katrina landfall; December 2007 just prior to the national recession; and current*. The survey was administered online through the software Survey Monkey as well as through paper surveys when the online survey proved not to capture as many minority persons as initially expected. Appendix K provides a literature review of the field research method of collecting survey data. Appendix L provides a thorough description of the instrument development and methods used by the Team to collect responses. Section 6.1 provides a description of the survey findings.

6.1 Survey Results

The survey results are described in this section supported with figures. The data tables for all close-ended questions are available in Appendix Q.

6.1.1 Hurricane Katrina Questions

The first question on the survey asked respondents "As of August 29, 2005, what was your employment status?" The following options were provided: employed; not working but looking for a job; not employed and not looking for a job, because full-time student; Not employed and not looking for a job because performing domestic duties; not employed and not looking for a job because retired; and not employed and not looking for a job because disabled. Of the 2,220 respondents who accessed the questionnaire, 2,198 answered the question and 22 did not provide an answer. A strong majority (74.0%) of respondents

* "Current" herein refers to the time that each questionnaire was taken. All questionnaires were collected between March 31, 2011, and July 8, 2011.

indicated that they were employed. Of the respondents, 26 percent were not employed—13.3 percent were not looking for a job due to being a full-time student; 6.4 percent were not looking for a job due to being retired; 2.9 percent were looking for a job; 2.8 percent were not looking for a job because they were performing domestic duties; and 0.6 percent were not looking for a job due to being disabled.

The second question on the questionnaire asked respondents "In what sector were you employed when Hurricane Katrina hit on August 29, 2005?" The following twenty options were provided*: agriculture, forestry, fishing, and hunting; mining, quarrying, and oil and gas extraction; construction; manufacturing; wholesale trade; retail trade; transportation and warehousing; information; finance and insurance; real estate; professional and technical services; management of companies and enterprises; administration and waste services; educational services; healthcare and social assistance; arts, entertainment, and recreation (included casinos); accommodation and food services; other services, except public administration; public administration; and military. Additionally, respondents were given the option to specify an unlisted employment sector by selecting "Other." Of the 2,220 respondents who accessed the questionnaire, 1,610 answered the question and 610 did not provide an answer. "Educational services" was indicated with the highest frequency at 38 percent†; followed by "Other" at 12.6 percent; "Healthcare and social assistance" at 10.9 percent; "Professional and technical services" at 7.6 percent; "Retail trade" at 5.0 percent; "Arts, entertainment, and recreation (includes casinos)" at 4.0 percent; "Finance and insurance" and "Construction" each at 3.1 percent; "Manufacturing" at 3.0 percent; "Accommodation and food services" at 2.6 percent; "Management of companies and enterprises" at 1.6 percent; "Public administration" and "Military" each at 1.5 percent; "Other services, except public administration" at 1.4 percent; and "Real estate" at 1.0 percent. Finally, six sectors were selected by less than one percent of respondents—"Information," "Transportation and warehousing," "Agriculture, forestry, fishing, and hunting," "Wholesale trade," "Administration and waste services," and "Mining, quarrying, and oil and gas extraction" at 0.9, 0.8, 0.6, 0.2, 0.2, and 0.2 percent, respectively.

The third question on the questionnaire asked respondents, "How long had you been employed in the same job when Hurricane Katrina hit on August 29, 2005?" Respondents were instructed to select one answer of the following: less than 3 months; 3-6 months; 7-11 months; 1-2 years; 3-5 years; 6-10 years; and more than 10 years. Of the 2,220 individuals who looked at the survey instrument, 1,601 answered this question and 619 did not answer this question. Of those who answered, 36.9 percent indicated that they had been employed in the same job more than 10 years when Hurricane Katrina hit, 20.8 percent had been at the same job 3-5 years, 15.3 percent had been at the same job 6-10 years, 15.1 percent had been at the same job 1-2 years, 5.2 percent had been at the same job less than three months, 3.8 percent had been at the same job 7-11 months, and 2.9 percent had been at the same job 3-6 months.

The fourth question on the questionnaire asked respondents, "As of August 29, 2005, how were you paid?" Respondents were instructed to select either hourly wage or salary. Of the 2,200 individuals who looked at the questionnaire, 1,582 answered this question and

* Sectors provided aligned with US Bureau of Labor Statistics (BLS) data.

† School systems, as well as Mississippi Gulf Coast Community College (MCGCC), were approached to participate in the survey, thereby explaining the oversampling of educators.

638 did not answer this question. Of those who answered, 65.8 percent indicated they were paid by salary and the remainder (34.2%) indicated they were paid an hourly wage.

Those who indicated they were paid hourly were asked, "How much were you paid per hour?" Respondents were instructed to select one of the following options: minimum wage; $5.16-$7.50; $7.51-$10.00; $10.01-$12.00; $12.01-$15.00; $15.01-$20.00; or more than $20.00. Of the 542 individuals who were paid hourly, 19.4 percent were paid more than $20.00 per hour, 12.5 percent were paid $15.01 to $20.00 an hour, 16.1 percent were paid $12.01 to $15.00 an hour, 13.3 percent were paid $10.01 to $12.00 an hour, 23.8 percent were paid $7.51 to $10.00 an hour, 10.7 percent were paid $5.16 to $7.50 an hour, and 4.2 percent were paid minimum wage.

Those who indicated they were paid by salary were asked, "How much was your annual salary?" Respondents were instructed to select one of the following options: $19,999 and under; $20,000 to $29,999; $30,000 to $39,999; $40,000 to $49,999; $50,000 to $59,999; $60,000 to $69,999; $70,000 to $79,999; $80,000 to $89,999; $90,000 to $99,999; $100,000 to $150,000; or more than $150,000. Of the 1,004 individuals who answered this question, 1.8 percent were paid more than $150,000, 3.8 percent were paid between $100,000 and $150,000, 4.1 percent were paid between $90,000 and $99,999, 4.3 percent were paid between $80,000 and $89,999, 6.5 percent were paid between $70,000 and $79,999, 7.5 percent were paid between $60,000 and $69,999, 13.4 percent were paid between $50,000 and $59,999, 23.8 percent were paid between $40,000 and $49,999, 20.0 percent were paid between $30,000 and $39,999, 11.5 percent were paid between $20,000 and $29,999, and 2.4 percent were paid $19,999 or under.

Respondents were then asked to provide their address as of August 29, 2005, when Hurricane Katrina made landfall. Figures 6.1 and 6.2 provide the geocoded street addresses that respondents provided for their residence when Hurricane Katrina hit the Gulf Coast by street and census block, respectively.

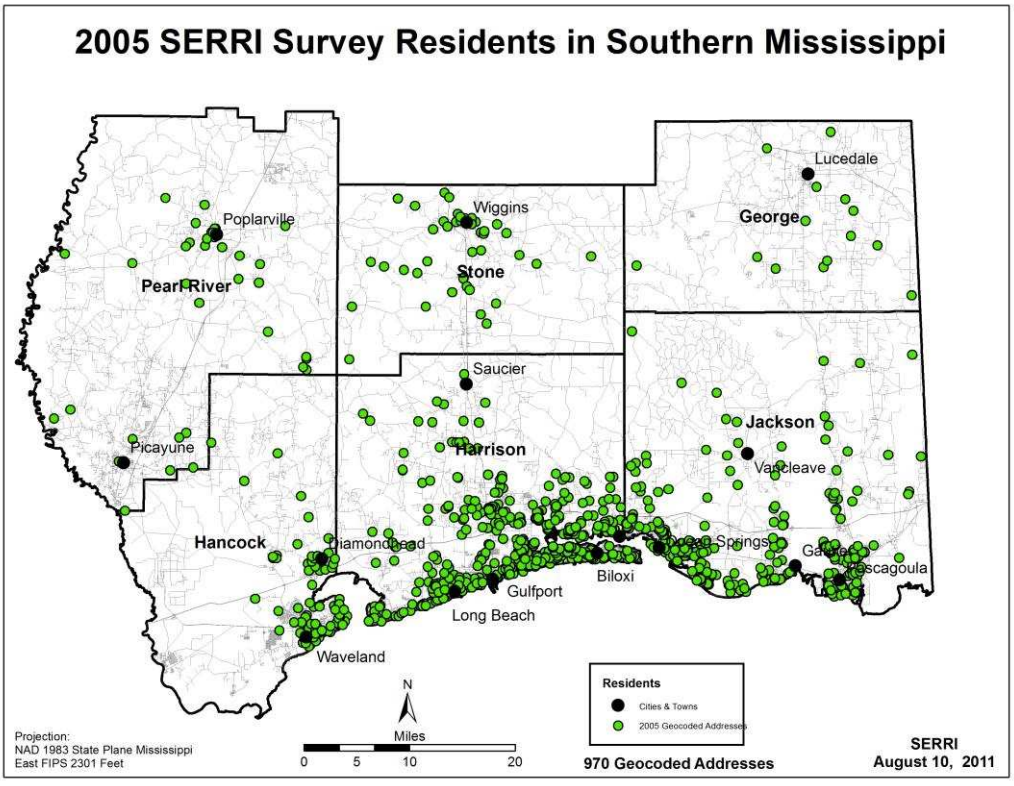


Figure 6.1: Pre-Katrina Geocoded Street Addresses 2005 (Source: Authors 2011)

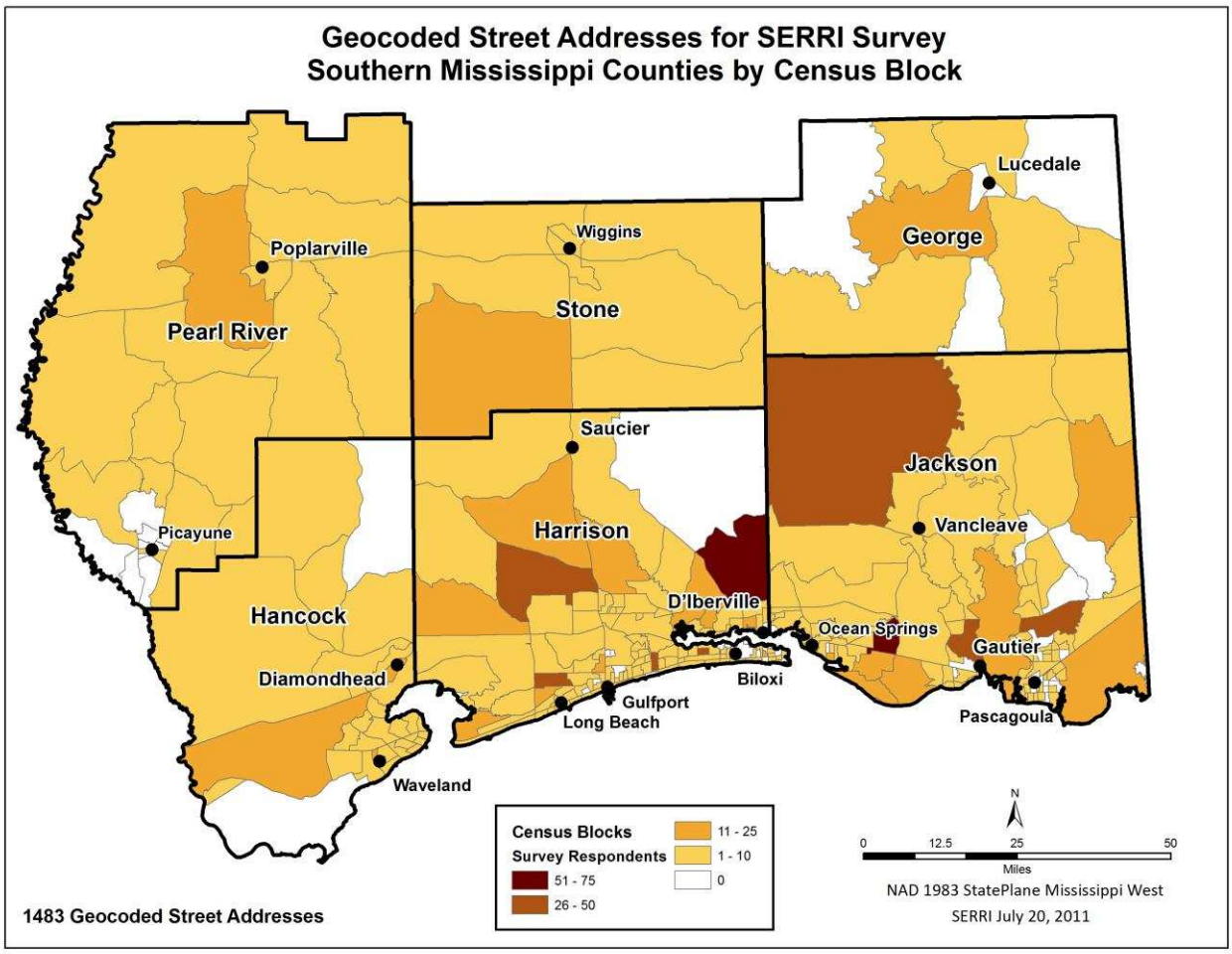


Figure 6.2: Pre-Katrina Geocoded Street Addresses by Census Block (Source: Authors 2011)

The next question asked respondents, "Did you rent or own your residence?" Respondents were asked to choose either rent, own, did not pay rent (lived with family or friends), or other. If "other" was selected, respondents were asked to specify. Of the 2,200 individuals who looked at the questionnaire, 2,044 answered this question and 176 did not answer this question. Of those who answered, 66.3 percent owned their residence, 17.5 percent did not pay rent, 14.0 percent rented, and 2.2 percent indicated that these selections did not apply to their situation (see Figure 6.11). When asked to specify, answers varied, but included housing provided by church, military housing, university student housing, and company housing.

Respondents were asked, "Did you evacuate for Hurricane Katrina?" and were given the option of answering "yes" or "no." Of the 2,200 individuals who viewed the questionnaire, 2,034 answered this question and 186 did not answer this question. Of those who answered, 51.4 percent did not evacuate and 48.6 percent did evacuate. Those who evacuated were then asked, "How long were you away from your city/town following Hurricane Katrina?" Respondents were asked to select one of the following: 1-3 days, 4-6 days, 1-2 weeks, 3-4 weeks, or 5 weeks or more. Of the 988 individuals who indicated that they evacuated, 977

answered this question. Of these 977, 34.0 percent evacuated for one to three days, 19.1 percent evacuated for four to six days, 21.1 percent evacuated for one to two weeks, 9.7 percent evacuated for 3-4 weeks, and 16.1 percent evacuated for five weeks or more (see Figure 6.3).

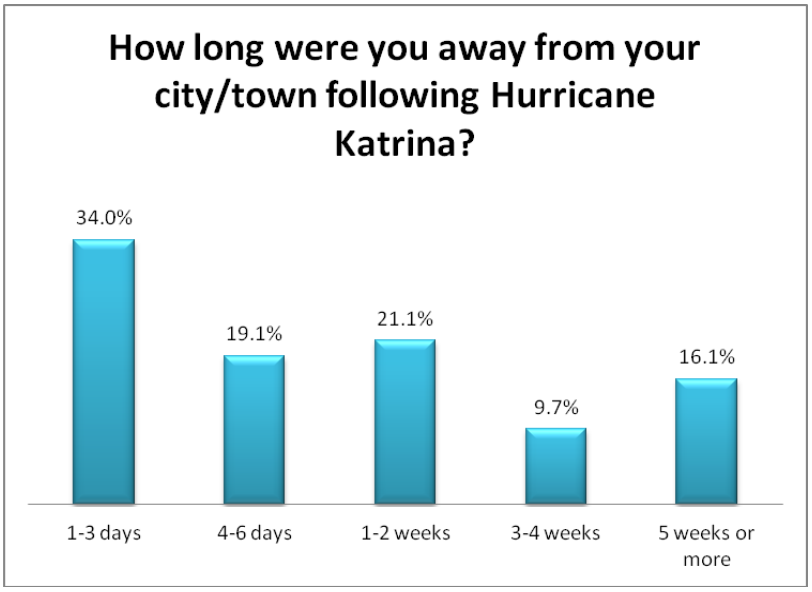


Figure 6.3: Post-Katrina Length of Evacuation (Source: Authors 2011)

Next, those who evacuated were asked, "How much money did you spend during your evacuation?" Respondents were asked to select one of the following: $0-$100; $101-$250; $251-$500; $501-$1,000; or more than $1,000. Of the 988 respondents that indicated they evacuated, 977 answered this question. Of those who answered, 10.7 percent spent less than $100, 13.8 percent spent between $101 and $250, 24.0 percent spent between $251 and $500, 18.5 percent spent between $501 and $1,000, and 33.0 percent spent more than $1,000 (see Figure 6.4).

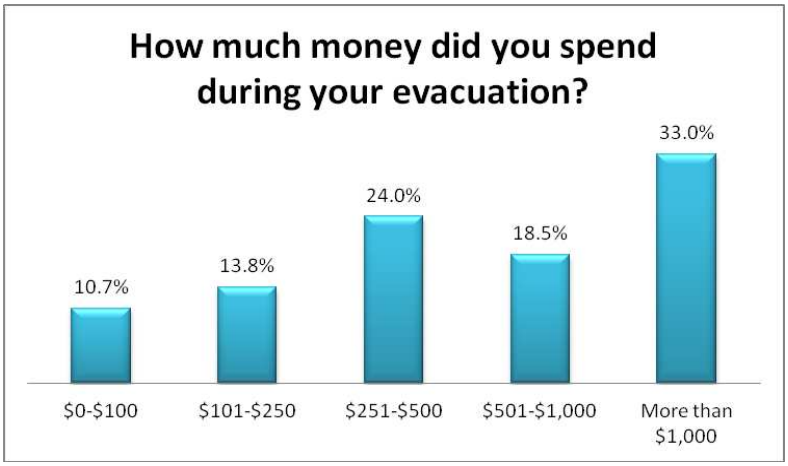


Figure 6.4: Post-Katrina Evacuation Cost (Source: Authors 2011)

All survey respondents were asked, "What were your sources of news and information regarding food, water distribution, and relief supplies for the first two weeks after the storm?" Respondents were instructed to check all that apply and given the following options: radio, television, internet, newspaper, word of mouth, visit to city hall, visit to grocery store, visit to hurricane shelter, volunteers, neighbors, churches, public safety officials, cell phone (text, push-to-talk), phone calls (landline), HAM radio, or fliers. Additionally, respondents were given the option to indicate that they had not returned to their community in the first two weeks after the storm or "other." Of the 2,220 individuals who viewed the questionnaire, 2,017 answered this question and 203 did not answer this question. Of those who responded, 63.5 percent received this news and information by word of mouth, 55.5 percent received it by radio, 48.1 percent received it from neighbors, 33.8 percent received it by cell phone, 34.5 percent received it from television, 27.2 percent received it from churches, 23.3 percent received it from volunteers, 17.9 percent received it from newspapers, 15.0 percent were not in the community the first two weeks after the storm, 13.3 percent received the information from public safety officials, 8.5 percent received it on the internet, 8.4 percent received it at the grocery store, 7.4 percent received it through landline telephones, 4.2 percent received it through visiting a hurricane shelter, 1.9 percent received it by visiting city hall, 1.5 percent received it by HAM radio, and 0.9 percent received it from fliers (see Figure 6.5). Furthermore, 7.4 percent of respondents indicated that they received news and information regarding food, water distribution and relief supplies for the first two weeks after the storm from sources not listed. Other sources included business connections, driving around and looking at places, and military briefings.

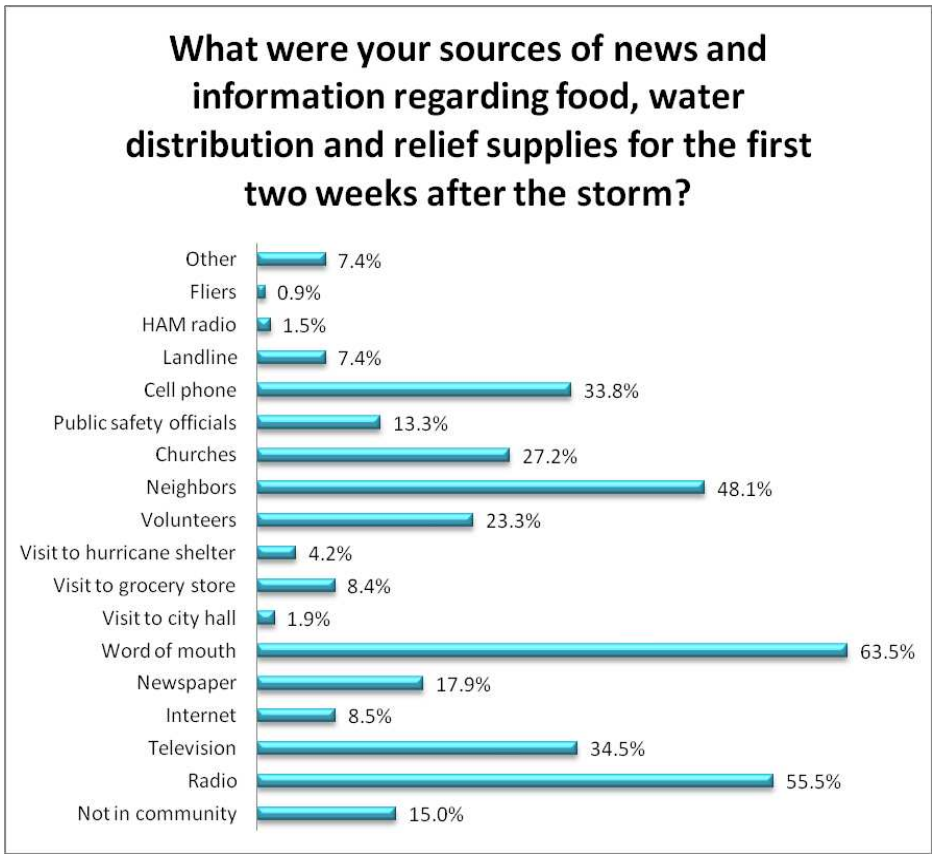


Figure 6.5: Post-Katrina Sources of Information (Source: Authors 2011)

The next question asked respondents, "In the hurricane affected areas, how soon was it before you were able to use debit/credit cards?" Respondents were instructed to select one of the following: immediately after the storm, 1-3 days, 4-7 days, 15-30 days, more than 30 days, "I do not know," or "Do not use debit/credit cards." Of the 2,220 individuals who viewed the questionnaire, 1,990 respondents answered this question and 230 did not answer this question. Of those who answered, 33.3 percent indicated that they do not know, 18.3 percent replied that they were able to use debit/credit cards within eight to fourteen days, 14.6 percent replied fifteen to thirty days, 13.0 percent replied four to seven days, 4.9 percent replied one to three days, and 2.6 percent replied that they were able to use debit/credit cards immediately after the storm. Additionally, 5.9 percent responded that they do not use credit/debit cards.

Survey respondents were then asked, "Which of the following businesses was the most helpful to you to have immediately following Hurricane Katrina?" Respondents were directed to check one of the following options: casinos, large retailers (Wal-Mart, Kmart, etc.), small retailers, building supply/home furnishings (Lowe's, Home Depot, etc.), banks, hotels/motels, or other. Those who selected other were asked to specify. Of the 2,220 individuals who viewed this questionnaire, 1,930 answered this question and 290 did not answer this question. Of those who responded, 35.1 found large retailers to be the most helpful immediately following Hurricane Katrina, 17.0 percent found building supply/home furnishing stores to be the most helpful, 15.5 percent indicated small retailers, 14.6 percent indicated banks, 2.6 percent indicated hotels/motels, and 0.4 percent found casinos to be the most helpful. Additionally, 14.8 percent of respondents provided other non-listed businesses to be the most helpful.

The next question asked respondents, "Were you or someone you know a victim of any of the following crimes stemming from Hurricane Katrina?" Respondents were instructed to check all that apply of the following: mugging, robbery, burglary/break-in, rape/sexual assault, assault/battery, fraud (experienced or attempted), none, or other (please specify). Of the 2,220 individuals who viewed the questionnaire, 1,920 answered this question and 300 did not answer this question. Of those who responded, a strong majority (70%) indicated that they were not, nor was anyone they knew, a victim of crime following Hurricane Katrina. However, 16.0 reported being the victim of or knowing someone who was the victim of fraud, 12.0 percent reported burglary/break-in, 10.2 percent reported robbery, 1.6 percent reported mugging, 1.3 percent reported assault/battery, and 0.8 percent reported rape/sexual assault. Additionally, 3.8 percent of respondents selected "other." Specified entries for this selection included looting, drugs, illegal use of utilities, and price gouging.

Respondents were then asked, "When Hurricane Katrina struck on August 29, 2005, did you have any of the following types of insurance?" They were instructed to check all that apply for the following: did not have insurance, flood insurance, wind insurance, homeowner's insurance, renter's insurance, or other (please specify). Of the 2,220 individuals who viewed the questionnaire, 1,963 answered this question and 257 did not answer this question. Of those who answered, 76.6 percent had homeowner's insurance, 35.5 percent had flood insurance, 20.1 percent had flood insurance, 16.3 percent had a form of insurance that is not listed, 5.0 percent had renter's insurance, and 16.3 percent did not have insurance (see Figure 6.6). Of those who specified that they had a form of insurance that was not listed, those commonly provided include car insurance, health insurance, life insurance, covered under parent/guardian's insurance, boat insurance, earthquake insurance, and specialty insurance coverage, such as antique car and builder's risk.

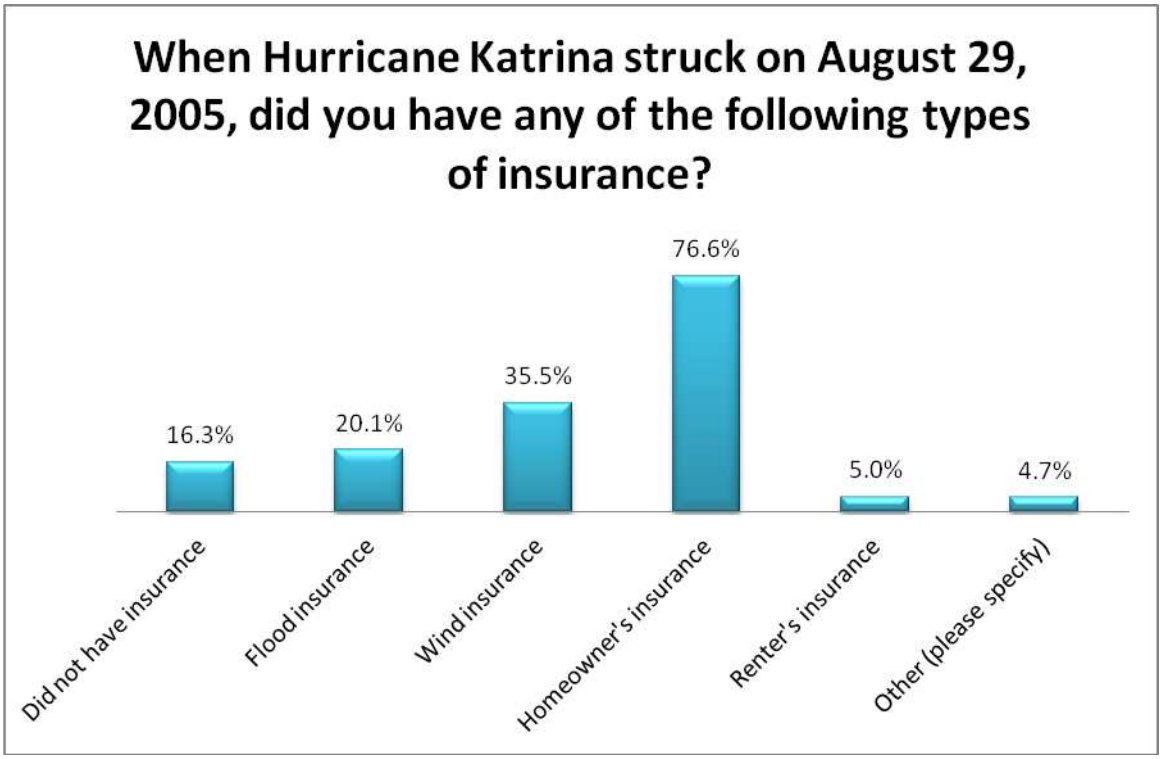


Figure 6.6: Pre-Katrina Insurance Coverage (Source: Authors 2011)

All respondents were then asked, "What was your NON-REIMBURSED property loss as a result of Hurricane Katrina?" Directions asked respondents to check one of the following options: no non-reimbursed loss; $1-$100; $101-$250; $251-$500; $501-$1,000; $1,001-$5,000; $5,001-$10,000; $10,001-$25,000; $25,001 to $50,000; $50,001-$100,000; or more than $100,000. Of the 2,220 individuals who viewed this questionnaire, 1,894 answered this question and 326 did not answer it. Of those who responded, 25.7 percent reported not having any non-reimbursed loss, 1.4 percent reported non-reimbursed property loss of less than $100 loss, 1.4 percent reported losses between $101 and $250 in non-reimbursed property loss, 2.6 percent reported between $251 and $500, 6.9 percent reported between $501 and $1,000, 19.2 percent reported between $1,001 and $5,000, 10.2 percent reported between $5,001 and $10,000, 9.5 percent reported between $10,001 and $25,000, 7.0 percent reported between $25,001 and $50,000, 8.8 percent reported between $50,001 and $100,000, and 7.4 percent reported more than $100,00 in non-reimbursed property loss as a result of Hurricane Katrina (see Figure 6.7).

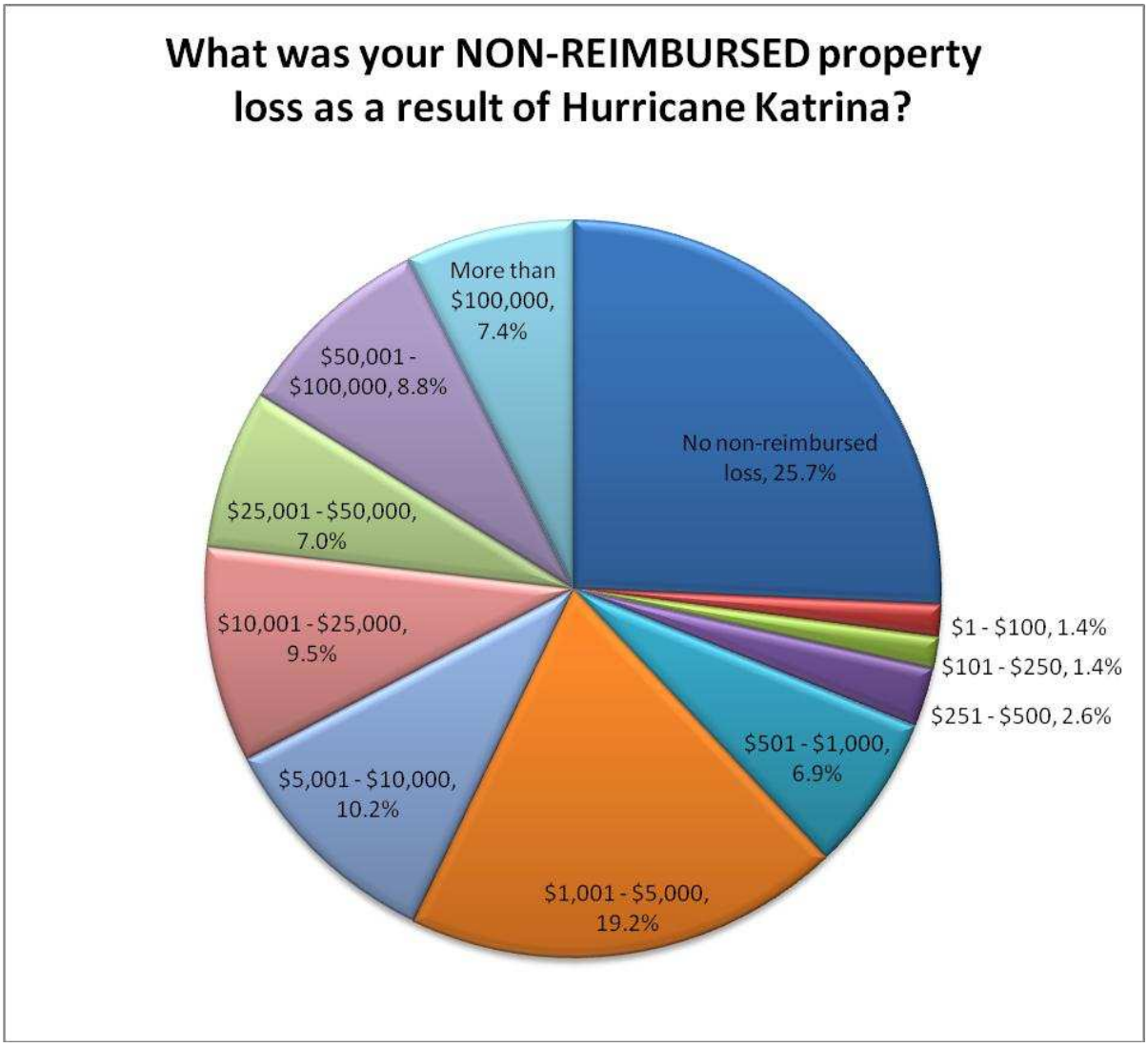


Figure 6.7: Post-Katrina Non-Reimbursed Property Loss (Source: Author 2011)

Still on the topic of reimbursement, the next question asked respondents, "With what agency did you file a claim for damages due to Hurricane Katrina?" Respondents were instructed to check all that apply of the following: did not file a claim, FEMA (Federal Emergency Management Agency), MEMA (Mississippi Emergency Management Agency), SBA (Small Business Administration), MDA (Mississippi Development Authority), insurance, or other (please specify). Of the 2,220 individuals who viewed this questionnaire, 1,930 answered this question and 290 did not answer this question. Of those who answered, 61.9 percent filed a claim for damages with insurance, 53.3 percent filed with FEMA, 19.8 percent filed with SBA, 11.3 percent filed with MDA, 9.7 percent filed with MEMA, and 15.7 did not file a claim for damages due to Hurricane Katrina. Additionally, 2.9 percent indicated that they filed with an agency not listed (see Figure 6.8). The most common agencies specified as "other" were Red Cross and unemployment.

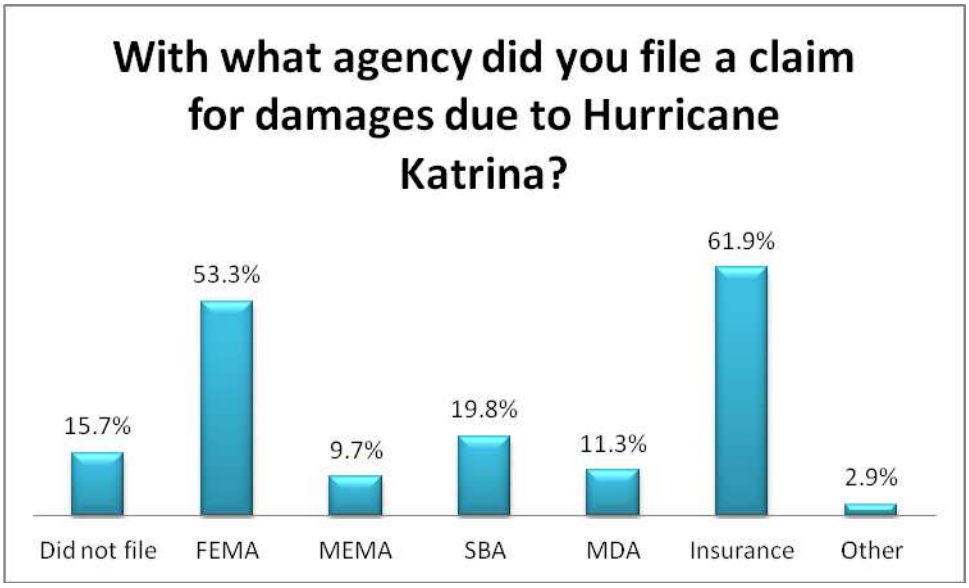


Figure 6.8: Post-Katrina Damage Claim Agencies (Source: Authors 2011)

All respondents were then asked, "How much did you receive from insurance and other cash grant sources?" Respondents were instructed to check one of the following options: did not receive any insurance payout or cash grant; $1-$10,000; $10,001-$25,000; $25,001-$50,000; $50,001-$100,000; $100,001-$200,000; $200,001-$300,000; or more than $300,000. Of the 2,220 individuals who viewed this questionnaire, 1,836 answered this question and 384 did not answer this question. Of those who answered it, 22.5 percent did not receive any insurance payout or cash grant, 19.8 received less than $5,000, 12.9 percent received between $5,001 and $10,000, 16.0 percent received between $10,001 and $25,000, 9.3 percent received between $25,001 and $50,000, 8.8 percent received between $50,001 and $100,000, 7.7 percent received between $100,001 and $200,000, 1.9 percent received between $200,001 and $300,000, and 1.2 percent received more than $300,000 (see Figure 6.9).

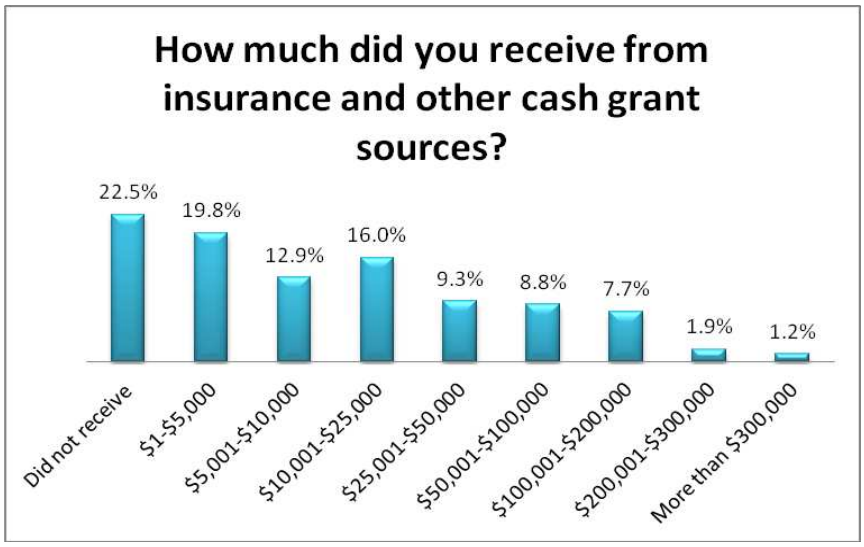


Figure 6.9: Post-Katrina Insurance/Cash Grants Amounts (Source: Authors 2011)

Next, respondents were asked, "Which sources provided assistance to you following Hurricane Katrina?" and instructed to check all that apply of the following options: did not receive assistance; Red Cross; Salvation Army; military; local government; church or faith-based group; Rotary Club; Lions Club; Kiwanis Club; place of work; local business, not place of work; friends; family; neighbors; or other (please specify). Of the 2,220 individuals who viewed the questionnaire, 1,908 answered this question and 312 did not answer this question. Of those who answered this question, 62.3 percent received assistance from Red Cross, 61.4 percent received assistance from family, 54.8 percent received assistance from friends, 51.7 percent received assistance from church or faith-based groups, 42.5 percent received assistance from neighbors, 27.5 percent received assistance from their place of work, 27.3 percent received assistance from the Salvation Army, 23.7 percent received assistance from the military, 11.0 percent received assistance from their local government, 6.8 percent received assistance from a source not listed, 6.1 received assistance from a local business (not place of work), 1.2 percent received assistance from the Rotary Club, 0.6 percent received assistance from the Lions Club, and 0.3 percent received assistance from the Kiwanis Club (see Figure 6.10). Furthermore, 7.1 percent of respondents answered that they did not receive assistance. Those who indicated that they received assistance from other sources we asked to specify— common answers included gas stations, shelters, labor unions, schools, and universities.

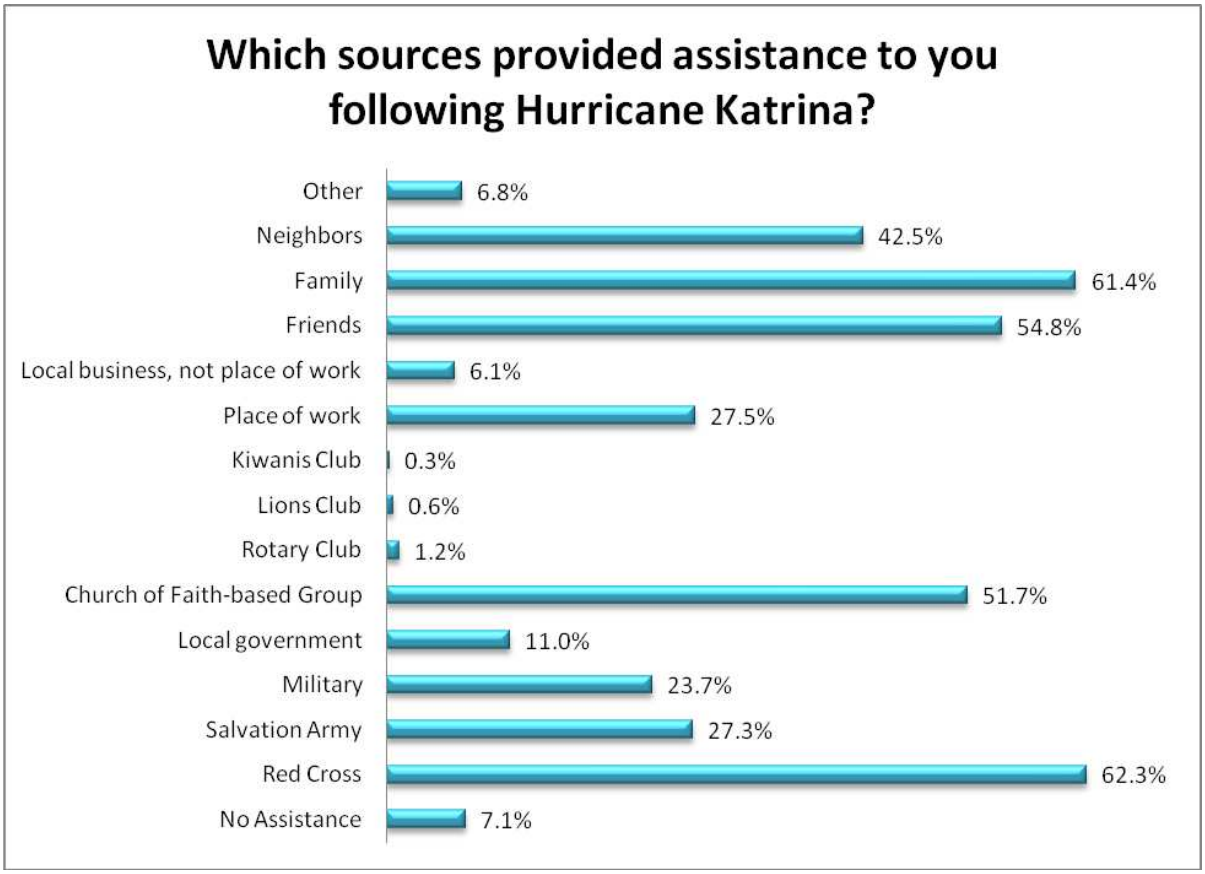


Figure 6.10: Post-Katrina Sources of Assistance (Source: Authors 2011)

Those individuals (1,779) who indicated that they received assistance following Hurricane Katrina were then asked, "What form of assistance did you receive for recovery?" Respondents were instructed to check all that apply of the following options: cash, food and/or water, appliances, transportation, debris removal, clothing, housing, assistance with applying for recovery program, home repair, or other. If "other" was selected, respondents were asked to specify what other assistance they received. Of the 1,779 individuals who were asked this question, 1,741 answered it and 38 did not answer it. Of those who answered it, 87.7 percent received food and/or water, 56.4 percent were assisted with debris removal, 44.3 percent received cash, 34.6 percent were assisted with home repair, 22.8 percent received clothing, 17.7 percent were provided housing, 10.3 percent received assistance with applying for recovery programs, 7.0 percent received appliances, and 4.4 percent received assistance with transportation (see Figure 6.11). Additionally, 6.3 percent received forms of assistance falling outside of the provided categories, such as gas, school supplies, electronic benefit transfer (EBT) cards, generators, beds, toiletries, ice, and tree removal.

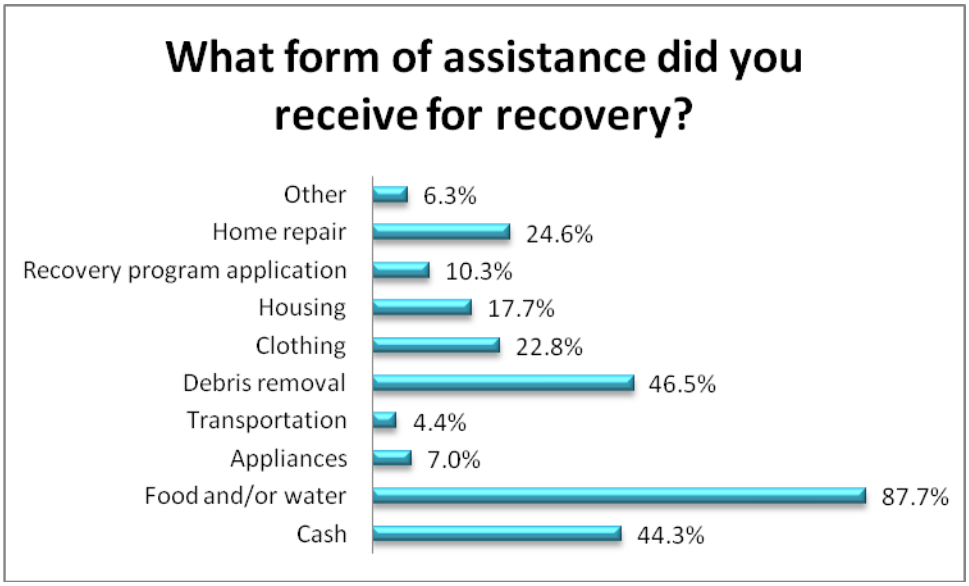


Figure 6.11: Post-Katrina Forms of Assistance (Source: Authors 2011)

Survey respondents were then asked, "How much of your savings did you use for your household's Hurricane Katrina recovery?" Respondents were instructed to select one of the following options: did not use savings; $1-$100; $101-$250; $251-$500; $501-$1,000; $1,001-$5,000; $5,001-$10,000; $10,001-$25,000; $25,001-$50,000; $50,001-$100,000; or more than $100,000. Of the 2,220 individuals who viewed the questionnaire, 1,818 answered this question and 402 did not. Of those who answered, 31.8 percent did not use savings, 1.0 percent used less than $100, 2.5 percent used between $101 and $250, 5.5 percent used between $251 and $500, 10.8 percent used between $501 and $1,000, 21.1 percent used between $1,001 and $5,000, 10.3 percent used between $5,001 and $10,000, 6.9 percent used between $10,001 and $25,000, 5.2 percent used between $25,001 and $50,000, 2.9 percent used between $50,001 and $100,000, and 1.9 percent used more than $100,000 of their savings on their household's Hurricane Katrina recovery.

The next question asked respondents, "Have you moved since Hurricane Katrina hit on August 29, 2005?" and instructs them to select either "yes" or "no." Of the 2,220 individuals who viewed this questionnaire, 1,916 answered this question and 304 did not answer this question. Of those who answered, 61.5 percent have not moved since Hurricane Katrina and 38.5 percent have moved since Hurricane Katrina. Those who indicated they have moved since Hurricane Katrina hit on August 29, 2005 were then asked, "Was your move directly related to Hurricane Katrina?" and instructed to select either "yes" or "no." Of those 737 individuals who were asked this question, 725 answered it and 12 did not answer it. Of those who answered, 49.2 percent replied that their move was not directly related to Hurricane Katrina and 50.8 percent replied that their move was directly related to the storm.

Respondents were then asked, "Did you lose your job as a result of Hurricane Katrina?" and given the option of selecting, "did not have a job," "yes," or "no." Of the 2,220 individuals who viewed the questionnaire, 1,905 answered this question and 315 did not answer this question. Of those who answered, 69.8 percent did not lose their job as a result of Hurricane Katrina and 12.9 did lose their job as a result of the storm. Additionally, 17.3 percent indicated that they did not have a job at that time.

The 246 individuals that reported losing their jobs as a result of Hurricane Katrina were then asked, "How many months were you out of work?" Respondents were instructed to select one of the following answers: less than 1 month; 1-2 months; 3-4 months; 5-6 months; 7-8 months; 9-10 months; 11-12 months; or more than 12 months. Individuals who indicated being out of work more than 12 months were asked to specify the number of months they were out of work. Of the 246 individuals who were asked this question, 208 answered the question and 32 did not answer. Of those who replied that they were out of work less than a year, 13.0 percent were out of work less than 1 month, 16.8 percent were out of work 1-2 months, 21.2 percent were out of work 3-4 months, 16.3 percent were out of work 5-6 months, 9.6 percent were out of work 7-8 months, 5.8 percent were out of work 9-10 months, and 14.9 percent were out of work 11-12 months (see Figure 6.12). Additionally, 34 individuals responded that they were out of work more than a year. The average of the specified responses was 39.8 months and responses ranged from 13 to 72 months.

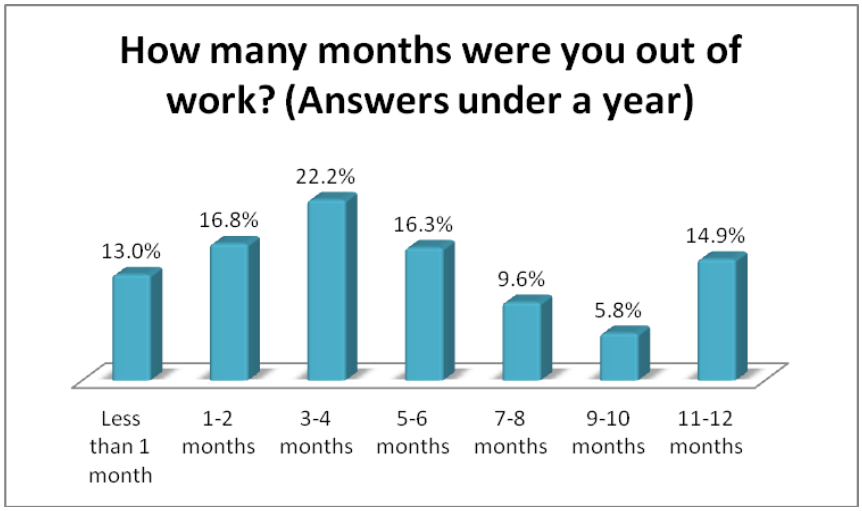


Figure 6.12: Katrina Job Loss Length of Unemployment Under a Year (Source: Authors 2011)

The individuals that reported not having a job at the time of Hurricane Katrina were then asked, "What activities did you engage in during your unemployment period?" Respondents were instructed to select all that applied of the following options: looked for a job, looked for housing, rebuilt my home, sought counseling for trauma, gambled at the casinos, worked for odd/cash jobs, could not work because I had to take care of my children, and other (please specify). Of the 505 individuals who answered this question, 45.0 percent looked for a job, 27.5 percent rebuilt their home, 17.0 percent worked for cash/odd jobs, 15.6 percent looked for housing, 9.3 percent took care of children, 7.3 percent sought counseling for trauma, and 0.4 percent gambled at the casinos (see Figure 6.13). Additionally, 37.2 percent indicated participating in an activity that was not listed. These individuals were then asked to specify the activity. An overwhelming majority of these responses focused on attending school or being retired.

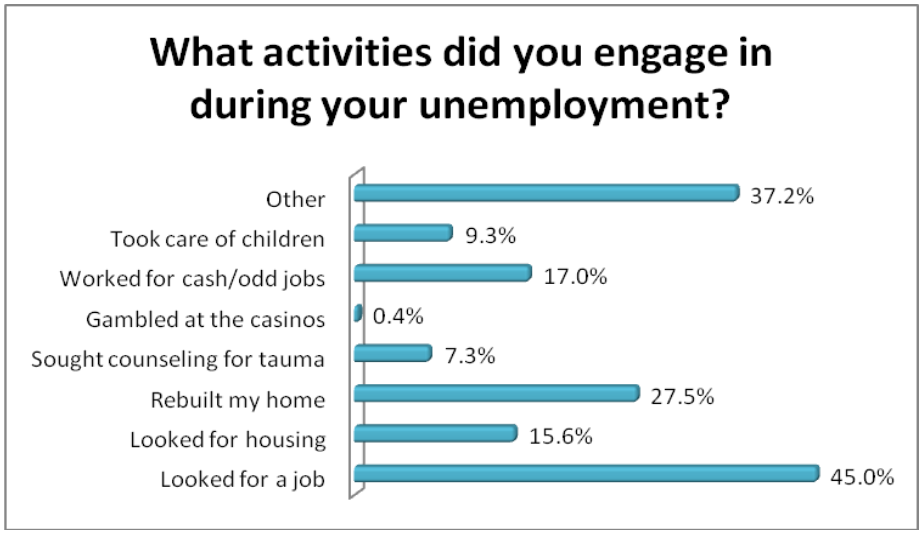


Figure 6.13: Post-Katrina Unemployment Activities (Source: Authors 2011)

6.1.2 December 2007 Recession Questions

The topic of unemployment was then followed up by the question, "What was your employment status as of December 2007?" Respondents were instructed to select one of the following: employed; not working but looking for a job; not employed and not looking for a job, because full-time student; not employed and not looking for a job, because performing domestic duties; not employed and not looking for a job, because retired; and not employed and not looking for a job because disabled. Of the 2,220 respondents who accessed the questionnaire, 1,875 answered the question and 345 did not provide an answer. A strong majority (75.4%) of respondents indicated that they are employed. Of the respondents, 24.6 percent were not employed— 7.8 percent were not looking for a job due to being a full-time student, 7.8 percent were not looking for a job due to being retired, 5.4 percent were looking for a job, 2.6 percent were not looking for a job because they were performing domestic duties, and 1.1 percent were not looking for a job due to being disabled.

The next question on the questionnaire asked respondents "In what sector were you employed when the recession hit in December 2007?" The following twenty options were

provided: agriculture, forestry, fishing, and hunting; mining, quarrying, and oil and gas extraction; construction; manufacturing; wholesale trade; retail trade; transportation and warehousing; information; finance and insurance; real estate; professional and technical services; management of companies and enterprises; administration and waste services; educational services; healthcare and social assistance; arts, entertainment, and recreation (included casinos); accommodation and food services; other services, except public administration; public administration; and military. Additionally, respondents were given the option to specify an unlisted employment sector by selecting "Other." Of the 2,220 respondents who accessed the questionnaire, 1,424 answered the question and 796 did not provide an answer. Of those who answered "educational services" was indicated with the highest frequency at 40.7 percent, followed by "other" at 13.0 percent, "healthcare and social assistance" at 10.3 percent, "professional and technical services" at 7.3 percent, "retail trade" at 4.8 percent, "arts, entertainment, and recreation (includes casinos)" at 2.6 percent, "finance and insurance" and "construction" each at 3.2 percent, "manufacturing" at 2.9 percent, "accommodation and food services" at 2.7 percent, "public administration" at 1.7 percent, "management of companies and enterprises" at 1.1 percent, "military" at 1.1 percent, "other services, except public administration" at 1.8 percent, and "information" at 1.0 percent. Finally, six sectors were selected by less than one percent of respondents— "real estate," "transportation and warehousing," "agriculture, forestry, fishing, and hunting," "wholesale trade," "administration and waste services," and "mining, quarrying, and oil and gas extraction" at 0.7, 0.7, 0.6, 0.2, 0.4, and 0.1 percent, respectively.

The next question asked respondents, "How were you paid when the recession hit in December 2007?" Respondents were instructed to select either hourly wage or salary. On the 2,220 individuals who viewed the questionnaire, 1,416 answered this question and 804 did not answer this question. Of those who were employed, 64.9 percent were paid by salary and 35.1 percent were paid by hourly wage (see Figure 6.14). This is roughly a one percentage point decrease from those who indicated being paid by salary when Hurricane Katrina made landfall.

Those who indicated they were paid hourly when the recession hit in 2007 were asked, "How much were you paid per hour?" Respondents were instructed to select one of the following options: minimum wage; $5.16-$7.50; $7.51-$10.00; $10.01-$12.00; $12.01-$15.00; $15.01-$20.00; or more than $20.00. Of the 497 individuals who were paid hourly, 19.3 percent were paid more than $20.00 per hour, 16.5 percent were paid $15.01 to $20.00 an hour, 10.7 percent were paid $12.01 to $15.00 an hour, 16.5 percent were paid $10.01 to $12.00 an hour, 20.7 percent were paid $7.51 to $10.00 an hour, 10.7 percent were paid $5.16 to $7.50 an hour, and 5.6 percent were paid minimum wage. For a visual comparison of the change in hourly wages between when Hurricane Katrina hit in 2005 and the recession hit in 2007, see Figure 6.14.

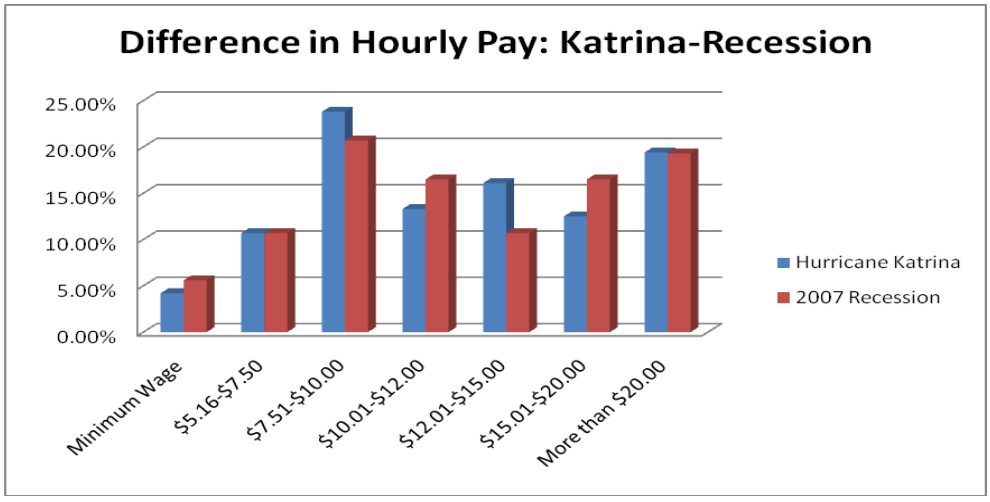


Figure 6.14: Pre-Katrina – December 2007 Hourly Pay (Source: Authors 2011)

Those who indicated they were paid by salary at the time the recession hit in 2007 were asked, "How much was your annual salary?" Respondents were instructed to select one of the following options: $19,999 and under; $20,000 to $29,999; $30,000 to $39,999; $40,000 to $49,999; $50,000 to $59,999; $60,000 to $69,999; $70,000 to $79,999; $80,000 to $89,999; $90,000 to $99,999; $100,000 to $150,000; or more than $150,000. Of the 876 individuals who answered this question, 2.3 percent were paid more than $150,000, 4.1 percent were paid between $100,000 and $150,000, 3.7 percent were paid between $90,000 and $99,999, 3.3 percent were paid between $80,000 and $89,999, 7.2 percent were paid between $70,000 and $79,999, 8.2 percent were paid between $60,000 and $69,999, 16.3 percent were paid between $50,000 and $59,999, 24.7 percent were paid between $40,000 and $49,999, 19.1 percent were paid between $30,000 and $39,999, 7.1 percent were paid between $20,000 and $29,999, and 4.1 percent were paid $19,999 or under. Figure 6.15 compares annual salaries at the time Hurricane Katrina hit in 2005 to annual salaries in December 2007.

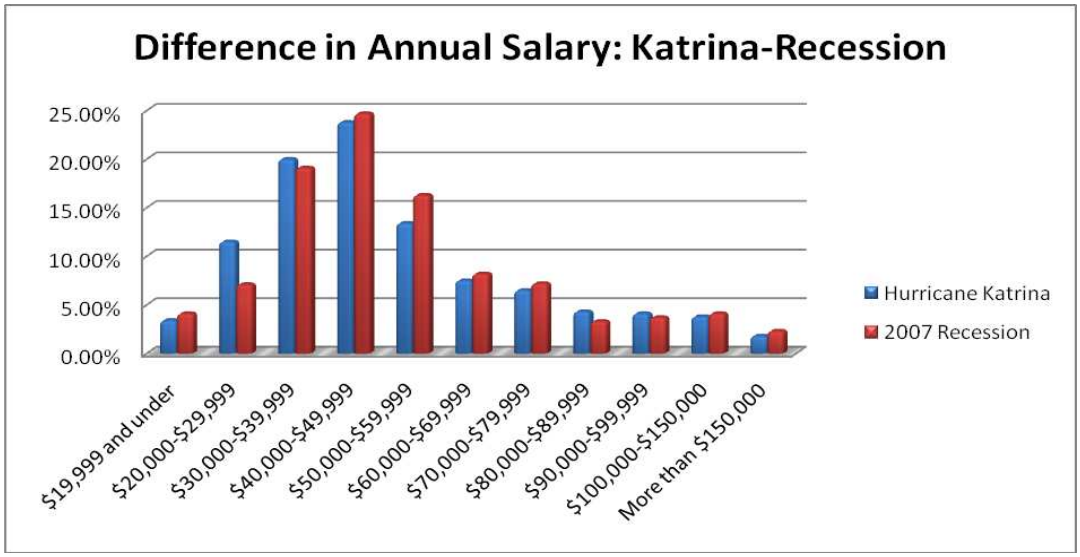


Figure 6.15: Pre-Katrina – December 2007 Annual Salary (Source: Authors 2011)

The next question asked respondents, "Did you lose your job due to the recession that began in December 2007?" Respondents were asked to select one of the following: did not have a job, yes, or no. Of the 1,518 individuals who answered this question, 89.7 percent did not lose their job, 6.5 percent did lose their job, and 3.8 percent did not have a job.

The next question on the questionnaire asked respondents, "How long had you been employed when the recession hit in December 2007?" Respondents are instructed to select one answer of the following: less than 3 months; 3-6 months; 7-11 months; 1-2 years; 3-5 years; 6-10 years; and more than 10 years. Of the 2,220 individuals who looked at the questionnaire, 1,315 answered this question and 905 did not answer this question. Of those who answered, 39.2 percent indicated that they had been employed in the same job more than 10 years when Hurricane Katrina hit, 15.3 percent had been at the same job 6-10 years, 14.8 percent had been at the same job 3-5 years, 17.6 percent had been at the same job 1-2 years, 4.1 percent had been at the same job 7-11 months, 4.3 percent had been at the same job 3-6 months, and 4.6 percent had been at the same job less than three months. Figure 6.16 compares the length of time respondents reported being employed when Hurricane Katrina hit to the length of time they reported being employed when the recession hit in December 2007.

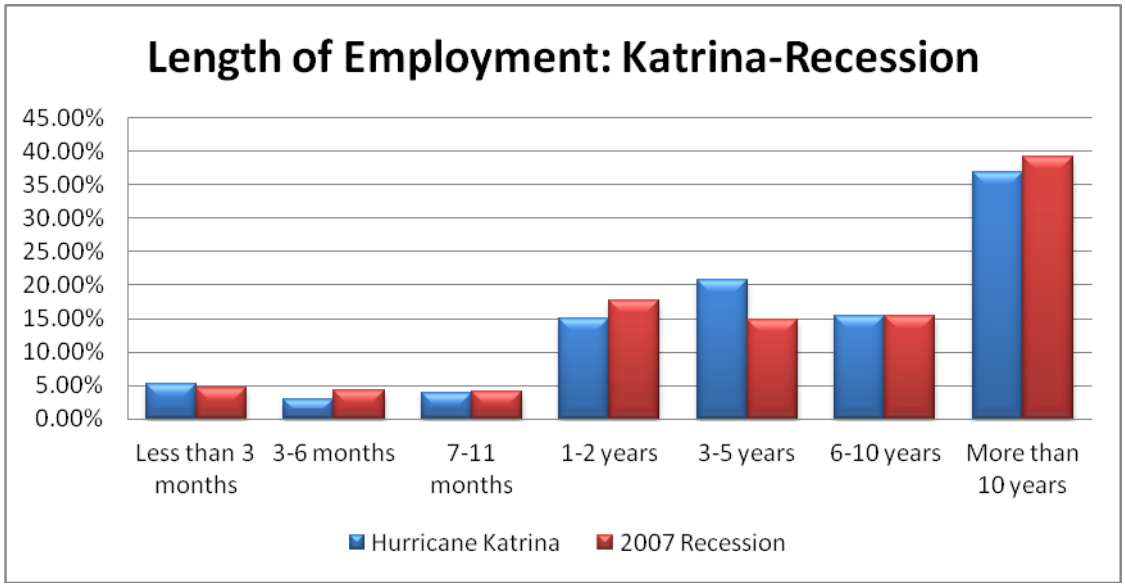


Figure 6.16: Pre-Katrina – December 2007 Lengths of Employment (Source: Authors 2011)

Respondents were then asked, "What was your home address when the recession hit in December 2007?" They were given the option of selecting either "same address of given previously" or "different address." Of the 1,843 individuals who answered this question, 72.3 percent are at the same address as previously given and 27.7 percent were at a different address. Those who reported residing at a different address in December 2007 than when Katrina hit in 2005 were then asked to provide their new address. The 2007 residences of respondents are mapped in Figure 6.17 and compared to 2005 residences in Figure 6.18.

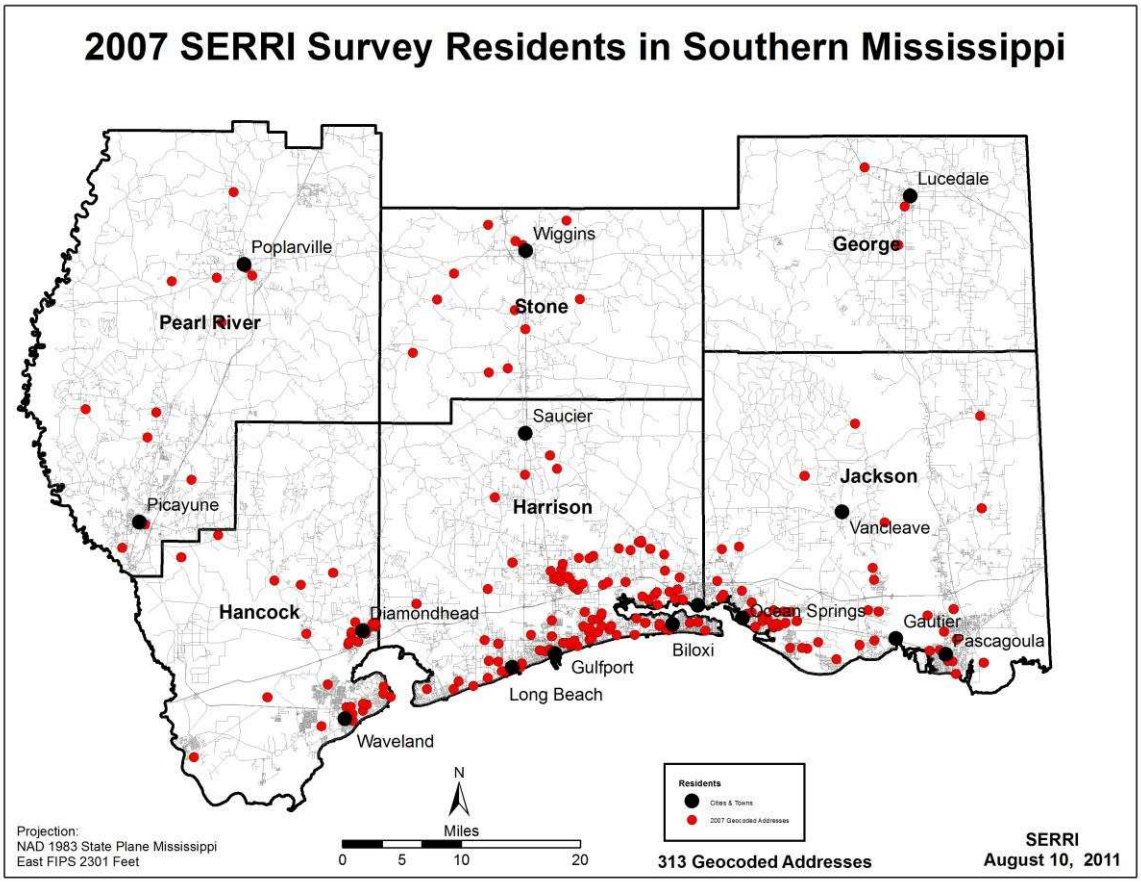


Figure 6.17: 2007 Survey Respondents' Southern Mississippi Residence (Source: Authors 2011)

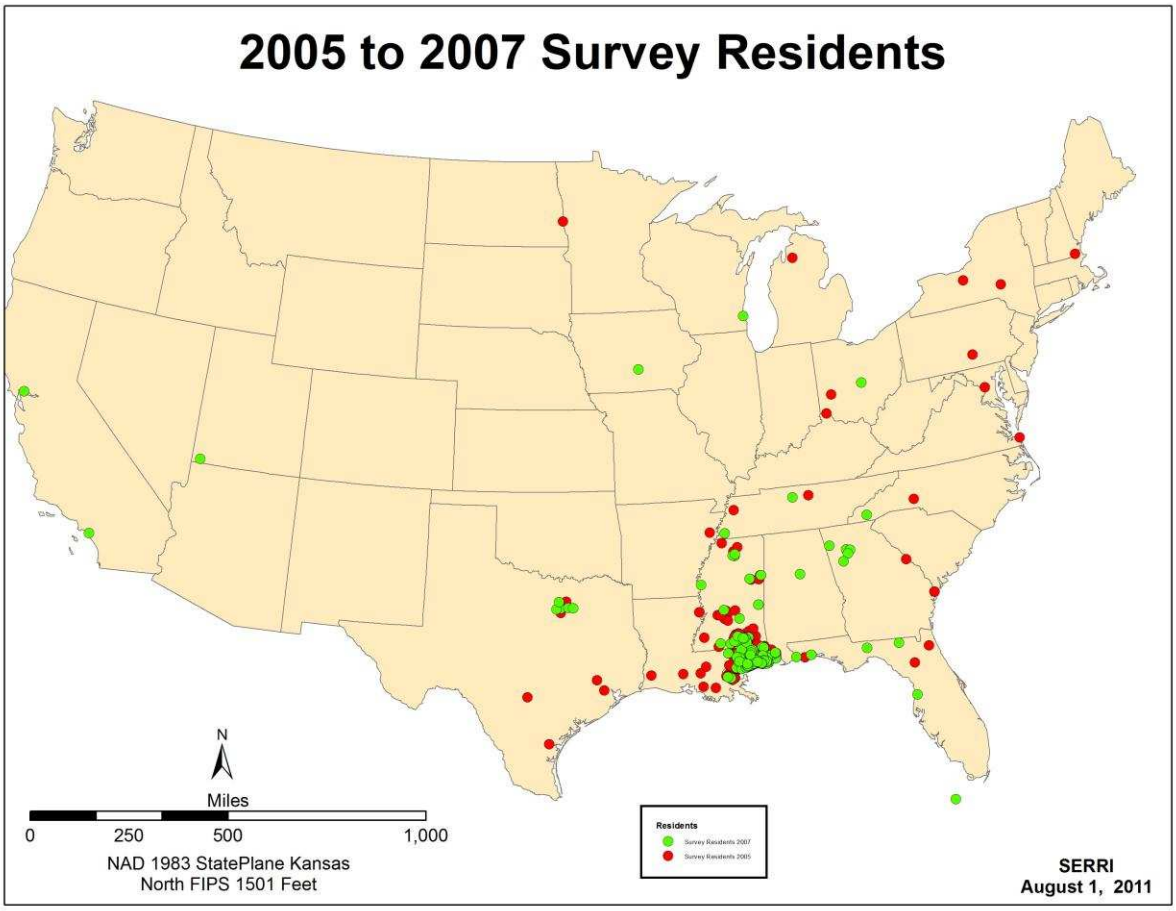


Figure 6.18: 2005 and 2007 Survey Respondents (Source: Authors 2011)

The next question asked all respondents, "Did you rent or own your residence when the recession hit in December 2007?" Respondents were asked to choose one of the following options: rent, own, did not rent (lived with family and friends), or other (please specify). Of the 1,867 individuals who answered this question, 70.3 percent owned their residence when the recession hit in 2007, 14.8 percent did not pay rent, 12.6 rented, and 2.3 percent provided that they living situation was not an option. Those who selected "other" were asked to specify. Among the living situations specified, FEMA trailer and university housing were the most common comments. Figure 6.19 compares living situations in December 2007 to at the time when Hurricane Katrina hit the Gulf Coast.

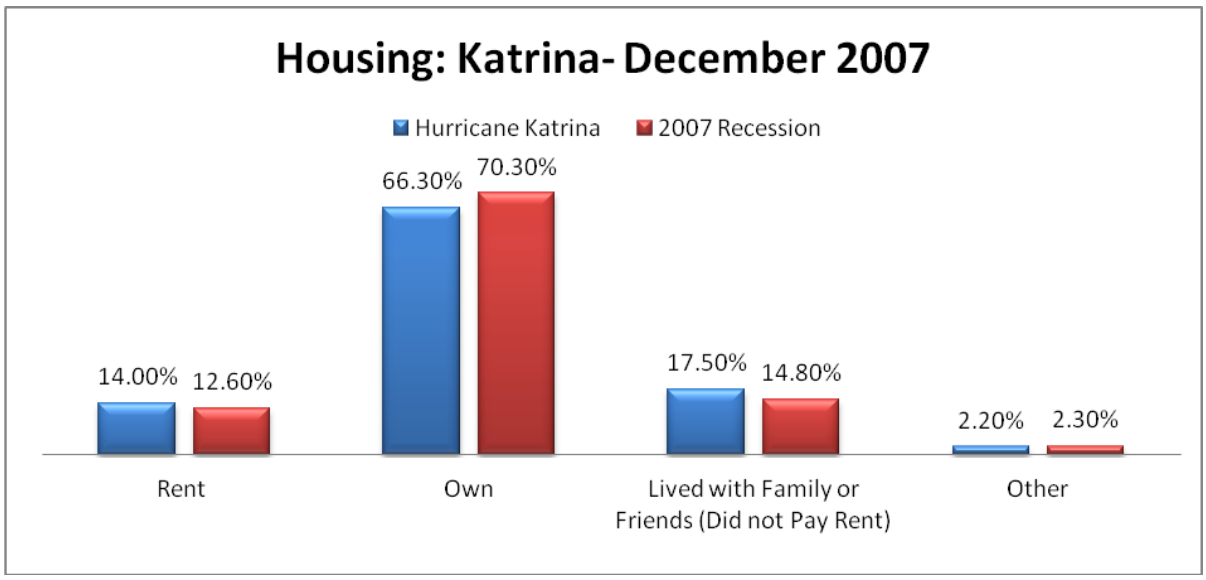


Figure 6.19: Pre-Katrina – December 2007 Living Situation (Source: Authors 2011)

6.1.3 2011 (Current) Questions

The next question asked respondents, "When compared to pre-Katrina levels, how 'recovered' is your city/town?" Respondents were instructed to select one of the following: 100%, 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, or 10% or less. Of the 1,865 individuals who answered this question only 8.7 percent believe their community has recovered 100 percent, while 18.9 percent of respondents reported 90 percent recovery, 19.5 percent reported 80 percent recovery, 19.2 percent reported 70 percent recovery, 12.8 percent reported 60 percent recovery, 9.4 percent reported 50 percent recovery, 5.8 percent reported 40 percent recovery, 3.8 percent reported 30 percent recovery, 1.4 percent reported 20 percent recovery, and 0.5 percent reported that compared to pre-Katrina level, their community has recovered 10 percent or less (see Figure 6.20).

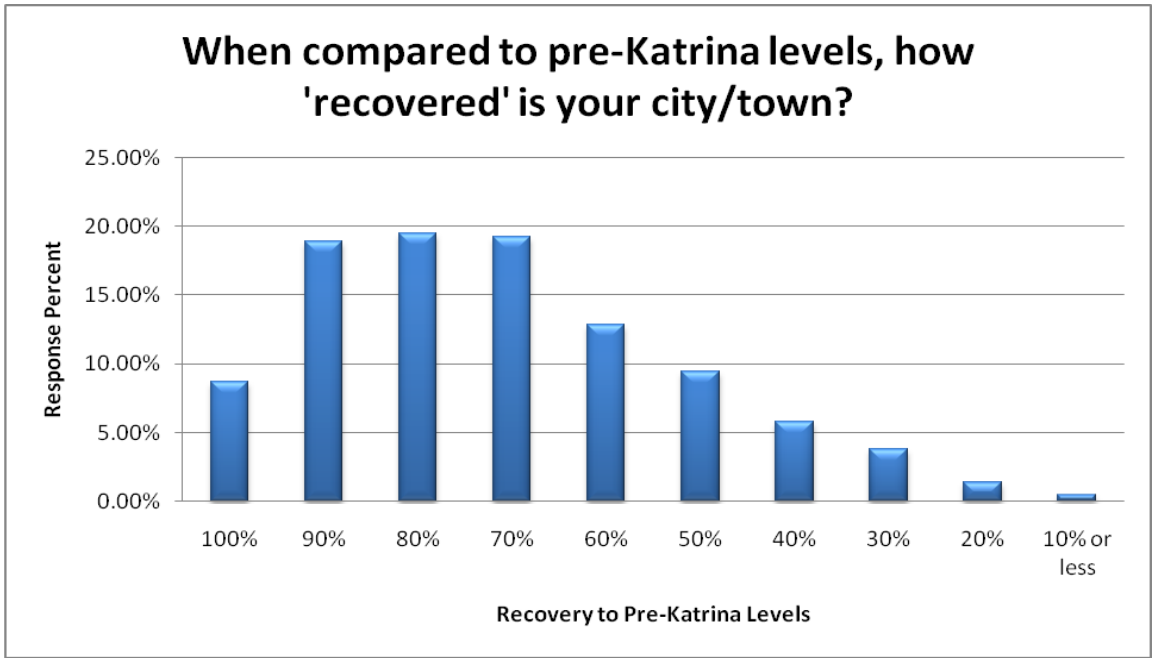


Figure 6.20: Perceived Recovery (to Pre-Katrina Levels) (Source: Authors 2011)

Respondents were then asked, "When did your city/town reach your estimation of recovery from Hurricane Katrina?" Respondents were able to select a month and a year. Of the 1,529 individuals who responded to this question, 26 believed their city/town reached their own estimation of recovery from Hurricane Katrina in 2005, 87 individuals selected 2006, 155 individuals selected 2007, 169 individuals selected 2008, 237 individuals selected 2009, 362 individuals selected 2010, and 493 individuals selected 2011 (see Figure 6.21).

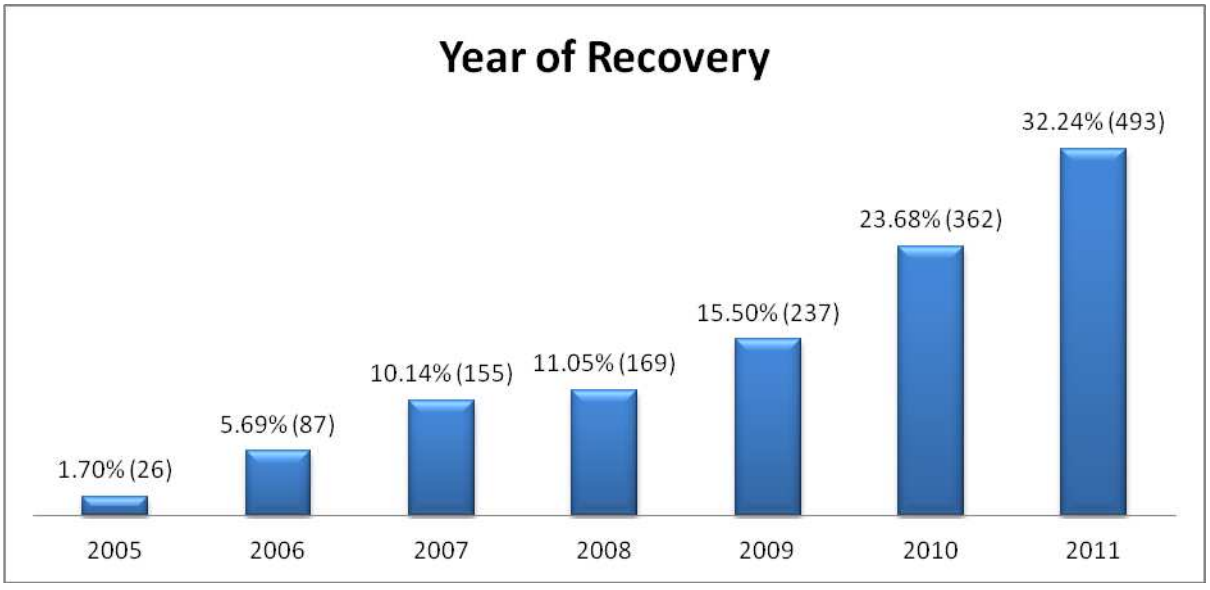


Figure 6.21: Perceived Year of Recovery (to Pre-Katrina Levels) (Source: Authors 2011)

The next question again asked survey respondents, "What is your present address?" Respondents were able to select either "same address as December 2007" or "different address." Of the 1,826 individuals who answered this question, 77.4 percent had the same address at the time of the survey that they had in December 2007 and 22.6 percent reported having a new address. Figure 6.22 maps the 2010 residences of survey respondents and Figure 6.23 compares residences across the three time periods.

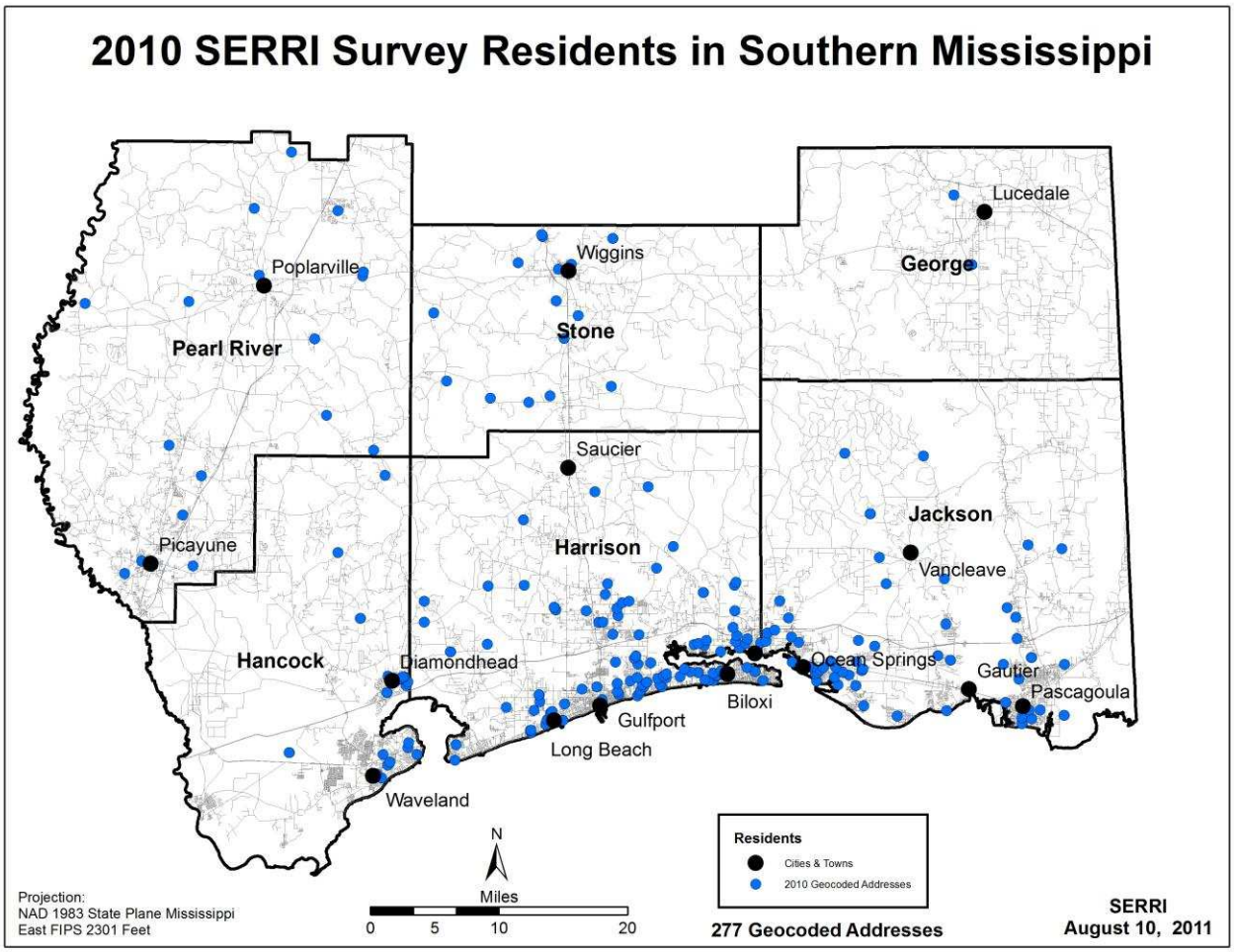


Figure 6.22: 2010 Survey Respondents' Southern Mississippi Survey Residence (Source: Authors 2011)

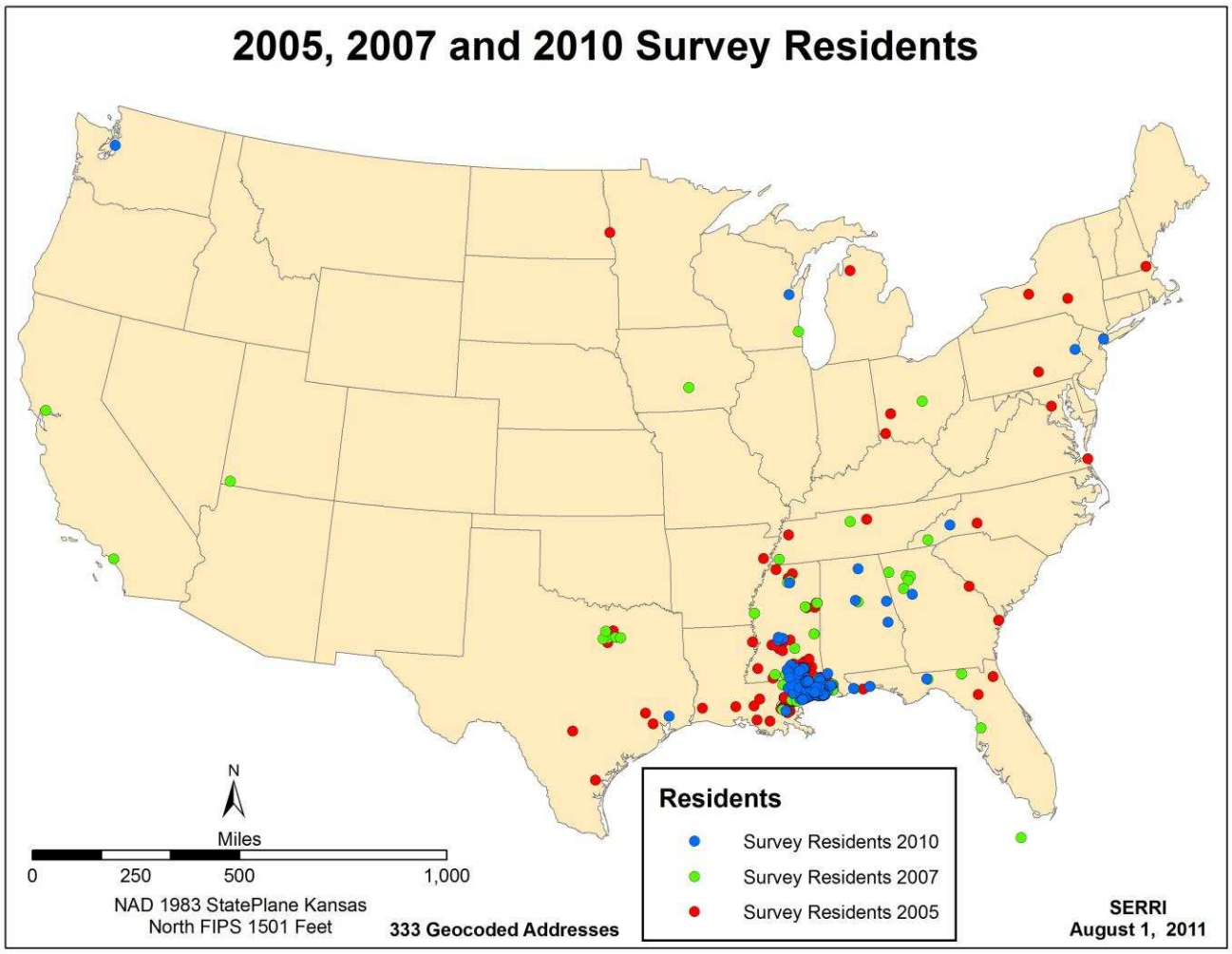


Figure 6.23: 2005, 2007, and 2010 Survey Residents (Source: Authors 2011)

Respondents were then asked, "What is your current employment status?" Respondents were asked to choose one of the following options: employed; Not working but looking for a job; Not employed and not looking for a job because full-time student; not employed and not looking for a job, because performing domestic duties; not employed and not looking for a job because retired; and not employed and not looking for a job because disabled. Of the 2,220 respondents who accessed the questionnaire, 1,849 answered the question and 371 did not provide an answer. A strong majority (71.3%) of respondents indicated that they were employed. Of the respondents, 28.7 percent were not employed— 9.5 percent were not looking for a job due to being a full-time student, 10.5 percent were not looking for a job due to being retired, 5.6 percent were looking for a job, 1.7 percent were not looking for a job because they were performing domestic duties, and 1.4 percent were not looking for a job due to being disabled. Figure 6.24 compares the responses to this question during before Hurricane Katrina, in December 2007, and at the time of the survey.

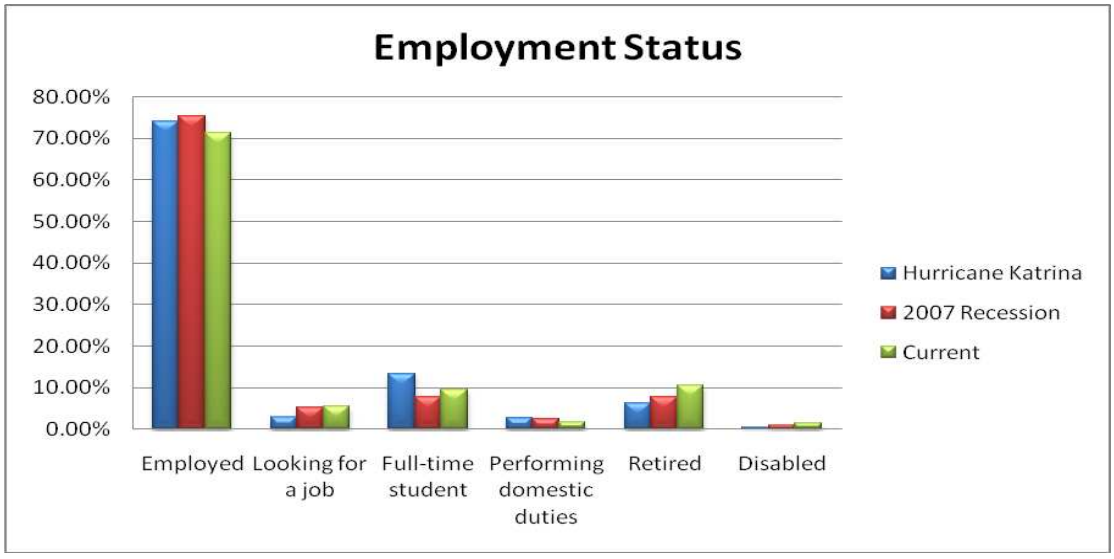


Figure 6.24: Employment Status Across Periods Studied (Source: Authors 2011)

The next question on the questionnaire asked respondents "In what sector is your job?" The following twenty options were provided: agriculture, forestry, fishing, and hunting; mining, quarrying, and oil and gas extraction; construction; manufacturing; wholesale trade; retail trade; transportation and warehousing; information; finance and insurance; real estate; professional and technical services; management of companies and enterprises; administration and waste services; educational services; healthcare and social assistance; arts, entertainment, and recreation (included casinos); accommodation and food services; other services, except public administration; Public administration; and Military. Additionally, respondents were given the option to specify an unlisted employment sector by selecting "Other." Of the 2,220 respondents who accessed the questionnaire, 1,327 answered the question and 893 did not provide an answer. "Educational services" was indicated with the highest frequency at 44.7 percent, followed by "other" at 13.2 percent, "healthcare and social assistance" at 9.6 percent, "professional and technical services" at 7.2 percent, "retail trade" at 4.1 percent, "arts, entertainment, and recreation (includes casinos)" at 2.0 percent, "finance and insurance" at 3.3 percent, "construction" at 2.2 percent, "manufacturing" at 2.0 percent, "accommodation and food services" at 2.1 percent, "public administration" at 1.7 percent, "management of companies and enterprises" at 1.2 percent, "military" at 0.8 percent, "other services, except public administration" at 1.7 percent, "information" at 1.0 percent, "real estate" at 0.8 percent, "transportation and warehousing" at 0.7 percent, "agriculture, forestry, fishing, and hunting" at 0.5 percent, "wholesale trade" at 0.2 percent, "administration and waste services" at 0.2 percent, and "mining, quarrying, and oil and gas extraction" at 0.2. Figure 6.25 looks at sector change across when Hurricane Katrina hit, December 2007, and current.

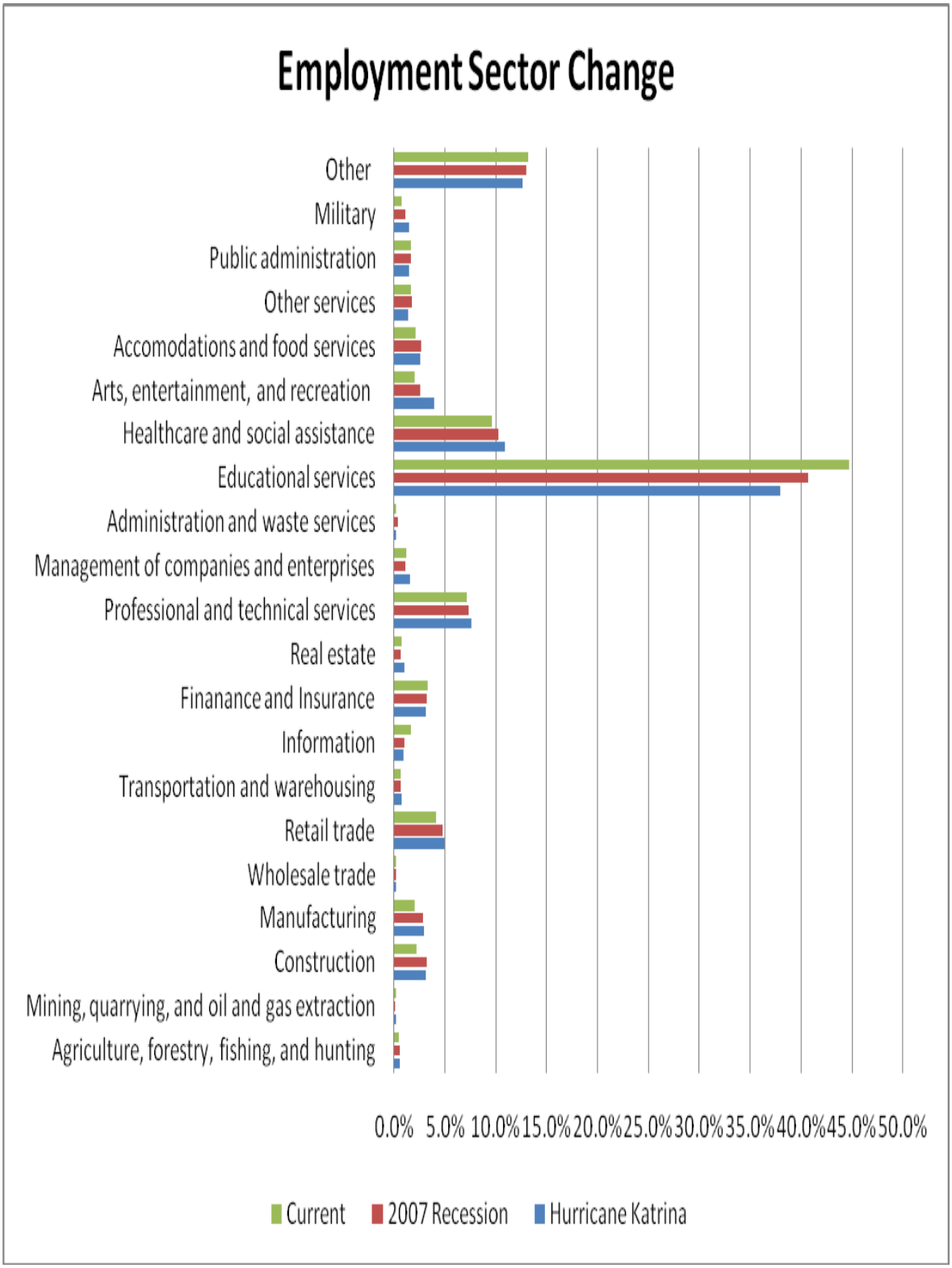


Figure 6.25: Employment Sector Across Three Periods of Study (Source: Authors 2011)

The next question on the questionnaire asked respondents, "If currently employed, how are you paid?" Respondents were instructed to select either hourly wage or salary. Of the 2,200 individuals who looked at the questionnaire, 1,317 answered this question and 903 did not answer this question. Of those who answered, 68.5 percent indicated they were paid by salary and the remainder (31.5%) indicated they were paid an hourly wage. Figure 6.26 looks at change in how respondents were paid across the three time periods.

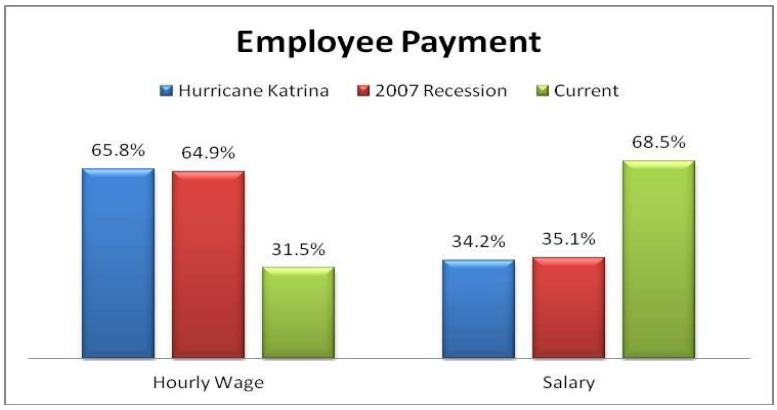


Figure 6.26: Form of Payment Across Three Periods of Study (Source: Authors 2011)

Those who indicated they are currently paid hourly were asked, "How much are you paid per hour?" Respondents were instructed to select one of the following options: minimum wage; $5.16-$7.50; $7.51-$10.00; $10.01-$12.00; $12.01-$15.00; $15.01-$20.00; or more than $20.00. Of the 418 individuals who were paid hourly, 22.7 percent were paid more than $20.00 per hour, 14.1 percent were paid $15.01 to $20.00 an hour, 12.7 percent were paid $12.01 to $15.00 an hour, 14.8 percent were paid $10.01 to $12.00 an hour, 19.6 percent were paid $7.51 to $10.00 an hour, 8.6 percent were paid $5.16 to $7.50 an hour, and 7.4 percent were paid minimum wage. For a comparison of the change in hourly wages between when Hurricane Katrina hit in 2005, the recession began in December 2007, and current, see Figure 6.27.

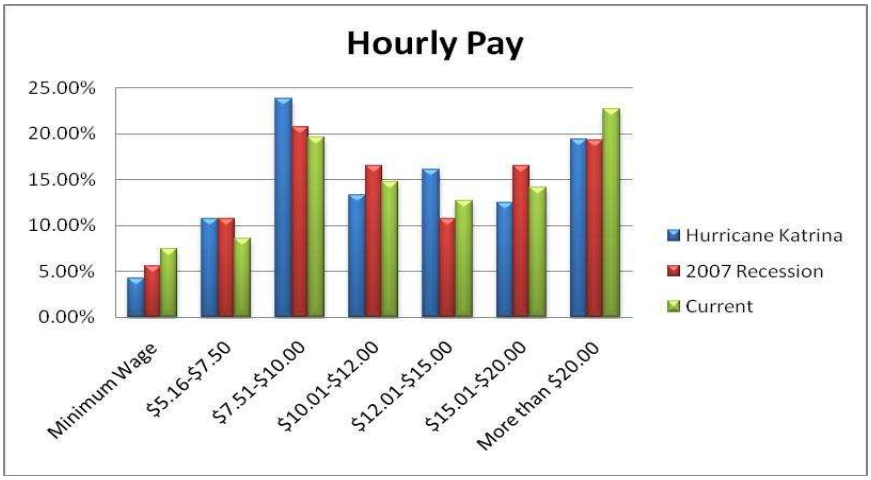


Figure 6.27: Hourly Pay Across Three Periods of Study (Source: Authors 2011)

Those who indicated they are currently paid by salary were asked, "How much is your annual salary?" Respondents were instructed to select one of the following options: $19,999 and under; $20,000 to $29,999; $30,000 to $39,999; $40,000 to $49,999; $50,000 to $59,999; $60,000 to $69,999; $70,000 to $79,999; $80,000 to $89,999; $90,000 to $99,999; $100,000 to $150,000; or more than $150,000. Of the 864 individuals who answered this question, 2.5 percent were paid more than $150,000, 4.7 percent were paid between $100,000 and $150,000, 3.9 percent were paid between $90,000 and $99,999, 4.4 percent were paid between $80,000 and $89,999, 6.5 percent were paid between $70,000 and $79,999, 9.3 percent were paid between $60,000 and $69,999, 16.9 percent were paid between $50,000 and $59,999, 22.8 percent were paid between $40,000 and $49,999, 17.2 percent were paid between $30,000 and $39,999, 7.9 percent were paid between $20,000 and $29,999, and 3.8 percent were paid $19,999 or under. Figure 6.28 compares annual salaries at the time Hurricane Katrina hit in 2005 to annual salaries in December 2007 to current salaries.

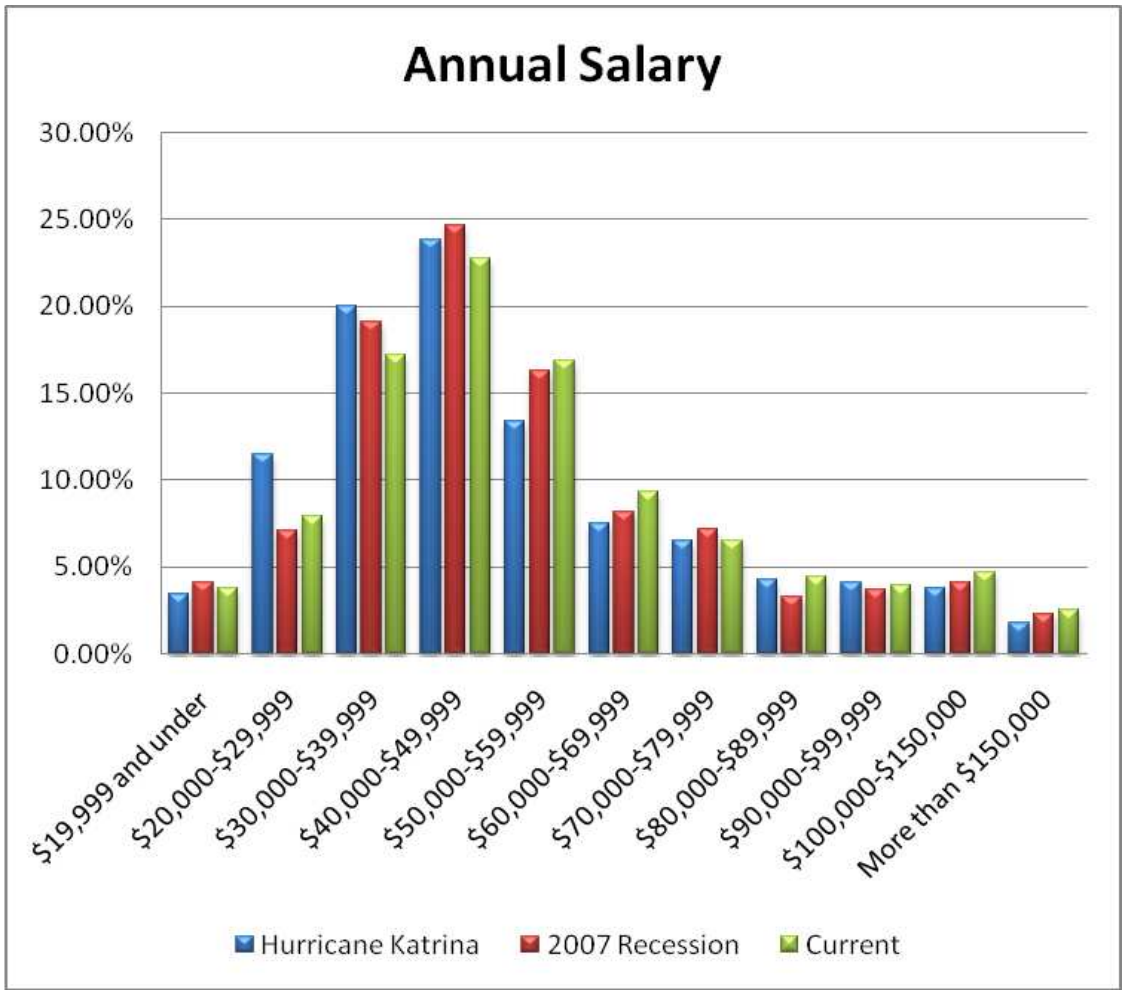


Figure 6.28: Annual Salary Across Three Periods of Study (Source: Authors 2011)

The next question on the questionnaire asked respondents, "How long have you been employed in your current job?" Respondents are instructed to select one answer of the following: less than 3 months; 3-6 months; 7-11 months; 1-2 years; 3-5 years; 6-10 years; and more than 10 years. Of the 2,220 individuals who looked at the questionnaire, 1,311 answered this question and 909 did not answer this question. Of those who answered, 39.1 percent indicated that they had been employed in the same job more than 10 years when Hurricane Katrina hit, 17.5 percent had been at the same job 6-10 years, 20.8 percent had been at the same job 3-5 years, 11.1 percent had been at the same job 1-2 years, 5.6 percent had been at the same job 7-11 months, 3.1 percent had been at the same job 3-6 months, and 2.8 percent had been at the same job less than three months. Figure 6.29 compares the length of time respondents reported being employed when Hurricane Katrina hit to the length of time they reported being employed when recession hit in December 2007 and the length of time they have been employed in their current job.

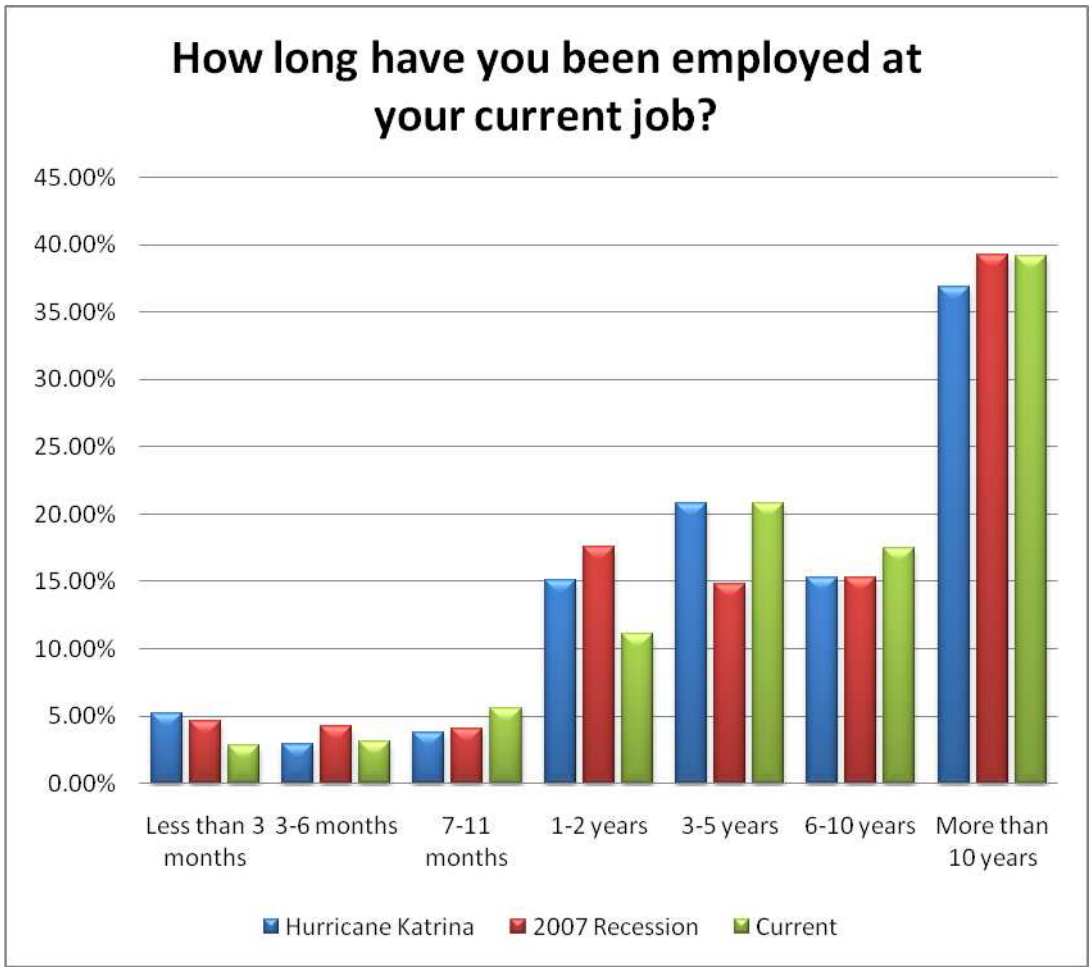


Figure 6.29: Length of Employment Across Three Periods of Study (Source: Authors 2011)

6.1.4 Demographic (Other) Questions

The remainder of the survey questions addressed respondent demographics. Respondents were first asked, "When were you born?" Respondents were able to select a month from January-February and a year from 1900-2000. Of the 1,795 individuals who responded to this question: one was born in 1900, one in 1901, one in 1910, three in 1924, one in 1925, one in 1928, three in 1929, three in 1930, four in 1931, five in 1932, six in 1933, eleven in 1934, two in 1935, ten in 1936, ten in 1937, thirteen in 1938, eight in 1939, twelve in 1940, seven in 1941, six in 1942, fourteen in 1943, sixteen in 1944, twenty-four in 1945, twenty-eight in 1946, thirty-two in 1947, thirty-five in 1948, thirty-nine in 1949, forty-two in 1950, thirty-eight in 1951, forty-four in 1952, forty-five in 1953, thirty-nine in 1954, forty-seven in 1955, forty-three in 1956, sixty-one in 1957, thirty-nine in 1958, forty-three in 1959, fifty-six in 1960, sixty in 1961, thirty-one in 1962, fifty-two in 1963, thirty-two in 1964, thirty-seven in 1965, thirty-eight in 1966, forty-one in 1967, twenty-eight in 1968, thirty-three in 1969, forty in 1970, thirty-nine in 1971, thirty-two in 1972, twenty-three in 1973, twenty-two in 1974, twenty-two in 1975, sixteen in 1976, thirty in 1977, thirty-three in 1978, twenty-five in 1979, twenty-six in 1980, twenty-seven in 1981, twenty-five in 1982, twenty-three in 1983, nineteen in 1984, twenty in 1985, eighteen in 1986, twenty-three in 1987, twenty-one in 1988, twenty-eight in 1989, thirty-one in 1990, sixty-two in 1991, forty-two in 1992, and three in 1993. Birth years ranged from 1900 to 1993, with an average of 46.57 years of age.

The next demographics question asked, "What is your race?" Respondents were asked to select all that apply of the following: white, black, American Indian and Alaska Native persons, Asian, Native Hawaiian or other Pacific Islander, two or more races, or other (please specify). Of the 1850 individuals who answered this question, 84.7 percent are white, 11.9 percent are black, 1.2 percent are American Indian/Alaska Native persons, 1.0 percent are Asian, 0.2 percent are Native Hawaiian or other Pacific islander, 1.8 percent are two or more races, and 1.4 percent are race not listed. Those who responded that their race was not listed were asked to specify. Of the comments provided, the majority used the comment box to express protest to the question by answering human race, human being, or explanations for choosing not to answer. All respondents were then asked, "What is your ethnicity?" and given the option to select either "Hispanic or Latino" or "not Hispanic." Of the 1,733 individuals who answered this question, 98.7 percent are not Hispanic and 1.2 percent are Hispanic or Latino.

The next question asked all respondents, "Do you rent or own your residence?" Respondents were asked to choose one of the following options: rent, own, do not rent (lived with family and friends), or other (please specify). Of the 1,849 individuals who answered this question, 73.1 percent own their residence, 12.4 percent do not pay rent, 12.3 percent rent their residence, and 2.2 percent provided that their living situation is not an option. Those who selected "other" were asked to specify. Among the living situations specified, church, military, and university housing were the most common comments. Figure 6.30 compares living situations in December 2007 to at the time when Hurricane Katrina hit the Gulf Coast and the time of survey.

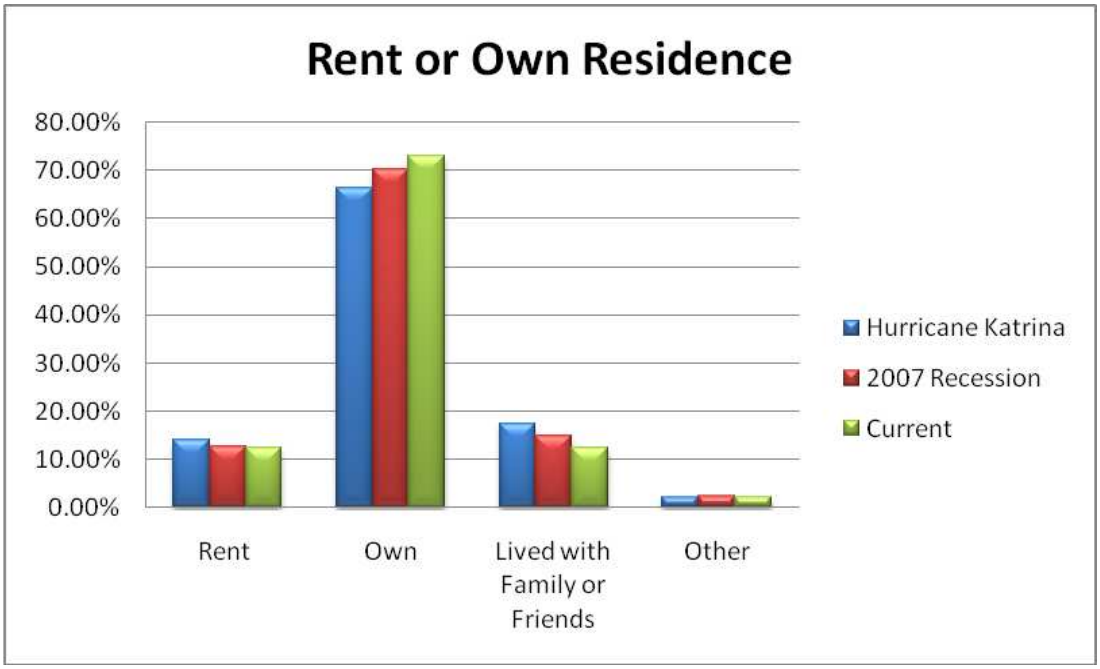


Figure 6.30: Current Living Situation (Source: Authors 2011)

The respondents who indicated that they own their home were then asked: "If you own your home, what is the value of your house, apartment, condo, or mobile home?" Respondents were asked to select one of the following options: less than $10,000; $10,000-$14,999; $15,000-$19,999; $20,000-$24,999; $25,000-$29,999; $30,000-$34,999; $35,000-$39,999; $40,000-$49,999; $50,000-$59,999; $60,000-$69,999; $70,000-$79,999; $80,000-$89,999; $90,000-$99,999; $100,000-$124,999; $125,000-$149,999; $150,000-$199,999; $250,000-$299,999; $300,000-$349,999; $350,000-$399,999; $400,000-$499,999; $500,000-$749,999; $750,000-$999,999; or $1,000,000 or more. From the 1,296 individuals who answered this question, the following responses were provided: 0.5 percent have a home value of less than $10,000; 0.2 percent from $10,000-$14,999; 0.3 percent from $15,000-$19,999; 0.4 percent from $20,000-$24,999; 0.3 percent from $25,000-$29,999; 0.5 percent from $30,000-$34,999; 0.6 percent from $35,000-$39,999; 1.0 percent from $40,000-$49,999; 1.8 percent from $50,000-$59,999; 2.4 percent from $60,000-$69,999; 1.8 percent from $70,000-$79,999; 4.0 percent from $80,000-$89,999; 4.3 percent from $90,000-$99,999; 12.9 percent from $100,000-$124,999; 15.5 percent from $125,000-$149,999; 20.0 percent from $150,000-$199,999; 14.1 percent from $200,000 to $249,999; 7.7 percent from $250,000-$299,999; 3.2 percent from $300,000-$349,999; 3.2 percent from $350,000-$399,999; 2.5 percent from $400,000-$499,999; 1.5 percent from $500,000-$749,999; 0.9 percent from $750,000-$999,999; and 0.5 percent have a home value of $1,000,000 or more (see Figure 6.31).

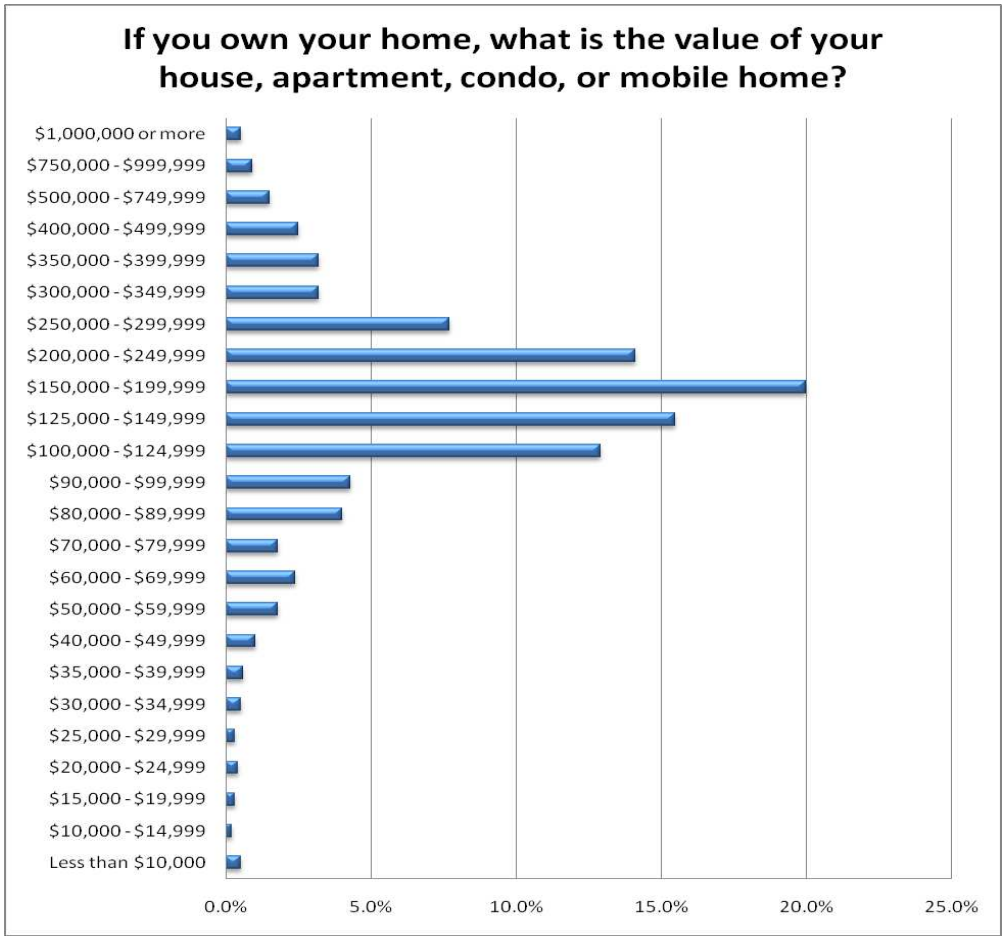


Figure 6.31: Current Home Value if Owned (Source: Authors 2011)

The respondents that provided that they rent their home, were then asked: "What is the monthly rent?" They were instructed to enter a numeric amount in dollars. The average of the 206 responses provided was $653.29. Rent amounts ranged from $97 to $1,600 per month.

All respondents were then asked, "Gender?" and provided the options of "male" and "female." Of the 1,845 individuals who answered this question, 67.2 percent are female and 32.8 percent are female.

The next question asked, "Number of people in household?" and instructed respondents "do NOT count yourself." Respondents were able to enter a numerical value for the category of "18 years or older" and a numerical value for the category of "17 years or younger." For the category of "18 years or older," once the entries "52" and "20" were deleted as extreme outliers, responses ranged from zero to ten with an average of 1.51. For the category of "17 years or younger," responses ranged from zero to eight with an average of 1.02.

All respondents were then asked, "Marital status?" and instructed to choose one of the following: married, widowed, divorced, separated, never married not living with someone, and unmarried partner. Of the 1,818 respondents, 59.8 percent are married, 16.8 have never been married and are not living with anyone, 11.6 percent are divorced, 6.4 have an unmarried partner, 3.8 percent are widowed, and 1.7 percent are separated.

The final question on the survey asked respondents, "Highest degree or level of school completed?" Respondents were instructed to select one of the following: 12th grade or less, no diploma; high school graduate or equivalent; some college, no degree; associate's degree; bachelor's degree; master's degree; professional degree (MD, DDS, DVM, LLB, JD); and doctoral degree (PhD, EdD). Of the 1,841 individuals who answered this question, 1.7 percent selected 12th grade or less (no diploma), 6.2 selected high school graduate or equivalent, 21.0 percent selected some college (no degree), 12.2 percent selected associate's degree, 25.4 percent selected bachelor's degree, 26.6 percent selected master's degree, 2.6 percent selected professional degree, and 4.2 percent selected doctoral degree (see Figure 6.32).

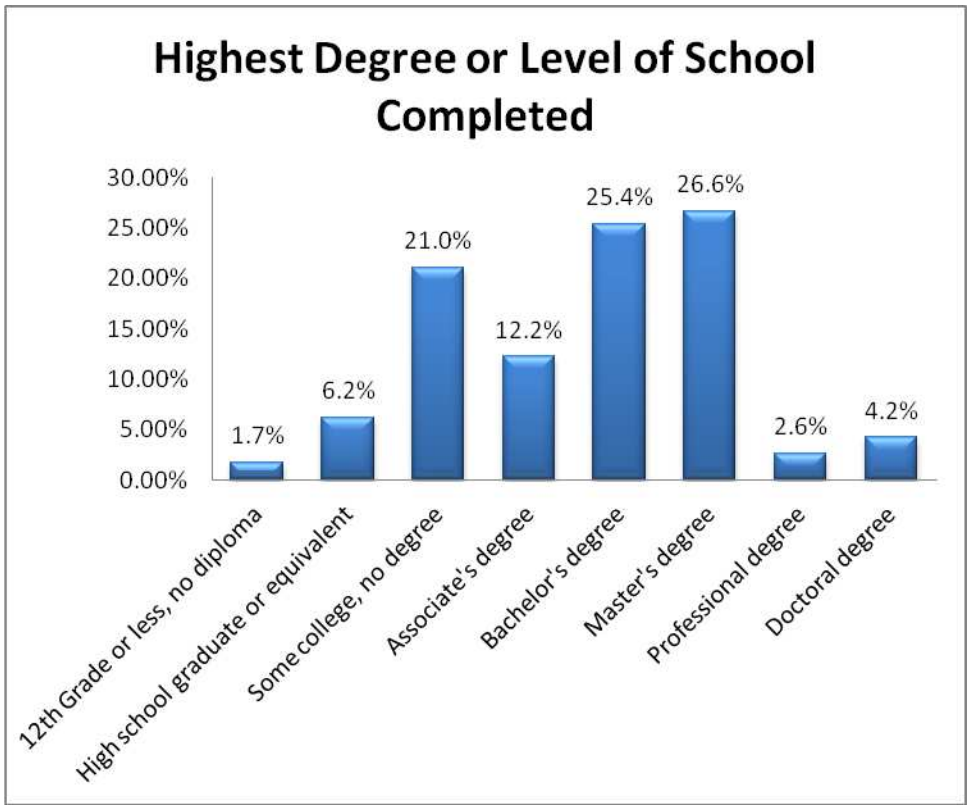


Figure 6.32: Respondent Education Level (Source: Authors 2011)

7. EMPLOYMENT

This section of the report uses available public and propriety data to model the effects that Hurricane Katrina had on employment, unemployment and reemployment in the study area. There are several statistical and analytical approaches that are used in this section, using basic statistics and visual representations of the period of impact and recovery from Hurricane Katrina using data from the Bureau of Labor Statistics. This portion of the study focuses on South Mississippi (though South Alabama will also be discussed) for two reasons. First, some of the proprietary data only cover Mississippi. Second, the issue of "recovery" from Katrina is not really appropriate for South Alabama. South Alabama showed no negative employment effects from Hurricane, so it was not impacted to the point that it needed to recover from the storm.

7.1 Unemployment and Employment Following Hurricane Katrina

This section examines the labor markets of south Mississippi and Alabama after the impact of Hurricane Katrina. It is critical to understand the role of labor markets in disaster recovery, as a functioning labor market is recognized to be a fundamental element of community revitalization (Zissimopoulos and Karoly 2010).* The destruction of physical capital (buildings, machines, and infrastructure) and human capital (human resources, job matches, and skilled workers) are the two greatest economic losses from a disaster (Kahn 2005; Baade *et al.* 2007), and either physical or human capital is a sufficiently significant topic to warrant a separate study.

7.1.1 Data and Measurement

Labor market data can be drawn from numerous sources. For instance, to study the effects of Hurricane Katrina (especially the dislocation of workers to other states), studies have incorporated the Current Population Survey (CPS) from the Bureau of Labor Statistics and the Census Bureau (Groen and Polivka 2008a, 2008b; Zissismopoulos and Karoly 2010; and Vigdor 2007). However, CPS data only provides nationally representative data without county level geographic indicators, and cannot be used to study the impact on the South Mississippi labor market. Instead, this chapter employs data from the Bureau of Labor Statistics' (BLS) Quarterly Census on Employment and Wages (QCEW) and Local Area Unemployment (LAU). Through the use of these data, this study is one of the few to estimate the duration of the impact of a natural disaster.†

One challenge for understanding disaster recovery is how to evaluate the destruction and rebuilding of economic stocks (Leiter *et al.* 2008). The specific challenge is that the damage from a disaster is on the economic stocks—human and physical—of a community and economic data on stocks is not regularly collected. For instance, while the stock of housing may be decreased because of the disaster, the sales tax receipts and even gross domestic product (GDP) can increase due to the purchasing of new material to rebuild the

* One reason why the authors choose employment data rather than other measures is that 60 percent of the total economic activity of any given area is comprised of payments to workers. This allows employment to become a good representative of economic performance.

† A similar study is that of Belasen and Polachek (2007), who also use the QCEW data to examine the impact of hurricanes in Florida on the local labor market.

damaged structures. Thus, although the region's quantity of productive resources may have decreased, the most common measure of economic activity, GDP, may reveal that the region's economic activity has grown.

7.1.2. Unemployment Rates

Based on LAU data, Figure 7.1 shows yearly unemployment rates for 2001 to 2008 in the six southern Mississippi counties and six southern Alabama counties. Four trends are noticeable from this figure.

- From 2002 to 2004, Mississippi counties experienced a general slight decline in the unemployment rate, which was primarily a result of the economic recovery following the 2000-2001 recession.
- From 2004 to 2005, unemployment rates spiked sharply for all counties in Mississippi. Most dramatically, Harrison County and Hancock County—the two most directly affected by Hurricane Katrina—saw their unemployment rates more than double from 5 percent to over 11 percent in this period. As these are yearly averages, the overall spike directly after Hurricane Katrina is significantly greater.
- Although unemployment rates remained high in 2006, they mostly returned to their pre-Katrina levels by 2007.
- Alabama counties (dashed lines) saw a decline in unemployment in the aftermath of Hurricane Katrina.

The following section seeks to assess the temporal recovery of the three coastal counties of Mississippi between Hurricane Katrina and the 2008-2009 recession. The data for the figures and tables presented within this section are derived from two sources, which allow the researcher to understand the employment picture from two different lenses: the Local Area Unemployment (LAU) records from the Bureau of Labor Statistics (BLS) and the Quarterly Census of Employment and Wages (QCEW) from the BLS. While the LAU calculates unemployment figures based upon the household random sampling techniques that are used in the Current Population Survey, the QCEW is a survey of employers. As such, the QCEW has a more accurate count of total employment, but only captures those workers with jobs; it contains no information on the unemployed.

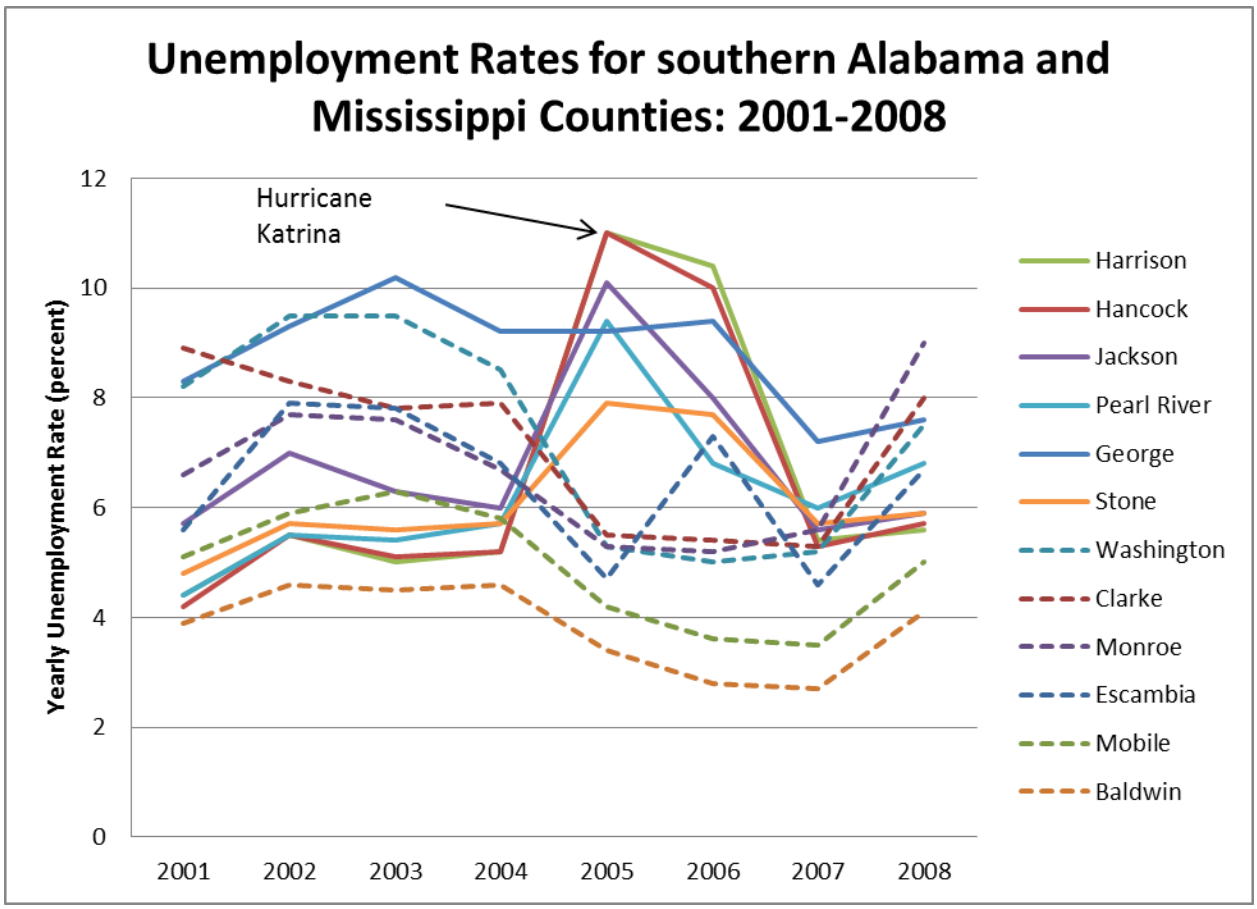


Figure 7.1: Yearly Unemployment Rates 2001-2008 (Source: BLS-LAU 2011)

Figures 7.2 and 7.3 show the unemployment rate in all Mississippi counties in January 2005 (pre-Katrina) and October 2005 (post-Katrina). Note that prior to Katrina, the coastal counties boasted some of the lowest unemployment rates in the state. For example:

- Hancock County had the lowest unemployment rate (6.0 percent) of the three coastal counties, which is similar to other fast growing bedroom communities, such as those found in Lamar, Rankin, Madison, Scott and De Soto Counties.
- Harrison and Jackson Counties had somewhat higher unemployment rates at 6.2 percent and 6.8 percent respectively. These are analogous to other larger urban areas in the state, such as Hinds, Warren, Forrest, and Lauderdale Counties.
- George, Stone and Pearl River Counties had relatively low unemployment rates similar to tertiary counties near metro areas.

Thus, prior to the storm, the employment picture in the coastal counties was similar to comparable areas in the state.

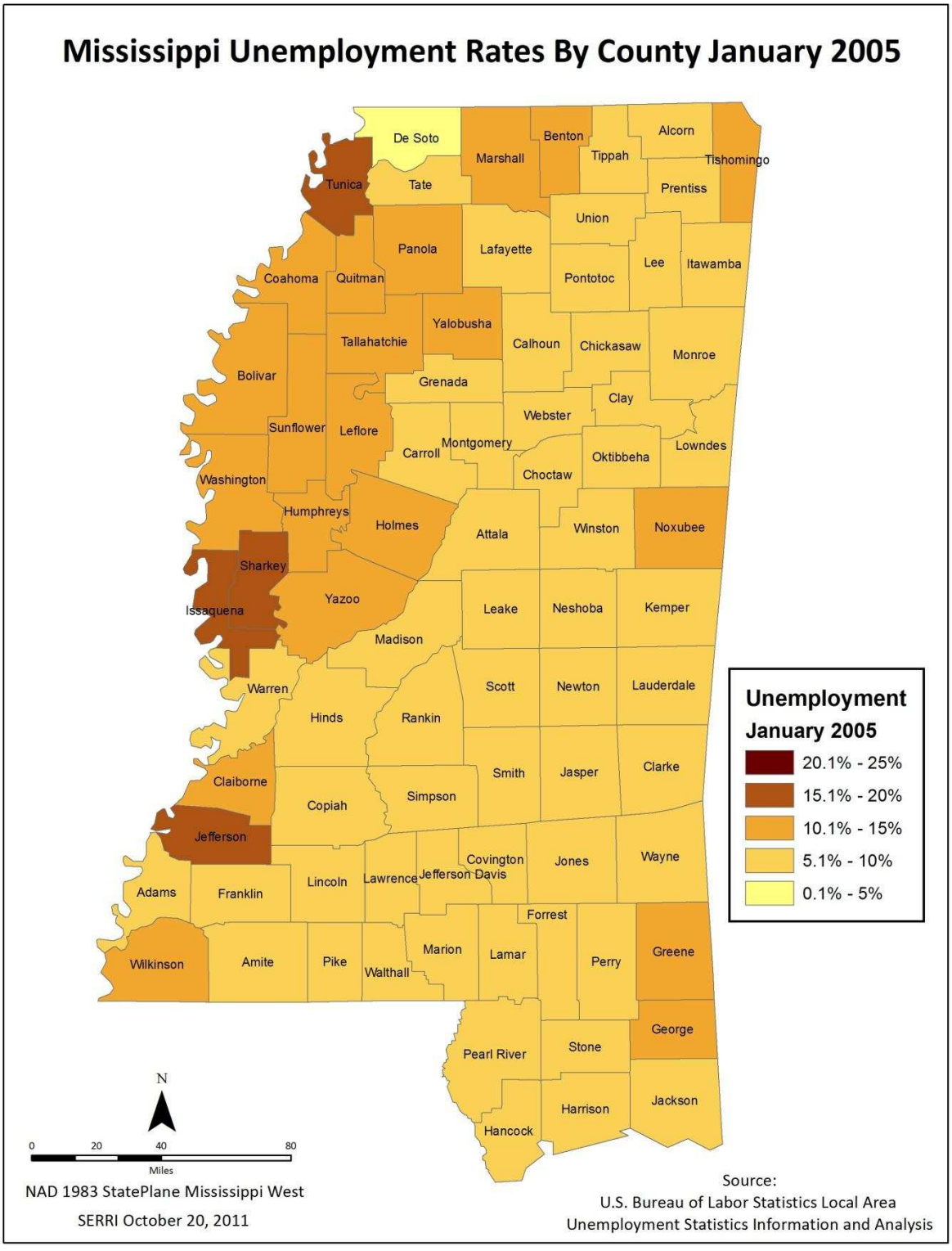


Figure 7.2: January 2005 Mississippi Unemployment Rates by County (Source: BLS LAU, 2011)

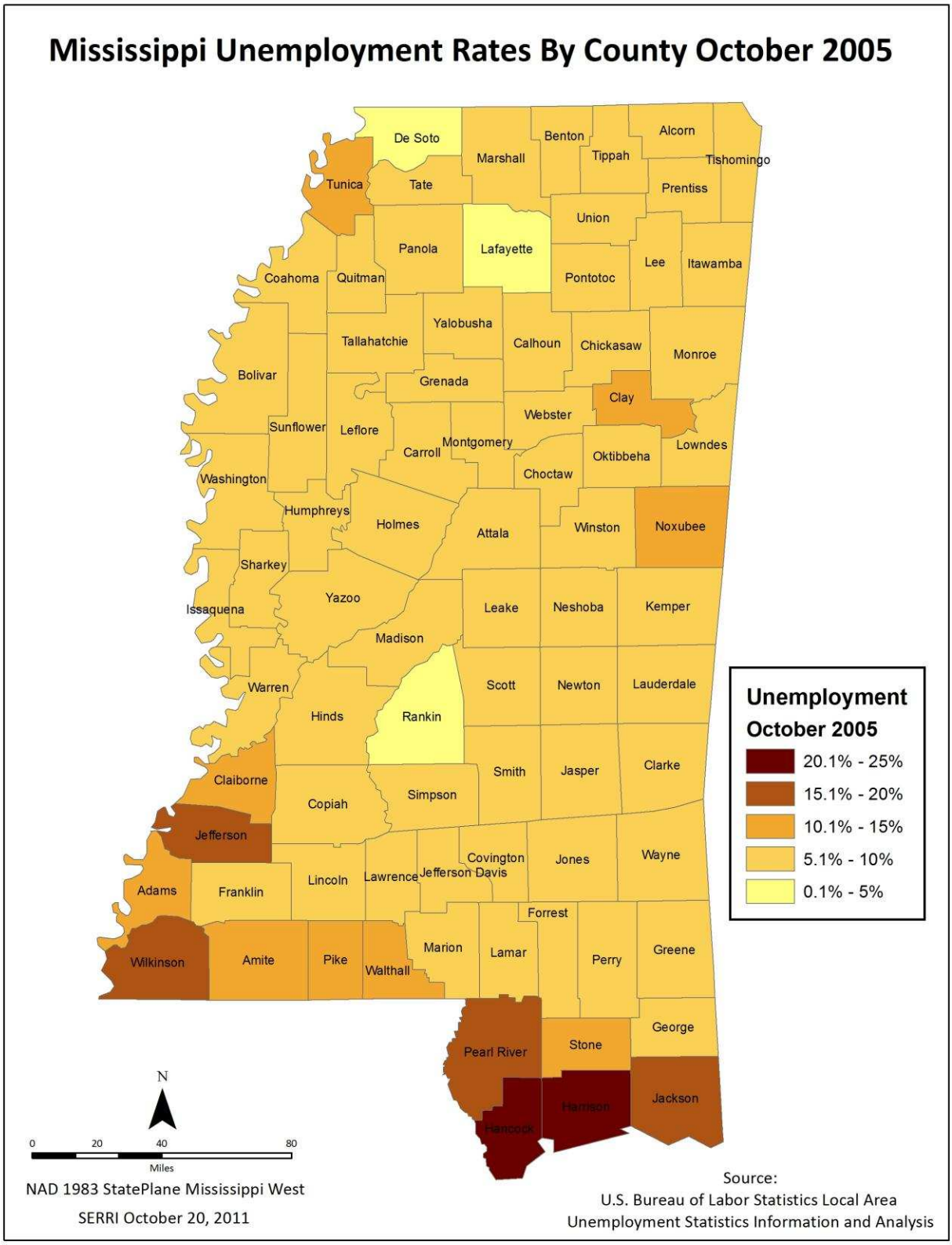


Figure 7.3: October 2005 Mississippi Unemployment Rates by County (Source: BLS LAU 2011)

Figure 7.3 shows unemployment in Mississippi by county in October 2005, less than two months after Katrina made landfall. Two differences are evident in this figure when compared to Figure 7.2.

- First, there was as a sharp spike in unemployment rates in many counties, not just those along the coast, but including those along the southern Louisiana border.
- Coastal and Southeastern counties including Pearl River County, as well as Hancock, Harrison, and Jackson Counties, saw double digit unemployment rates as a result of the disaster.

Figures 7.4 and 7.5 provide a regional perspective of Hurricane Katrina and show the unemployment rates in the southern coastal counties (and parishes) of Alabama, Mississippi, Florida, and Louisiana that are within 150 miles of Gulfport, Mississippi. Figure 7.4 shows the unemployment rate before the storm hit in January 2005 and Figure 7.5 shows the unemployment rate in October 2005. Figures 7.4 and 7.5 show two main points.

- A wide swath of counties experienced a spike in unemployment rates after the storm. This swath reached from the Alabama state line, along the coast and southeastern Louisiana.
- In Alabama and Florida several counties experienced a sharp lowering of the unemployment rates after Katrina, especially in the Mobile, Alabama, metropolitan area.

Thus, for the remainder of the analysis, we will focus on Mississippi, as Alabama's economy improved due to Hurricane Katrina. This finding is in concurrence with that of Belasan and Polachek's (2007) study of the impact of hurricanes in Florida: those counties not adversely affected by Florida's hurricanes, were likely to benefit from the storms.

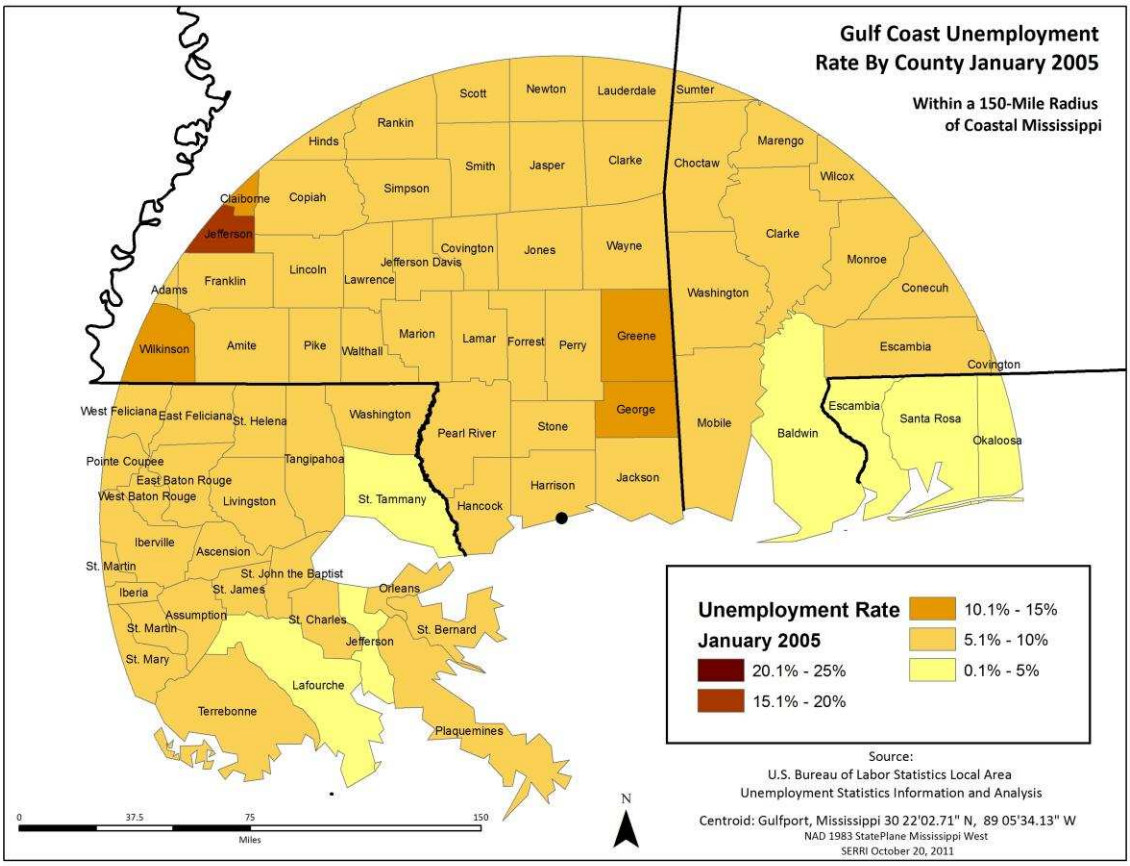


Figure 7.4: January 2005 Unemployment Rate within 150 miles of Gulfport (Source: Authors 2011)

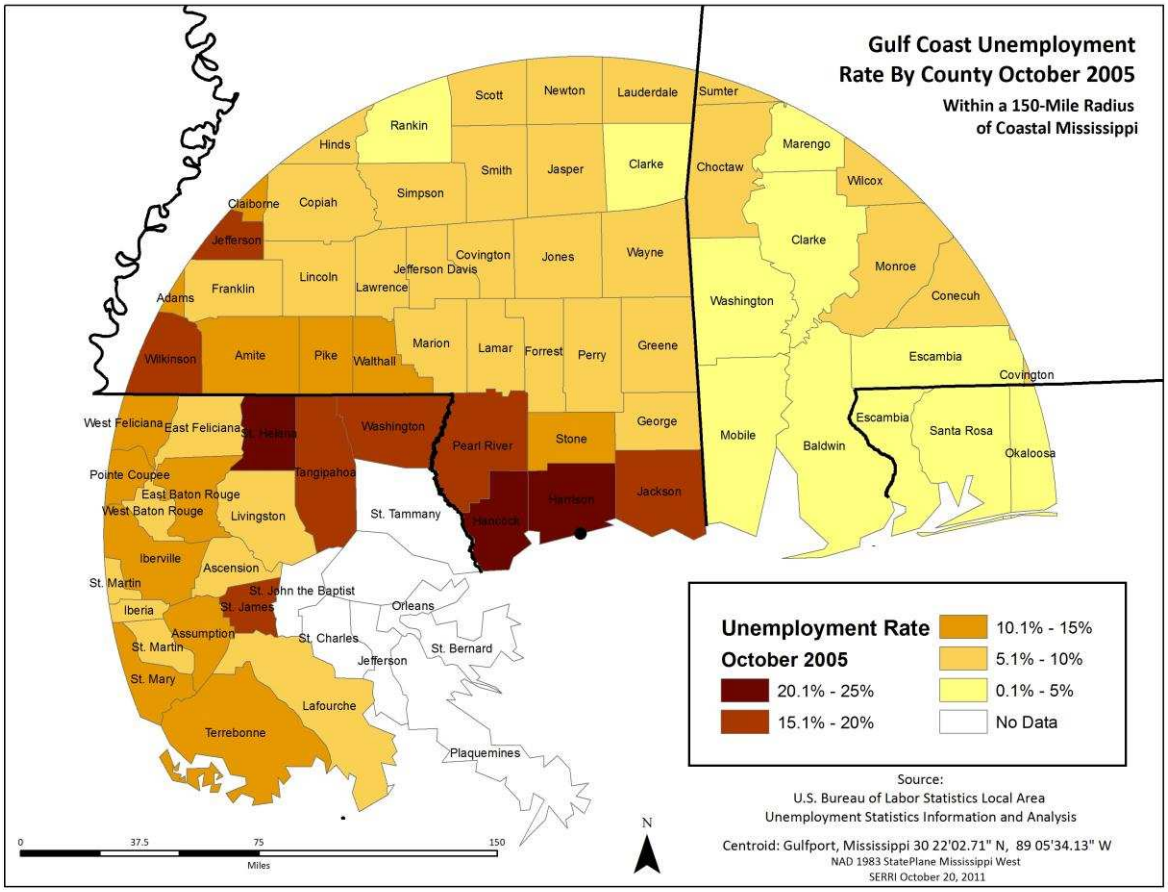


Figure 7.5: October 2005 Unemployment Rate within 150 miles of Gulfport (Source: Authors 2011)

7.1.3 Employment Levels

In order to measure the recovery from a disaster, the Team has determined that unemployment rates are not the suitable measure for modeling community resilience and recovery. This is for two reasons.

- First, unemployment rates are based upon the number of people in an area that are available for work. When the number of potential workers shifts dramatically, as is likely after a disaster, the unemployment rates are no longer a valuable measure of overall health of the labor market. This is most notable in areas like the city of New Orleans that lost a third of its population after Hurricane Katrina.
- Second, unemployment rates can be biased by workers that have given up looking for a job and have dropped out of the labor force. For this reason, a better measure of the overall health of the labor market is the total level of employment.

Figure 7.6 shows monthly employment in all sectors for the three Mississippi coastal counties for the period of January 2001 to December 2008, as provided by the QCEW data. The report will focus on the three coastal counties because they are large enough to have

meaningful data in the QCEW dataset while George, Stone, and Pearl River Counties do not have data from every month and the data is less reliable. As represented in this figure, Harrison County had the most employment of the counties along the Mississippi Gulf Coast, with an average of 90,000 jobs before Hurricane Katrina and approximately 70,000 jobs after landfall in September 2005. Jackson County is the second largest county in terms of employment, with 50,000 jobs before August 2005. Hancock County is much smaller in terms of employment than the other two counties, with only 10,000 jobs existing before Katrina.

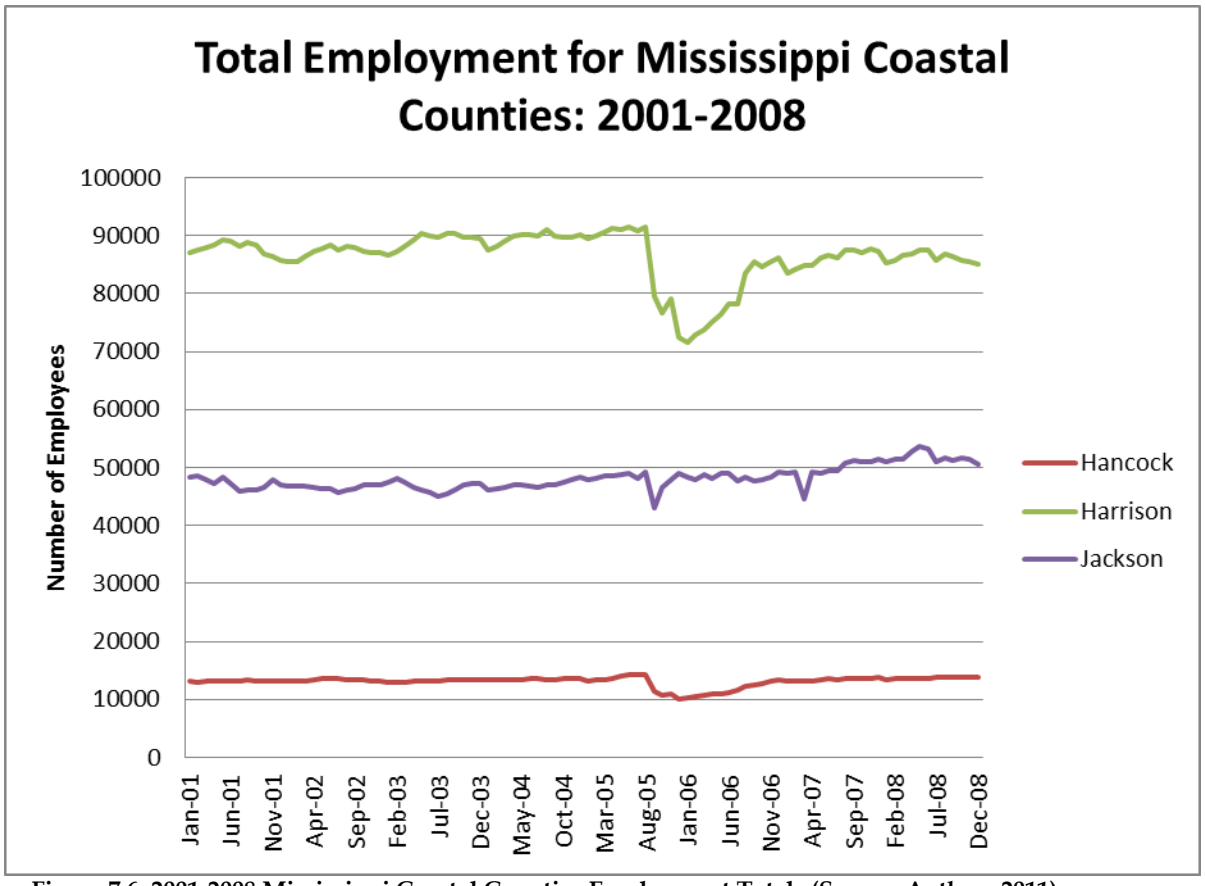


Figure 7.6: 2001-2008 Mississippi Coastal Counties Employment Totals (Source: Authors 2011)

Figures 7.7-7.9 show employment levels for different sectors for the three counties from 2001 through 2008. Figure 7.7 shows the scaled level of total employment during these years—the raw figures presented in Figure 7.6 have been scaled such that it is easier to view the proportional changes that might be obscured by the different sizes of the three counties. The scaling is done in such a way that the average for the period from January through August 2005 is set equal to 100. A value greater than 100 indicates the proportionate level above the 2005 pre-Katrina (January-August) employment level, while a value below 100 indicates the proportionate level below that level. Thus, a value of 110 indicates that employment for that county-sector is 10 percent higher than the average from January-August 2005 while a value of 90 indicates that the level of employment is 10 percent less than that of pre-Katrina 2005. Figure 7.7 shows that total employment in Hancock County had the largest proportionate decrease in employment, as the number of jobs fell by nearly 30 percent after the storm in comparison to early 2005. Harrison County had the second

most dramatic proportionate decrease, as in late 2005, total employment fell by 20 percent before it began to rise again. Jackson County, located farthest from landfall, experienced a 10 percent decrease in employment and employment began to recover within a few months.

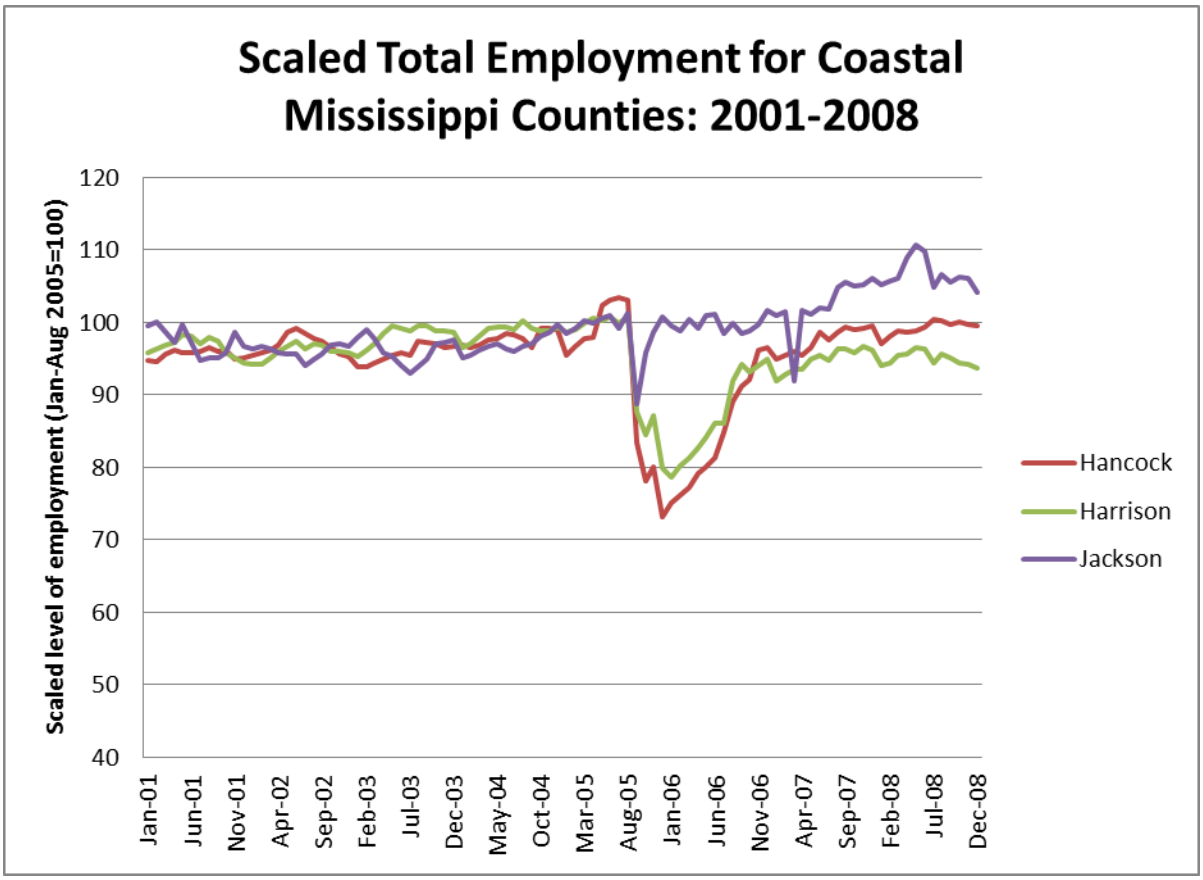


Figure 7.7: 2001-2008 Scaled Mississippi Coastal Counties Total Employment (Source: Authors 2011)

Figures 7.8 and 7.9 show scaled levels of employment in the construction and services sectors. Figure 7.8 shows that Hancock and Harrison Counties experienced a similar increase in construction employment following Hurricane Katrina. Construction slowly increased in late 2005 and early 2006 until the total size of employment in this sector was 50 percent higher in 2007 than it was in August 2005. In late 2007, construction employment began to contract. By the end of 2008, three years after the storm, construction employment was still nearly 20 percent higher than 2005 levels. Jackson County shows a peculiar dramatic decrease leading up to Katrina and then a similar boost after Katrina. The overall level of construction employment in Jackson County in 2006 was 100 percent higher than the pre-Katrina level, merely returning construction employment to its 2003 level.

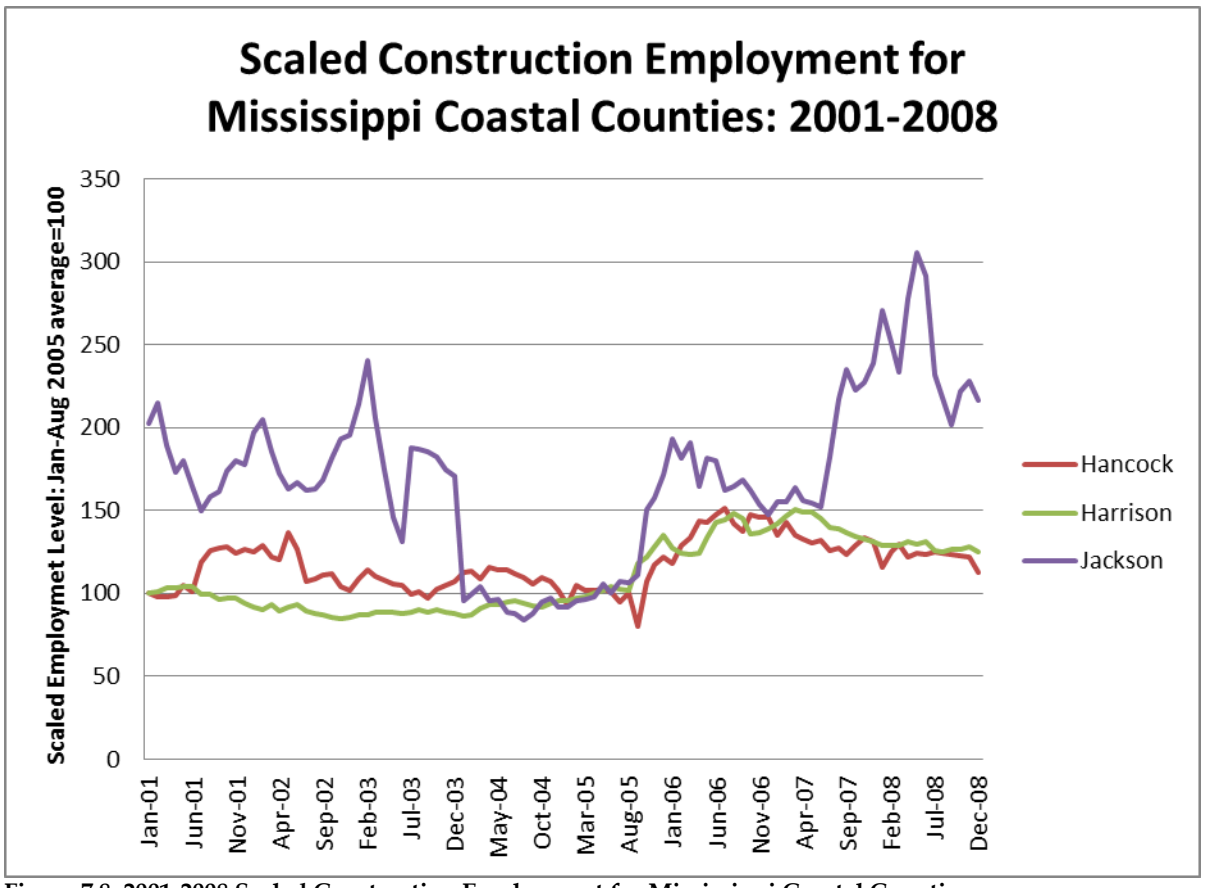


Figure 7.8: 2001-2008 Scaled Construction Employment for Mississippi Coastal Counties (Source: Authors 2011)

As the Mississippi Gulf Coast is primarily a service sector economy, the trends in service sector employment are apt to follow broad economic trends in the region. Figure 7.9 shows service sector employment for the three counties from January 2001 to December 2008. In Hancock County more than 40 percent of the service sector jobs were lost in the wake of the hurricane, while in Harrison County the figure is closer to a 30 percent loss. Jackson County, on the other hand, only suffered a 10 percent loss and quickly recovered. Although Hancock County suffered the steepest decline, it recovered to its previous level of service sector employment by the end of 2007. Harrison County, however, had not returned to the pre-Katrina level of service sector employment before the end of the study period.

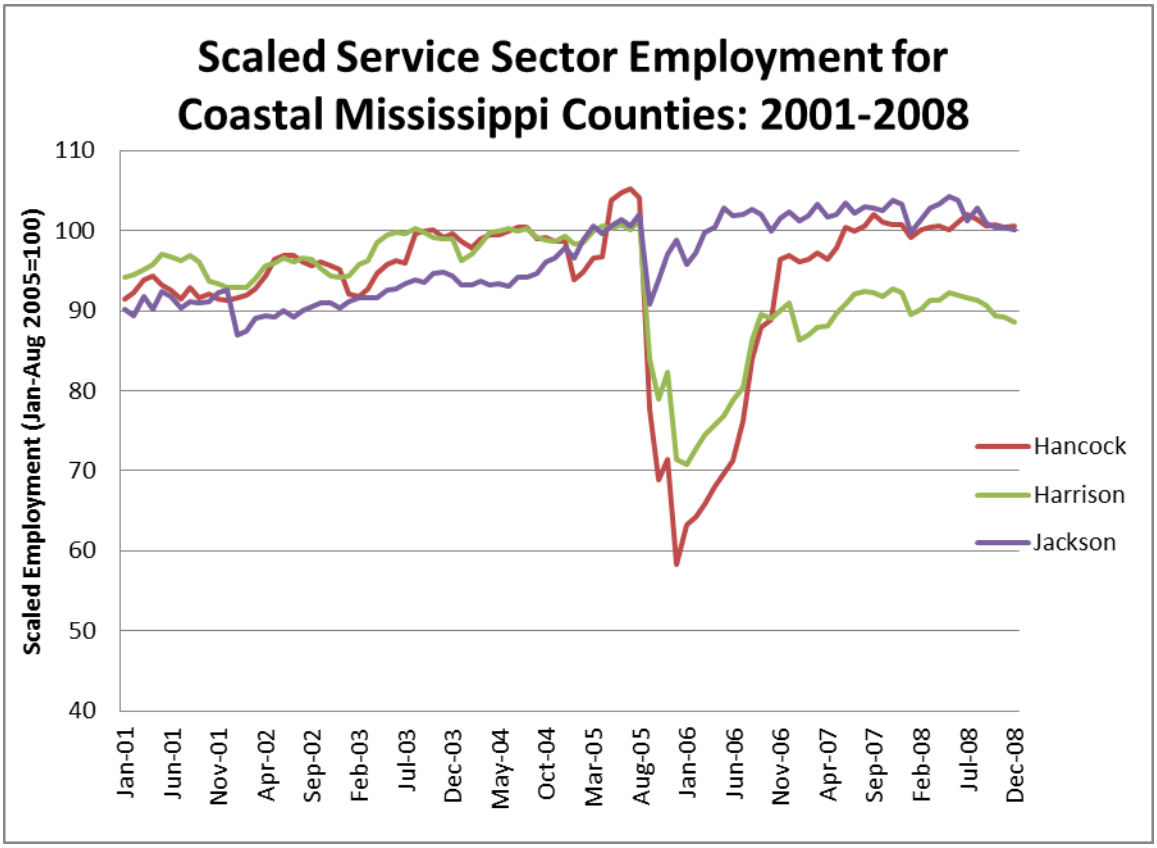


Figure 7.9: 2001-2008 Scaled Service Sector Employment for Coastal Mississippi Counties (Source: Authors 2011)

7.2 Measuring Disaster Recovery using Employment Data

7.2.1 Recovery Definition

This report proposes three alternative quasi-experimental methods to define economic recovery. These definitions start with a basic definition of disaster recovery. Specifically, at its most basic level, recovery from a natural disaster is defined by Dacy and Kunreuther (1969) as "…the rebuilding process that brings the community back to its pre-disaster economic level" (70).* We will then refine this definition and provide two alternatives to this basic definition below.

7.2.2 Three Measures of Disaster Recovery

This report will demonstrate the degree and timing of recovery of South Mississippi using three specific measures of recovery based upon employment data. The first measurement is the most literal interpretation of the above (Dacy and Kunreuther 1969) definition of disaster recovery. Specifically, using data from the QCEW, the Team will estimate how long it takes each county to return to its pre-Katrina level of employment.

* These definitions of recovery generally refer to 'long term recovery.' Operationally, anything beyond one year is referred to as 'long term,' so one may get a sense of whether or not long run recovery had been approached or not using the data through December 2007.

Since certain sectors (e.g. construction) see a spike in employment in the rebuilding process, it is necessary to choose only employment that can be reasonably expected to be sustained after the rebuilding of physical capital. Thus, in the analysis below, we will focus only on **service sector employment** in our determining the rate and/or date of recovery.

A second method defines disaster recovery to have occurred when an area achieves a projected level of employment, rather than simply the pre-disaster level of employment. To calculate this measure, the Team use historical data to make a linear projection of employment based upon recent employment growth. This projection method will estimate a linear growth rate using ordinary least squares regression. Thus, if employment had been growing at 2 percent per year in a county, the county will be considered to have recovered only after it has caught up with the level that it is predicted to have achieved without the disaster.

The third method uses a counterfactual geographical area as the comparison case. This method compares the growth in employment in the study region to employment growth during the time of the disaster recovery in a similar region that was not affected by the hurricane. Specifically, this method locates a region that has a similar employment structure to that of the Mississippi Gulf Coast and examines how employment changed in that community, comparing it to what was observed post-Katrina in Mississippi. As national trends concerning the housing boom, and then crisis, may have been obscured by the recovery effort, the counterfactual measure is intended to provide a researcher a better sense of what could have been expected to be 'normal' three years after Hurricane Katrina, had the storm not occurred.

Thus the three measures of Community Recovery that we will use can be summarized as follows:

- **Measure 1 Previous Level**: Community Recovery is dated as to when the employment level returns to the level achieved during the period January-August 2005.
- **Measure 2 Local Trend**: Community Recovery is dated as to when the employment level reaches the projected level that it would have achieved had employment growth continued on at the county's 2001-2005 employment growth trend.
- **Measure 3 National Trend**: Community Recovery is dated as to when the employment level reaches to the projected level that it would have achieved had employment grown at the same rates of similar locations from 2005-2008.

7.2.3 Measure 1: Return to Previous Level of Employment

To demonstrate the precise timing of employment recovery, the report includes tabular data that are similar to the above figures on service sector employment. Table 7.1 contains the average level of employment for the months of January through August for four years: 2005, 2006, 2007 and 2008. As previously noted, Harrison County is the largest of the three counties with 63,688 employed in the service sector in the eight months leading up to Hurricane Katrina. The second largest is Jackson County, followed by Hancock County, with over 21,000 and 8,000 service sector jobs respectively. In 2006, Jackson County had already recovered to its pre-Hurricane Katrina level of service sector employment and Hancock County had nearly recovered by the first part of 2007. By 2008, Hancock County's service sector employment exceeded the 2005 level—albeit by less than 1 percent. However,

Harrison County still endured a lower level of service sector jobs, even into 2008.* The January through August 2008 employment figure averaged 57,973, which is nine percent less than the level of employment before Katrina. Based upon these figures, the Team draws the following conclusions using Recovery Measure 1: Previous Level of Employment.

- Jackson County took less than one year to recover.
- Hancock County took between two and three years to recover.
- Harrison County took more than three years to recover.

Table 7.1: Service Sector Employment 2005-2008, Mississippi Coastal Counties

	Jan-Aug 2005	Jan-Aug 2006	Jan-Aug 2007	Jan-Aug 2008
Hancock	8,078	5,676	7,927	8,098
Harrison	63,688	49,047	56,875	57,973
Jackson	21,150	21,224	21,647	21,633

7.2.4 Measure 2: Return to Local Employment Trend

Based on the data provided in Table 7.1, the Team concludes that Hancock County recovered at a faster rate than Harrison County in that it returned to pre-Katrina service sector employment by the end of 2007. However, an examination of the historical data leads to the conclusion that pre-Hurricane Katrina levels of employment may not, in fact, be the best baseline when considering how one might conceive of economic recovery. Specifically, Figure 7.9 shows that there were differences in growth rates of employment before August 2005. Thus, the following steps are used for the second measure of recovery.

- First, estimate growth trends in employment by county for each of the three counties.
- Second, project estimated employment for 2006-2008 using the growth trends.
- Third, determine when employment levels reached the projected levels estimated in step two.

This approach is similar to Ewing and Kruse (2005) and Ewing, Kruse, and Thompson (2009) who controlled for the trend in earnings in an effort to measure the effect of disasters. To estimate the trend, the Team first created a dataset that consisted solely of the employment in the three counties prior to Hurricane Katrina, using all the data currently available. Thus, the Team took employment data from January 2001 to August 2005 for these three counties and then ran an ordinary least squares regression model of a time trend of employment from January 2001 to August 2005. The resulting beta coefficient on the time

* The recent release of the 2010 Decennial Census has confirmed that Harrison County is the only south Mississippi County to have lost population from 2000 to 2010.

trend from this regression produces the expected growth rate in employment over time centered on the time series average. Using this technique, the average growth rate per month for service sector employment is .20 percent for Hancock County, .13 percent for Harrison County and .20 percent for Jackson County. Using these estimates, the Team projected the employment level for September 2008 for each of the three counties and compared the obtained figures to the actual employment numbers, as provided in Table 6.2.

Table 7.2: Projected Service Sector Employment and Employment Losses from Katrina

County	Actual Sept 2008 Employment	Projected Sept 2008 Employment[a]	Projected Employment Losses from Hurricane Katrina
Hancock	8,005	8,603	-7.0%
Harrison	57,441	63,729	-9.9.%
Jackson	21,214	22,207	-4.5%

Source: Authors' tabulations based upon Bureau of Labor Statistics Quarterly Census of Employment and Wages. [a] These projections are based upon average growth rates in service sector employment from 2001 to 2005 by county.

The results presented in Table 7.2 confirm the results from Table 7.1. Jackson County's employment recovered most quickly of the three coastal counties, while Hancock County recovered somewhat more quickly than Harrison County. Thus, the first two methods of measuring disaster recovery produce the same results concerning the ordinal ranking of the recovery rates, as both describe the most distant of the three counties recovering the most quickly. However, the two measures arrive at different results concerning the degree of recovery. While Hancock County recovered to pre-Katrina service sector employment levels by September 2008, this county's economic recovery was not complete when measured against its expected employment growth. However, it still remains true that Hancock County, which received the most direct impact from the storm, recovered more quickly than did Harrison County.[*]

7.2.5 Measure 3: Return to National Employment Trend

A final measure of recovery is to compare the employment growth in South Mississippi to growth from a comparable region. While the first two measures have some advantages, they also have some shortcomings. Specifically, comparing employment post-Hurricane Katrina to employment pre-Hurricane Katrina does not take into account differential growth rates prior to the storm. Likewise, comparing employment to what it would have been assuming a constant growth rate does not take into account the possibility that macroeconomic changes could have either sped up or slowed down employment growth from its 2001-2005 path. Thus, a counterfactual case using a similar region may be a better yardstick for understanding what one could have expected employment levels to be in the absence of the disaster. For the comparison case, the Team choose the three coastal counties in the Corpus Christi metropolitan area—Aransas, Nueces and San Patricio—which are also known as the Texas Coast Bend. These three counties have a total level of employment of approximately 140,000 in 2001 with 100,000 (71%) of these jobs in the service sector. This is,

[*]This result is similar to Tierney's (2007) claim that one of the factors that one would expect should affect speed of recovery, but does not, is the magnitude of the impact from the disaster.

therefore, comparable to the three Mississippi coastal counties which had total employment of approximately 120,000 in 2001 with 87,000 (72%) of these jobs in the service sector.

To get a sense of the appropriateness of the counterfactual case study, consider unemployment rates for Aransas, Nueces and San Patricio Counties from 2000 to 2008. First note the decline in unemployment in the early 2000s is comparable to what happened in coastal Mississippi. Somewhat different than in Mississippi, the decline in unemployment started later in Texas, implying that the recession of 2001 was still having some effect into 2003 and 2004. Second, unemployment begins to rise in 2008 after the steady decline through 2007, implying that the 2008-2009 recession affected the Corpus Christi area labor market in a similar manner that it affected Mississippi.

The three Texas counties had a total of 108,000 sector service sector jobs in August 2005. By August 2008, service sector employment had risen to 113,700 jobs, representing a five percent increase during these three years. Each of the three counties in Texas has a corresponding county in Mississippi that is most similar to its own employment structure. Nueces County contains the city of Corpus Christi and is the largest of the three counties and is thus the natural comparison to Harrison County. San Patricio County has primarily a service sector economy, but has marine related industry and military employment similar to that found in Jackson County. Finally, Aransas County has the smallest population of the three and the highest rate of service sector employment, which is similar to that found in Hancock County. Furthermore, the county with the central city, Nueces, experienced relatively slower service sector employment growth during this time, with 4.0 percent over three years. From 2005 to 2008, Aransas and San Patricio counties experienced growth rates of employment of 8.2 percent and 11.3 percent, respectively.

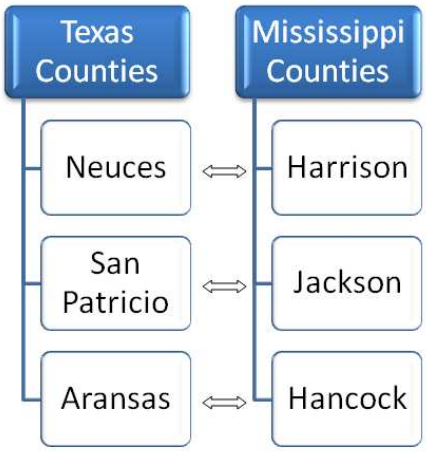


Figure 7.10: Counterfactual Case Study Counties (Source: Authors 2011)

Using the average employment growth in the three Texas counties as the benchmark, none of the three Mississippi counties had recovered by August 2008 (see Tables 7.3 and 7.4). While Jackson County saw its service sector employment return to its pre-Hurricane Katrina level, it showed relatively anemic growth, at .2 percent from 2005 to 2008. This implies that Jackson County's employment growth remained nearly 5 percentage points lower than it might have been without the hurricane. Similarly, Harrison County's service sector employment was 15 percent lower than what would have otherwise been expected to occur.

Table 7.3: Difference between Coastal Mississippi and Texas Employment Changes (Source: Authors 2011)

County	August 2005 Employment	August 2008 Employment	Percent Change	Percent change in Coastal Texas employment	Projected losses due to Hurricane Katrina
Hancock	8411	8061	-4.2	5.0	9.2
Harrison	64584	57867	-10.4	5.0	15.4
Jackson	21575	21627	0.2	5.0	4.8

Table 7.4 (Below): Difference between Coastal Mississippi and Texas Employment Changes (by county) (Source: Authors 2011)

County	August 2005 Employment	August 2008 Employment	Percent Change	Percent change in Coastal Texas employment (by county)	Projected losses due to Hurricane Katrina
Hancock	8411	8061	-4.2	(Aransas) 8.2	12.4
Harrison	64584	57867	-10.4	(Nueces) 4.0	14.4
Jackson	21575	21627	0.2	(San Patricio) 11.3	11.1

The central counties in the Mississippi and Texas coastal areas are Harrison County and Nueces County, respectively. A more precise comparison is employment growth in Harrison County to that in Nueces County, rather than comparing Harrison County's employment growth to all three Texas counties' employment growth. Note that national trends come to play in this comparison. For example, the 2005-2008 construction and real estate fueled economic growth throughout the United States saw central cities grow less than suburbs during this boom time. Therefore, when compared with Nueces County, the losses in Harrison county show a decrease of 14 percent with the counter factual rather than the 15 percent found when comparing to the entire Coastal Bend region. Conducting this exercise with Jackson County and Hancock County, however, shows greater losses than the previous calculation. The result of Hurricane Katrina is that the areas lost the growth opportunities offered by the housing boom. From 2005 to 2008 employment growth was 8.2 percent in Aransas County and 11.3 percent in San Patricio County. Hurricane Katrina effectively cost these counties part of the upward swing in the business cycle that the recovery aid dollars could not match or replace, especially given the reaction by the insurance industry after the storm. As insurance companies pulled out of the state, some residential developments that were planned became infeasible for a number of years until most of the insurance disputes were settled. For instance, a large number of mid-2005 planned condo developments were thwarted by Hurricane Katrina and by the time the region was able to get back to some semblance of normalcy, hence appearing attractive as a target for investment growth, the housing boom was over and the opportunity was lost.

Thus, using the three measures of recovery we can make the following conclusions.

- Employment in 2008 had recovered to its pre-Katrina levels in Hancock and Jackson Counties, but did not recover in Harrison County.
- Based upon either pre-Katrina local trends (Method 2) or post-Katrina national trends (Method 3), all three coastal counties had significantly lower

employment in 2008 than projected estimates. Estimated losses range from five percent to fifteen percent of service sector employment.

7.3. Modeling the Impact of Hurricane Katrina on Unemployment Duration

7.3.1 Objective

Employment levels recover when workers are matched with appropriate vacancies. However, the QCEW data used do not allow distinction between micro-communities within counties. Thus, this section uses a data set with more precise geographical indicators to estimate the factors which determine the speed of recovery. Specifically, this section estimates the factors that determine unemployment duration and the degree to which the length of unemployment spells are related to the impact of the storm and the demographic characteristics of the community.

7.3.2 Data

The data from this section come from administrative records of the Mississippi Department of Employment Security (MDES) on Unemployment Insurance claims from 2005 to 2008. These data record the start date, the end date, and the residence of the unemployment insurance claimant. By using these data, the Team estimates the factors that determine unemployment duration.

7.3.3 Methods for Estimating Unemployment Duration— Definitions

An individual's unemployment spell ends when a match is made between the individual seeking a job and an employer with a vacancy. The job search model provides the framework through which unemployment duration will be analyzed (Kiefer 1988). Let T_i be individual *i's* duration of unemployment, and *f(t)* be the probability distribution of realizations t; the cumulative distribution function is $F(t) = Pr(T_i \leq t)$ which gives the overall probability that the spell *s* will last until *t*.

$$F(t) = \int_0^t f(s)ds \tag{1}$$

Alternatively, one would be interested in the survival function which gives the probability that the spell (*s*) is of at least length *t*; that is

$$S(t) = 1 - F(t) \tag{2}$$

The hazard rate λ is the rate at which spells are completed after a certain duration.

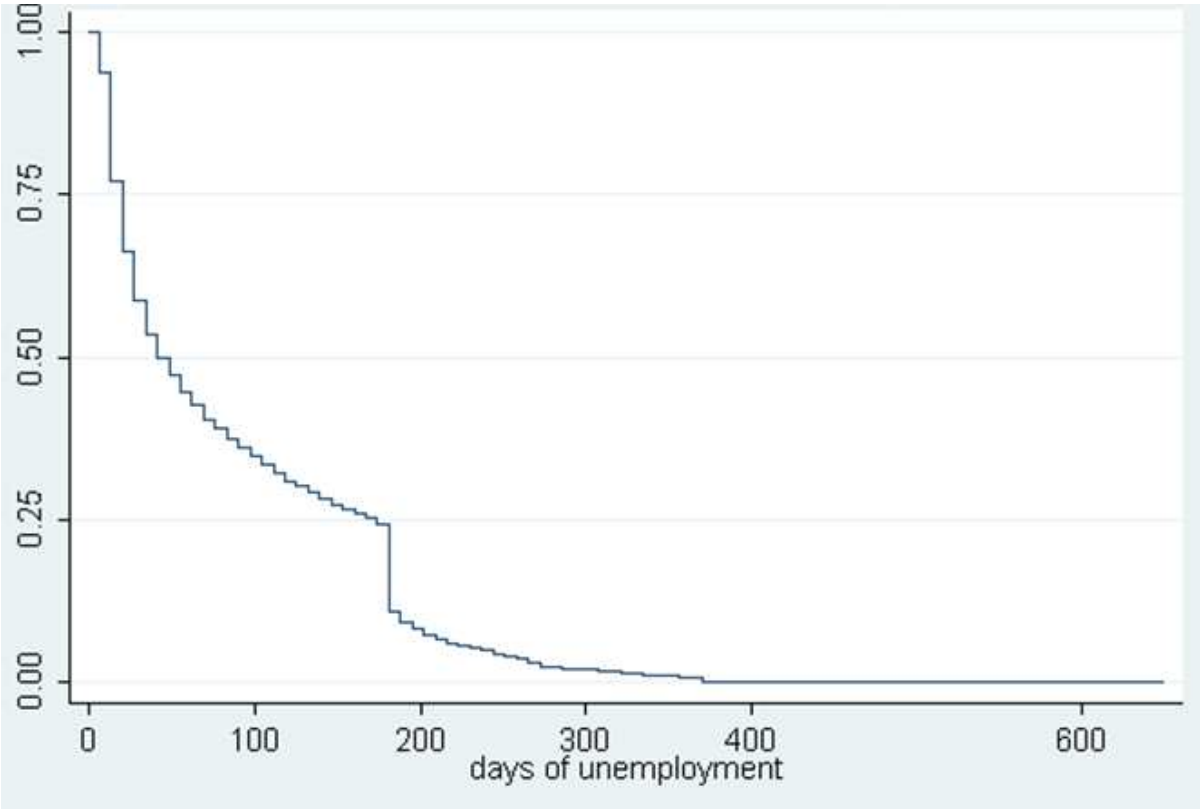
$$\lambda(t) = \frac{f(t)}{S(t)} \tag{3}$$

A number of hazard functions were fit to the data to check robustness of the results. The survival and hazard functions below are estimated using semi-parametric and non-parametric methods for the various types of communities.

7.3.4 Non-Parametric Survival Functions

This section describes how survival functions differ by economic and background characteristics and disaster vulnerability measures. Figure 7.11 shows the survival function for unemployment insurance for all those who received unemployment insurance for the first time in the week following Hurricane Katrina (week of September 5, 2005). As one can see, the median duration of unemployment for these works less than 60 days (as 50 percent still 'survived' in the state of unemployment) and by 180 days 75 percent of claimants had been removed from the unemployment rolls.

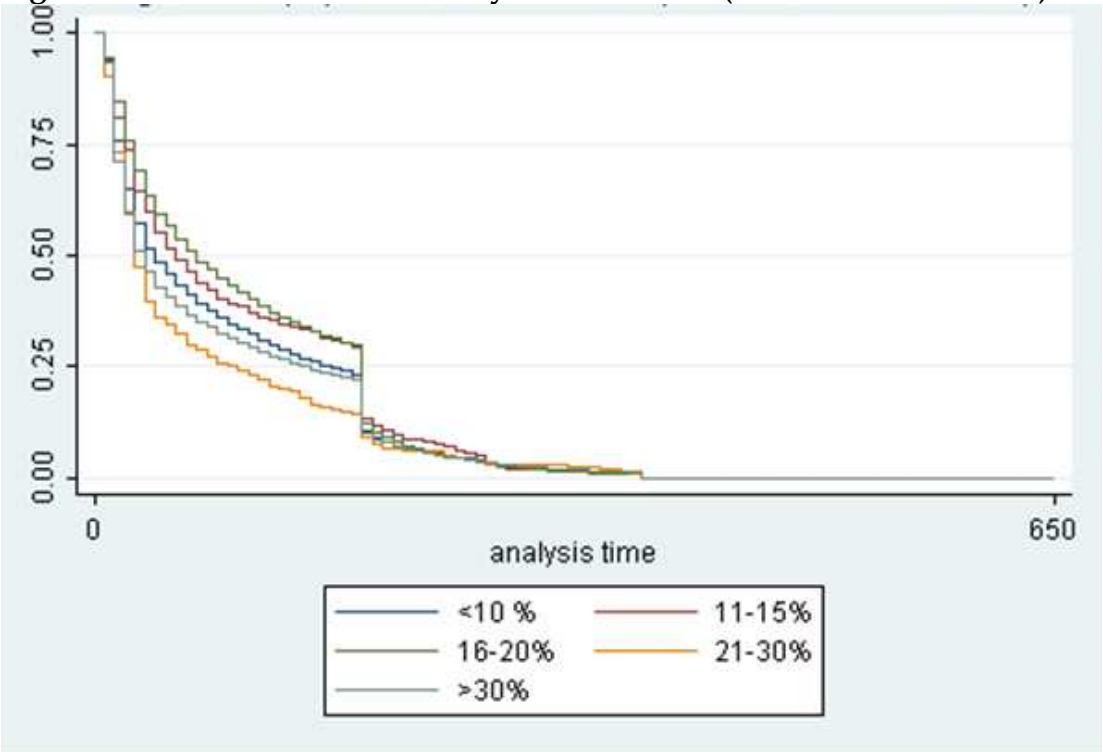
Figure 7.11: Survival Function of First Time Unemployment Insurance Recipients



(Source: Authors 2011)

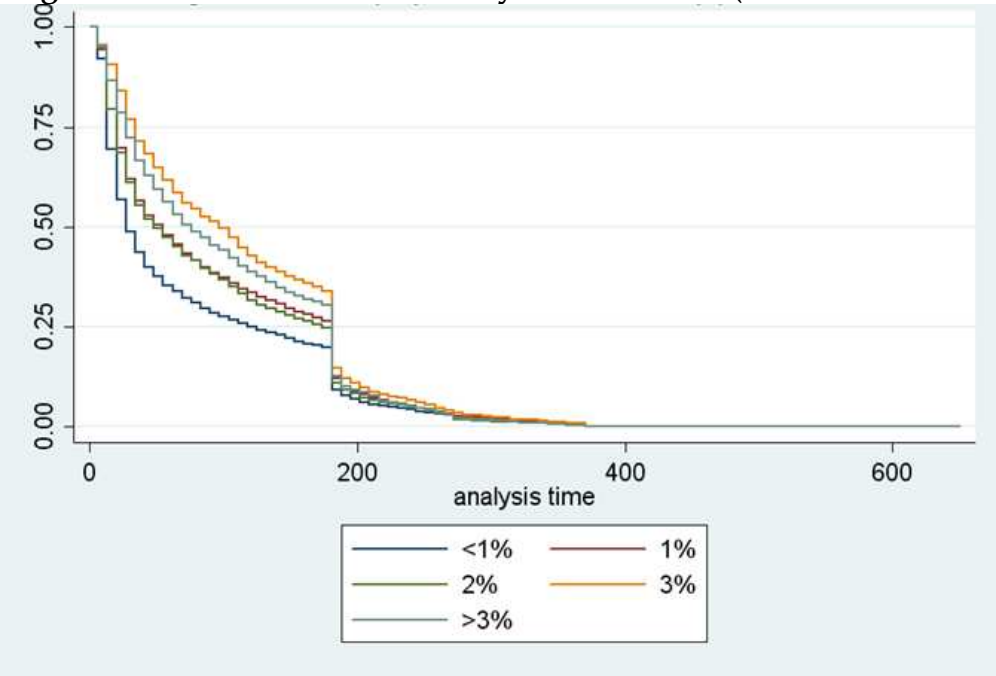
Figure 7.12A and 7.12B demonstrate the survival rates by percent racial minority in the community. Figure 7.12A presents the survival function by percent black, while 7.12B presents the survival function by percent Asian. As seen in Figure 7.12A, there is not a clear pattern of unemployment duration based upon the percent black in community. The group with the shortest unemployment duration was not the group with the lowest percent black while the group with the longest unemployment duration is not the group with the highest percent Black.

Figure 7.12A: Survival Function by Percent Black (Source: Authors 2011)



Unlike the case with percent Black, there does seem to be a pattern to the relationship between percent Asian and unemployment survival rates following hurricane Katrina. Figure 7.12B shows these survival rates by the percent Asian by five categories of community level rates of percent Asian. Individuals from communities with the lowest percent Asian (less than one percent) left unemployment at the slowest rate. Those from the two middle groups (1-1.99 percent and 2-2.99 percent) were the second slowest to recover as measured by leaving the state of unemployment and those with the greatest percent Asian left unemployment most quickly. In fact the median unemployment time for the communities with the largest percent Asian was nearly two months shorter than the communities with the smallest percent Asian.

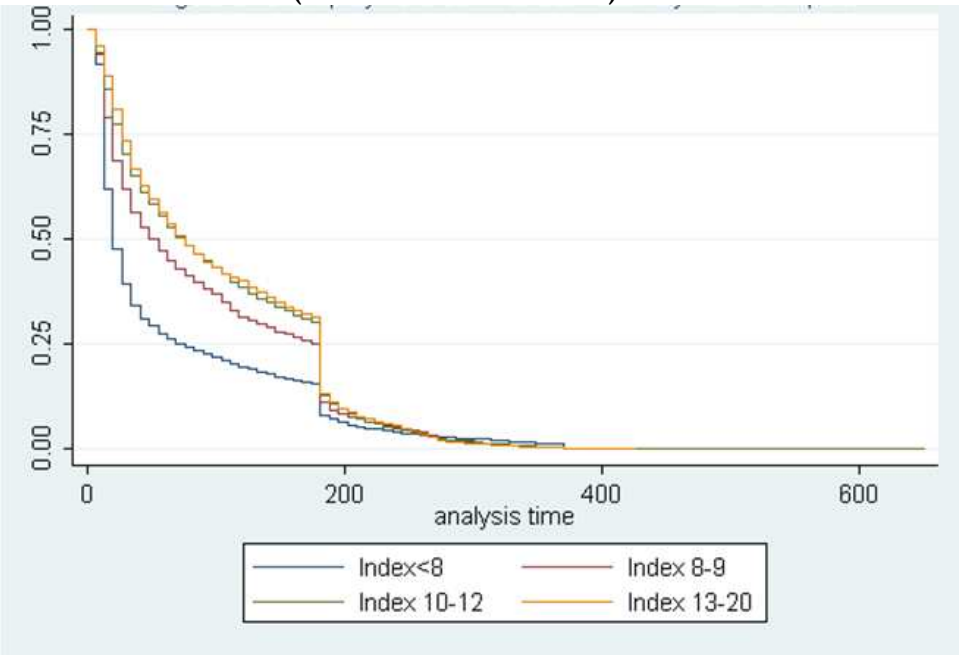
Figure 7.12B: Survival Function by Percent Asian (Source: Authors 2011)



If it is not the degree of social vulnerability as measured by intensity of the presence of ethnic and racial minorities that drives the variation in the unemployment duration spells, what is it? In short—the impact of the storm: those communities that had relatively light impact from the storm as measured by the Disaster Composite Index (DCI) (see Report Section 2) that accounts for its wind, storm surge and rainfall did not have as long to wait to get off of unemployment than those communities that were hit harder by the storm. If an area had relatively high surge and heavy rainfall and rain, then getting back to work was much more difficult.

Figure 7.13 shows the unemployment survival rates by the DCI. The median time to stay on unemployment insurance for individuals in areas where the DCI was less than 8 on the disaster composite index was approximately one month. For those who lived in areas where the disaster composite was 8 or 9, the median duration on unemployment insurance was two months. For those with a value of 10 or greater, the median duration was three months with relatively little difference between those who suffered an impact of 11 or 12 and those who had an impact of 13 or greater (with 20 as the maximum).

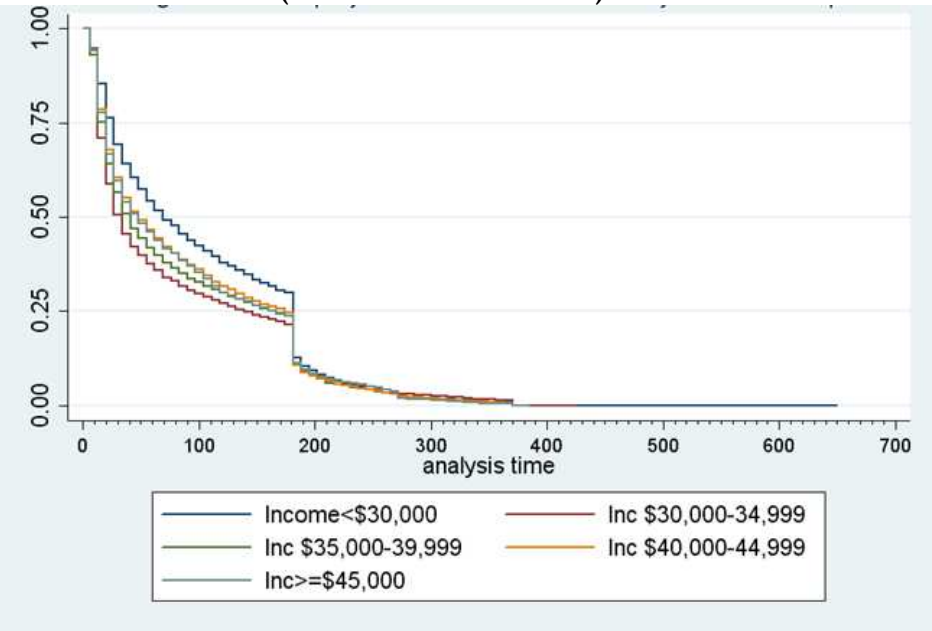
Figure 7.13: Unemployment Survival Rates by Disaster Composite Index (Source: Authors 2011)



Another measure of social vulnerability is the relative access to resources as measured by income or poverty. Segregating communities by income produces the following results.

- First, the poorest communities do have survival functions that indicate people from these areas have a harder time getting back to work after the unemployment that was caused by Hurricane Katrina. Figure 7.14 shows these survival functions by the 1999 median income of the communities. Unemployed individuals from communities that have a median household income of less than $30,000 per year take nearly three months for half of the individuals to return to work and another three months for three quarters of them return to work.
- Second, the relationship between income and unemployment duration is not monotonic. The communities with the next lowest level of income ($30-35,000) have the quickest recovery and movement out of unemployment with median times of one month.
- Third, the middle groups are also not directly related to their unemployment survival rates. Thus, like race, income as a measure of social vulnerability does not relate in the bivariate case (without controlling for other variables) to disaster recovery.

Figure 7.14: Survival Function by the 1999 Median Income of the Communities (Source: Authors 2011)



7.3.5 Hazard Modeling

Bivariate relationships are often misleading as they do not control for other factors. It may be the case that areas that are predominately minority were further away from the impact of the storm. A more useful modeling approach will be a multivariate approach that controls for disaster impact when looking at the importance of social vulnerability. Thus, the next section will use a Cox proportional hazard model to show what is the independent effect of each of these factors. In this model, the estimated effect is on the probability of leaving the state, so it is an estimate of *not surviving*.

Table 7.5 shows the effects of these various measures of disaster impact and social vulnerability of the community on an individual's unemployment duration. The coefficients reported can be interpreted as the effect of a change in the independent variable by one unit has on the probability of leaving unemployment. Thus, a positive coefficient indicates that this factor increases the probability of ending an unemployment spell while a negative coefficient indicates that it decreases the probability of ending a spell.

Looking first at the disaster composite index, notice that in all versions of the model that a higher disaster composite index is correlated with a lower probability of leaving unemployment when controlling for measurable social vulnerability indicators (the other independent variables). The reported coefficient indicates that for every one unit increase in the index, there is a lowering of the probability that an individual leaves unemployment on a given day by .04 percent. Thus, one way to think about this result is that a one unit change in disaster composite decreases the probability of leaving unemployment by about one percentage point. The probability of leaving unemployment after three months drops by 10 percentage points for every three unit increase in the disaster composite index. Given the fairly wide range of the disaster composite index, this is an indicator of a significantly meaningful effect.

Table 7.5: Effects of Measures of Disaster Impact and Social Vulnerability of the Community on an Individual's Unemployment Duration (Source: Authors 2011)

	(1)	(2)	(3)	(4)
VARIABLES	_t	_t	_t	_t
Disaster Index	-0.043***	-0.043***	-0.040***	-0.038***
	(0.001)	(0.001)	(0.001)	(0.002)
Black %	-0.001**	-0.001***	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Hispanic %	-0.026***	-0.027***	-0.045***	-0.041***
	(0.005)	(0.005)	(0.006)	(0.005)
Asian %	-0.037***	-0.037***	-0.021***	-0.019***
	(0.003)	(0.003)	(0.004)	(0.004)
Median Income	0.000			0.000***
	(0.000)			(0.000)
Grant	0.000***	0.000***	0.000*	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Per Capita Income		0.000	0.000***	
		(0.000)	(0.000)	
Unemployment Rate			4.893***	5.104***
			(0.537)	(0.551)
Observations	39833	39833	39833	39833

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As for measures of social vulnerability, all three measures of ethnic and racial minorities are negatively correlated with the probability of leaving unemployment. The largest impact appears to be based upon the level of the community's Asian and Hispanic population, this is largely an artifact of the relative size of these minority populations. A one percentage point increase in the Hispanic population is a more dramatic shift given the overall proportion of Hispanics in the population than the proportion of Blacks. When measuring the impacts in standard deviation terms (18, 1.1 and 1.8 for Black, Hispanic and Asian, respectively), a one standard deviation change in these variable leads to a very similar effect in the probability of leaving unemployment.

The final measures of social vulnerability are those that are correlated with economic status of the community as of the 2000 census. These measures give the regression the ability to control for the baseline of economic wellbeing directly rather than depend upon measures of vulnerability that are often correlated with wellbeing. We find that there is not a clear story to be told with these measures. While median income is positively correlated with the probability of leaving unemployment (as is per capita income), the unemployment rate is also positively correlated, indicating a higher unemployment rate in 2000 is correlated with leaving unemployment more quickly in 2005 and 2006.

The final measure in this model of unemployment duration is the payout of grants from the Mississippi Development Authority for home repair and reconstruction. The higher the per capita payout of these grants the quicker areas were to have individuals leave the unemployment rolls.

8. MODEL OF COMMUNITY RESILIENCE FOLLOWING A DISASTER

8.1 Overview

This section is organized as follows: in the next two parts, the data and methods used in this section will be presented. In the following two parts, the Team will present regression models of the impact of Hurricane Katrina on the economy of South Mississippi. Some of this work will reflect what is found in Report Section 7 looking at the impact of Katrina on employment. The econometric models will then use the survey data highlighted in Section 6 to estimate the impact of Hurricane Katrina on the probability of becoming unemployed, unemployment duration (using survey data), the losses to each household from Katrina, and the recovery rate of the community.

8.2 Data

There are two primary data sources for the modeling that will be used in this section.

- The administrative records of the Mississippi Department of Employment Security on Unemployment Insurance claims from 2005 to 2008 (same as from Report Section 7).
- The survey data collected by the team and described in Report Section 6 of this report.

As stated in Report Section 6, this survey received 2,200 responses to the Hurricane Katrina Volunteer Survey implemented in March through June of 2011 and 1,825 (82.2%) of these respondents completed the survey. This survey was completed mostly online using Survey Monkey, but the team also pursued under-represented communities using paper surveys to increase the representativeness of the survey responses.

Table 8.1 contains means, standard deviations, minima and maxima of key variables from the survey. As can be seen in this table, the number of survey respondents who self-reported as Black and Hispanic are lower than the averages for the sample area. Our sample is also above average in terms of years of schooling, percent female and mean income.

Table 8.1 Descriptive Statistics of Key Variables (Source: Authors 2011)

Variable	Obs	Mean	Std.Dev.	Min	Max
Black	2287	.0961959	.2949242	0	1
Hispanic	2220	.0099099	.0990764	0	1
Asian	2287	.0078706	.0883858	0	1
age	1792	45.47098	15.26923	17	86
female	2220	.5581081	.4967239	0	1
Education (years)	1841	15.78816	2.245936	10	20
Surge avg	1678	15.84874	7.899766	0	25.26
Median Income	1678	35696.84	10649.19	0	51449
Disaster index	1678	9.666269	3.791456	3	19
% Black (zip)	1588	17.48572	16.05065	1.783894	70.38247
%Hispanic (zip)	1588	2.24178	1.01699	.6203325	6.006611
% Asian (zip)	1588	1.906979	1.795494	.076147	9.242477
Per capita Grant	1588	3198.754	3127.195	0	14961.61
Home owner	2287	.5924792	.4914806	0	1

8.3 Methods

This section will use an econometric model to predict the effects of storm and population characteristics on community resilience and recovery. Similar to the Cox-Proportional Hazard models estimated in Report Section 7, a regression model of unemployment duration will be estimated. The model will predict the impact of Hurricane Katrina on the expected unemployment duration for communities within the sample frame. Next, the team will take characteristics from Hurricane Ike which impacted Galveston, Texas, in 2008 to simulate the estimated impact of a similar storm would be on unemployment duration in Mississippi.

This approach creates a predictive model of disaster recovery based upon survey answers collected by the team. The team then uses out of sample simulations to estimate recovery time in the case of a storm the size of Hurricane Ike hitting specific communities within Mississippi.

8.4 Regression Results

Table 8.2 presents results from regression models with different dependent variables. The first column uses the probability of losing one's job as the dependent variable. The second column uses months of unemployment (for those who did lose their job) as the dependent variable. The third column uses the dollar value of property loss as the dependent variable. And the fourth column uses the estimated percent recovery of the community as the dependent variable. This sample includes all those respondents with valid zip codes. Since the models are based loosely upon the framework of social vulnerability, it is logical that these covariates are more closely tied to economic/social outcomes than merely predicting evacuation behavior.

Table 8.2. Ordinary Least Squares Regression Models of Key Dependent Variables (Source: Authors 2011)

	(1)	(2)	(3)	(4)
VARIABLES	losejob	Months Unem	Prop Loss	% Recovery
black	-0.027	0.210	-9,121.845***	1.163
	(0.039)	(0.688)	(3,362.651)	(1.905)
hispanic	0.122	-1.096	4,127.363	4.028
	(0.087)	(0.988)	(7,777.840)	(4.454)
asian	0.339**	-0.417	-6,669.533	5.557
	(0.137)	(1.268)	(9,892.479)	(5.411)
female	-0.025	0.035	3,738.384*	-4.517***
	(0.025)	(0.421)	(2,143.471)	(1.217)
age	-0.003***	0.014	65.780	-0.141**
	(0.001)	(0.018)	(96.306)	(0.055)
ed	-0.003	0.011	-224.891	0.076
	(0.006)	(0.116)	(509.332)	(0.289)
ownhom05	-0.053*	0.416	9,537.633***	3.023**
	(0.031)	(0.499)	(2,701.348)	(1.530)
wage	-0.005***	-0.051**	348.210***	-0.035
	(0.001)	(0.025)	(84.822)	(0.049)
per_black	0.001	-0.013	307.709***	-0.287***
	(0.001)	(0.017)	(71.459)	(0.041)
per_hisp	-0.002	0.094	-805.920	-1.094*
	(0.013)	(0.238)	(1,127.292)	(0.639)
per_asian	0.017**	0.195*	2,778.760***	-2.014***
	(0.007)	(0.117)	(624.485)	(0.352)
disaster	0.012***	0.133**	989.916***	-1.987***
	(0.003)	(0.051)	(256.682)	(0.146)
Constant	0.362***	1.602	-14,856.611*	107.158***
	(0.102)	(1.879)	(8,465.621)	(4.764)
Observations	868	103	927	946
R-squared	0.122	0.191	0.114	0.266

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Specifically, we find that six variables are significant in the zip code level variable regressions in column 1. Two important factors here are both the fact of an individual being Asian and the percent of Asians living in the zip code are important factors in determining the probability of losing a job. Second, there are three socio-economic variables that are related to job type and status that tied to the probability of losing one's job: age, wage, and being a homeowner. Specifically, older workers, who are likely to have more tenure, are less likely to lose one's job. Higher wage (and salary) workers are less likely to lose their jobs and homeowners are also less likely to lose their jobs. Finally, the disaster composite index also has a significant impact on the probability of losing one's job.

Column 2 presents results of the regression models where the dependent variable is the number of months an individual is unemployed. The sample is very limited in all the regressions since only those who were working before Katrina, but then lost their jobs due to Katrina are included in the sample. The only variables that are significant in these models are closely related to the ones that also affected the probability of losing one's job in the first place. Specifically, wages are negatively correlated with the number of months unemployed; percent Asian in the zip code is positively correlated with the number of months unemployed; and the disaster index is positively correlated with the number of months unemployed. These models are less robust than the ones from Report Section 7 on employment conditions post Katrina, largely because of data issues with the sample size and the number of valid addresses.

Column 3 presents results of the regression models where the dependent variable is the total dollar uncompensated loss to the individual. The results indicate that many of the socio-economic variables are related to property, largely in part due to their relationship to the total wealth of the individuals in the first place. With the greater property values came greater probability of losing more of this property. Specifically, blacks lost less than whites and females report higher losses than males. Additionally, those who are homeowners report higher losses than do renters and those with higher wages report higher losses than those with lower wages. Finally, the demographics of neighborhoods also tend to be related the losses. The percent black and the percent Asian of the zip code tend to be correlated with higher losses. This is an interesting feature which may have to deal with the overall losses due to the geographic location of the neighborhood, but it is important to recall that these covariates are significant, even when controlling for the disaster impact, which is also significant.

Column 4 presents results from a regression of the covariate on the perception of how recovered the community is. The recovery perception is based upon the percentage (in deciles) that the respondent believes their community is recovered. In this model, there is a large set of individual and community level variables that statistically predict the perception of community recovery. On the individual level : females perceive less recovery than males and older respondents perceive less recovery than younger respondents. Homeowners, however, perceive a greater degree of recovery than do renters. Finally, the demographics of one's neighborhood strongly affects the perception of community resilience and recovery. The percent Black, the percent Hispanic and the percent Asian all are negatively correlated with the perception of the community's recovery while racial/ethnic variables of the respondent do not affect the perception of recovery.

This section will use the empirical results from the above analysis and the analysis from Chapter 7 in order to develop a predictive model. Table 8.3 shows the regression results from model of unemployment duration at the zip code level. In this model, the dependent variable is the number of days that an individual has been on Unemployment Insurance.

Instead of using the overall disaster composite index as an independent variable, this model breaks apart the various components to be able to get a richer set of predictive effects from a simulated storm.

Table 8.3 shows the preferred regression model of the impact of the disaster on unemployment duration. As can be seen from the first column, the set of variables is fairly limited and only includes those variables for which the research team was able to find consistent support for their inclusion. These variables include the two components of the disaster composite index (surge and wind), demographic variables—such as race and income—and policy variables.

Table 8.3 Effects of Measures of Disaster Impact and Social Vulnerability of the Community on an Individual's Unemployment Duration (Source: Authors 2011)

	(1)	(2)	(3)	(4)
Surge (feet)	-0.012***	-0.011***	-0.009***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
Wind (MPH)	-0.010***	-0.011***	-0.011***	-0.010***
	(0.000)	(0.000)	(0.000)	(0.000)
% Black	0.000	-0.000	-0.002***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
% Hispanic	-0.026***	-0.030***	-0.043***	-0.038***
	(0.005)	(0.005)	(0.006)	(0.006)
% Asian	-0.028***	-0.030***	-0.022***	-0.020***
	(0.003)	(0.003)	(0.004)	(0.004)
Median Income	0.000***			0.000***
	(0.000)			(0.000)
Per Capita Grant	0.000***	0.000*	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Per Capita Income		0.000***	0.000***	
		(0.000)	(0.000)	
Observations	39833	39833	39833	39833

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

8.5 Predictive Model of Community Resilience

Based upon the results from Table 8.3, the next step uses the estimated coefficients from a linearized version of the duration model to get a predictive model of the effect of storm impact and demographic characteristics on the recovery of a region as measured by unemployment duration. Thus, a region is recovering more slowly when people stay on UI benefits for longer. If individuals are able to leave unemployment insurance more quickly, the area is seen as recovering more quickly.

Table 8.4 shows the predicted effects of the model on unemployment duration using the historical values from Hurricane Katrina. In Table 8.4, the rows represent different historical

values of the determinant variables for selected communities which are listed along the column headers. The table shows the effects using the predictive model for six communities: Bay St. Louis, Long Beach, Gulfport, Biloxi, Ocean Springs and Gautier. In addition to storm impact measures, the model includes the percent Black, Hispanic and Asian; per capita income; and per capita grant funding from the MDA homeowner grants.

Table 8.4. Estimated Model Unemployment Duration Model with Projected Impact of Hurricane Katrina (Source: Authors 2011)

Unemployment Duration Model	Bay St. Louis	Long Beach	Gulfport	Biloxi	Ocean Springs	Gautier
Changing Cells:						
Wind Speed	100	90	90	75	75	60
Rainfall	9	4	3.5	3.5	2	2.5
Storm Surge	20	25	21	21.98	19.2	15.21
PC Grant	11572	2535	2004	4840	4477	3712
Percent Black	8.8	7.3	54.47	27.8	7.2	25.6
Percent Hispanic	1.74	2.2	2.27	3.8	0.6	2.9
Percent Asian	1.13	2.4	0.93	9.2	0.3	1.15
Median Income	46124	43069	25305	26187	47133	41186
Result Cells:						
Expected Unemployment Duration	43	93	95	91	65	42

While demographic differences affect unemployment duration, wind speed and storm surge appear to be driving most of the results. Additionally, the homeowner grants are very important in this model and some communities, such as Bay St. Louis, received much higher level of grants than other communities. These factors led to the predicted recovery time in Bay St. Louis being just half as long as other communities, despite having the strongest impact of the storm.

Table 8.5 demonstrates the utility of the model by presenting an out of sample simulation. This simulation takes the meteorological impact data from Hurricane Ike, which impacted the Texas coastline in 2008. The maximum sustained wind speed at landfall for this storm was 120 miles per hour with a 24 foot storm surge. We then took data from the entire impacted storm area for Ike to predict the effect of such a storm on the Mississippi coastline assuming that the storm directly hit the city of Gulfport. In this model simulation, we then use the average levels of homeowner grants to balance out the impact of policy variables *a priori* .

Table 8.5 Estimated Model Unemployment Duration Model with Projected Impact of a Hurricane Ike Sized Storm Impacting Gulfport Directly (Source: Authors 2011)

Unemployment Duration Model- Ike Scenario	Bay St. Louis	Long Beach	Gulfport	Biloxi	Ocean Springs	Gautier
Changing Cells:						
Wind Speed	85	90	120	90	85	75
Rainfall	10	12	14	14	12	8
Storm Surge	20	22	24	22	18	15
PC Grant	3513	3513	3513	3513	3513	3513
Percent Black	8.8	7.3	30.2	27.8	7.2	25.6
Percent Hispanic	1.74	2.2	2.4	3.8	0.6	2.9
Percent Asian	1.13	2.4	1.2	9.2	0.3	1.15
Median Income	46124	43069	34500	26187	47133	41186
Result Cells:						
Expected Unemployment Duration	68	79	138	88	61	56

The results from this simulation are very informative in terms of the nature of the underlying relationships in the predictive model. The first item to note is that the vast difference between unemployment duration in Gulfport (138 days) and those of other somewhat similar communities (e.g. Biloxi) are largely driven by the differences in wind speed. Storm surge, while clearly important, does not decrease much from one community to the next and thus, it is the decrease in the level of wind speed which drives the lower predicted value for unemployment duration in this model. Likewise, differences in racial composition and income are statistically significant. However, the differences in the recovery of a community such as Biloxi (high minority) compared to one that is only twelve percent minority (Long Beach) does not dramatically change the difference in unemployment duration between the two communities. While Biloxi shows an average duration of 88 days, the richer and less minority community of Long Beach has an average duration of 79 days, less than a week and a half shorter.

Table 8.6 shows the relative sensitivity of the projected results of this model. In this table, the team presents results from two simulations. In the first one, the "Ike-like" storm hits Long Beach directly and in the second the simulated Ike hits Biloxi directly. In addition to the point estimates, however, this table includes two more predicted values for unemployment duration in each community. We also report the lower bound of the 95 percent confidence interval for the wind and surge impacts of the storm and the upper bound of the 95 percent confidence interval. Since all of the predictive models are measured with some probabilistic errors of the point estimates, this table gives a sense of the relative robustness of the model.

Table 8.6 Estimated Model Unemployment Duration Model with Projected High and Low Bounds of a Hurricane Ike-Sized Storm Impacting Long Beach and Biloxi (Sources: Authors 2011)

Unemployment Duration Model- High and Low Scenario	Long Beach Low	Long Beach Medium	Long Beach High	Biloxi Low	Biloxi Medium	Biloxi High
Changing Cells:						
Wind Speed	120	120	120	120	120	120
Rainfall	14	14	14	14	14	14
Storm Surge	22	22	22	22	22	22
PC Grant	3513	3513	3513	3513	3513	3513
Percent Black	7.3	7.3	7.3	27.8	27.8	27.8
Percent Hispanic	2.2	2.2	2.2	3.8	3.8	3.8
Percent Asian	2.4	2.4	2.4	9.2	9.2	9.2
Median Income	43069	43069	43069	26187	26187	26187
Result Cells:						
Expected Unemployment Duration	100	112	126	102	114	127

As can be seen in Table 8.6, the relative precision of the model used here is fairly high. The upper bound and lower bound for the impacts of wind speed and storm surge in the projection that estimates unemployment duration for Long Beach differ by only 26 days. Thus, if even if both the impact of wind and storm were measured with error to a degree that we are confident that the range of the actual impact has less than a 2.5 percent probability of being lower than 100 days of unemployment duration for Long Beach. Likewise, there is less than a 2.5 percent probability that the actual impact of a Ike-like storm hitting Long Beach will be an average level of unemployment duration greater than 126 days. For Biloxi, the 95 percent confidence interval indicates that the range of unemployment duration in Biloxi would be between 102 days and 127 days.

Table 8.7 presents a final model of community recovery and resilience. In this model we take separate questions from the survey described in Chapter 6 to create our dependent variable for the regression model. First, we take the date that the individual claims that the community has returned to the current state of recovery. We then use that date to determine the number of months between Katrina and the date of achieving that recovery. That is known as the months to partial recovery. Next, we then take the percent recovered (for example 80) and take that number divided into 100 and multiply the resulting value times the months of partial recovery. This yields the months to full recovery. For example, if an individual says that it has taken 60 months to achieve 80 percent recovery, we take 100/80 and multiply that by 60 months to get an estimate on the number of months to full recovery. This calculation gives the projected number of months to recovery. The mean for this value is approximately 81, implying that the average resident of south Mississippi

estimated that it will take until nearly 2013 until their community fully recovers. While this is merely illustrative, it does a good job of indicating relative speed of recovery.

Table 8.7 Estimated Recovery Model for Selected Communities with Hurricane Katrina Data (Sources: Authors 2011)

Months to Recovery Model	Bay St. Louis	Long Beach	Gulfport	Biloxi	Ocean Springs	Gautier
Changing Cells:						
Wind Speed	100	90	90	75	75	60
Rainfall	9	4	3.5	3.5	2	2.5
Storm Surge	20	25	21	21.98	19.2	15.21
Percent Black	8.8	7.3	54.47	27.8	7.2	25.6
Percent Hispanic	1.74	2.2	2.27	3.8	0.6	2.9
Percent Asian	1.13	2.4	0.93	9.2	0.3	1.15
Median Income	46124	43069	25305	26187	47133	41186
Result Cells:						
Expected months until 100 percent recovery	82	70	68	63	42	33

To estimate the recovery model, we take similar variables as those used in models in table 8.2 and estimate an OLS regression model of these covariates on the projected recovery date. We then use the coefficients from the OLS model to then create predicted values for recovery times within the sample of the Katrina survey respondents. Table 8.7 shows that using this model that the predicted recovery time for Bay St. Louis is twice that of the communities in Jackson County, while all communities in Harrison and Hancock counties faced recovery times of at least 5 years.

9. CONCLUSION

This research has addressed how communities and specific populations within those communities respond to a disaster; thereby providing critical knowledge about potential efficacy of timely and targeted assistance to ensure rapid and effective rebuilding of local economies. By definition, a disaster is an unusual source of stress within an established system. This research has, in five stages, sought to address preparation for and reaction to such a stress. Mixed methods research employing qualitative and quantitative data analysis, in accordance with social science standards, has been used and presented to address the research questions of this report. Furthermore, economically vulnerable communities, commonly consisting of minority and immigrant groups, have been given emphasis as these groups are frequently the last to recover from a disaster, if recovery takes place at all.

The Literature Review-Landscape Assessment (Report Section 2) provides a survey of the literature in resiliency. The Team finds that its own research generally validates what exists in the literature, while at the same time advancing the literature by modeling community-level resiliency.

Stages I and II of this research have been designed to address "what" happened. Stages II and III answer "how" and "why" it happened. Stages IV and V use available data and field data to estimate relationships between social-economic factors, speed of recovery, and resilience in communities. The findings of these questions are addressed within this section of the report. Section 9.1 integrates the findings from field research. Section 9.2 presents the modeling outcome.

9.1 Field Research Discussion

9.1.1 Overall Impact and Recovery

Although Hurricane Katrina caused obvious physical damage to Gulf Coast communities, interview respondents provided that the storm had both a positive and negative impact on their communities— destruction being a negative impact, but positive impact in that it drew communities together. Another impact that interviewees commented on as a positive factor is that it forced the communities to build stronger and safer buildings and other structures. As far as physical damage, interviewees overwhelmingly agreed that surge was the most destructive, followed by wind, and then rain.

Questions regarding recovery were designed to gather information not only on degree of perceived recovery, but also on measures of recovery. In interviews, some elites answered in terms of business and/or economic activity, while others answered by infrastructure capacity or population level. Furthermore, some interviewees answered with reference to their individual recovery, while others spoke of community level recovery. Interviewees commonly gave tangible measures, as opposed to mental health, social cohesion, or a general feeling of security. Focus group participants commonly replied that recovery is not completely possible, because those affected will never be able to regain what they lost. Others defined recovery as the stabilization of mental outlooks and general happiness.

Perceptions of recovery varied across communities. Only 8.7 percent of survey participants believe that their community has completely recovered to pre-Hurricane Katrina levels. However, 20.8 percent of respondents believe their community has recovered 50 percent or less, compared to the 79.1 percent that believe their community is

more than 50 percent recovered. The majority of these respondents (55.92%) do not feel that their community recovered until 2010 or 2011, while only 7.39 percent of the respondents feel their community recovered in 2005 or 2006. Interviewees most commonly agreed that their communities are still recovering, but have been making gradual progress. Elites were commonly quick to assert that insurance and increased construction costs have countered quick and effective recovery in their communities. According to elites, insurance is the primary obstacle to recovery, based not only on its lack of payouts following Hurricane Katrina, but also its increase in price. Focus group participants also identified insurance as the primary obstacle to recovery. Survey data provides that 76.6 percent of respondents had homeowner's insurance as of August 29, 2005, while only 35.5 percent had wind insurance, 20.1 percent had flood insurance, and 5.0 percent had renter's insurance, 16.3 percent reported not having insurance coverage at that time. Despite the majority of respondents having insurance coverage, only 26.0 percent of survey respondents reported having no non-reimbursed property loss as a result of Hurricane Katrina. Moreover, 43.0 percent reported non-reimbursed property loss of over $5,000.

The interview and focus group participants make clear that a major impediment to recovery is insurance. Issues surrounding insurance include the rising cost of insuring a house in the coastal counties of Mississippi, the disparity in the perception of insurance claims paid versus claims owed, and the post-Katrina wrangling over what is covered and what is not.

The Mississippi Insurance Commissioner's office reported to the Team that the average cost along the six coastal counties in Mississippi increased approximately 80% since Hurricane Katrina (phone conversation, October 26, 2011). The Team could not obtain raw data tracking the cost in each individual county per year, but *USA Today* (August 26, 2010) cites survey data from the National Association of Insurance Commissioners claiming the nationwide average for homeowners insurance went up 7.6% between 2005 and 2007. Some individuals may have thought their homeowners insurance covered all types of damage associated with a hurricane. As one focus group participant suggested, people are going to wonder what their insurance covers and does not cover when the next storm hits. A 2007 survey of 673 men and women by the National Association of Insurance Commissioners (www.naic.org) reveals that 83% of Southerners believed a standard homeowners policy covers damages from tornado, wind, hailstorm, and burst pipes from freezing and busted plumbing. The South's score of 83% was second highest in the US behind the North Central states (92%), and substantially higher than the Western states (54%). A 2008 press release by the Insurance Information Institute (www.iii.org) states the group conducted a survey of 1,004 individuals and found that 39% of Southerners versus 27% nationwide believe that homeowners insurance covers flooding. These surveys and the Team's own research suggest a need to educate residents about what insurance does and does not cover.

The interview and focus group participants suggest that persons might be abandoning insurance policies due to the inability to afford the increasing cost of the premiums. Persons will choose to buy food and medicine before they pay their insurance premiums. Figure 6.18 shows that when Hurricane Katrina struck in August 2005, about three-fourths of the survey respondents held a homeowners insurance policy, one-third had a wind insurance policy, one fifth held a flood insurance policy, and one-sixth did not hold any insurance policies relating to property. About 62% of respondents filed a Hurricane Katrina-related claim with insurance. More than half of the survey respondents report they received $10,000 or less in insurance payouts.

The Mississippi Insurance Department reported in a press release dated December 16, 2005, that over $1.9 billion had been paid by insurance companies in hurricane-related damages in Hancock, Harrison, and Jackson Counties, Mississippi. A follow-up release, dated January 30, 2006, shows that the figure rose to over $6.8 billion in just six weeks. These figures exclude flood damages.

The return of casinos and gaming industry played an instrumental role in recovery, as recognized by the elites, given the need for the creation of jobs and that casinos are one of the largest employers on the Mississippi Gulf Coast. The cities are dependent on the gaming revenue that casinos generate. Individuals, however, do not feel that casinos were particularly helpful following Hurricane Katrina; only 0.4 percent of survey respondents indicated that casinos were the most helpful businesses immediately after the storm. Big businesses, in general, with their "deep pockets" were valuable resources for economic recovery. Not only did their headquarters, located outside the region, allow them to open quicker than small local businesses, but they also provided tax revenue to the city and supplies to individuals that were needed to rebuild their homes. As interviewees noted, businesses selling rebuilding materials suddenly found a large market for their goods. These comments were confirmed by survey data—35 percent of respondents indicated that large retailers were the most helpful businesses following Hurricane Katrina, followed by building supply and home furnishing suppliers (17.0%), small retailers (15.0%), banks (15.0%), and hotels/motels (3.0%).

The coastal cities are not homogenous in terms of race, ethnicity, and household income-the resulting disparities were reflected in damage and recovery. For resiliency to occur in these communities, it is important for community leaders to recognize disparities between neighborhoods and that some groups have different needs. If efforts are not made to reach out to socially isolated groups in preparation and recovery stages, the resulting limited information and access to resources can prove devastating to future integration. Most elites, however, do not believe there to be socially isolated groups in their communities, nor do they believe that groups within their community were impacted differently by Hurricane Katrina. This is concerning, as marginalized groups have been found to be disproportionately affected by disaster and socio-economic factors have been argued to be a greater determinant of impact levels than geographic proximity to the disaster (Tierney 1999; Cutter, Mitchell, and Scott 2000).

The Team finds that certain neighborhoods and populations were more vulnerable to Katrina than others. This finding coincides with the literature (Cutter *et al.* 2008; Cutter and Emrich 2006; Cutter, Mitchell and Scott 2000; Morrow 1999), which argues that vulnerability is the antonym of resiliency. The literature suggests vulnerability contains both biophysical and social factors, and the Team sees evidence of this on the Mississippi Gulf Coast. In terms of biophysical, East Biloxi is low-lying, sandwiched between the Mississippi Sound and the Biloxi Back Bay. The result is that the communities of East Biloxi were especially vulnerable to the storm surge from Hurricane Katrina. In terms of social vulnerability, interview and focus groups participants tell of how unaffordable homeowners insurance is. The Team's model (Figure 7.15) reveals those in neighborhoods that are in the lowest demographic for median income (under $30,000) have the most difficulty finding work following Hurricane Katrina.

The Team finds that Geographic Information Systems (GIS) is a useful tool for modeling community resiliency. The Team used GIS to develop the Disaster Composite Index in (Report Section 3). The literature review details how Cutter, Mitchell, and Scott (2000) utilized GIS to map vulnerable areas in Georgetown County, South Carolina. While the

Team did not use GIS for the same type of mapping as Cutter, Mitchell, and Scott, the Disaster Composite Index reinforces the importance of GIS programs with identifying vulnerabilities to disasters.

When interviewees were asked about these differences in recovery, most stated the obvious answer—the closer the community was to the storm, the more damage it received, and the more damage it received, the longer it took to recover. This, however, does not explain the differences in recovery within communities. Some elites explained the recovery disparity by affluence—home owners have more of an interest in rebuilding, but renters can simply walk away. This study confirms that areas do, in fact, recover at different rates. Jackson County, for instance, recovered the most quickly of the three coastal Mississippi counties, while Hancock County recovered somewhat more quickly than Harrison County.

Focus group respondents reported that the distribution of aid resulted in unequal recovery, realizing that the "squeaky wheel gets the grease" when it comes to obtaining financial assistance for recovery. Some, they reported, even came out of the disaster with higher living standards than they previously experienced.

Another factor that focus group participants reported to have affected recovery was the lack of child care services after the storm. According to survey data, 9.3 percent of respondents that lost their job following Hurricane Katrina took care of children during their time of unemployment. Until schools and day care centers were able to return to service, parents were forced to find alternative places for their children to stay while they rebuilt and make efforts to return to work. Some children were, as a result, enrolled in school north of the affected areas, others stayed with out of area family members.

Similarly, the lack of transportation following Hurricane Katrina prevented people from getting to work and accessing supplies, which slowed recovery for many individuals. Focus group participants provided that some found themselves without transportation as a result of flooded vehicles, while others were disabled by road debris, which caused damage to cars and blocked roads. Even those with reliable transformation were limited by authorities patrolling disaster areas and the lack/price of gasoline.

Population shifts relating to the disaster affected recovery. One interviewee, for instance, commented on his/her community benefitting from Hurricane Katrina economically as a result of the influx of refugees into the community as a mass exodus took place on the coast. Most elites acknowledge that a population change or demographic shift has taken place, specifically that the coastal population initially fell sharply due to evacuation, that populations north of interstate 10 have increased, and that the Hispanic immigrant population has increased. Immediately after the storm, for instance, school enrollment fell by 500 students in Ocean Springs schools and enrollment is just now starting to return to pre-Katrina numbers. These concepts of population loss in coastal communities were confirmed by survey data—of the 38 percent of respondents that reported to have moved since Hurricane Katrina hit, 51 percent provided that their move was directly related to the storm. As previously mentioned, the slow return has been attributed by elites to the high costs of insurance and rebuilding. Focus groups reported that the price of housing has drastically increased for both single family dwellings and apartments, which has prevented many from returning to the Coast.

9.1.2 Preparedness and Evacuation

Dovers and Hamdmer (1992) identified three types of systems in terms of how they prepare for and respond to disasters. Type I are those who resist change and try to maintain

the status quo. The Team finds enough permanent changes occurring on the Mississippi Gulf Coast to reject classifying the Coast as a Type I system. For example, interview subjects sometimes state that new building codes have hindered the development along the beach (Highway US 90) from returning to pre-Katrina levels. Furthermore, the interviewees noted that some communities built back stronger and better than before. Type II systems change at the margins, and Type III systems are open and adaptable. Based on these definitions, the Mississippi Gulf Coast best fits the Type II classification.

Interviewees were asked if their community was prepared for a hurricane, and then asked if their community was prepared for a hurricane the size of Katrina. While respondents overwhelmingly agreed that no community could be prepared for a disaster as devastating as Hurricane Katrina, feelings on preparedness for a "regular" hurricane varied. Elites rarely named individuals as responsible for not having the community prepared for Katrina, but rather placed the blame across the whole community. Furthermore, elites believe that their communities are more prepared now for a hurricane than they were for Hurricane Katrina, as they now have a better understanding what was effective and what was not. A few elites even made the distinction that residents are more mentally prepared than in the past, but financially and economically are not strong enough to withstand another disaster. However, it was also noted that the further Hurricane Katrina gets from the collective memory, the more complacent residents will become, and thus the less prepared they will be. The challenge then is to find a balance between keeping the disaster close enough to prepare for the potential of future disasters, while far enough to recover physically and mentally.

The lack of desperately needed items following the storm highlighted failures to prepare for many individuals and communities. Focus group participants discussed the lack of fuel, water, food, and health supplies available immediately after the disaster.

Focus group participants noted that individuals should prepare as if they are evacuating much longer than anticipated. Furthermore, they suggested, based on their experiences, to prepare for evacuation long before it is needed, such as keeping important documents, photos, and medicines in an "evacuation box." Other suggestions included to prepare for situations in which communication and banking services are not available; this entails planning for alternative sources of communications and stockpiling emergency cash. Of survey respondents, 40.2 percent reporting being unable to use debit/credit cards in the first week after the storm. A third evacuation suggestion made by focus group participants is to plan to leave as early as possible, which proved particularly important for disabled evacuees given limited accommodations.

Hurricane Camille was discussed as support for answers across the interviews and focus groups. Individuals treated this 1969 hurricane as the standard for measurement. For instance, elites commonly compared the level of preparation for Katrina to that of Camille. Berke and Campenella (2006) note that disasters are viewed as low probability events, and Masigno (2009) writes how a disaster can have a minimal impact one time and a severe one the next time. The Team learned from the study participants that Hurricane Camille served as the standard of preparedness prior to Hurricane Katrina. Disaster planners and responders failed to prepare for a disaster the scale of Hurricane Katrina, and residents failed to realize how bad it could get. The study participants felt no community could be prepared for a storm the size of Hurricane Katrina. Much of the disaster that Hurricane Katrina brought to the Gulf Coast is manmade, which is consistent with Geis (2000). While people were unprepared for the aftermath of the storm, the pro-social behavior that Rodriguez, Trainor, and Quarantelli (2006) find happened in New Orleans also happened

along the Mississippi Gulf Coast. Interview and focus group participants shared stories of how neighbors helped one another. Boettke *et al.* (2007), Chamlee-Wright and Storr (2009), and Kweit and Kweit (2002) examine the pro-social behavior that emerges on the community level, as was found in this research, to conclude that common place attachment generates community horizontal integration through cooperation in recovery efforts, which promotes an understanding of and closeness to one's neighbors, as well as the effective use of recovery resources.

According to survey results, 51.4 percent of respondents evacuated for Hurricane Katrina. Interview respondents provided that individuals are more likely to evacuate now for any category of a storm, while prior to Katrina residents, if evacuating at all, would wait for a category 4 or 5 storm. Focus group participants indicated the importance of evacuating and taking hurricane warnings seriously. There are, however, many variables that individuals mentioned considering when choosing to evacuate or not. Evacuation is expensive given the price of gasoline, hotel room charges, food, and related expenses. Of the survey respondents that evacuated, the majority (53.1%) was away from their city/town for more than a week and about a quarter (25.8%) was away for more than three weeks. Furthermore, 33 percent of respondents reported spending over $1,000 during evacuation. Several focus group participants provided that they did not evacuate for Hurricane Katrina because they did not have the resources to do so. Others reported evacuating, but being turned away from shelters. In some cases, parents were separated from their disabled children due to specialty shelters enforcing strict admittance criteria. Focus group participants also commented on criminal activities within shelters, such as theft and predatory child abuse.

Of course, those who chose not to evacuate faced different sets of problems. Several focus groups participants personally knew people who drowned in their houses. Pet ownership also influenced individuals' decision to evacuate, as shelters were unable to accept pets. Those who chose to evacuate without their pets commonly returned to find their pets had drowned in the flood or escaped during the disaster.

9.1.3 Economic Factors

The field research instruments have given special attention to separating the effects of the United States' recession from that of Hurricane Katrina recovery when discussing and quantifying economic factors. To this effect, questions referred to periods of time, such as pre-Hurricane Katrina, immediately after Hurricane Katrina, two or three years after Hurricane Katrina, December 2007 recession, and at the time the survey was completed in 2011.

Interviewees commonly noted the loss of small businesses and industry within their communities, while others noted an increase in construction related jobs during the period of recovery. Also of interest is that the communities were experiencing different levels of economic success prior to Hurricane Katrina. Gulfport elites, for instance, commonly expressed that their economy was "booming," while Moss Point elites, on the other hand, felt that Hurricane Katrina took away what little economic development they may have had. Regardless of these differences, elites overwhelmingly characterize their economies as devastated immediately following Hurricane Katrina. Even businesses that were able to open quickly were unable to get employees to immediately return. Many small business owners were forced to choose between returning to work and repairing their homes.

Elites felt that the recovery process should have occurred quicker than it has and commonly blame insurance companies and increased construction costs for this delay. This is one of the reasons that they believe their communities' current economic challenges are related to— stemming from— Hurricane Katrina, such as insurance issues, population loss, and tax revenue. Furthermore, the post-Hurricane Katrina rise in insurance prices disproportionately affects the poor. Many African-Americans and Vietnamese immigrants inherit their homes, as opposed to purchasing them, and therefore were not required to have insurance. Following Hurricane Katrina, most without insurance were unable to not only rebuild their homes, but to afford insurance on new homes.

Employment also played a crucial role in economic recovery. According to survey data, 13 percent of respondents lost their job as a result of Hurricane Katrina. Of those individuals, 14 percent were out of work more than a year and 41 percent were out of work between 5 months and a year. Forty-five percent of respondents looked for a job during this period of unemployment, while 27.5 percent rebuilt their home, 17.0 percent worked for cash/odd jobs, 15.6 percent looked for housing, 9.3 percent took care of children, and 7.3 percent sought trauma for counseling. The problem of unemployment was compounded by the onset of the national recession in December 2007. According to the survey, 6.5 percent of respondents lost their job as a result of the recession.

9.1.4 Sources of Assistance and Information

According to survey data, in addition to the 61.9 percent of respondents that filed a claim with insurance, 53.3 percent filed with FEMA, 19.8 percent filed with SBA, 11.3 percent filed with MDA, and 9.7 percent filed with MEMA, but 15.7 percent of respondents did not file a claim for damages due to Hurricane Katrina. Of those who filed claims, 22.5 percent of respondents did not receive insurance or other grant sources. Of those who did receive assistance, 48.7 percent received less than $25,000, while only 10.8 percent received more than $100,000 in assistance. Survey respondents mentioned that the Red Cross (62.3%), family (61.4%), friends (54.8%), and church and faith-based groups (51.7%) were the primary providers of assistance. Finally, food and/or water (87.7%) was the most common form of assistance received for recovery, followed by debris removal (46.5%), cash (44.3%), home repair (24.6%), clothing (22.8%), and housing (17.7%). Despite this assistance, many individuals provided their own source of assistance. Only 32 percent of survey respondents reported not having to use saving for their households' recovery for Hurricane Katrina, while 27 percent used more than $5,000 from their personal savings.

"Confusion" and "unorganized" are the words that best characterize the distribution of offerings of assistance. Interviewees commonly complained that the massive bureaucracy of FEMA was not conducive to effective disaster aid and relief. FEMA representatives were reportedly often unknowledgeable, unable to provide what they had promised, and changed too often to hold anyone accountable. Elites expressed the frustration of what amounted to individuals having a new representative each week and each representative gave different information. Similarly, elites expressed concern over proper handling and distribution of funds by MEMA, MDA, non-profits, and churches. Focus group participants expressed numerous complaints regarding the FEMA trailers in particular, such as being unable to find a place to park the trailers, long waits to receive trailers, and a general disorganization regarding information provided by FEMA representatives.

Additionally, assistance groups were purportedly underprepared to meet the needs of non-English speaking populations. Assistance literature was not adequately provided in the

native languages of many of the minority populations, namely the Vietnamese and Spanish speaking populations. Focus group participants similarly noted the need for the use of captioning and interpreters by television stations for communicating with local deaf communities.

Focus group participants provided that most aid was distributed through ad hoc distribution centers that sprang up in parking lots, churches, schools, and other public areas. Individuals learned of these distribution centers and what was being offered at each by word of mouth. Participants commonly reported of the problems that resulted from this distribution method, such as black market profiteering. Additionally, the type of aid being provided by outside communities was commonly not proportionate to the need, such as the excess of clothing donated that became a burden to aid distributors. What was actually needed most was generators and/or the return of electrical power. Following the storm, however, generators were in short supply and more expensive to purchase than they had been prior to the storm. Focus group participants commonly reported on having purchased an emergency generator since Hurricane Katrina in preparation for future disasters.

One form of assistance that focus groups explained as fundamental to mental coping with the disaster was the provision of places to go to obtain telephone and internet communication services. The stress of the disaster was compounded by not being able to communicate with loved ones. Following the disaster, many people thought that getting to high ground would enable them to connect through surviving cell phone towers and flocked to unstable structures based on this information. Cell phone networks were "jammed" by the sharp increase of calls across the Coast. Additionally, much of the information provided regarding assistance was provided on the internet. One focus group discussed that these services were provided, in their community, by the local chamber of commerce.

In the interviews, political elites most commonly identified their colleagues as leaders instrumental to recovery and to give praise to the performance of government agencies. Business and social elites, on the other hand, rarely named political leaders as instrumental actors. Those individuals most commonly cited include Governor Haley Barbour, Congressman Gene Taylor, and Senators Trent Lott and Thad Cochran. When the elites were asked to name organizations instrumental to recovery, the most commonly identified were the Red Cross, the Salvation Army, and various religious based groups.

Elites provided mixed responses on the response by the local, state, and federal governments. While some believe that the government did as well as could have been expected under the circumstances, others felt that action could have been taken quicker. Most, however, agree that more authority and flexibility needs to be provided to the local governments than was afforded following Hurricane Katrina. Consultants, they suggested could have been offered to the local governments and assisted with the community rebuilding process, as opposed to several bureaucracies overlapping each other. Furthermore, jobs that were given to those from outside areas providing assistance could have been given to local people in need of income.

A common theme across focus groups and interviews is praise of how individuals within communities provided assistance to each other. Homes that were still standing became temporary shelters. Residents offered their property for the placement of FEMA trailers. Neighborhoods shared their food in community barbeques before it spoiled from lack of electricity. Furthermore, 48.1 percent of survey respondents cited neighbors as a source of news and information regarding food, water, distribution and relief supplies for the first two weeks after the storm. Finally, 42.5 percent of survey respondents indicated having received assistance from neighbors following Hurricane Katrina.

Focus group participants reported that their primary source of information regarding Hurricane Katrina was community organizations, such as churches and human services organizations. It must, however, be considered that the focus groups were organized through community organizations, as well. Many churches became, not only sources of information, but were immediately established as points of distribution. Churches set up meal tents, provided assistance with home repairs, delivered food to the needy, supplied counseling, coordinated volunteers, cared for the needs of volunteers, and provided a host of other goods and services.

Given the lack of electricity, television, internet, and other news sources, valuable information could not be accessed. Of the survey respondents, 7.4 percent received information regarding relief supplies from landlines, 17.9 percent from newspapers, 55.5 percent from radio, 8.5 percent from internet, and 34.5 percent from television. Focus groups participants overwhelmingly felt that the media were of great informational assistance. Newspapers, for instance, provided lists of where one could go to obtain assistance. In the absence of access to radios and newspapers for many, word of mouth remained as a fundamental source of information. This is confirmed by the survey, in which 63.5 percent of respondents reported receiving information regarding availability of relief by word of mouth, 48.1 percent cited neighbors, and 27.3 percent cited churches. Focus group respondents noted that much of these verbal cues were communicated through community elites.

9.1.5 Health and Social Risks

Focus group and interview participants reported numerous health risks related to Hurricane Katrina. Individuals repairing their homes commonly faced odors triggering respiratory stress. Lack of general healthcare left small infections and other illnesses untreated. In a few rare cases, these infections led to amputations. A doctor volunteering during Hurricane Katrina shared a story of contracting a flesh eating bacteria that led to early retirement. Another elderly woman was forced to wait two weeks before a doctor was able to reset her broken shoulder due to the lack of medical facilities and personnel.

Immediately after the storm, medical supplies, such as ointments to care for sores and skin irritations and tetanus shots, were desperately needed. Focus groups commonly commented on individuals developing these ailments from working in flood waters which were contaminated by rotting corpses, sewage, and debris.

Additionally, focus groups participants discussed issues regarding individuals with health problems being unable to return following the storm, as well as those who stayed or returned having to leave the state to access health care services. Out of areas pharmacies, however, were reportedly very flexible toward Coast residents needing prescription refills.

Mental health was also negatively affected by the storm. Like every community, there were individuals in Gulf Coast communities that were struggling with social issues— addiction mental illness, poverty, addiction, and family concerns— prior to Hurricane Katrina. But many of those who found these matters to be manageable before the storm lost the social structures and thereby sufficient support to manage and maintain a balance in their life. Mental health became a point of critical concern as suicide, divorce, and bankruptcies, among other socially upsetting factors, became more common in the wake of Hurricane Katrina. Furthermore, many found the loss of natural sites and wildlife sounds unsettling. Focus group respondents addressed the need for large group grief counseling. Focus group respondents commonly reported issues related to their own and/or their

communities' increased alcohol and drug abuse. Pharmacies were targeted by drug dealers, causing hospital pharmacies to need to be protected by armed guards.

Church pastors told the Team of how vital it was for their churches to resume regular services as quickly as possible, even if it meant holding services out doors or at a temporary location. One focus group told of the importance of creating a sense of normalcy for children by reopening the schools and this validates the findings of Ward and Shelley (2008).

Crime was reported as a problem across interviews, focus groups, and surveys. In addition to drug abuse and black market profiteering, looting became a serious issue. Of the survey respondents, 30.0 percent reported that they or someone they knew were a victim of crime stemming from Hurricane Katrina, with 16.0 percent indicating fraud, 12.0 percent indicating burglary/break-in, and 10.2 percent reporting robbery. Focus group participants reported being "ripped off" by contractors either not showing up after receiving payment or providing shoddy workmanship.

9.2 Modeling Discussion

9.2.1 Unemployment

The examination of the effect of Hurricane Katrina on the employment levels on the Mississippi Coast yields some interesting results. All three coastal counties experienced a drop in unemployment after the 2000-2001 recession ended, but not surprisingly, this drop quickly reversed itself after Hurricane Katrina. Jackson Country recovered the fastest to pre-Katrina levels, while Harrison Country recovered the slowest. Harrison County did not fully recover its service sector employment base by the end of the study period. A counterfactual analysis using the Texas Coastal Blend Counties, which are similar in characteristics to coastal Mississippi, shows that Katrina had a negative impact on the employment levels in Mississippi. The Team employed a hazard model to measure the duration of unemployment. The Team finds those residing in areas scoring high on the Disaster Composite Index (Report Section 3) tended to stay unemployed longer. In terms of poverty and income levels, the poorest segment had the longest unemployment durations, but the next poorest segment had a lower duration than even higher segments. Finally, a multivariate analysis of race and ethnicity as a percentage of the neighborhood, income, and Mississippi Development Authority (MDA) grant money payouts shows race and ethnicity to be negatively correlated with leaving unemployment, and MDA payouts to be positively correlated with leaving unemployment. The results for income were conflicting.

9.2.2 Modeling

In this report, the Team produced an econometric model of community resilience and recovery. The process through which this model was developed involved running dozens of specifications of different kinds of econometric modeling techniques to determine which demographic and geophysical impact variables best fit a model that most reasonably represents the speed of economic recovery for a community.

In conclusion the Team developed two econometric models of recovery that were derived using two separate datasets. The first data set contains administrative records of unemployment insurance claims. These records include start dates and end dates of individuals filing for and receiving unemployment benefits. Because individuals end their spells of unemployment when they are able to return to work, the ending of a spell can be

one indicator of recovery on an individual level that can be aggregated up to a community. Our model of unemployment duration was tested using in-sample, out of sample and best case, worst case scenario projections.

The second measure of community recovery used in this research is a measure of estimated time of full recovery based upon response the Hurricane Katrina Survey conducted by the research Team. Using questions about percent recovery and when this recovery was achieved, we produce a measure of predicted months to full recovery. This variable then is used in an OLS regression to estimate the impact of various community features and disaster impacts on recovery time. We use this model to produce an in-sample projection of community recovery for six communities in the study area. We find that the projected recovery time for those living in Harrison and Hancock Counties is nearly twice as long as those communities in Jackson County.

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APPENDIX A. INTERVIEW LITERATURE REVIEW

Appendix A. Interview Literature Review

Dasgupta and Beard (2007) define local elites as those who are locally-based and possess disproportionate access to social, political, or economic power. Interviewing elites offers unique rewards and challenges. Hertz and Imber (1995) assert that elites provide valuable insight into business, professional, political, and cultural affairs. A random population sampling to obtain elite subjects is not considered to be practical as elites are relatively few in number. While a random sampling is adequate in many situations, certain individuals may need to be specifically targeted for an interview if the researcher seeks elites (Clarke and Sison 2003).

Precedence exists for using interviews as a method for researching disaster recovery. For instance, Hysted and Keller (2008) utilized of phone interviews to gauge the long-term experiences, recovery strategies, remaining impacts, and changes in disaster management when a forest fire threatened to wipe out an eco-tourism industry cluster in British Columbia. Elites often employ what can be termed "gatekeepers" to manage their schedules, and access to the elites includes first winning over these gatekeepers. Having an academic affiliation can also prove advantageous (Hertz and Imber 1995).

Berg (2007) offers several suggestions for the interview. These include building rapport though initial small-talk, presenting a natural front and an image of aware hearing, being respectful, and being appreciative in manner and speech.

Berg (2007) explains there are three basic types of qualitative interviews: structured (standardized), semi-structured (semi-standardized), and unstructured (unstandardized). Structured interviews involve the researcher rigorously adhering to a prepared set of questions without any deviation or comment. Unstructured interviews are the most fluid in that the researcher lets the interview evolve based on the comments made by the subject. Questions may be added or deleted. Semi-structured interviews involves a prepared set of questions, but allow the researcher to deviate in order of questions asked or to ask new questions in response to remarks made by the subject. The semi-structured approach is what the Team adopted for this project.

The first step toward analysis is to transcribe the interview to generate complete records. To do this, the interview must be recorded, and the subject should be made aware of this. While there is some debate about the need for a complete transcription, having one ensures the researcher has a complete record of the interview available (Alcock and Iphofen 2007). One data analysis strategy used in a wide range of disciplines is called "content analysis." Berg (2007) defines content analysis as a "careful, detailed, systematic examination and interpretation of a particular body of material in an effort to identify patterns, themes, biases, and meanings" (303-304). Content analysis has many components, and can be both qualitative and quantitative in nature. Content analysis began quantitatively and the qualitative branch evolved later (Graneheim and Lundman 2004). According to Berg (2007), data are first read carefully in what is known as "open coding," then data are sorted into "coding frames." The first level is a broad, general level, and each subdivision becomes more specific. Graneheim and Lundman (2004) explain that data are broken down into "meaning units," which are statements related to one another in content and context. Berg (2007) states that analysis then involves comparing findings against the literature or theory, and developing an explanatory explanation of the findings. He also warns that while conclusions and ideas will come during the course of the analysis, he implores researchers to treat these as tentative as subsequent analysis may refute or contradict it.

APPENDIX B. INTERVIEW METHODS

APPENDIX B. INTERVIEW METHODS

The aim of this research is to capture the views, insights, and experiences of the elites in each community through individual qualitative interviews. Interviewing elites is invaluable as the elites are considered to have had leadership roles in Katrina recovery and would be among those most knowledgeable about community activities. Specifically, the Team classifies elites as either business, social, or political. Some persons, however, clearly could be classified in more than one category. In such cases, the classification of the elite is determined by which channel the researcher contacted the elite. In other words, if a business leader is also the chair of a non-profit and the researcher contacted the elite through the non-profit to speak as a representative of that organization, then the subject is classified as a social elite.

Through research Team meetings a method was developed for the interview stage of this project. The method followed industry practices as outlined in the literature review. These practices, broken down by process stage, are as follows: instrument development, IRB approval and informed consent, instrument implementation, and data analysis.

Instrument Development

The Team used the semi-structured interview approach using an instrument approved by the Institutional Review Board at The University of Southern Mississippi (USM). Drs. Butler and Sayre developed the beta version of the interview instrument in February 2010, and the Qualitative Research Methods Class in the International Development Doctoral Program (IDV) at USM beta tested the instrument as a class assignment. Each student chose a small rural community north of the coast (see Table B.1; see Figure B.1). The students identified at least one business, social, and political elite in their respective communities to interview. The students arranged the interviews, recorded the actual interview with the respective elites using the beta instrument as the source of questions, and created a verbatim transcript of the interviews. The communities where beta tests interviews occurred are provided in Table B.1 and mapped in Figure B.1. The case study communities analyzed in this report are provided in Table B.2.

Mississippi	Alabama
Diamondhead	**Citronelle**
D'Iberville	**Magnolia Springs**
Gautier	**Robertsdale**
Lucedale	**Chickasaw**
Poplarville	**Point Clear**
Saucier	**Prichard**
Vancleave	

Table B.1: Beta-Testing Communities (Source: Authors 2011)

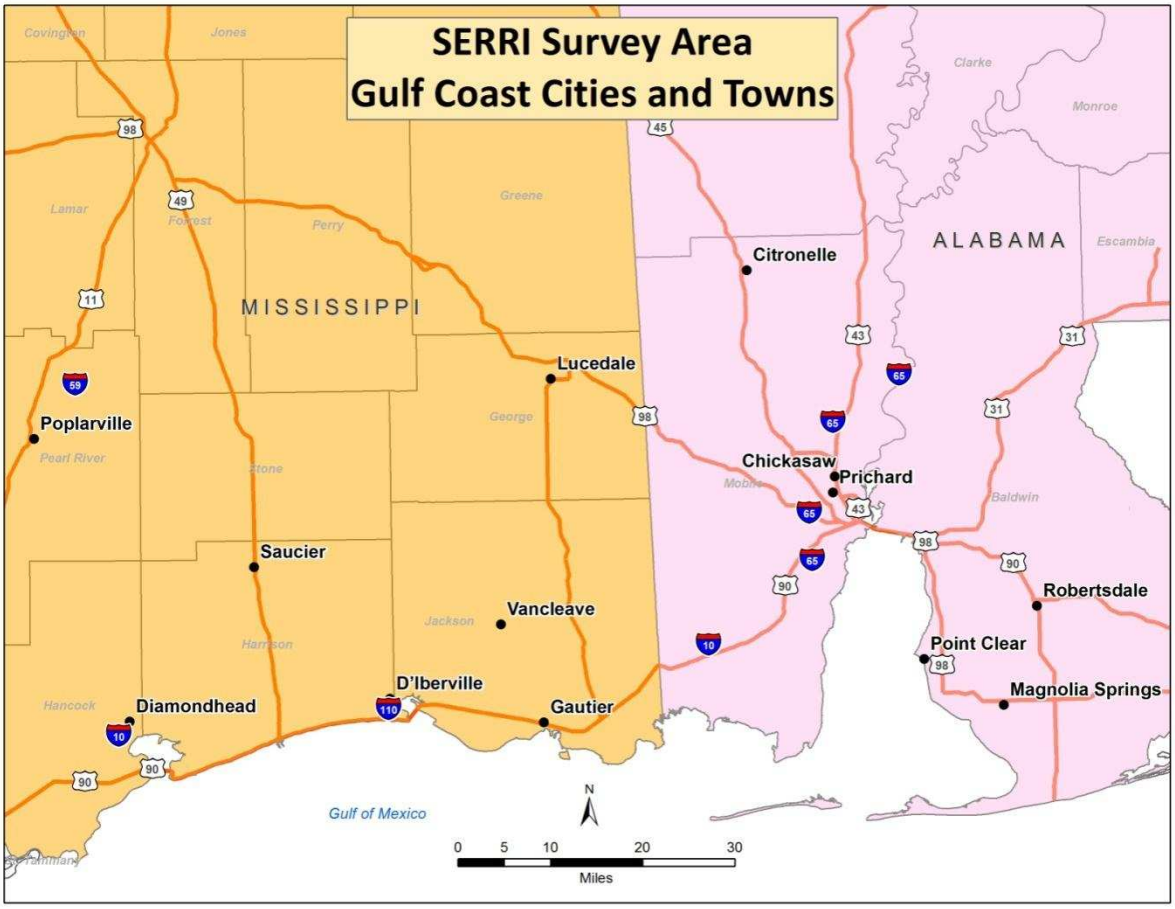

Figure B.1: Beta-Testing Communities Map (Source: Authors 2011)

The Team developed the final interview instrument after reviewing beta interviews. For instance, beta instrument inquiries regarding the presence of "marginalized isolated" populations in the communities indicate that the elites overwhelmingly did not perceive there to be any such groups in their respective communities. Therefore, the Team changed "marginalized" to "socially isolated" in the final instrument in hopes that the clarification might spur more insight.

IRB Approval and Informed Consent

An informed consent sheet was created and read before the start of each interview. The focus group approach and materials were explained to and approved by the Institutional Review Board (IRB) of The University of Southern Mississippi (USM) prior to the conduction of the Team's first interview (see Appendix C). All interviewees agreed to be recorded, as explained by the disclosure statements (see Appendix D). Interviewee informed consent forms provided the following information:

- The purpose of the research— to study social and economic recovery of communities after Hurricane Katrina
- The instrument consists of 31 questions
- The length of interviews is about 20-40 minutes

- Interviewees are free to answer any or all of the questions
- The interview will be recorded and transcribed to accurately capture statements
- The name and contact information of the project directors, as well as the University's Institutional Review Board

Instrument Implementation

The Team implemented the interviews in the case study communities by first identifying potential elites to call upon for interviews. The Team used a combination of Internet searches, USM contacts, and personal contacts to identify potential subjects. The goal was to interview at least two elites in each classification (social, political, and business) from each of the case-study communities (Gulfport, Long Beach, Biloxi, Ocean Springs, Moss Point, D'Iberville, Gautier, and Waveland/Bay St. Louis), as well as casino executives for each community that had casinos. The casinos are among the largest area employers and are by far the main regional tourism draw.

The interviews took place at a location of the subject's choosing, often the subject's office, and occasionally by phone. Face-to-face interviews are clearly preferable because of the chance to read body language; however, phone interviews were conducted upon request of the subject. The researcher obtained informed consent, and anonymity was never guaranteed because these are community elites may be easily identifiable based on transcribed comments. The researchers recorded the interview using Sony PX720 digital recorders, and the audio recordings were downloaded to secure computers as MP3 files to be used for transcription purposes.

There were eighteen prospective individuals the Team either failed to reach or declined to be interviewed (see Table B.2). This means the team succeeded 77 percent of the time when requesting an interview. While the Team intended for the interviews to be one-on-one, occasionally the subject would invite someone to join the interview. These situations were allowed, though not encouraged.

	Business	Political	Social	Casino
Gulfport	3	2	3	0
Long Beach	0	0	1	NA
Biloxi	0	0	2	0
Ocean Springs	2	0	1	NA
Moss Point	0	0	0	NA
D'Iberville	0	0	0	NA
Gautier	1	1	0	NA
Waveland/BSL	0	0	0	2
Total	**6**	**3**	**7**	**2**

Table B.2: Distribution of Uncompleted Interviews (Source: Authors 2011)

Data Analysis

The Team transcribed the interviews verbatim. The Team subjected the transcripts to content analysis (Berg 2007). Insights garnered from the interviews provided suggestions for questions in the focus group and survey instruments. For example, an interview with

one economic elite suggested that the cash-only economy was a challenge in the immediate aftermath of Katrina as the damage to the telecommunication systems prevented debit or credit transactions from occurring. Because of this insight, the Team incorporated a question on the survey instrument regarding how long it took for people to be able to use debit and credit cards after the storm (see Report Section 6).

APPENDIX C. INTERVIEW IRB APPROVAL

Appendix C.1 IRB Submission Narrative

IRB Submission
David Butler

1. **Project Goal**

   The goal of this project is to collect data associated with social and economic recovery from Hurricane Katrina in the bottom six counties of Mississippi and the bottom six counties of Alabama.

2. **Protocol**

   a. *Procedures*-The research is being led by Dr. David Butler and Dr. Ward Sayre with additional help from five graduate students all of whom have been trained on interviews and IRB techniques to date. Using comparison communities based on similar demographics but differential rates of recovery, we are going to interview political, social and economic elites in each community regarding their community's recovery from Hurricane Katrina. Contact will first be made by phone, followed-up by a visit in person to conduct the interview. The interviewee will be read an oral consent which includes that this is a university academic interview, that all persons will remain anonymous, and that the interview will be recorded for transcription purposes and then deleted. The subject will then be handed a copy of the consent form which includes the research directors' contact information on it. The recording starts and the interviewer explores the twenty-seven questions on the interview instrument and any necessary follow-up questions. At the end of the interview, the recorder is turned off, and the interviewee is asked if we may contact her/him again in the future for any follow-up questions that we may have. Necessary contact information is exchanged if this is not already in place. The interviews are then downloaded on a computer, transcribed verbatim for archival purposes, and then deleted from the recorder.

   b. *Number and Age of Subjects*-We expect the comparable communities in the six county area of Mississippi and Alabama to produce approximately 100 interviews but the final number is unknown at this time. All persons interviewed are over 18 years of age.

   c. *Population/Criteria Selection*-The population being examined are the social, economic and political elites of their respective communities. It is believed that these people would have been directly or indirectly involved in Hurricane Katrina response and recovery and would be in a unique position to view the totality of the community rather than just an individual building or neighborhood. It is expected that each elite will view the community through a different gaze/lens so answers in the interview will differ between the elites within the same community. If an elite is was not living in south Mississippi or south Alabama during and after Hurricane Katrina, we will interview the elite to see what they know of the event and then seek out the another elite that was around during and after Hurricane Katrina.

   d. *Time*- The interview will take from 20-40 minutes depending up on the level of depth the subject answers the twenty-seven questions.

e. *Location*-The interviews will take place at the elite's office unless an alternate location is identified and agreeable to all persons. Interviewing the subject at her/his office will give them a sense of comfort when answering the questions. It additionally adds more context to the interviewer on the subject's place of work.

f. *Instrument*-Attached you will find the interview instrument. This instrument was created by the research team. The instrument was beta tested in the field from January-March 2020. Several questions were modified from the original instrument to create this final instrument.

g. *Special Situations*-The persons under examination are elites and therefore personalities must be understood. Often elites desire for their name to be used in such research or they can be very hesitant to sit for an interview just in case the information is released to the public. Because of these potentials, and confirmed during the beta testing of the instrument, signing a consent form can prevent an interview from occurring. Instead, we have opted to read the attached oral consent form before each interview and give them a copy after it is read.

h. *Class*-This is not a class project.

i. *Partnerships*-We are not partnering with any other groups or organizations on this project.

3. **Benefits**-The main benefit for this research is to model social and economic recovery from a major natural disaster at a micro-community level to help build better response to disasters and more informed public policy.

4. **Risks**

a) *Risks*-There are minimum risks to the subject. The only perceived risk at this time is that of being uncomfortable with the subject matter of Hurricane Katrina recovery since the subject is still on the mind of people five years after the event, especially given the ongoing Deepwater Horizon oil spill. Subjects are not required to answer any question if they feel uncomfortable.

b) *Conditions*-If a subject does not fit the criteria of the desired population they will be removed from the research study.

c) *Anonymity*-Anonymity will be assured in all publications from the material by assigned random names and numbers to each subject, such as, leader3, business 5, etc.

d) *Data Protection*-The data is kept on a single computer on an external hard drive that is not accessible to the internet. This is a standard procedure we use with our proprietary data sets and will be used for the interview data as well.

e) *Data Disposition*-All recording are digital and are permanently erased following the transcription. Any paper notes will be shredded.

5. Informed Consent

a) See attached form.

Appendix C.2 Interview IRB Approval

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

TO: David Butler
118 College Drive #5108
Hattiesburg, MS 39406-0001

FROM: Lawrence A. Hosman, Ph.D.
HSPRC Chair

PROTOCOL NUMBER: 10070701
PROJECT TITLE: Hurricane Katrina Socio-Economic Recovery

Enclosed is The University of Southern Mississippi Human Subjects Protection Review Committee Notice of Committee Action taken on the above referenced project proposal. If I can be of further assistance, contact me at (601) 266-4279, FAX at (601) 266-4275, or you can e-mail me at Lawrence.Hosman@usm.edu. Good luck with your research.

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **10070701**
PROJECT TITLE: **Hurricane Katrina Socio-Economic Recovery**
PROPOSED PROJECT DATES: **07/01/2010 to 06/30/2011**
PROJECT TYPE: **New Project**
PRINCIPAL INVESTIGATORS: **David Butler**
COLLEGE/DIVISION: **College of Arts & Letters**
DEPARTMENT: **Political Science, International Development, International Affairs**
FUNDING AGENCY: **Department of Homeland Security, SE Regional Researh Initiative**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **07/20/2010 to 07/19/2011**

Lawrence A. Hosman
Lawrence A. Hosman, Ph.D.
HSPRC Chair

7-22-2010
Date

HUMAN SUBJECTS REVIEW FORM
UNIVERSITY OF SOUTHERN MISSISSIPPI
(SUBMIT THIS FORM IN DUPLICATE)

Protocol # 10090701
(office use only)

Name David Butler Phone 601.266.4735

E-Mail Address david.butler@usm.edu

Mailing Address 118 College Drive, Hattiesburg, M, 39406
(address to receive information regarding this application)

College/Division Arts and Letters Dept Pol Sci, Int'l Development, Int'l Affair:

Department Box # 5108 Phone 601.266.4735

Proposed Project Dates: From July 2010 To June 2011
(specific month, day and year of the beginning and ending dates of full project, not just data collection)

Title Hurricane Katrina Socio-Economic Recovery

Funding Agencies or Research Sponsors Dept Homeland Security, Dept of Energy, SE Regional Research Initi

Grant Number (when applicable) GR03602

Yes New Project

No Dissertation or Thesis

no Renewal or Continuation: Protocol #

no Change in Previously Approved Project: Protocol #

Principal Investigator — Date 7-1-10

Advisor — Date

Department Chair — Date July 1, 2010

RECOMMENDATION OF HSPRC MEMBER

Category I, Exempt under Subpart A, Section 46.101 ( ) ( ), 45CFR46.

X Category II, Expedited Review, Subpart A, Section 46.110 and Subparagraph (5).

Category III, Full Committee Review.

HSPRC College/Division Member — DATE 7-16-10

HSPRC Chair — DATE 7-22-10

APPENDIX D. INTERVIEW INFORMED CONSENT

INFORMED CONSENT- INTERVIEW

Hurricane Katrina

The University of Southern Mississippi
Project Director: Dr. David L Butler and Dr. Edward Sayre
Contact Information: David Butler, David.Butler@usm.edu, 601.266.4735
Edward Sayre, Edward.Sayre@usm.edu, 601.266.4004

The following information will be read to the interviewee by the interviewer:
"The purpose of this interview is to study the social and economic recovery of communities after Hurricane Katrina. I will ask you 31 questions and feel free to answer any or all of them. If you do not feel like answering a question, you may skip it. This interview is scheduled to take between 20-40 minutes. Your participation is completely voluntary and that you can quit this interview at any time you desire without penalty. This is a university academic interview and therefore all persons and places of work will remain anonymous. The interview will be recorded for transcription purposes to ensure we captured your statements corrected and then deleted. The project directors' names, emails and phone numbers are at the top of this page and can be contacted at any time if you have any questions about the research. Do you have any questions at this time?"

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

Give a copy of this form to the interviewee

APPENDIX E. INTERVIEW INSTRUMENT

APPENDIX E. INTERVIEW INSTRUMENT

Hurricane Katrina Interview Instrument

Community Leaders

Date:_____

Person interviewed:_____

Title/Position of Person being interviewed: _____

Interviewer: _____

**Note this interview will be reviewed for transcription purposes*

1. Did Hurricane Katrina have a negative impact on your community?
   - ☐ Negative impact, go to #2
   - ☐ Positive impact, go to #4
   - ☐ No Impact, go to #4

2. In what month and year do you believe your community recovered to pre-Katrina levels or to the new normal for your community (Hurricane Katrina hit in August 2005), if it has recovered?

   _____
   _____
   _____
   _____

3. By what measure(s) do you base the estimation of when your community recovered back to pre-Katrina levels or the new normal?

   _____
   _____
   _____
   _____

4. How has the employment and economic landscape in your community changed since Hurricane Katrina, if at all?

   _____
   _____
   _____
   _____

5. What were your main economic challenges pre-Katrina (January-August 2005)?

   _____
   _____
   _____
   _____

6. What were your immediate economic challenges in the days following Katrina (September-December 2005)?

   _____
   _____
   _____
   _____

7. What were your economic challenges after Katrina (2006-2008)?

   _____
   _____
   _____
   _____

8. Do you still have economic challenges today that stem from Katrina?

   _____
   _____
   _____

9. How well do you believe your community was prepared for a hurricane before Katrina?

   _____
   _____
   _____

10. How well do you believe your community was prepared for a hurricane the size and severity of Katrina before Katrina?

    _____
    _____
    _____
    _____

11. How would you rank wind, rain and storm surge damage from Katrina affecting the infrastructure of your community? 3=highest impact, 2=medium impact and 1=least impact.
    Rain ____

    Wind ___

Surge___
_____
_____
_____

12. What active steps did your community take to recover in terms of employment and infrastructure?
_____
_____
_____
_____

13. What money did the local agencies and organizations receive for recovery? Who received them and what were the sources of those funds?
Amounts_____
_____
Source_____
_____
Agencies_____
_____

14. What money did the people in your community receive for recovery and rebuilding? What were the sources of those funds?
Amounts_____
_____
Source_____
_____

15. What was the effect on tax receipts after Hurricane Katrina (sales and property)?
_____
_____
_____

16. All communities have socially isolated groups. What did your community do to include these groups before Katrina, if any?
_____
_____
_____

17. Were there efforts to incorporate or connect with these isolated people **after** Katrina?
_____

_____
_____
_____

18. What recommendations do you have to help incorporate these groups and individuals into the community before the next disaster?

_____
_____
_____

19. Who were the community leaders instrumental to efforts of recovery?

_____
_____
_____
_____

20. What was the population change and shifts in your community, in migration, out migration and changes in neighborhoods after Katrina, if any?

_____
_____
_____
_____

21. What were the demographic changes after Katrina, if any?

_____
_____
_____

22. Which organizations assisted recovery in your community most (both internal and external organizations)?

_____
_____
_____
_____

23. Within your town, which neighborhoods seemed to recover most/fastest from Katrina and why?

_____
_____
_____
_____

24. Within your town, which neighborhoods seem to recover least/slowest from Katrina and why?

_____
_____
_____
_____

25. Which nearby communities do you think recovered most/fastest from Katrina and why?

_____
_____
_____
_____

26. Which nearby communities do you think recovered least/slowest and why?

_____
_____
_____
_____

27. Are there any types of businesses in your community that made your community more or less resilient to Hurricane Katrina?

_____
_____
_____
_____

28. Were all business types in your community equally affected by Katrina? Please elaborate.

_____
_____
_____
_____

29. In hindsight, what could local, state and federal officials have done better to help your community recover more quickly?

_____
_____
_____
_____

30. Is your community prepared for another Hurricane Katrina-like disaster event today?

_____
_____
_____

_____

31. Who else would you recommend that we speak with regarding Hurricane Katrina recovery in your community/town?

_____
_____
_____

APPENDIX F. FOCUS GROUP LITERATURE REVIEW

APPENDIX F. FOCUS GROUP LITERATURE REVIEW

A focus group is an interview with a small group of people that is led by a moderator charged with directing the discussion on a particular topic. Full groups involve about eight to ten participants in addition to the moderator(s) while mini-groups involve about four to six participants (Greenbaum 1998). The distinguishing mark of focus groups research from other types of group research is the fact that focus groups consider the interaction of the participants as well as what they say individually (McLafferty 2004). Morgan (1996) adds that group research that does not have an interviewer or is for purposes other than research, such as therapy, is not a focus group. The product is group data that reflects collective notions that have been shared and negotiated by participants (Kitzinger 1995). Focus group interviews are a useful research tool for meeting the following purposes:

- To obtain background information on a specific topic
- To generate research hypotheses for use in triangulation
- To diagnose potential shortcomings or an idea or product
- To observe how interviewees interact in conversation
- To gain multiple interpretations of previous knowledge

Focus groups are the primary research method of marketing research, but have only become accepted as a reliable method in the social sciences in the past two decades (Morgan 1997). Recently, both market researchers and social scientists have begun exploring online focus group methods (Berg 2007). Morgan (1996) suggests that, at least in sociology, focus group research is often found in conjunction with other forms of qualitative research methods in the literature.

As a data-gathering method, traditional focus groups have significant advantages, as well as notable disadvantages. Berg (2007) presents the advantages of this method as follows: flexible in terms of cost, setting, and number of participants; provides the possibility to collect a large amount of information in a short period of time; capable of generating insight on important subjects; does not require complex sampling strategies; provides the opportunity for the moderator to probe side topics; places participant on equal status with each other, as opposed to a traditional interviewer-interviewee relationship; and it can be applied to transient and "one shot" populations. Berg (2007) presents the accompanying disadvantages of focus group research as follows: the skill and motivation of the moderator affects the quality of data; attendance is voluntary and could therefore be insufficient; conversation may fall short or exceed the suggested time length; dominant personalities may overpower weaker personalities; and a group opinion often emerges over individual feelings. Thus, focus group data is more detailed than that usually results from surveys, but not as in-depth as that produced from long form semi-structured interviews, for instance. Traditional interviewing methods, however, are unable to observe and document interaction between discussants for greater detail on attitudes, opinions, and experiences. "Hearing how one group member responds to another provides insights without disrupting underlying normative group assumptions. Meanings and answers arising during focus group interviews are socially constructed rather than individually created" (Berg 2007, 149). This insight is critical for understanding interpretive interactionism.

Folch-Lyon and Trost (1981) recommend holding the focus group at a neutral location such as a community center, but state that other locations such as homes and offices can work if they provide privacy. The researchers suggest light snacks and refreshments at the

beginning of the focus group make participants more comfortable. Taping focus groups allows for more accurate analysis of what was said after the focus group session is finished. Folch-Lyon and Trost (1981) argue that apprehension of the tape recorder fades as the group starts talking.

The task of a moderator is similar to that of a one-on-one interviewer. Focus group moderators should be trained and practiced facilitators. Furthermore, moderators should, in advance, prepare a series of open-ended questions for discussion (Berg 2007; Kitzinger 1995). Questions can be standardized or semi standardized, depending on the needs of the research and the preference of the moderator. Berg (2007) suggests beginning the focus group session with an introduction of the research and directions for how the focus group is meant to operate. Additionally, it is important that the researcher asks the participants if they understand this information and what is expected of them. Next, the moderator should explain the use of the recording device, seek permission for its use, and notify the participants what will be done with the audio recording after the focus group concludes. Finally, moderators should understand the sensitivity of the subject being addressed, such as questions regarding deviant behavior, alcohol and drug use, and issues of mental health.

Often, moderators may wish to gather information about the participant regarding what they know or believe individually. "One useful strategy is to have subjects fill out a brief pencil-and-paper survey that is administered before the actual question-and-answer/discussion segment of the focus group begins" (Berg 2007, 157). This is commonly done to collect demographic information.

The validity of focus group data is dependent, among other factors, on the implementation of standard sampling procedures for several reasons. First, focus group data is often used to pilot an interview schedule; therefore, if the focus group participants do not represent a sample similar to the population that the survey wishes to study, then the instrument will not address the best issues and use the best wording. Second, the sampling method used will affect the participants chosen, which, of course, affects the raw data produced. Hollander (2004) acknowledges that critics of the focus group method question if participants share their true feelings. Hollander (2004) uses the term *problematic silence* for when participants do not share relevant feelings and *problematic speech* for when participant statements do not reflect underlying beliefs or experiences.

Raw data, once obtained, must be transcribed verbatim, including all question, probes, responses, and noteworthy sounds. "It should also include any slang, dialects, or pauses offered by focus group members as they respond to the moderator and each other" (Berg 2007, 162). To supplement this information, either the moderator or an assistant should take notes during the focus group, which includes details such as interactionary cues offered by individuals of the group- facial expression of note, body language gestures, and side comments.

The transcripts and notes must then be analyzed to identify trends and patterns. Content analysis is used to address similarly used words, themes across answers and/or focus groups, and question answers (Berg 2007). Additionally, the researcher should pay attention to the consistency across questions within focus groups and between similar focus groups. The researcher must meticulously organize this information for indexing and retrieval. Berg (2007) suggests that researchers should avoid quantifying focus group data. Instead, they should provide quotations to support generalizable findings and describe patterns of interest before demonstrating it with a quotation.

Focus groups participants must be ensured confidentiality for the researcher to be able to foster truthful and free-flowing discussions. This can be achieved by first having members

sign or verbally agree to a statement of confidentiality. This not only applies to the relationship between the moderator and group members, but also between members of the group (Berg 2007). Enforcement of this agreement, however, is a matter of honor, not law. Additionally, participants must be informed that they are allowed to leave at any point during the focus group and that participation is voluntary.

APPENDIX G. FOCUS GROUP METHODS

APPENDIX G. FOCUS GROUP METHODS

The aim of this research is to capture the verbal interaction of community members through their instrument led discussion on Hurricane Katrina's affect on their respective communities. A general approach to, and guidelines for, the focus group effort were determined as advised in the literature and by Team member expertise. The objective, research problem and research questions were clearly defined in an effort to steer the data collection process in an efficient manner (Berg 2007). The individual interviewing conducted earlier in the research effort provided a single account of Hurricane Katrina recovery issues. Focus groups were needed afterward to provide more overall depth into not only the "what" but particularly the "whys" of the phenomena of interest (Barbour 2007) from the perspective of several witnesses. Respondents are able to share their perspectives in a group setting, receiving feedback from other respondents as a way to confirm or further sharpen points of view.

Through research Team meetings, a method was developed for the focus group stage of this project. The method followed industry practices as outlined in the literature review. These practices, broken down by process stage, are as follows: instrument development, IRB approval and informed consent, instrument implementation, and data analysis.

Instrument Development

As with any research endeavor, the first step in conducting quality focus groups is to plan them thoroughly. The primary objectives of conducting focus groups within this study are to determine 1) how recovery was experienced by the respondents; 2) why they believed recovery efforts produced the given results; and 3) what was, and still is, necessary to recover. Questions presented to respondents asked them to compare their communities before and at various stages after the storm (immediately after the storm to a month after the storm), asking them for their experiences and interactions that were important for, or an impediment to, recovery. Secondary objectives cover how people perceive their own progress to recovery and the nature and quality of communication experienced after the storm. The focus group instrument used can be found in Appendix J. "Levels of 'synergy, snowballing, stimulation, and spontaneity' that a group dynamic can generate" need to be encouraged (Williams 2001, 2). As such, open ended questions were used to bring about information through group dynamics.

IRB Approval and Informed Consent

An informed consent sheet was created and read before the start of each focus group. The subjects were informed of confidentiality issues, understand what the study is about and informed how data (their inputs) was to be used. Furthermore, "[b]eing honest and keeping participants informed about the expectations of the group and topic, and not pressuring participants to speak is good practice" (Gibbs 1997). All respondents were informed that they were free to leave the focus group at any time should the need arise without any penalty whatsoever. The focus group approach and materials were explained to and approved by the Institutional Review Board (IRB) of The University of Southern Mississippi (USM) prior to the conduction of the Team's first focus group (see Appendix H). Focus group informed consent forms provided the following information (see Appendix I):

- The purpose of the research— to study the social and economic recovery of communities after Hurricane Katrina
- The instrument consists of 7 question sets
- The estimate time of completion is one hour
- Participants are free to answer any or all of the questions
- Participation is completely voluntary
- All persons and places of work are to remain anonymous
- The focus groups will be recorded and transcribed to accurately capture statements
- The name and contact information of project directors, as well the University's Institutional Review Board

Instrument Implementation

Interview length was set to approximately one hour, intending to be adequate to meet research needs while not being burdensome to subjects. Many methodology experts suggest one to two hours (Gibbs 1997). Barbour (2007) states that there is no magic number of focus groups or the number of participants in each focus group. By holding more than one focus group a researcher will have stronger evidence to support conclusions made should those conclusions be evident by data gathered from more than one group (Barbour 2007). The decision to end coordination of further focus groups came at a time when nearly no new information was being discovered through existing sources.

The real issue with respect to numbers of participants in any one focus group has to do with the moderator's ability to "afford equal voice" during discussions (Barbour 2007, 60). The ability to distinguish between voices when reviewing recorded proceedings is difficult enough with a small group, further motivating group sizes to be of a limited number. In the case of this project, focus group sizes were limited to no more than ten participants. Group sizes may be as small as three individuals depending on the nature of the topic to be discussed. Accordingly, three participants represented our minimum focus group size. Other practical considerations with respect to size of a single group include the ability of chosen facilities to handle the group gathering, availability of the target group in a given locale and time constraints of participants (Barbour 2007). These considerations were analyzed with the gatekeepers of each focus group to make certain such needs were addressed prior to running the group.

Moderators were used, as Berg (2007) suggests, to add "structure and direction but restrained contribution" (Berg 2007, 159). Care was taken in selecting focus group moderators. Moderators must "possess the ability to listen, probe, and direct group interaction" while feeling capable of managing a focus group and able to help participants "feel at ease in disclosing specific information to a particular moderator" (Williams 2001, 6). Two individuals ran each focus group meeting: one moderator and one note taker. Moderators were chosen from a pool of doctoral research assistants and research associates working in the International Development program at The University of Southern Mississippi. These individuals had completed coursework covering focus group methods and worked under the mentoring of the principle researchers. Most moderators came with previous focus group experience from previous research contract efforts either at the university or at other research firms. Prior to becoming a moderator, graduate research assistants without prior work experience running focus groups were note takers for at least two focus groups prior to being given the responsibility of moderating their own group. Note takers observed the group and provided additional insight into verbal responses and

non-verbal behavior as recommended by Berg (2007). All focus groups were run with at least one graduate assistant who had prior focus group experience

Access to impacted populations came from political, economic, and social elites tapped into for the earlier interview stage of this project. This, in effect, constituted the start of a "snowball" approach to building focus groups. Elites and focus group participants were asked for their recommendations as to what community group should be contacted for future focus groups. Referrals obtained from sources already participating in focus groups provided a means to open doors to other community groups. Where referrals were inadequate to meet sample size objectives, project team members located community organizations, schools, government offices, and local businesses to ask for their cooperation in this important research endeavor. Internet search engines (such as Google) and the regional yellow pages were used to prospect for organizations. The categorizations of businesses and organizations available through both sources made it easy to find the types of organizations such as those noted above. The Team made cold calls and briefly explained to various levels of gatekeepers who the researchers are, the purpose of the call, and the importance of the research being conducted. After the brief introduction, the person contacted was asked for their assistance in connecting with a decision maker in the organization that could organize a focus group. Despite the time that has passed since the storm, most individuals spoken to showed sensitivity to the importance of the work and were happy to cooperate. As such, the Team often reached primary gatekeepers, such as a manager or church pastor, either directly, through voicemail, or by leaving a message with an administrative assistant. Discussions about the project made to each primary gatekeeper were brief, discussing who the team members are, the purpose for the research and that all information received would remain confidential. The Team's offer to provide incentives, such as a free meal in exchange for respondent time was also discussed as appropriate.

A given number of rejections were expected from cold calling. Infrequently were the reasons provided due to lack of interest in the research. When rejections were received the rejections principally emanated from a lack of time or the fact that the organizations operations were so small that it would be next to impossible to organize enough respondents to justify a gathering.

The location of a focus group is important in order to maximize convenience of access but also to ensure a setting that is comfortable to participants and conducive to the flow of communication. As such, gatekeepers were asked if their existing facilities could be used. These facilities were a place where respondents regularly met, such as a church banquet hall, library meeting area, or workplace lunchrooms. With all reasonable forethought taken into site selection, an ice breaker is often useful for environments that participants may be unfamiliar with (Barbour 2007) or as a way to relax participants prior to the formal start of the focus group. Ice breakers often took the form of sharing a light snack or meal with respondents and making small talk. These snacks, as well as office supplies and a fully functional recording device were obtained ahead of the meeting. In the case of the recording devise, extra batteries and an alternate recording device were always brought to each group. Each devise was tested within 24 hours of its use.

In a one-on-one interview, control of the conversation is relatively simple compared to groups of three or more individuals. The complexities grow with the sensitivity of the subject matter discussed. Group dynamics are important considerations. A researcher can determine if the group is truly coming to a consensus or if certain members are holding out or perhaps seemingly going along with the group. If so, the researcher may need to consider further questioning (Barbour 2007, 143). Healthy debate, even some antagonism,

may be productive to generate helpful data. However, issues related to a group member being domineering or too silent require intervention techniques that bring about order and equal time to all participants. Such techniques include moving to different subjects or directing a question to a quieter respondent (Barbour 2007). Focus group moderators were familiarized with such techniques as part of their doctoral coursework at The University of Southern Mississippi.

All focus groups met minimum participant requirements (three) according to Barbour (2007). The moderator discussed terms of confidentiality prior to the start of the recording and described as part of the informed consent component just after each recording was started. Respondents were informed that the recording made would be used to create accurate transcripts and build the project report. The focus group recording would remain in the moderator or note takers possession and be deleted when the project was complete in order to preserve anonymity. In addition, participant names would be changed on the report and the community organization name and location would not be disclosed in the report. All focus groups and respondents agreed to participate, acknowledging they understood the nature of the study and the terms of confidentiality.

The Team obtained demographic information about the focus group participants through a short survey, which asked sex, race, marital status, occupation, city and zip, and income. Since the survey asked for zip code of residency and occupation, the Team chose not to administer it to the participants at the homeless shelter or food bank where three of the focus groups occurred, as these are vulnerable populations. The Team struggled to get enough participation from these populations, and had been warned by the management of these agencies that such populations would be very insecure when talking to researchers. Therefore, during these three focus groups, the Team simply recorded observed sex and race without asking the participants to fill out a survey that asks about residency, employment, and income. Not everyone who took the survey answered every question.

Of the 82 focus group participants who provided demographic information: 52 individuals were female and 30 individuals were male; 69 individuals were white, 12 individuals were black, and 1 individual was two or more races; 7 individuals reported an income of less than $19,999, seven individuals reported an income between $20,000-$29,999, seven individuals reported an income between $30,000-$$39,999, nine individuals reported an income between $40,000-$49,999, two individuals reported an income between $50,000-$59,999, eight individuals reported an income between $60,000-$69,999, three individuals reported an income between $70,000-$79,999, two individuals reported an income between $80,000-$89,999, three individuals reported an income between $90,000-$99,999, two individuals report an income between $100,000-$149,999, and two individuals reported an income of greater than $150,000; and 18 individuals lived in Biloxi, nine individuals lived in Gulfport, one individual lived in Vancleave, three individuals lived in D'Iberville, eight individuals lived in Bay St. Louis, one individual lived in Kiln, eleven individuals lived in Ocean Springs, one individuals lived in Gautier, and five individuals lived in Moss Point.

Most focus groups were conducted within the time allotted by agreement. The moderator thanked each participant. If refreshments were provided, any that were left at the end of the meeting often stayed at the facility for the participants and their colleagues to enjoy as our thanks for their time.

A member of the Team conducted the transcribing in order to foster further familiarity with the data. Up to a point of diminishing returns, the more the Team has a chance to go over the raw data, the more likely the researchers are able to find important points to share

in the final report. In addition, the Team has the ability to draw on firsthand knowledge of the interview itself to add non-verbal communication cues quickly.

Data Analysis

Placing data into categories and reporting the results are the final steps. As data is examined, categories or responses of similar nature, begin to appear. Categorization of data allowed for development of insights and meanings to the original research questions. Lewis (1995) states the importance of looking for trends and patterns, adding that multiple focus groups can be of particular assistance in discovering trends. As suggested by Lewis (1995) particular emotion or emphasis was noted on subject responses as appropriate.

As stated in the literature review, the transcript derived from the focus group was reviewed with notes taken during the interview to compare verbal responses with recorded non-verbal behavior. All words were included in the archive-style transcript to include "um", "you know" and similar spoken elements to make certain no clues to meaning would be inadvertently disregarded. The transcript was read through multiple times as responses were reviewed, categorized and re-reviewed. Findings generated from the data had supportive commonality to the interviews conducted earlier in the project.

APPENDIX H. FOCUS GROUP IRB APPROVAL

APPENDIX H. FOCUS GROUP IRB APPROVAL

Appendix H.1 Focus Group IRB Narrative

IRB Submission-Focus Group
David Butler
David.Butler@usm.edu

6. Project Goal

The goal of this project is to collect data associated with social and economic recovery from Hurricane Katrina in the bottom six counties of Mississippi and the bottom six counties of Alabama.

7. Protocol

j. *Procedures*-The research is being led by Dr. David Butler and Dr. Ward Sayre with additional help from five graduate students all of whom have been trained on focus groups and IRB techniques to date. Using comparison communities based on similar demographics but differential rates of recovery, we are going to conduct at a minimum of 2 focus groups in each community regarding their community's recovery from Hurricane Katrina. Contact will first be made by contact with the social elites we interviewed in the previous phase of this research. The focus group moderator will be read an oral consent which includes that this is a university academic focus group, that all persons will remain anonymous, and that the interview will be recorded for transcription purposes and then deleted. The participants will then be handed a copy of the consent form which includes the research directors' contact information on it. The recording starts and the focus group leader asks the 7 questions on the focus group instrument and any necessary follow-up questions. At the end of the focus group, the recorder is turned off. Necessary contact information is exchanged if this is not already in place. The focus groups are then downloaded on a computer, transcribed verbatim for archival purposes, and then deleted from the recorder.

k. *Number and Age of Subjects*-We expect the comparable communities in the six county area of Mississippi and Alabama to produce between 10-15 focus groups with an average of 7 participants in each group. All persons at the focus group will be 18 years of age or older.

l. *Population/Criteria Selection*-The population being examined is a cross section of the study communities assisted in selection by our social elite contacts.

m. *Time*- The focus group will take approximately 1 hour depending up on the level of depth the subject answers the six questions.

n. *Location*-The focus groups will take place at a social gathering place such as church or community center if available. Otherwise they will be scheduled at the Southern Miss Long Beach campus.

o. *Instrument*-Attached you will find the focus group instrument. This instrument was created by the research team. The instrument was created based on findings from the interviews we completed in the previous phase of this research project.

p. *Special Situations*-The persons under examination are a cross-section of the community. Because we will have a variety of socio-demographic persons present, and in the interest of maximizing time available, we have opted to read the attached oral consent form before each focus group and then give each participant a copy after it is read.

q. *Class*-This is not a class project.

r. *Partnerships*-We are not partnering with any other groups or organizations on this project.

8. **Benefits**-The main benefit for this research is to model social and economic recovery from a major natural disaster at a micro-community level to help build better response to disasters and more informed public policy.

9. **Risks**

f) *Risks*-There are minimum risks to the subjects/participants. The only perceived risk at this time is that of being uncomfortable with the subject matter of Hurricane Katrina recovery since the subject is still on the mind of people five years after the event, especially given the recent Deepwater Horizon oil spill. Subjects are not required to answer any question if they feel uncomfortable.

g) *Conditions*-If a subject does not fit the criteria of the desired population they will be removed from the research study.

h) *Anonymity*-Anonymity will be assured in all publications from the material by assigned random names and numbers to each subject/participant.

i) *Data Protection*-The data is kept on a single computer on an external hard drive that is not accessible to the internet. This is a standard procedure we use with our proprietary data sets and will be used for the interview data as well.

j) *Data Disposition*-All recording are digital and are permanently erased following the transcription. Any paper notes will be shredded.

10. Informed Consent

b) See attached form.

Appendix H.2: Focus Group IRB Approval

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

TO: David Butler, Ph.D.
118 College Drive #5108
Hattiesburg, MS 39406-0001

FROM: Lawrence A. Hosman, Ph.D.
HSPRC Chair

PROTOCOL NUMBER: 11011813
PROJECT TITLE: Hurricane Katrina Socio-Economic Recovery

Enclosed is The University of Southern Mississippi Human Subjects Protection Review Committee Notice of Committee Action taken on the above referenced project proposal. If I can be of further assistance, contact me at (601) 266-4279, FAX at (601) 266-4275, or you can e-mail me at Lawrence.Hosman@usm.edu. Good luck with your research.

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
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HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **11011813**
PROJECT TITLE: **Hurricane Katrina Socio-Economic Recovery**
PROPOSED PROJECT DATES: **10/01/2010 to 06/30/2011**
PROJECT TYPE: **New Project**
PRINCIPAL INVESTIGATORS: **David Butler**
COLLEGE/DIVISION: **College of Arts & Letters**
DEPARTMENT: **Political Science, International Development, International Affairs**
FUNDING AGENCY: **Department of Homeland Security, Department of Energy, SE Regional Research Initiative Grant #GR03602**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **01/18/2011 to 01/17/2012**

Lawrence A. Hosman — 1-21-2011

Lawrence A. Hosman, Ph.D.
HSPRC Chair

Date

HUMAN SUBJECTS REVIEW FORM
UNIVERSITY OF SOUTHERN MISSISSIPPI
(SUBMIT THIS FORM IN DUPLICATE)

Protocol # 10111813
(office use only)

Name David Butler Phone 601.266.4735

E-Mail Address david.butler@usm.edu

Mailing Address 118 College Drive, Hattiesburg, M, 39406
(address to receive information regarding this application)

College/Division Arts and Letters Dept Pol Sci, Int'l Development, Int'l Affair:

Department Box # 5108 Phone 601.266.4735

Proposed Project Dates: From October 2010 To June 2011
(specific month, day and year of the beginning and ending dates of full project, not just data collection)

Title Hurricane Katrina Socio-Economic Recovery

Funding Agencies or Research Sponsors Dept Homeland Security, Dept of Energy, SE Regional Research Initi

Grant Number (when applicable) GR03602

Yes New Project

No Dissertation or Thesis

no Renewal or Continuation: Protocol #

no Change in Previously Approved Project: Protocol #

Principal Investigator — Date 10-22-10

Advisor — Date

Department Chair — Date 10.22.10

RECOMMENDATION OF HSPRC MEMBER

Category I, Exempt under Subpart A, Section 46.101 ( ) ( ), 45CFR46.

✓ Category II, Expedited Review, Subpart A, Section 46.110 and Subparagraph (7).

Category III, Full Committee Review.

HSPRC College/Division Member — DATE 10/25/10

HSPRC Chair — DATE 1-21-11

APPENDIX I. FOCUS GROUP INFORMED CONSENT

APPENDIX I. FOCUS GROUP INFORMED CONSENT

Informed Consent-Focus Group
Hurricane Katrina

The University of Southern Mississippi
Project Director: Dr. David L Butler and Dr. Edward Sayre
Contact Information: David Butler, David.Butler@usm.edu, 601.266.4735
Edward Sayre, Edward.Sayre@usm.edu, 601.266.4004

The following information will be read to the focus group participants by the focus group leader:

"The purpose of this focus group is to study the social and economic recovery of communities after Hurricane Katrina. I will ask you 7 questions and feel free to answer any or all of them. If you do not feel like answering a question, you may skip it. This focus group is scheduled to take approximately 1 hour. Your participation is completely voluntary and that you can quit this interview at any time you desire without penalty. This is a university academic focus group and therefore all persons and places of work will remain anonymous. The focus group will be recorded for transcription purposes to ensure we captured your statements correctly and then it will be deleted. The project directors' names, emails and phone numbers are at the top of this page and can be contacted at any time if you have any questions about the research. Do you have any questions at this time?"

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

Give a copy of this form to each participant

APPENDIX J. FOCUS GROUP INSTRUMENT

APPENDIX J. FOCUS GROUP INSTRUMENT

Hurricane Katrina Focus Group Instrument

Date:_____

Community examined:_____

Moderator: _____

Note taker: _____

1. Tell me about your community and neighborhood just before Katrina made landfall? What was it like? Were people prepared? Scared? Did people evacuate? Did neighbors help one another? Did the mayor make announcements? Police chief? Pastors or ministers? Bosses at work? Did you anticipate the level of destruction? Where were you when Katrina made landfall?

   _____
   _____
   _____
   _____
   _____
   _____

2. Tell me about the first few hours and days after Hurricane Katrina made landfall in your neighborhood and community. What was it like? What did people do? Did neighbors help one another? Did you hear any announcements from political or disaster leaders? Any word from churches or your workplace? Family members local or outside the area? Relief workers and law enforcement?

   _____
   _____
   _____
   _____
   _____
   _____

3. What were your needs, the needs of your neighborhood the needs of your community a few weeks to a month after Hurricane Katrina? What was it like? What did people do? Did neighbors help one another? Did you hear any announcements from political or disaster leaders? Any word from churches or your workplace? Family members local or outside the area? Relief workers and law enforcement?

   _____
   _____
   _____
   _____
   _____
   _____

4. Did you recover from Katrina? When did you recover? Did your neighborhood? Did your community? How have people adjusted? Did neighbors help one another? Did political or disaster leaders help out in any way? How about local churches? Any assistance from your workplace? Did local family members or outside family members assist in your recovery in

any way? Relief workers and law enforcement? What is/was your definition of recovery? Expectations of recovery?

_____
_____
_____
_____
_____
_____

5. If another Hurricane Katrina was coming your way, what should be done to prepare differently for you, your neighborhood and your community? What could be done before, during and after the storm to increase the chances of recovery and improve the speed of recovery?

_____
_____
_____
_____
_____
_____

6. When did money start flowing after Hurricane Katrina? What was the source of these funds? Did everyone receive them or only some people? What did people spend their relief money on? How soon did people go back to work? What were the barriers that prevented people from going to work?

_____
_____
_____
_____
_____
_____

7. How is your community different now than before Katrina? How many people left and did not come back? Why did people leave?

_____
_____
_____
_____
_____
_____

APPENDIX K. SURVEY LITERATURE REVIEW

APPENDIX K. SURVEY LITERATURE REVIEW

Surveys are a method of collecting information to understand a phenomenon, such as attitudes, behaviors, or understanding, that research seeks to describe, explain or contrast (Fink 2003; Connelly 2009). Traditional methods for collecting this information include mail, telephone, e-mail, and the Internet (Fan and Yan 2009; Fink 2003). Survey methods can be direct or indirect. Collecting information directly asks questions of respondents, while collecting information indirectly include can be done by reviewing records, thoughts, or action (Fink 2003). Scrupulous steps must be undertaken in the development and administration stages to guarantee valid and reliable data, as the quality of data is reliant on a well constructed and validated survey instrument (Connelly 2009; Morris and Nguyen 2008; Baron-Epel *et al.* 2004). An effective survey must 1) convince the respondents to participate, 2) include valid measures of the factors being examined, and 3) be structured in a manner as to elicit acceptable and accurate information (Connelly 2009). The survey system is comprised of seven steps: setting objectives for information collection, designing the survey, preparing a reliable and valid survey instrument, administering the survey, managing and analyzing survey data, reporting the results, and guaranteeing this is done ethically (Fink 2003).

First, researchers must develop clear objectives— a declaration of the intended outcomes of the survey. "When planning a survey and its instrument, you need to define all potentially imprecise or ambiguous terms in the survey objectives" (Fink 2003). Instead, use terms that are associated with an exact definition. Hypotheses and survey are then developed from these objectives, which come from defined needs, reviews of literature, or even other surveys. Next, a systematic examination of existing literature will make known current research on the topic of the objective. This available data should be used to find the "holes" in the obtainable research (Fink 2003). Additionally, objectives may come from experts on the topic under consideration, as these individuals may play an influential role in the work or be affected by the findings.

Once the objective is established, questions should be drafted that directly solicit information to be used to advance knowledge on the issue under investigation. Questions must be straightforward to effectively gather accurate and consistent information in an explicit manner. All instrument questions must be grammatically and syntactically correct and ask for one thought at a time with a mutually exclusive answer bank, if provided (Fink 2003). Question wording must be purposeful and meticulous, concrete, and written in complete sentences, as any heedlessness in this area can potentially result in a respondent to misunderstand a question and provide an erroneous answer (Fan and Yan 2009). Concrete questions, which are precise and unambiguous, allow survey respondents to "readily identify the relationship between the intention of the question and the objectives of the survey" (Fink 2003). Additionally, survey questions can be open or closed, where open-ended questions do not provide answer options to respondents and closed-ended questions offer preselected answers. Although open-ended questions allow the respondent to write his or her own answer, this format is often time consuming in the reply coding stage of analysis (Connelly 2009). Close-ended answers can be categorical or nominal, ordinal or numerical. Categorical or nominal response choices have values with no numerical or ordinal meaning, while ordinal response choices place answers on an ordered scale. Furthermore, numerical response choices ask for numbers (Fink 2003).

Question comprehension relies on the use of neutral terms and qualifiers, simple grammar, and common and unambiguous terms. Thus, words with double meanings,

combining multiple questions, and loaded or leaded words must be avoided in survey development. Additionally, the response component in close ended questions should include all possible answers to the question (Connelly 2009; Fink 2003). Questions must be ordered in a logical fashion, which includes the avoidance of beginning with difficult questions (Fan and Yan 2009).

Fink (2003) examines four types of survey instruments: self-administered questionnaires, interviews, structured record review, and structured observation. Self-administered questionnaires are completed by the respondents and by mail, in-person, or on the internet or telephone. An interview, at minimum, consists of a purposeful conversation— an interviewee answering questions and an interviewer asking questions. A structured record review is completed by the researcher recording information from records, such as financial, medical, or school records. Finally, structured observations visually collect data.

According to Fink (2003), "a design is a way of arranging the environment in which a survey takes place. The environment consists of the individuals or groups of people, places, and activities, or objects that are to be surveyed" (31). Designs can be descriptive or experimental, where descriptive designs produce information on existing phenomena and experimental designs compare a group that's environmental arrangement has been altered to a control group.

Even under ideal conditions, it is difficult to examine an entire population (Morris and Nguyen 2008). Researcher, therefore, rely on a sample of the population under consideration. Samples, the actual people who complete the survey, are intended to be representative of the target population, which is the group to which the researcher intends to relate the survey's findings (Connelly 2009; Fink 2003). Thus, the sample should represent the population adequately in so far as demographics. "You must also have clear and definite eligibility criteria, apply sampling methods rigorously, justify the sample size, and have an adequate response rate" (Fink 2005). Eligibility criteria refer to the set of characteristics necessary for inclusion in the survey.

As different sampling methods have different response rates, the sampling method affects the quality of data produced (Fan and Yan 2009). Sampling methods are either probability sampling or nonprobability sampling, where probability sampling involves random selections and can be generalized, while nonprobability sampling is self-selected based on the needs of the survey and therefore cannot be generalized (Fan and Yan 2009; Fink 2003). Methods of probability sampling include: random sampling, stratified random sampling, systematic sampling, and cluster sampling. Methods of nonprobability sampling include: convenience sampling, snowball sampling, and quota sampling. Each method has unique advantages, disadvantages, and appropriate scenarios for implementation. For example, cluster sampling is commonly used in cases of limited access, such as natural disasters (Morris and Nguyen 2008). Researchers must also consider the percentage of their sample population with the medium by which they are distributing the survey (Baron-Epel *et al.* 2004). Response rates are defined as the percentage of those eligible to respond that actually responded— calculated by dividing the actual respondents by the eligible respondents (Fan and Yan 2009). Unsolicited surveys generate the fewest responses. While no single response rate is considered the accepted standard, researchers should aim to increase their response rates as much as possible. As information will inevitably be lost due to nonresponse, a potential bias may exist in the results if there is a difference between those who responded and those who opted not to respond (Fan and Yan 2009). Item nonresponse, for instance, introduces bias (Fink 2003).

To be reliable, a survey instrument must be consistent and to be valid, it must be accurate. "Reliability, or the consistency of information gathered by a survey, can be seriously imperiled by poorly worded and imprecise questions and directions. If an instrument is unreliable, it is also invalid, because you cannot obtain accurate findings with inconsistent data" (Fink 2003). A reliable instrument is free of measurement error—obtained scores should reflect true scores. Measures of reliability include: test-retest reliability, equivalence, internal consistency, inter- and intra-rater reliability (Fink 2003). Test-retest reliability examines the correlation between scores overtime. Equivalence measures the extent to which comparable questions measure comparable concepts at an equivalent level of difficulty. Internal consistency measures the extent to which all questions assess the same quality. Inter-rater reliability refers to the extent to which respondents agree on the ratings of survey items. Finally, intra-rater reliability refers to the consistency of measurement for a single respondent (Fink 2003).

Validity is the degree to which an instrument serves the purpose for which it was created. Measures of validity include: content validity, face validity, criterion validity, and construct validity (Fink 2003). Content validity refers to the extent to which measures thoroughly and appropriately evaluate the qualities they are intended to measure. Face validity refers to how measures appear on the surface. Criterion validity compares responses to similar external studies, which serves to either establish predictive validity or concurrent validity. Construct validity "demonstrates that a survey distinguishes between people who do and do not have certain characteristics" (Fink 2003).

Surveys can be analyzed using statistical and/or qualitative methods, which are undertaken in five steps. Statistical analyses can be derived from descriptions, relationships, comparisons, and predictions. First, a frequency count should be completed in which the percentage of each variable is be noted for each question (AbuAlRub 2006; Fink 2003). Next, an average answer should be calculated when possible. Third, relationships between measures should be established and modeled, such as through correlation. Fourth, demographics should be considered to determine if differences between variables, such as men and women are statistically meaningful, as opposed to occurring by chance. Finally, the analyzed data should be used as a prediction tool. Data is analyzed by methods such as description, comparison, summarization, content analysis, and appropriate statistical tools (Fink 2003).

As neither qualitative nor statistical analysis is inherently superior, the method should be dictated by the purpose of the survey and the form of the data solicited in the survey. Qualitative surveys are used to "collect information on the meanings that people attach to their experiences and on the ways they express themselves" (Fink 2003). They are, therefore, a valuable tool in soliciting details in respondents' own words, as well as for accessing small samples. Such surveys are analyzed through content analysis, in which written or recorded documents and observations are summarized, analyzed, and interpreted. The data must first be organized and carefully assessed, which includes sorting it, cleaning it, and entering it into files. This is an essential step, as "only clean data stand a chance of producing valid and reliable information. You can clean qualitative data by checking to see that the coding of observations, narratives, and themes are consistent" across researchers (Fink 2003).

There are commonly guidelines in place for working with human subjects. "If you are conducting your survey for an institution or organization that receives U.S. government support or as part of your work in an academic institution, however, you are likely to have to prepare written documentation of your planned survey procedures for review by an institutional review board (IRB) before you begin" (Fink 2003). This process is in place to

guarantee the privacy and human rights of the respondents. IRB consider: the design of the study; the risks and benefits associated with the study; the equitable selection of subjects; the identification of subjects and confidentiality; the qualifications of the researcher; and informed consent by participants to be included in research (Fink 2003). Research must adhere to scientific practices and avoid research misconduct, such as: exaggerating findings to support the view of the researcher; changing survey protocol without IRB approval; failing to document methodology; releasing participant information without permission; undertaking research with insufficient resources; and conducting research with a financial or social conflict of interest (Fink 2003).

APPENDIX L. SURVEY METHODS

APPENDIX L. SURVEY METHODS

The aim of this research is to collect data on a large sample of Gulf Coast residents regarding the social and economic recovery of respondents as individuals, as well as the perspectives of overall community recovery. This data is needed to model disaster recovery and resiliency (see Report Sections 7 and 8). The phenomenon being addressed by this survey is the relief and recovery of coastal Mississippi following Hurricane Katrina. The research surveys the community to gather information that will be used to describe and explain details of the damage and recovery and compare rates of recovery on the individual, community, city, and county level. The method used was web-based and face-to-face (paper) surveys in which questions were asked directly of the respondents in natural settings. As researched, attention was given to the development and administrative processes to ensure valid and reliable data (Connelly 2009; Morris and Nguyen 2008; Baron-Epel *et al.* 2004). The survey instruments were self-administered questionnaires with descriptive designs.

The objective of this survey is to gather first-hand accounts from the residents who lived in coastal communities when Hurricane Katrina hit on August 29, 2005, regarding relief and recovery efforts by formulating questions germane to the hypothesized endogenous and exogenous factors related to community resilience. These objectives were developed by Dr. David Butler and Dr. Ward Sayre, experts on development of the Gulf Coast at The University of Southern Mississippi, based on defined needs.

Through research Team meetings, a method was developed for the survey stage of this project. The method followed industry practices as outline in the literature review. These practices, broken down by process stage, are as follows: instrument development, IRB approval and informed consent, instrument implementation, and data analysis.

Instrument Development

As suggested by Fink (2003), survey questions were drafted that solicit information to be used in analyzing the issue under investigation. These questions went under numerous review processes, to ensure that they were straightforward, grammatically and syntactically correct, purposeful, concrete, written in complete sentences, and designed to elicit specific information. A combination of open-ended and close-ended questions was used. The close-ended questions provided categorical, ordinal, and numerical answer options. The questions were examined to ensure neutral terms and qualifiers, simple grammar, and common and unambiguous terms. Words with double meanings, combining multiple questions, and loaded or leaded words were also avoided. Additionally, questions were checked to ensure that all possible answers were included.

The rough draft of the survey instrument was developed by Dr. David Butler on March 23, 2010, and distributed to the Team for review, comments, and familiarity. A 31 question survey instrument was first drafted through a beta-testing project conducted under Dr. David Butler by the students of The University of Southern Mississippi's International Development Doctoral Program enrolled in the Spring 2010 Research Methods course. Each student in this course beta tested the instrument through field research in the rural communities north of the coast (see Table A.1; see Figure A.1) The following cities were studied within this research: Diamondhead, D'Iberville, Gautier, Lucedale, Poplarville, Saucier, and Vancleave in Mississippi; Citronelle, Magnolia Springs, Robertsdale, Chickasaw, Point Clear, and Prichard in Alabama.

The first draft of the SERRI survey instrument was then developed by Dr. David Butler on November 4, 2010, by adding 41 questions to the existing beta-instrument. The instrument was developed by the Team through several drafts. The final draft of the 57 question survey was completed on December 9, 2010 (see Appendix O).

IRB Approval and Informed Consent

An informed consent sheet was created and provided to the survey participants. For those who took the survey online, the information was provided at the start of the survey. For those who took a paper and pen survey, the informed consent sheet was the appended to the front of the survey. The survey approach and materials were explained to and approved by the Institutional Review Board (IRB) of The University of Southern Mississippi prior to the administering of the Team's first survey (see Appendix M). The survey informed consent statement provided the following information (see Appendix N):

- The purpose of the research— to study the social and economic recovery of communities after Hurricane Katrina
- The survey takes 10 minutes or less to complete
- Respondents are free to answer any or all of the questions
- Participation is completely voluntary
- All persons and places of work are to remain anonymous
- The names and contact information of the project directors, as well as that of the USM's IRB

Instrument Implementation

In previous research, the Team conducted interviews with social, political, and economic elites (see Report Section 4) in the cities and recorded these points of contact in an Excel spreadsheet. The information recorded includes the name of the contact, the role of the contact in the community, phone number if available, address if available, and other notes on contact. These interviews and previously obtained contact information served as a basis for reaching the community to solicit survey responses.

As it would be impossible to elicit responses from the entire population of the Gulf Coast, a sample of the population was examined. The eligibility criterion for participants of the survey was that they lived on the Gulf Coast when Hurricane Katrina hit and were 18 years of age or older. The sampling methods used were convenience sampling and snowball sampling, which are nonprobability methods. This research is convenience sampling in that it utilizes the previously established contacts in the community who are "ready and available" (Fink 2003, 41). This research is also snowball sampling in that the previously established contacts are asked to identify other members of the population, as by forwarding the web survey link through email to their community contacts. Snowball sampling was used in the research, as the population listing was unavailable and could not be compiled. Additionally, through snowball sampling, the source of contact information cannot be identified. This is important, as unsolicited contact has the lowest response rates. To reach a sample that is representative of the population, quota sampling was encouraged toward the completion of the survey to ensure that minorities and marginalized communities are adequately accounted for.

Once the survey instruments had been edited, the final survey was entered into Survey Monkey on February 19, 2011, at 10:31am central standard time (CST). Once the surveys were created, the Team tested the survey links to ensure that the links connected to the surveys and to take a precursory look at the surveys. Next, these links were provided to current students and alumni of The University of Southern Mississippi International Development Doctoral Program (through the program listserv) for feedback. Recipients had the opportunity to take the survey and report any issues back to the developers. The links were sent to members of the listserv with the instructions of testing the surveys, but not sending them to any contacts. In testing the instrument, it was concluded that the resident survey had a completion time of about ten minutes. This falls within the suggested time frame for best response rates, which is less than thirteen minutes (Fan and Yan 2009). After edits were made, the link was allowed to be sent to contacts and all surveys that were already completed during the instrument testing phase were deleted by the Team. The first survey response began at 9:01 am CST on March 31, 2011, and finished at 9:07 am CST. The last survey response was received on July 6, 2011, at 11:50am CST. The survey was officially closed on July 8, 2011, at 11:03am CST.

In reviewing the best method for administering the survey in the communities being researched, it was taken into consideration that in addition to the already below average response rates generated by web-based surveys (Fan and Yan 2009), the states in which the communities are located, Mississippi and Alabama, currently rank second and third to last among all states for internet penetration. Falling only behind West Virginia (58.2%), Mississippi has an internet penetration rate of 59.73 percent and Alabama has a rate of 60.61 percent (U.S. National Telecommunications and Information Administration 2010). It is, furthermore, difficult to obtain data following humanitarian emergencies, which limits survey ability. War, famine, population, displacement, and other humanitarian disasters limit the sampling techniques that the Team is able to use in conducting surveys (Morris and Nguyen 2008). Given the knowledge of internet penetration rates, papers surveys were solicited to supplement the web-based surveys. These paper surveys were entered into Survey Monkey by the Team

Information will be lost due to nonresponse, which potentially biases the results. If there is a difference between those who responded and those who opted not to respond, the data is also biased. The response rates generated in this research are far from ideal. The survey demographics do not reflect the demographics of the Mississippi coastal counties. In particular, this research's survey oversamples females by about a two to one margin. However, women are more likely to respond to surveys. In terms of race, the survey oversamples whites. The Teams made an effort to reach minorities to remedy the imbalance by specifically contacting organizations whose membership base is historically minority and churches in minority neighborhoods. The organizations were contacted by phone or by email with requests to distribute the survey to members. Team members visited four minority church worship services to promote the survey. Although such efforts generated a significant amount of minority responses, a truly representative sample was not reached.

The name of the university under which this research is being conducted was included in all correspondence, as surveys administered by governmental or academic organizations yield higher response rates than do commercial surveys (Fan and Yan 2009, 133). Survey Monkey provides the number of completed surveys, the number of started surveys that were not completed, and the percentage of surveys completed. The researcher, however, is unable to determine the exact response rate without knowing how many contacts received

the web link. The respondents were asked to forward the link, therefore only the primary contacts can be identified as eligible respondents.

Responses were requested in three steps. First, previously established contacts within the community were contacted by telephone to request completion and distribution of the surveys. The interview contacts were reached and given a brief introduction to the survey process. After which, the researchers asked if they would be willing to distribute the survey to the community via email. The contacts were then sent an email containing the link to the survey. Follow up requests were sent as needed.

The survey invitation was used to notify the participants of their eligibility as a pre-Katrina resident of the Gulf Coast. As suggested by Fan and Yan (2009), the following was included in the invitation: the name of the organization operating the survey (The University of Southern Mississippi); the title of the survey; the purpose of the survey (to examine Katrina relief and recovery to improve future efforts); deadlines; eligibility; the source of contact information; and the name and the title of the principal investigator. Personalization of emails was used when possible. Additionally, non-link HTMLs and attachments were not utilized. Although material incentives were not used as a method for increasing response rates, it was expected that informing respondents that the research would be used to investigate how to better organize relief and recovery efforts on the Gulf Coast in the event of a future disaster would entice responses.

The software used for administering the survey was Surveymonkey.com. It supports all major browsers and allows researchers to download results in Excel format, CSV format, XML format, HTML format, and PDF format. Additionally, filters can be applied to the data to generate a data by responses or by properties. Survey Monkey provides the following options for question format: Multiple Choice (Only one answer.); Multiple Choice (Multiple answers.); Matrix of Choices (One answer per row.); Matrix of Choices (Multiple answers per row.); Matrix of Drop-Down Menus; Rating Scale; Single Textbox; Multiple Textboxes; Comment/Essay Box; Numerical Textboxes; Demographic Information (U.S.); Demographic Information (International); Date and/or Time; Image; Descriptive text. Survey Monkey's default setting does not allow multiple submissions from the same IP address. This setting, however, was removed by the Team to allow access from multiple respondents with the same IP address.

The Survey Monkey "logic" allows a researcher to design surveys in a manner such that questions that are not applicable to the particular respondent are not seen on the screen. It skips unnecessary questions. This feature was utilized in the surveys. The following items are offered as survey options: page numbering, question numbering, add logo to the survey, show progress bar, show survey title in survey, show individual titles per page, changing the language of the surveys, an exit survey button, next and previous buttons, using an asterisk to highlight required questions, theme, requiring selected questions, deleting results, and changing wording after the survey has begun. Even once the survey becomes active, questions can be: edited, moved, copied, deleted, or have logic added.

As outlined above, approval for this research was received from the university's Institutional Review Board. The questions were drafted to be sensitive to the subject and anonymity was guaranteed to all respondents, as stated in the informed consent

Data Analysis

Once all data was collected, it was first organized and coded by the Team. Nonresponse of questions was not addressed on a case-by-case basis. Forbes, however, has chosen to

include questions with missing data as the missing responses are not thought to add bias to the results.

The survey received 2,200 responses to the Hurricane Katrina Volunteer Survey; 1,825 (82.2%) of these respondents completed the survey. The data was first analyzed by a frequency count in which all answers to each question were presented as a percentage. Next, the mean, median, and/or mode were determined for applicable variables. Third, the demographics of the respondents were compared to those found in the population being studied. Fourth, variables were represented with visuals. Open-ended questions were coded on a case-to-case basis. The answers were examined by common theme and then categorized. To ensure consistency, the coding was compiled twice for each question. If the answers were not the same in both exercises, then the answers were re-coded.

In compliance with academic standards and the university's Institutional Review Board (IRB), respondents, whether online or paper, were presented with an Informed Consent page. It was the first page of the survey and provided the name of the university, the project directors, the contact information— email and phone numbers— for the directors, the purpose of the study, the estimated time for completion of the study, directions for completing the survey, anonymity, and the address and phone number for contacting the Human Subjects Protection Review Committee at the University of Mississippi's Institutional Review Board for questions or concerns about rights as a study subject (see Appendix N).

APPENDIX M. SURVEY IRB APPROVAL

APPENDIX M. SURVEY IRB APPROVAL

Appendix M.1 Survey IRB Narrative

IRB Submission-Survey Instrument
David Butler
David.Butler@usm.edu

11. Project Goal

The goal of this project is to collect data associated with social and economic recovery from Hurricane Katrina in the bottom six counties of Mississippi and the bottom six counties of Alabama.

12. Protocol

s. *Procedures*-The research is being led by Dr. David Butler and Dr. Ward Sayre with additional help from five graduate students all of whom have been trained on survey methods and IRB techniques to date. Using comparison communities based on similar demographics but differential rates of recovery, we are going to survey a representative sample in each community regarding their community's recovery from Hurricane Katrina. Contact will be made through social groups within each community during which were first contacted during the interview phase of this research. The surveys will be distributed both electronically through Survey Monkey, by paper face-to-face and face-to-face with the use of an iPad to get the sample we are seeking. A consent including that this is a university survey, that all persons will remain anonymous, and that the survey data will be aggregated and then deleted will be on the first page before the instrument begins.

t. *Number and Age of Subjects*-We expect the comparable communities in the six county area of Mississippi and Alabama to produce between 300-400 completed instruments. All persons at the focus group will be 18 years of age or older.

u. *Population/Criteria Selection*-The population being examined is a cross section sample of the study communities.

v. *Time*- The survey will take approximately 10 minutes to complete.

w. *Location*-The survey will be sent out electronically via email and will be distributed through the previously contacted social groups in each community. If a representative sample is not achieved through this means we will gather surveys via paper and iPad in communities not represented through local groups or door to door as needed.

x. *Instrument*-Attached you will find the survey instrument. This instrument was created by the research team based on findings from the interviews we completed in the previous phase of this research project.

y. *Special Situations*-The persons under examination are a cross-section of the community. Because we will have a variety of socio-demographic persons present we will need translators to access certain populations and may have to translate the survey into other languages.

z. *Class*-This is not a class project.

aa. *Partnerships*-We are not partnering with any other groups or organizations on this project.

13. **Benefits**-The main benefit for this research is to model social and economic recovery from a major natural disaster at a micro-community level to help build better response to disasters and more informed public policy.
14. **Risks**

k) *Risks*-There are minimum risks to the subjects/participants. The only perceived risk at this time is that of being uncomfortable with the subject matter of Hurricane Katrina recovery since the subject is still on the mind of people five years after the event, especially given the recent Deepwater Horizon oil spill. Subjects are not required to answer any question if they feel uncomfortable.

l) *Conditions*-If a subject does not fit the criteria of the desired population they will be removed from the research study.

m) *Anonymity*-Anonymity will be assured in all publications from the material. Names will not be collected in the survey and only street level data is requested. This data will be aggregated and reported at the zip code level.

n) *Data Protection*-The data is kept on a single computer on an external hard drive that is not accessible to the internet. This is a standard procedure we use with our proprietary data sets and will be used for the interview data as well.

o) *Data Disposition*-All recording are digital and are permanently erased following the completion of the survey. Any paper notes will be shredded.

15. Informed Consent

c) See attached form.

APPENDIX M.2 SURVEY IRB APPROVAL

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

TO: David Butler, Ph.D.
118 College Drive #5108
Hattiesburg, MS 39406-0001

FROM: Lawrence A. Hosman, Ph.D.
HSPRC Chair

PROTOCOL NUMBER: 11011815
PROJECT TITLE: Hurricane Katrina Socio-Economic Recovery - Survey Instrument

Enclosed is The University of Southern Mississippi Human Subjects Protection Review Committee Notice of Committee Action taken on the above referenced project proposal. If I can be of further assistance, contact me at (601) 266-4279, FAX at (601) 266-4275, or you can e-mail me at Lawrence.Hosman@usm.edu. Good luck with your research.

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
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HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **11011815**
PROJECT TITLE: **Hurricane Katrina Socio-Economic Recovery - Survey Instrument**
PROPOSED PROJECT DATES: **12/01/2010 to 06/30/2011**
PROJECT TYPE: **New Project**
PRINCIPAL INVESTIGATORS: **David Butler, Ph.D.**
COLLEGE/DIVISION: **College of Arts & Letters**
DEPARTMENT: **Political Science, International Development, International Affairs**
FUNDING AGENCY: **Department of Homeland Security**
HSPRC COMMITTEE ACTION: **Expedited Reviw Approval**
PERIOD OF APPROVAL: **02/07/2011 to 02/06/2012**

Lawrence A. Hosman
Lawrence A. Hosman, Ph.D.
HSPRC Chair

2-8-2011
Date

HUMAN SUBJECTS REVIEW FORM
UNIVERSITY OF SOUTHERN MISSISSIPPI
(SUBMIT THIS FORM IN DUPLICATE)

Protocol # 11011815
(office use only)

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(address to receive information regarding this application)

College/Division Arts and Letters Dept Pol Sci, Int'l Development, Int'l Affair

Department Box # 5108 Phone 601.266.4735

Proposed Project Dates: From December 2010 To June 2011
(specific month, day and year of the beginning and ending dates of full project, not just data collection)

Title Hurricane Katrina Socio-Economic Recovery

Funding Agencies or Research Sponsors Dept Homeland Security, Dept of Energy, SE Regional Research Initi

Grant Number (when applicable) GR03602

Yes New Project

No Dissertation or Thesis

no Renewal or Continuation: Protocol #

no Change in Previously Approved Project: Protocol #

Principal Investigator — 12/9/10 Date

Advisor — Date

Department Chair — December 9, 2010 Date

RECOMMENDATION OF HSPRC MEMBER

Category I, Exempt under Subpart A, Section 46.101 ( ) ( ), 45CFR46.

✓ Category II, Expedited Review, Subpart A, Section 46.110 and Subparagraph (b).

Category III, Full Committee Review.

HSPRC College/Division Member — 1/29/11 DATE

HSPRC Chair — Lawrence A. Hosman 2-8-11 DATE

APPENDIX N. SURVEY INFORMED CONSENT

APPENDIX N. SURVEY INFORMED CONSENT

Informed Consent-Survey
Hurricane Katrina

The University of Southern Mississippi
Project Director: Dr. David L Butler and Dr. Edward Sayre
Contact Information: David Butler, David.Butler@usm.edu, 601.266.4735
Edward Sayre, Edward.Sayre@usm.edu, 601.266.4004

The following information will be on the first page of the survey whether it is online or via paper.

"The purpose of this survey is to study the social and economic recovery of communities after Hurricane Katrina. They survey take 10 minutes or less to complete. Feel free to answer any or all of the questions. If you do not feel like answering a question, you may skip it. Your participation is completely voluntary and you can quit the survey at any time without penalty. This is a university survey and therefore all persons and will remain anonymous. The project directors' names, emails and phone numbers are at the bottom of this page and can be contacted at any time if you have any questions about the research."

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

APPENDIX O. SURVEY INSTRUMENT

APPENDIX O. SURVEY INSTRUMENT

Hurricane Katrina Recovery Survey Instrument
The University of Southern Mississippi
Dr. David L. Butler, Ph.D.
Dr. Edward Sayre, Ph.D.

Note: Please complete all of the following questions to the best of you ability. Note the survey takes approximately 10 minutes to complete.

Before Hurricane Katrina

1. As of August 29, 2005, what was your employment status? (check one)
   a) Employed (go to question 2)
   b) Not working but looking for a job (go to question 7)
   c) Not employed and not looking for a job because:
      a. Full time student (go to question 7)
      b. Domestic duties (go to question 7)
      c. Retired (go to question 7)
      d. Disabled (go to question 7)

2. In what sector were you employed when Hurricane Katrina hit on August 29, 2005? (check one)
   a) Agriculture, forestry, fishing, and hunting
   b) Mining, quarrying, and oil and gas extraction
   c) Construction
   d) Manufacturing
   e) Wholesale trade
   f) Retail trade
   g) Transportation and warehousing
   h) Information
   i) Finance and insurance
   j) Real estate
   k) Professional and technical service
   l) Management of companies and enterprises
   m) Administration and waste services
   n) Educational services
   o) Healthcare and social assistance
   p) Arts, entertainment, and recreation
   q) Accommodation and food services
   r) Other services, except public administration
   s) Public administration
   t) Military
   u) Other [specify:]

3. How long had you been employed in the same job when Hurricane Katrina hit on August 29, 2005? (check one)
   a) Less than 3 months
   b) 3-6 months
   c) 7-11 months
   d) 1-2 years
   e) 3-5 years
   f) 6-10 years

g) More than 10 years

4. As of August 29, 2005, how were you paid? (check one)
   a) Hourly
   b) Salary (go to question 6)

5. How much were you paid per hour? (check one)
   a) Minimum Wage (go to question 7)
   b) $5.16 to $7.50 (go to question 7)
   c) $7.51 to $10.00 (go to question 7)
   d) $10.01 to $12.00 (go to question 7)
   e) $12.01 to $15.00 (go to question 7)
   f) $15.01 to $20.00 (go to question 7)
   g) More than $20.00 (go to question 7)

6. How much was your annual salary? (check one)
   a) $19,999 & under
   b) $20,000-$29,999
   c) $30,000-$39,999
   d) $40,000-$49,999
   e) $50,000-$59,999
   f) $60,000-$69,999
   g) $70,000-$79,999
   h) $80,000-$89,999
   i) $90,000-$99,999
   j) $100,000-$150,000
   k) More than $150,000

7. What was your home address on August 29, 2005?
   a) Enter Street: _____
   b) Enter City: _____
   c) Enter State: _____
   d) Enter Zip:_____

8. Did you rent or own your residence? (check one)
   a) Rent
   b) Own
   c) Did not pay rent (lived with family or friends)
   d) Other [specify:]

Hurricane Katrina

9. Did you evacuate for Hurricane Katrina? (check one)
   a) Yes
   b) No (go to question 12)

10. How long were you away from your community following Hurricane Katrina? (check one)
   a) 1-3 days
   b) 4-6 days
   c) 1-2 weeks
   d) 3-4 weeks
   e) 5 weeks or more

11. How much money did you spend during your evacuation? (check one)
   a) $0-$100
   b) $101-$250

c) $251-$500
d) $501-$1,000
e) More than $1,000

12. What were your sources of news and information regarding food and water distribution and relief supplies for the first two weeks after the storm? (check all that apply)
a) I was evacuated for the first two weeks
b) Radio
c) Television
d) Internet
e) Newspaper
f) Word of mouth
g) Visit to city hall
h) Visit to grocery store
i) Visit to hurricane shelter
j) Volunteers
k) Neighbors
l) Churches
m) Public Safety officials
n) Cell phone (text, push-to-talk)
o) Phone calls – landline
p) HAM radio
q) Flyers
r) Other [specify:]

13. How long was it before you were able to use debit/credit cards? (check one)
a) Immediately after the storm
b) 1-3 days
c) 4-7 days
d) 8-14 days
e) 15-30 days
f) More than 30 days
g) Do not use debit/credit cards

14. Which of the following businesses was the most helpful to you to have immediately following Hurricane Katrina? (check one)
a) Casinos
b) Large retailers (Wal-Mart, Lowe's, etc.)
c) Small retailers
d) Building supply/home furnishings
e) Banks
f) Hotel/motels
g) Other [specify:]

15. Were you or someone you know a victim of any of the following crimes resulting from Hurricane Katrina? (check all that apply)
a) Mugging
b) Robbery
c) Burglary/Break-in
d) Rape/Sexual assault
e) Assault/Battery
f) Fraud (experienced or attempted)
g) Other [specify:]

16. When Katrina struck on August 29, 2005, did you have the following type of insurance? (check all that apply)
    a) Did not have insurance
    b) Flood insurance
    c) Wind insurance
    d) Homeowner's
    e) Renter's insurance
    f) Other [specify:]

17. What was your non-reimbursed property loss as a result of Hurricane Katrina? (check one)
    a) No non-reimbursed loss
    b) $1-$100
    c) $101-$250
    d) $251-$500
    e) $501-$1,000
    f) $1,001-$5,000
    g) $5,001-$10,000
    h) $10,001-$25,000
    i) $25,001-$50,000
    j) $50,001-$100,000
    k) More than $100,000

18. With what agency did you file a claim for damages due to Hurricane Katrina? (check all that apply)
    a) Did not file a claim
    b) FEMA (Federal Emergency Management Agency)
    c) MEMA (Mississippi Emergency Management Agency)
    d) SBA (Small Business Administration)
    e) MDA (homeowner grants)(Mississippi Development Authority)
    f) Insurance
    g) Other [specify:]

19. How much did you receive from insurance and other cash grant sources? (check one)
    a) $0-$5,000
    b) $5,001-$10,000
    c) $10,001-$25,000
    d) $25,001-$50,000
    e) $50,001-$100,000
    f) $100,001-$200,000
    g) $200,001-$300,000
    h) More than $300,000

20. Which sources provided assistance to you following Hurricane Katrina? (check all that apply)
    a) Did not receive assistance
    b) Red Cross
    c) Salvation Army
    d) Military
    e) Local government
    f) Church/Religious Group [specify:]
    g) Rotary Club
    h) Lions Club
    i) Kiwanis Club
    j) Other community club [specify:]
    k) Place of work
    l) Local business, not place of work
    m) Friends

n) Family
o) Neighbors
p) Other [specify:]

21. What form of assistance did you receive for recovery? (check all that apply)
a) Did not receive assistance
b) Cash
c) Food and/or water
d) Appliances
e) Transportation
f) Debris removal
g) Clothing
h) Housing
i) Assistance with applying for recovery programs
j) Home repair
k) Other [specify:]

22. How much of your savings did you use for your household's Hurricane Katrina recovery? (check one)
a) Did not use savings
b) $1-$100
c) $101-$250
d) $251-$500
e) $501-$1,000
f) $1,001-$5,000
g) $5,001-$10,000
h) $10,001-$25,000
i) $25,001-$50,000
j) $50,001-$100,000
k) More than $100,000

23. Did you lose your job as a result of Hurricane Katrina? (check one)
a) Did not have a job (go to question 26)
b) Yes
c) No (go to question 26)

24. How many months were you out of work?
a) Less than 1 month
b) 1-2 months
c) 3-4 months
d) 5-6 months
e) 7-8 months
f) 9-10 months
g) 11-12 months
h) More 12 months

25. What activities did you engage in during your unemployment period? (Check all that apply)
a) Looked for a job
b) Looked for housing
c) Rebuilt my home
d) Sought counseling for trauma
e) Gambled at the casinos
f) Worked for cash/odd jobs
g) Could not work because I had to take care of my children
h) Other [specify:]

Recession

26. What was your employment status as of December 2007? (check one)
    a) Employed
    b) Not working but looking for a job (go to question 31)
    c) Not employed and not looking for a job because:
        a. Full time student (go to question 31)
        b. Domestic duties (go to question 31)
        c. Retired (go to question 31)
        d. Disabled (go to question 31)

27. In what sector were you employed when the recession hit in December 2007? (check one)
    a) Agriculture, forestry, fishing, and hunting
    b) Mining, quarrying, and oil and gas extraction
    c) Construction
    d) Manufacturing
    e) Wholesale trade
    f) Retail trade
    g) Transportation and warehousing
    h) Information
    i) Finance and insurance
    j) Real estate
    k) Professional and technical service
    l) Management of companies and enterprises
    m) Administration and waste services
    n) Educational services
    o) Healthcare and social assistance
    p) Arts, entertainment, and recreation
    q) Accommodation and food services
    r) Other services, except public administration
    s) Public administration
    t) Military
    u) Other [specify:]

28. How were you paid when the recession hit in December 2007? (check one)
    a) Hourly
    b) Salary (go to question 30)

29. How much were you paid per hour? (check one)
    a) Minimum Wage (go to question 31)
    b) $7.26 to $10.00 (go to question 31)
    c) $10.01 to $12.00 (go to question 31)
    d) $12.01 to $15.00 (go to question 31)
    e) $15.01 to $20.00 (go to question 31)
    f) More than $20.00 (go to question 31)

30. How much was your annual salary in December 2007? (check one)
    a) $19,999 & under
    b) $20,000-$29,999
    c) $30,000-$39,999
    d) $40,000-$49,999
    e) $50,000-$59,999
    f) $60,000-$69,999
    g) $70,000-$79,999
    h) $80,000-$89,999

i) $90,000-$99,999
j) $100,000-$150,000
k) More than $150,000

31. Did you lose your job due to the recession that began December 2007?
a) Did not have a job (go to question 33)
b) Yes
c) No (go to question 33)

32. How long were you employed when the recession hit in December 2007? (check one)
a) Less than 3 months
b) 3-6 months
c) 7-11 months
d) 1-2 years
e) 3-5 years
f) 6-10 years
g) More than 10 years

33. What was your address when the recession hit (December 2007)?
a) Same address as August 2005
b) Different Address
    a. Enter Street: _____
    b. Enter City: _____
    c. Enter State: _____
    d. Enter Zip:_____

34. Did you rent or own your residence that you just entered? (check one)
a) Rent
b) Own
c) Did not pay rent (lived with family or friends)
d) Other [specify:]

Today

35. What percentage has your community recovered to pre-Katrina levels? (check one)
a) 100% (go to question 36)
b) 90% (go to question 37)
c) 80% (go to question 37)
d) 70% (go to question 37)
e) 60% (go to question 37)
f) 50% (go to question 37)
g) 40% (go to question 37)
h) 30% (go to question 37)
i) 20% (go to question 37)
j) 10% or less (go to question 37)

36. When did your community recover from Hurricane Katrina? (check one)
a) Recovery month_____
b) Recovery year_____

38. What is your present address?
a) Same address as December 2007
b) Different Address
    a. Enter Street: _____
    b. Enter City: _____

c. Enter State: _____
d. Enter Zip:_____

39. Have you moved since Hurricane Katrina hit on August 29, 2005? (check one)
    a) Yes
    b) No (go to question 41)

40. Was your move directly related to Hurricane Katrina? (check one)
    a) Yes
    b) No

41. What is your current employment status? (check one)
    a) Employed
    b) Not working but looking for a job (go to question 47)
    c) Not employed and not looking for a job because:
        a. Full time student (go to question 47)
        b. Domestic duties (go to question 47)
        c. Retired (go to question 47)
        d. Disabled (go to question 47)

42. In what sector is your job? (check one)
    a) Agriculture, forestry, fishing, and hunting
    b) Mining, quarrying, and oil and gas extraction
    c) Construction
    d) Manufacturing
    e) Wholesale trade
    f) Retail trade
    g) Transportation and warehousing
    h) Information
    i) Finance and insurance
    j) Real estate
    k) Professional and technical service
    l) Management of companies and enterprises
    m) Administration and waste services
    n) Educational services
    o) Healthcare and social assistance
    p) Arts, entertainment, and recreation
    q) Accommodation and food services
    r) Other services, except public administration
    s) Public administration
    t) Military
    u) Other [specify:]

43. If employed currently, how are you paid? (check one)
    a) Hourly
    b) Salary (go to question 45)

44. How much are you paid per hour? (check one)
    a) Minimum Wage (go to question 46)
    b) $7.26 to $10.00 (go to question 46)
    c) $10.01 to $12.00 (go to question 46)
    d) $12.01 to $15.00 (go to question 46)
    e) $15.01 to $20.00 (go to question 46)
    F) More than $20.00 (go to question 46)

45. How much is your annual salary? (check one)
    a) $19,999 & under
    b) $20,000-$29,999
    c) $30,000-$39,999
    d) $40,000-$49,999
    e) $50,000-$59,999
    f) $60,000-$69,999
    g) $70,000-$79,999
    h) $80,000-$89,999
    i) $90,000-$99,999
    j) $100,000-$150,000
    k) More than $150,000

46. How long have you been employed in your current job? (check one)
    a) Less than 3 months
    b) 3-6 months
    c) 7-11 months
    d) 1-2 years
    e) 3-5 years
    f) 6-10 years
    g) More than 10 years

Demographics

47. When were you born?
    Month____ Year_____

48. What is your race? (check all that apply)
    a) White
    b) Black
    c) American Indian and Alaska Native persons
    d) Asian
    e) Native Hawaiian or other Pacific Islander
    f) Two or more races
    g) Other [specify:]

49. What is your ethnicity?
    h) Hispanic or Latino
    i) Not Hispanic
    j) Other [specify:]

50. Do you rent or own your residence? (check one)
    a) Rent (go to question 52)
    b) Own
    c) Do not pay rent (live with family or friends) (go to question 53)
    d) Other [specify:] (go to question 53)

51. If you own your home, what is the value of your house, apartment, condo, or mobile home? (check one)
    a) Less than $10,000 (go to question 53)
    b) $10,000 - $14,999 (go to question 53)
    c) $15,000-$19,999 (go to question 53)
    d) $20,000-$24,999 (go to question 53)
    e) $25,000-$29,999 (go to question 53)
    f) $30,000-$34,999 (go to question 53)
    g) $35,000-$39,999 (go to question 53)

h) $40,000-$49,999 (go to question 53)
i) $50,000-$59,999 (go to question 53)
j) $60,000-$69,999 (go to question 53)
k) $70,000-$79,999 (go to question 53)
l) $80,000-$89,999 (go to question 53)
m) $90,000-$99,999 (go to question 53)
n) $100,000-$124,999 (go to question 53)
o) $125,000-$149,999 (go to question 53)
p) $150,000-$174,999 (go to question 53)
q) $175,000-$199,999 (go to question 53)
r) $200,000-$249,999 (go to question 53)
s) $250,000-$299,999 (go to question 53)
t) $300,000-$399,999 (go to question 53)
u) $400,000-$499,999 (go to question 53)
v) $500,000-$749,999 (go to question 53)
w) $750,000-$999,999 (go to question 53)
x) $1,000,000 or more (go to question 53)

52. What is the monthly rent?
a) $_____ dollars

53. Gender? (check one)
a) Male
b) Female

54. Occupation?
a) Write out (nurse, personnel manager, supervisor of order department, auto mechanic, accountant)_____

55. Marital status? (check one)
a) Now married
b) Widowed
c) Divorced
d) Separated
e) Never married not living with someone
f) Unmarried partner

56. Number of people in household (do not count yourself)?
a) 18 years or older_____
b) 17 years or younger_____

57. Highest degree or level of school COMPLETED? (check one)
a) 12^{th} grade or less, no diploma
b) High school graduate or equivalent
c) Some college but no degree
d) Associate's degree
e) Bachelor's degree
f) Master's degree
g) Professional degree (MD, DDS, DVM, LLB, JD)
h) Doctoral degree (PhD, EdD

APPENDIX P. SURVEY INVITATION

APPENDIX P. SURVEY INVITATION

Below is a link to a survey about Hurricane Katrina recovery in our community. This survey is being conducted by The University of Southern Mississippi. The results of this survey will help decision-makers understand the level of recovery/non-recovery of our community which can help to shape decisions in the future when another storm hits potentially leading to a faster or more full recovery for our community.

Your participation is very important and I appreciate you taking the time out to complete the survey. I hope that you will consider forwarding this email with link to any friends, family, and contacts and invite their participation as well.
If you have any questions, please let me know.

http://www.surveymonkey.com/s/KVSVD5S

Sincerely,

David

David L. Butler, Ph.D.
International Development Doctoral Program

APPENDIX Q. SURVEY DATA TABLES

APPENDIX Q. SURVEY DATA TABLES

As of August 29, 2005, what was your employment status? (Select one)		
Answer Options	**Response Percent**	**Response Count**
EMPLOYED	74.0%	1627
Not working but LOOKING FOR A JOB	2.9%	64
Not employed and Not looking for a job because FULL-TIME STUDENT	13.3%	292
Not employed and Not looking for a job because performing DOMESTIC DUTIES	2.8%	62
Not employed and Not looking for a job because RETIRED	6.4%	140
Not employed and Not looking for a job because DISABLED	0.6%	13
	answered question	2198
	skipped question	22

In what sector were you employed when Hurricane Katrina hit on August 29, 2005? (Select one)		
Answer Options	**Response Percent**	**Response Count**
Agriculture, forestry, fishing, and hunting	0.6%	10
Mining, quarrying, and oil and gas extraction	0.2%	3
Construction	3.1%	50
Manufacturing	3.0%	48
Wholesale trade	0.2%	4
Retail trade	5.0%	81
Transportation and warehousing	0.8%	13
Information	0.9%	15
Finance and insurance	3.1%	50
Real estate	1.0%	16
Professional and technical services	7.6%	122
Management of companies and enterprises	1.6%	26
Administration and waste services	0.2%	4
Educational services	38.0%	612
Healthcare and social assistance	10.9%	175
Arts, entertainment, and recreation (includes Casinos)	4.0%	65
Accommodation and food services	2.6%	42
Other services, except public administration	1.4%	23
Public administration	1.5%	24
Military	1.5%	24
Other (please specify)	12.6%	203
	answered question	1610
	skipped question	610

How long had you been employed in the same job when Hurricane Katrina hit on August 29, 2005? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Less than 3 months	5.2%	84
3-6 months	2.9%	47
7-11 months	3.8%	61
1-2 years	15.1%	241
3-5 years	20.8%	333
6-10 years	15.3%	245
More than 10 years	36.9%	590
	answered question	1601
	skipped question	619

As of August 29, 2005, how were you paid? (check one)		
Answer Options	**Response Percent**	**Response Count**
Hourly Wage	34.2%	541
Salary	65.8%	1041
	answered question	1582
	skipped question	638

How much were you paid per hour? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Minimum Wage	4.2%	23
$5.16-$7.50	10.7%	58
$7.51-$10.00	23.8%	129
$10.01-$12.00	13.3%	72
$12.01-$15.00	16.1%	87
$15.01-$20.00	12.5%	68
More than $20.00	19.4%	105
	answered question	542
	skipped question	1678

How much was your annual salary? (Check one)		
Answer Options	**Response Percent**	**Response Count**
$19,999 & under	3.4%	34
$20,000 - $29,999	11.5%	115
$30,000 - $39,999	20.0%	201
$40,000 - $49,999	23.8%	239
$50,000 - $59,999	13.4%	135
$60,000 - $69,999	7.5%	75
$70,000 - $79,999	6.5%	65
$80,000 - $89,999	4.3%	43
$90,000 - $99,999	4.1%	41
$100,000 - $150,000	3.8%	38
More than $150,000	1.8%	18
	answered question	1004
	skipped question	1216

Did you rent or own your residence? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Rent	14.0%	286
Own	66.3%	1355
Did not pay rent (lived with family or friends)	17.5%	358
Other (please specify)	2.2%	45
	answered question	2044
	skipped question	176

Did you evacuate for Hurricane Katrina? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Yes	48.6%	988
No	51.4%	1046
	answered question	2034
	skipped question	186

How long were you away from your city/town following Hurricane Katrina? (Check one)		
Answer Options	**Response Percent**	**Response Count**
1-3 days	34.0%	332
4-6 days	19.1%	187
1-2 weeks	21.1%	206
3-4 weeks	9.7%	95
5 weeks or more	16.1%	157
	answered question	977
	skipped question	1243

How much money did you spend during your evacuation? (Check one)		
Answer Options	**Response Percent**	**Response Count**
$0 - $100	10.7%	105
$101 - $250	13.8%	135
$251 - $500	24.0%	234
$501 - $1,000	18.5%	181
More than $1,000	33.0%	322
answered question		977
skipped question		1243

What were your sources of news and information regarding food, water distribution and relief supplies for the first two weeks after the storm? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
I evacuated and was not in my community for the first two weeks	15.0%	302
Radio	55.5%	1119
Television	34.5%	695
Internet	8.5%	172
Newspaper	17.9%	362
Word of mouth	63.5%	1280
Visit to city hall	1.9%	38
Visit to grocery store	8.4%	170
Visit to hurricane shelter	4.2%	85
Volunteers	23.3%	470
Neighbors	48.1%	971
Churches	27.2%	549
Public Safety officials	13.3%	268
Cell phone (text, push-to-talk)	33.8%	681
Phone calls - landline	7.4%	150
HAM radio	1.5%	30
Fliers	0.9%	18
Other (please specify)	7.4%	150
answered question		2017
skipped question		203

In the hurricane affected areas, how soon before you were able to use debit/credit cards? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Immediately after the storm	2.6%	52
1-3 days	4.9%	98
4-7 days	13.0%	259
8-14 days	18.3%	365
15-30 days	14.6%	290
More than 30 days	7.3%	146
I do not know	33.3%	662
Do not use debit/credit cards	5.9%	118
	answered question	1990
	skipped question	230

Which of the following businesses was the most helpful to you to have immediately following Hurricane Katrina? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Casinos	0.4%	8
Large retailers (Wal-Mart, Kmart, etc.)	35.1%	678
Small retailers	15.5%	300
Building supply/home furnishings (Lowe's, Home Depot, etc.)	17.0%	328
Banks	14.6%	281
Hotel/motels	2.6%	50
Other (please specify)	14.8%	285
	answered question	1930
	skipped question	290

Were you or someone you know a victim of any of the following crimes stemming from Hurricane Katrina? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Mugging	1.6%	30
Robbery	10.2%	196
Burglary/Break-in	12.0%	231
Rape/Sexual assault	0.8%	16
Assault/Battery	1.3%	24
Fraud (experienced or attempted)	16.0%	308
None	70.0%	1344
Other (please specify)	3.8%	72
	answered question	1920
	skipped question	300

When Hurricane Katrina struck on August 29, 2005, did you have any of the following types of insurance? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Did not have insurance	16.3%	320
Flood insurance	20.1%	394
Wind insurance	35.5%	697
Homeowner's insurance	76.6%	1504
Renter's insurance	5.0%	98
Other (please specify)	4.7%	93
answered question		1963
skipped question		257

What was your NON-REIMBURSED property loss as a result of Hurricane Katrina? (Check one)		
Answer Options	**Response Percent**	**Response Count**
No non-reimbursed loss	25.7%	486
$1 - $100	1.4%	26
$101 - $250	1.4%	27
$251 - $500	2.6%	50
$501 - $1,000	6.9%	130
$1,001 - $5,000	19.2%	363
$5,001 - $10,000	10.2%	194
$10,001 - $25,000	9.5%	180
$25,001 - $50,000	7.0%	132
$50,001 - $100,000	8.8%	166
More than $100,000	7.4%	140
answered question		1894
skipped question		326

With what agency did you file a claim for damages due to Hurricane Katrina? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Did not file a claim	15.7%	303
FEMA (Federal Emergency Management Agency)	53.3%	1029
MEMA (Mississippi Emergency Management Agency)	9.7%	188
SBA (Small Business Administration)	19.8%	383
MDA (Mississippi Development Authority) - "homeowner grants"	11.3%	219
Insurance	61.9%	1195
Other (please specify)	2.9%	56
answered question		1930
skipped question		290

How much did you receive from insurance and other cash grant sources? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Did not receive any insurance payout or cash grant	22.5%	413
$1 - $5,000	19.8%	364
$5,001 - $10,000	12.9%	236
$10,001 - $25,000	16.0%	294
$25,001 - $50,000	9.3%	171
$50,001 - $100,000	8.8%	161
$100,001 - $200,000	7.7%	141
$200,001 - $300,000	1.9%	34
More than $300,000	1.2%	22
	answered question	1836
	skipped question	384

Which sources provided assistance to you following Hurricane Katrina? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Did not receive assistance	7.1%	136
Red Cross	62.3%	1188
Salvation Army	27.3%	520
Military	23.7%	453
Local government	11.0%	209
Church or Faith-based Group	51.7%	987
Rotary Club	1.2%	22
Lions Club	0.6%	12
Kiwanis Club	0.3%	6
Place of work	27.5%	524
Local business, not place of work	6.1%	117
Friends	54.8%	1045
Family	61.4%	1171
Neighbors	42.5%	811
Other (please specify)	6.8%	129
	answered question	1908
	skipped question	312

What form of assistance did you receive for recovery? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Cash	44.3%	772
Food and/or water	87.7%	1526
Appliances	7.0%	121
Transportation	4.4%	77
Debris removal	46.5%	809
Clothing	22.8%	397
Housing	17.7%	309
Assistance with applying for recovery program	10.3%	180
Home repair	24.6%	429
Other (please specify)	6.3%	109
answered question		**1741**
skipped question		**479**

How much of your savings did you use for your household's Hurricane Katrina recovery? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Did not use savings	31.8%	579
$1 - $100	1.0%	19
$101 - $250	2.5%	45
$251 - $500	5.5%	100
$501 - $1,000	10.8%	197
$1,001 - $5,000	21.1%	383
$5,001 - $10,000	10.3%	187
$10,001 - $25,000	6.9%	126
$25,001 - $50,000	5.2%	95
$50,001 - $100,000	2.9%	52
More than $100,000	1.9%	35
answered question		**1818**
skipped question		**402**

Have you moved since Hurricane Katrina hit on August 29, 2005? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Yes	38.5%	737
No	61.5%	1179
answered question		**1916**
skipped question		**304**

Was your move directly related to Hurricane Katrina? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Yes	50.8%	368
No	49.2%	357
answered question		725
skipped question		1495

Did you lose your job as a result of Hurricane Katrina? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Did not have a job	17.3%	329
Yes	12.9%	246
No	69.8%	1330
answered question		1905
skipped question		315

How many months were you out of work? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Less than 1 month	13.0%	27
1-2 months	16.8%	35
3-4 months	21.2%	44
5-6 months	16.3%	34
7-8 months	9.6%	20
9-10 months	5.8%	12
11-12 months	14.9%	31
MORE than 12 months (please specify a NUMBER of MONTHS)		34
answered question		208
skipped question		2012

What activities did you engage in during your unemployment period? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Looked for a job	45.0%	227
Looked for housing	15.6%	79
Rebuilt my home	27.5%	139
Sought counseling for trauma	7.3%	37
Gambled at the casinos	0.4%	2
Worked for cash/odd jobs	17.0%	86
Could not work because I had to take care of my children	9.3%	47
Other (please specify)	37.2%	188
answered question		505
skipped question		1715

What was your employment status as of December 2007? (Select one)		
Answer Options	**Response Percent**	**Response Count**
EMPLOYED	75.4%	1414
Not working but LOOKING FOR A JOB	5.2%	98
Not employed and Not looking for a job because FULL-TIME STUDENT	7.8%	147
Not employed and Not looking for a job because performing DOMESTIC DUTIES	2.6%	49
Not employed and Not looking for a job because RETIRED	7.8%	147
Not employed and Not looking for a job because DISABLED	1.1%	20
answered question		1875
skipped question		345

In what sector were you employed when the recession hit in December 2007? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Agriculture, forestry, fishing, and hunting	0.6%	8
Mining, quarrying, and oil and gas extraction	0.1%	1
Construction	3.2%	46
Manufacturing	2.9%	41
Wholesale trade	0.2%	3
Retail trade	4.8%	68
Transportation and warehousing	0.7%	10
Information	1.0%	14
Finance and insurance	3.2%	46
Real estate	0.7%	10
Professional and technical service	7.3%	104
Management of companies and enterprises	1.1%	16
Administration and waste services	0.4%	6
Educational services	40.7%	579
Healthcare and social assistance	10.3%	147
Arts, entertainment, and recreation (includes Casinos)	2.6%	37
Accommodation and food services	2.7%	38
Other services, except public administration	1.8%	26
Public administration	1.7%	24
Military	1.1%	15
Other (please specify)	13.0%	185
answered question		1424
skipped question		796

How were you paid when the recession hit in December 2007? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Hourly Wage	35.1%	497
Salary	64.9%	919
answered question		1416
skipped question		804

How much were you paid per hour? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Minimum Wage	5.6%	28
$5.16-$7.50	10.7%	53
$7.51-$10.00	20.7%	103
$10.01-$12.00	16.5%	82
$12.01-$15.00	10.7%	53
$15.01-$20.00	16.5%	82
More than $20.00	19.3%	96
	answered question	**497**
	skipped question	**1723**

How much was your annual salary in December 2007? (Check one)		
Answer Options	**Response Percent**	**Response Count**
$19,999 & under	4.1%	36
$20,000 - $29,999	7.1%	62
$30,000 - $39,999	19.1%	167
$40,000 - $49,999	24.7%	216
$50,000 - $59,999	16.3%	143
$60,000 - $69,999	8.2%	72
$70,000 - $79,999	7.2%	63
$80,000 - $89,999	3.3%	29
$90,000 - $99,999	3.7%	32
$100,000 - $150,000	4.1%	36
More than $150,000	2.3%	20
	answered question	**876**
	skipped question	**1344**

Did you lose your job due to the recession that began December 2007?		
Answer Options	**Response Percent**	**Response Count**
Did not have a job	3.8%	58
Yes	6.5%	98
No	89.7%	1362
	answered question	**1518**
	skipped question	**702**

How long were you employed when the recession hit in December 2007? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Less than 3 months	4.6%	61
3-6 months	4.3%	56
7-11 months	4.1%	54
1-2 years	17.6%	232
3-5 years	14.8%	195
6-10 years	15.3%	201
More than 10 years	39.2%	516
	answered question	**1315**
	skipped question	**905**

What was your home address when the recession hit in December 2007?		
Answer Options	**Response Percent**	**Response Count**
Same address as given previously	72.3%	1333
Different address	27.7%	510
	answered question	**1843**
	skipped question	**377**

Did you rent or own your residence when the recession hit in December 2007? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Rent	12.6%	235
Own	70.3%	1313
Did not pay rent (lived with family or friends)	14.8%	276
Other (please specify)	2.3%	43
	answered question	**1867**
	skipped question	**353**

When compared to pre-Katrina levels, how 'recovered' is your city/town? (Check one)		
Answer Options	**Response Percent**	**Response Count**
100%	8.7%	162
90%	18.9%	353
80%	19.5%	363
70%	19.2%	359
60%	12.8%	239
50%	9.4%	176
40%	5.8%	108
30%	3.8%	70
20%	1.4%	26
10% or less	0.5%	9
	answered question	1865
	skipped question	355

What is your present address?		
Answer Options	**Response Percent**	**Response Count**
Same address as December 2007	77.4%	1414
Different address	22.6%	412
	answered question	1826
	skipped question	394

What is your current employment status? (Select one)		
Answer Options	**Response Percent**	**Response Count**
EMPLOYED	71.3%	1318
Not working but LOOKING FOR A JOB	5.6%	103
Not employed and Not looking for a job because FULL-TIME STUDENT	9.5%	176
Not employed and Not looking for a job because performing DOMESTIC DUTIES	1.7%	31
Not employed and Not looking for a job because RETIRED	10.5%	195
Not employed and Not looking for a job because DISABLED	1.4%	26
	answered question	1849
	skipped question	371

In what sector is your job? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Agriculture, forestry, fishing, and hunting	0.5%	6
Mining, quarrying, and oil and gas extraction	0.2%	2
Construction	2.2%	29
Manufacturing	2.0%	27
Wholesale trade	0.2%	3
Retail trade	4.1%	54
Transportation and warehousing	0.7%	9
Information	1.7%	23
Finance and insurance	3.3%	44
Real estate	0.8%	10
Professional and technical services	7.2%	95
Management of companies and enterprises	1.2%	16
Administration and waste services	0.2%	3
Educational services	44.7%	593
Healthcare and social assistance	9.6%	127
Arts, entertainment, and recreation (includes Casinos)	2.0%	27
Accommodation and food services	2.1%	28
Other services, except public administration	1.7%	23
Public administration	1.7%	22
Military	0.8%	11
Other (please specify)	13.2%	175
	answered question	**1327**
	skipped question	**893**

If currently employed, how are you paid? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Hourly Wage	31.5%	415
Salary	68.5%	902
	answered question	**1317**
	skipped question	**903**

How much are you paid per hour? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Minimum Wage	7.4%	31
$5.16-$7.50	8.6%	36
$7.51-$10.00	19.6%	82
$10.01-$12.00	14.8%	62
$12.01-$15.00	12.7%	53
$15.01-$20.00	14.1%	59
More than $20.00	22.7%	95
	answered question	418
	skipped question	1802

How much is your annual salary? (Check one)		
Answer Options	**Response Percent**	**Response Count**
$19,999 & under	3.8%	33
$20,000 - $29,999	7.9%	68
$30,000 - $39,999	17.2%	149
$40,000 - $49,999	22.8%	197
$50,000 - $59,999	16.9%	146
$60,000 - $69,999	9.3%	80
$70,000 - $79,999	6.5%	56
$80,000 - $89,999	4.4%	38
$90,000 - $99,999	3.9%	34
$100,000 - $150,000	4.7%	41
More than $150,000	2.5%	22
	answered question	864
	skipped question	1356

How long have you been employed in your current job? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Less than 3 months	2.8%	37
3-6 months	3.1%	40
7-11 months	5.6%	73
1-2 years	11.1%	145
3-5 years	20.8%	273
6-10 years	17.5%	230
More than 10 years	39.1%	513
	answered question	1311
	skipped question	909

What is your race? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
White	84.7%	1567
Black	11.9%	220
American Indian and Alaska Native persons	1.2%	22
Asian	1.0%	18
Native Hawaiian or other Pacific Islander	0.2%	3
Two or more races	1.8%	33
Other (please specify)	1.4%	26
	answered question	1850
	skipped question	370

What is your ethnicity?		
Answer Options	**Response Percent**	**Response Count**
Hispanic or Latino	1.3%	22
Not Hispanic	98.7%	1711
	answered question	1733
	skipped question	487

Do you rent or own your residence? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Rent	12.3%	228
Own	73.1%	1352
Do not pay rent (live with family or friends)	12.4%	229
Other (please specify)	2.2%	40
	answered question	1849
	skipped question	371

If you own your home, what is the value of your house, apartment, condo, or mobile home? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Less than $10,000	0.5%	6
$10,000 - $14,999	0.2%	3
$15,000 - $19,999	0.3%	4
$20,000 - $24,999	0.4%	5
$25,000 - $29,999	0.3%	4
$30,000 - $34,999	0.5%	7
$35,000 - $39,999	0.6%	8
$40,000 - $49,999	1.0%	13
$50,000 - $59,999	1.8%	23
$60,000 - $69,999	2.4%	31
$70,000 - $79,999	1.8%	23
$80,000 - $89,999	4.0%	52
$90,000 - $99,999	4.3%	55
$100,000 - $124,999	12.9%	167
$125,000 - $149,999	15.5%	200
$150,000 - $199,999	20.0%	259
$200,000 - $249,999	14.1%	182
$250,000 - $299,999	7.7%	99
$300,000 - $349,999	3.2%	42
$350,000 - $399,999	3.2%	42
$400,000 - $499,999	2.5%	32
$500,000 - $749,999	1.5%	20
$750,000 - $999,999	0.9%	11
$1,000,000 or more	0.5%	6
	answered question	**1294**
	skipped question	**926**

Gender? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Male	32.8%	606
Female	67.2%	1239
	answered question	**1845**
	skipped question	**375**

Number of people in household (do NOT count yourself)?			
Answer Options	**Response Average**	**Response Total**	**Response Count**
18 years or older	1.51	2,603	1680
17 years or younger	1.02	1,124	1099
		answered question	**1723**
		skipped question	**497**

Marital status? (Check one)		
Answer Options	**Response Percent**	**Response Count**
Married	59.8%	1088
Widowed	3.8%	69
Divorced	11.6%	210
Separated	1.7%	30
Never married not living with someone	16.8%	305
Unmarried partner	6.4%	116
	answered question	**1818**
	skipped question	**402**

Highest degree or level of school COMPLETED? (Check one)		
Answer Options	**Response Percent**	**Response Count**
12th grade or less, no diploma	1.7%	31
High school graduate or equivalent	6.2%	115
Some college but no degree	21.0%	387
Associate's degree	12.2%	225
Bachelor's degree	25.4%	468
Master's degree	26.6%	490
Professional degree (MD, DDS, DVM, LLB, JD)	2.6%	47
Doctoral degree (PhD, EdD)	4.2%	78
	answered question	**1841**
	skipped question	**379**

APPENDIX R. BLACK AND WHITE MAPS

APPENDIX R. BLACK AND WHITE MAPS

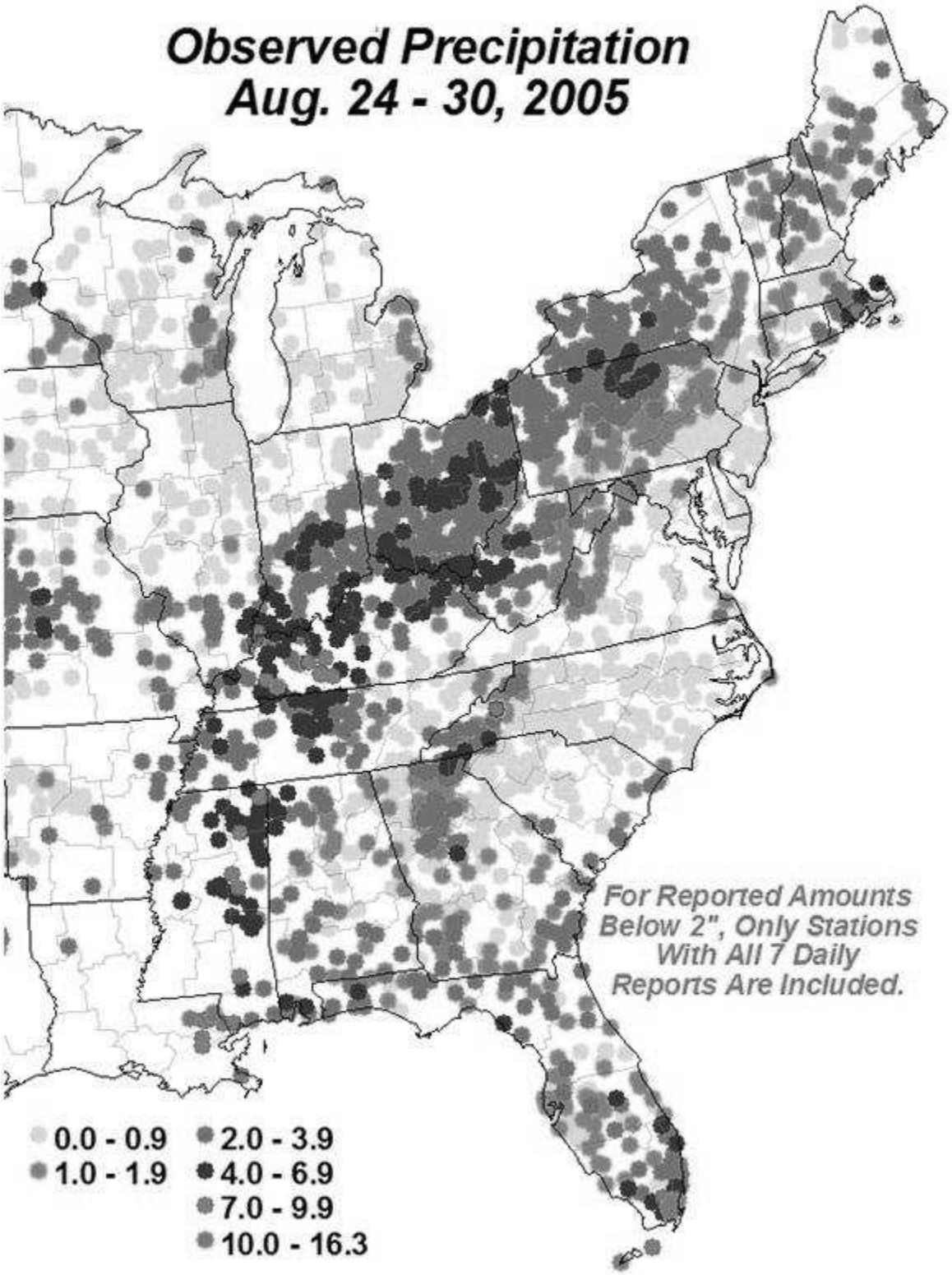

Figure 3.1

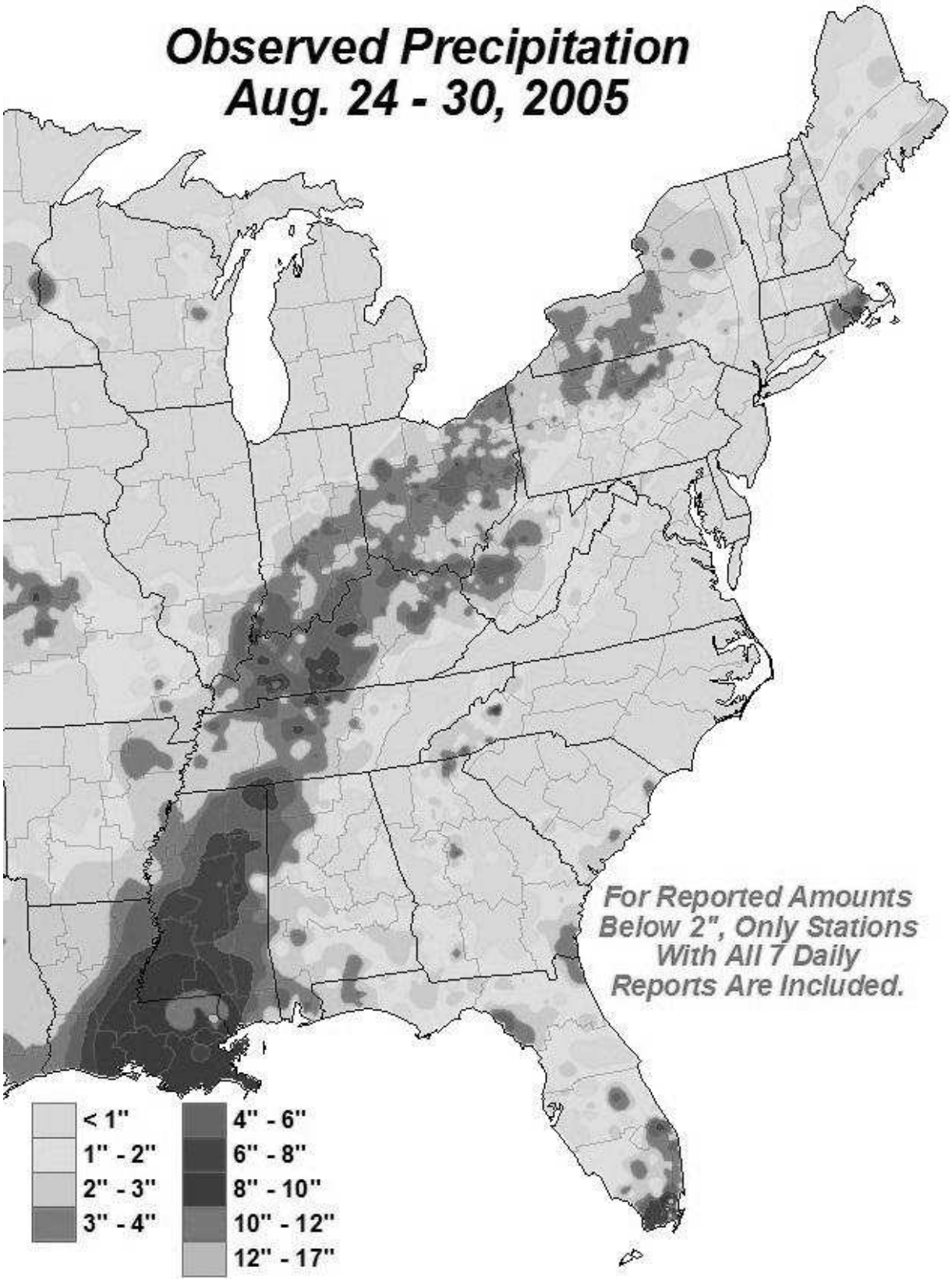
Observed Precipitation
Aug. 24 - 30, 2005
For Reported Amounts Below 2", Only Stations With All 7 Daily Reports Are Included.
< 1"
1" - 2"
2" - 3"
3" - 4"
4" - 6"
6" - 8"
8" - 10"
10" - 12"
12" - 17"

Figure 3.2

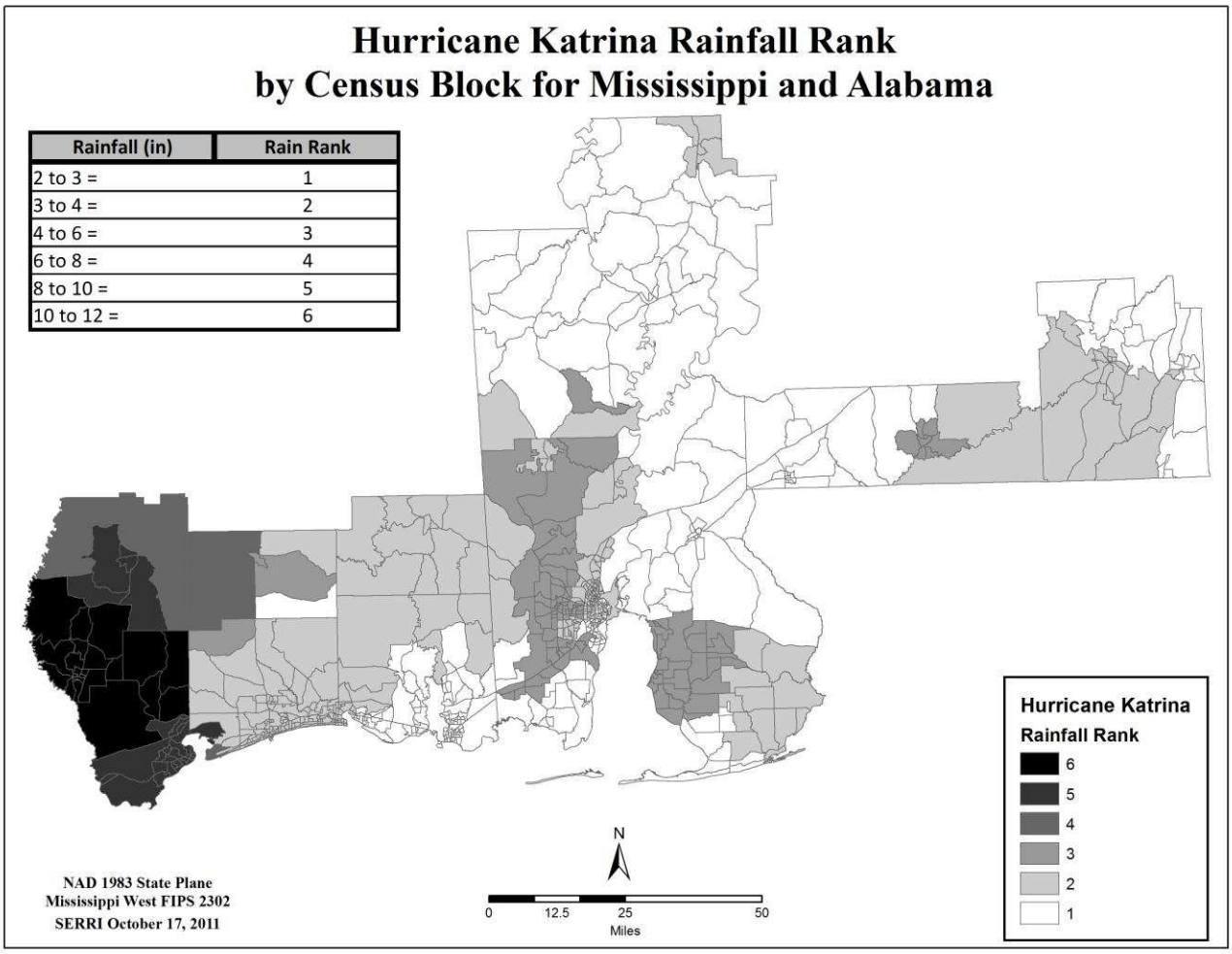
Hurricane Katrina Rainfall Rank
by Census Block for Mississippi and Alabama
Rainfall (in)
Rain Rank
2 to 3 = 1
3 to 4 = 2
4 to 6 = 3
6 to 8 = 4
8 to 10 = 5
10 to 12 = 6
Hurricane Katrina
Rainfall Rank
6
5
4
3
2
1
N
0
12.5
25
50
Miles
NAD 1983 State Plane
Mississippi West FIPS 2302
SERRI October 17, 2011

Figure 3.3

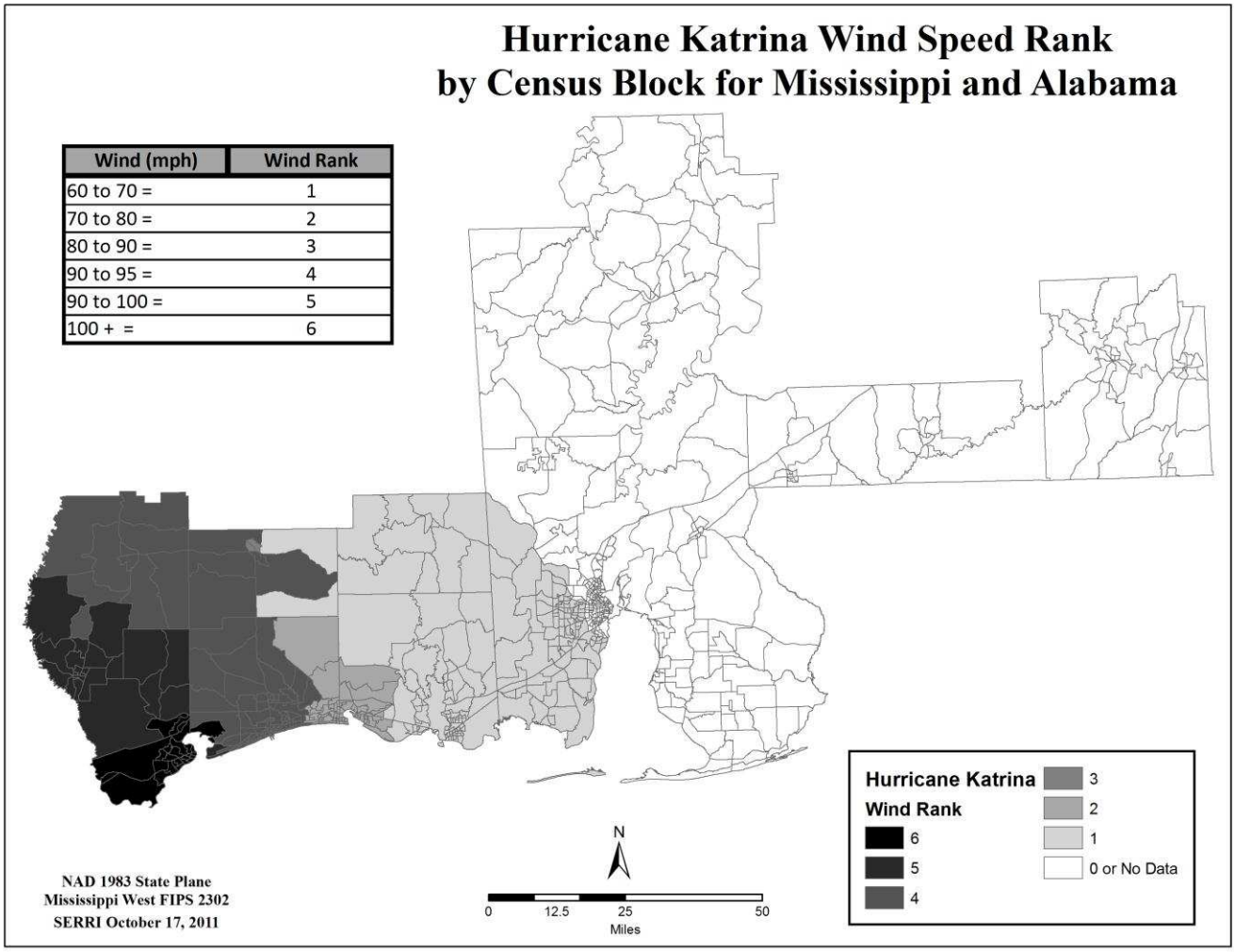
Hurricane Katrina Wind Speed Rank
by Census Block for Mississippi and Alabama
Wind (mph)
Wind Rank
60 to 70 = 1
70 to 80 = 2
80 to 90 = 3
90 to 95 = 4
90 to 100 = 5
100 + = 6
NAD 1983 State Plane
Mississippi West FIPS 2302
SERRI October 17, 2011
N
0
12.5
25
50
Miles
Hurricane Katrina
Wind Rank
6
5
4
3
2
1
0 or No Data

Figure 3.5

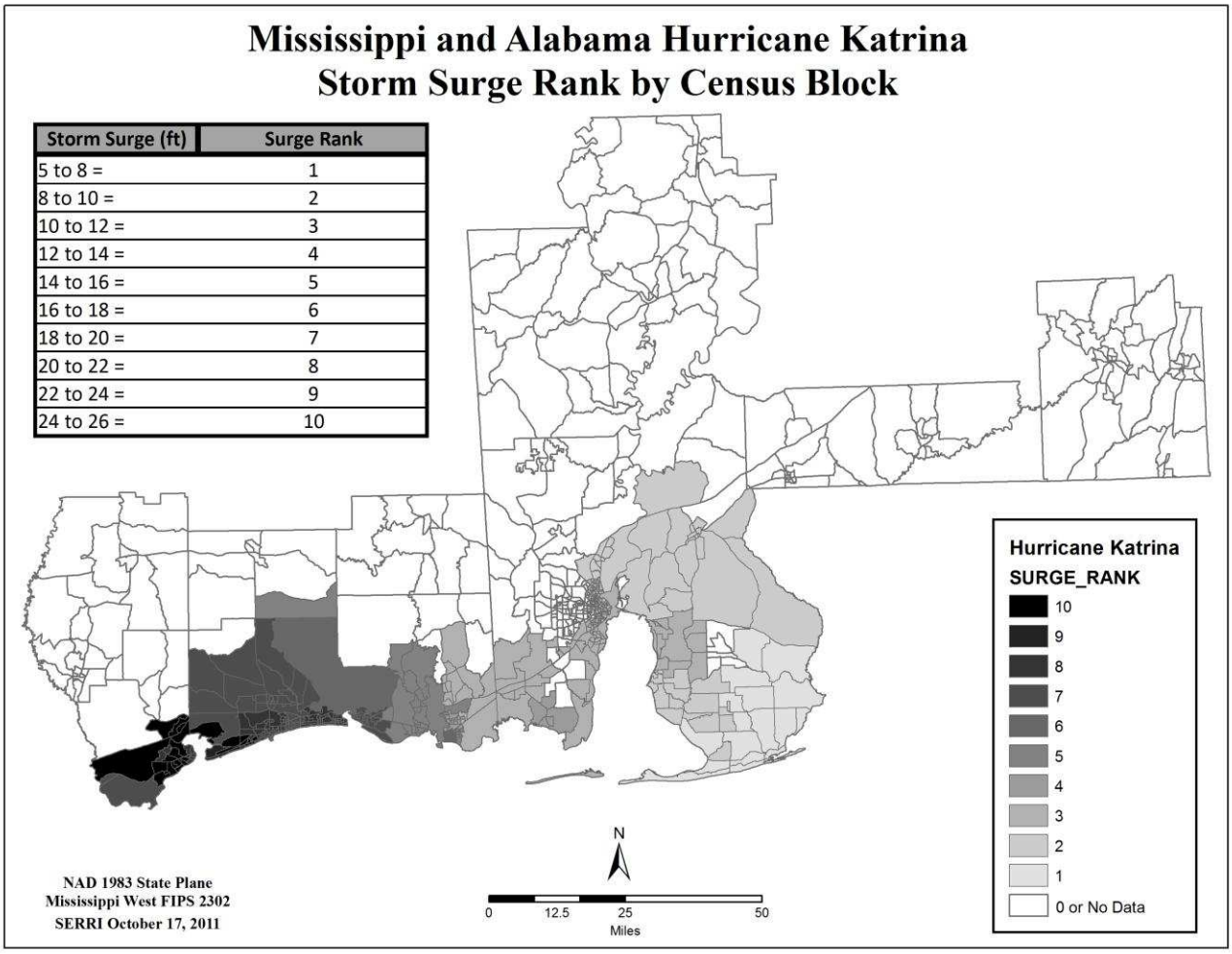
Mississippi and Alabama Hurricane Katrina
Storm Surge Rank by Census Block
Storm Surge (ft) | Surge Rank
5 to 8 = 1
8 to 10 = 2
10 to 12 = 3
12 to 14 = 4
14 to 16 = 5
16 to 18 = 6
18 to 20 = 7
20 to 22 = 8
22 to 24 = 9
24 to 26 = 10
Hurricane Katrina
SURGE_RANK
10
9
8
7
6
5
4
3
2
1
0 or No Data
N
0
12.5
25
50
Miles
NAD 1983 State Plane
Mississippi West FIPS 2302
SERRI October 17, 2011

Figure 3.7

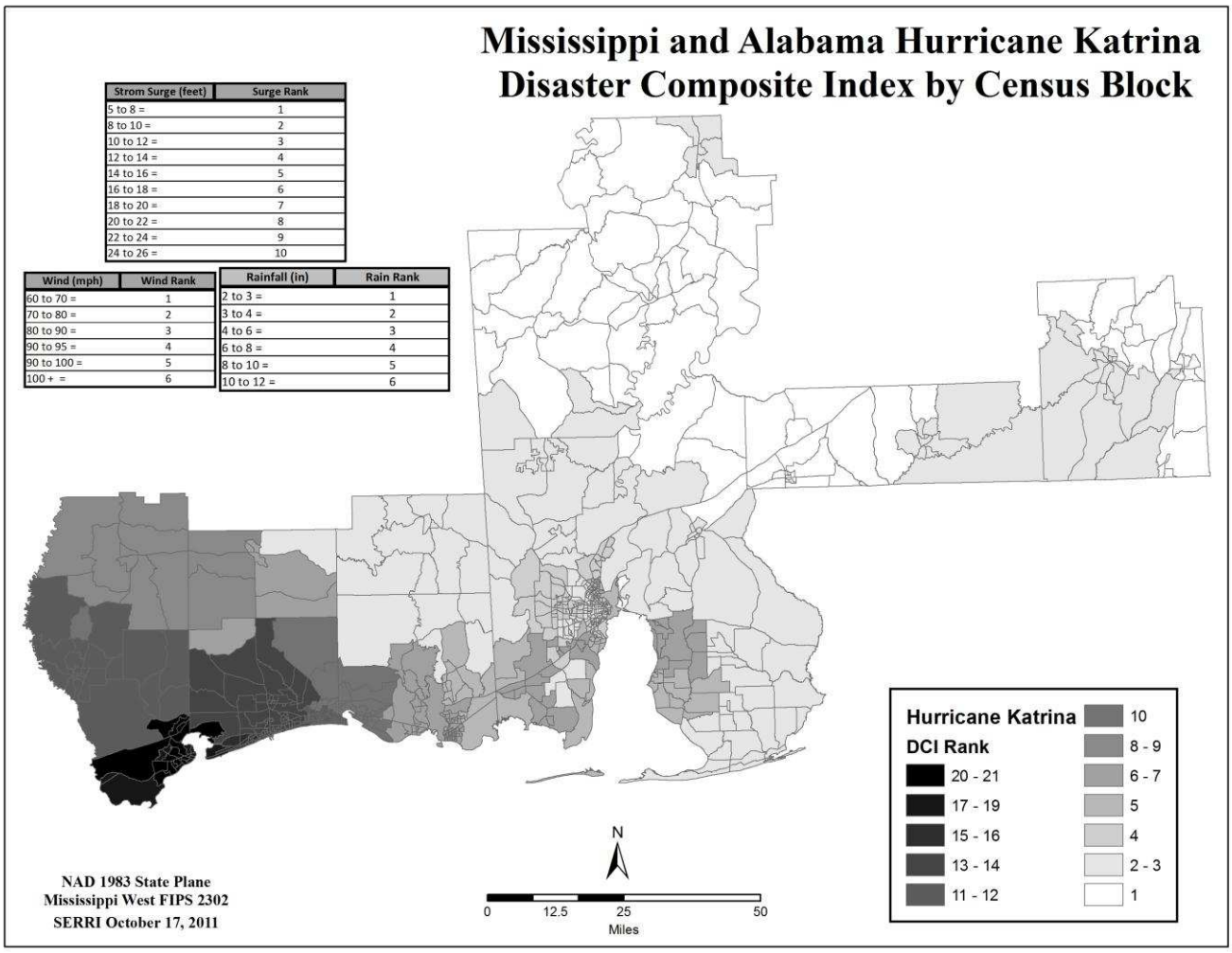
Mississippi and Alabama Hurricane Katrina
Disaster Composite Index by Census Block
Strom Surge (feet) | Surge Rank
5 to 8 = 1
8 to 10 = 2
10 to 12 = 3
12 to 14 = 4
14 to 16 = 5
16 to 18 = 6
18 to 20 = 7
20 to 22 = 8
22 to 24 = 9
24 to 26 = 10
Wind (mph) | Wind Rank
60 to 70 = 1
70 to 80 = 2
80 to 90 = 3
90 to 95 = 4
90 to 100 = 5
100 + = 6
Rainfall (in) | Rain Rank
2 to 3 = 1
3 to 4 = 2
4 to 6 = 3
6 to 8 = 4
8 to 10 = 5
10 to 12 = 6
Hurricane Katrina
DCI Rank
20 - 21
17 - 19
15 - 16
13 - 14
11 - 12
10
8 - 9
6 - 7
5
4
2 - 3
1
N
0
12.5
25
50
Miles
NAD 1983 State Plane
Mississippi West FIPS 2302
SERRI October 17, 2011

Figure 3.8

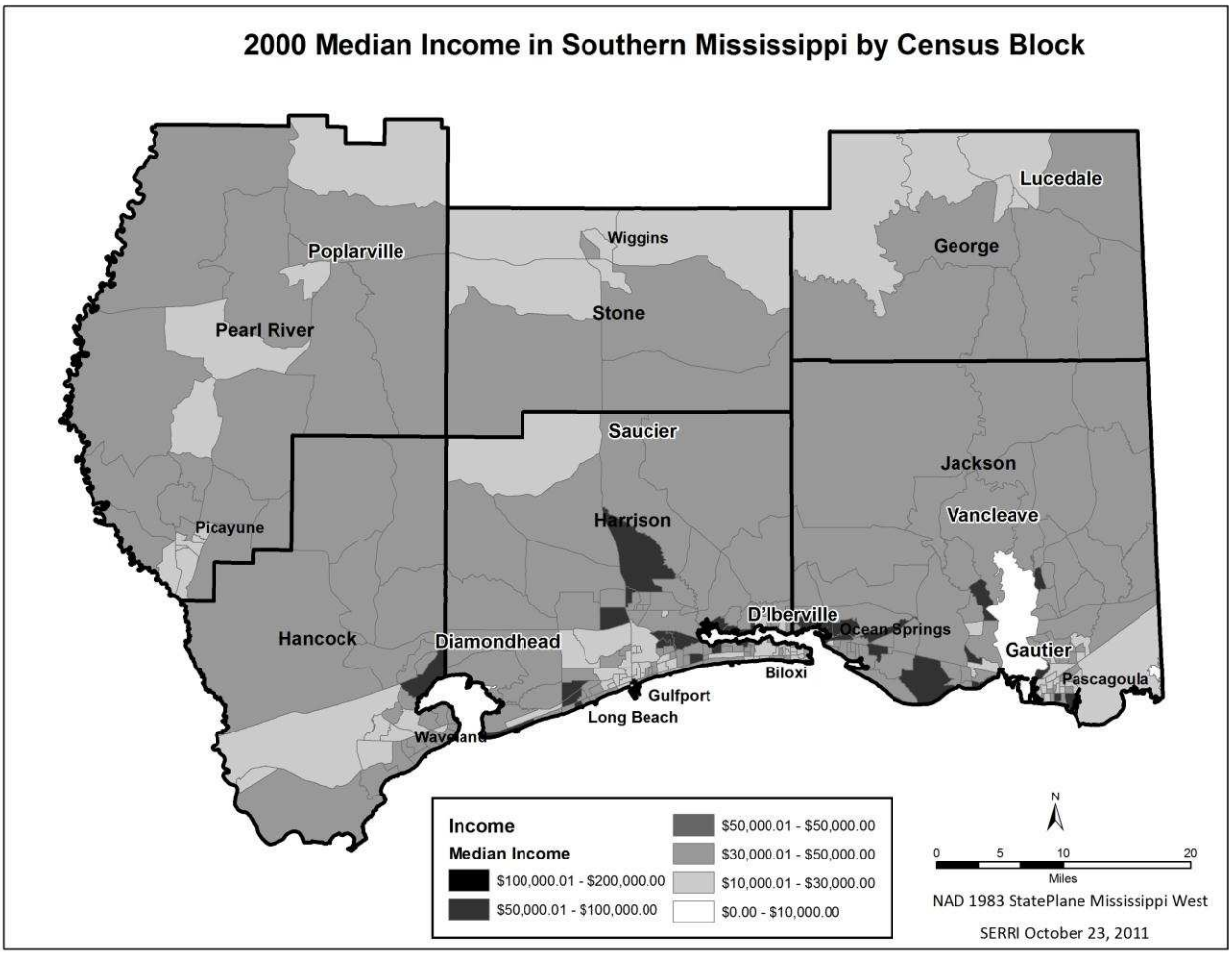
2000 Median Income in Southern Mississippi by Census Block
Lucedale
George
Wiggins
Poplarville
Stone
Pearl River
Saucier
Jackson
Vancleave
Picayune
Harrison
D'Iberville
Ocean Springs
Hancock
Diamondhead
Gautier
Biloxi
Pascagoula
Gulfport
Long Beach
Waveland
Income
Median Income
$100,000.01 - $200,000.00
$50,000.01 - $100,000.00
$50,000.01 - $50,000.00
$30,000.01 - $50,000.00
$10,000.01 - $30,000.00
$0.00 - $10,000.00
N
0 5 10 20
Miles
NAD 1983 StatePlane Mississippi West
SERRI October 23, 2011

Figure 4.3

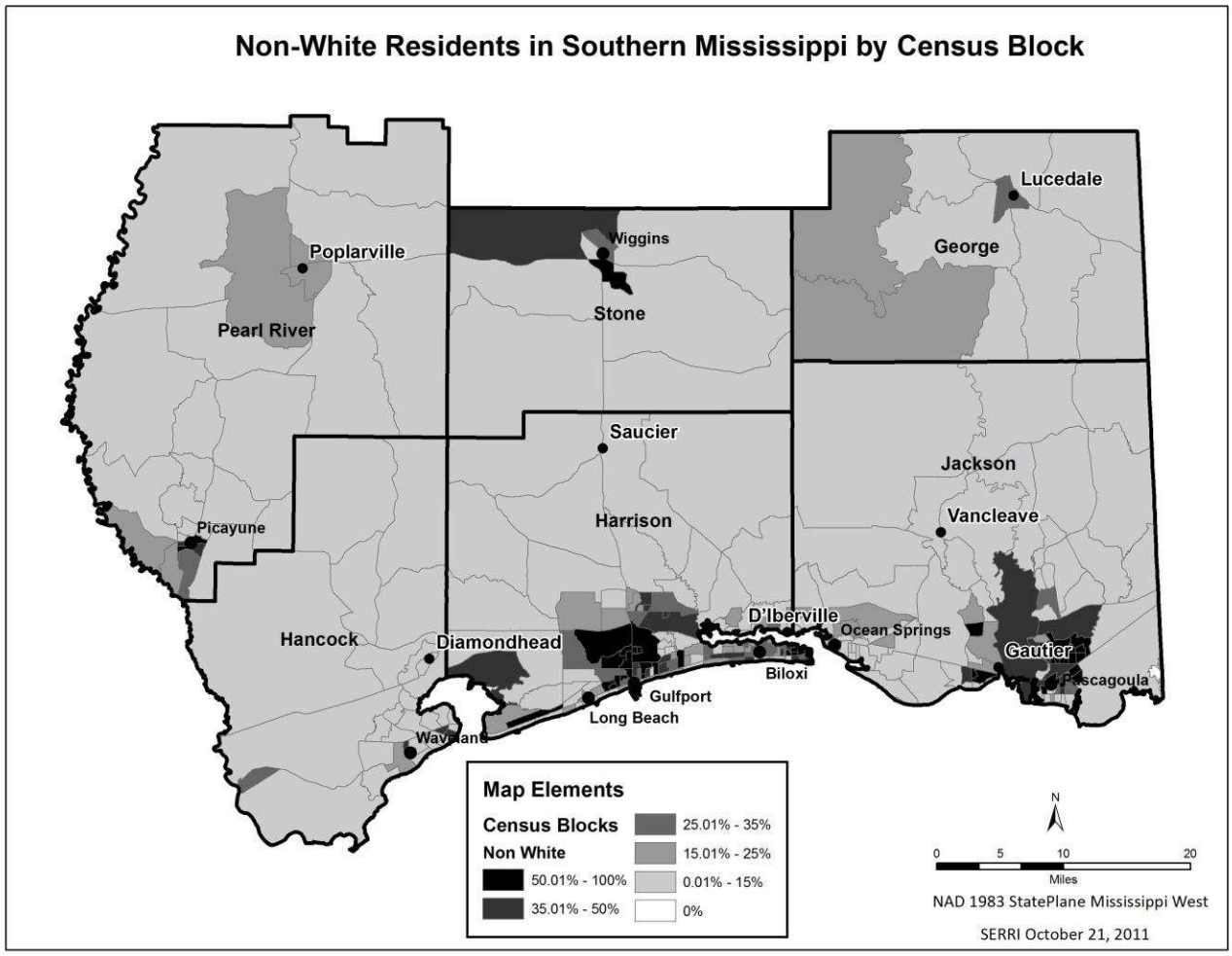
Non-White Residents in Southern Mississippi by Census Block
Lucedale
George
Wiggins
Poplarville
Stone
Pearl River
Saucier
Jackson
Harrison
Vancleave
Picayune
D'Iberville
Ocean Springs
Hancock
Diamondhead
Gautier
Biloxi
Pascagoula
Gulfport
Long Beach
Waveland
Map Elements
Census Blocks
Non White
50.01% - 100%
35.01% - 50%
25.01% - 35%
15.01% - 25%
0.01% - 15%
0%
N
0 5 10 20
Miles
NAD 1983 StatePlane Mississippi West
SERRI October 21, 2011

Figure 4.4

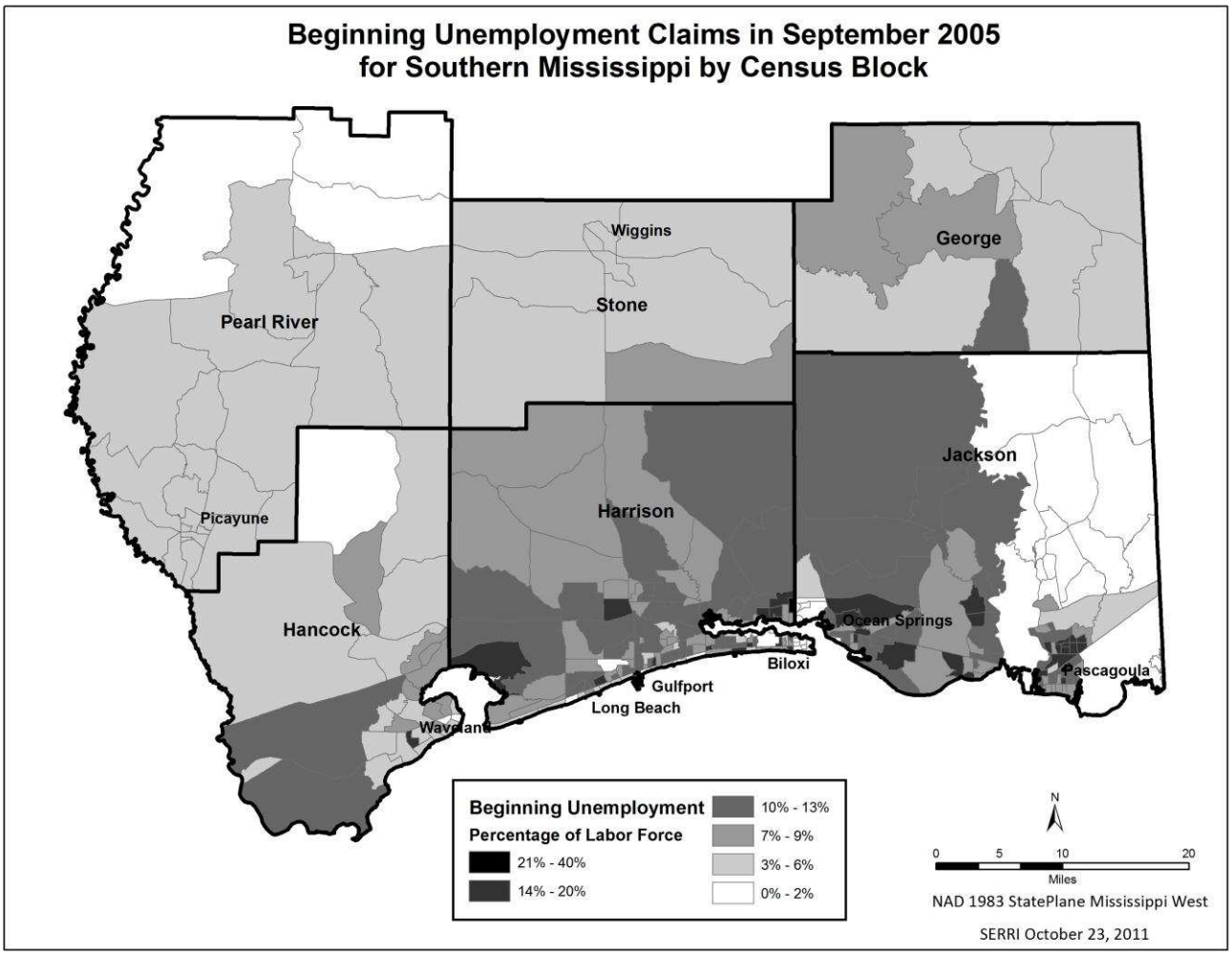
Beginning Unemployment Claims in September 2005
for Southern Mississippi by Census Block
Wiggins
George
Stone
Pearl River
Jackson
Harrison
Picayune
Hancock
Ocean Springs
Biloxi
Pascagoula
Gulfport
Long Beach
Waveland
Beginning Unemployment
Percentage of Labor Force
21% - 40%
14% - 20%
10% - 13%
7% - 9%
3% - 6%
0% - 2%
N
0
5
10
20
Miles
NAD 1983 StatePlane Mississippi West
SERRI October 23, 2011

Figure 4.5A

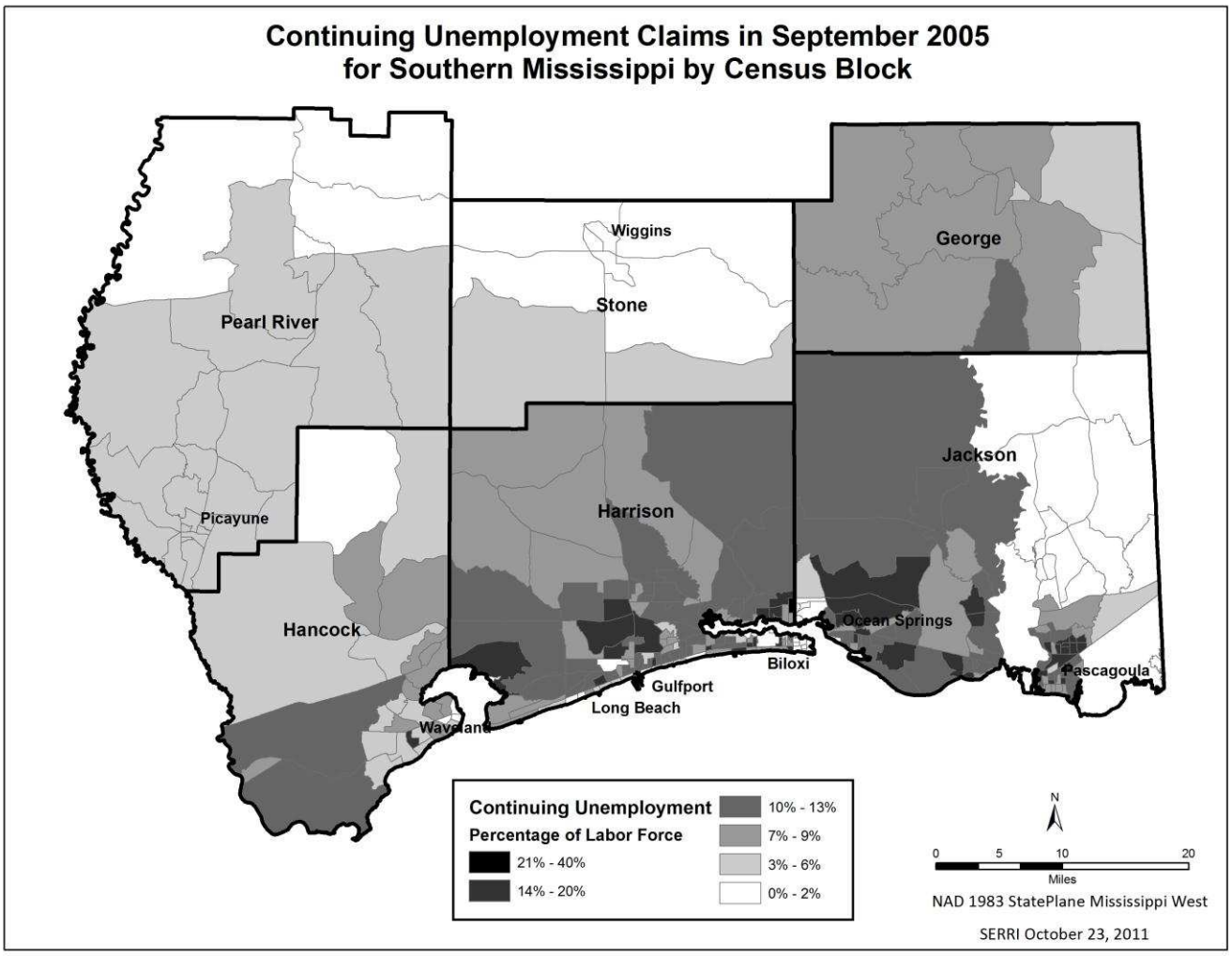
Continuing Unemployment Claims in September 2005
for Southern Mississippi by Census Block
Wiggins
George
Stone
Pearl River
Jackson
Harrison
Picayune
Hancock
Ocean Springs
Biloxi
Pascagoula
Gulfport
Long Beach
Waveland
Continuing Unemployment
Percentage of Labor Force
21% - 40%
14% - 20%
10% - 13%
7% - 9%
3% - 6%
0% - 2%
N
0
5
10
20
Miles
NAD 1983 StatePlane Mississippi West
SERRI October 23, 2011

Figure 4.5B

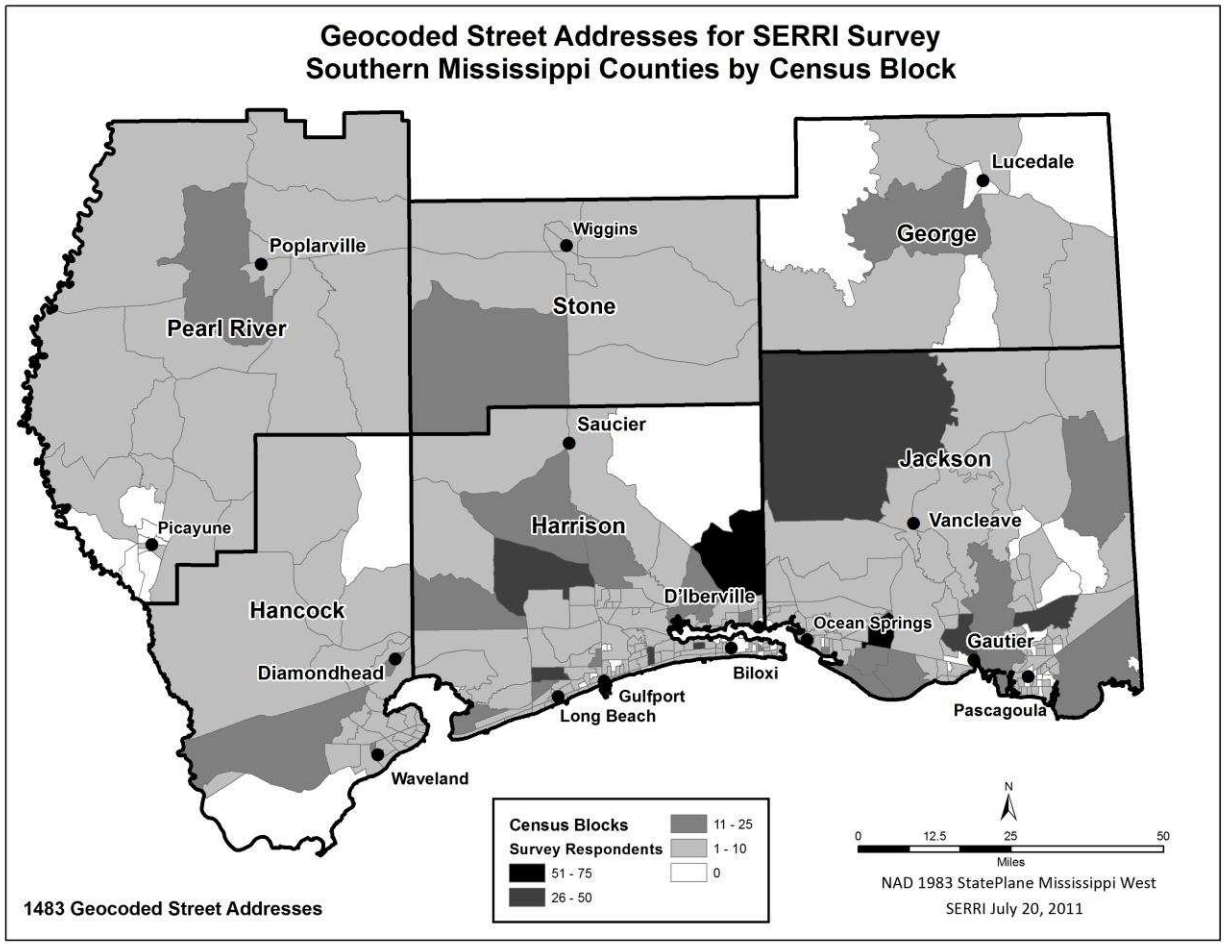
Geocoded Street Addresses for SERRI Survey
Southern Mississippi Counties by Census Block
Lucedale
George
Wiggins
Poplarville
Stone
Pearl River
Saucier
Jackson
Vancleave
Picayune
Harrison
D'Iberville
Hancock
Ocean Springs
Gautier
Diamondhead
Biloxi
Gulfport
Long Beach
Pascagoula
Waveland
Census Blocks
Survey Respondents
51 - 75
26 - 50
11 - 25
1 - 10
0
N
0
12.5
25
50
Miles
NAD 1983 StatePlane Mississippi West
SERRI July 20, 2011
1483 Geocoded Street Addresses

Figure 6.2

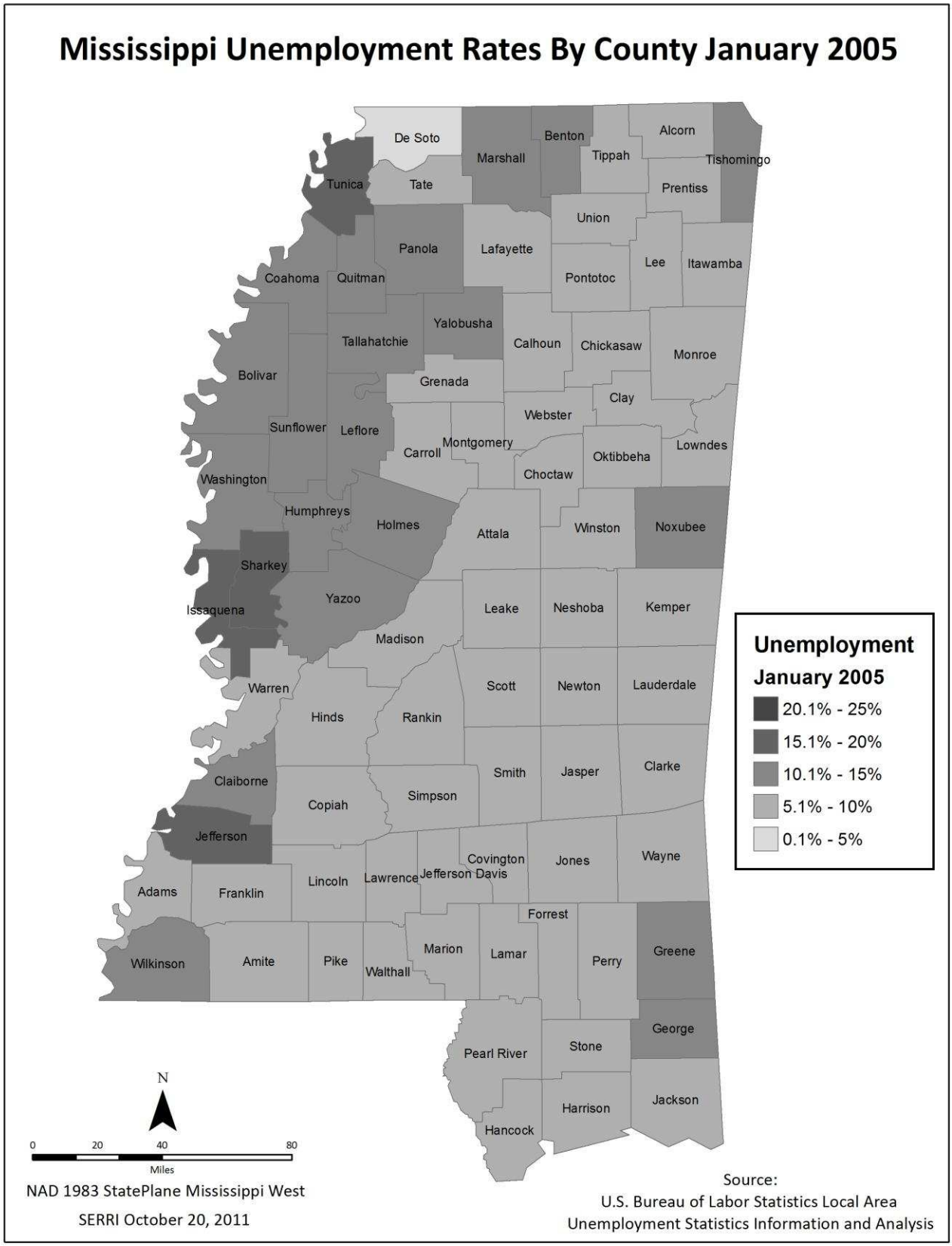
Mississippi Unemployment Rates By County January 2005
De Soto
Benton
Alcorn
Marshall
Tippah
Tishomingo
Tunica
Tate
Prentiss
Union
Panola
Lafayette
Lee
Itawamba
Coahoma
Quitman
Pontotoc
Yalobusha
Tallahatchie
Calhoun
Chickasaw
Monroe
Bolivar
Grenada
Clay
Webster
Sunflower
Leflore
Carroll
Montgomery
Oktibbeha
Lowndes
Choctaw
Washington
Humphreys
Holmes
Attala
Winston
Noxubee
Sharkey
Yazoo
Issaquena
Leake
Neshoba
Kemper
Madison
Warren
Scott
Newton
Lauderdale
Hinds
Rankin
Smith
Jasper
Clarke
Claiborne
Copiah
Simpson
Jefferson
Covington
Jones
Wayne
Adams
Franklin
Lincoln
Lawrence
Jefferson Davis
Forrest
Wilkinson
Amite
Pike
Walthall
Marion
Lamar
Perry
Greene
George
Pearl River
Stone
Harrison
Jackson
Hancock
Unemployment
January 2005
20.1% - 25%
15.1% - 20%
10.1% - 15%
5.1% - 10%
0.1% - 5%
N
0
20
40
80
Miles
NAD 1983 StatePlane Mississippi West
SERRI October 20, 2011
Source:
U.S. Bureau of Labor Statistics Local Area
Unemployment Statistics Information and Analysis

Figure 7.2

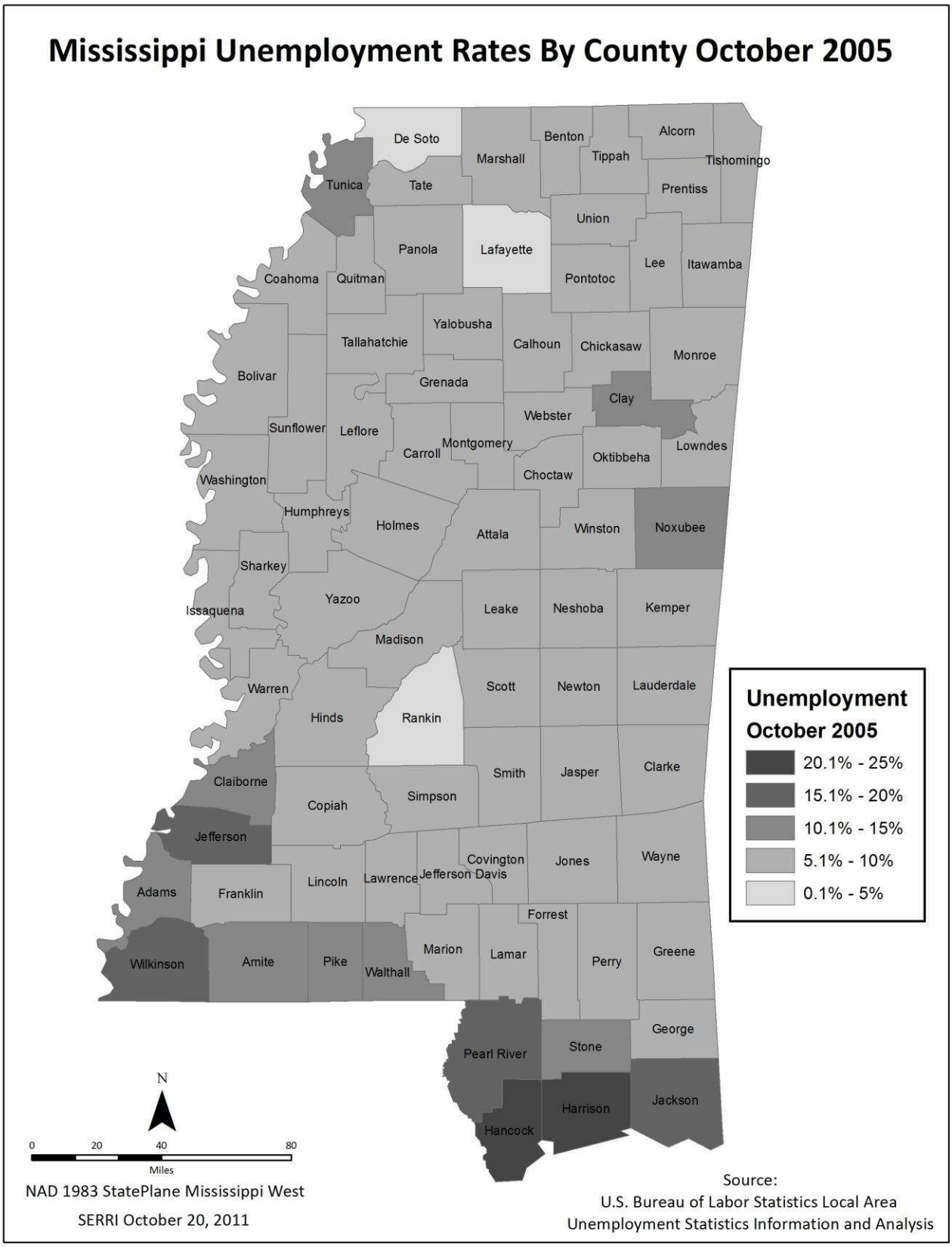
Mississippi Unemployment Rates By County October 2005
De Soto
Benton
Alcorn
Marshall
Tippah
Tishomingo
Tunica
Tate
Prentiss
Union
Panola
Lafayette
Lee
Itawamba
Coahoma
Quitman
Pontotoc
Yalobusha
Tallahatchie
Calhoun
Chickasaw
Monroe
Bolivar
Grenada
Clay
Webster
Sunflower
Leflore
Montgomery
Carroll
Oktibbeha
Lowndes
Washington
Choctaw
Humphreys
Holmes
Attala
Winston
Noxubee
Sharkey
Yazoo
Issaquena
Leake
Neshoba
Kemper
Madison
Warren
Scott
Newton
Lauderdale
Hinds
Rankin
Smith
Jasper
Clarke
Claiborne
Copiah
Simpson
Jefferson
Covington
Jones
Wayne
Adams
Franklin
Lincoln
Lawrence
Jefferson Davis
Forrest
Wilkinson
Amite
Pike
Walthall
Marion
Lamar
Perry
Greene
George
Pearl River
Stone
Harrison
Jackson
Hancock
Unemployment
October 2005
20.1% - 25%
15.1% - 20%
10.1% - 15%
5.1% - 10%
0.1% - 5%
N
0
20
40
80
Miles
NAD 1983 StatePlane Mississippi West
SERRI October 20, 2011
Source:
U.S. Bureau of Labor Statistics Local Area
Unemployment Statistics Information and Analysis

Figure 7.3

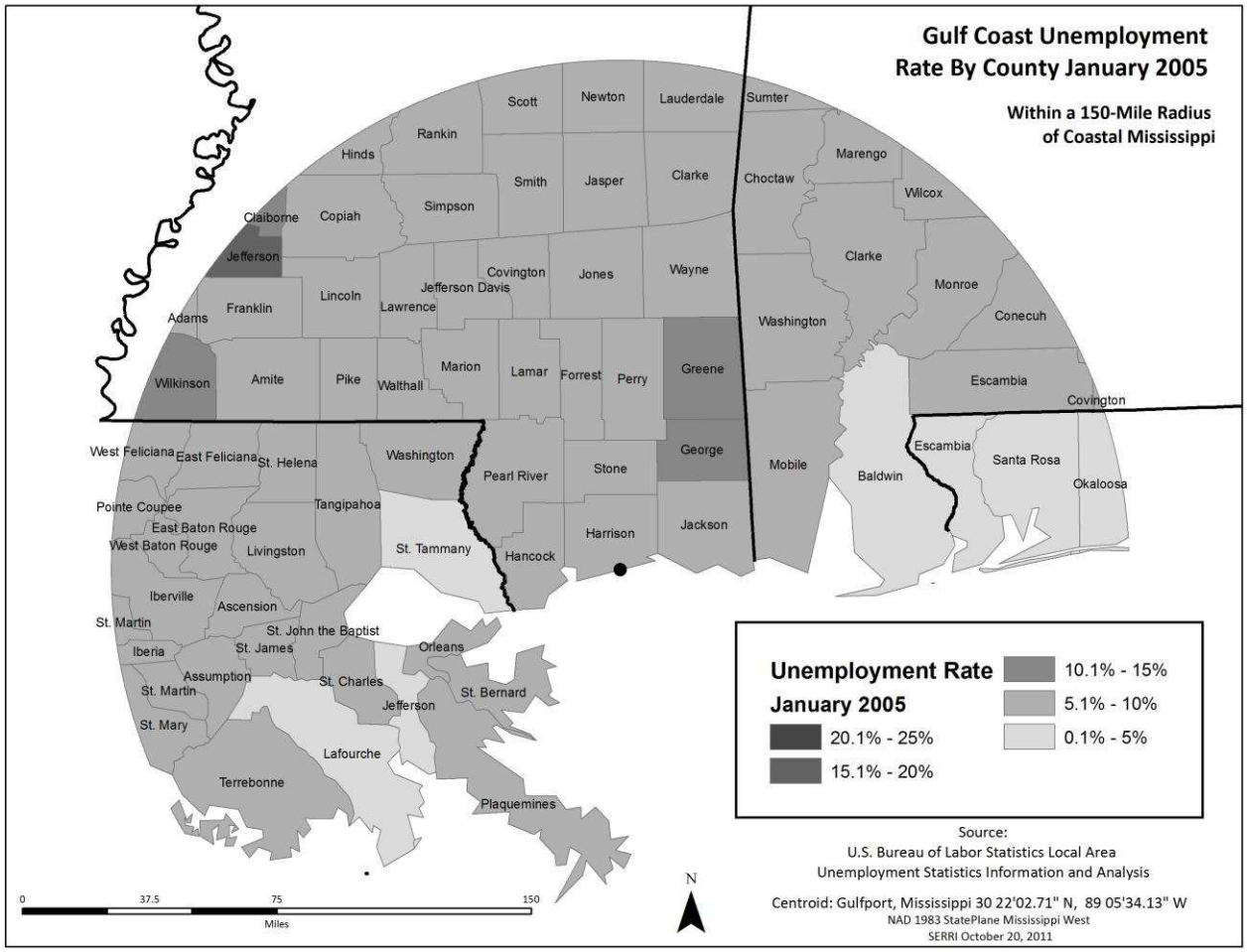
Gulf Coast Unemployment Rate By County January 2005
Within a 150-Mile Radius of Coastal Mississippi
Scott
Newton
Lauderdale
Sumter
Rankin
Hinds
Smith
Jasper
Clarke
Choctaw
Marengo
Wilcox
Simpson
Claiborne
Copiah
Jefferson
Covington
Jones
Wayne
Clarke
Monroe
Jefferson Davis
Lincoln
Lawrence
Franklin
Adams
Washington
Conecuh
Wilkinson
Amite
Pike
Walthall
Marion
Lamar
Forrest
Perry
Greene
Escambia
Covington
West Feliciana
East Feliciana
St. Helena
Washington
Pearl River
Stone
George
Mobile
Escambia
Santa Rosa
Baldwin
Okaloosa
Pointe Coupee
Tangipahoa
East Baton Rouge
West Baton Rouge
Livingston
St. Tammany
Hancock
Harrison
Jackson
Iberville
Ascension
St. Martin
St. John the Baptist
St. James
Orleans
Iberia
Assumption
St. Charles
St. Bernard
St. Martin
Jefferson
St. Mary
Lafourche
Terrebonne
Plaquemines
Unemployment Rate January 2005
20.1% - 25%
15.1% - 20%
10.1% - 15%
5.1% - 10%
0.1% - 5%
N
0
37.5
75
150
Miles
Source:
U.S. Bureau of Labor Statistics Local Area Unemployment Statistics Information and Analysis
Centroid: Gulfport, Mississippi 30 22'02.71" N, 89 05'34.13" W
NAD 1983 StatePlane Mississippi West
SERRI October 20, 2011

Figure 7.4

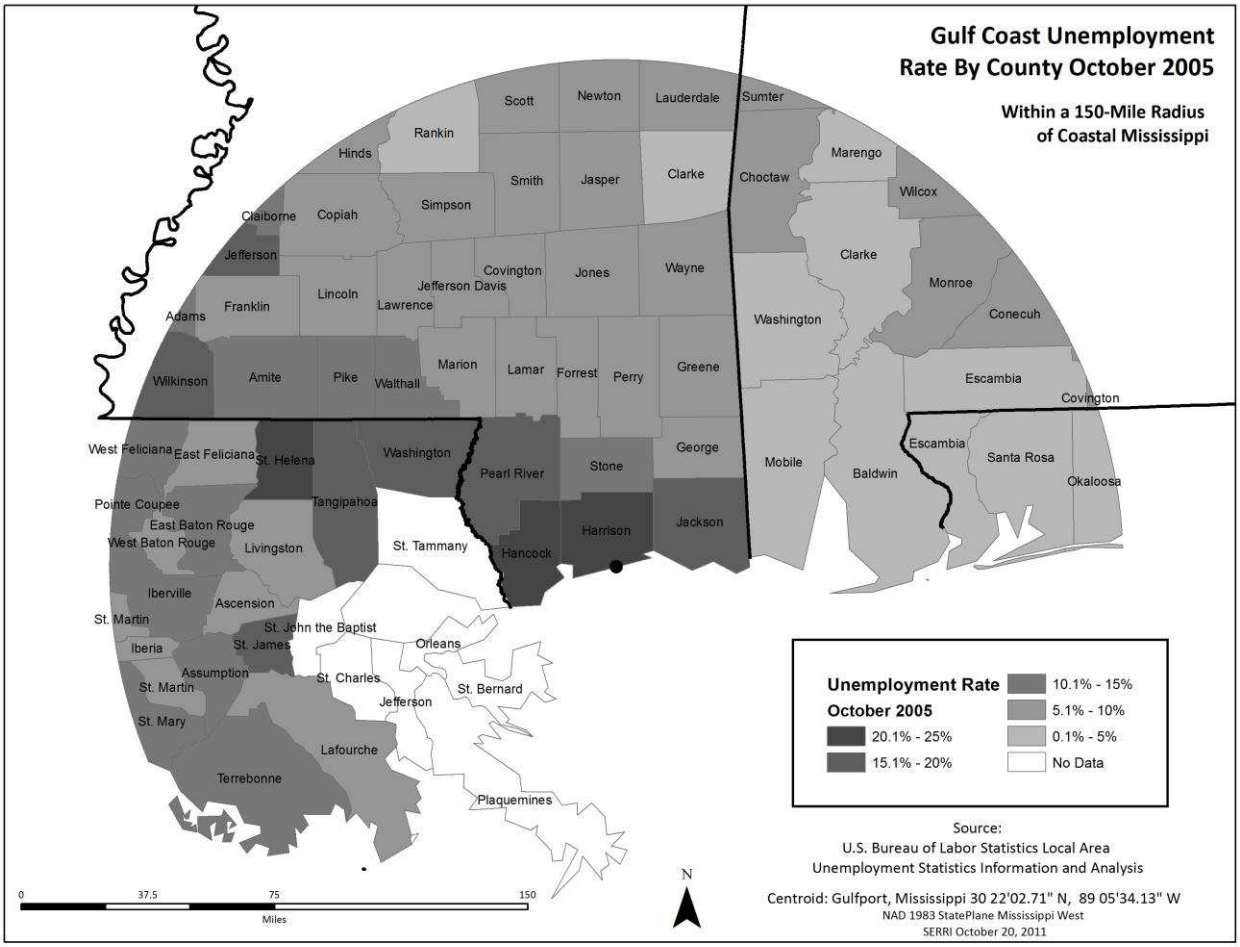
Gulf Coast Unemployment Rate By County October 2005
Within a 150-Mile Radius of Coastal Mississippi
Scott
Newton
Lauderdale
Sumter
Rankin
Hinds
Smith
Jasper
Clarke
Choctaw
Marengo
Wilcox
Simpson
Claiborne
Copiah
Jefferson
Covington
Jones
Wayne
Clarke
Monroe
Jefferson Davis
Lincoln
Lawrence
Franklin
Adams
Washington
Conecuh
Wilkinson
Amite
Pike
Walthall
Marion
Lamar
Forrest
Perry
Greene
Escambia
Covington
West Feliciana
East Feliciana
St. Helena
Washington
Pearl River
Stone
George
Escambia
Santa Rosa
Mobile
Baldwin
Okaloosa
Pointe Coupee
Tangipahoa
Harrison
Jackson
East Baton Rouge
West Baton Rouge
Livingston
St. Tammany
Hancock
Iberville
Ascension
St. Martin
St. John the Baptist
Orleans
Iberia
St. James
Assumption
St. Charles
St. Bernard
St. Martin
Jefferson
St. Mary
Lafourche
Terrebonne
Plaquemines
Unemployment Rate October 2005
20.1% - 25%
15.1% - 20%
10.1% - 15%
5.1% - 10%
0.1% - 5%
No Data
Source:
U.S. Bureau of Labor Statistics Local Area Unemployment Statistics Information and Analysis
Centroid: Gulfport, Mississippi 30 22'02.71" N, 89 05'34.13" W
NAD 1983 StatePlane Mississippi West
SERRI October 20, 2011
0
37.5
75
150
Miles
N

Figure 7.5

APPENDIX S. REVIEWERS' COMMENTS

Appendix S.1. Reviewers' Comments- Dr. Benjamin Thomas

Final Report (Dated 2 September 2011)
Modeling Micro-Economic Resilience and Restoration after a Large Scale Catastrophe: An Analysis of the Gulf Coast after Katrina
Comments on the Final Report by Ben Thomas (Phone: 865-574-5438; Email: thomasbjr@ornl.gov)
1 October 2011

TABLE OF CONTENTS

Page iii – May want to confirm the spelling of John's last name. By the way, thanks for the kind remarks.

Page v – vii: The Table of Contents have numerous errors. Several page numbers are incorrect. Section 3.3 (Interview Findings) is missing. Section 3.3.1 should be "IMPACTS AND LEVEL OF DESTRUCTION". Section 3.3.8 should be "POPULATION CHANGES AND SHIFTS". Section 3.4 is named "Interview Findings" on page 36 rather than "DISCUSSION" as shown in the Table of Contents. Section 4.3.1 should be "PREPARATIONS FOR AND STORM SURVIVAL" based on title used on page 43. Section 4.3.2 on page 45 is titled "Challenges in the Immediate Aftermath of the Storm". Section 5 should be "SURVEYS" based on the title used on page 52. Similar title corrections are needed for Section 5.2.2, 5.2.3, 5.3.2, 6.1.1, 6.2, 8.1.1, and 8.1.5. Also need to fix the page numbers for the Appendices. Each appendix should have its own page number sequence (e.g., A-1, B-1, C-1, etc.). Observe some Sections have the same name such as Section 6.2.1 and Section 7.3 are both named "Data". Also, Section 6.2.2 is named "HAZARD MODELS" while Section 6.3 is named "HAZARD MODELING". Seems a bit confusing.

LIST OF FIGURES & LIST OF TABLES

Page ix –xi: There are mistakes in the page numbers and the names for the List of Figures.

Page xiii: There are mistakes in the page numbers and the names for the List of Tables.

Page xiii – xviii: The page numbers are missing.

EXECUTIVE SUMMARY

Page xviii: It would be nice to see the Executive Summary expanded. In the 5th sentence, it would be nice to clarify "social networking". Also in the 5th sentence, "developing" should perhaps be "develop".

Regarding the 5th sentence, are you really analyzing the efficacy of disaster response or disaster recovery? The last sentence appears to lack clarity. Having read the report, I better understand what "provision of models" mean but for someone reading only the Executive Summary, the term "models" is not very clear. Perhaps it would be good to further clarify the scope of "models" being spoken of.

SECTION 1 - INTRODUCTION

Page 1: The reference to RA-9 would be meaningless to most readers. Suggest removing it.
Page 1: 2nd Paragraph – Suggest using the current name of Infrastructure Protection and Disaster Management Division rather than Infrastructure/Geophysical Division". Suggest checking the DHS S&T website to better describe the mission of the Infrastructure Protection and Disaster Management Division.
Page 1: 3rd Paragraph – Suggest rewording for better clarity the sentence that begins with "The communities between".
Page 1: 4th Paragraph – the last sentence appears to be pretty strong – especially the phrase "if ever".
Page 1: Section 1.1 – Suggest revising the paragraph for better clarity.
Page 2: Section 1.1.1 – The phrase "determined the impact of the disaster" appears so broad and unspecified. Would it be better to say "determined the impact of Hurricane Katrina". Also, all disasters are both geographical and temporal in nature. Hence, what is the point of the statement?
Page 2: Section 1.1.1. – It is difficult to see how the content of the paragraph addresses the title of Section 1.1.1. It appears there is no real substance in Section 1.1.1.
Page 2: Section 1.1.2 – The first paragraph in the section begins with the phrase "With the data we answer". The question that comes to mind is "what data" is being spoken of here? Why is the section titled "Field Collection of New Data"? What is the new data? What is the old or existing data?
Page 3: Section 1.1.2 – In my opinion, I would suggest finding a better term than "elite" . Some leaders are not always elite, and some elite are not always leaders.
Page 3: Section 1.1.2 – 1st paragraph – 2nd to last sentence – Change "does it exist" to "does not exist".
Page 3: Section 1.1.3 – 1st paragraph – What is a hazard model? What is "a model that estimates the impact of hypothetical disasters"?
Page 3: Section 1.1.3 – 2nd paragraph – What does the first sentence mean?
Page 4: Section 1.1.3 – The last two paragraphs are confusing or too far in the weeds for an Introductory Section.
Page 4: Section 1.2 – The paragraph refers to "a model" in the 4th sentence; then to "this model" in the 5th sentence; and then to "these models" in the 6th sentence. This is confusing. Is there a model, a specific model, or several models?

SECTION 2 – DISASTER COMPOSITE INDEX

Page 4 – Section 2.1 – 1st paragraph – How do you "measure the extent of the damage"?
Page 4 – Last line – Change "the DCI though presentations" to "the DCI through presentations".
Page 5 – Top line – How do you replicate the DCI in LA following Hurricane Katrina if this has not been done before?
Page 5 – Section 2.2 – Should not NWS/NOAA be the official holders of meterological data? What is meant by "the primary data to create the Disaster Composite Index"? What would the primary data be?

Page 5 – Section 2.2. – 2nd to last sentence in paragraph – Change "that that" to "that".
Page 5 – Section 2.3.1 – Do not see the polygons being referenced in Figures 2.1 and 2.2.
Page 6 – Difficult to distinguish the colors … what are the units for each range (assume inches) … What do the words in red mean?
Page 7 – What is the difference between Figures 2.1 and 2.2? What information is being described in Figure 2.2 that is not described in Figure 2.1? Assume the units are inches. What does the text in red mean?
Page 8 – Figure 2.3 – Difficult to distinguish between 4, 5, and 6. Should add the color scheme to the table in the figure.
Page 8 – Bottom line – Suggest changing "see Figure 2.4 below" to "see Figure 2.4".
Page 9 – Legend in Figure 2.4 is difficult to read.
Page 10 – There is no reference to Figure 2.5 in the discussion. Similar thoughts are with Figure 2.3.
Page 10 – Section 2.3.3 – Figure 2.7 is FEMA High Water Marks Data Points rather than NOAA data.
Page 11 – Figure 2.6 - The color schemes are difficult to separate.
Page 12 – First bullet is not clear.
Page 12 – Second bullet – not clear how Figure 2.2 applies.
Page 13 – Section 2.4 – Correct the 3rd sentence.
Page 14 - Table 2.1 was not clear to me – not clear how the numbers in the table are calculated or generated.
Page 14 – Last line – Suggest changing "Figure 2.9 below" to "Figure 2.9".
Page 15 – Figure 2.9 – Color schemes are not easily distinguishable.

SECTION 3 – INTERVIEWS

Page 16 – It would be nice to consider categorizing the bullets. That would help the reader further comprehend the information.
Page 17 – Section 3.1 – Expected the literature review to be about the subject matter of the project rather than about the approach or methods for conducting interviews. Although this is nice, it seems more appropriate for an appendix.
Page 19 – Suggest rewording 2nd sentence in the first paragraph.
Page 19 – Suggest consider organizing so that it is clear when speaking of the beta-test communities and the case-study communities. Think the clarity would be enhanced to separate the discussions of the two sets of communities.
Page 20 – Middle paragraph – How were the 19 distributed among the different groups?
Page 21 – Section 3.3.1 – Suggest reorganizing so that each question represent a subsection of Section 3.3.1. Such would help the reader to pause and consider the response/feedback for each question.
Page 21 – Section 3.3.1 – 3rd paragraph – Wondered how different each respondent defined "recovery".
Page 22 – The graphic titled Community Trajectories should be listed as Figure 3.2 rather than Table 3.2. Not really sure this shows a trajectory of recovery. By trajectory

I am thinking how slope curves. How does the reader interpret a trajectory of recovery from graphic?
Page 23 – Should move title for Section 3.3.3 to the next page.
Page 26 – Section 3.3.4 – Third paragraph – should perhaps change "two elites mentioned Barbour" to "two elites mentioned Governor Barbour".
Page 26 – Table 3.3 – Heading for Table 3.3 should be moved to Page 27.
Page 30 – Figure 3.6 – What are "UI Claims"?
Page 33 – Section 3.3.9 – 1st paragraph – change "Bay. St. Louis" to "Bay St. Louis". Also change "higher elevation that most" to "higher elevation than most".
Page 34 – Top paragraph before Figure 3.8 – review and reword the last line.
Page 34 – Figure 3.8 – Not sure what it is illustrating.
Page 35 – Second bullet – change "Do I really look at that stupid" to "Do I really look that stupid".
Page 36 – Section 3.4 - Expected more discussion about the interview findings. Perhaps this was covered in the bullets on page 16.

SECTION 4 – FOCUS GROUPS

Page 37 – Section 4.1 - Expected the literature review to be about the subject matter of the project rather than about the approach or methods for conducting focus groups. Although this is nice, it seems more appropriate for an appendix.
Page 37 – Section 4.1 – 2nd bullet – What is meant by "triangulation"?
Page 39 – Section 4.2 – It appears from the Table of Contents that the title should be "Methods". Suggest putting the information in Section 4.2 in an appendix and referring to it as the methodology used to conduct focus groups. I think it is important to keep the reader focused on the subject matter of the project rather than spending too much time discussing literature reviews on methodologies. Putting such information in an appendix allows the reader to refer to it as needed while remaining focused on the subject matter at hand. Please note that this is only an opinion and not guidance.
Page 45 – Section 4.3.2 – Regarding "health risks" – what about PTSD?
Page 52 – Line spacing needed before the title for Section 4.4.

SECTION 5 – SURVEYS

Page 52 – Section 5.1 – Should move title to the next page. Nevertheless, I think the content of Section 5.1 should be put in an appendix. The literature review that would be most important for this report would be about the subject matter of the project. What has been discovered already? What did your research confirm or deny? It is my opinion that though the literature review of survey practices is good, it is not the landscape assessment that would be of interest to DHS.
Page 53 – 1st paragraph – 3rd sentence is not clear.
Page 53 - 2nd paragraph – change "researchers must developed" to "researchers must develop".
Page 53 – 3rd paragraph – 4th sentence is not clear.
Page 53 – 4th paragraph – what does "loaded or leaded words" mean?

Page 53 – 1st paragraph – last sentence – what does it mean? "Finally, structured observations visually collect data."
Page 53 – 2nd paragraph – last sentence is not clear.
Page 53 – 4th paragraph – second to last sentence is not clear.
Page 55 - 1st paragraph – change "validity refers how" to "validity refers to how".
Page 55 – 2nd paragraph – 3rd sentence is not clear; also last sentence is not clear.
Page 55 – last paragraph – change "commonly guidelines" to "common guidelines".
Page 56 – Section 5.2.1 – what does "loaded or leaded words" mean?
Page 57 – Section 5.2.3 – Note that Page 59 has a section numbered 5.2.3 also.
Page 57 – Section 5.2.3 – last paragraph – Should "February 19, 2010" be "February 19, 2011" since the survey was approved February 8, 2011. Also, in the 2nd sentence change "that they links" to "that the links".
Page 58 – 2nd paragraph - 2nd sentence – change "are far from ideal The survey" to "are far from ideal. The survey".
Page 59 – It appears the section named "Data Analysis" should be numbered Section 5.2.4.
Page 59 – last paragraph – suggest changing "Volunteer Survey, 1,825" to "Volunteer Survey; 1,825".
Page 60 – Section 5.3.1 – It would be nice to see this section subdivided into subsections by the questions. Moreover, it appears the first set of questions presented to the reader would have been the demographic questions to describe who is participating in the survey.
General Comment Regarding Section 5.3 – Might be good to consider using a semi-colon as the delimiter separating possible responses to questions. When reading all the responses to the question, I was left with asking my self "how is this information going to be used"? Also, I was expecting some type analysis of the responses or some type of comparative analyses with other surveys or literature reviews. Also, in the pie charts, the percentages are rounded to the next whole number but the percentages are not rounded in the discussions (e.g., decimals are used).
Page 66 – Figure 5.7 – What does Figure 5.7 describe that Figure 5.8 on page 67 does not describe. Why the two figures? What are they saying?
Page 68 – There is no reference in the discussion to Figures 5.9 and 5.10. Why are they there?
Page 70 – Last sentence in the paragraph is not clear. The word "percent" is missing after "14.0" and after "2.2.".
Page 71 – Suggest changing "?", and were given" to "? Respondents were given"
Page 71 – Figure 5.12 – change "5 weeks for more" to "5 weeks or more".
Page 74 – The word "percent" is missing after "14.6".
Page 77 – Think the reference to Figure 5.19 should be Figure 5.18 instead.
Page 83 – The percentage 61.5 rounds up in Figure 5.25 while the percentage 38.5 rounds down in Figure 5.25.
Page 85 – Figure 5.29 is not mentioned in the discussion. It is not consistent with the data in Figure 5.28.

Page 86 – Section 5.3.2 – The switch to a set of questions on the December 2007 Recession took me by surprise. At one moment we are talking about Hurricane Katrina and suddenly we switch to another topic without rhyme or reason (it appears to me).
Page 91 – It would be better to use dissimilar color schemes in Figure 5.37. What should one take away from Figure 5.37?
Page 92 – Figure 5.38 – What is the relevance or the value or the units of measure of the green dot?
Page 93 – Figure 5.39 – What is the information displayed in Figure 5.39? What does it mean?
Page 94 – Figure 5.40 – What information or conclusions should we draw from Figure 5.40?
Page 95 – Figure 5.41 – Believe the legend "Lived with Family or Friends" should be "Did not pay rent". Note: It would be good to keep consistency in the color schemes for 2005 Katrina and for 2007 Recession.
Page 95 – Section 5.3.3 – Turning now to another set of questions. It would be good to introduce this series of questions to help define the context for the reader.
Page 96 – Figure 5.43 presents information in percentages but the discussion is in terms of carnal numbers.
Page 97 – Figure 5.44 – what is the purpose of this information? Why are there circled addresses outside the study area?
Page 98 – What is the meaning of Figure 5.45?
Page 99 – What is the purpose of Figure 5.46? What information should the reader take away?
Page 100 – What is the purpose of Figure 5.47? What information should the reader take away?
Page 101 – What is the purpose of Figure 5.48? What information should the reader take away?
Page 102 – What information should the reader draw from Figure 5.50?
Page 104 – What is the message of Figure 5.51 and Figure 5.52?
Page 105 – What is the take-away from Figure 5.53? Are we really comparing "apples to apples"? If in 2005, my hourly wage was $8/hour and I maintained my job and received 5% increase each year. Then in 2007 my hourly wage would be $8.82/hour and in 2011, my hourly wage would be $10.35/hour? So, in 2005 and 2007, I remain in the hourly range of $7.51 – $10.00 and in 2011 I am in the range $10.01 - $12.00. So not really sure what the information in Figure 5.53 is telling me.
Page 106 – Not really sure what Figure 5.54 is telling me. Note that a respondent could be a high school graduate and 1st year college student in 2005, then be a 2nd year college student in 2007 and then be fully employed at about $45,000/year in 2011. So what is the message in Figure 5.54?
Page 107 – Why do you think 909 persons did not answer the question?

Page 107 – Figure 5.55 – Were the respondents the same for each time the question was asked for 2005, 2007 and current? Not really sure what information can be drawn from Figure 5.55.
Page 108 – Figure 5.56 raises questions about the participants in the survey. A significant number were born before 1945. Those born before 1940 should be retired. Those born after 1992 are just graduating from high school and such explains a lot of responses. Did you perform an analysis of the demographics to see how the demographics explain some of the survey responses?
Page 110 – Figure 5.58 – What should be the take-away? What information is being presented and what lessons do we learn?
Page 111 – Figure 5.59 – Missing the home value range of "$200,000 – $249,999" in the discussion.

SECTION 6 – EMPLOYMENT

Page 113 – Line spacing needed after Figure 5.63.
Page 113 – Section 6 – 1st paragraph – Assume the study area is MS Gulf Coast counties and not AL.
Page 114 – Section 6.1 – Use of the terms "labor markets", "economic stocks", and "unemployment rate" appear to be used interchangeably. Is this correct? Please note that the 1st sentence mentions AL but AL does not appear in any of the following discussions. Numerous questions about the clarity of Section 6.1.
Page 115 – Section 6.1.1 – Appears the title should change to "Experimental Methods for Measuring Economic Recovery"? Again several questions about the clarity of this section. Where is AL in the discussion?
Page 115 – Section 6.1.2 – What is temporal recovery? What figures and tables are begin referenced in the 2nd sentence in Section 6.1.2?
Page 115 – Footnote – What is the "data" that is being referred to here?
Page 116 – Line spacing needed after Figure 6.1.
Page 117 – Figure 6.2 - Would be better to use another color scheme to more clearly differentiate the different unemployment ranges. Perhaps brown, red, blue, yellow, green would make things clearer.
Page 118 – The caption for Figure 6.2 should be moved to Page 117.
Page 118 – Figure 6.3 - Would be better to use another color scheme to more clearly differentiate the different unemployment ranges. Perhaps brown, red, blue, yellow, green would make things clearer.
Page 119 – Paragraph refers to Figures 4 and 5 which perhaps should be to Figures 6.4 and 6.5. Color scheme used in Figure 6.4 is not clearly distinguishable.
Page 120 – Color scheme used in Figure 6.5 is not clearly distinguishable. What is meant by "all industries" in the first sentence of the paragraph?
Page 121 – Change "Figure 7.6" to "Figure 6.7".
Page 123 – I thought the construction industry was not being considered based on a statement I though I recalled reading but could not locate.
Page 125 – Heading for Table 6.1 should be moved to next page.

Page 126 – Not clear the meaning of the data in Table 6.1. Is it saying Hancock and Jackson have recovered and Harrison has not?
Page 126 – Need to clarify the discussion in Section 6.1.3. Had problems with the discussion.
Page 127 – Assume the footnote at the top of the page is misplaced.
Page 127 – Section 6.1.4 – Should "sector" be placed before "employment" for further clarity?
Page 128 – Middle paragraph beneath Figure 6.11 is confusing. Also it is not clear what information one should take away from Tables 6.3 and 6.4.
Page 129 – Top paragraph appears to lack clarity. It is not clear what the conclusion or summary or information is here. What is the take-away? What is the point being made?
Page 129 – Section 6.2.1 – It is not clear what data is being used?
Page 129 – Section 6.2.2 – What is a "job search model"? What is the mathematical definitions or equations for *f(s)*? What is S(t)?
Page 130 – What does Equation 3 mean?
Page 130 – Figure 6.12 – what is a survival function? What is the legend for the y-axis?
Page 131 – What does the second to the last sentence mean in the top paragraph before Figure 6.13A?
Page 131 – Figure6.13A – what is the legend for the y-axis? What does the information in the box mean? Should the x-axis be labeled "days of unemployement"?
Pages 132-135 – Discussions and figures lack clarity. Same questions as for Figure 6.13A.
Page 136 – Table 6.5 – Not sure what it means or what the information it is presenting. Really difficult to comprehend. Moreover the discussion beneath Table 6.5 was puzzling.

SECTION 7 – MODEL OF COMMUNITY RESILIENCE FOLLOWING A DISASTER

Page 138 – 1st paragraph – 2nd to last line – change "models in show real world" to "models in real world".
Page 138 – 2nd paragraph – Why the "181"?
Page 138 – 3rd paragraph – 3rd sentence – change "will them use" to "will then use".
Page 138 – 3rd paragraph – last sentence – change "a job in the when" to "a job when".
Page 139 – Move the heading for Table 7.1 to the next page.
Page 140 – Not sure what the information in Table 7.1 is saying.
Section 7.4 (Results) – Regretfully, I could not comprehend this section. The discussions and the associated tables are confusing. It appears there should be a better way to present the information. Moreover, the way the tables are presented across two pages with no definitions of the elements or contents of the tables adds to the confusion.
There is an assumption that the reader should understand the content of the Tables in this section. I believe this is a wrong assumption. Should seek to simplify or clarify the information. The information in Sections 6 and 7 requires strong peer review.

Page 158 – Most would differ about the recovery time for Harrison and Hancock. What's in the literature?

SECTION 8 – CONCLUSION

Page 158 – 2nd paragraph – 2nd sentence - change "is happened" to "it happened".
Page 159 – Title of Section 8.1.1 should be "Overall Impact and Recovery" based on Table of Contents.
Page 159 – Section 8.1.1 – 3rd paragraph – change "based not only" to "based not only on".
Page 159 – Section 8.1.1 – 3rd paragraph – change "result if Hurricane Katrina" to "result of Hurricane Katrina".
Page 159 – Section 8.1.1 - 4th paragraph – change "casinos were they" to "casinos were their"
Page 160 – 2nd paragraph – 1st sentence – change "these more damage" to "the more damage".
Page 162 – Section 8.1.3 – change "from that that" to "from"
Page 163 – Section 8.1.4 – Not consistent in using "%" rather than "percent" in the last sentence of the 1st paragraph.
Page 166 – Section 8.3 – The title should be "Closing Remarks on Policy Implications" based on Table of Contents.
Page 167 – 1st paragraph – change "effectively rebuilding" to "effective rebuilding"
Page 167 – 2nd paragraph – why "(212)"?
Pages 168-169 – Should be deleted.

APPENDICES

NOTE: Did not review any of the appendices

GENERAL IMPRESSION

- Report has a tremendous amount of data reflecting a significant level of effort which is well appreciated.
- The literature reviews of greatest interests would be those that reflect the project title rather than the methods used for data collection (e.g., surveys, focus groups, etc.).
- Analysis of the data in terms of stand-alone analysis and comparative analysis with the literature would be very helpful.
- Several areas of the report appear to have data that perhaps can be consolidated to minimize repetition and to enhance the potentials for comparative analysis.
- Believe Sections 2-5 deserve to be treated as a separate report and Sections 6-7 as another report. The peer reviewers may differ for each.

Appendix S.2. Reviewers' Comments- Dr. John Plodinec

September 19, 2011
David L. Butler, Ph.D.
Edward A. Sayre, Ph.D.
University of Southern Mississippi
Hattiesburg, MS

Comments on Draft SERRI Report

Dear Drs. Butler and Sayre:
I appreciate the opportunity to review your report. While I found that the report needs some important modifications, your findings valuable insights and perspectives to our understanding of recovery from disasters. I have several specific comments, but I will also provide a few general ones.

General Comments

- You are to be lauded for the huge data collection effort, and the effective use you have made of the data. In all of the sections except for the modeling effort, I endorse your conclusions as reasonable, and in line with the previous literature. However, as noted above, your data and findings are important extensions of our understanding of disaster recovery. I urge you to get them to a wider audience as soon as possible. As I point out in my specific comments, there are some important policy perspectives that arise from them.
- I was frustrated by the modeling effort. It starts off well – the perspectives offered were useful, correct and presented well. However, the linear regression analysis was a real problem for me. The R^2 values of the fits are so small that they cannot be expected to have any real predictive value. In my opinion, this is due to your assumption that the data can be fit to a linear model. Frankly, I suggest you report that you did it, but state that it did not lead to a satisfactory result, citing the R^2 values. I further suggest that you carry out a follow on study using a non-linear model.
- There are a fair number of typos and mis-placed words. You might want to have an uninterested editor review the report for such things.

Specific Comments
Section 2. As you know, I was a little cool to the idea of a Disaster Composite Index. However, you did a fine job of developing it and then using it in the document.
Section 3 – summary of themes from the interviews. An excellent summary of a tremendous amount of material. The ability of bigger businesses to reopen faster, i.e., as anchors of economic recovery, cannot be overstated. I suggest taking a look at the wording of some of these, however – they sound a bit like the oracle of the obvious; e.g., "pre-Katrina, communities were either booming" or they were not. If possible, you might want to add a follow-on statement relating to their fate, e.g., "those in decline tended to continue in decline."
Section 3.3.5-3.3.10. The discussion of isolated groups, and the different perceptions of them by the various elites, was excellent. The theme of differential rates of recovery is stated clearly here, but deserves to be emphasized in several other sections.

Section 4.3. Another very important and impressive section. Much of this merely confirms previous work by others. However, there are important points of emphasis often missing from previous work; e.g., the importance of people in their neighborhoods as first responders to the needs of each other cannot be overemphasized. The importance of planning (or its lack) is properly pointed out.

One of the hindrances noted was insurance. This comes through in several places. If possible, it would be worthwhile to have a section focused on insurance. You present the community's perspective; it would be good to try to get the insurers' perspective and then draw appropriate conclusions. For example, a recent article suggested longer-term insurance policies as an answer to some of the insurance problems. From your work, I would conclude that a comprehensive (all-hazards) homeowner's policy would be more valuable.

Section 5. What a tremendous amount of work, and a very good presentation. My only quibble is that it would be nice to do comparisons between pre-Katrina and now in a few places (e.g., crime statistics). Figure 5.14 is an important contribution re community communications. I was especially impressed by 5.22 showing the importance of family, friends and FBO's in providing assistance.

Section 6.1. It would seem that using the actual number of those employed rather than unemployment rates would be more meaningful in terms of recovery. However, a very good discussion of an important issue.

Section 6.1.1. The discussion of the three methods/measures of economic recovery is excellent.

Figure 6.1. No mention seems to be made of the disparity between Jackson and the other two counties prior to the Katrina, and the almost identical values after. Why did this happen?

Figure 6.8. What caused the huge dip in Jackson County between 11/06 and 4/07? Needs explanation.

Section 6.1.3. You really need to try to provide some reason why Hancock recovered more rapidly than Harrison.

Section 6.2. As I read Table 6.5, Unemployment Rate [prior to Katrina] seems to be the dominant factor on the duration of unemployment. If this is correct, needs to be clearly stated. Section 6.2.2 is not very clear; terminology seems to drift (e.g., is a spell a duration of unemployment?). This would be better if re-written assuming that the audience are not modelers.

Section 7. As indicated above, this section should be substantially reworked. The fact that variables are statistically significant components of a model that has little predictive value renders their statistical significance meaningless, in practical terms.

Appendix S.3. Reviewers' Comments- Dr. Ji Sun Lee

David Bulter, Ph.D.
Edward Sayer, Ph.D.
University of Southern Mississippi Gulf Coast
730 East Beach Boulevard,
Long Beach, Mississippi, 39560

Homeland Security
Science and Technology

Date: September 23, 2011
Re: SERRI Project Review

This SERRI project is of particular relevance for the Department of Homeland Security, Science and Technology Directorate Human Factor/Behavioral Sciences Division. The concept of community resilience has become a priority in the national agenda, and as agencies and departments focus on the issue of resilience, many of the programs emerging have primarily emphasized the importance of fortifying the nation's critical and physical infrastructure, public health resilience and bio-security, and resilience against cyber-attack. However, adequate attention has not been paid to resilience in relation to individuals and communities. Social and behavioral science research into how communities define themselves, communicate effectively, and develop relationships; and what factors within a community correlate to social, psychological, and economic resilience or vulnerability are vital to developing evidence-based programs and tools for all levels of government and society. The research issues studied in this project; identifying communities in the gulf region, understanding mobility, studying economic stability, and realizing how cultural differences affect the resilience of a community all seek to inform the government to design better tools and implement better policies that allow for communities to respond to and recover from natural disasters.

The mixed methods approach to the complicated research questions presented in this study allowed for a full understanding of the context of this research. The numbers alone would not have been enough for future developed of applied policies and interventions for similar communities hit by a natural disaster. The data analysis was sound concerning the unemployment benefits and insurance costs associated with loss, but the detailed collection and analysis of the qualitative data added the rationale of the socio-cultural implications of disasters. This analysis portrayed why people stayed or moved, and to the strong psychological ties that tear or bind groups. The collection and presentation of the nuances of resilience supported by strong theory in the literature made for a compelling argument.

I strongly recommend the report, and want to see more mixed method studies looking into complex systems with multiple inter-dependencies as they impact resilience both at the individual and collective levels. The difficulty of focusing and developing the research questions alone hinders these types of studies. However, I believe this study is a strong example, with many more to follow.

Sincerely,
Ji Sun Lee
Program Manager; Community Preparedness and Resilience
DHS, Science & Technology Directorate, HFD

Appendix S.4 Reviewers' Comments- Dr. Laura Myers

MISSISSIPPI STATE UNIVERSITY

Social Science Research Center

November 25, 2011

Dr. Butler and Dr. Sayre,

I have reviewed your SERRI Report 11-3-11 and my comments are included below.

Summary of Review: This report covers a mixed methods analysis of the MS Gulf Coast and the recovery from Hurricane Katrina. The authors do an excellent job of explaining the stages of this research and the purpose of each stage of the research. The methods chosen and the levels of analyses were suitable to the purposes and goals of the research. The results of the research and the landscape assessment are clearly presented. However, the structure of the report could be clarified with the assistance of a systems approach to the results. The authors indicate this is an economic analysis, but it is truly a systems approach to an economic analysis. System factors at the individual, organizational, and community levels are all part of this analysis. This makes the report somewhat confusing. While the report does divide the study into stages, the transition from the 3 levels of individual, community, and sometimes organizational leads to a lack of depth of discussion and implications. For example, the focus group results and the survey results are brief. This is understandable given the large amount of data, but it leaves the end-user thinking about the implications. This, I think, is the biggest area for improvement. What are the implications, what are some of the solutions that have already been implemented, and what solutions do you suggest if none have been developed? In fact, who are the end-users of this report and how would they use this information? The report is extremely technical and well done, but I'm not sure that most end-users would be able to draw out all of the great implications from this research. Please see a summary of strengths and weaknesses below.

Strengths:

- Very clear that this is first effort to analyze local community economic systems.
- This is not a theoretical or descriptive analysis, but a true post-disaster analysis.

- The use of multiple methods to collect data throughout stages is critical to the economic analysis.

- Very critical finding from analysis is that different groups have different levels of vulnerability and that social elites may not recognize this fact. See suggestion in weaknesses.

- Concept of neighborhood-level self-reliance as part of resiliency is a great strength of the study.

- The recommendation that systems enabling people to communicate with one another should be explored is very important and has been an outcome of numerous studies. See suggestion below.

- The recommendation that aid distribution and policies need to be reviewed is a critical one and probably one of the most current issues still facing the areas focused on in this study.

- The DCI is a tremendous tool. I would suggest publishing on the DCI for future use by emergency recovery planners.

- I was looking for recognition of the recession that began in 2007 to be sure the researchers had taken this into account. It was recognized and taken into account. I would suggest mentioning it in the executive summary so the end-user does not think about it early on and wonder if your results are skewed because it was not done.

- Your findings on businesses and resilience in which small businesses do not have the resources for recovery while big businesses and those with outside headquarters were able to recover more quickly is consistent with research on this issue and on the business continuity literature. I would suggest adding some business continuity literature to support this finding.

- The finding from the focus group analysis: "*Evacuation is financially burdensome, forcing some to "ride it out"* is very important and should be developed more in discussion.

- Modeling analysis very strong.

- Survey results are tremendous. See suggestions below.

Weaknesses:

- Suggestion: Develop more discussion on the social elites finding that social elites may not recognize socially isolated groups and the differential impact on them. Add more social elite literature to support this discussion.

- The findings of this study, including the lack of recognition of socially isolated groups, are very relevant to emergency managers and emergency planning. However, the application of these findings to emergency management professionals and emergency planning stakeholders is imbedded too deep within the analytical analysis discussion. I would suggest that these very practical applications be highlighted in the executive summary and also throughout the report. These application implications appear to be in the report, but are currently lost within the high level analytical discussion. While the high-level analytical discussion is important, the professional end-user of this knowledge will not be able to find the useful applications that result from this project. I would suggest, especially in the executive summary and in any implications discussion that the analytical discussion be reduced in complexity.

- Concept of neighborhood-level self-reliance as part of resiliency is a great strength of the study. Develop more discussion on how this neighborhood self-reliance can be developed as part of preparedness.

- Suggestion: "*The sooner usual activities can occur; the sooner there is a sense of normalcy."* I would suggest developing this finding with psychological literature to support the need to return to normalcy as quickly as possible.

- Communication systems that can help people connect after the storm have been developed and implemented. Since you make suggestion that this should be explored, I would suggest a brief review of the literature on these new systems be added to help the end-user of your report to know what directions to take on this issue.

- You make the recommendation that shelter policies need to be reviewed and you explain accurately what was wrong with shelter policies during Katrina. These policies have been reviewed and revised. The state of Mississippi has newly revised shelter policies that address all the issues you have raised. I would suggest including some of that new policy in your discussion.

- The literature review focuses primarily on resilience and the factors of resiliency. As the factors are discussed, the relevant social science disciplines such as psychology, sociology, and others are discussed briefly. This particular study is an economic study, but the approach of the study encompasses a systems approach to resiliency and recovery. As such, I would suggest a little more literature development on those factors of resiliency and the relevant social science discipline support for those factors, especially on those factors that were relevant in the outcomes of this current study. See note on psychological literature on returning to normalcy above.

- The elite interview analysis needs a bit more description of who the elites are. The elites are classified into business, political, etc., but I would like to know a bit more to understand who and who did not consent to an interview. Without identifying the persons, I would briefly describe what the categories included. For example, political: local officials, first responders, …; business: small and medium size business owners,…

- In the discussion on social elites, the last comment: "When warnings become false alarms, it builds a false sense of confidence" is a critical one. I would suggest developing this comment more either in this location or in the conclusion. This is a major finding.

- Need more explanation on how the focus groups were selected and what their makeup was. You launch quickly into the results of the focus group without a clear explanation of who they were. Need this for context. You explain where they came from but not any descriptives on who they were.

- The focus group result: "*Lack of knowing what to do in critical situations placed some people and property in danger"* should be developed as an application for emergency planning stakeholders. Given this result, how should planners educate the public in preparedness education?

- I did not see much reference to emergency management in the study population. Were first responders and emergency managers any part of the data collection? If so, highlight this more. If not, explain why not.

Please let me know if I can provide more detail on any of these comments or any perspective on any of these issues.

Sincerely,

Laura Myers

Laura Myers, Ph.D.
Research Professor of Criminal Justice and Emergency Management
Mississippi State University
Cell # (828.243.2952)

Appendix S.5 Reviewers' Comments- Dr. Fran Norris

Norris comments on Butler & Sayre resilience report

My comments follow the order of the report. I didn't read for typos, although I did notice a few. I am assuming someone will do a careful proofing of the last draft. I'll make a few global remarks at the end.

1. I appreciated the frame in the intro about why New Orleans and Mobile were excluded. Perhaps you should rename the study to clarify that the focus is the Mississippi Gulf Coast.
2. Page 6- I think "great socioeconomic equalizer" should be in quotes. It is generally the affluent who think this is true, and of course, it isn't true at all.
3. Page 7 - The opinions about the helpfulness of church groups are common ones. I often think they need context. They are influenced by low expectations of what faith-based and non-profit organizations are supposed to do (compared to their high expectations of what government is supposed to do).
4. Page 8 – nice discussion of main points. Second paragraph should be "implies" not replies.
5. The opinions that aid went to those not in need or who were intentionally scamming the system are common and often more rumor than fact. I realize you are reporting opinion but you repeat this point often, and it starts to sound like truth.
6. Page 13 – I didn't understand last sentence of first full paragraph. Social psychological aspects are usually studied using epidemiologic methods (this is my primary field).
7. Page 13 – Although you later cite our community resilience paper on a minor point, I was (to be honest) a little disappointed that you had not found it useful in framing the elements of communities thought to shape their resilience. That paper resulted from an in-depth review of the literature across many disciplines. I thought some of the elites' comments fit the framework pretty well.
8. Page 13 - Lui et al appear to be specifically discussing economic resilience.
9. Page 13 – Mental health, in my mind, is the manifestation (result) rather than cause of resilience although effects are likely bi-directional.
10. Page 15 – The Galea study was undertaken to focus on the consequences of Katrina in southern Mississippi. You might mention it here (last paragraph before "modeling disasters.
11. I really appreciate your attention to measuring severity of exposure using objective indicators. This was impressive. In future work, it would be interesting perhaps to also include number of applications for FEMA assistance as a measure of social impact. (I've used this measure in helping the Crisis Counseling Program estimate staffing needs for disaster areas.) I didn't think you needed so much detail in this final report, although I could see the value for some internal documents. The legend for the figure on page 23 is on the next page, so I wasted some time trying to deduce what the colors meant before I saw the legend.
12. Page 25 – If you explained surge inundation limit, I missed it.
13. Page 30 - I know you have appendices, but key info about methods needs to be briefly stated in the text. With a report this long, 1 in 100 is going to look at the appendices. On page 30, you need to define "elites" and define "beta test."

14. Page 30 – clarify that the first point about perceived recovery means through 2010.
15. In case I forget to say it later, the interview section was one of the strongest sections of the report.
16. Page 31 – Camille comes up often. Perhaps you should say more about it.
17. Reading the summary before the details gave this since of great redundancy. Given that you have the executive summary at the beginning, I suggest reversing this order, and reducing repetitiveness. (There is lots of repetition in the report in part an effect of its length, but it also contributed to its wordiness.) Another possibility would be to do the first part as pithy highlights in bullets set off in a shaded box.
18. Page 34 – I would drop this figure. It looks like a causal model but it isn't. It does add anything to the discussion.
19. Page 37 – Challenges timeline was great.
20. Page 37 – The later part of the quote is really important, a real problem.
21. Page 38 – what is "charette?"
22. Page 39 – I'm repeating an earlier point because this attitude that anyone could just walk into Red Cross and walk away with money is maddening. It is veiled racism or classism and a sign that the statements about the community coming together are often clichés and bunk. (This doesn't really imply that there is anything wrong with your report, but there is a deeper level of interpretation and discussion about some of the elites' opinions to be made.)
23. Page 46 – figure is simple, not necessarily or helpful relative to text.
24. Page 52 – the focus group results veer away from the topic of economic resilience. I think you are at your best when you keep that as a frame, and you could do that better if you concentrated on those results that are most relevant to that topic.
25. Page 53 – I might note, as an aside, that epidemiologic research has not usually confirmed the widespread belief that there is increased alcohol and drug use. There may be some recidivism among the population with previous problems.
26. Page 54 – the needs timeline is very good but too short! You are making the point that recovery is a long-term process but only show the first few weeks.
27. Page 58 – Nor has research confirmed that the elderly are at high risk for psychological recovery. In fact, often, they have an ability to put losses in perspective.
28. Page 62 – In terms of presentation this was the weakest section of the report. It was way too long. A simple table could have been used to summarize the less interesting information so that the reader wasn't totally glazed over when you discuss the stuff that matters. It was, frankly, dull, and it didn't need to be.
29. Page 62 – Basic methodology needs to be reported. I didn't have the appendices with me when I was reading this (on a plane) and didn't know how the respondents were selected and what modality was used to collect the data. I began to sense that this was a convenience sample who responded to an on-line survey. As you know, this is methodologically weak, so upfront you perhaps should tell us about the method and why the reader should consider the results representative. This is imperative because your focus is on frequency (prevalence) data which are the most biased in this type of sample. Tests of

relationships between variables are usually okay. I am writing things I know you know, but you owe it to your readers to clarify this.

30. WAY too many figures that just repeat the text. Use the figure or the text but not both. Also, as I was printing this on my home color printer, I began to realize that this probably cost me at least $20 to print. You need to think about the ongoing cost of people printing out all these unnecessary figures. I'd drop most of them so that people will actually ponder the ones that matter and don't get annoyed. Sorry, but it was annoying, and if it was to me, it might be to the readers who matter!
31. There is also too much detail in the categories reported without a sense for way the detail matters. Collapse the data in meaningful ways so the reader doesn't get totally bogged down and lost.
32. I did like figure 6.7 or 6.8, but CHOOSE. Don't use both, in my opinion. This same comment could be made for multiple times when you show very similar information.
33. On the figures showing relative frequencies (e.g., 6.14) consider putting the items in rank order of frequency for greater impact. This would be a good use of how a figure can say something the text can't say as well.
34. I never care much for crime questions about "someone you know." They dramatically inflate incidence and prevalence rates. They include rumors and things that happened to "friends of friends." Please provide the reader with some understanding that 10% of the population were not victims of robbery.
35. Page 93 (and elsewhere) – remember when reporting increases/decreases to consider the standard errors. They may be nothing more than measurement/sampling error.
36. The survey results dealing with change and recovery were the best. Reducing the earlier part would give this part more impact.
37. Page 100 – Legend is too small to read.
38. Page 123 – Second bullet – make clearer that this is post-Katrina.
39. Figure 7.1 – Great figure in purpose but too busy to get the important info readily. Could you perhaps use very pale shadings for the counties other than MS coast?
40. Figure 7.2-7.3 – seem the same, which makes the statement on page 127 wrong.
41. Figure 7.4-7.5 – could you reduce size and fit on one page for greater impact?
42. Page 129 and elsewhere – As the lead scientists, you should choose and defend the best method and present that to the reader. The approach of showing a set of results, then criticizing it, then showing another set of results that are more methodologically correct made no sense to me. It was another point of potential annoyance – why did I just spend the effort to understand something and then basically read, "never mind."
43. Love figure 7.6. This is a wonderful example. And, Figure 7.7 was also very cool. So was 7.10.
44. In this section, your expertise shows. It is probably the best part of the report.
45. Page 133 – once again, I thought this section was really good.
46. Page 136, table. Shouldn't SEs be taken into account? With them, the 2007 figures might be not be significantly different.
47. Page 138 – this continues to be interesting.

48. Page 141 – check wording in first paragraph.
49. Page 143 – I couldn't understand what any of these figures can mean independent of impact. Sure enough, LATER (p. 146), you write this also, but not until you made the reader (me) spend time on results that aren't completely valid. Just do what is right/best, and leave the rest for an internal report.
50. I wasn't confident that the analysis was correct in table 7.5. You are analyzing individual data with collective predictors. The observations are not independent. Doesn't this need to be accounted for in the model somehow (like with HLM or GEE)? You have such a huge number of observations; significance means little. What percent of variance is explained?
51. Page 149 – A sentence on how you handled missing data would be helpful.
52. Table 8.2 and elsewhere. I believe you should have used logistic regression for dichotomous outcome measures.
53. Please use meaningful variable labels rather than computer code to make it easier on reader.
54. Page 155 – the findings about Asian were interesting – does it have to do with industries (fishing, shrimping)?
55. Table 8.5. I believe your sample size is too small to have so many predictors. I also wondered whether the distribution of the DV met the assumptions of OLS.
56. Not your fault, but I ALWAYS have trouble with variables that are scored in the inverse of the meaning of the words. In table 8.7, a high score means less recovery. I get confused with interpreting the positive and negative signs. It's like a double negative.
57. I can't expertly evaluate the models of unemployment duration, but they seemed very cool.

In summary, I think your research makes a tremendously valuable contribution to understanding resilience! Some of the employment figures should live on as classic examples of what we mean by a "resilient trajectory." I loved the mixture of methods. I think the best part was the modeling you did at the end, and probably the second best part was the interviews with key informants. The survey I was less sure about. In terms of presentation, I think you need to focus on reducing redundancy and cutting extraneous stuff so that your really interesting findings shine through! I'm afraid people will begin to scan and browse through the dull stuff, thus missing the good stuff. Also, I suggest making and defending choices and then presenting the results based on the best choices. I did have some questions about the OLS regressions, as noted above. Sometimes this reads like an internal document prepared to help you think things through rather than for an external audience. But all my trivial comments aside, I want you to know that I was impressed with the scope and importance of your work and happy that I had the opportunity to learn more about it.

APPENDIX T. RESPONSE TO COMMENTS

APPENDIX T. RESPONSE TO REVIEWERS

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI
GULF COAST

30 November 2011
In Response to our Reviewers:

We would like graciously thank our reviewers for all the positive and critical comments. Just as we recognize the importance of publishing the findings of this research, we recognize the value of the opinions of experts in the fields in which we address. This final report reflects the product and work of many individuals. While not all comments were addressed specifically within the report, all comments were greatly appreciated and taken into consideration by the Team to create what we feel is the best possible report. The first round of revisions was undertaken based on the invaluable review of Dr. Benjamin Thomas, Dr. Ji-Sun Lee, and Dr. John Plodinec and the second based on those of Dr. Laura Myers and Dr. Fran Norris. Through the comments provided by these reviewers, we gained insight into the readings that different audiences may take of the report, which has allowed us to improve it with this in mind.

Substantial revisions have been made from the first draft sent to reviewers to this final report. Based on these comments, we have sought to balance our report for an audience of academics and policy makers. To this effect, we have revised the report body to be more direct regarding the findings. To accomplish this, several changes have been made. First, the policy implications have been placed in the introduction, as this is considered to be the highlight of the report for much of the audience of interest. Second, where possible, section findings were emphasized in bullet points in addition to discussed within text. Third, in the first draft of the report, much of the text focused on detailed methods, including literatures on each method. To better focus on the findings, this information has been moved to the report appendixes. Finally, based on feedback, an extensive effort has been made to introduce more literature throughout the report, beginning with the addition of the Literature Review-Landscape Assessment found in Report Section 2.

The modeling chapters, Report Sections 7 and 8, have also been thoroughly revised, which involved cleaning up the exposition and bringing forth the most salient aspects of the empirical findings and the modeling. Report Section 6, which provides a descriptive analysis of the survey results, has been significantly reduced so as to not take away emphasis from the use of this information as variables in the modeling. Furthermore, the figures and tables included in Report Section 7 have been reduced by one third and now provide a much clearer relationship between the sections within the chapter. The figures and tables that have been included in Report Section 7 of this final report highlight the main policy implications of the results. The results from the modeling that takes place in Report Section 8 was also narrowed to focus on only the most important results.

In addition to these larger changes, numerous editorial changes have been made since the first draft was sent reviewers.

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