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The Meaning of Place Recovery on The Mississippi Gulf Coast

Ronald L. Schumann, III
University of South Carolina

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THE MEANING OF PLACE RECOVERY ON THE MISSISSIPPI GULF COAST

by

Ronald L. Schumann, III

Bachelor of Science
University of South Alabama, 2007

Master of Arts
University of North Carolina at Charlotte, 2010

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Accepted by:

Susan L. Cutter, Major Professor

Amy Mills, Committee Member

Sarah Battersby, Committee Member

Lynn Weber, Committee Member

Lacy Ford, Senior Vice Provost and Dean of Graduate Studies

This work is dedicated to the people of the Mississippi Coast and others along the Gulf who endured Hurricane Katrina's impact and long-term recovery. It is my hope and prayer that this work truthfully gives voice to their stories, honorably remembers a place and a people forever altered by catastrophe, and equitably serves other communities beyond the disaster area who will face similar challenges after future disasters.

ABSTRACT

Recovery is a post-disaster period of adjustment when individuals, households, neighborhoods, and communities work to overcome the effects of a disaster and regain functionality. Recovery is a multi-scalar process whose outcomes are manifested in the physical landscape; however, assessments of the meaning, progress, and outcomes of recovery are specific to individuals who view the landscape from an embodied perspective within the local social hierarchy. Common recovery measurement techniques used by emergency managers, planners, local leaders, and hazards scholars approximate recovery with reconstruction of physical infrastructure or repopulation of residences. These longitudinal quantitative proxies may claim to represent the status of community recovery, but do they truly represent the ways in which residents assess their own recovery?

This study poses three research questions: 1) What does the recovery of place mean to local residents? 2) How do local residents assess recovery progress and recovery outcomes? 3) Are there differences between these participant recovery assessments and recovery indicators based on quantitatively derived secondary data? Using a feminist, intersectional approach in sampling and analysis, this work elucidates residents' perspectives about long-term recovery after Hurricane Katrina on the Mississippi Coast to build upon conceptual recovery knowledge. This study employs a mixed methodology consisting of photo elicitation, participatory mapping, recovery

indicators, and self-organizing maps. In doing so, this research demonstrates the utility of a bottom-up approach for understanding recovery that is complementary to top-down approaches focused on recovery policy implementation.

Findings show that memory and mobility guided the formation of residents' recovery meanings and assessments, which shifted between short-term and long-term recovery. Place attachment, life stage, and migration experience factored heavily into residents' recovery perspectives. In residents' eyes, businesses overwhelmingly exemplified speedy recovery while public and community features represented the success of recovery outcomes. Although indicators of home repair, reconstruction, and repopulation held merit in identifying where spatial recovery disparities existed, this study illustrates that the inclusion of bottom-up, place-based knowledge is essential to understand the complexity of recovery disparities present in the landscape.

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INTRODUCTION

1.1 Overview

Recovery is a post-disaster period of adjustment when individuals, families, and communities work to overcome the effects of a disaster and regain functionality. Far from being an orderly sequence of events (Dynes 1970, Haas et al. 1977), recent research has shown recovery to be a complex, non-linear process across social and spatial dimensions (NRC 2006). Recovery in the long-term is particularly understudied. With few exceptions (Chang 2010, Aldrich 2012), studies are limited to the first one to five years following a disaster event. Even less research exists on long-term recovery from large-scale catastrophes, which impact multiple social systems. Scholars have posited that generalized knowledge on disaster recovery may not apply after these catastrophic events (Quarantelli 1999, NRC 2006). As population growth continues to occur in biophysically vulnerable regions and the specters of climate change and sea level rise loom, research into such catastrophic events becomes increasingly valuable. Devastation wrought by 2005's Hurricane Katrina and ongoing long-term recovery activities along Mississippi's Gulf Coast provide a domestic example of such a catastrophe suitable for study.

Recovery is particularly challenging to research for several reasons. First, it is a multi-scalar process where neither the speed of recovery nor its prescribed outcomes are consistent across units of analysis. Scholars have shown that recovery for individuals, households, and neighborhoods often lags behind recovery at the larger community, county, or regional scales (Bolin 1982). A lack of available data for individuals and neighborhoods also makes cross-scalar investigation difficult. Second, recovery involves the restoration of both physical elements (i.e., housing, businesses, infrastructure, and the natural environment) and non-physical elements (e.g., psychological wellbeing, livelihoods, routines, and community life) of impacted areas. Being more easily quantifiable, and thus policy-relevant, a large proportion of current research proxies recovery using only these physical attributes. Comparative indicators of housing reconstruction (Curtis et al. 2010, Stevenson et al. 2010, Burton et al. 2011), population restoration (Finch et al. 2010), and economic rebound (Chang 2010, Sayre and Butler 2011) are exemplars; however these numbers can potentially mask the non-physical facets of recovery. Third, while social position based on age, ethnicity, class, gender, age, or income has been shown to complicate individual and community recovery (Phillips et al. 1994, Fothergill et al. 1999, Norris et al. 2002b, Elliot and Pais 2006), little knowledge exists on how intersections of these identities correlate with recovery activities and outcomes across differing impact levels. Nascent research that considers such socio-structural barriers to recovery has largely employed sampling strategies targeting single-identity groups. Other extant work tends to be exploratory,

leveraging quantitative approaches that treat these groups in aggregate rather than qualitative or mixed-method approaches evaluating experiences.

In order to surmount these challenges and present a holistic picture of recovery, researchers must utilize approaches to recovery foregrounded in the concept of place. Place is more than an administrative unit for management like a county or planning district. Place is a geographic concept that fuses recovery activities, the built and natural environment, social identities, symbolic meanings, and community functions at multiple spatial scales. Residents living in an area experience place visually and spatially through the landscape, which embodies the essence of a place.

Along the Mississippi Gulf Coast, the visual landscape provides evidence of a place that continues to recover unevenly from a disaster. Small stands of rebuilt homes punctuate untamed jungles of weeds, freshly mowed vacant lots, and house-less parcels with concrete slabs. While the physical landscape may be both a product of recovery policy implementation by local officials and a container for recovery activities undertaken by residents returning to "normal," this study operationalizes the concept of landscape differently. Landscape is defined as a symbolic representation of place that is actively constructed using different forms of situated visual and spatial knowledge. This definition of landscape focuses not on what is present, but on how meaning is attributed to what is present. In this way, residents and policy makers construct landscapes to understand the recovery process in which they are involved. Exploring recovery meaning making using the critical geographic concept of landscape holds

promise for building foundational knowledge on disaster recovery complementary to community-scale population and housing indicators.

1.2 Research Aims

This study interrogates the long-term disaster recovery process using place as a vehicle for documenting residents' perceptions of recovery activities and outcomes over an eight-year period following an extensive, high magnitude catastrophe. Qualitative insights gained from residents serve to contextualize approximations of recovery from the same event framed in terms of quantitative indicators.   This dissertation poses three questions:

1) What does the recovery of place mean to local residents? Are there differences in meaning based on geographic location, social position, or length of residence in the area?

2) How do local residents assess recovery progress and recovery outcomes? Does assessment vary based on geographic location, social position, or length of residence in the area?

3) Are there differences between these participant recovery assessments and recovery indicators based on quantitatively derived secondary data?

The first research question on the meaning of recovery demands a qualitative approach in formulating a broader, more nuanced understanding of long-term place recovery. Here I implement photo elicitation and participatory mapping as primary data collection techniques to foreground participant perspectives on recovery. Discourse analysis is used to explain the results. For the second question, I aggregate participant

map data to explore what recovery features participants map, their spatial distribution, and how participants assess the speed (i.e., process) and success (i.e., outcome) of recovery at each of these features. A background survey questionnaire about disaster impacts and demographics is used as the basis for stratifying the sample to explain group differences. To answer the third question, I aggregate participant map data to the census tract level and compute indicators for recovery speed and outcome. Secondary data on postal addresses and home loans are used to construct four separate indicators measuring reconstruction, repopulation, home repair, and home sales. Self-organizing maps and difference of means tests are used to compare the participant-derived and secondary data-derived indicators. Findings from questions one and two help contextualize the results for this third question.

I use a feminist, intersectional framework throughout the study to guide participant sampling, method selection, data collection, and analysis. The visual, spatial, and multivariate statistical techniques operationalized in answering the three research questions essentially construct three types of landscapes that represent recovery on the Mississippi Coast in different ways. The first type of landscape is visual and depicts residents' recovery meanings nested in individual and social memory. The second landscape type is spatial and comprises residents' assessments of landmarks and physical features within their activity spaces. The third type of landscape is spatial and place-based, but focuses on aggregating and comparing data within administrative units (i.e., census tracts) as policy makers would. By adopting the intersectional paradigm to construct these various types of recovery landscapes, this research demonstrates the

value of implementing a bottom-up, place-based approach to not only build upon conceptual recovery knowledge but also to augment top-down indicator-based approaches for recovery monitoring.

1.3 Document Structure

The following chapter summarizes relevant literature from three primary areas: a) disaster recovery; b) critical landscape theory and memory; and c) critical GIS. In doing so, I justify the need for continued research on recovery as well as my approach for investigating recovery. The third chapter describes the Mississippi Coast study area and the project's overall research design. I address recruiting methods and diagram the final participant samples from which data are derived for each research question. Additionally, I cover the design and implementation of the survey instrument and a semi-structured interview guide for follow-ups after photo elicitation.

Chapters four through six include methods and findings pertinent to each of the three research questions posed. Successive chapters build incrementally on one another. The fourth chapter describes the photo elicitation method and explores the multiple meanings of recovery revealed in the discourse analysis of photographic and interview data. Methods and findings here tap into the visual aspects of place used by residents to construct their own recovery landscapes for the purposes of understanding the process. The fifth chapter discusses participatory mapping and details my implementation of this method with Gulf Coast residents. Attributes and spatial patterns of participant map data are assessed overall, then stratified by participant characteristics and compared across groups. Results from the photo elicitation and

interviews inform the selection of participant characteristics serving as the basis for group comparisons. This spatial approach extends the meanings elicited in the first research question, but focuses on locations of importance salient to the residents themselves.   The sixth chapter relates methods for constructing participant-derived indicators and secondary quantitative indicators. A comparison of each combination of indicators follows. I explain my statistical findings by triangulating evidence from earlier qualitative and descriptive analyses. The interlocking, incremental mixed methodology employed throughout this study is crucial for fully explicating the concept of place within disaster recovery, as understood through landscape.

The seventh and final chapter summarizes findings from the three research questions and links these findings from this project back to recovery theory. I describe specific contributions of this work to disasters research and, more broadly, to larger bodies of geographic work on mobility, memory, and urbanization. Connections to the ideas of sustainable and resilient recovery and adaptive resilience are given special attention. This last chapter also points to future directions in recovery methodologies. Being simultaneously visual and spatial, the mixed methodology employed in this study is capable of accessing the meanings and value judgments that guide recovery in the eyes of those living the process in a way that indicators alone cannot. I contend that both bottom-up, place-based and top-down approaches must be operationalized in tandem to understand the meaning of recovery.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

At its most basic level, this study addresses the "why" and "how" questions

regarding observed and perceived spatial recovery disparities. In doing so, it aims to

present alternate ways of seeing the recovery landscape that are transformative both

conceptually and practically. This research is informed by disasters literature on

recovery, human geography and sociological studies on landscape, and feminist

approaches including intersectionality and critical geographic information systems (GIS).

In this literature review, I demonstrate that 1) there is a lack of holistic research on long-

term community recovery, 2) current research does not address the crucial role of place

in mediating various types of local recovery (i.e., physical, economic, social, and

psychological), and 3) on the whole, research that examines recovery through the

perspectives of impacted residents rarely considers how multiple identities (i.e.,

intersections of age, gender, race, income, etc.) shape perceptions of disaster recovery.

2.2 Recovery

Less is known about recovery, especially long-term recovery, than any other

phase of the disaster cycle (Rubin 2009). This is partly because major disasters and

catastrophes that cause damage extensive enough to upset social systems happen

unexpectedly and infrequently. The protracted recovery period following such an event could continue for years or decades (Kates et al. 2006), long after media attention and research funding dollars have been diverted to other areas. Each recovery's unique geographic context also complicates cross-disaster and cross-cultural comparisons of the recovery process even if the disasters occur at roughly the same time (see Haas et al. 1977).

2.2.1 Definitions and Outcomes

There is little agreement among recovery stakeholders on the aims, outcomes, or the meaning of recovery. Scholars, government officials, emergency managers, and lay people often interchange the terms "reconstruction," "restoration," "rehabilitation," and "rebound" with recovery; however, each term implies different goals and objectives for recovery (Quarantelli 1999). Reconstruction suggests a focus solely on the built environment. Restoration presumes a return to an original pre-disaster condition or form, which may include social and cultural elements in addition to physical structures. Rehabilitation connotes post-disaster improvement upon a pre-disaster physical state, often in terms of economic development, beautification, or functionality. Finally, rebound typically refers to a comeback that could be economic, population-based, or ecological in nature. The term recovery and its apparent synonyms refer to distinct yet interdependent physical, economic, social, and psychological facets that comprise the adjustment phase after a disaster (Neal 1997, NRC 2006, Phillips 2009, FEMA 2011).

Inconsistencies in the aims of recovery compound challenges that emerge because of the sequence of prior events and decisions that affect recovery's success.

Recovery is nested within the four-phase disaster cycle of preparedness, response, recovery, and mitigation (National Governor's Association 1979, Drabek 1986). The phases are merely a framework for organizing related emergency management activities (Phillips 2009); however connections between phases should not be underemphasized. The recovery continuum described in the National Disaster Recovery Framework (NRDF) (FEMA 2011) links activities before a disaster (e.g., preparedness exercises, resource inventories, and cross-organizational capacity building) and activities in short-term recovery (e.g., mass sheltering and setting up interim infrastructure for government and business functions) to the nature and speed of long-term recovery progress.

Recent disaster literature anchored by the central questions, "Recovery for whom?" and "Recovery to what?" invites consideration of the acceptability of recovery decisions, the equity of recovery processes, and the variability of recovery outcomes, which may leave some survivors and communities better or worse off than before (Quarantelli 1999). Ideally, recovery processes should work to mitigate future hazards (Godschalk et al. 1989, Berke et al. 1993), reduce vulnerabilities (Cutter 1996, Wisner et al. 2004), and build resilience in affected communities (Folke 2006, Cutter et al. 2008, Olson 2011), though rarely does this happen for everyone. The NDRF (FEMA 2011, 13) concedes, although "each community defines successful recovery outcomes differently based on its circumstances, challenges, recovery vision, and priorities," to be successful in recovery, all communities should overcome physical, emotional, and environmental disaster impacts and reestablish social and economic community viability in addition to demonstrating resilience by implementing all-hazards mitigation and vulnerability

reduction strategies, as advocated by scholars. Both the NRDF and research studies, thus, offer guidance on how to recover but tend to sidestep those key questions: who (and where) is the community? And what does a successful recovery outcome look like to them?   For answers, I review conceptual models of disaster recovery from the literature and examine studies that have, in one way or another, attempted to measure one or more facets of community recovery.

2.2.2 Conceptual Models and Frameworks

Kates and Pijawka (1977) propose a sequential model for the recovery process at the community scale that mirrors the disaster management cycle. Their model consists of four overlapping stages: (1) emergency, (2) restoration, (3) replacement-reconstruction, and (4) commemoration, development, and betterment, where each successive stage lasts about ten times longer than the previous. Emergency activities consist of search and rescue operations, medical relief, delivery of supplies like water, food, and ice, and recovery of the deceased. Restoration activities including reestablishment of lifeline utilities (power, water, sanitation), municipal services (public safety, schools), and households within affected areas ramp up in communities where relief functions are still underway. Large-scale clearing of debris signals the beginning of the reconstruction phase as does the formation of long-term planning councils for rebuilding. The reconstruction of physical infrastructure in the form of roads, rail lines, parks, and public buildings takes place at the same time as rebuilding of businesses and permanent housing. Activities continue until such a time as the pre-disaster levels of infrastructure are attained. After this time, any gains to housing or infrastructure are

considered improvements for the betterment of the community. As major construction

projects come to a close, this last phase also includes the erection of memorials and

establishment of rituals to commemorate the disaster event (Kates et al. 2006).

This 10-10-10 Recovery Model (Figure 2.1), remains the preeminent model in

contemporary recovery research (Kates et al. 2006), despite criticisms that it

overemphasizes physical reconstruction to the detriment of social processes

(Quarantelli 1999) and neglects recovery's place-based antecedents rooted in the

community fabric and in local decisions made during earlier disaster phases (Nigg 1995,

Olshansky and Chang 2009). The community scale 10-10-10 Model also does not

address what community means, though it is often uncritically applied to municipal and

county units because of data availability, when in fact, larger cities and counties may

consist of multiple communities.
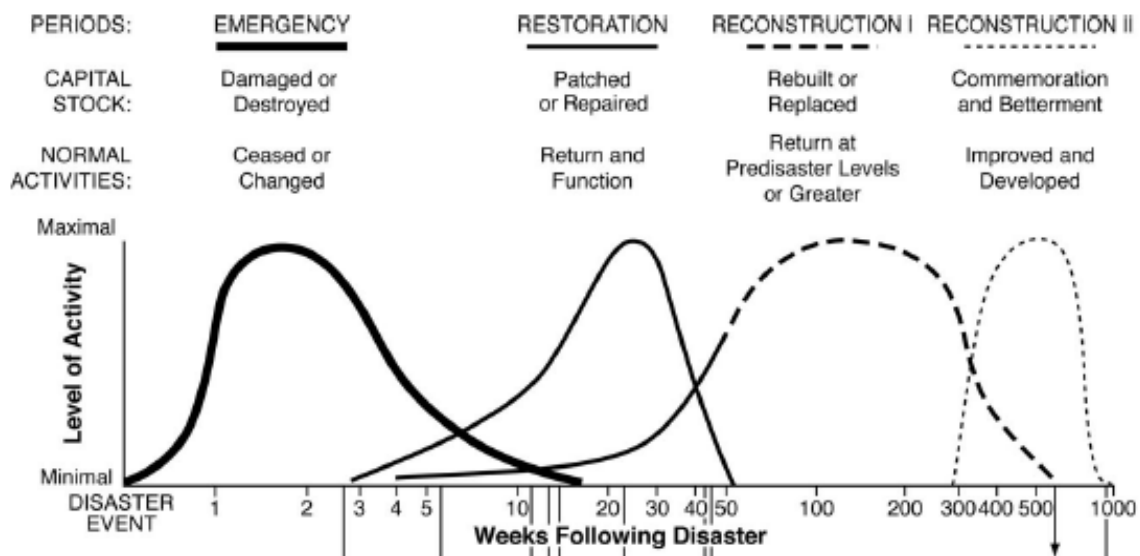
Figure 2.1 Kates' 10-10-10 Recovery Model, adapted from Kates et al. 2006.

Rubin's (1985) agency-based community recovery model offers an alternative, but it applies only to emergency management officials, not residents in general (Figure 2.2). The model emerged from case studies of 14 U.S. disaster recoveries taking place between 1977 and 1984. Their conceptualization of recovery centers on counties and municipalities successfully accessing financial aid and resources after presidential disaster declarations in order to rebuild residences, reconstruct buildings, resume utility service, reopen public facilities, return to pre-storm population levels, and implement both structural and non-structural mitigation. This model is cyclical and inter-dependent rather than sequential, as in the 10-10-10 Model. It emphasizes three components of a successful recovery: leadership, ability to act, and knowledge of what to do. Leadership characteristics include flexibility, cooperation with public and private decision makers, and a vision of what the community could and should look like. The ability to successfully leverage administrative skills and technical expertise on the structure of mutual aid agreements, planning processes, and enabling legislation lead to effective use of available resources. Finally, the institutional knowledge acquired from previous experience that includes what federal and state aid programs exist and how to navigate bureaucratic red tape make the recovery process run more smoothly. Interestingly, the model makes reference to community vision as key component of recovery. This seems to indicate that local knowledge about place is vital; however, the model approaches recovery from a command-and-control perspective and does not account for potential differences in community vision among stakeholders in non-leadership roles.
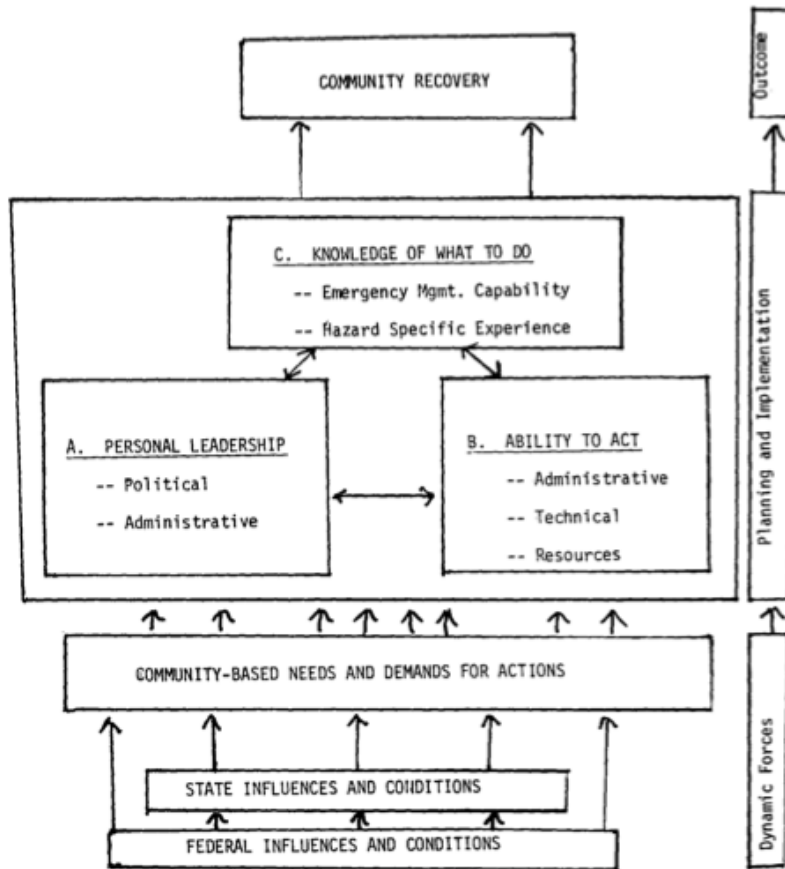
Figure 2.2 Rubin's Emergency Management Recovery Model.
Source: Rubin 1985.

More recently, several models have attempted to unite the physical processes of

rebuilding with the socio-demographic, political, and/or economic processes at work

during recovery. Chang and Falit-Baiamonte (2002) relate business characteristics like

business size, occupancy tenure, and sector to three loss factors: market vulnerability

(i.e., diversification, stability, resource access), damage, and mitigation strategies. They

show how market vulnerability and, to a lesser extent damage, drives business recovery,

along with neighborhood factors such as infrastructure repair and image which affect a

return to pre-disaster customer levels.

Pais and Elliot (2008) propose a regional spatial recovery model (Figure 2.3) based on modeled damages and population change data from four hurricanes in the 1990s and 2000s. Simultaneous economic development pressures, readily available post-disaster capital, and a public sentiment to rebuild bigger and better converge upon a partially clean slate for rebuilding to produce a stratified social and spatial landscape. The core impact zone receiving the most severe damage decreases in population density and in racial and ethnic diversity as entrenched elites stave off development pressures and minority citizens find they are unable to rebuild. An inner ring just outside the core zone witnesses an increase in population, in-migration, and racial diversity driven by relocation from the core and by relocation from outside areas because of reconstruction employment and kinship networks. Overall, this pattern leads to imprudent development in hazardous areas and an outward areal expansion of the densely populated urban landscape. Although this latter finding corroborates studies that find an expansion of the urban extent common in post-disaster scenarios (Haas et al. 1977, Hagelman et al. 2012) and racial homogenization in and around heavily affected neighborhoods (Peacock and Girard 1997, Smith et al. 2006), the precise spatial patterns of resettlement by race/ethnicity and the posited causal forces responsible for the spatial recovery machine have yet to be validated by other case studies.
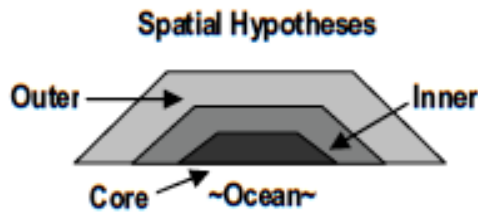
Figure 2.3 Spatial Recovery Machine
Model. Source: Pais and Elliot 2008.

Similarly, Rathfon and colleagues (2013) build upon the community level housing

recovery model developed by Quarantelli (1995) as well as empirical studies of housing

recovery (Comerio 1998, Cole 2003). Whereas Quarantelli's model for housing recovery

is sociological in nature and mirrors Haas and colleagues' (1977) wave-like model with

successive phases of emergency shelter, temporary shelter, temporary housing, and

permanent housing, the Rathfon group models the possible paths for the recovery of

residential structures (Figure 2.4). Progressing from an initial damage state, a structure

may (or may not) undergo temporary protection measures before either a) being

demolished and rebuilt or b) undergoing construction for major or minor repairs. The

end stage could be demolition, repaired, or rebuilt. They implement their model for

Hurricane Charley recovery in Punta Gorda, showing with remotely sensed imagery,

building permits, property sales, appraisals, and government documentation (FEMA / US

Army Corps of Engineers) that multi-family housing and commercial structures were

more likely than single, owner-occupied housing to follow the demolished path. They

also found no differences in recovery speed or property sales based on either land use

type or initial damage state of the property. This latter finding contradicts work by

Zhang and Peacock (2010), which did find that sales varied based on damage level.
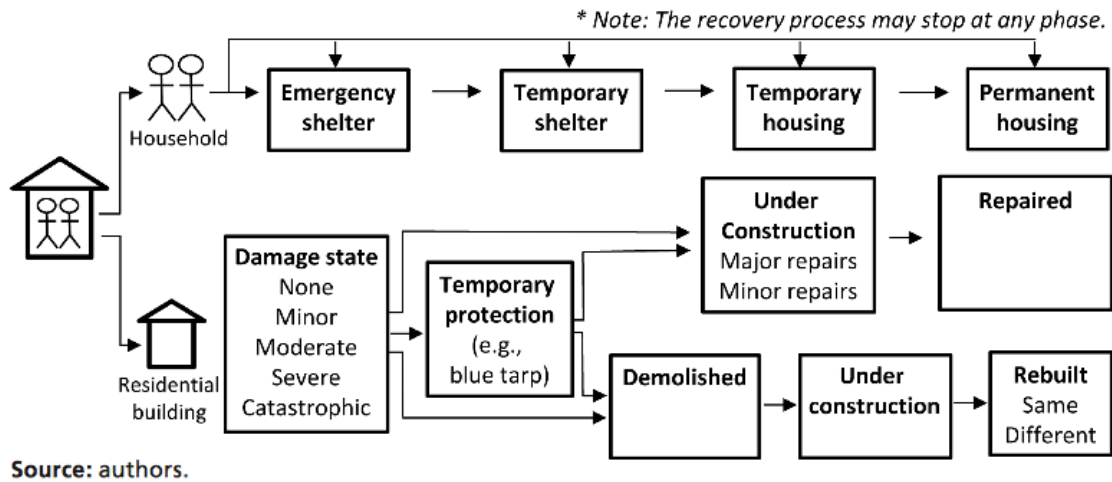
Figure 2.4 Sheltering and residential building recovery models. Source: Rathfon et al. 2013.

Social capital, emergent groups, and rapid response labor migration are notably

absent from extant conceptual models of recovery, despite growing evidence of their

importance to disaster recovery (Drabek and McEntire 2003, Tierney and Trainor 2003,

Fussell 2009, G. Smith 2011a, Aldrich 2012, Ganapati 2012). Aldrich (2012)

demonstrates quantitatively the correlation between population recovery and social

capital proxies like voter turnout and political demonstrations; however, the causal links

between social capital proxies and population return may not necessarily be

straightforward. Richardson and colleagues (2014) examine the viability of the

individual-level psychosocial framework *communitas*, or a particularly rich sense of

community, for describing community-scale social recovery. They describe a three-step

process paralleling reconstruction from a disaster where a community loses its pre-

existing social order and must reform its identity from the ground up. The framework

appears useful in describing short-term social recovery in a socially homogenous small

town noted for civic leadership accolades and rapid rebuilding, though the concept may

not apply over the long-term or in more diverse locations.

Other extant models conceptualize recovery at the family or household level

(Bolin 1982, Bolin and Bolton 1983). In these sociological models, recovery is likened to

the ability to access financial aid or a simple yes/no response to whether residents feel

emotionally or economically recovered. These models tend to rely on quantitative

techniques like path analysis or discriminant analysis to describe the relationship

between various factors (e.g., household size, income, religious affiliation, or race)

during recovery. Narrow definitions of gender (biological sex), race (white/non-white),

and family (nuclear, two-parent) are employed in these models, which fail to explore the

implications of these identities for recovery. In short, they do not consider the lived

experience and its impact on residents' own assessments of recovery.

2.2.3 Recovery Assessment

By and large, current empirical studies measure recovery with quantitative

proxies that tabulate housing characteristics such as reconstruction, vacancy,

affordability, or tenure (Kamel 2012, Zhang 2012, Cutter et al. 2014a), population

change (Finch et al. 2010, Li et al. 2010, Cross 2014), receipt and adequacy of disaster

aid (Gotham 2014, Spader and Turnham 2014), employment rebound (Zottarelli 2008,

Schumann 2013), or business return (Hagelman et al. 2012, Xiao and Van Zandt 2012).

The more sophisticated of these measurement approaches triangulate between several

of these indicators by combining population numbers with data on regional economic conditions (Chang 2010), for example, or by cross-referencing housing counts with estimates of exposure or local social vulnerability (Van Zandt et al. 2012, Cutter et al. 2014b). Other scholars focus on normalization efforts to improve data comparability, and indeed, much variation exists depending on whether recovery is approximated by: a) a return to pre-disaster levels (e.g., population count, housing stock), b) a return to the pre-disaster trajectory (e.g., pre-event population trend, economic flows), c) stabilization to a new normal, or d) return to observed trends in comparable areas (Rose 2004, Chang 2010, Sayre and Butler 2011). The first type of recovery assessment (a), which is based on stock variables, illustrates the conceptualization of recovery as an outcome, while the other approaches (b, c, d), which assess recovery based on trends or flow variables, exemplify assessments of recovery as a process.

Visual, spatial, and geo-statistical methods are increasingly being applied to identify reconstruction disparities (Curtis et al. 2010, Stevenson et al. 2010, Burton et al. 2011). These studies tend to be longitudinal in nature, viewing recovery as a process. Dynamic video and digital photography are used as either primary data collection techniques or for data verification, and spatial statistics (e.g., Monte Carlo simulations, spatial interpolation, spatio-temporal clustering) serve to identify geographic areas where the relative rate of recovery is progressing quickly or lagging. Data collection and analysis procedures common to these studies foster, at best, limited engagement with local knowledge—only one of these studies consulted locals in any form (Curtis et al. 2010).

A recent content analysis of recovery indicator literature reveals differences in indicator preferences depending on authorship (Jordan and Javernick-Will 2013). Engineers tended to cite housing repair and the restoration of public facilities and lifelines, social scientists focused on economic indicators, while practitioners relied upon a mix of population return, housing restoration, and sustainability indicators. A multi-round Delphi survey with experts validated the importance of critical facility and lifeline operation in measuring recovery; participants also identified water quality, debris removal, and social service availability by consensus as additional indicators. Utilizing quantitative indicators possesses real advantages with regard to comparability across administrative districts, policy relevance, exploration of trends or patterns, and broad-brush summary capabilities. However, when divorced from place-based knowledge, a downscaled recovery analysis becomes prohibitive and the consideration of community fabric or local decision-making is next to impossible.

Literature on the recovery concept and on recovery assessments holds important implications for the research design of the current study. First, methods that explore residents' own recovery meanings and recovery assessments must leave open the possibility for multiple definitions of recovery (e.g., restoration, rehabilitation, etc.) and for conceptualizations of recovery as a process or as an outcome. Second, to provide a context for recovery meanings and assessments, the methods must focus on residents' own lived experience rooted in place (i.e., the spatial and visual landscape of their recovering community). Hence, consideration of the human geographic concept of

landscape is essential in developing both a guiding framework for the study and in steering the methodology.

2.3 Landscape

The concept of landscape is an essential tool for perceiving and understanding one's world. The landscape, put simply, includes everything one sees from a situated perspective. Each individual's unique social position, past experiences, imagination, bodily form, and self-identity tailor this perspective or "gaze" that is projected onto the landscape to gain understanding (Cosgrove 2008). Thus, seeing a landscape entails more than an objective optical sensing of the physical arrangement of buildings, terrain, vegetation, and human bodies; it is a subjective process of envisioning the social and symbolic meanings that underpin the physical, spatial world (Soja 1980, Milligan 1998). Landscapes are, therefore, visions of places constructed from different forms of embodied visual and spatial knowledge. The landscape, by virtue of its dual physical and symbolic nature, represents the essence of a "place." With repeated landscape interaction, people develop cognitive and emotional bonds with place, or place attachments, that serve functional and psychological needs (Scannell and Gifford 2010). Over time, such interactions can also actively shape self and group identities (Proshansky 1978, Hoelscher 2003, Nowell et al. 2006).

The physical-symbolic duality of place encapsulated in the landscape concept makes it relevant to the study of disasters because, when a disaster rearranges the physical landscape, it can result in damaged place attachments, severed self-identities, and additional anxiety during the recovery process. Several pertinent examples of the

importance of place and landscape emanate from the disasters literature. Erikson

(1976) documents the collective sense of loss and depression in the wake of a

destructive dam burst and flood in a West Virginia hollow. The displacement and

destruction of houses, possessions, and familiar landmarks symbolically represented the

erasure of a working class, communal society whose interactions formed members' self-

identities. A study by Fothergill (2004) demonstrates how women's self-efficacy and

perception of psychological stability mirrored home rebuilding processes and the

restoration of familiar routines after the 1997 Grand Forks, North Dakota, flood. Burley

and colleagues (2007) also forge links between place, identity, and disaster in coastal

Louisiana. They show how ethnicity, local nativity, age, and cognizance of a gradually

eroding subsistence livelihood defined and strengthened place attachments.

Connections to place can also prove beneficial in disaster recovery. In two

distinct ways, place was paramount in the successful evacuation, return, and post-

Katrina recovery of the Vietnamese community in Village de L'Est, New Orleans East

(Leong et al. 2007, Airriess et al. 2008, Li et al. 2010, Olson 2011). First, ties to a

neighborhood Catholic Church provided strong bonding capital and decisive leadership

rooted in the current place of residence. Second, historic ties to a single village in

Vietnam and the shared migration experience that brought the immigrants to the Gulf

Coast, together, resulted in bridging capital with other Gulf Coast Vietnamese

communities, institutional knowledge about government procedures, and experiential

knowledge on starting over from scratch. The knowledge and social capital formed in

relocating from the same place of origin was essential for accessing formal (governmental) and informal recovery aid.

The landscape functions as both an archive for collective memory and a directive for remembering and forgetting (Hoelscher and Alderman 2006, Colten and Giancarlo 2011), hence the role of memory is an important consideration for the present study that investigates recovery in a post-disaster landscape. The fourth phase of Kates and Pijawka's (1977) 10-10-10 Recovery Model focuses on remembering the disaster event through the construction of memorials and the performance of rituals, though other scholars note the format these remembrances varies widely. Smith (2011b), for example, discusses the informal practice of sensory memory as an essential element in the process of understanding and coping with the aftermath of 1969's Hurricane Camille in coastal Mississippi. Foote (2003) describes a range of memorialization practices that may occur in the wake of a disaster, depending on the way in which survivors and society wish to remember it. This range includes 1) sanctification, in the form of a memorial structure, 2) designation, with a plaque or marker, 3) rectification, which involves repair and reuse without recognition, and 4) obliteration, when a site is purposefully erased because of stigma. In comparing memorials erected after the 2001 Gujarat earthquakes and the 2004 Indian Ocean tsunami in Sri Lanka, Simpson and de Alwis (2008) show that disaster memorials in these locations represent sites of tension that unified dissenters while also reifying the power of the state.

Landscape, being a material product of larger-scale political and social discourses (Schein 1997), has the power to naturalize mainstream ideologies (Daniels 1989,

Mitchell 1996). Thus, the roles exerted by political and economic power, together with

collective social memory, guide rebuilding efforts during disaster recovery. Two case

studies from the disasters literature show the materialization of power and memory

particularly well. In Xenia, Ohio, a tornado spawned during the 1974 Super Outbreak

leveled much of the town. Francaviglia (1978) discusses how political elites rebuilt the

town as a memorial to the familiar, recreating the same development patterns that had

existed before, minus neighborhoods deemed unsightly or occupied by undesirable

groups. Colten and Giancarlo (2011) view social memory as a repository of local

knowledge about successful strategies for disaster mitigation, preparation, and

recovery. Examining successive hurricanes striking southeast Louisiana and Mississippi

from 1915 to 2005, they argue that the region's built landscape is the material reflection

of unsafe development policies pursued by local leaders who actively forgot the

consequences of these events and ignored the biophysical vulnerability of the region.

While the effects may have brought short-lived economic investment, the erosion of

social memory represents a longer-term loss of resilience to disasters.

Literature on landscape theory demonstrates the existence of intrinsic links between

place, memory, identity, and power, which must be translated into the methodology

when examining residents' own recovery meanings and assessments vis-à-vis landscape.

Figure 2.5 presents my own conceptual model for approaching the outlined research

questions in light of these links between recovery and the post-disaster landscape. In

the model, recovery is a vague idea comprising several facets (i.e., economics, built

infrastructure, the natural environment, social structures, and psychological meanings).

The physical post-disaster landscape is the visual and material result of the ideas/ideals of recovery being enacted through policy decisions. While recovery policy is implemented at multiple administrative levels (e.g., state, county, municipality, parcel, housing unit), residents perceive the recovery process at spatial scales that are less rigid (e.g., region, community, neighborhood, household). During the recovery process, residents read and interact with the physical landscape around them, constructing their own landscapes of meaning to form their understandings of recovery (i.e., assessments of its speed and the acceptability of outcomes). These envisioned landscapes also guide the actions they take to recover (e.g., rebuilding in place, relocating, memorializing the event, or mitigating against future disasters). The proposed research questions, thus, seek to examine the interaction between residents and the physical post-disaster
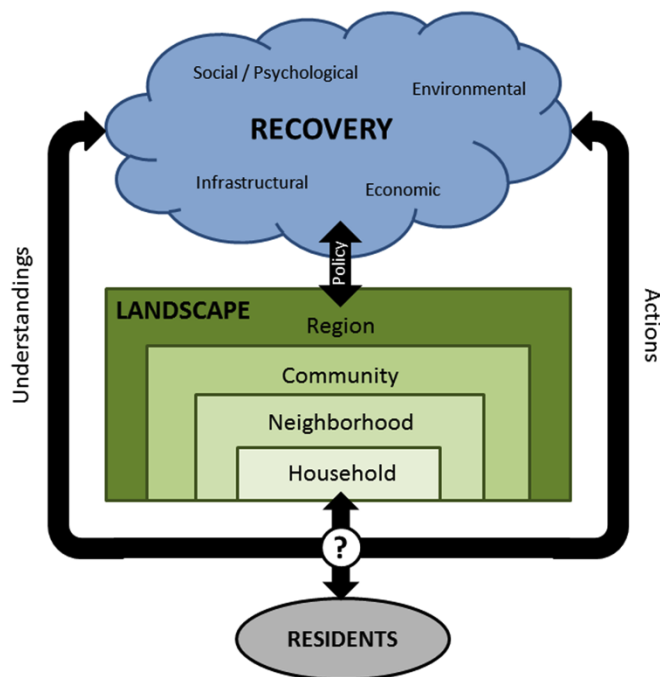
Figure 2.5 Proposed model for investigating recovery landscapes. Source: Author.

landscape where meaning is made in order to discover how such interactions help residents define recovery, assess its progress and outcomes, and how these constructed views differ from standard assessments of recovery employed by decision makers.

2.4 Intersectionality and Feminism

In order to equitably address differences in the perception of recovery as seen through the post-disaster landscape, methods must consider residents' multiple identities and the power differentials present in the study area so as not to privilege powerful voices or reify dominant discourses on recovery. The feminist notion that people view and understand the landscape through their own embodied perspective (Rose 1993, Cosgrove 2008) provides guidance on what framework and methods to operationalize in looking with residents at their own disaster landscapes. First, the framework and methods used should account for both the historical and geographical context of the place being studied. Second, they should consider how each resident's social position might shape their own view of the post-disaster landscape. Social position (or social location) refers to one's place in the social hierarchies of race, ethnicity, class, age, gender, sexuality, and nation. It is a result of intersecting power hierarchies (Weber 2010b, p24).

The feminist, intersectional approach is ideal for exploring recovery understandings because it accounts for geographic context, social position, and power hierarchies in its three foundational tenets: 1) the existence of multiple, situated realities (Rose 1993, Valentine 2007, Weber 2010b); 2) the socially constructed, locally

contextual, and multi-scalar nature of these realities (Elliot and Pais 2006, Leong et al. 2007, Pearce 2007); and 3) cognizance that the self and group identities that form the basis of these realities are fluid, multidimensional, and place-based (Hancock 2007, Bowleg 2008). The intersectional framework is consistent with language contained in a recent NRC report on facing hazards and disaster (2006, 158), which acknowledges that "a multiplicity of recovery trajectories […] are shaped […] by axes of stratification" such as income, race, ethnicity, access to monetary aid, and availability of informal social support.

Sociological research on disasters demonstrates the effects of these and other axes on recovery understandings and actions. Women, for instance, experience recovery differently than men in terms of family obligations, strategies for coping, and overall psychological effects (Fothergill 2000, Enarson 2012). Blacks, Hispanics, and immigrants, who may be limited in their recovery efforts by insurance redlining, de facto exclusion, and government mistrust, must rely heavily on kinship networks to fulfill unmet needs (Peacock et al. 1997). The high value of collective memory, strong kinship bonds, and limited incomes among these minority groups also make permanent relocation less likely than for whites (Fothergill et al. 1999, Leong et al. 2007). Differences in recovery perspectives have also been documented between government officials, front-line recovery workers, and lay residents on the basis of occupation (Weber 2010a, Weber and Messias 2011). Finally, the recovery process as experienced by any individual is the result of federal and state disaster policy decisions made by emergency managers, planners, business leaders, and governing officials at all

jurisdictional levels, and courses of action taken by the individual in response to these conditions. All policies and actions have historical antecedents rooted in place. Thus, the social, symbolic, and spatial landscape in which a disaster occurs foregrounds the recovery experience (Miller and Rivera 2008, M. Smith 2011b).

Current intersectional scholars direct their research primarily toward action-based or policy-based goals that consider the effects of race, ethnicity, class, gender, and sexuality rather than controlling for them. Studies promote multiple forms of empowerment (Townsend et al. 1999) among historically underrepresented groups through coalitions, participatory research, or institutional-citizen partnerships (Wang and Burris 1994, Cole 2008). A large body of work has been devoted to identifying social and psychosocial determinants of health and healthcare disparities (Higgins et al. 2010, Shim 2014), while sizable research has also examined issues related to equity in economic development and politics (Facio et al. 2004, Frasure and Williams 2009, Hankivsky 2012). These studies show the ability of intersectional research to illuminate links between external conditions (i.e., social, economic, environmental) and internal responses (i.e., psychological, emotional, cognitive), which is an important consideration for recovery research.

Psychologists and psychiatrists have already produced substantial work on disaster recovery demonstrating relationships between external socio-demographic characteristics and health outcomes, both physical and psychological (Norris et al. 2002a, b, Norris et al. 2004, Davidson and McFarlane 2006, Chen et al. 2007). These studies suggest that mainstream recovery research lacks a focus on the psychological

and symbolic role of place as it relates to recovery outcomes. Meanwhile, a separate

body of nascent research by geographers uses narrative and visual approaches to

explore the nuanced meaning of home (Morrice 2012) and the concept of emotional

work (Whittle et al. 2012) as seen from participants' own social positions. Though

exemplary in their treatment of place, these studies do not directly or systematically link

their findings to recovery practice. The current study attempts to bridge this gap

between feminist theoretical approaches that consider the social position of recovering

residents and practical methods for assessing the recovery of a place as mediated

through the post-disaster landscape.

2.5 Critical GIS

Feminist geographic research that embodies intersectional aims exists not only

in the realm of landscape studies; it has also taken root in the geographic information

systems (GIS) sub-field (Schuurman 2006), which holds utility in systematically

answering the "where" and "why" questions on disaster recovery proposed in this

study. Feminist GIS and participatory GIS emerged from discussions on the effects of

GIS on society and a shared concern from social theorists about the overly positivist,

empirical, and masculinist guise of GIS rebranded as GIScience (Obermeyer 1998, Kwan

2002, Sheppard 2005). Both feminist GIS and participatory GIS fall under the umbrella

of critical GIS. While more traditional, analytical GIS arising out of geography's

quantitative revolution produces generalizable knowledge reliant on statistical

relationships and discounts the subjectivities of the analyst, critical GIS makes these

subjectivities the object of analysis. Critical GIS emphasizes the role of lay people,

particularly underrepresented groups, in creating geographical knowledge.

Public participation GIS strives to make qualitative spatial information accessible and

usable by grassroots groups, and feminist GIS goes farther. Feminist GIS acknowledges

that individuals do not remotely sense the world from an external position; but rather,

they view the world from inside a body, and many valid vantage points exist. Gender,

livelihoods, and power hierarchies also feature center stage in feminist GIS (Pavlovskaya

and St. Martin 2007, Valentine 2007). Studies often show how social positionality,

religiosity, memory, perception, and emotion guide understandings and interactions

with space (Parks 2001, Pavlovskaya 2002, 2004, Kwan 2007). Researchers often engage

subjects in interactively mapping affective, subjective, or local knowledge (Pavlovskaya

2004, Kwan 2007, Pavlovskaya and St. Martin 2007).

Critical GIS methods are already making in-roads into disaster research. The

concept of volunteered geographic information (VGI) aims to recast the public as

sensors for environmental information pertinent in warning, response, or recovery from

disaster (Elwood 2008). From a healthcare perspective, efforts to involve

underrepresented communities in evaluating their own needs during disaster planning

and recovery could help mitigate against future mortality, morbidity, post-traumatic

stress, and other negative health outcomes (Davidson and McFarlane 2006). Allowing

citizens to direct their own pre- and post-disaster community planning efforts is shown

to increase satisfaction with the recovery process and the reconstructed spaces, which

are more pertinent to the logistical, social, and cultural needs of the community (Corser

and Gore 2008, Wagner et al. 2008, Barrios 2009). These efforts have also been shown to boost neighborhood pride, optimism, self-efficacy, and quality of life (Barrios 2009, Olshansky and Chang 2009).

The incorporation of participatory GIS methods into localized decision making is not without its challenges. Access to GIS technology, the rigidity of the software's architecture for feature storage and representation (e.g., data layers, geometry), the shortage of publicly accessible data, and inconsistencies in data formats and organization make the integration of participatory GIS methods prohibitive by community-based groups, non-profits, and smaller municipalities prohibitive (Barndt 1998, Sheppard 2005). Collaboration between these various local organizations and governments using participatory GIS is exponentially more difficult, particularly in a post-disaster scenario.

The current study operationalizes feminist, intersectional, and critical GIS methods, including in-depth interviews, photo elicitation, and participatory mapping, as tools to critically explore place recovery both visually and spatially. These techniques use residents not only as sensors for showing where recovery is happening but also as agents in defining the meaning, significance, and acceptability of recovery as a process and an outcome responsible for shaping the post-disaster Mississippi Gulf Coast. Results from these methods are compared against recovery indicators derived from secondary data. Though local, state, and federal entities rely on these types of indicators for monitoring recovery, the question remains as to whether or not residents' assessments of recovery match common indicator-based assessments. Such a

determination is necessary for promoting empowerment among underrepresented

groups and overall citizen efficacy in the recovery process. The chapters that follow

detail the study area, data collection procedures, implementation, and results from each

of these techniques meant to explore meanings and assessments of long-term place

recovery in communities along the post-Katrina Mississippi Coast.

CHAPTER 3

METHODOLOGY

3.1 Study Area

The Mississippi Gulf Coast provided a compelling site for examining ongoing long-term recovery processes for several reasons. First, the Coast is no stranger to catastrophic hurricanes. Longtime residents still recall vividly the landfall of Category 5 Hurricane Camille in 1969 and the protracted recovery process afterward, giving a basis for comparison to the post-Hurricane Katrina recovery. Second, while the Coast as a whole had recovered most of its pre-2005 population and reconstructed its major infrastructure by the start of this study (GCBCRF 2008, Sayre and Butler 2011), secondary events like the Great Recession (2008-10), the BP Gulf Oil Spill (2010), and Hurricane Isaac (2012) have differentially prolonged and complicated the Katrina recovery process for some residents. The three southernmost counties of Mississippi—Hancock, Harrison, and Jackson—comprise some of the most affluent, ethnically diverse, and urbanized areas in a relatively poor, historically biracial, rural state (Table 3.1). Within these three counties, however, sufficient variation exists in population characteristics and development patterns to permit comparison of disparate perspectives across a range of damage impacts. The visual landscape of damage and

recovery also varies greatly from west to east across the study region. The next

paragraphs provide background on the counties and communities in the study area.

Table 3.1 Demographic comparison of study area counties with Mississippi.
Sources: U.S. 2010 Census and 2008-12 American Community Survey

	Hancock	Harrison	Jackson	State
Population	43,929	187,105	139,668	2,967,297
% Urban Pop.	57.4	77.2	72.7	49.3
% White	88.4	69.7	72.1	59.1
% Black	7.1	22.1	21.5	37.0
% Hispanic	3.3	5.3	4.6	2.7
% Asian	1.0	2.8	2.2	0.9
Median Household Income (08-12 ACS)	$43,727	$43,593	$49,750	$38,882

Hancock County, the farthest west of the three counties (Figure 3.1), is primarily

white and working to middle class. Pre-Katrina, the beach town of Waveland and its

historic neighbor Bay St. Louis attracted weekenders from New Orleans and retirees

who converted family fishing camps into permanent homes. Post-storm growth has

slowed except in Bay St. Louis's historic district and along the commercialized Highway

90 corridor, which both sit on high ground and remained relatively unscathed by the

hurricane's massive surge. Diamondhead along I-10 is a Hawaiian-themed suburb,

home to middle to upper class residents, many of whom work at NASA's John C. Stennis

Space Center, the county's largest employer. Hancock County was truly ground zero

during Hurricane Katrina. Small cities surrounding St. Louis Bay experienced an

amplified surge due to the bay's concavity, which pushed flooding miles inland. Today

in Hancock County, mailboxes, driveway cuts, chimneys, and empty pilings overtaken

with vines and undergrowth—the remains of once-occupied suburban neighborhoods—

make for a visually arresting landscape.
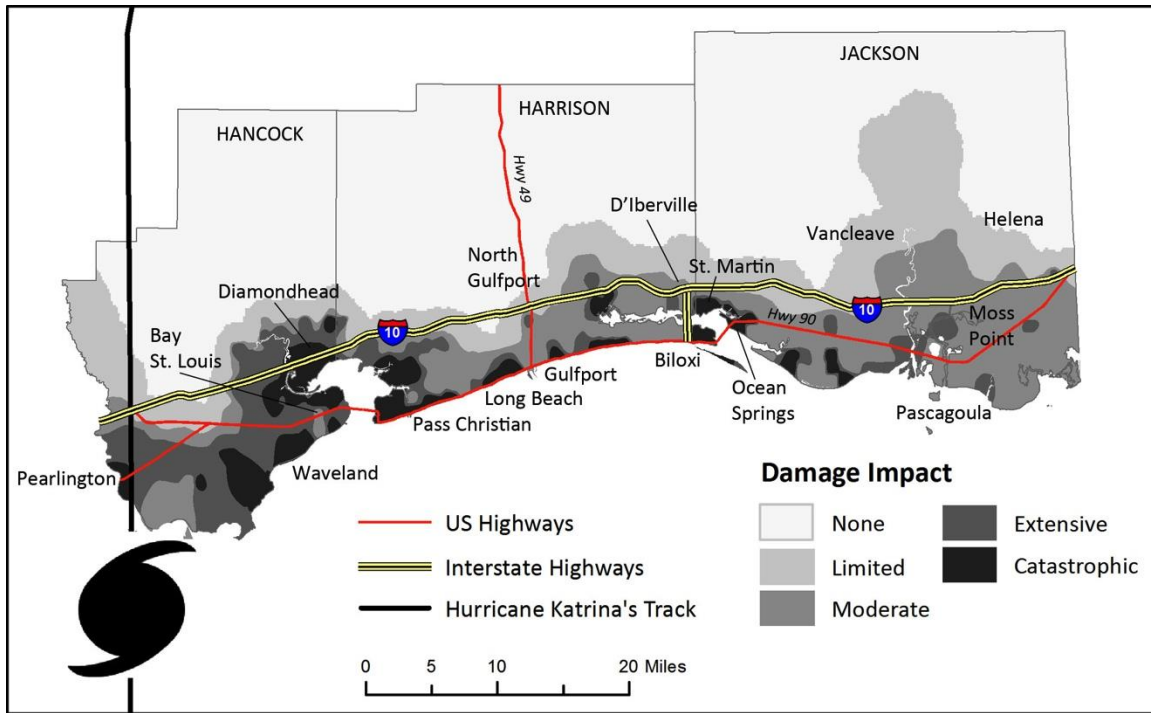
Figure 3.1 Map of current and former residential locations for full study participants

The scenery in western Harrison County to the east looks much the same, but

with more signs of life near rebuilt Main Street districts in Pass Christian and Long

Beach. Unincorporated Henderson Point, in westernmost Harrison County, received the

maximum high water mark of 27.8 feet in Katrina, and resembles Hancock County more

than the rest of Harrison County to the east. The gulf waters swept away fishing camps

and homes already raised 10-15 feet off the ground. In Pass Christian, a historic

summer resort for wealthy New Orleans Creole families, a twenty foot bluff mitigated

some damage to the historic properties, but did not prevent massive destruction. Oak

tree skeletons sculpted into statues of coastal creatures, new boardwalks, and a freshly

paved Highway 90 adorn the now sparsely populated shoreline in western Harrison County. Farther east in more urbanized Gulfport and Biloxi, the berm of the east-west CSX railroad line served as a protective barrier, containing surge damage to the first quarter mile from the shoreline. Surge and wave heights were amplified in neighborhoods lining the shores of Biloxi Bay, similar to the funneling effect observed at St. Louis Bay. Nearly all of the East Biloxi peninsula overwashed during Katrina, and the first few waterfront blocks in D'Iberville north of the bay were scraped clean of everything but foundations. Post-hurricane residential growth in Harrison County has taken place mainly north of I-10 in North Gulfport, and retail growth can be seen in D'Iberville's new Promenade shopping area at the junction of I-10 and I-110.

With a population just shy of 200,000 as of 2010 (U.S. Census Bureau 2010), Harrison is the most populated and the most urban of the three counties. Gulfport and Biloxi, the second and fifth largest cities in the state, are culturally distinct. Gulfport is biracial, more culturally conservative, and Protestant, while Biloxi remains a more liberal, Catholic, and diverse city. Point Cadet at the eastern tip of the peninsula is the heart of Biloxi's seafood heritage. Here Slavs, Poles, and Croatians made fishing nets and shucked oysters in the canneries at the turn of the century. Over the last thirty years, a large Vietnamese population has settled on the Point and taken the reigns of the shrimping and seafood packing industries. The heart of Biloxi's African American culture lies just to the west of the point in the center of the East Biloxi peninsula. Eight casinos ring the outer edge of this densely populated and impoverished peninsula. They

function as major economic engines for the county, as do Keesler Air Force Base, the Naval Construction Battalion Center (Seabee Base), and the Port of Gulfport.

Jackson County overall fared better, though cities located on Biloxi Bay received a pounding similar to their neighbors. These places include mixed white, black, and Vietnamese working class neighborhoods in St. Martin, Gulf Hills, and Gulf Park Estates as well as wealthy, majority white, gentrifying areas of historic Ocean Springs. Pascagoula's downtown district with its shipbuilding and refining interests was relatively quick to rebuild when compared with neighborhoods in majority black Moss Point to its north. Flood-prone and swampy, this area took on water for Hurricane Katrina and again for Hurricane Isaac. The impoverished Kreole neighborhood in northeastern Moss Point was especially hard hit in Isaac due to its low elevation, substandard housing stock, and a dam breach on the Escatawpa River upstream near Helena. Jackson County's protected inland towns like Latimer, Vancleave, and Gautier are sites of new suburban development as working age white and Vietnamese residents relocate to escape the rising insurance costs and elevation requirements mandated in their former coastal neighborhoods.

My intimate knowledge of the region and its post-Katrina evolution, gleaned through a variety of channels, further justified the selection of the study area. Deep knowledge of place and culture proved essential to interpreting the nuanced meanings communicated by participants, particularly in participatory mapping. As a New Orleans area native and Mobile, Alabama, resident for 22 years prior to this project, I was well acquainted with the region. My employment on the Gulf Coast beginning in 2008 and

involvement in ongoing fieldwork with the Hazards and Vulnerability Research Institute (HVRI) since 2010 have increased my familiarity with coastal Mississippi. A decade-long, spatial data record of residential reconstruction collected by HVRI researchers provided further context on recovery patterns and locations to target for participant recruitment. An established network of professional and personal contacts in the study area proved vital to efficient recruiting via snowball, which I detail next.

3.2 Recruiting and Sampling

I operationalized the intersectionality framework in sampling by recruiting an array of participants that varied in their social position on the basis of multiple identities. My recruiting strategy aimed for diversity, and thus, was purposive rather than representative. I weighted my sample more heavily toward women, people of color, and poor to working class residents in order that results might address extant theoretical knowledge gleaned using primarily white, middle-class, or race- and gender-blind samples. This is a criticism of early sociological studies in disaster. Obtaining good balance first by race/ethnicity and gender, then by neighborhood location, age, and storm experience during Hurricane Katrina was challenging.

I implemented three recruiting strategies with personal contacts, professional contacts, and impromptu church visits. Personal friends agreed to pilot test my methods, and several others also referred me to relatives and acquaintances who possessed unique experiences during Hurricane Katrina and the recovery process. Professional contacts received a letter via email introducing the project and the aims of the research and a flyer for distribution (Appendix A). After making contact, an initial in-

person meeting was arranged. Initially I told these professionals that I was seeking set

of individuals who were diverse in terms of gender, race/ethnicity, and residence

location. As my sample began to fill out, I modified my recruitment criteria as needed. I

also compiled a list of churches and made recruitment visits. Church visits to a Catholic

church and a Baptist church in Hancock County yielded participants. Finally, a chance

meeting during a HVRI field data collection exercise in Diamondhead resulted in two

additional participants to round out the sample. In all, I spoke with 102 individuals on

the Gulf Coast who either became participants or aided in sampling in some way.

Pilot testing of methods, recruiting, and data collection for this study occurred

during five successive trips to the Mississippi Gulf Coast between June 2013 and

February 2014. Time spent in the field totaled just over 8 weeks. Figure 3.2 summarizes

each of these trips, various participant groups, the procedures implemented, and data

derived from each group. During each trip, valuable insights added to either my

background knowledge of the study area or to data collection beyond a proposed

sample of 25-30 residents. For instance, snowball sampling through professional

contacts meant I interacted with government officials, advocacy organizers, academics,

clergy, and non-profit managers. I term this group my "key informants" (Figure 3.2).
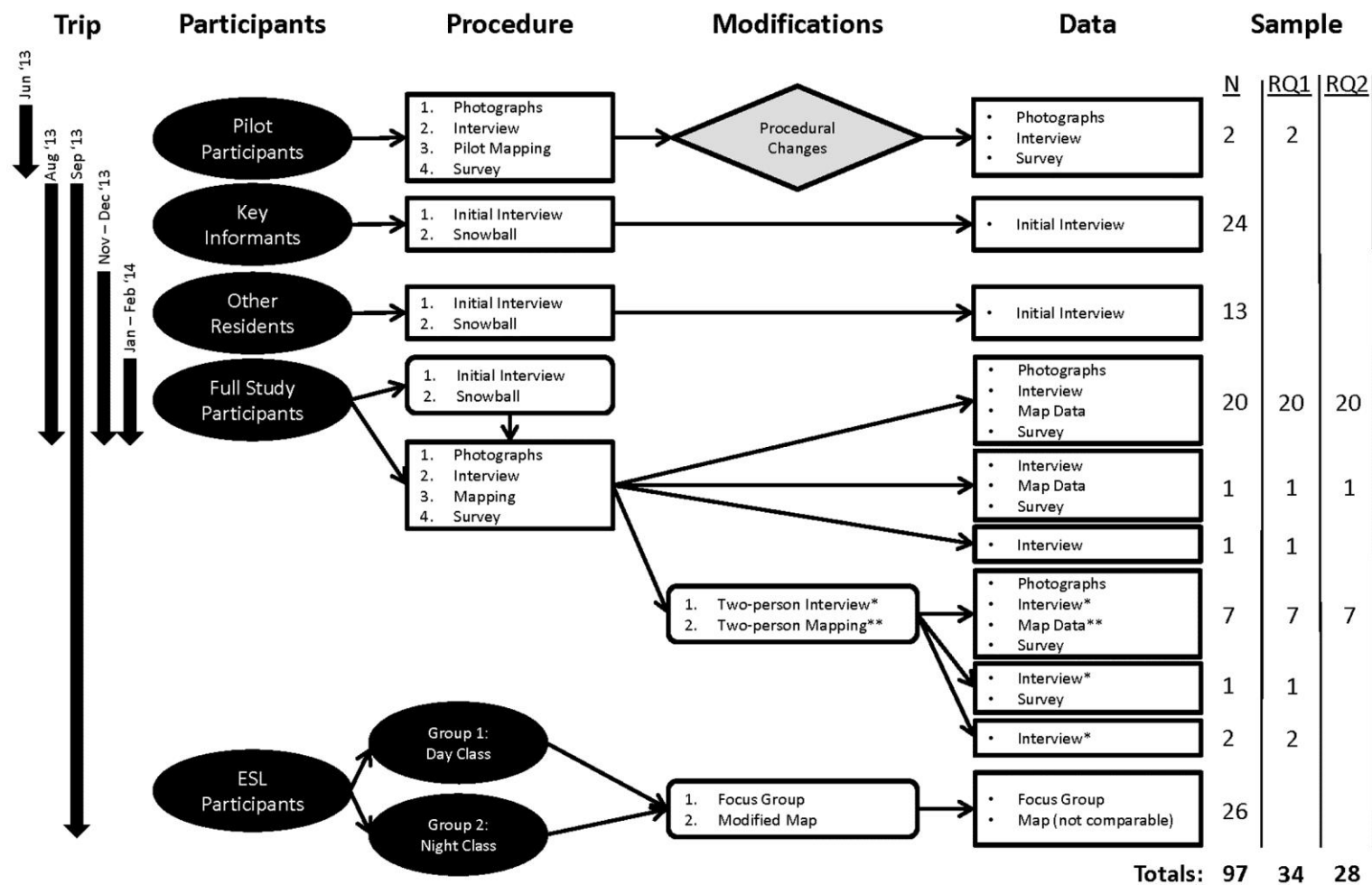
Figure 3.2 Map of current and former residential locations for full study participants

Meetings with key informants helped to identify and contextualize long-term recovery issues on a number of fronts: housing, tourism, real estate, economic development, government financing, population change, immigration, public education, emergency management, health and welfare, social support, and cultural affairs. I developed a standard initial interview schedule (Appendix B) to use at these meetings, adding specific probes to the schedule with successive meetings. The set of questions dealt with Hurricane Katrina impacts; secondary impacts from the BP Oil Spill, Hurricane Isaac and the economic recession; recovery assistance; short-term versus long-term (current) recovery issues; and specific asks on insurance, rebuilding, and economic development activities. When referred to "other residents" (Figure 3.2) who were citizen leaders or neighborhood area experts, I was able to systematically implement the same initial interview schedule.

"Full study participants" (Figure 3.2) were those recruited to take part in photo elicitation, a follow-up semi-structured interview, participatory mapping, and a short demographic survey. Key informants and other residents referred me to my full study participants, who were usually third, fourth, or fifth connections from an initial snowball contact. I attempted to meet with each full study participant twice. The initial meeting was to introduce myself, obtain written consent to participate, find out the basics of the participant's Katrina recovery experience to inform ongoing purposive sampling, and provide instructions for the photo elicitation exercise to be completed independently. I used the same initial interview schedule as with the key informant and other resident

groups to direct the conversation and maintain internal consistency of initial interview data. Initial meetings lasted from 10 minutes to 45 minutes in length and were conducted in libraries, coffee shops, casual restaurants, offices, and participant homes. The second meeting with full study participants is when actual data for analysis were collected. These data included photographs, a semi-structured interview about the photographs and the recovery process broadly, and a set of hand-mapped community recovery features representing both process and outcome variables. The background survey was administered at the end. After completing all these project facets, full study participants were compensated $40 in cash. Second meetings varied in length from 45 minutes to 3 hours, but most lasted just under 90 minutes.

Slight modification of the ordering of these steps was necessary in some cases to expedite data collection and prevent participant attrition, which was an ongoing problem. For instance, some participants agreed to take part in the full study, but after an initial interview and request to schedule a second meeting were unable to commit additional time. Individuals with whom I had conducted an initial interview and gleaned data from already were shifted into the "other residents" group in order to preserve the data for triangulation purposes if necessary. In fact, because of participant attrition, recruiting efforts continued through November 2013, occurring simultaneously with follow-up interviews and mapping exercises.

The initial meeting for some participants was conducted via phone call or email instead of in person. In the case of Vietnamese participants who spoke little or no English, a translator at a local social advocacy organization acted as an intermediary. I

had an initial in-person meeting with the translator to explain the study, and she agreed to assist in recruiting from the Vietnamese community. I prepared packets with translated copies of the recruitment flyer, introduction letter, photo elicitation instructions, and a disposable camera for her to distribute to Vietnamese participants. In these cases, the follow-up meeting was the only time I met with these full study participants. I used this packet and single-meeting procedure with a few hard-to-reach snowball contacts, relying on the referring participant to transfer instructions and a camera. In these cases consent to participate was obtained during the first in-person meeting at the same time as data collection.

Extenuating circumstances forced modifications of the data collection procedure during the second meeting with 10 full study participants. An ice storm during the final week of data collection meant that the only way to obtain data from six participants would be to hold joint interviews. This was only done when participants were recruited together and previously acquainted as co-workers or friends. Another four participants were interviewed jointly when spouses of recruited full study participants joined the interview conversation. Spouses did not fill out the background survey.

In September 2013, an opportunity arose to recruit recent international immigrants attending adult education English as a Second Language (ESL) classes to study. Potential theoretical insights and racial/ethnic diversification of the sample justified their inclusion. Mutual benefit was established through my leading an English conversation on disaster recovery and cultural integration during class time. In light of the classroom setting and varying levels of pre-Katrina experience, I modified my

interview schedule to conform to a focus group style. The new set of questions focused on household challenges in relocation, changes in the community due to recovery, and sources of support in recovery and/or relocation (Appendix C). Spanish and Vietnamese translators on staff obtained verbal consent from ESL students and stayed for the duration of the focus groups. I conducted two focus groups with a total of 26 ESL participants, each lasting approximately 90 minutes. The daytime class included immigrants from Mexico, Colombia, Vietnam, Jamaica, Madagascar, and Czech Republic, while the night class was exclusively Hispanic with group members hailing from Mexico, Guatemala, and Peru.

I obtained some form of data from a total of 97 individuals; however, I do not use all of it to address my research questions (Figure 3.2). I collected interview data from 34 full study and pilot participants (Appendix D) using the follow-up interview guide, so I use these internally consistent data to answer my first research question on the meaning of recovery. Twenty-nine of these 34 participants provided usable photos from photo elicitation, which I use in my analysis for research question one. Where appropriate, I supplement these primary data with supporting evidence from selected key informants and other residents (Appendix E). A total of 28 full study participants (all subset from the n=34) provided map data that was internally consistent, so this group forms the sample for answering the second research question.

Table 3.2 compares each of my samples against the overall Mississippi Coast population (three counties combined). Eighteen females and 16 males participated, making up the sample of 34. I oversampled black and Vietnamese residents while

undersampling whites. Of the participants who answered the income question, 19 of

them fell at or the below median income category; however, 23 of the 34 participants

possessed some form of post-secondary education. Figure 3.3 depicts the aggregated

residential histories of the 34 participants revealing an even distribution of residences

across damage zones. East Biloxi and Waveland, both heavily damaged, contain notable

concentrations of participant addresses.

Table 3.2 Demographic comparison of study area and participant samples. Sources: U.S.
2010 Census and 2008-12 American Community Survey.

	Mississippi Coast		Sample RQ1		Sample RQ2	
	Population	Percent	Population	Percent	Population	Percent
Total	370,702	100	34	100	28	100
Gender						
Female	187,018	50.4	18	52.9	14	50
Male	183,684	49.6	16	47.1	14	50
Age						
18-40 years	114,262	30.8	7	20.6	5	17.9
41-64 years	118,511	32.0	14	41.2	14	50
65+ years	45,978	12.4	13	38.2	9	32.1
Race / Ethnicity						
Black	74,565	20.1	8	23.5	8	28.6
Asian (Vietnamese)	8,764 (4,730)	2.4 (1.3)	7	20.6	7	25
White	269,943	72.8	19	55.9	13	46.4
Income						
< $21K	N/A	N/A	8	23.5	8	28.6
$21K – 42K	N/A	N/A	8	23.5	8	28.6
$42K – 63K	N/A	N/A	3	8.8	2	7.1
$63K – 84K	N/A	N/A	5	14.7	3	10.7
> $84K	N/A	N/A	4	11.8	4	14.3
Unknown	--	--	6	17.7	3	10.7
	Pop. > 25	**Percent**	**Population**	**Percent**	**Population**	**Percent**
Total	243,638	100	34	100	28	100
Education						
Less than HS	11,146	4.6	3	8.8	3	10.7
Some HS	23,664	9.7	1	2.9	1	3.6

	Mississippi Coast		Sample RQ1		Sample RQ2	
Finished HS	73,728	30.3	3	8.8	3	10.7
Trade School	23,089	9.5	2	5.9	2	7.1
Some college	61,797	25.4	7	20.6	7	25
Bachelor's	31,182	12.8	10	29.4	6	21.4
Grad. Deg.	19,063	7.8	4	11.8	4	14.3
Unknown	--	--	4	11.8	2	7.1
	Households	Percent	Population	Percent	Population	Percent
Total	141,061	100	34	100	28	100
Dependent Children						
Yes	41,644	29.5	13	38.2	12	42.9
No	99,417	70.5	21	61.8	16	57.1
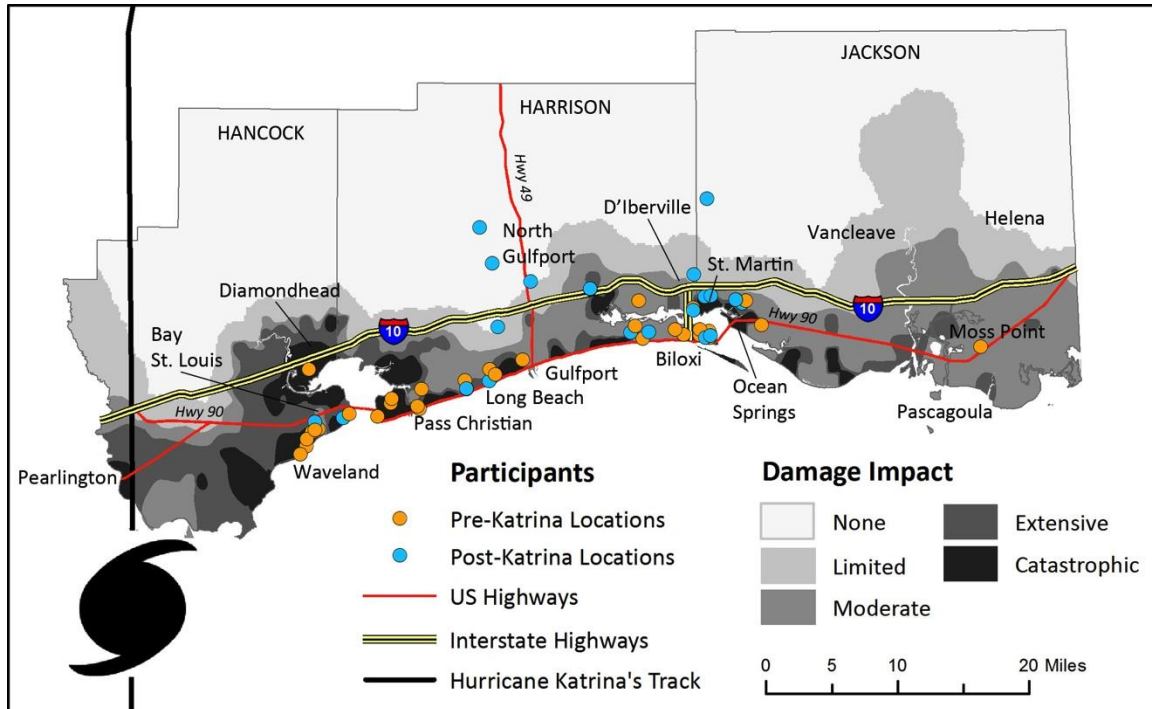
Figure 3.3 Map of current and former residential locations for full study participants

3.3 Survey Instrument

I designed the survey instrument to orient myself to the experiences and

multiple identities that form the basis of each participant's perspective on recovery.

These are among the axes of stratification identified by the National Research Council (NRC 2006) that may differentially affect recovery trajectories for individuals, households, and communities. Knowledge of these attributes allows me to stratify the sample across multiple characteristics and assess commonalities in map data for research questions two and three.

The survey asks about disaster impacts, sources of aid, individuals living in the household at the time of Hurricane Katrina (i.e., elderly, dependent children), residential history since the storm, occupation and employment, number of years living on the Mississippi Coast, and basic demographic questions (i.e., gender, age, race/ethnicity, income, educational attainment) . The race/ethnicity question was left as a free response on the survey; however, I reduced the category post-hoc to include only Black, White, and Vietnamese—the dominant groups on the Coast. No participant expressed themselves as multiracial. Income categories were based on a standard deviation classification centered on the median household income for the state of Mississippi obtained from the 2007-2011 American Community Survey. The survey instrument was pilot tested in June 2013. Minor modifications included the addition of a residential history page (i.e., space for multiple addresses beyond a pre-Katrina address and current address) and a slight rewording of one option for BP Oil Spill impacts (i.e., tar balls or oil slick "nearby" rather than on the participant's property). Appendix F contains a copy of the survey instrument.

3.4 Follow-Up Interview Guide

Open-ended interview questions asked residents to recount personal experiences, struggles, and turning points during the recovery process. The interview guide parallels prompts from the photo elicitation exercise given to participants at the initial meeting before delving into specifics on the repopulation of neighborhoods, economic and social conditions in the community, and where reconstruction seems to be lagging. Questions were written to actively engage with participants' photographs as props so participants could visually show rather than simply tell about successes and failures of the recovery process in their homes, neighborhoods, and communities. Participants were also asked to consider the extent to which the Mississippi Coast had fully recovered and what would need to happen for recovery to be complete. Participants were also asked about the concepts "new normal" and "resilience": Were they are familiar with the ideas? How did they define these ideas in light of their recovery experiences? Was the Mississippi Coast exemplary of these ideas? The final wrap-up question bid participants to share anything about recovery not addressed previously and offer advice for other recovering residents elsewhere. The interview guide was pilot tested in June 2013, and no major modifications were made. Appendix G contains a copy of this interview guide that was used at second meetings with 34 pilot and full study participants.

CHAPTER 4

RESULTS: THE MEANING OF RECOVERY

4.1 Overview

This first research question asks what the recovery of place means to residents

of the Mississippi Coast, and whether the meaning differs based on a resident's

geographic location, social position, or length of residence in the area. This chapter first

describes the photo elicitation method I used to answer the question and my

implementation of the method with residents. Photo elicitation is appropriate for

interrogating the interaction between residents and the physical landscape through

which they construct meanings of recovery (See Figure 2.5). The significance of visual

symbols contained in the photos—both outcomes of a recovery process and evidence of

the inner workings of that long-term process— were explored through the follow-up

interview. Feminist literature on landscape and intersectionality describes how

meaning is derived from a geographically contextual, embodied experience predicated

on one's social position (Rose 1993, Weber 2010b). Hence it is important to consider

not only the meanings of recovery, but also the commonalities in recovery perspectives

that give rise to variations in meaning.

The final sections of this chapter report results from the discourse analysis of

photographs and interview data. I first describe six meanings of recovery identified in

the analysis: commemoration, betterment, sensory experience, materiality, adjustments

to activity space, and changing functions of spaces. The intertwining of memory and mobility are evident in the discussion of these meanings. Secondly, I distinguish between the three standpoints adopted by residents in their framing of the recovery process: the long timer, the newcomer, and the immigrant. I note how the geographic and social factors of place attachment, life stage, mobility, and cultural integration serve to differentiate these standpoints. Finally, residents' perception of distinct short-term, transition, and long-term recovery phases is explored. This finding is significant because it shows how the meaning of recovery and judgments on the success of outcomes shift during the recovery process.

4.2 Photo Elicitation

Photo elicitation is a participatory method that uses participant-authored photographs as a means for generating deeper, more specific data in conversations with research subjects. Participants receive a disposable camera and a prompt that they fulfill as if responding to a journal entry, but instead, the medium of response is photography. The photographs are then developed and discussed in a follow-up interview or focus group setting. Photo elicitation and its variant Photovoice (Wang and Burris 1997) have been implemented widely across social science disciplines to investigate agricultural livelihoods (Beilin 2005), community health and wellness (Lopez et al. 2005, Nykiforuk et al. 2011), public and classroom education (Royce 2004, Chio and Fandt 2007), and memorialization practices (McIntyre 2003).

Photo elicitation is consistent with a phenomenological and feminist framework focused on knowledge gained through social position and lived experience (Rose 2007).

The method dovetails well with the emic theoretical perspective of the first research question and its focus on creating a visual landscape of meaning. Participants themselves point the camera, take pictures of the world from their embodied vantage points, and endow such photos with meaning through the follow-up interview. The photographs, thus, comprise a participant's gaze, or the way in which they see and understand the physical, recovering landscape for themselves.

Photo elicitation is sensitive to power differentials and employs the aim of documentary photography to shed light on the less powerful; however, it rejects notions that research subjects lack agency to document their own condition or to challenge the overarching power structure (Wang and Burris 1994). The technique allows participants to create and steer a dialogue with their own photographs, thereby empowering the research subjects to tell their own story rather than entrusting the researcher to do so. Both the simplicity of taking a photograph and providing the cameras improve the overall accessibility of the method to traditionally underrepresented groups (Wang and Burris 1997). Even individuals who lack the technological wherewithal to operate a digital or smartphone camera or those who lack the financial resources to own one can participate. In the case of a focus group follow-up at the end, communal dialogue also affirms the "power with" others who share similar concerns and values (Townsend et al. 1999).

Photo elicitation is the most appropriate choice of visual method to operationalize a feminist, intersectional framework. Other methods fall short for various reasons. Photo documentation (e.g., Suchar 1997) foregrounds researcher

perspectives rather than participant viewpoints. Content analysis of images (e.g.,

Alderman and Modlin 2013) relies on extant secondary data with, at best, limited

knowledge about the image creators. Finally, repeat photography (e.g., Danielsen et al.

2000, Burton et al. 2011), which imposes a preset path or grid of points where photos

are to be taken at multiple time intervals, privileges spatial and temporal

representativeness over the meaning of places significant to would-be participants.

4.2.1 Implementation

For this study, participants were given two prompts that were to be answered

through photography: 1) "Go and take pictures of things (objects, people, landmarks,

scenes, locations, etc.) around your house that show the recovery that has taken place

or is happening now." 2) "Go and take pictures of things (objects, people, landmarks,

scenes, locations, etc.) around your neighborhood and community that show the

recovery that has taken place or is happening now." These prompts were designed to

facilitate reflection on recovery as an outcome (i.e., "has taken place") and as an

ongoing process (i.e., "is happening now"). The prompts had the potential to spur

photographs on a wide variety of subject matter that could deal with social, economic,

infrastructure, institutional, ecological, or psychological facets of recovery. Separate

prompts for household and community recovery asked participants to document

evidence of recovery activities at multiple spatial scales. Appendix H contains the set of

the elicitation instructions given to participants.

Photo elicitation prompts were distributed at the initial meeting with

participants. Some participants opted to use their own smartphone or digital cameras

rather than the disposable cameras I provided. Participants took between four weeks

and six months to complete the photo elicitation exercise. I contacted previously

recruited participants before each trip to set up follow-up meetings. If participants had

used disposable cameras, I would arrange a camera pickup location and develop the film

prior to the follow-up meeting. I made one set of prints to view and discuss during the

follow-up, and I retained a digital copy of the photos on CD. After the meeting,

participants got to keep their prints. If participants used a smartphone or digital

camera, we copied pictures directly from their device to my laptop computer and

scrolled through the photos during the interview.

Each follow-up session began with participants telling me about what was

happening in their photographs. This portion of the interview was unstructured,

allowing participants to speak freely. I interrupted only to clarify details when they

were unclear. The photo review doubled as a warm-up and eliminated the need for a

separate question to initiate dialogue. Afterward, I proceeded to a semi-structured

interview style using open-ended questions from the follow-up interview guide (See

Appendix G), and where possible, referring back to insights offered during the opening

photo review. This method generated both photographic data and interview data for

analysis.

4.2.2 Analysis

Audio data from follow-up interviews were transcribed verbatim. I completed

approximately half of the transcription using Dragon Dictate software. These tended to

be the interviews with excessive background noise, accents, or multiple speakers. Other

interviews were sent digitally as audio files to Verbal Ink, Inc., for professional

transcription. Interviews outsourced for transcription were quality checked upon return

for accuracy. I repeated this process for all hand-transcribed interviews to check the

accuracy of the dictation software. This procedure gave me a first reading of the data.

During a second listening and re-reading of each transcript, I noted dominant

themes for each interviewee—this was my first pass at systematic, inductive coding. I

also viewed photographs during this second reading of the transcripts to re-familiarize

myself with the visual context. Performing this task in quick succession with all

interviews allowed me to discern major themes or ideas present across interviews.

These are the themes presented in the following sections.

Next, I undertook an exhaustive, content coding of a participants' interview data.

I used QSR NVivo content analysis software to source code all interviews by speaker and

attribute participants' words to demographic data from their background

questionnaires using the *AutoCode* and *Classification Set* functions, respectively. With

approximately 70% of the interview data, I hand-coded minor themes that permeated

each block quotation in the interview transcripts and entering these codes into NVivo.

This procedure gave me a third and fourth reading of the majority of interviews.

Modifications to my major themes were made after each reading, increasing the validity

of my findings.

4.3 Meanings of Recovery

Based on the analysis of photographic and interview data, I identified six

meanings of recovery: commemoration, betterment, sensory experience, materiality,

adjustments to activity space, and changing functions of spaces. I use commemoration

as a blanket term referencing the multiple uses of memory during the recovery process.

The notion of personal or community betterment achieved through recovery often

competes with the desire of residents to commemorate the landscape that existed pre-

disaster. Vivid sensory experiences define the recovery process as do the presence or

absence of material possessions. Recovery also spurs new daily mobility patterns,

modifying where residents are able to go and by what mode of transportation. These

modifications to activity space—the geographic area in which daily activities occur—

form the basis for how recovery is perceived visually and spatially. Finally, the

functionality of formerly developed or inhabited spaces is a key consideration for

residents in determining the ultimate success of recovery outcomes, though levels of

acceptable functionality differ within recovering communities. The following subsections

provide further explanation and evidence for each of these meanings.

4.3.1 Commemoration

Commemoration by residents took on several forms. It was evident in residents'

navigational practices and mental maps of relief supply distribution points in the earliest

days of recovery. Different residents likened commemoration to replacement, a loss of

heritage and place identity, and even memorialization practices. Commemoration in

the long term recovery competed against the ideal of community betterment in two

specific ways. In all instances of commemoration, however, residents focused on

commemorating pre-disaster places and practices rather than commemorating the

disaster event itself. Not a single resident photo or interview referenced a formal

memorial to Hurricane Katrina or Hurricane Camille, although these structures do exist

in Biloxi and unincorporated Hancock County. This finding on place commemoration

departs from Kates' recovery model (i.e., Kates and Pijawka 1977, Kates et al. 2006),

which identifies commemoration of the disaster event itself as the last phase of the

recovery process.

Many residents commemorated familiar landmarks and waypoints that had been

suddenly erased by acknowledging their importance as navigational bearings:

"I was going to take some pictures of the beach where a lot of the

landmarks where (*sic*) I remember how to get down the highway, they're

not there, they're gone. […] I never knew where I was on the beach until I

saw certain place, because I didn't look at […] the name of the streets, I

just drove" (Interview, Wanda).

Not only was the absence of street signs unnerving in the immediate aftermath, but the

loss of so many relative distance markers proved disorienting—you didn't know where

to turn or how far you'd gone (Interviews: Wanda, Ellen). In the nine years since

Hurricane Katrina, many residents remarked how they'd begun to forget where former

landmarks had once stood (Figure 4.1). Debris piles constantly on the move and the

gradual replacement of ruined structures with empty, slabbed lots created a sense of

placelessness for residents resuming normal routines (Interviews: Ellen, Gina).

Figure 4.1 Ellen's photo showing the lack of landmarks, Gulfport

Landmarks identified on residents' navigational mental maps were not limited to pre-storm landmarks. Former locations for ice and water pickup were referenced as were churches known for their supply of relief workers and the locations of defunct FEMA trailer parks (Interviews: Fred, Justin, Linh, Marcel, Olivia, Rose, Stephen, Thomas). These landmarks comprised a temporary geography of relief that was commemorated as residents explained their own movements within their communities in the emergency and restoration periods of recovery.

Commemoration as replacement framed recovery as a restoration of the pre-storm structure of the Coast. Recovery in this sense entailed restoring the same people and structures to their former locations. Anything shy of this was not full recovery. For example, one resident deemed Henderson Point's recovery incomplete by comparing

the neighborhood's pre-storm 400-plus homes to the 124 or so currently reconstructed (Interview, Fred). Commemoration by replacement also included an assessment of who remains present in the community and active in its social functioning:

> "We lost a lot of people, some through death but, mainly, through them moving away because […] they weren't at an age to rebuild, especially our older community, which, to me, was – what Pass Christian was, and they're gone. And it's not the same." (Interview, Olivia).

Commemoration by replacement, recollection of relief locations, and memory use in wayfinding comprise instances of commemoration that dominated in short term recovery.

Residents also recognized a loss of heritage and place identity in the destruction of landmarks lost to the storm, which tended to manifest later in the recovery process (Interviews: Eric, Mary, Olivia). Commemoration of place identity played out in three ways. Some residents told stories about significant one-time events such as baptisms or graduations that had occurred at landmarks erased by storm surge (Interview, Gina). Other residents spoke of erased landmarks as reminders of people who had left or died (Interviews: Cong, Dieu, Mary). This finding is similar to Erikson's (1976) study on the Buffalo Creek flood. Finally many remembered community watering holes and former gathering places that were important to the functioning of one or more wider communities of people. The Four R's, a greasy breakfast joint, was recalled as a gathering spot of many of Pass Christian's old guard (Interview, Olivia), as was Toca's grocery on Henderson Point, which was an invaluable point of information on residents

of the area (Interview, Fred). The loss of functionality and familiarity was one and the same among these residents—a loss that had yet to be filled at the time of the interviews, approximately eight and a half years after the event. In some cases, new places or events had taken the places of those lost, thus restoring some level of functionality. Examples illuminated by residents included kids programs and family movies at the new Town Greens in D'Iberville and Long Beach, Wave Fest on Coleman Avenue, the restoration and improvement of East Biloxi's Beck Park, and the construction of the state-of-the-art Kroc Center for recreation.

Place attachment materialized in a few interviews. One resident spoke of the loss of familiar houses on her regular walk to the beach. She did not know who had lived in these houses and they were not essential to wayfinding, however, she remarked about being saddened by their loss because a bond of familiarity had been formed over years of walking by them (Interview, Gina). Alternatively, another resident (Interview, Anna) spoke of plantation style homes native to the Coast and her wanting to see more of that style house because for her it represented a piece of Mississippi's history that she recognized as part of her own heritage (Figure 4.2).

Touristic commemorative practices emergent in the new, reconstructed Biloxi came under fire. The Biloxi tour train's route continues to wind its way through the unoccupied fields of the former Point Cadet fishing village. One Point native's ride on the train brought tears to her eyes. Similar to the reaction of Ninth Ward residents in New Orleans, the touristification of her destroyed and virtually lifeless childhood

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Figure 4.2 Anna's photo of a plantation style house, Pass Christian

neighborhood was too much to bear. She spoke of this memorialization practice with disdain remarking about its invasiveness. "Show them what's there, but not this," (Interview, Ruth) referring to the devastated, now empty fields.

Contributions of African Americans were systematically erased from the reconstructed, plantation style Dantzler mansion, which serves as Biloxi's Welcome center. The exhibit continues to "limp along" without paying much homage to the contributions of the area's non-white residents (Interview, Mary). A similar struggle for recognition continued along Biloxi's waterfront up until 2013 when the Biloxi beach wade-ins (Mason and Smith 2000) were finally memorialized with a plaque. The bloody struggle for equal access to the beach was equated with an ongoing fight in East Biloxi to reopen Nichols Elementary School (Interviews: Mary, Sheila, Wanda), a traditionally black school with deep roots in the community (Figure 4.3).

Figure 4.3 Author photos of beach wade-in plaque and Nichols School, Biloxi

The geography of memory was pervasive in the post-Katrina recovery process, and the ideals of commemoration through replacement and commemoration of place identity were found to instigate community battles in which nostalgia and functionality were placed at odds with one another. I detail this typology of commemoration battles in the next subsection where activities centered on commemoration are framed in terms of betterment.

4.3.2 Betterment

The suddenness and large areal extent of Hurricane Katrina's meant that large swaths of the built, cultural landscape are erased nearly instantaneously, which opened the door to competing ideas about how the landscape might be reconstructed better than before. Arguments over how to commemorate the past while reconstructing a

better "new normal" for the future dominated the long-term recovery discourse. These controversies tended to take one of two forms: 1) the first type of scenario pits visions for a preserved past against a functional future, while 2) the second type of scenario debates the wisdom of functional, frugal reconstruction versus structures that are beautiful, but burdensome in some way—financially, technologically, or merely inconvenient. Scenario one issues are inherently commemoration battles that center around historic landmarks left heavily damaged or with limited functionality. Often these sites are important to the place identity of a neighborhood or a social group. Recovery-specific funding opportunities invite competing visions for physical preservation and future use. Long-term economic viability frames much active dialogue in these commemoration battles.

Thirty-Third Avenue High School is one landmark that exemplifies this first scenario (Figure 4.4). This high school, situated in a historically black Gulfport neighborhood, was the last in the city to integrate. For one community faction, the building's symbolic importance justifies the need for preservation of the structure in its entirety. The City of Gulfport leases a portion of the high school property to Job Corps, a vocational training program run through the U.S. Department of Labor. In light of recovery funding made available through a Community Development Block Grant, a second community faction is vying for the high school to be torn down to allow Job Corps to expand operations. Their argument leverages a vision of economic success and social mobility for future neighborhood residents. While community factions are not divided solely on race, the way in which a racialized history should be remembered is a

Figure 4.4 Ellen's photos of 33rd Avenue High School, Gulfport

major facet of the debate (Interview, Ellen). Interviews with other residents and with

key informants in advocacy and education revealed a similar controversy over Nichols

School in Biloxi, the mid-century modern Gulfport Library, and the abandoned Markham

Hotel, also in downtown Gulfport (Interviews: Brad, Justin, Sheila, Wanda). Other instances of this scenario type emerged at the household scale during the recovery of historic residences in Waveland and Pass Christian. In these instances, however, interviewees explained that psychological pressures weighed heavily alongside institutional funding barriers in determining how recovery (and commemoration) materialized (Interviews: Rose, Olivia).

The second type of scenario reflects a widely held—though not unequivocal—desire to rebuild bigger and better than before. Like commemoration struggles, these betterment issues are also observed at both the household or community scales, but they tend to involve new structures rather than historic ones. Plans for government buildings and public facilities often exemplify this struggle, though individual residents may be fraught with similar choices in their own rebuilding process. In both of these types of controversies, place identity rooted in nostalgia for the past and vision for the future plays a formative role. Below are some examples illuminated in photographs and interviews.

One interviewee (Interview, Vien) contrasted his beautiful new, two-story home with surround sound, which sits about ten feet off the ground, with his neighbor's domicile, a small, at-grade storage shed with plumbing and an air conditioning unit (Figure 4.5). The interviewee described his burden of taking on a second mortgage to rebuild better than before; he is currently applying for a daughter in Vietnam to join the family, and he will pass on the house and mortgage to her. Across the street, the elderly

man in the shed refused to begin another 30-year mortgage because of his short

lifespan and opted for a frugal, functional alternative to housing reconstruction.

Figure 4.5 Vien's photo of a rebuilt storage shed used as housing in his
neighborhood, D'Iberville

Disputes over excessively grand or overly environmentally sustainable municipal

facilities also conform to this scenario type. Residents' views on Waveland's behemoth

city hall and separate, detached firehouse were polarized. While meant to paint a vision

of a city on the rise, most residents criticized the city for being overly ambitious and

short-sighted, as the structures burden the city with high maintenance costs and incite a

more bureaucratically tedious procedure to qualify for public assistance (Interviews:

Dave, Elaine, Jared, Rose). The oft-cited counterpoint to Waveland's approach to city

hall building was Pass Christian, where the city opted to build a facility adequately sized

to meet current needs all under one roof, thus increasing efficiency in terms of

operational costs and disaster assistance paperwork (Interviews: Chantel, Dave, Elaine, Jared). Waveland's Business Incubator received similar criticism for its size in addition to its over-emphasis on sustainable technologies too advanced for tenants and maintenance staff. The building's modern design also seems uncharacteristic for a beach town and disruptive to the overall sense of place (Interviews: Dave, Jared). In all cases, irrespective of scale, reconstruction of the built landscape deviating from previous form created competing visions for the future.

4.3.3 Sensory Experience

The process of recovery as described by residents is one reliant on the senses—visual, auditory, and olfactory. Similar to Smith's (2011b) findings on survival and recovery stories from Hurricane Camille, post-Katrina residents recounted in vivid detail the visual images that played a central role to their reorientation within a recovering landscape. The emptiness of the recovery landscape, prevalence of eyesores, and environmental renewal were three visual themes that emerged from photos and narratives. Buttressing the visual experience were familiar but long unheard sounds that punctuated residents' recovery timelines and lingering smells that reminded them of long-term recovery's sluggishness.

Prominent in nearly every participant's photosets were pictures showing the lack of visual subjects. Sometimes this emptiness took the form of a concrete slab or mailbox where friends or neighbors once resided (Figure 4.6a), the empty lot where a favorite amusement park or attraction once stood (Figure 4.6b), or parking lots that

marked former shopping plazas and mundane retail facilities locals once frequented

(Figure 4.6c). As one participant put it:

> The businesses and the homes, they look – sometimes it's a desolate look that –
>
> you know, what happened here? You can tell that there was once was some life
>
> there. Now, there's nothing there. (Interview, Ellen)

Figure 4.6 (a) Mary's photo of the house on Third Street, (b) Brad's photo of a devastated amusement park, and (c) Cal's photo of a former shopping center

The lack of visual markers to photograph as part of the method confused some

participants at first, leading one man to ask whether I wanted a whole roll of pictures

with nothing in them (Paul). In describing the three-story condominium and small shops

that once filled in the landscape of Waveland beach, a female participant acknowledged

that,

> " it's not a great picture, but I just wanted to show that there's just so much
>
> emptiness. And, again, taking these pictures made me think about it. But I've,
>
> unfortunately, just gotten used to it [...] you walk it every day, and it's there

every day, and […] nothing seems to be happening, and you keep looking at it,

and nothing happens. And, after a while, you just kind of get desensitized to the

nothingness. And, like you said, almost forget what was there." (Interview,

Rose)

Perhaps it is the ease with which such lost landmarks are forgotten that spurs incendiary

debates over whether and how those precious few surviving landmarks should be

commemorated, as previously described.

Many of these surviving landmarks were deemed eyesores. Residents spoke of

and photographed abandoned houses, condemned hotels, gutted shells of buildings,

broken sewer pumps, crumbling roads, wrecked cars, remnants of debris, and

Mississippi cottages doled out by the state as temporary living quarters (Interviews:

Anna, Elaine, Fred, Justin, Kimberly, Olivia). Eyesores were most often deemed sources

of irritation that disrupted overall aesthetics; however, they could also be framed as

sources of disease (e.g., black mold), crime, or danger (e.g., fire hazard) detrimental to

the well-being of people nearby and, thus, unquestionably removable:

…refacing all the businesses, making them look modern and nice, putting night

life downtown, and basically tryin' to make the downtown a thriving place to

visit and live. Then you got places like […] the Markham Building. […] It's a huge

building that used to be full of prominent businesses, attorneys, and things like

that before the storm, it's now just never been renovated. It's not even safe to

go in. It's full of black mold and it's dilapidated. […] The windows are broken

out of it. The doors are boarded up. It's an eyesore. Not to mention it's a

breeding ground for criminal activity. (Interview, Justin)

Such dilapidation marred the success of areas renewed, beautified, and enlivened

through recovery activities. The most emphatic reactions of the participants seemed to

be based on this type of juxtaposition.

During the disaster or in its immediate aftermath, the presence of eyesores

might incite humor. These strange sights often inspired ridiculous, hyperbolic

comparisons. For instance, the synchronized opening of car windows and trunks during

the rising storm tide suggested the presence of an imaginary orchestra conductor

(Interview, Paul), while the massive cargo containers at the Port of Gulfport moved by

the surge were likened to Legos® strewn about a child's messy bedroom (Interview,

Royce).   But as recovery progresses into the long-term, residents reflected on the

abhorrence of such visual reminders that disrupted a vision of recovery. Many

Vietnamese residents referenced the "houses with long legs" (i.e., raised on stilts) now

dominating East Biloxi either disparagingly or with tongue-in-cheek humor. Residents

considered them unsightly, inconvenient for families with young children, and the

antithesis of a successful recovery (Interviews: Allison, Cong, Dieu, Quy).

Participants' stories revealed a large degree of place attachment to the unique

natural landscape of the Gulf Coast. The constancy of the visual environment stirred

powerful emotions to return, while the renewal of this natural landscape was cited as

both evidence of recovery and a source of optimism. This theme was common among

elderly and retired, or soon-to-be retired, participants. According to one Diamondhead couple:

> We missed what we worked for all our lives to retire to this point. We loved the view and the wildlife and we decided it wasn't going to get any easier to rebuild because of our age and, at that time, his health. (Interview, Carol)

With delight, her husband described the thunderstorms, rainbows, hogs, and alligators visible through their reconstructed picture windows overlooking the marsh. Sitting down in a chair the first night after moving into their rebuilt home, he realized this view was the one constant—it never changed (Interview, Jim). A retired Waveland couple spoke about rebuilding their home facing the Gulf rather than the street to take in the views they longed for during return trips to clean up debris after Katrina. Watching the fishing boats and shrimp trawlers ever visible in the sound have become a part of their new routine (Interview, Cal & Ruby). Instead of mourning the emptiness of their Pass Christian neighborhoods, residents here focused on recovery's silver lining: the peacefulness of the brilliant, newly acquired sunsets visible over the vacant landscape (Interviews: Elaine, Olivia). A bumper crop of sunflowers in vacant yards in the years following Katrina (Interview, Chantel) as well as oak trees recovering their leaves after the salt burn were signs of recovery:

> …every time [I walked the beach] I felt better looking at the beach. It's not because everything is [*sic*] back but because everything was green. […] You know, totally different perception. I was comfortable with the fact that it was green. (Interview, Gina)

While the vast majority of residents spoke about positive environmental place attachments that contributed to their own satisfaction with the recovery, singular viewpoints that contradicted this pattern stood out. For one Gulfport business owner who lived on one of the local bayous, the view of the Gulf was only a reminder of loss. To her, the water represents an evil force that stole her business, her home, and precipitated her husband's alcoholism and eventual death. Today she avoids driving the beachside Highway 90 at all costs (Interview, Sonya).

Recovery was also sensory, though smell and sound were greeted with differing responses. References to the "Katrina smell" abounded in interview transcripts. The damp stench was described as reeking of decomposition, chemicals, gasoline, and sewage. The smell would crop up whenever mementos were re-exhumed, be they water-damaged recipe books or hours of undamaged storm footage rendered uneditable by the haunting smell (Interview: Brad & Sonya).

> But [just in] the last month… I would walk up and hug a person, and before I could let them go Katrina would pass… That odor would pass through my nose. […] when I asked mama, do you smell that? She said, no, you're the only one who smells that. What's wrong with you? (Interview, Wanda)

A legitimate sensation at times, and a memory trigger at others, the reemergence of the Katrina smell seems to be a psychological consequence of recovery that continues into the long-term. By contrast, the familiar sounds of train whistles, clinking rail cars, and chirping birds the spring following Katrina were met with jubilation (Interviews: Chantel, Fred).

4.3.4 Materiality

The importance of material objects either as symbols of a successful and complete recovery or as reminders of ongoing loss also emerged from participant narratives. In the short-term, residents marveled equally at personal belongings that remained untouched by Katrina's winds and water as well as those belongings found in unexpected places. Similar to the strange sights discussed above, these instances of amazement or irony most often peppered the narratives of those who lived or worked in high damage areas during Katrina's emergency and early restoration period. Whether a statue of Humpty Dumpty sitting on the one intact wall at a devastated Gulfport amusement park (See Figure 4.6b) or the multitude of Virgin Mary statues still gracing the front gardens of flattened homes, accounts were replete with irony, amazement, and even religious allusions (Interviews: Fred, Patricia). One Biloxi resident posited divine intervention as the reason why communion linens at his home that remained inexplicably white though submerged in muddy water and an olive oil bottle used to mark doorposts for protection (as with blood in the 10th Biblical plague) remained unmoved (Interview, Marcel). Chairs placed just-so by floodwaters and sets of china found after years of soil subsidence topped the list of items found in unexpected places (Interviews: Chantel, Jim & Carol).   Most outrageous was one participant's wedding photo that washed out of his Pass Christian home, was rediscovered by a plumber friend working under a house four miles north in DeLisle, and returned. Though a little muddy in spots, the photo remained intact (Interview, Fred).

During long-term recovery, surviving possessions tended to serve

commemorative roles: a repaired and refinished altar table at a heavily flooded church

(Interview, Eric), the old sign from a destroyed nightclub business cleaned off and

rehung in the new club (Interviews: Brad, Sonya), a devastated church bell tower

preserved as a memorial aside a dead oak trunk intricately carved and reborn as an

angel after Hurricane Katrina (Interviews: Anna, Cal). These symbols were upheld as

examples of successful and complete recovery (Figure 4.7).   This type of

commemoration differs slightly from the commemoration of landmarks described

above. Here, material possessions seem to commemorate the disaster event itself or

one's personal experience of the event—perhaps even a family's or household's

Figure 4.7 (a) Cal's photo of an angel sculpted from a dead oak tree as a
memorial, and (b) Sonya's photo of a memorial to a nightclub business
destroyed by Hurricane Katrina

experience with Hurricane Katrina, which is consistent with extant theory (e.g., Kates

and Pijawka 1977). The commemorative battles over prominent landmarks are, at a

larger scale, symbolic of a sense of place, community history, or nostalgia for a lost

landscape.

Participants also referenced everyday objects whose losses, while causing only

momentary annoyances, serve as trifling reminders of the recovery process long after

the disaster and material replacement has largely ended:

> Every day, eight years later, I'll go to use something or go… God, that's another
>
> thing I lost! And it will be a stupid little thing like a potato peeler… [or] a letter
>
> opener. Or I know I had those pair of shoes. I thought I just wore them! Nope.
>
> (Interview, Sonya)

Both mundane household items and even nearby stores were referenced in this way as

taken-for-granted (Interviews: Brad, Natalie). Only when their use was required in

performing daily tasks did the realization of loss occur. Middle aged women tended to

comment more often on materialism and loss in a daily sense more often than did men,

though both men and women seemed equally likely to comment on material symbols,

oddly placed objects, or artifacts untouched by the storm. One form of disaster learning

especially prominent among both middle aged men and women was their becoming

either less materialistic or more frugal as a result of the Katrina recovery (Interviews:

Brad, Gina, Justin, Patricia, Sonya, Wanda).

4.3.5 Adjustments to Activity Space

Disaster researchers have already documented that survivors base assessments

of their own recovery on the experience of other places, often comparing the losses

sustained and the amount of recovery aid received —a "grass is greener" mentality

(Quarantelli 1999). These relativistic views of recovery dominate the framing of news media stories and recovery metrics as well. At the beginning of this study, I posited that these relativistic views of recovery should also be spatial in nature, and neighborhood location was thought to be a primary determinant of how one judged the speed of the recovery process and the success of its outcomes. Results from participatory mapping suggest that in Mississippi, activity space rather than residential location plays the primary role in forming relativistic understandings of recovery. This is contrary to research findings in post-Katrina New Orleans, where the status of the neighborhood is essential in diagnosing (or even symbolizing) recovery progress (Landphair 2007, Leong et al. 2007, Breunlin et al. 2008, Chamlee-Wright and Storr 2009, Curtis et al. 2010).

Dissimilarities in the character between New Orleans and the Mississippi Coast are essential to understanding how the formation of these relativistic viewpoints differs. Compared to Mississippi, New Orleans is a denser urban area where residents often have deep cultural roots in their neighborhoods. The neighborhood unit has historically formed the core of activity space in which people interact—a neighborhood there serves all the functions of daily life: home, work, school, worship, day-to-day shopping, and leisure in terms of corner bars, grocers, playgrounds, etc. Social bonds among residents tend to be more local and there is greater value in one's place identity at the neighborhood scale.

Recovery on the Mississippi Coast is based, first, on its layout as a string of low to medium density cities that have grown together over the last 30 years and are linked together by a few major highways. Very rarely does one find an instance where all daily

activities happen within the neighborhood. Participants display a large degree of mobility in their daily activities. For instance, participants in Waveland spoke of family ties to New Orleans and of shopping trips to Gulfport (Interviews: Dave, Rose, Paul). Residents in Pass Christian and Long Beach also frequently worked or shopped in Biloxi or Gulfport (Interviews: Anna, Elaine, Gina, Kimberly, Stephen). Even residents of East Biloxi, many of whom are low income, simply by the nature of the recovering landscape, are forced to carry on their shopping, employment, trips to social services in D'Iberville, Gulfport, or Ocean Springs (Interviews: Patricia, Wanda).

Point Cadet and East Biloxi were the last vestiges of the dense, urban, insular neighborhoods that characterize New Orleans to this day. They were a cultural hearth for Croatians, Vietnamese, and black residents alike, where ethnic services like fishnet making, Asian groceries, and jazz clubs could be found (Interviews: Mary, Ruth, Wanda). The character of the recovering landscape is one in which mobility plays a greater role since economic and community redevelopment is occurring north of Interstate Highway 10, and automobiles are the means by which residents living historically close to the Coast are forced to carry on the day-to-day functions of life.

The shift in this activity space is part of a larger discourse on suburbanization and sprawl which have been hastened by Katrina's destruction of denser shoreline infrastructure and by heavy-handed policies aimed at minimizing insured losses by encouraging raised construction. The resulting built landscape is one in which activity space and residential location are increasingly divorced. Increasing physical distance

between points of activity translates to a greater importance in mobility as a factor governing residents' relativistic views on recovery.

Participant maps reveal shifts in activity space and mobility over the course of the recovery process as well as several ancillary factors that have a bearing on one's activity space. How one views the recovering landscape, thus, varies as a function of time and of place identity. In the emergency and restoration stages of recovery, community activities are necessarily displaced as debris is cleared and basic functionality is restored. Temporary landmarks appeared frequently on participant maps, especially among residents who lived in catastrophic damage areas like Waveland, Pass Christian, East Biloxi, and Ocean Springs (Interviews: Linh, Marcel, Rose, Thomas). FEMA trailer parks (Interviews: Fred, Justin, Sonya), feeding tents (Interviews: Fred, Olivia), and relief supply pickup areas (Interviews: Marcel, Rose Stephen, Thomas), and churches where volunteer labor could be procured (Interviews: Olivia, Rose, Marcel) exemplify these types of landmarks. Photographs (Justin, Marcel) often revealed this hidden element of recovery geography that has long since been replaced by functioning schoolyards, stadiums, and non-descript parking lots (Figure 4.8).

Residents in these areas also tended to identify landmarks that had been essential to the pre-storm social functioning of the area but whose functions had been displaced. Examples of these types of landmarks included corner stores, bars, and social services (SNAP benefit) offices as sources of information and support (Interviews: Fred, Natalie, Wanda).

Figure 4.8 (a) Marcel's photo of a former relief supply distribution area, East Biloxi, (b) Justin's photo of a former FEMA trailer park, Gulfport

Damage produced by storm surge and wind had a second effect besides altering the landmarks themselves that served community functions; it also made physical mobility a challenge, especially early in the recovery process. The interview process

illuminated changes in the way residents moved about the recovering landscape and the scale at which the landscape could be seen. The mode of transportation and scale changed drastically in short-term recovery:

> So all of our cars went underwater, so we had no transportation. So the week after Katrina, he [a relative] brought us a Gator [vehicle], which I still have—love the Gator! And, for three months, that was my only means of transportation. It was about three or four months after Katrina that we bought cars. [...] But I drove it [the gator] everywhere. So that's what we would do to go get the ice and water and the treat of the day and to the soup kitchen [...] that was kinda (*sic*) fun. So, anyway, this was where it was really happening in Waveland.
>
> (Interview, Rose)

Taking auto-mobility for granted meant seeing the terrain from a new perspective. Other residents remarked about missing bridges and how the distances between friends, work, church, and other activities increased exponentially (Interviews: Elaine, Thomas). Altered routes meant an adjustment in the typical scenery observed on trips and what landscapes were regularly observed. Getting out of town had a similar effect. One resident commented on his son's observation of Mississippi's brown salt-burned trees and debris in contrast to Alabama's green ones (Interview, Royce).

Scale was another important element nuancing residents' mobility about the recovering landscape. Several residents chose to take photographs while on walks in their neighborhoods or along the beach (Interviews: Chantel, Gina, Justin, Quy, Rose). The pedestrian scale of these photographs contrasts sharply with most photographs

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that were taken from a car window or within driving distance (but outside of walking

distance) of participant's homes (Figure 4.9). The spatial extent of the devastation and

lack of reconstruction are far more evident among residents who opted to take

photographs on foot. Simultaneously, these pedestrian photographers also were the

ones whose photographs focused more on ecological recovery and natural beauty

rather than on built infrastructure. One participant who worked in public safety

contrasted how the devastated area looked in the immediate aftermath when viewed

from helicopter, the view standing on top of his patrol car, and the view from atop

motorcycles that welcomed a band of New Orleans police officers who had come

prepared to snivel at the damage (Interview, Fred). In each case, the atypical scale and

perspective used to view the landscape accentuated the areal extent and the magnitude

of the damage wrought by Katrina's wind and surge.

The scale of the photographs and the concentration of landmarks identified

through the mapping exercise were connected with participants' social mobility, age,

and/or occupation. Residents with low social mobility (and physical mobility) tended to

take photographs within their own neighborhood rather than photographs spanning the

wider community or region. This was the case with many African-American participants

from East Biloxi who focused on the reconstruction of their own homes and the

recovery of neighborhood landmarks like the Kroc Center, the former Blue Note Club,

Hope CDA, localized churches, and public parks (Interviews: Marcel, Patricia, Wanda).

Figure 4.9 Photos taken on foot versus by car: (a) Chantel's photo of blooming sunflower during a walk, (b) Quy's photo of a friend's shrimp boat dock, (c) Gina's photo of church ruins where her son graduated, and (d) Natalie's photo of Waveland grocery stores

Age limited the ability or willingness to be mobile while taking photographs. Five of the participants who were late middle age to elderly chose to document recovery activities happening within view of their front porches or within a few block radius of home. Though these perspectives were not limited exclusively to one racial or ethnic group, highly local photographs were most common among the Vietnamese participants recruited, who tended to be older. Physical disability and lack of an automobile defined

the situated perspective from which they viewed recovery (Cong, Hanh, Quy, Vien). As

one elderly white female participant stated, "this is my world." (Interview, Rose). This

localized view of the world contrasted starkly against participants in their twenties

whose recovery maps showed evidence of dispersed activities focused on

entertainment and shopping. Movie theaters, malls, casinos, and laser tag courses were

among the landmarks identified as important for recovery. Often these landmarks were

concentrated in one of a few burgeoning shopping areas along the Coast, far from the

actual homes of these residents (Maps: Anna, Kimberly, Linh, Thomas, Vincent).

A final determinant of one's activity space and conceptualization of recovery

through maps and photographs was occupation. Individuals employed in civil service or

public safety were more likely to identify public facilities as significant recovery

landmarks (Interviews: Fred, Justin, Rose). Similarly, those employed in the service and

entertainment industry spoke about restaurants and clubs that had varying degrees of

success in reopening (Brad, Sonya). Their relativistic views of recovery were, in large

part, relative to the industry of employment. A secondary nuance appeared among

working class participants who worked long shifts. Their lack of leisure time resulted in

maps and photographs that featured landmarks either in their immediate neighborhood

(often their own home or landmarks within view of their home) or on the way to and

from work (Interviews: Royce, Vien). Relativistic views among this working class group

resulted in localized, "outlier" perspectives that bore little similarity to insights gleaned

from the majority of participants. These perspectives tended to be circumstantial,

secondhand, or lacking in detail, except when discussing events and locations in the

immediate vicinity of home or work. For instance, when prompted as to why one participant insisted that Biloxi's recovery was more successful than Gulfport's, he was at a loss for an example (Interview, Royce). This same participant, however, was able to discuss in detail the progression of recovery activities within the mobile home park where he lived at the time of Hurricane Katrina and in businesses and facilities just beyond its bounds.

The results of participatory mapping and photo elicitation interviews reveal a compelling dialectic between mobility around one's activity space and one's perspective on the recovery process. The recovery process itself forces changes in the physical landscape displacing social community functions and residential locations. But the fact that one's routes and modes of transport are severely altered form the basis of understanding the recovery process. In short, recovery alters activity space at the same time as activity space governs perceptions of recovery.

A huge irony of recovery is that the process makes mobility a greater necessity. Residents must be more mobile after the event to maintain community ties. East Biloxi is a prime example of this phenomenon where the community of people who once called the Point home—scattered by post-storm diaspora and inability to rebuild in place—now largely resides elsewhere, though historical communal meeting places survive. Community life has been divorced spatially from the "people" community. Places like the French Club, the Slavonian Lodge for the Croatians, and the Vietnamese Catholic church and Buddhist temples survive as remnants of the former place (Figure 4.10). These landmarks are met with a continual ebb and flow of former residents in

Figure 4.10 Remaining vestiges of community in East Biloxi: (a) Quy's photo of Slavonian Lodge, and (b) Thomas's photo of the Lion Dance at the Vietnamese Buddhist Temple

their cars—mostly old-timers—who return for mass or for evening dinners (Interviews:

George, Harold, Mary, Ruth). In the meantime, new Vietnamese congregations are

being planted north of I-10 in Vancleave and historic ties to the Point wane as the distance becomes too great for an aging group (Interview, Mai). The recovery process has contributed to a growing sense of placelessness along the immediate coastline, which is seen in the corporate, commercial landscape mapped by younger and newer residents (Kimberly, Linh, Vincent). How this growing placelessness in the landscape and lack of place attachment among Coast newcomers affects resilience and long-term sustainability is a subject open for debate.

4.3.6 Changing Functions of Spaces

Residents across the sample commonly linked their perceptions of recovery, or lack thereof, to two interrelated facets of the recovery landscape: functionality and ownership. Functionality is gauged by the intensity of current human land use. Spaces that are used more intensely or that serve larger segments of the community were identified as successes of the recovery process, while those that languished unoccupied or unused were seen as failures. At times, an area's former use was referenced in judging whether or not a space had recovered (i.e., commemoration by replacement). More often than not, though, as long as a space was actively functioning in some way, it was considered to be recovered. I provide two contrasting examples.

First, the notion of dead places emerged in many interviews with residents comparing neighborhoods like Clermont Harbor, beachfront areas of Waveland, Henderson Point, and Point Cadet to ghost towns or graveyards (Interviews: Anna, Cal, Elaine, Hanh). These were the failures—places that had not recovered or would not

recover in residents' eyes. The connection to death is partially visual, as this Waveland

resident relates, quoting his son-in-law:

> When you look at all the slabs, and the empty areas it does kinda look like you're
>
> walking through maybe a cemetery. […] He said "It's kinda like a cemetery,"
>
> walking – I mean you see steps, and nothing. (Interview, Cal)

Slabs, steps to nowhere, and structural skeletons are likened to tombstones (Figure

4.11). In total, 21 out of 29 photo elicitation participants took at least one picture of

empty lots or slabs. But the mention of death involves a deeper sense of current or

imminent emptiness reflected in the neighborhoods bereft of human habitation and

livelihoods:

> What are we gonna wind up with, ghost towns? […] All these people who have
>
> mortgages, you know what's gonna happen? They're gonna walk away 'cause
>
> they can't afford the mortgage. […] I mean in a way if you look at places like
>
> Clermont Harbor and way down there, it kinda looks like a ghost town already
>
> 'cause no one's rebuilt. But then of the ones who have, all it'll take is one more
>
> storm, or for the rates to go up enough to where it starts happening,
>
> abandonment. (Interview, Elaine)

Residents attributed the prevalence of the ghost town landscape to increases in flood

insurance rates, depopulation of waterfront neighborhoods, and a lack of demand for

stores and services in these uninhabited areas. Interviews conveyed the sense of loss as

residents mourned formerly living neighborhoods (Interviews: Hanh, Mary).

Figure 4.11 Fred's photos of skeleton structures, Henderson Point

In contrast to the loss and failure evident in the graveyard imagery, recovery was deemed successful if a formerly occupied space regained any use—not simply its former use. Town Greens in Long Beach and D'Iberville were hailed as exemplars (Interviews: Hanh, Stephen). A Vietnamese resident in D'Iberville describes how her Town Green / community center used for movie nights and kids' fairs came to be:

> Before [it] was a school. It's new, it just popped up. Before [it] was just a tiny, tiny house, and now they just made it bigger. The house, it was a little house before, and then after Katrina they built a bigger house. […] She says she doesn't speak English, so the Town Green, she knows it's there, but she never uses it. So the kids use it all over. (Interview, Hanh – *translated*)

A revamped Jones Park complete with splash pads, palm trees, a concert pavilion, and family movie night events (Figure 4.12) replaced the former patch of grass with a few boat slips and shrimping vessels (Interview, Justin). As one resident admits, "Yes, it was

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a park that – but it wasn't a park that was utilized to the degree that it is utilized now"

(Interview, Ellen). Increased community presence contributes to the idea that this space

has recovered to a better use than before. The sentiment that recovery efforts have

fundamentally changed the character of these public facilities expanding their range of

uses for greater community benefit fosters both individual pride and a sense of

communal ownership.

Figure 4.12 Justin's photos of Jones Park, Gulfport

Not only did recovery modify the function and sense of ownership of public facilities, the recovery process also helped democratize, to some extent, formerly private spaces. Photos, interviews, and the exploratory pilot photo tour exposed numerous examples of such properties damaged, then resurrected in new ways. In Pass Christian, a house demolished by Katrina's surge with pool in the rear has become a community pool (Interview, Anna). In Bay St. Louis, former driveways and front lawns of private residences swept away have now become public beach parking (Figure 4.13). Swing sets and chairs situated on houseless foundations provide panoramic views of the Mississippi Sound for property owners and visitors alike (Figure 4.14). A long-time Waveland resident relates how an unplanned, privately owned, community park came into being:

> That lot is owned by Mr. [X]. There was a house on it. He lost the house in Katrina […]. He and his wife live in an apartment in the Bay, and he […] comes every day and maintains it. So it's like a park area. He enjoys the outdoors, and in the apartment they don't have any greenery or anything. So he comes every day, which, again, he says they can't afford to build back there, and they're older, but he enjoys doing this. And so, again, that's kinda (*sic*) mixed emotion. Is that a positive or a negative? It's a positive because he enjoys it, and the whole neighborhood enjoys this park-like area, but it's different than it was. Got it? So that's why I did that, just 'cause it's a different use of the land, but it's still owned by the same person and maintained. (Interview, Rose)

Figure 4.13 Author photo of beach parking on private lawns, Waveland

Figure 4.14 Kimberly's photo of lawn furniture on empty foundation, Bay St. Louis

Tinged with nostalgia, her story highlights that the legacy of property ownership and continued functionality—a blend of memory and development—are requisites for judging recovery's success.

In long-term recovery, private development challenges nascent notions of communal commodity ownership formed through the recovery process. A Waveland business owner and employee raise the question, who owns the Gulf views created in the wake of Katrina's destruction? They relay how, in neighboring Bay St. Louis, this is a point of contention for residents whose views have been blocked by newly built, raised restroom facilities, and for business owners on the landward side of Beach Boulevard who have capitalized on the new views since Katrina and now feel threatened by private beachside development:

> They think because Katrina washed away the people on the beach side that they had no rights, that only they have rights. In other words, they had a view now they never had before. [This landside business], They feel like they're entitled to that now. When they get upset and they fight against somebody like [the beachside business owner], they impede his ability to grow his business because they're fighting for what they feel is theirs, which is not. They just didn't have somebody on that land. [...] People forget that other people have rights too, because you have a view because nobody's house is in front of you. You're mad at your neighbor now when they build their house in front of your view. Is it your neighbor's fault or they just exercising the right to the property they own? So it's different. (Interview, Dave)

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This quote shows awareness of increasing polarization between public and privatized space, which now characterizes the beachfront in Mississippi. Some residents paint private development as positive if such development improves accessibility to amenities not previously enjoyed. One young, middle-class white man, a former Pass Christian resident, approves of the modern-age condo complexes (Figure 4.15) rising in place of former antebellum mansions, commenting that a larger cross-section of regular people (i.e., members of his same social class) could now enjoy beach accommodations once reserved for elite, landed families:

> The old antebellum homes were nice to look at, but I mean, they didn't really help anybody. Certain families owned 'em. Nobody else could afford to live around there on the beach. If you didn't have money, you were never gonna be there. Now, those homes are gone, and it's sad that the history's gone behind 'em, but now you've got places like this, large condos. (Interview, Justin)

Old-timers, however, regardless of their social class lamented the loss of homey-ness that the beach in Mississippi once had (Interviews: Olivia, Royce). Increasing private development aimed at tourism, particularly condominium rentals intended for non-locals, make for a touristic and placeless post-recovery landscape akin to the Florida coast (Interview, Royce). Functionality may have returned to portions of beachside Highway 90, however, both sense of place and local ownership were sacrificed.

Figure 4.15 Justin's photo of new condominium rentals, Pass Christian

4.4 Standpoints on the Meaning of Recovery

In operationalizing the intersectional paradigm through sampling methodologies and in the interpretation of results according to social position, I aimed to discern how overlaps along various axes of stratification (e.g., race, class, gender, ethnicity, income level) (National Research Council 2006) could collectively shape residents' recovery understandings. Three general standpoints on recovery emerged: the long timer, the newcomer, and the immigrant. They represent three identities that determine which meanings are most frequently used to explain the recovery process and its outcomes as seen through the coastal Mississippi landscape. Place attachment, life stage, degree of mobility, and migration experience helped to differentiate the three standpoints.

Although these standpoints did not automatically conform to race, class, or gender divisions, several prominent intersections of these identities are evident within the three groups that may explain why certain themes were more prominent than others. Tables 4.1 and 4.2 depict long timers, newcomers, and immigrants broken down by gender and race/ethnicity, respectively, then by other characteristics.

4.4.1 Long Timers

The long timers group was the largest of the three (Table 4.1). The stark white-black dichotomy of this group is a remnant of historic population trends in the area (Table 4.2). Average length of residence on the coast as 34 years, and participants from this group overwhelmingly came from Harrison County. Long timers showed an even gender balance, but white participants, and particularly white males dominated. Surprisingly the group included a balance of middle age and older people, even though older, white retirees made up the largest subset of the group. Middle-aged long timers were more heavily female, with a more even racial balance between black and white residents. This group comprised highly educated, high income-earning individuals. Approximately two-thirds held an advanced degree and over 50% earned at or above the median income for the Mississippi Coast. Though highly educated, white long timers formed the largest subset here, all black residents who disclosed data had earned at least a bachelor's degree. Likely a product of the older retirees in this group, better than half of long timers had no dependent children at the time of Katrina. A larger proportion of black long-timers, mostly middle-aged, did have children, while white long-timers tended not to have children.

Table 4.1 Three standpoints on recovery showing intersections of gender with other characteristics in each group

	Long timers N = 17		Newcomers N = 13		Immigrants N = 4	
	Female N = 8	**Male** N = 9	**Female** N = 8	**Male** N = 5	**Female** N = 2	**Male** N = 2
Race / Ethnicity						
Black	3	1	2	2	0	0
Vietnamese	1	1	1	0	2	2
White	4	7	5	3	0	0
Age						
18-40	1	2	2	2	0	0
41-64	5	3	2	2	1	1
65+	2	4	4	1	1	1
Income						
< $21K	2	1	0	1	2	2
$21K – 42K	1	2	4	1	0	0
> $42K	4	5	2	1	0	0
Unknown	1	1	2	2	0	0
Education						
HS or less	1	2	1	0	1	2
Vocational	0	1	4	3	1	0
Advanced	6	5	2	1	0	0
Unknown	1	1	1	1	0	0
Dependent Children						
Yes	3	4	2	3	1	0
No	5	5	6	2	1	2
Area						
Biloxi Bay	3	4	2	1	2	2
Hancock	0	3	3	3	0	0
W Harrison	5	2	3	1	0	0
Avg. years on Coast	29	40	13	9	13	23
Overall	34		11		18	
Avg. moves since storm	1.25	1.56	2.25	1.6	2.5	2.5
Overall	1.41		2		2.5	

Table 4.2 Three standpoints on recovery showing intersections of race/ethnicity with other characteristics in each group

	Long timers N = 17			Newcomers N = 13			Immigrants N = 4		
	Black N = 4	**Viet.** N = 2	**White** N = 11	**Black** N = 4	**Viet.** N = 1	**White** N = 8	**Black** N = 0	**Viet.** N = 4	**White** N = 0
Gender									
Female	3	1	4	2	1	5	0	2	0
Male	1	1	7	2	0	3	0	2	0
Age									
18-40	0	1	2	1	1	2	0	0	0
41-64	3	1	4	2	0	2	0	2	0
65+	1	0	5	1	0	4	0	2	0
Income									
< $21K	1	2	0	1	0	0	0	4	0
$21K – 42K	1	0	2	1	1	3	0	0	0
> $42K	1	0	8	0	0	3	0	0	0
Unknown	1	0	1	2	0	2	0	0	0
Education									
HS or less	0	2	1	0	0	1	0	3	0
Vocational	0	0	1	2	1	4	0	1	0
Advanced	3	0	8	1	0	2	0	0	0
Unknown	1	0	1	1	0	1	0	0	0
Dependent Children									
Yes	3	1	3	3	0	2	0	1	0
No	1	1	8	1	1	6	0	3	0
Area									
Biloxi Bay	2	2	3	2	1	0	0	4	0
Hancock	0	0	3	0	0	6	0	0	0
W Harrison	2	0	5	2	0	2	0	0	0
Avg. years on Coast	53	18	30	12	7	12	--	18	--
Overall	34			11			18		
Avg. moves since storm	1.25	1.5	1.45	2	1	2.13	--	2.5	--
Overall	1.41			2			2.5		

Long timers included people born on the Mississippi coast, people who had lived on the Mississippi coast for many years, or those who had spent a substantial portion of their life there. Strong place attachments differentiated long timers from newcomers, as did advanced life stage in many, but not all, instances. Long timers' place bonds formed over time and through repeated interaction translated to their tendency to evoke commemoration and activity space recovery meanings. For example, one Pass Christian resident took a photograph of her church congregation's symbolic procession as they moved from their temporary facility to the historic, reconstructed sanctuary building (Figure 4.16). The procession took place during a regular mass, but it marked an emotional end to the church's collective return, "'cause we were finally back in" (Interview, Chantel). While this instance shows place attachment to a building and group of people occupying it, place attachments to the natural environment were also observed. These attachments were most common among retiree long timers, showing that advanced life stage can influence recovery meaning. Cal, a Waveland resident, described how the Gulf views and shrimp boats on the water beckoned him and his wife, Ruby, to return and rebuild their retirement home:

> "We were living in Baton Rouge, and we'd go somewhere on the coast and she would look out there like she really wanted to come back here… We were at [this restaurant] in the Pass, and she was eating, and she looked around, and I thought, 'I think we gotta come back here.' It is such a beautiful place…" (Interview, Cal)

In their rebuilt, raised, modular home, Cal and his wife now incorporate the views from

their front porch as part of their daily routines.

Figure 4.16 Chantel's photo of her church's recovery procession

4.4.2 Newcomers

Newcomers averaged 11 years on the coast and included more women,

particularly older women, than men (Table 4.1). Most newcomers were white, though

they outnumbered black residents by less than in the long timer group (Table 4.2).

Individuals in this group showed a wide and balanced range of ages. Newcomers

comprised mainly working class and lower middle class individuals; however, four of the

13 provided no information on income. Members of this group possessed specialized

vocational training beyond a high school education, but few had earned a bachelor's or

other advanced degree. Proportionally, white and black newcomers showed the same distribution of post-secondary education. These newcomers lived primarily in Hancock County and west Harrison County, which includes places like Pass Christian, Long Beach, and Gulfport. Newcomers displayed a larger degree of residential mobility post-Katrina than did long timers. This could have been a function of heavier damage along the western portions of the coast, relocations for work or in the process of settling in a new place, or a higher propensity for working class individuals to rent rather than own their homes.

Newcomers to the area were mostly those who had moved in within the last 10 to 15 years and had little to no pre-Katrina baseline to work with. Lacking the personal memories, place attachments, and engrained routines of the long timers group, new comers relied on visual, material, and functional meanings to make sense of recovery. Members of this group often synonymized new construction or development as a sign of recovery, regardless of whether the structure being built had had a pre-storm version or not. Economic development, casinos, large infrastructure projects, and suburban growth were features often enumerated by newcomers (Interviews: Dieu, Kimberly, Mai, Patricia, Vincent). Activity at an East Biloxi concrete plant was viewed as a positive sign of progress and new buildings to come, as was a busload of casino patrons (Figure 4.17). A row of historic shops in downtown Long Beach (Figure 4.18) could have reflected commemoration, but the lack of place attachment was evident in their framing as an economic boon to the community (Interview: Stephen).

Figure 4.17 Dieu's photos of a tour bus and concrete plant, East Biloxi

Figure 4.18 Stephen's photo of economic development in historic downtown Long Beach

Newcomers were distinct from long timers and immigrants because of their high degree of mobility, though few directly referenced activity space meanings when discussing recovery. Members of this group tended to be working age individuals whose

routes to and from work dominated their maps (Maps: Dieu, Patricia, Stephen) or younger people moving from one entertainment node to another (Maps: Kimberly, Linh, Vincent). By contrast, long timers (particularly those advanced in life stage) and immigrants displayed limited mobility in their maps and photograph locations.

4.4.3 Immigrants

Immigrants comprise the smallest group from the sample of 34 who took part in the photo elicitation method. All four immigrants were Vietnamese who lived near Biloxi Bay (Table 4.2). Three of them had emigrated within the last 20 years from Ho Chi Minh City (Saigon), while the fourth did not disclose his hometown. These participants included two men and two women (Table 4.1) who were middle age to elderly and spoke little English. Three had no dependent children living with them at the time of Hurricane Katrina. All four immigrants earned in the lower-most income category and only one possessed vocational training beyond a high school education. Employment in low wage, low level service jobs and in the seafood industry may explain why this group showed the highest residential mobility post-Katrina. Members of this group moved, on average, 2.5 times.

Immigrants born or raised outside of the United States formed a third group identifiable by their conceptualizations of recovery. Although activity space, visual, and function meanings dominated within this group, the international migration experience set them apart from newcomers and long timers. The dire struggles endured among Vietnamese Boat People migrating to the US in the 1980s and 1990s diminished the experience of surviving and recovering from Hurricane Katrina. Recovery was

understated and referenced nonchalantly relative to the migration experience. One

resident joked about swimming through his flooded neighborhood, while another spoke

casually of how friends or Vietnamese contractors helped rebuild houses (Interviews:

Hanh, Vien). Recovery was a short-lived inconvenience and a small price to pay for

living in what one participant deemed the Promised Land (Interviews: Quy, Vien).

Current issues among this group centered on successful cultural integration, maintaining

stable employment, and providing for children and grandchildren (Interviews: Cong,

Hanh, Quy, Vien).

While pragmatic optimism was the tone among Vietnamese residents, Hispanic

and Jamaican residents spoke with a more bitter tone about receptivity issues such as

ongoing discrimination in the workforce and racism that had increased since 2007 (ESL

focus groups). Focus group members placed little value in the landscape as a measure

of recovery; rather, social conditions in terms of education, employment,

transportation, and legal resources were paramount.

Activity space meanings came through in focus groups and individual mapping

exercises, as did the focus on cultural integration. In mapping important community

features, religious congregations (i.e., churches, temples) were the most identified type

of feature. Multiple homes of relatives or friends were mapped—these features were

notably absent from all but two of maps drawn by American-born participants. Both

immigrants and US-born Vietnamese participants referenced ethnic businesses in their

maps, photos, and discussions; however, immigrants tended to qualify the importance

of ethnic stores and cultural landmarks as necessities for cultural integration (i.e.,

activity space and functionality recovery meanings) (Interviews: Hanh, Vien; ESL focus

groups), while long timers and new comers of Vietnamese descent (Interviews: Linh,

Thomas) viewed these recovery landmarks as essential symbols of ethnic heritage (i.e.,

commemoration, visual, and material meanings).

4.5 Temporal Phases of Recovery

Distinguishing between temporal phases of recovery is helpful for understanding

how the judgments about the speed and success of outcomes change during the

recovery process. Residents discussed two distinct phases of the recovery process

(Table 4.3) separated by a transition phase, which notably differs from Kates' four-phase

10-10-10 Model (Kates and Pijawka 1977, Kates et al. 2006). One participant remarked

how, in long-term recovery, the physical condition is much more satisfactory, whereas

in short-term recovery the physical circumstances were difficult, but it was a more

emotionally satisfying time period (Interview, Olivia). Other participants echoed these

sentiments (Interviews: Fred, Patricia, Wanda). Although long timers, newcomers, and

immigrants expressed the same six recovery meanings (i.e., commemoration,

betterment, sensory experience, materiality, adjustments to activity space, and

changing functions of spaces) in short-term and long-term recovery, the transition

phase marked a change in the acceptability of recovery outcomes and the ultimate goals

(as seen on the landscape) of the local recovery process. The next three sections explain

these differences in recovery assessments as well as major activities, attitudes, and

community issues associated with each resident-defined recovery phase.

Table 4.3 Comparison of short-term and long-term recovery

Short-Term	Long-Term
Psychological / Social • Camaraderie • Community-mindedness • Public participation • Altruism • Faith in God • Empowering • Adrenaline to restore • Indecisiveness over whether to stay or go • Encouragement through volunteer efforts • So much help you didn't realize loss Infrastructure • Little physical remains • Primitive Institutional • Odd location of supplies • Being occupied by soldiers	Psychological / Social • Interpersonal distance • Lack of compassion • Need for psychological aid and recovery information • Victim mentality pervasive Infrastructure • New buildings • Bettered homes • Beautiful buildings with high maintenance costs (new burdens) • Substandard housing degrades in secondary disasters Institutional • Organizational capacity for aid, but limited resources • Lack of interest in community organizations

4.5.1 Short-Term Recovery

The short-term recovery process from Hurricane Katrina was marked by an outpouring of faith, altruism, and communal behaviors. These psychological and social responses fostered both optimism and community boosterism. Community members fueled by pride and optimism were task-driven (Interviews: Eric, Olivia), however, the strong, equally shared desire to rebuild physical infrastructure lost to the disaster could easily be misinterpreted as agreement over *how* the rebuilding should take place. This was exposed only later, in long-term recovery, when inherent disagreement over the

fate and future of communal and government structures fully crystalizes (i.e., the commemoration versus betterment struggle).

Volunteers who assist and out-of-area experts who offer advice are generally welcomed and appreciated, but tend to create rifts in the social fabric that fester and grow over the longer term. One problem in the most devastated areas of Hancock County, in particular, was that design charrettes and other planning-related events were held before many residents had even returned to the area. The residents who attended were mostly those whose immediate neighborhood was not part of the planning design (Interview, Rose).

Faith played a large role in residents' short-term recovery experiences:

I felt closer to God than ever, and I felt like I was in the hand of God. And it was a new experience for me because I had never been needy. (Interview, Olivia)

Churches like St. Rose in Bay St. Louis and New Bethel in Biloxi functioned as sites of aid from which information and help were dispatched. Makeshift churches held in tents, then in unfurnished sanctuaries and auditoriums provided sites for communal worship and gatherings. Altruism was reflected in helping behaviors and a want to do more. One resident remarked how God had called her to Biloxi after her house was destroyed in 2004's Hurricane Ivan. Despite the fear in navigating the devastated landscape and the shaky social terrain, faith provided the staying power and compassion to assist in community recovery efforts (Interviews: Marcel, Patricia).

Community organizers adopted an optimistic approach and often acted as cheerleaders championing the can-do-it spirit (Interview, Mary). Civic and cultural pride

were evident in street festivals and parades that foster a sense of normality (Figure 4.19). At these crucial events, residents expressed their thankfulness for having made it through the storm. Neighbors were happy to see one another and take stock of their fellow community members in term of who survived, who remained, and who has yet to return (Interview, Natalie).

Figure 4.19 Community events: (a) Jared's photo of a street festival, Bay St. Louis, and (b) Chantel's photo of a Mardi Gras parade, Pass Christian

Community boosterism emerged as a force behind strides made at the municipal level in replacing key structures like police and fire stations, schools, libraries, and civic centers. According to some residents, however, boosterism in the short-term clouded reasoned judgment of future demographic trends in planning these types of structures, thus making bigger seem categorically better (Interviews: Dave, Elaine, Jared). The pro-growth, phoenix-like hopes of the early recovery period was echoed among councilmembers who saw their cities as unquestionably "on the rise" (Interview, Rose).

During this time, residents cheerfully and graciously accepted volunteer help from a multitude of sources. Primarily Protestant church groups from across the nation left marks on the landscapes and memories of Gulf Coast communities. Many residents shared fond stories of the hours spent cleaning debris and ripping out sheetrock with the assistance of these helpers (Interviews: Chantel, Marcel). Many still keep in touch to some degree with the volunteer groups providing at least some minimal bridging capital (Interviews: Chantel, Marcel, Rose). The nature of this help was often serendipitous and residents remarked how it seemed divinely inspired.

> If we did not brace the house this particular day, it was in danger of collapse"
> said one interviewee, "but by the Grace of God, this group of men showed up
> with a bobcat to help. (Interview, Olivia)

It was the same with this resident's car, which was caught in a road collapse—a group from the Army Corps of Engineers brought a crane from down the street where they were working to pick up the car and place it gently back on solid pavement.

Discussions among ESL focus group members echoed these same sentiments that their assistance was very much needed and appreciated upon arrival immediately post-Katrina. Manual labor tasks such as debris clearance, sheetrock replacement, and roofing went to primarily Latino immigrants. By 2007 and 2008, however, attitudes toward these new Latino arrivals had begun to shift and many felt that they were being actively shunned from the community (ESL Focus Group 2, Biloxi).

A long-time resident spoke of being overlooked by volunteers. She was located in an isolated area, cut off after Katrina because of the lack of cleared roads and the destruction of the Bay St. Louis Bridge. The spatial mismatch between volunteer efforts and her needs bred resentment instead of further altruism and hope (Interview, Elaine). To her, there appeared to be little cross-church or inter-institutional coordination in distributing volunteers across the coast. Collecting and distributing real-time integrated data on resident needs seemed to be a problem in systematically coordinating reconstruction efforts.

4.5.2 Transition Phase

The transition phase between short and long-term recovery consisted of increasing social distance in the community and changes in the perceived purpose of the recovery process itself. Most interesting to observe among interviewees was the point in time that each participant said they experienced these sorts of transitions. The transition phase came first in the east, to areas with less overall damage, and gradually shifted westward to areas with more damage. Residents in Harrison County

experienced this transition in 2007 or 2008, while Hancock County residents described these types of events happening in 2010-2013.

Residents became aware of the loss of community bonds that had developed in short-term recovery as food tents, supply drop-points, and volunteers began to disappear from the recovery landscape. Suddenly there was a dearth of communal gathering places, and people began to feel isolated and siloed in their own homes. One interviewee remarked about the sudden emptiness he felt in his home because he had housed nearly 20 fellow church members and neighbors whose homes had been destroyed and were under repair (Interview, Eric).   A loss of recovery purpose bred depression.

A recovery divide begins to emerge as more permanent housing comes online. The spatial mismatch between increasingly scarce volunteer labor resources and resident needs helps expand social fissures created in the short term. The disappearance of *communitas* (Richardson et al. 2014) is evident as residents move through housing recovery at rapidly different rates. For example, one resident who was quick to rebuild her home relative to the rest of her community remarked how she felt resentment among residents who had yet to finish their homes, despite her continued involvement in community-centered volunteer activities (Interview, Olivia).

Three groups differing in social attitudes emerged to form a recovery divide. The first group was the haves—those who tend to be well off and experience complete reconstruction of their homes first. The haves became vocal, insisting that others who have not yet recovered were whining. A second group in the middle who experienced

only minor problems bore the brunt of their recovery struggles silently. The third group

comprised those in serious need of assistance. The poor and working classes made up a

large proportion of this last group who ended up worse than they were pre-disaster

(Interviews: Julie, Mary, Paula).

Substandard housing became a problem during secondary disasters, particularly

for this third group, as deferred maintenance programs often did not provide enough

money to fix pre-existing structural problems that have been made worse by the

disaster event. If the first dispersal of funds after an initial disaster is only sufficient for

a Band-Aid fix and a secondary disaster worsens the damage, the resident is faulted and

no further aid funds are dispersed. This was a problem with tornado and rainwater

damage during Hurricane Isaac (Interview: Julie & Paula). Ancillary interviews[1] with

African American residents in the working class Kreole neighborhood of Moss Point also

validate these circumstances.

Nostalgia and communal optimism began to wane during the transition from

short-term to long-term recovery, in large part due to the realities of political and

economic recovery barriers: higher FEMA base flood elevations, rising flood and

homeowner insurance rates, falling housing prices, and waning regional economic

investment. The honeymoon phase of boosterism came to an end. Residents began to

realize that the goal of recovery to "what was before" was unattainable. After Katrina,

the prudence and practicality of long-term recovery to the pre-disaster status quo came

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[1] Impromptu, unstructured resident interviews conducted during HVRI field work (NSF #0623991) following Hurricane Isaac on the Mississippi Coast, September 2012.

to be widely questioned, and adoption of a "new normal" approach to recovery emerged:

> "We were just very active in recovery and rebuilding […], it was an emergency. You didn't have a lot of time to reflect. But I think when I drove down on the Point [*in East Biloxi*] and I just walked the streets, drove around, let myself cry, and looked at it, […] I had to accept […] this isn't going to rebuild. We've got to do the best with what we have left, and we've got to make it good for the people that live here" (Interview, Mary).

From a psychological standpoint, the adoption of a new normal framework could be accompanied by a shift from victim mentality to a survivor mentality (Interview, Phyllis). This prompted a reinvestment in homes and a desire to return and restore functionality to properties receiving only minor damage. Some residents decided that adopting the survivor mentality, for them, meant demolishing what was left by the storm in favor of new construction. Painful recollections or attitudes of hopelessness now attached to unrepaired homes (no matter how minor their damage) meant recovery would be impossible without erasure of this material past first (Interview, Olivia).

Another marker of transition was that citizens began complaining (Interview, Rose). Whereas early in recovery when the burdens in common among community members seemed to trump personal preferences, after housing and business construction had stagnated and most people had returned to permanent domiciles, trite issues like lack of parking came to be issues at council meetings.

Attitudes toward immigrant workers also changed. According to several Hispanic immigrants who had been received with open arms shortly following Katrina, by 2007, the mood had begun to change (ESL Focus Group 2, Biloxi). Rapid response labor force migration to a historically non-Hispanic area suddenly brought about the realization in the populace that a substantial Hispanic minority existed. Conservative rhetoric about illegal immigrants stealing American jobs exacerbated the souring reception. The situation was only made worse by conservative state and local politicians elected in the 2008 elections and the recession that followed. Although extant research identifies rapid response labor migration as distinct from other instances of chain migration and links the process to federal immigration policy in the 1990s (Fussell 2009), further research would be needed to determine whether the attitudes within the receiving community are generalizable symptoms of recovery or whether they are unique to the larger socio-political context in which Mississippi's Katrina recovery occurred.

In referencing visible changes to the landscape, one interviewee talked about recovery as a continual "becoming" rather than a concise period of time with a neat bookend and easily definable outcomes (Interview, Julie). This seems to be the difficulty with pinning down when recovery concludes or diagraming it as a simultaneous social *and* spatial process. Changes are so slow and gradual that they are almost imperceptible in the day-to-day routines of recovering residents (Interview, Rose). Only when examined reflectively and longitudinally are notable changes evident in the physical, social, and psychological condition of residents.

4.5.3 Long-Term Recovery

Long-term recovery seemed to include a loosening of institutional ties emergent after the disaster. Emergent groups, organizations, and associations developed through adaptive resilience disbanded either because of a lack of resources or a waning interest in the cause. For instance, even though social case workers continued to have roundtables to discuss the numerous unmet housing repair needs, these meetings ceased to have a purpose with the lack of funding resources. Eventually they were ended (Interviews: Julie & Paula, Cora & Ginny). Similarly, a lack of interest among high school youth who did not experience the void of school community life during Katrina's short-term recovery period saw no need to continue the Noodle Bowl flag football tradition that brought together Asian youth from across the Mississippi Coast (Interview, Linh & Thomas).

Long-term recovery was marked by bigger questions about how decisions on the fate of structures affected remembrance of the past, vision for the future, resilience against hazards, and sustainability in light of environmental and economic realities. The story presented earlier about the neighbors, one who rebuilt a bigger more robust house and one who elected to live in a shed (Interview, Vien), exemplifies the economic sustainability versus hazards resilience dilemma at the household level. So too does the comparison of an older Pass Christian resident's decision to restore her 1880s historic home for the sake of historic preservation while her middle-aged neighbor opted to tear down and rebuild new using fortified construction methods (Interview, Olivia). The divergent range of household adjustments among axes of memory, sustainability, and

resilience are set against a complex backdrop of immigration hoops, municipal planning

goals, disaster financial aid, and life events ranging from divorce to retirement to child-

rearing.

Divergent approaches during long-term recovery were echoed at the municipal

and regional level, though the question here, too, was which strategies for adaptive

resilience strengthen inherent resilience for the next storm? Municipalities could either

adopt the phoenix-like beauty of new, large-scale civic construction (along with the

costly burdens of insurance and maintenance) or continue operating with the former,

fixed-up pre-event structures that did not symbolize a recovered, ascendant city

(Interviews: Dave, Elaine, Jared, Rose; Field notes[2]). The realities of rising insurance

costs and the inconvenience of living in impractically elevated homes drove the

population shift away from developed areas on the immediate coastline, creating long-

term concerns for the places they left behind. Less populated school systems with fixed

borders have trouble remaining financially solvent (Interviews: Dean, Shannon).

Residents and cities were left with increasing per capita costs of operating (and in the

case of Waveland, rebuilding) dense networks of water and sewer infrastructure in

areas that will likely never be rebuilt at previous densities (Interviews: Dave, Rose; Field

notes[3]). Long-term recovery also brought wildlife encroachment into depopulated

areas—residents noted upticks in snakes, rats, deer, and coyote sightings, though the

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[2] Field notes from impromptu, unstructured interview with a Waveland resident during HVRI fieldwork,
September 2012.

[3] Ibid.

circumstances of individual encounters and ecological values determined how they viewed the encounters (Interviews: Anna, Ellen).

Larger environmental and social issues stemming from the northward migration also framed long-term recovery in Mississippi. The areal expansion of development post-disaster has led to continuous sprawl and increased auto dependence. None of the resident interviewees expressed concern over possible ecological consequences of this development pattern, though key informants in the government social services did note social equity concerns. While low density areas north of I-10 have become popular relocation places due to lower rebuilding costs and insurance rates, these areas lack the transit services necessary for displaced, carless residents who move there. Vietnamese residents who lacked personal transportation in these northern fringe areas were also divorced from vital ethnic services and community support. During short-term recovery, the local housing authority took care to relocate residents to areas like the Buford Highway corridor in Atlanta where these types of transit and ethnic community services were available; however, the task of providing permanent, long-term housing for low-income Vietnamese residents is tougher. In Biloxi, where fewer government-owned housing options were replaced after Katrina, increasing support for a voucher approach to low-income housing (instead of the government-as-landlord public housing model) and a mandate that housing vouchers not pay for rentals in high-risk zones make finding affordable, socially sustainable public housing difficult (Interview: Allison & Will).

4.6 Findings

This first research question asked: what does the recovery of place mean to local residents? This question was meant to interrogate the purpose of the recovery process itself (i.e., recovery to what?) as seen by through the landscape of the Mississippi Coast by a diverse cross-section of residents. Residents recruited to participate differed in terms of their degree of rootedness in place, location of residence, and place within the intersection of social hierarchies on the coast in order to examine how meanings varied based on various facets of identity (i.e., recovery for whom?). Photo elicitation, follow-up interviews, and cursory analysis of participant-labeled maps revealed six unique meanings of recovery: commemoration, betterment, sensory experience, materiality, adjustments to activity space, and changing functions of spaces.

The purpose of commemoration changed over the course of the recovery period from a simple replacing of what was lost to a memorialization of a sense of place. Commemoration and betterment were found to be at odds with one another, particularly in the long-term, depending on how well rebuilt structures reflected a sense of the local past or a vision for the future. Modes of transportation, physical mobility, and social ascendancy (or lack thereof) all factored into the evolution of activity space among residents. In long-term recovery, spatial mismatches between a social community's activity space and their residence were found, thereby increasing mobility. The lines blurred between what counted as public space and what was private space, at times inciting controversy, and at other times pride.

Place attachment, mobility, life stage, and foreign immigration experience were factors in how residents tended to spin the meaning of recovery. Long-timers emphasized commemoration and activity space meanings along with the return of familiar sights and sounds. Newcomers to the area often pointed to material representations of recovery and changing functions of spaces; to them, new construction was a sign of economic and population growth. International migrants downplayed the short-term recovery experience, instead highlighting betterment through community integration and localized activity space where the necessities of daily life could be procured.

CHAPTER 5

PARTICIPANT RECOVERY ASSESSMENTS

5.1 Overview

The second research question asks how residents assess their own recovery in terms of progress and outcomes, and whether the assessment varies based on geographic location, social position, or length of residence in the area. This chapter begins by describing the participatory mapping method I used and its implementation with residents. The mapping exercise took place during the follow up meeting with residents after discussion on their photos had concluded. In keeping with a feminist approach, participatory mapping enabled residents to, first, independently identify places in their community that showed the ongoing recovery and its effects, and secondly, to assess these places based on the speed of the recovery process (i.e., fast or slow) and the acceptability of the outcome (i.e., success or failure). The acts of mapping and assigning value to each of these places allowed participants to construct their own spatial recovery landscapes representing recovery from their individually situated vantage points. The places identified form a dataset of recovery features, which is used to answer the question. In reporting findings, I first describe the recovery feature dataset as a whole in terms of participant-assigned labels (i.e., fast, slow, success, or failure) and feature types (i.e., business, residence, public facility, etc.). To answer the

second part of the question, I stratify the recovery feature dataset based on

characteristics of the resident identifying each feature. Resident characteristics came

from the background survey detailed previously in the methods chapter. In light of the

geographic specificity of hurricane impacts, I proxy residents' geographic position with

damage received from Hurricane Katrina. Social position is approximated with three

characteristics: age, income, and the presence of dependent children in the household.

Though social position encompasses far more facets, I focus on these three

characteristics because they correspond best to life stage and mobility, which affected

how the residents framed the six meanings of recovery in research question one.

Finally, length of residence in the area is measured by the number of years one has lived

on the Mississippi Coast.

5.2 Participatory Mapping

Participatory mapping capitalizes on local knowledge that can be useful in

understanding and tackling community problems. The method, which falls under the

umbrella of public participation GIS (PPGIS), has emerged out of cartography's critical

turn (Harley 1988, Crampton 1995, Sheppard 1995). Participatory mapping furthers

social justice aims in democratizing planning and development processes that empower

historically underrepresented groups (Schuurman 2006, Pavlovskaya and St. Martin

2007). Individuals or groups on the ground are enlisted in mapping features of interest

to researchers. These features may be ecological or social in nature. Applications of

participatory mapping are commonly found in public health (Dennis et al. 2009),

development planning (Weiner and Harris 2003, Norwood and Cumming 2012), and environmental planning (St. Martin and Hall-Abner 2008).

Scholars have operationalized an array of data collection techniques ranging from sketch maps drawn and labeled entirely by participants (e.g., Potter 2015) to mobile mapping applications or GPS receivers carried by participants to track movements and catalog absolute locations in real-time (e.g., Kwan 2007, Loebach and Gilliland 2010). Sketch maps provide maximum context in the form of rich, qualitative data but minimal levels of geographic precision. They are found to be over time, but poor in accurately representing distances (Golledge 1976, Kaplan 1976, Blades 1990). Using receivers or mobile apps offer the precision required of GIS and need minimal post-processing but lack the archival capabilities for deep local knowledge as interviews would elicit.

The current study uses a middle of the road approach that asks residents to label, classify, and describe features of their choosing on a basemap with streets and roads. The basemap controls for inaccuracies that may be present if residents were to simply draw sketch maps, allowing these absolute locations to be aggregated in a GIS for post-hoc analysis following the actual mapping exercise. Prompts to vocally describe features being mapped simulates an interview or go-along method, providing rich contextual data that might be absent if residents were asked to use a mobile GPS unit to catalog features independently. Lynch (1960) notes that sketched and label maps often contain fewer numbers of features but show more consistency in what features are labeled, whereas interviews about a place reference more places with less consistency

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between participants. This finding affirms the appropriateness of the mixed

methodology being implemented in the broader study, where the participatory mapping

results are be viewed in tandem with results from the photo elicitation and interviews

rather than independently.

5.2.1 Implementation

Participants used five colored wet-erase markers on a large, laminated map of

the Mississippi Gulf Coast to identify places that showed recovery. To familiarize

participants with the map scale and layout, they were first asked to use a purple marker

to label the location of their house. Participants then received four prompts and four

colored markers, two at a time. They were asked to 1) "use a black marker to label

places that recovered quickly" and 2) "use a blue marker to label places that recovered

slowly." I reiterated black for fast and blue for slow before handing over the markers. I

intentionally used the word "place" in the prompts to keep the geography vague and

open-ended; if participants asked for clarification, I told them places could be areas,

landmarks, or features. As participants began to identify recovery features on their

maps, I elicited details by prompting them to explain aloud what each feature was, why

they were marking it, and when they remembered that location or landmark being fully

recovered. Participants were also invited to use the entire map—not just their

immediate neighborhood or hometown.

When participants could no longer think of additional fast or slow recovery

features, I asked them to 3) "use a green marker to label places where recovery was

successful" and 4) "use a red marker to label places where recovery was unsuccessful."

I reiterated green for good, in your opinion, and red for bad, in your opinion, before relinquishing the markers. The same talk-aloud prompts were used to elicit details. Participants were allowed to label one feature in multiple ways, if they chose to do so. For example, one feature might receive a fast and an unsuccessful label or a slow and successful label. Cases where participants assigned a double-label for recovery speed (i.e., both fast and slow) or outcome (i.e., both success and failure) did occur but were exceedingly rare.

The participatory mapping lasted anywhere from 10 to 25 minutes. I documented each participant's labels with several detailed photos on my personal digital camera in order to recreate the map later in a GIS. Map labels were then erased for the next participant. A total of 22 participatory mapping exercises were conducted with 28 participants. Though individual mapping exercises were the intention, scheduling difficulties arising from an ice storm the final week of data collection meant six of the 28 participants had to do joint (two-person) mapping exercises instead. Only co-workers or friends recruited together participated in these joint mapping exercises. This glitch in data collection necessitated additional data processing for analysis, which I detail later.

The map used in the participatory mapping exercise was a large-area (1:50,000 scale), two-foot by five-foot map of the Mississippi Coast I created from US Census Tigerline files. Major highways, primary and secondary roads, railroads, and water bodies were mapped. All major highways and a selection of smaller streets were labeled with feature names. Prominent landmarks were not labeled as in other studies

(Pavlovskaya 2002, Colluccia and Louse 2004) to eliminate the potential for researcher bias in terms of what landmarks participants themselves might identify.

This map was pilot tested in June 2013 along with a series of detailed (1:12,000 scale) maps printed on letter-sized paper that was unique for each pilot participant. These smaller paper maps, which depicted building footprints and zoomed-in areas around each participant's home, work, and hometown, were designed in case participants had trouble locating features on the more general, laminated map; however, they were ultimately not used in full-scale implementation. The series of mapping prompts pilot tested was also modified for the implementation to reflect clear, dichotomous classifications of recovery outcomes (i.e., success/failure) and speed of the recovery process (i.e., fast/slow). Hence, any participatory mapping data generated by pilot participants was not comparable to data generated during implementation, and thus, was excluded from further analysis.

5.2.2 Analysis

At the conclusion of each participant's mapping exercise, I digitally photographed all labeled recovery features. Individual features in these photos were first catalogued in a spreadsheet by image number, participant ID, interview number, geometry type (point, line, polygon), feature description, and label type (presence (1) /absence (0): fast, slow, success, failure, orientation) (Table 5.1). Audio from the participatory mapping exercise and follow-up interview transcripts helped to clarify the feature description.

Table 5.1 Example records from recovery feature dataset

FID	Int	Pcpt	Feature Description	Geo	Phot	Fas	Slo	Suc	Fai	Ori
U013	I701	P501	Biloxi Regional Hospital	Point	DSC0 6414	1	0	0	0	0
U039	I701	P501	Ansley / Lower Bay / Pearlington	Area	DSC0 6430	0	0	0	1	0
U040	I702	P502	P502's Home	Point	DSC0 7074	0	0	0	0	1
U041	I702	P502	Beaches Slow (Hwy 90 Curve - Broad Ave GPT)	Line	DSC0 7074 _75	0	1	0	0	0
U199	I719	P519	Beau Rivage	Point	DSC0 6969	1	0	1	0	0
U308	I729	P529	Beau Rivage	Point	DSC0 7022	1	0	0	0	0
U362	I727	P533 _527	Beau Rivage	Point	DSC0 7037	1	0	0	1	0

I catalogued a total of 420 features identified by residents. Of these, 323 were unique features[4]. I assigned these recovery features two sets of identifiers to differentiate the subset of unique data features from the full dataset. A unique identifier (n=323) is helpful for summarizing types and spatial relationships of recovery features, in general, to answer the first part of research question two. A secondary identifier (n=420) is necessary to examine participant feature labels—the first part of

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[4] A feature was deemed unique based on its description rather than the type of geometry (point, line, polygon) residents may have used to represent it on their maps. For instance, Edgewater Mall in Biloxi was symbolized as a polygon by some residents and a point by others, but this was counted as one unique feature.

the research question—and to discern between-group participant subjectivities in the identification of recovery features—the focus of the second part of the question.

Additional pre-processing of the full dataset of 420 recovery features was necessary before examining differences in recovery assessments based on participant characteristics. I first removed features marked solely for orientation purposes (i.e., participants' homes if they did not also label the home as fast, slow, successful, or failure) from the total of 420 recovery features. Next, because 61 of the 420 recovery features were identified during joint mapping exercises—an unplanned modification of the procedure because of the ice storm—it was impossible to attribute these features solely to one participant or the other. Often times, the two people who participated in a joint mapping exercise would fall into different categories for age, length of residence, or damage. In order to account for this, these 61 features identified cooperatively by two participants during each joint mapping exercise were selected from the dataset of 420, duplicated, attributed to each participant individually, and then merged back with the dataset. The resulting dataset, which was ready to stratify by participant characteristics, included 491 recovery features.

When inputting participants' identified recovery features into a GIS, features are reduced to the most compact geometry type possible while still retaining their intended meaning. For instance, individual buildings like casinos, hospitals, and stores are represented as points, while shopping centers, neighborhoods, port facilities, and military bases are represented as polygons. Linear features were only coded as such if the participant labeled them as lines on the map—these were mostly development

corridors, main streets, bridges, or beaches. Audio from the participatory mapping

exercise and follow-up interview transcripts helped to clarify the appropriate geometry

type.

5.3 Participant Recovery Assessments

To answer the first part of the research question, I present summaries of map

data by recovery feature label and by recovery feature use type. Feature use types

indicate what kind of feature (e.g., business, public, residence, etc.) is being mapped,

while feature labels indicate each participant's assessment(s) of recovery process speed

(i.e., fast/slow) and recovery outcome (i.e., success/failure). While feature labels were

assigned by participants during the participatory mapping exercise, use types were

researcher-assigned. Based on audio data from participant interviews, I categorized 418

of the 420 recovery features into one of eight use types (Table 5.2). The distinction

between community, mixed use, and public features is ownership: community features

like churches are built by a private or non-profit organization for communal use, mixed

use features contain a mixture of businesses, residences, and publicly owned spaces

that make up a corridor or district, and public features are owned and/or managed by

the local, state, or federal government. Two features could not be identified and were

categorized as unknown use.

Table 5.2 Definitions of eight feature use types

Use Category	Definition	Examples
Business	Retail outlets, businesses, entertainment venues, and other for-profit enterprises, or features that provide business services.	Casino Magic Walmart on Hwy 49 Promenade Shopping Center Bay St. Louis Chamber of Commerce
Community	Social gathering places, symbolic places for particular social groups, and places vital to personal mobility or information exchange. May be public or private.	WLOX TV Slavonian Lodge Sacred Heart Church Gulfport-Biloxi Regional Airport
Industrial	Manufacturing and shipping facilities and infrastructure.	Biloxi Bay Train Bridge Pipe & Fiber Optic Factory
Military	Military bases or installations used exclusively for active or retired military personnel.	Keesler Air Force Base Veteran's Affairs
Mixed Use	Districts, neighborhoods, large areas, or corridors with a mixture of uses.	Downtown Gulfport, Coleman Ave. (Waveland) Beach from Oak St to Jones Park
Public	Publicly owned facilities and infrastructure maintained by city, state, or federal government and privately-owned facilities that provide public services.	I-110 Bridge Old Gulfport Library Biloxi Regional Hospital Pass Christian City Hall Complex
Residential	Buildings serving as domiciles and neighborhoods comprising dwellings or allocated for such use.	Turn Key neighborhood New houses on Sandy Hook Bayou Auguste Public Housing
Temporary	Locations important in relief and response operations.	FEMA Feeding Tent Temporary City Hall in Quonset Huts
Unknown	Undetermined feature marked during mapping exercise, but not labeled or discussed.	--

The following subsections discuss what residents are mapping as recovery and how they are assessing the recovery of these features. I explore uses and labels of the most frequently identified recovery features. I also briefly describe the spatial patterns

for each label, displaying digitized composite maps that group all fast, slow, success, and

failure features, respectively. Due to the small participant sample size, the large spatial

extent over which participants identified features, and the imprecision in the hand-

drawn mapping method, I refrain from implementing any geostatistical spatial analysis

techniques. Feature digitization is, however, a necessary middle step in aggregating

participant assessments to the tract level in order to compare them against quantitative

indicators as part of the third research question.

5.3.1 Recovery Feature Labels and Use Types

When examining labels that participants assigned to each of the 420 recovery

features, 87% of these features received a single label (Figure 5.1). Participants
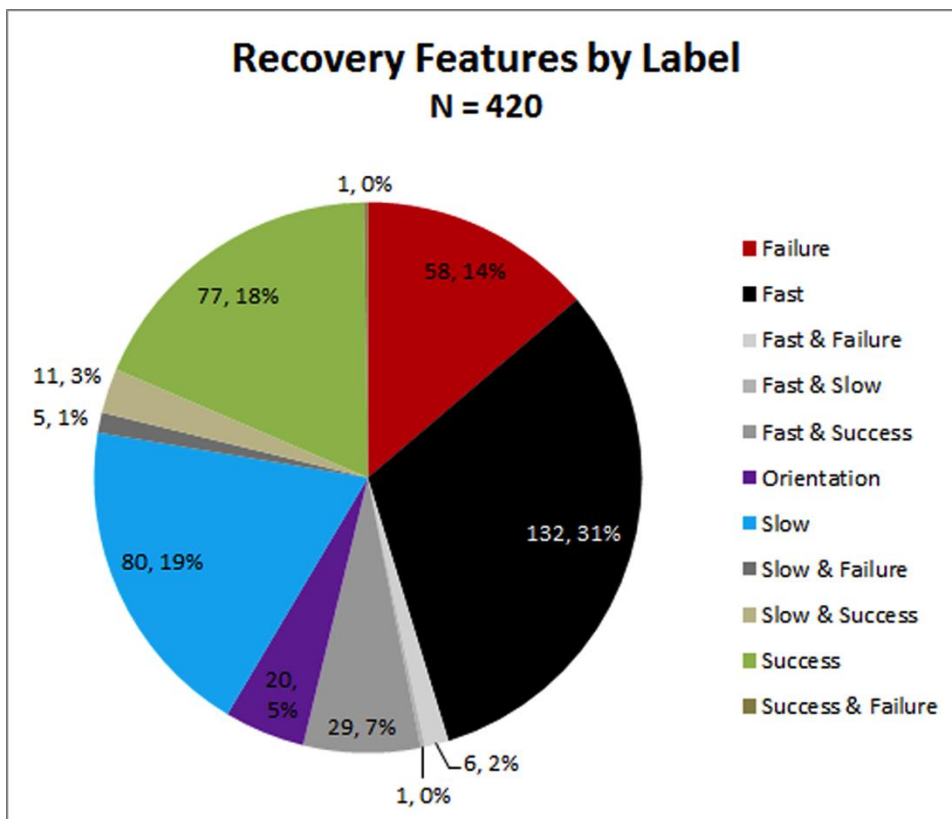
Figure 5.1 Pie chart of all mapped recovery features by participant-
assigned label

identified half of all recovery features by speed (fast or slow), with fast features making up the larger group (31%). Nearly a third of all recovery features (32%) were identified by outcome (success or failure). Among features identified by multiple labels, features noted for their fast recovery speed were most often equated with successful outcomes (29 features, 7%).

Figure 5.2 shows the distribution of participant labels (n=420) within each of the eight use types. The Y axis also shows the number and proportion of unique recovery features (n=323) that fell into the eight use types. Over half of unique recovery features were either business (30%) or residential (27%). Removing homes mapped for orientation purposes only slightly reduces the proportion of residential features (22%). While business features represent the largest use type category in the recovery feature set, if community, mixed use, and public features were combined, this would become the largest category (38%).

Examining the distributions of labels within use types, business landmarks overwhelmingly exemplified speedy recovery in participants' eyes. Nearly half of all labels assigned to business features (48%) were fast. Residential features received the largest proportion of slow labels (32%) and failure labels (33%). Residential features that were deemed slow to recover or unsuccessful in recovery outcome were diffuse in their spatial distribution and included anything from vacant lots and defunct apartment complexes to piecemeal redevelopment in highly damaged neighborhoods.
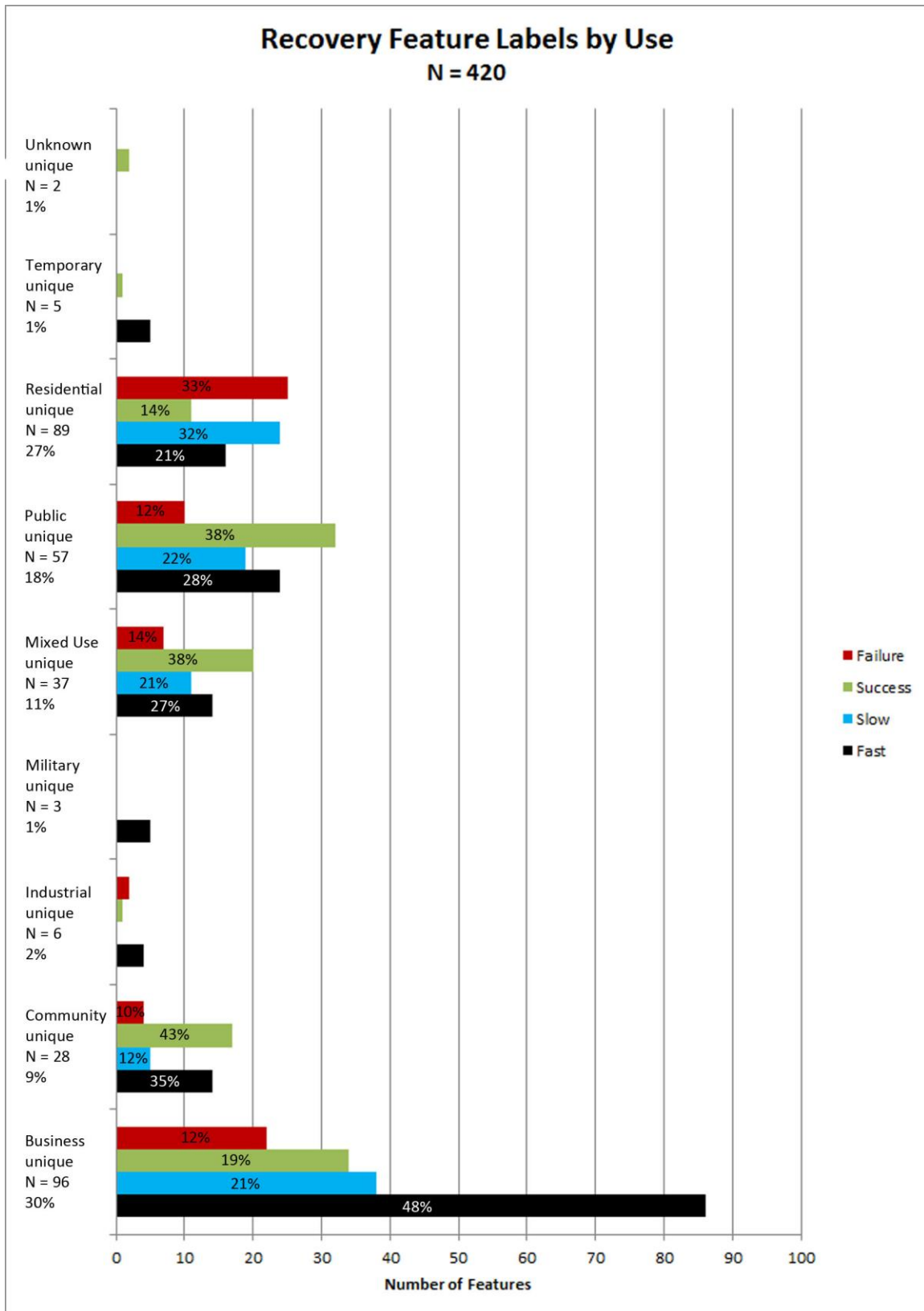
Figure 5.2 Chart of all mapped recovery features by use and participant-assigned label

The distribution of participant speed and outcome labels across features designated as community, mixed use, or public was similar and distinct from businesses and residences. These features were most often identified as successful, and secondarily as fast. Community features garnered the largest proportion of success labels (43%). Churches and harbors comprised the majority of these successful features. Public and mixed use features showed similarly high rates of success (both 38%).

5.3.2 Frequently Identified Recovery Features

A total of 49 unique features were duplicates identified at least twice in separate follow-ups (Figure 5.3). Approximately half of these features were businesses including
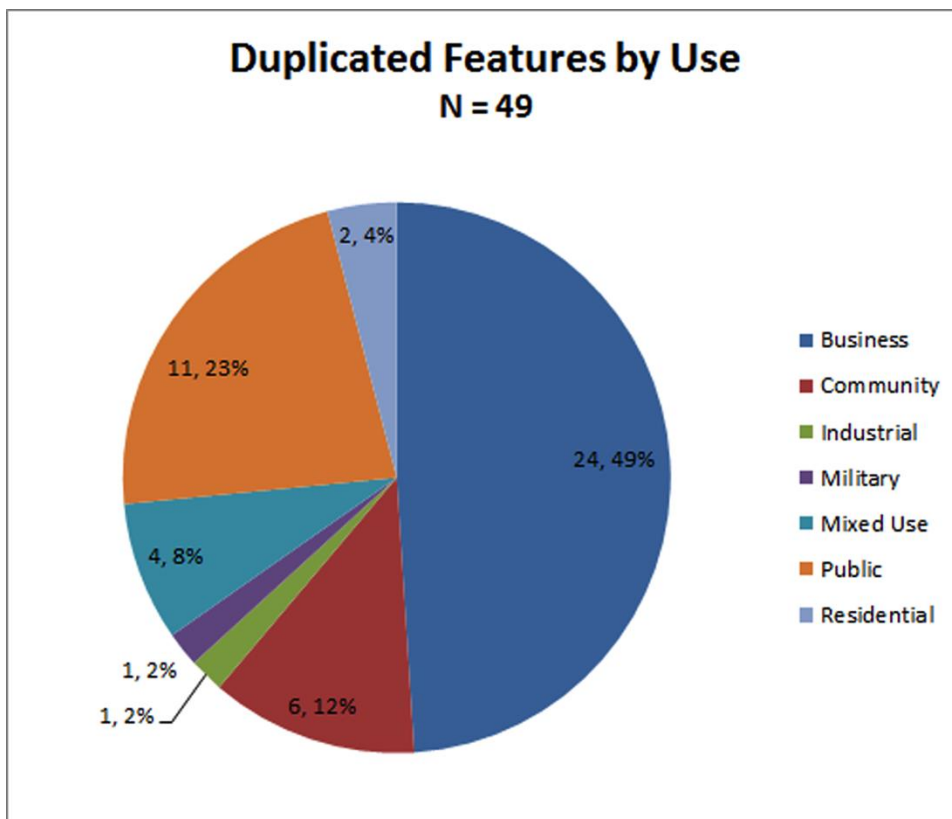
Figure 5.3 Chart of recovery features identified by multiple participants, categorized by use type

Walmart stores, home improvement stores, and large shopping center areas. Nearly a quarter of them were public facilities like parks, city hall complexes, and libraries. The widespread identification of places utilized by members of multiple communities and social groups in their daily activities further supports the meaning of recovery as activity space.

Seven unique recovery features were mapped at least five times (Figure 5.4). All but two of these were Biloxi casinos. Seven participant maps included Grand Casino on Point Cadet. Six maps included Golden Nugget on Point Cadet as well as Hard Rock and IP Casinos, also on the Biloxi peninsula. Gulfport's downtown district and the Biloxi-Ocean Springs Bridge, each identified five times, were the exceptions to the casino rule. Casinos most often received fast labels from the participants mapping them. Such rapid recovery of the casinos was not without controversy, however; all of the failure labels among these most identified features were assigned to casinos. Meanwhile, economic redevelopment and architectural façade work in Gulfport's downtown earned the greatest number of success labels.

The emergence of a Biloxi-centric, casino-dominated pattern is not a surprise considering the high concentration of low-income Vietnamese and African American residents from Biloxi and D'Iberville recruited for this study. Not only do these residents—some with limited physical mobility and sparse transportation options—live in full view of these behemoth structures (Figure 5.5), but many have either worked for
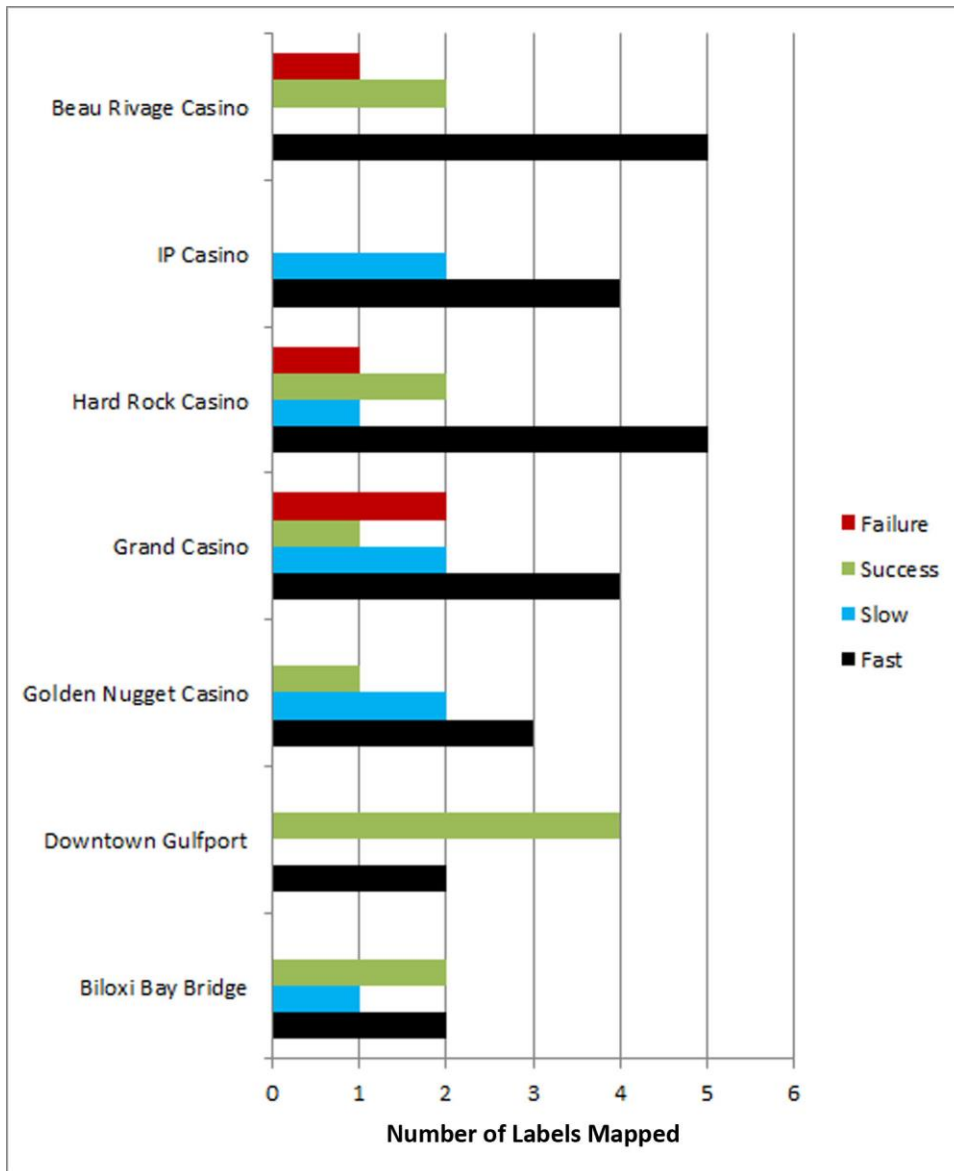
Figure 5.4 Most frequently mapped recovery features by label

the casinos or continuously pass them on their daily travels (Interviews: Dieu, Hanh, Wanda, ESL focus groups). This pattern confirms findings from the qualitative analysis, which identified visual/sensory experiences and changes in activity space as recovery meanings.

Figure 5.5 Author photo of Beau Rivage Casino visible over the neighborhood, East Biloxi

5.3.3 Spatial Patterns in Recovery Features

Figure 5.6 shows raw patterns of point, line, and polygon features that participants mapped. Fast features clustered near major commercial corridors such as Highway 49 in Gulfport, and I-110 in Biloxi and D'Iberville (Figure 5.6a). Many of these features were, in fact, the stores themselves. Slow features hugged waterfront areas along the immediate coastline and areas fronting St. Louis Bay, Biloxi Bay, and the Pascagoula River Delta. Slow area features were also more widespread across the coastal zone than are fast features, which seem to concentrate in the most highly urbanized portions of eastern Harrison County (Figure 5.6b). Multiple participants identified the beaches themselves as slow to return, though the stretch of beach labeled varied based on the participant's residence and activity space.
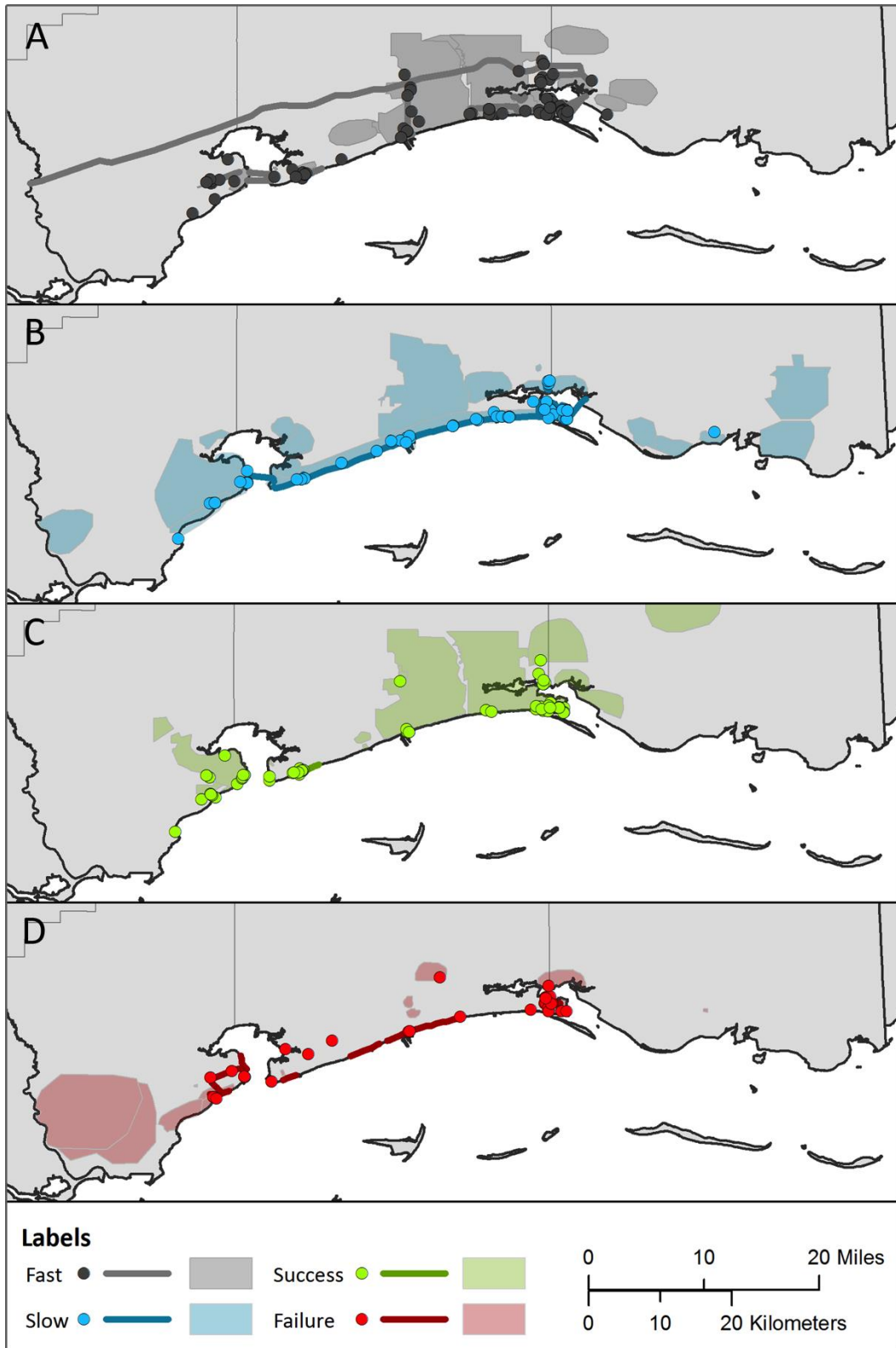
Figure 5.6 Composite maps recovery features (N = 420) labeled by study participants as a) fast, b) slow, c) success, and d) failure

Downtown areas in Bay St. Louis, Pass Christian, Gulfport, and Biloxi displayed conspicuous clusters of success point features—these were primarily churches, town greens, public parks, and civic buildings. There seems to be an absence of point recovery features elsewhere, except for areas around shopping malls—Edgewater Mall on the Coast, Promenade in D'Iberville, and Crossroads in Gulfport all show up on this map (Figure 5.6c). Finally, failure features are strongly concentrated in East Biloxi and Bay St. Louis / Waveland where study participants received the most extensive damage (Figure 5.6d). The large areal failure feature attributed to Pearlington draws the eye westward toward that most heavily damaged region, which remains vulnerable to future hurricane impacts.

5.4 Differences in Participant Recovery Assessments

To answer the second part of the research question, I compare recovery feature labels and use types (n=491) between participant groups based on the damage they received, their age, their income, the presence of children in the household, and length of residence on the Mississippi Coast. Damage was a pertinent aspect of recovery that resulted from resident's exposure at their geographic location. Justification for including this variable stemmed from initial interviews where residents eagerly discussed their experiences during the storm, the intensity of impacts at their location, and the resultant damage to their home. In general after hurricanes, water damage is responsible for a greater proportion of losses than wind and is more likely than wind to cause a total loss of one's residence. I categorize participants by their reported

residential damage during Katrina: water (storm surge or freshwater), wind (roof, leaks, other structural damage), or none.

Two relevant factors identified during the photo elicitation and follow-up interviews were shown to influence recovery meanings and differentiate residents' standpoints: mobility and life stage. Income and age could impact one's physical and/or social mobility, while age and the presence of dependent children are each good indicators of life stage. Collectively, these three characteristics speak to the idea of social position. Ideally a feminist, intersectional approach to analysis would examine these social position characteristics together; unfortunately, the small participant sample size (n=28) inhibits this type of analysis, so I examine each of these characteristics independently. Five household income range options from the participant background survey were combined to create three categories for analysis: low income (less than $21,000), below median ($21,000 – 42,999), and median income or above ($43,000 or higher). Targeting low income, poor and working class participants was part of the intersectional sampling strategy, hence larger numbers of participants in these groups. Median household incomes in the three Mississippi coastal counties range between $43,000 and 50,000 (US dollars) according to the 2012 and 2013 five-year ACS (U.S. Census Bureau 2012, 2013), providing further justification for the uppermost category. Three categories for age seem appropriate based on the large age range in my sample population: young (18-40 years), middle (41-64 years), and old (65 years and older). These categories coincide well with distinct life stages focused on independent or partnered adulthood, childrearing, and retirement, respectively. The

presence (or absence) of dependent children at the time of Hurricane Katrina was treated as a binary, also generating two analysis categories.

Finally, I assess differences in recovery features based on participants' length of residence measured as the number of years on the coast. Results from the photo elicitation and follow up interviews suggest that place attachment may be important in forming a long timer's standpoint on recovery which centers on commemoration-based recovery meanings. As place attachments are built over time through repeated interactions over time (Milligan 1998, Scannell and Gifford 2010), Age and length of residence are both indicators of the potential for these attachments. I define three categories for length of residence on the Mississippi Coast: short (less than 10 years), medium (10-19 years), and long (20 years and over). Since my interviews took place 8-9 years after Hurricane Katrina, it seemed the storm offered a natural breakpoint for separating length of residence, with the addition of a 1-2 year period to become familiar with the area. After eliminating the two pilot participants and interviewees without map data, the median length of residence on the Mississippi Coast was 19.5 years, justifying the second category break. The following subsections discuss results from each characteristic breakdown.

5.4.1 Recovery Assessments by Damage

When gauging long-term recovery, it seems not to matter what kind of damage you received; so long as you received some kind of damage to your home, your perspective on the process and its outcomes are similar. Labels assigned to recovery features by residents with wind or water damage showed a similar distribution (Figure

5.7). Affected residents only gave about one-third of features fast labels, while those

residents unaffected by damage to their own property labeled a substantial amount

(50%) of recovery features as examples of quick recovery. The other major difference

between damaged and undamaged groups was the proportion of failures identified.

Failures amounted to only 6% of features mapped by participants receiving no storm

damage, while the proportion was roughly three times greater for people with wind or

water damage.
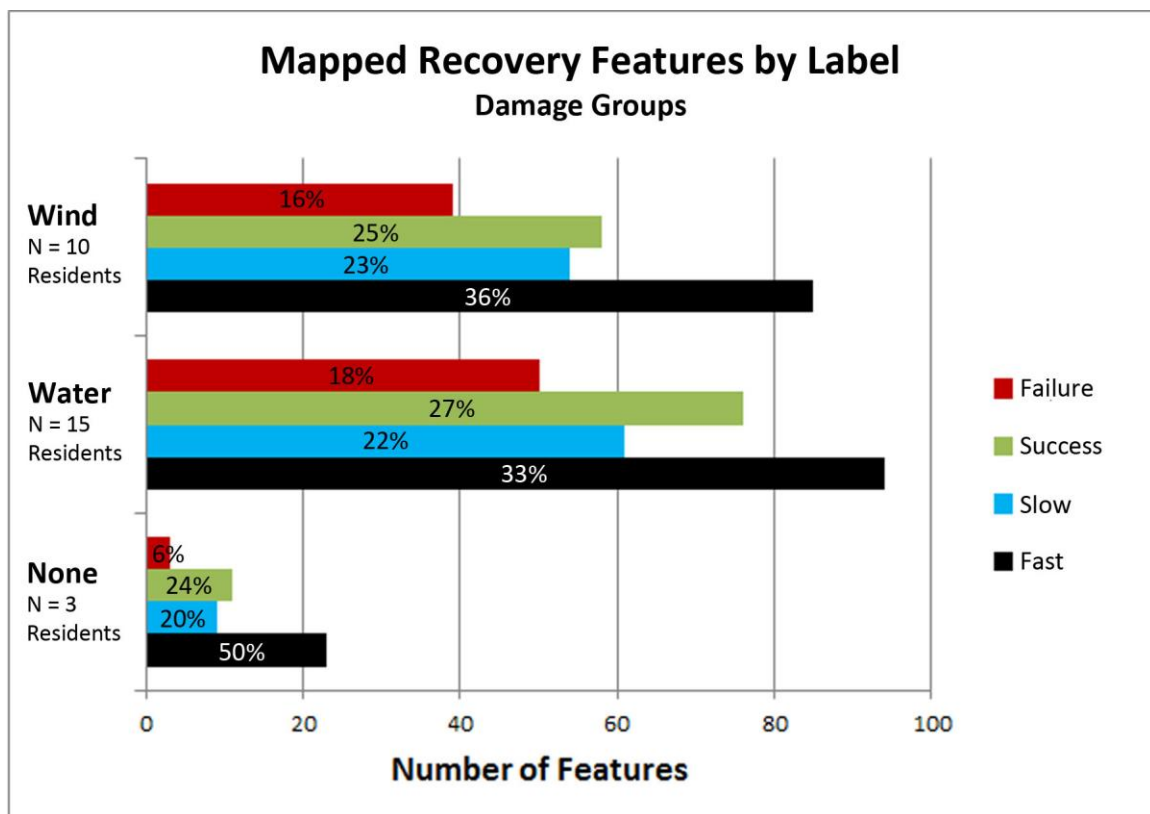
Figure 5.7 Proportion of participant-assigned recovery feature labels stratified by
participant damage context

On average, business features comprised nearly half (47%) of all recovery

features identified by residents receiving no damage to their home (Figure 5.8)—more

than residents with storm damage. Participants receiving either type of damage during

Hurricane Katrina identified considerably more public features as exemplary of recovery

and slightly more residential features than did those with homes unaffected by the

storm. Differences in assessments between residents receiving damage and those

receiving none can be explained in two ways. For the no damage group, the largest

impacts of recovery had to do with short-lived business interruptions (hence the high

proportion of business features with fast recovery labels). For the damaged groups, not

only was the alteration in living conditions a large adjustment during the recovery

period (whether this involved relocating to temporary housing, repairing a structure

while living in the house, or combining households), but the concern with public

features may also reflect relativistic views of recovery, a sustained sentiment of

communitas, or feelings of civic pride associated with commemoration and community

betterment.
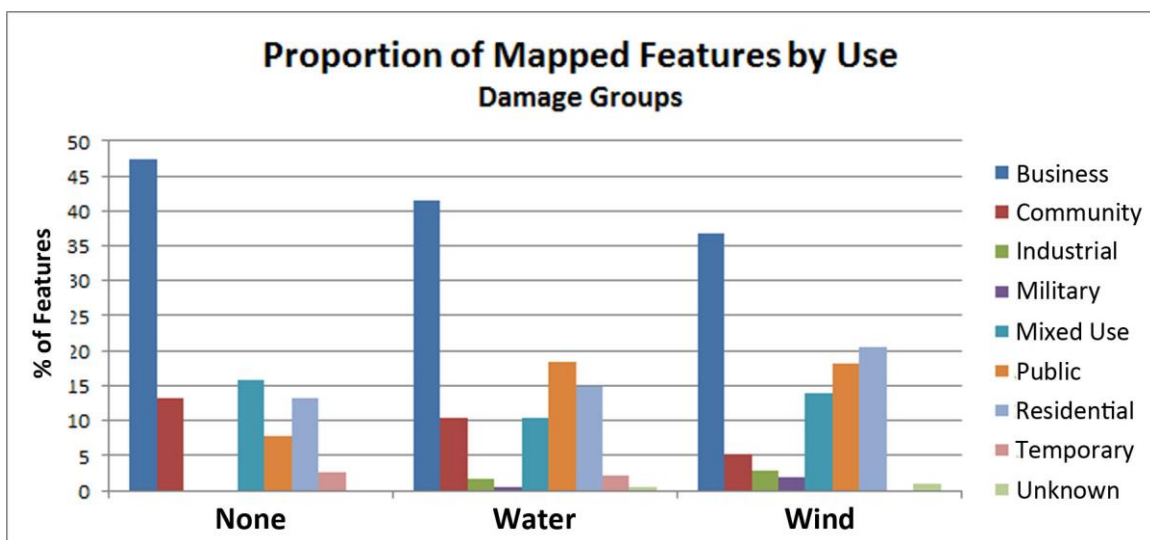
Figure 5.8 Recovery feature use types stratified by participant damage context

5.4.2 Recovery Assessments by Income

The most salient differences between income groups in terms of assigned recovery feature labels occurred between the two lower income groups and the upper income "median or above" group (Figure 5.9). "Low income" and "below median" income participants each identified over 60% of their features by recovery progress, while participants with greater economic affluence focused more on recovery outcomes. This is logical as low income and working class families living pay check to pay check depend more heavily on the continuous availability of businesses and public services. Lower income groups readily notice lapses in these local services or the absence of such businesses, whereas higher income groups might simply venture farther

Mapped Recovery Features by Label
Income Groups

Median or Above
N = 9
Residents
- 21% Failure
- 32% Success
- 15% Slow
- 32% Fast

Below Median
N = 8
Residents
- 14% Failure
- 24% Success
- 26% Slow
- 36% Fast

Low Income
N = 8
Residents
- 14% Failure
- 22% Success
- 22% Slow
- 42% Fast

Legend: Failure, Success, Slow, Fast

Number of Features (0, 20, 40, 60, 80, 100)
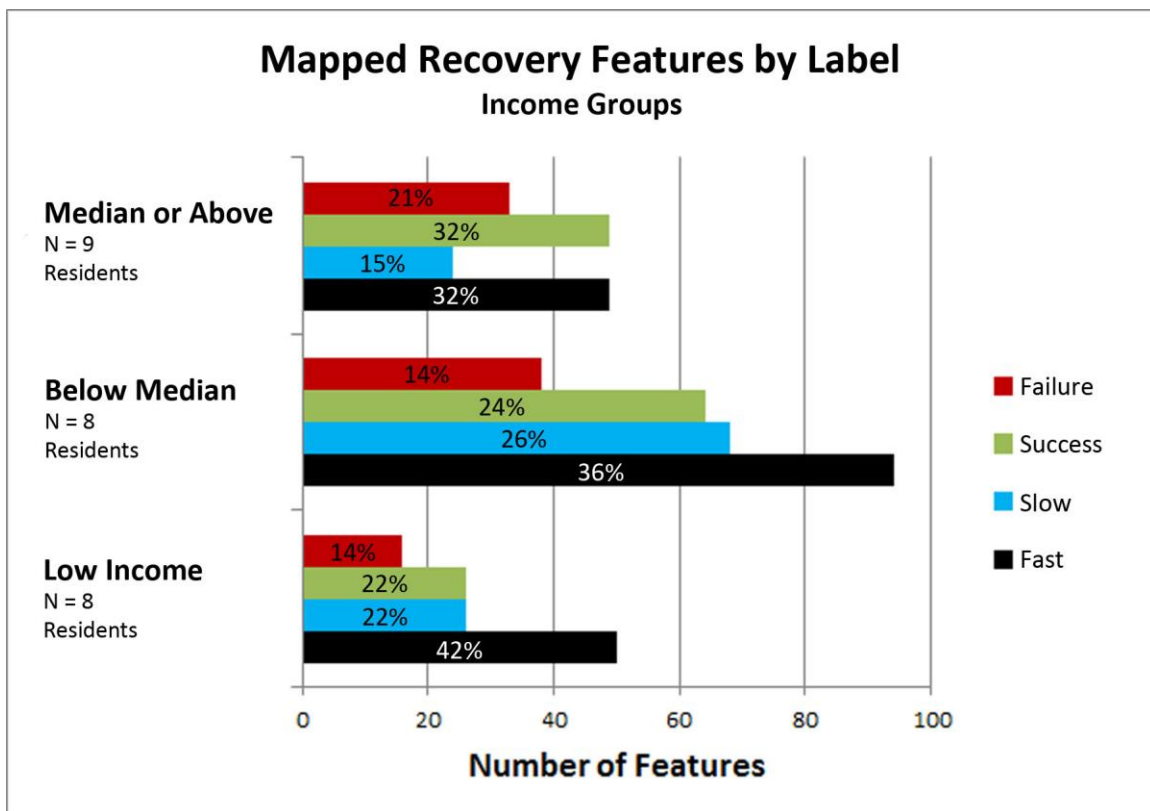
Figure 5.9 Proportion of participant-assigned recovery feature labels stratified by participant income category

from home to access the same services. In support of this explanation, participants in

the highest (median or above) income group identified the lowest percentage of slow

recovery features on their maps. Also, higher income groups tended to identify

successively more features as recovery successes.

The effect of affluence also permeates the demarcation of recovery features by

use type (Figure 5.10). Low income residents identified more community features (e.g.,

churches, harbors) than did their higher income counterparts. This is unsurprising

considering the reliance on churches as mechanisms for recovery aid and the

dominance of subsistence livelihoods, particularly fishing, in this group. Two other

linear associations emerge between groups. First, as wealth increases, the identification

of business features decreases. Businesses accounted for just under 45% of recovery

features identified by the lowest income group, while businesses made up only one

third of features identified by the uppermost income group. Second, as wealth

increases, so does the proportion of mixed use areas on participant maps. These mixed

use areas were often diversion districts or Main Street corridors (e.g., Downtown Bay St.

Louis, Coleman Ave in Waveland) noted for their small shops, historical charm,

restaurants, and entertainment venues. The contrast between necessity and leisure is

evident. When lower income participants did identify mixed use areas, they were often

highway corridors dominated primarily (though not solely) by low density commercial

operations.
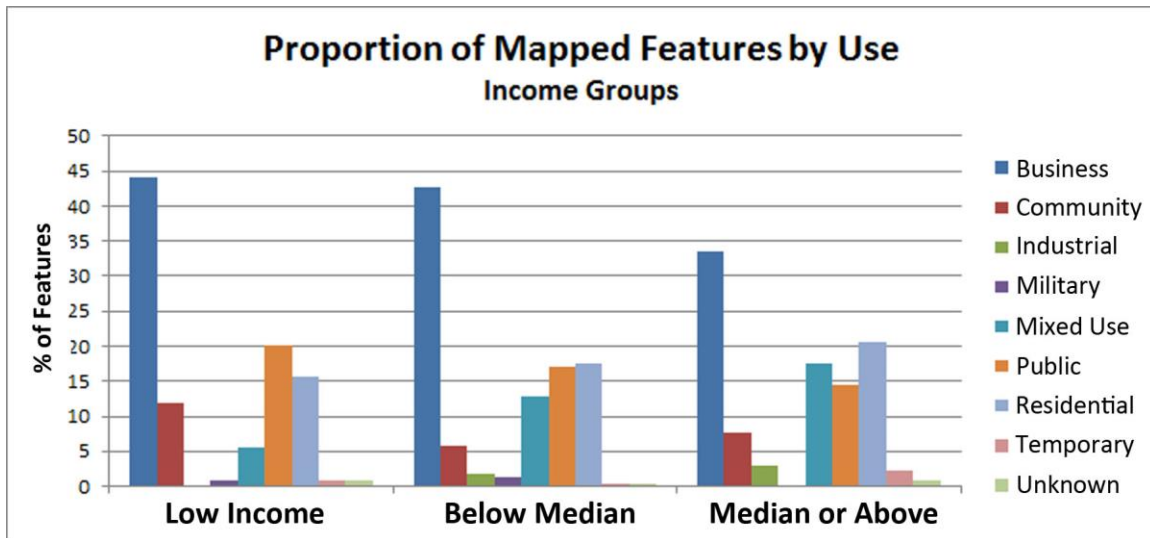
Figure 5.10 Recovery feature use types stratified by participant income category

5.4.3 Recovery Assessments by Age

Age seems to have little effect on how participants assign labels to recovery features (Figure 5.11). The most prominent difference between the groups is the tendency of more advanced age groups to view fewer places as recovery failures. Middle-aged and old groups also labeled proportionally more features as slow than did young participants. Old participants also labeled a greater proportion of their features as successful recovery outcomes.

Comparisons of identification patterns by feature use type reveal several more insightful trends (Figure 5.12). With increasing age, residents in the sample identified fewer mixed use features, but more public and residential features as demonstrative of recovery efforts. Young and middle age participants also identified slightly higher proportions of business features. These trends validate results from interview analysis
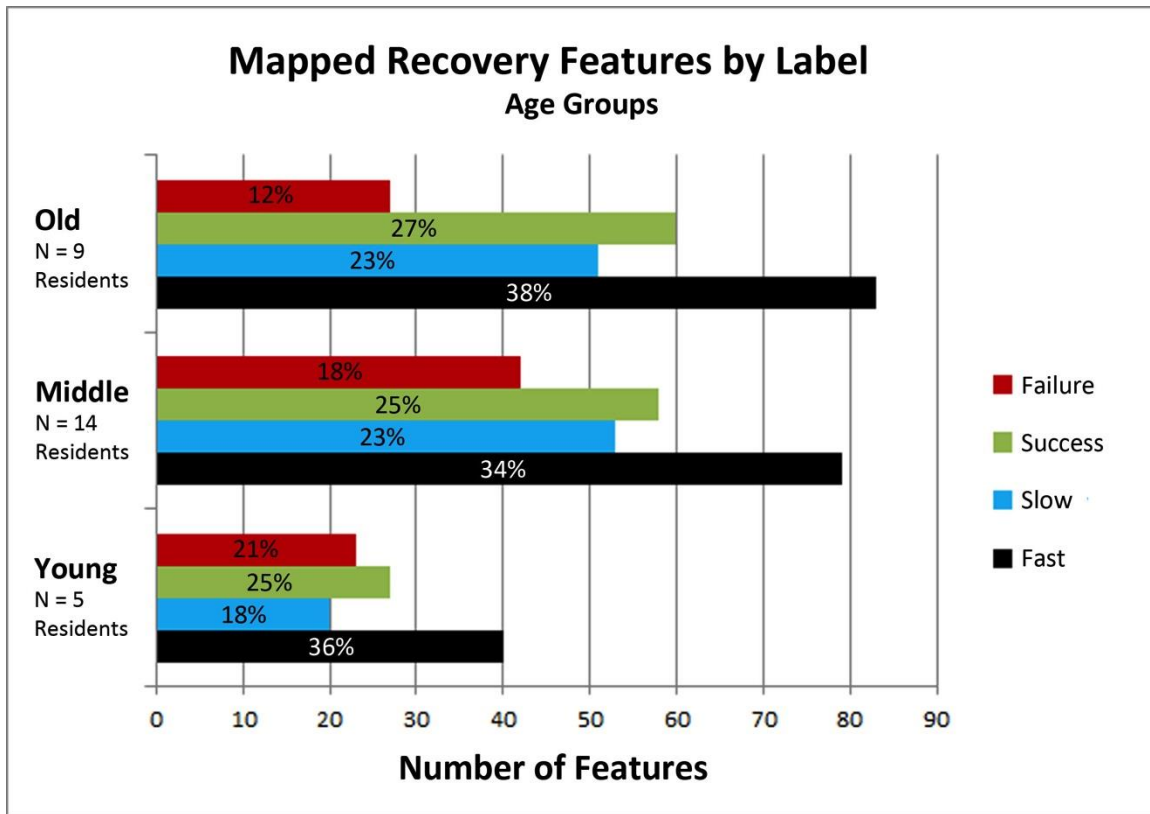
Figure 5.11 Proportion of participant-assigned recovery feature labels by the participant's age
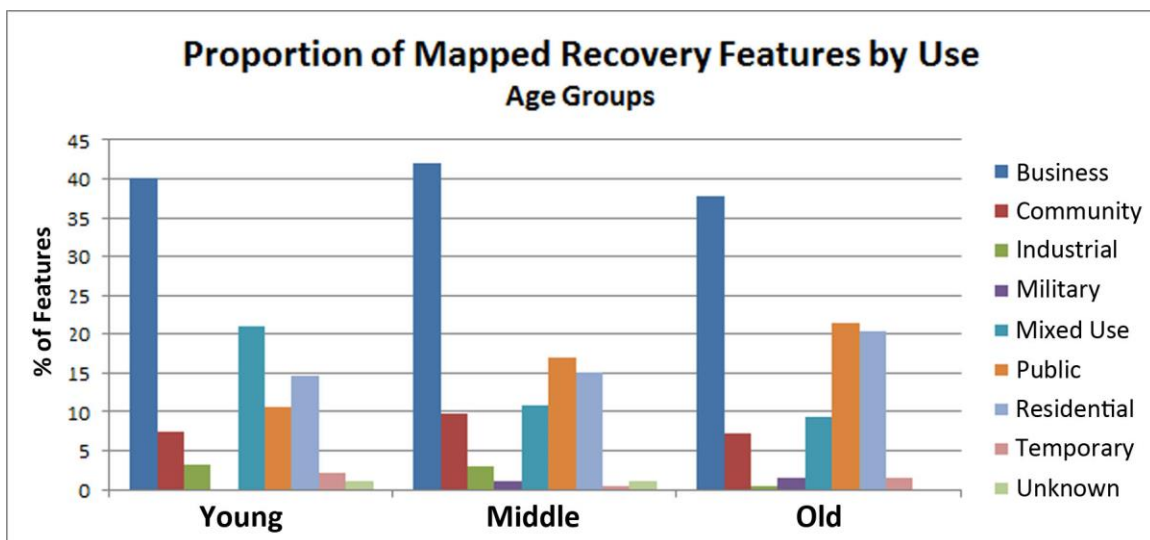
Figure 5.12 Recovery feature use types stratified by the participant's age

and cursory inspection of participant maps. Young residents—all but one childless—tended to value retail establishments and entertainment amenities that fall into business or mixed use categories (e.g., shopping centers and downtown districts). Meanwhile, older residents valued aspects of the coast related to family life (e.g., homes) and leisure activities that capitalized on the coast's natural landscape (e.g., municipal parks, the public beach).

5.4.4 Recovery Assessments by Dependent Children

Individuals with no children identified more than twice as many places as slow to recover as those with dependents (29% vs. 13%), while individuals with children pointed out higher rates of failure among the recovery features they mapped (Figure 5.13). I speculate this could be due to the short-term inconvenience that younger people may

Mapped Recovery Features by Label
Dependent Children Groups

No N = 16 Residents: Failure 21%, Success 28%, Slow 13%, Fast 38%
Yes N = 12 Residents: Failure 13%, Success 24%, Slow 29%, Fast 34%

Legend: Failure, Success, Slow, Fast

Number of Features
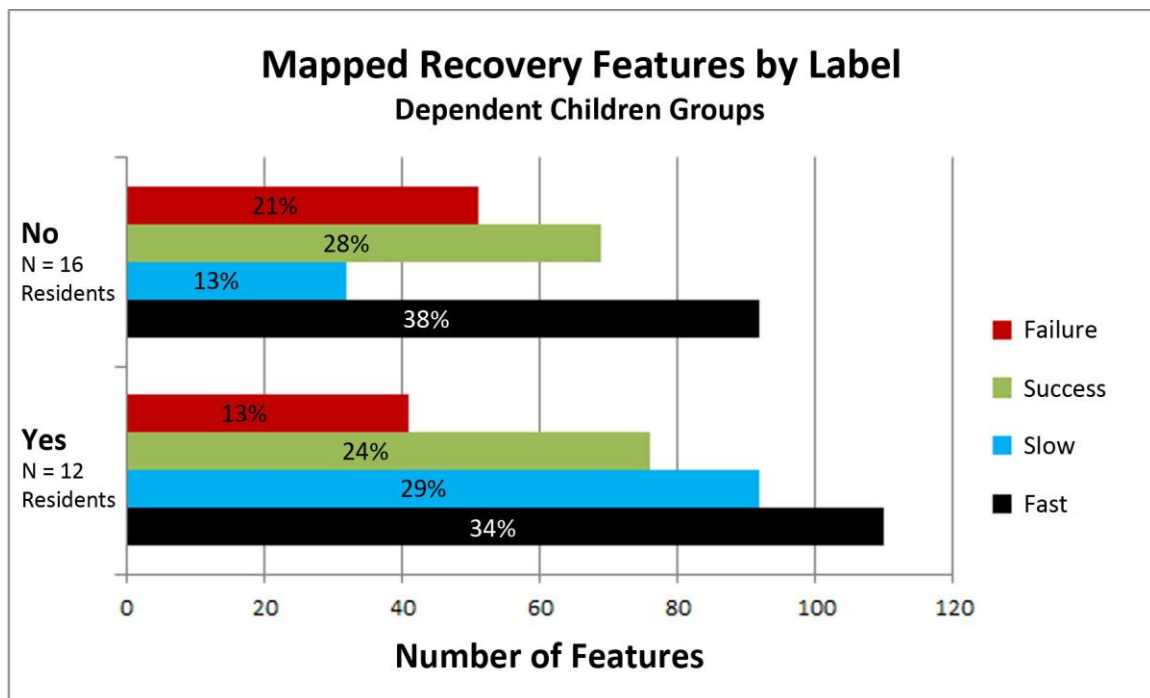
Figure 5.13 Proportion of participant-assigned recovery feature labels by presence of dependent children in the participant's household

emphasize when highly frequented stores or common amenities are unavailable during the recovery period (i.e., complaints over nothing to do, nowhere to go out) (Interview, Vincent). Those with dependent children may be thinking about the long-term recovery of employers, neighborhoods, schools, and overall quality of life.

The chart comparing the proportion of feature use types (Figure 5.14) seems to validate this assertion. Participants with no children mapped, on average, more business features (43%) than did participants with dependents (35%). Participants who had children also tended to point out slightly more mixed use features. In this case, interview commentary reveals that this group discusses Main Street areas, undamaged neighborhoods, and commercial corridors (e.g., Highway 90 in Waveland, Highway 49 in North Gulfport) as essential for services and economic growth rather than discussing their use as entertainment districts (Interviews: Dave, Ellen, Jared, Stephen).
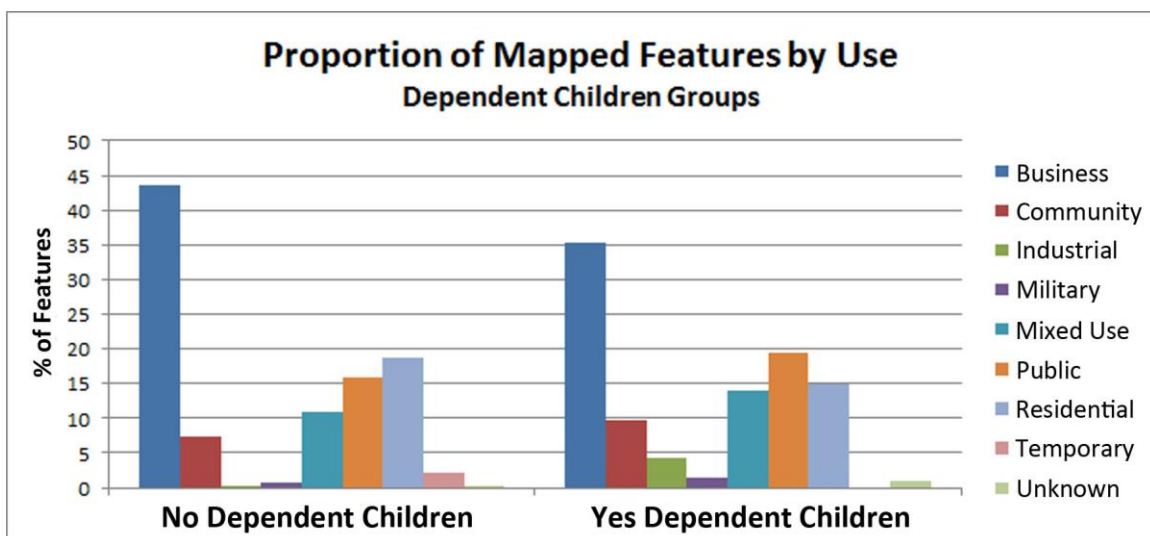
Figure 5.14 Recovery feature use types stratified by presence of dependent children in the participant's household

5.4.5 Recovery Assessments by Years on the Coast

Short-term residents who had moved in since Hurricane Katrina identified proportionally more features that stood out as recovery failures (21%) than did medium or long-term residents who had pre-Katrina experience (14-15%) (Figure 5.15). The higher rate of failure assessments could be due to new residents' lack of pre-storm memory to serve as a measuring stick for success; instead, these newer residents could be comparing local landmarks with equivalent features from former home areas. Long-time residents of over 20 years identified twice as many slow features (27%) as did short-term residents (14%) who had moved in since about the time of Hurricane Katrina.
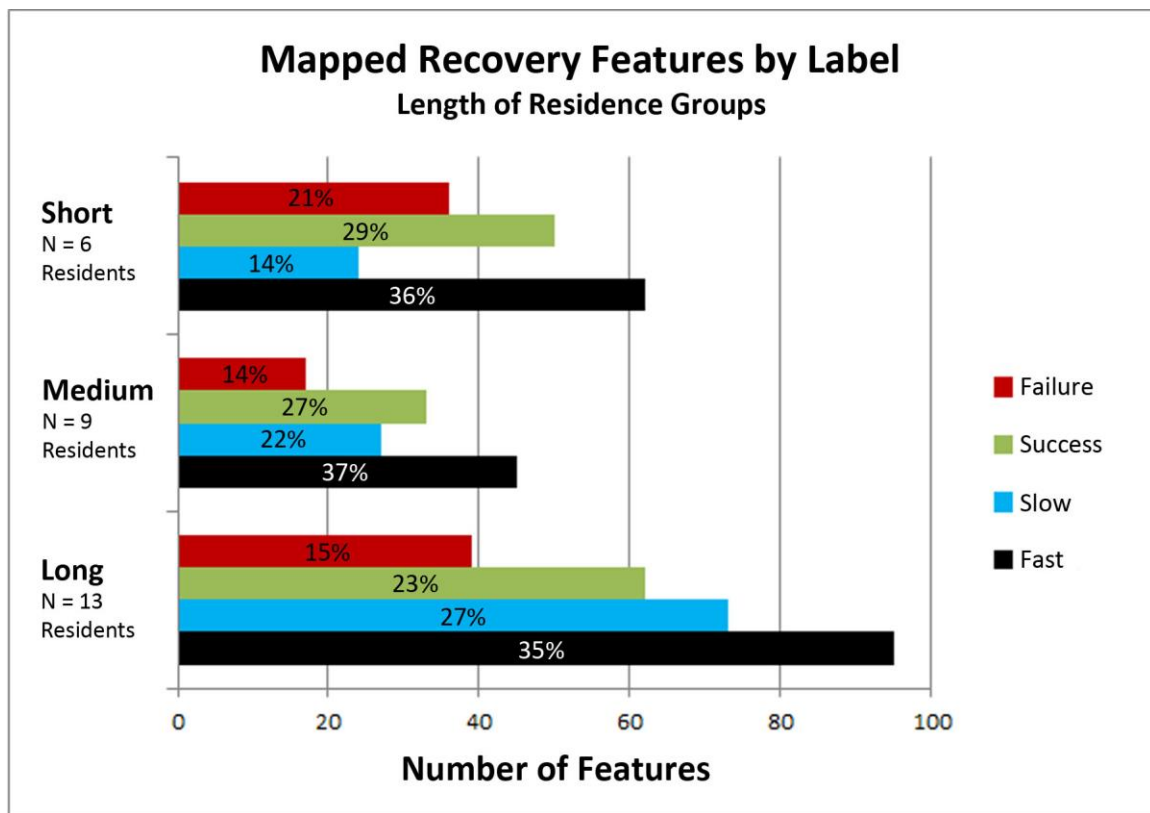
Figure 5.15 Proportion of participant-assigned recovery feature labels stratified by the participant's time living on the Mississippi Coast

Once again, this could be a function of greater place attachments and the loss of familiar routines among long-time residents, while post-Katrina arrivals lack such attachments and pre-storm memories to assess the speed. Long-time residents may also compare to previous storm experiences in their speed and outcome assessments, which did come out in several interviews (Interviews: Ellen, Fred, Ruth).

Comparing proportions of feature use types, groups who had pre-Katrina knowledge of the area (medium and long-time groups) identified greater proportions of community features (Figure 5.16) than did those without pre-Katrina knowledge. Business landmarks dominated in all groups, comprising a third or better of recovery features. Long-time coast residents identified the highest proportion of businesses,
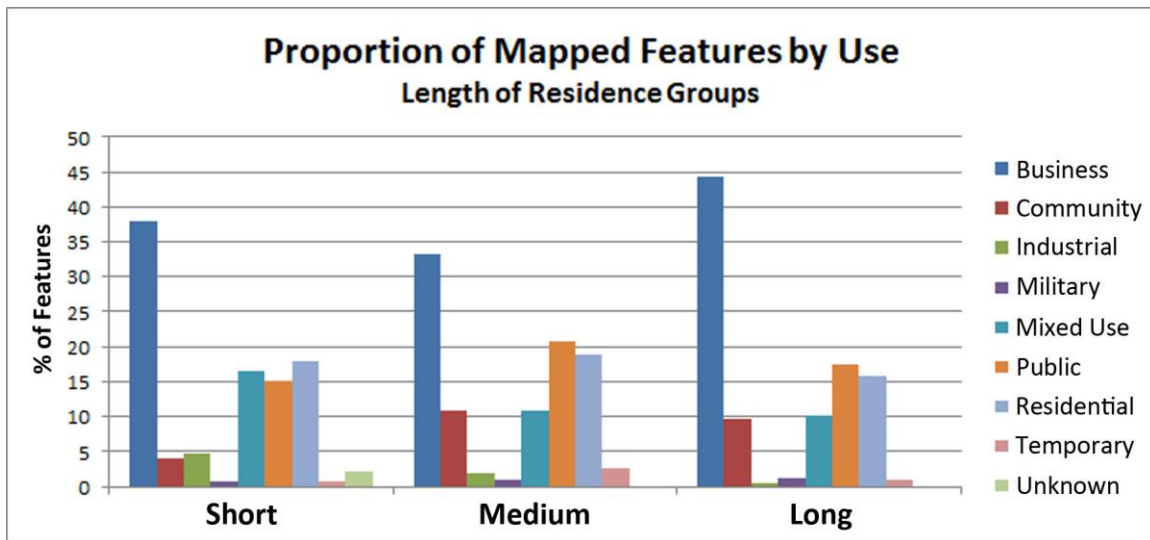
Figure 5.16 Recovery feature use types stratified by the participant's time living on the Mississippi Coast

which were mostly iconic landmarks or establishments that had gone out of business

(Interviews: Brad, Mary, Wanda). Medium and longer-term residents also identified

fewer mixed use features than did those who had moved in during the last 10 years.

5.5 Findings

This second research question asked: how do local residents assess recovery

progress and recovery outcomes? Once again a diverse sample of people were needed

to determine the criteria for assessment (i.e., recovery to what?) and whether these

criteria were different based on one's geographic and social locations (i.e., recovery for

whom?). Systematic analysis of residents' labeled maps of the Mississippi Coast

supplemented with their interview remarks showed that personal activity space and its

determinants (i.e., life stage, physical mobility, income, place attachment) more strongly

influenced where residents saw community recovery and how they judged success than

did axes of stratification themselves (e.g., race, ethnicity, gender, age).

Considering participant assessments in the aggregate, several trends were

evident. Businesses were the most common spatial indicators for recovery speed, and

they overwhelmingly exemplified fast recovery along the coast. Casinos and big box

stores were commonly identified. Residential features were next most important,

though housing recovery was slow and residents were largely dissatisfied with the

results of residential reconstruction either due to the long time frame over which it

occurred, elevation requirements, or inability to rebuild in their original location. Public,

community, and mixed-use features, when assessed together, were most prominent on

residents' maps of recovery—more so than businesses or residences alone. Harbors,

churches, new bridges, shopping and entertainment districts, and the status of public beaches themselves served as litmus tests for the progression of recovery. Eight to nine years post-Katrina, these features were largely assessed as successes, and in hindsight, deemed quick to recover.

Several pertinent differences emerged in terms of how residents assessed recovery based on facets of their own storm experience or positionality. Residents who received damage to their home more often identified residential features as criteria for recovery assessment, including their own home and homes of friends or neighbors, as well as public features; residents receiving no damage identified a larger proportion of businesses which were deemed quick to recover. Higher income residents pointed more often to mixed-use features as indicators for recovery, while lower income residents highlighted businesses. Lower income groups also focused more on the speed with which these features recovered, whereas residents with higher incomes more frequently assessed the success or failure of outcomes. Older residents were less likely to emphasize recovery failures, but more often spoke of public features as indicators for assessing the recovery process. Younger residents identified more mixed-use places typically associated with entertainment. Residents with dependent children during recovery identified more features based on failure outcomes than did residents without who focused on slow to recover businesses. As length of time in residence on the coast increased, residents identified fewer failure outcomes but more slow features as compared to newcomers who had moved to the coast in the past 10 years. Newcomers

equated businesses with recovery, while medium and long-time residents tended to

identify more community features.

CHAPTER 6

RESULTS: ASSESSMENTS VERSUS INDICATORS

6.1 Overview

The third research question asks whether there are differences between

participant recovery assessments and recovery indicators based on quantitatively

derived secondary data. Acknowledging that both approaches hold value and

recognizing that the best recovery measurements, whether qualitative or quantitative,

should validate one another, this chapter compares results from these two disparate

forms of analysis. To do this, I co-construct two types of landscapes for understanding

recovery—one based on the bottom-up summation of residents' spatial perceptions and

the other on indicators that depict singular changes in facets of the physical landscape,

as seen from the top-down vantage point of a policy maker, local decision maker, or

planner. This chapter first explains how I aggregate participant assessments of recovery

derived from the participatory mapping exercise and transform these qualitative data

into two, census tract level quantitative indicators of recovery speed and recovery

outcome. Spatial patterns of these qualitatively derived indicators are discussed here as

well. Next, I detail data sources and aggregation procedures for four quantitative

indicators: 1) reconstruction, 2) repopulation, 3) home improvement, and 4) home

purchase. These quantitative indicators measure the recovery concepts of rebuilding

(and demolition), return (and vacancy), rehabilitation, and residential turnover, respectively. Since these data were longitudinal and collected throughout the recovery period, I discuss how self-organizing maps were used to group census tracts with similar recovery trends. I then describe the clusters produced by using the self-organizing map algorithm. The final subsections of this chapter assess the comparability between the participant assessment indicators and the four quantitative recovery indicators using difference of means tests (i.e., ANOVA and/or Welch's ANOVA).

6.2 Participant-Derived Indicators

In order to compare qualitative participant assessments with quantitative recovery indicators, data from the mapping exercise (see chapter 5) must be quantified and aggregated at a spatial scale matching that of the secondary indicators. In this case, participant data are aggregated to the census tract level. Not only are there sufficient quantitative datasets available at this scale, but the tract level also permits sub-county analysis where local, situated knowledge gleaned from participant assessments can be examined. I create difference-based composite indicators for recovery speed and recovery outcome that combine the fast/slow and success/failure binaries mapped by participants. Much like a calculation for net revenue or net migration, where outflow is subtracted from inflow, I take counts of slow recovery features within each tract and subtract them from fast recovery features to create a composite recovery speed indicator. The same is done for recovery outcome using the difference between success and failure features mapped. I detail the methods I used for aggregating and counting map features within the GIS next.

6.2.1 Aggregation Methods

Two separate aggregation methods were used in creating the recovery speed

and recovery outcome indicators: 1) a raw difference and 2) an average of normalized

participant differences (Table 6.1). Raw difference aggregation to compute recovery

speed is a simple subtraction of the total number of fast features minus the total

number of slow features contained in a tract, or success features minus failure features

in the case of recovery outcome. The average of normalized participant differences

aggregation takes into account each participant's fast feature labels in a census tract

and normalizes (divides) by the total number of features the participant identified in

that tract. The same calculation is performed for slow features, and then the two

normalized values are subtracted. This normalized difference is calculated for each

participant individually, and these normalized differences are then averaged to obtain

the recovery speed indicator value. The procedure is repeated with success and failure

features, respectively, to obtain the recovery outcome indicator value for each tract.

Table 6.1 Formulae for two participant assessment aggregation methods

Aggregation Method	Calculation
1. Raw Differences	$(\# \, fast \, features - \# \, slow \, features)$ $(\# \, success \, features - \# \, failure \, features)$

Aggregation Method	Calculation
2. Average of Normalized Participant Differences	$$Mean\left((P1 + P2 \ldots + P28)\left(\left(\frac{\#\ fast\ features}{\#\ total\ features}\right) - \left(\frac{\#\ slow\ features}{\#\ total\ features}\right) \right) \right)$$ $$Mean\left((P1 + P2 \ldots + P28)\left(\left(\frac{\#\ success\ features}{\#\ total\ features}\right) - \left(\frac{\#\ failure\ features}{\#\ total\ features}\right) \right) \right)$$

While the raw difference method is computationally simpler and easier to implement, the average normalized difference method is more balanced and equitable for several reasons. First, the normalization provided by this aggregation method controls for extreme values that may exist in some tracts due to oversampling of low income, limited mobility residents in a few low income areas (e.g., East Biloxi, D'Iberville). Based on the earlier finding that participants' recovery maps closely reflected their mobility patterns, these residents may have all their mapped features concentrated near home, leading to extreme feature counts. Normalization is also based on each participant's mapping preferences rather than on the total number of features mapped by anyone in that tract. The implication is that each participant's opinion on recovery, as mapped during the mapping exercise, carries equal weight; for residents who mapped fewer features in a tract, each feature receives proportionally more weight, and for residents who mapped more features in a tract, each feature receives proportionally less. Finally, calculating an average based on individual recovery

assessments acknowledges the situated knowledge contributed from each resident's

intersectional standpoint and, thus, is inherently more feminist in nature than a simple

sum and difference. Both methods hold merit—one is more practical to implement and

the other is more theoretically consistent with this study's approach. Since aggregation

methods can significantly alter results, I use both aggregation methods in the

comparison analysis between participant assessments and secondary recovery

indicators.

6.2.2 Indicator Construction

Recovery speed and recovery outcome indicators are derived from the

geospatial dataset containing 491 recovery features identified by participants during the

participatory mapping exercises and joint mapping exercises (see Chapter 5). This GIS-

based dataset contains recovery features mapped by (or attributed to) each of the 28

participants, with the features mapped solely for orientation purposes removed.

Several decisions made during feature digitization in GIS sought to preserve the

validity of participant data and the internal consistency of the dataset while also

facilitating ease of later analysis. I used a 2010 U.S. census tract map and visible satellite

base imagery from ArcGIS to help digitize recovery features. Care was taken to ensure

that recovery features did not cross tract boundary lines *unless* specified by the

participant[5]. While distinct point features and polygons with hard boundaries visible on

satellite imagery (i.e., shopping centers, port facilities) did not pose problems in

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[5] Many linear and large polygon features drawn did, in fact, span multiple tracts. This was common when participants labeled sections of beaches, neighborhoods, or cities as a whole on their maps. The one-to-many join to attach features to tract IDs shows the effect of these large, multi-tract features.

digitization, neighborhoods or portions of cities represented with haphazardly drawn

circles did (Figure 6.1). In these cases, I tried not to exaggerate the areal extent of such

recovery features unless the participant-drawn border came close to a tract boundary.

In these instances, I expanded the size of the area to overlap adjacent tract boundaries.

For internal consistency, features identified by multiple participants were retraced

precisely so they would be represented the same way by the aggregated, tract-level

indicators.
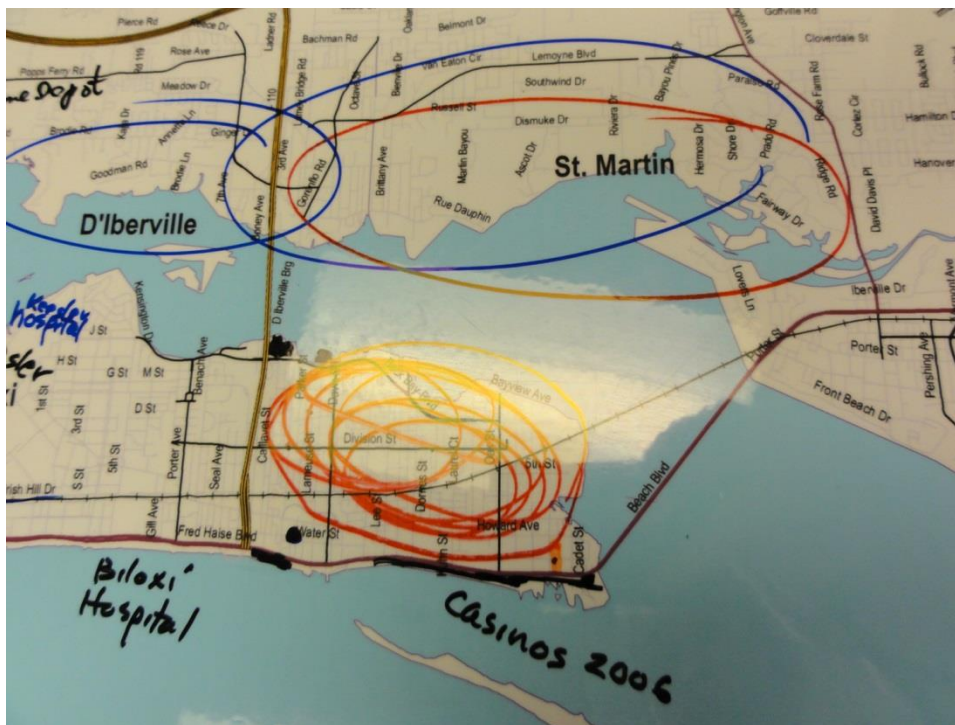
Figure 6.1 Example photograph showing rough representation of area
features

A one-to-many spatial join operation was performed to attach tract IDs to each

of the 491 recovery features. Recovery features marked as fast, slow, success, and

failure were each summarized by tract to obtain a count for each label. Features

identified by more than one participant's labeling were counted once for each label in each tract the feature intersected. This produced a total of 1,027 tract-located features on the coast from which recovery speed and outcome indicators were calculated using the two aggregation methods detailed previously.

6.2.3 Indicator Summary

Maps of recovery speed show good consistency across both aggregation methods (Figure 6.2a, 6.2b). North Gulfport's east-west I-10 corridor emerges in both maps as fastest. Outside of the port and the immediate vicinity of downtown Gulfport, this I-10 corridor is where the majority of low-level retail and industry are located. During Katrina, this area was exposed to wind damage, but not storm surge. Interviewees young and old noted how quickly businesses in this area reopened, though it featured more prominently in maps drawn by younger participants (Maps: Linh, Thomas, Vincent). The low-level retailing area along Highway 90 in Waveland / Bay St. Louis appears fast according to both aggregation methods as well. D'Iberville, Ocean Springs, and casino row in Biloxi are noted for their fast recoveries, ranking above the median score for speed (Figure 6.2a). Meanwhile, Pearlington, historic sections of Bay St. Louis, DeLisle, and Long Beach received the slowest scores (Figure 6.2a). Accounting for the proportion of each participant's fast-slow using the average normalized method removes most extreme slow values. This is also a function of the tendency for participants to identify more fast features than slow features. Figure 6.2b shows only downtown Long Beach as slowest to recover.
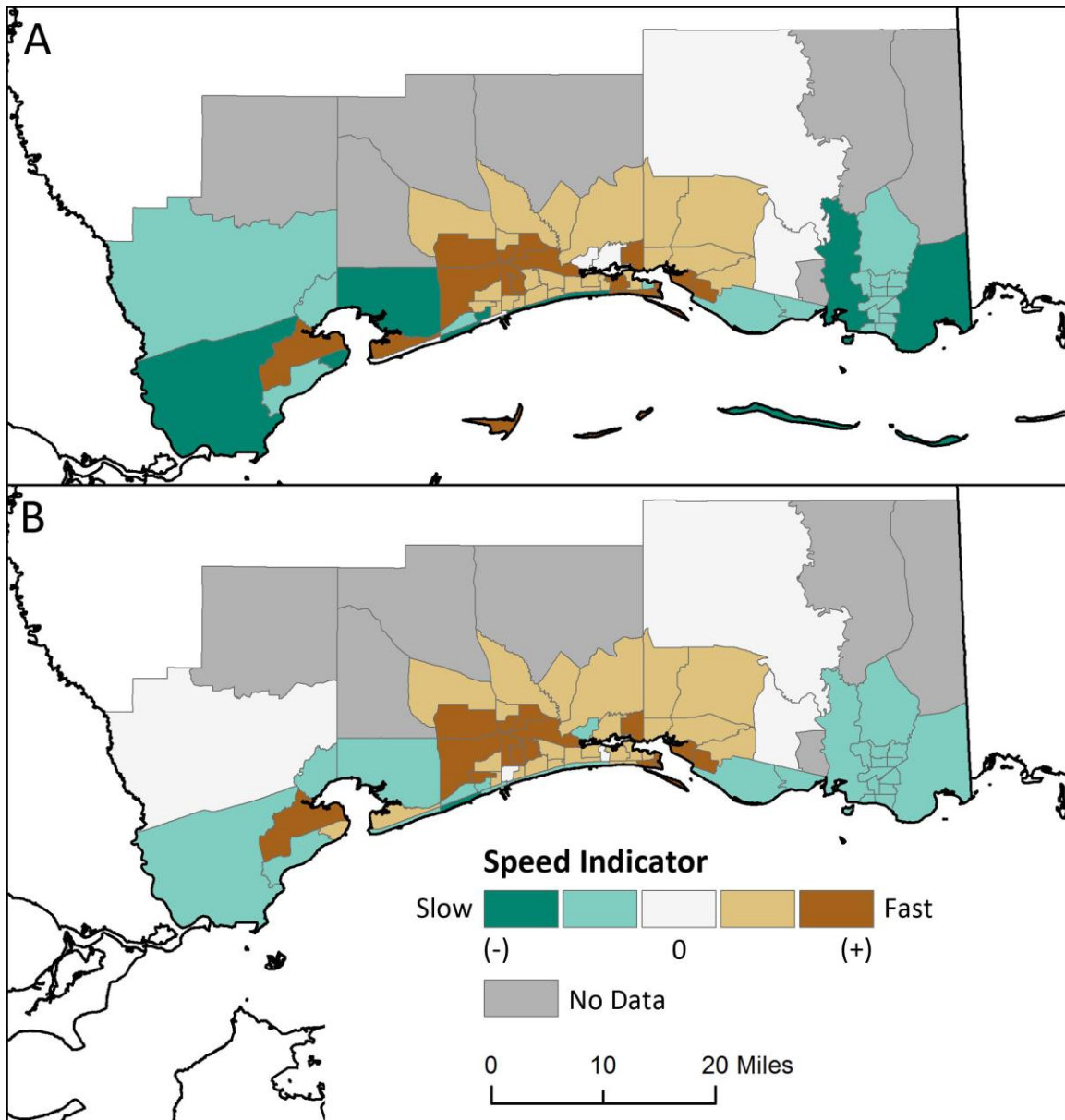
Figure 6.2 Tract level recovery speed indicator maps calculated with (a) the raw difference and (b) the average of normalized participant difference aggregation methods

Maps based on perceived recovery outcomes show less consistency across aggregation methods (Figure 6.3a, 6.3b). Downtown Ocean Springs, D'Iberville, and neighborhoods in East Gulfport north of the CSX railroad line (i.e., Broadmoor, Pass

Road) are the only consistent successes in both maps. St. Martin is consistently a failure, though the tract scores below the median for failure (closer to zero) and does not fall into the extreme failure category. Figure 6.3b shows how normalization generally smooths the extremes, causing a significant number of tracts to shift in classification.
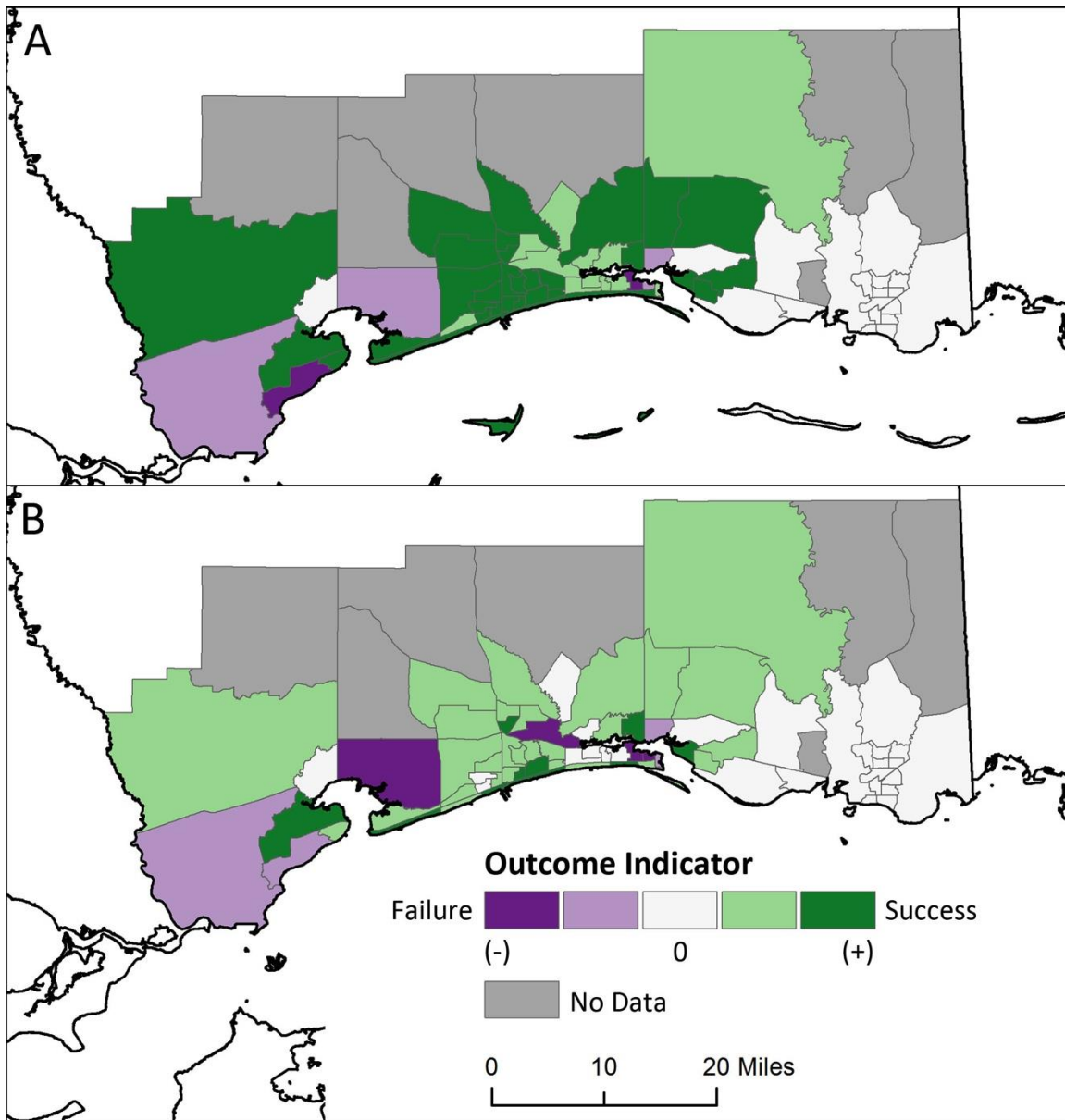
Figure 6.3 Tract level recovery outcome indicator maps calculated with (a) the raw difference and (b) the average of normalized participant difference aggregation methods

For example, outcome indicator scores Downtown Waveland, Kiln, Pass Christian, Latimer, Gulfport, and North Gulfport shift from the extreme categories to just above and just below median categories. In a few areas like DeLisle and East Biloxi, the averaged normalized difference method produced more extreme failure scores, while on Point Cadet and in the Seaway Road industrial corridor in Gulfport, the classification reversed from success (using raw differences) to failure (using average normalized differences). In the case of Point Cadet, participants' tendency to label far more success features than failure features (a trend among Vietnamese immigrants) is the cause of the classification shift. A low number of recovery features is the cause of the classification shift along Seaway Road.

6.3 Secondary Data-Derived Indicators

Postal address vacancy data and home mortgage origination data provide information useful for assessing post-disaster recovery. Postal data track the addition and deletion of addresses as well as their occupancy status, which can approximate housing construction, demolition, repopulation, and extended vacancies. From these data I construct two recovery indicators that measure 1) reconstruction and 2) repopulation. Home mortgage data designed to guard against predatory and/or discriminatory lending practices shows trends in financing for home improvement and home purchase. From these data I construct two more recovery indicators that measure 3) home improvement (i.e., repairs and improvements) and 2) home purchase

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(i.e., residential turnover). The following two sections detail indicator construction

methods and summarize the distribution of the indicator values.

6.3.1 Indicator Construction

Two secondary data sources form the basis for four tract-level indicators on the

recovery process. These data sources include 1) the United States Postal Service (USPS)

vacancies dataset published by the U.S. Department of Housing and Urban Development

(HUD 2015) and 2) Home Mortgage Disclosure Act (HMDA) data available through the

U.S. Consumer Financial Protection Bureau (CFPB 2014). Records for census tracts in

each of the three coastal Mississippi counties are downloaded from the web in comma-

delimited format. Pre-processing and indicator calculation are performed using

Microsoft Excel and ArcGIS software.

The USPS vacancies dataset provides quarterly estimates that total the number

of addresses, vacant addresses, and no status (no-stat) addresses for the fourth quarter

of 2005 through the present. After 2007 these totals are broken down by residential,

business, and other addresses. A vacant address in the dataset refers to an address not

collecting mail for 90 days or longer, while a no-stat address could refer to one of three

types of addresses: a) businesses or residences under construction but not yet occupied,

b) urban addresses not likely to be active for some time, or c) rural route addresses

vacant for 90 days or longer (HUD 2015).

Based on the definitions, vacant addresses indicate seasonally occupied vacation

homes, which are not useful in determining recovery progress. No-stat addresses, on

the other hand, provide information on newly built, unoccupied homes and those unfit

for occupancy, perhaps due to extensive storm damage. The trend in no-stat addresses, when considered in light of the trend in total addresses, could indicate one of four different scenarios occurring in a recovering neighborhood: new construction, demolition, long-term vacancies, and gradual population return (Table 6.2).

Table 6.2 Description of recovery scenarios based on USPS data

Scenario	Total Address Trend	No-Stat Trend	Rationale
New Construction	Increasing	Increasing	New addresses are being added to the USPS database as new structures are built but have yet to be occupied.
Demolition	Decreasing	Decreasing	Addresses are being removed from the USPS database as structures are being demolished and not replaced.
Long-Term Vacancies	Stable	Increasing	Total address count remains stable indicating houses have not been destroyed but remain unfit for occupancy. No-stat addresses increase as more structures remain unoccupied.
Gradual Population Return	Stable	Decreasing	Total address count remains stable indicating houses have not been destroyed but unfit for occupancy. No-stat addresses decrease as occupants repair and reoccupy structures.

Two indicators are created to quantify changes over time to the built landscape (i.e., reconstruction or demolition) and changes over time to the human population (i.e., repopulation or vacancy), respectively:

$$Reconstruction = \frac{(\# \; addresses \; T_2 - \# \; addresses \; T_1)}{(\# \; addresses \; T_1)} * (100)$$

Repopulation

$$= \frac{(\# \text{ no stat addresses } T_2 - \# \text{ no stat addresses } T_1)}{|\# \text{ addresses } T_2 - \# \text{ addresses } T_1 + 0.5|} * (-1) * (100)$$

Extreme positive values indicate new construction and repopulation/return, respectively. Extreme negative values indicate demolition and vacancy, respectively. Values close to zero indicate little change to the built or human landscape. The addition of 0.5 in the denominator of the second formula is to prevent a zero denominator since addresses are reported in whole units. The multiplication by negative one makes repopulation values positive rather than negative.

The HMDA dataset tabulates home mortgages originated for home purchase, home improvement, and refinancing, aggregated to the tract level. Loans are subset by intent to occupy (i.e., principal dwelling versus non-principal dwelling), type of structure (i.e., one-to-four family dwelling, multifamily, or manufactured home), race of applicant (i.e., American Indian, Asian, black, Hawaiian, white, or corporation), and ethnicity of applicant (i.e., Hispanic or non-Hispanic). These data are reported annually and available from 2007 to the present—a period representing Hurricane Katrina's long-term recovery timeframe. Loans for home improvement and loans for purchase could be especially insightful in benchmarking recovery, as individuals relied on home loans to recover their domicile after personal financial resources were exhausted. One would expect home improvement loans to be more common in high damage areas while home purchase loans would be more common in outlying, undamaged areas as the urban

development footprint expands post-disaster (Haas et al. 1977, Pais and Elliott 2008).

Using HMDA data, I define the following indicators:

$$Loan\ Purchase = \frac{(\#\ loans\ originated\ for\ home\ purchase)}{(\#\ loans\ originated)} * (100)$$

$$Loan\ Improvement = \frac{(\#\ loans\ originated\ for\ home\ improvement)}{(\#\ loans\ originated)} * (100)$$

Home purchase and home improvement loans are each normalized by the total number of loans originated annually in each tract. Both of these indicators are unidirectional, with values ranging from 0 to 100 percent.

While USPS postal vacancy data are available with 2010 census tract-level identifiers from the fourth quarter of 2005 through present, HMDA data are not. Though the data are consistent in their format, data from 2007-2011 are tabulated using 2000 census tract identifiers, while data for 2012 and 2013 are tabulated using 2010 census tract IDs. In order to solve the modifiable areal unit problem (MAUP) and prepare the dataset for analysis, I perform a simple areal-weighted interpolation for all data from 2007-2011. Using tract relationship files from the Census (U.S. Census Bureau 2015), I approximate raw numbers of loans originated (i.e., for home purchase, for home improvement, and total loans) within 2010 census tract boundaries rather than for 2000 census tracts, as tabulated. I do this by joining HMDA loan data to the relationship file based on 2000 tract IDs, then multiplying each record by the percentage

of land area within the 2010 tract. The resulting spreadsheet is summarized by 2010

tract ID and raw values summed to produce 2010 tract-level estimates. These data are

recombined with 2012-2013 HMDA data, and indicators are constructed according to

the formulae above. Indicators are joined with a 2010 census tract feature class in GIS

for mapping purposes.

6.3.2 Indicator Summary

Table 6.3 reports summary statistics on values from each of the four secondary

data-derived indicators. Considering all 2,560 observations regardless of time step,

reconstruction and repopulation indicators both show a normal distribution centered

near zero. Because of its design, the repopulation indicator has a larger range of values

than reconstruction; hence, these indicators are not directly comparable. I elect not to

take z-scores to compare these two indicators because zero is a meaningful value.

Reconstruction is right-skewed, indicating a higher frequency of construction rather

than demolition during the recovery time period, while repopulation is left-skewed

showing prevalence for vacancies rather than population return.

Both home improvement and home purchase indicators range from zero to 100.

Their common denominator, the total number of home loans originated, makes these

sets of values comparable. Both indicators display lognormal distributions due to higher

observed frequency counts of lower indicator values. Home purchase tends toward

normal, however, because of a higher mean indicator value (32.93) and a low frequency

of low, non-zero indicator values. The very low skewness value for the home purchase

Table 6.3 Summary of USPS and HMDA-based indicator values

	Reconstruction (Construction & Demolition)	Repopulation (Return & Vacancy)	Home Improvement	Home Purchase
Source	USPS	USPS	HMDA	HMDA
Time Steps	28	28	7	7
Distribution	Normal	Normal	Lognormal	Lognormal
N	2560	2560	560	560
Mean	0.65	-0.23	13.58	32.93
St. Dev.	3.21	20.81	10.50	12.41
Min	-19.84	-312	0	0
Median	0.16	0	11.70	32.93
Max	56.04	234	100	100
Range	75.89	546	100	100
Skewness	10.42	-3.41	2.05	0.10

indicator shows that the proportion of home loans originated for purchase is more

consistent from year to year compared with the proportion of loans originated for home

improvement, which shows more variability. This variability may be reflective of home

repairs made after a disaster or secondary event, particularly if spatial patterns emerge

in the results.

6.3.3 Multivariate Clustering

One challenging aspect of analysis in this third research question is the lack of

comparability between the longitudinal or serial data provided by USPS and HMDA

indicators and the one-time, snapshot data produced by the participatory mapping

exercise. In order to answer the research question, this serial data must be reduced to a

single value to be scaled or mapped. For this purpose, I use self-organizing maps

(SOMs), which allow me to examine similarities within each of the four longitudinal indicator datasets and statistically cluster tracts with similar indicator trends.

The Kohonen SOM (Kohonen 1990, 2001) was developed as a technique for describing the relationships that exist within a set of interrelated dynamic variables, called a neural network (Gurney 1997). A symmetrical array of nodes (at least 3x3) is used as an initial grouping framework, where each node is characterized by a vector of N dimensions based on the number of input variables. Here the input variables are the time series observations for each indicator. In a sequential process called training, cases (i.e., geographic units—specifically census tracts, in this study) are assigned to nodes based on the Euclidean distance between each node and each successive input vector. As cases are assigned to nodes one by one, the distance between nodes is adjusted based on the frequency with which nodes have won cases in the past. Thus, the SOM learns from each new case it is presented.

SOM nodes are capable of describing the shape of various trends and grouping similar shapes together, thereby permitting discovery of commonalities based on many aspects of the data (Cottrell et al. 1998). SOMs have been applied to problems in business, media, speech recognition, and artificial intelligence (Kaski et al. 1998, Oja et al. 2002). SOMs differ from standard clustering algorithms (e.g., K-means, hierarchical clustering) that classify cases into exclusive, non-overlapping groups because SOMs group cases based on their association or similarity to other cases (Moutinho 2011). The result is a map that shows relationships within a network rather than a tree-diagram of distinct categories.

Guo et al. (2006) have developed a software package for visualizing self-organizing maps, called SOMVIS that I use to select an ideal number of clusters for each indicator. The map itself is represented as a field of contiguous hexagons with superimposed colored circles representing clusters of data. Circle size is proportional to the distinctiveness of each data cluster; hence the number of large circles indicates the ideal number of clusters. Distance between data clusters is indicated by differences in circle color and distance on the diagram. Additionally, hexagons are colored along a grayscale with dark shades representing large distances or gaps between data clusters in n-dimensional space and light shades representing proximity of data clusters.

Using a SOM on the present indicator datasets is not without limitations. Since the SOM treats each time step as an independent variable without accounting for temporal lags, the serial nature of each dataset is lost. Thus, whereas places with similar (or extreme) indicator values at time T would have a greater tendency to cluster together, one place that experienced a peak in the data series at time T would not cluster together with another place that saw a similar peak at time T+1. Additionally, while the SOM produces a statistically-informed classification scheme for spatial units, it does not account for possible spatial autocorrelation (or lack thereof) in developing this classification.

I performed a trial run of SOMVIS using each of the four recovery indicators and created line graphs in Excel using the nested means (i.e., means of indicator values for each time step, T_1 to T_n, for tracts grouped into the same node) to show the actual indicator trends within each cluster. Several of the trend lines showed large spikes in

the indicator value. From these I was able to identify outlier values that were greater

than 10 standard deviations from the mean indicator score. Outlier values were

replaced with an average indicator score from the time steps immediately preceding

and following the observation, in order to maintain a gradual trend line for that tract. In

one case, an outlier value was identified in the initial time step, so the rate of change in

the indicator score from T_2 and T_3 was extrapolated backwards to impute a value. Three

outliers from the reconstruction indicator dataset and two outliers from the

repopulation indicator dataset were replaced. Two extreme outliers were identified in

the home improvement loan dataset; however, these two tracts and other less extreme

outliers from the dataset showed a spatial pattern related to Hurricane Isaac damage in

Moss Point and Pearlington from 2012-2013, so they were not removed. The home loan

dataset did not contain any extreme outliers comparable to values from other datasets,

thus, no values were removed prior to analysis. The following subsections interpret

trends in each of the four indicators within clusters generated by the SOM.

6.3.4 Reconstruction

Using a three-by-three Kohonen matrix, the SOM organizes tracts into nine

nodes based on their reconstruction indicator values at distinct time steps (Figure 6.4).

Four nodes win nearly three-quarters of the 80 census tracts: red (n=22), blue (n=15),

green (n=12) and purple (n=10). Figure 6.5 depicts graphs of the nested means (i.e.,

mean indicator value within each node) calculated for each quarter year, showing that

construction tends to outweigh demolition in the aggregate.
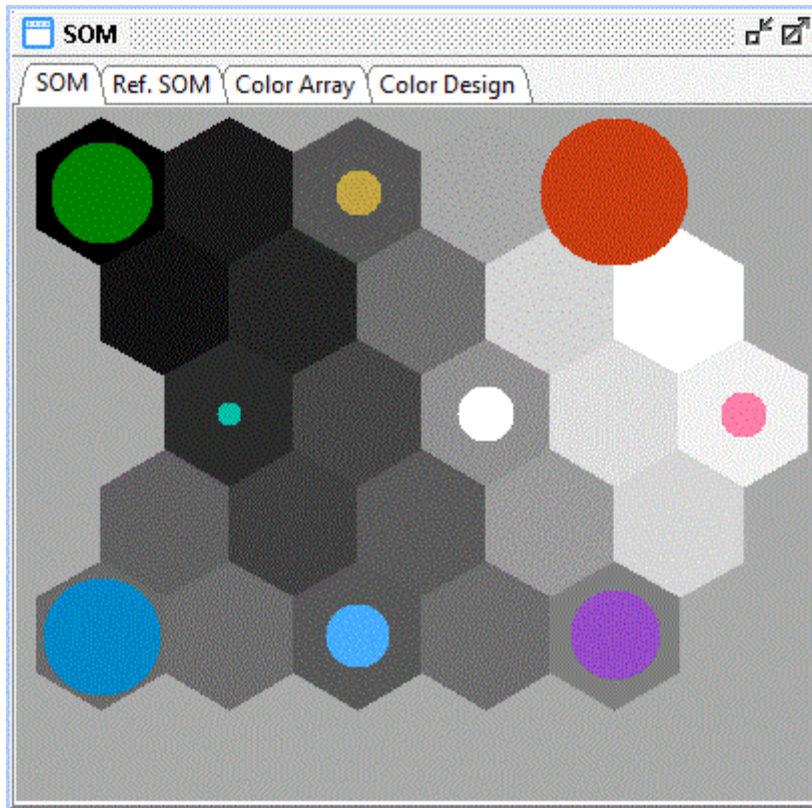
Figure 6.4 SOM node diagram for reconstruction index
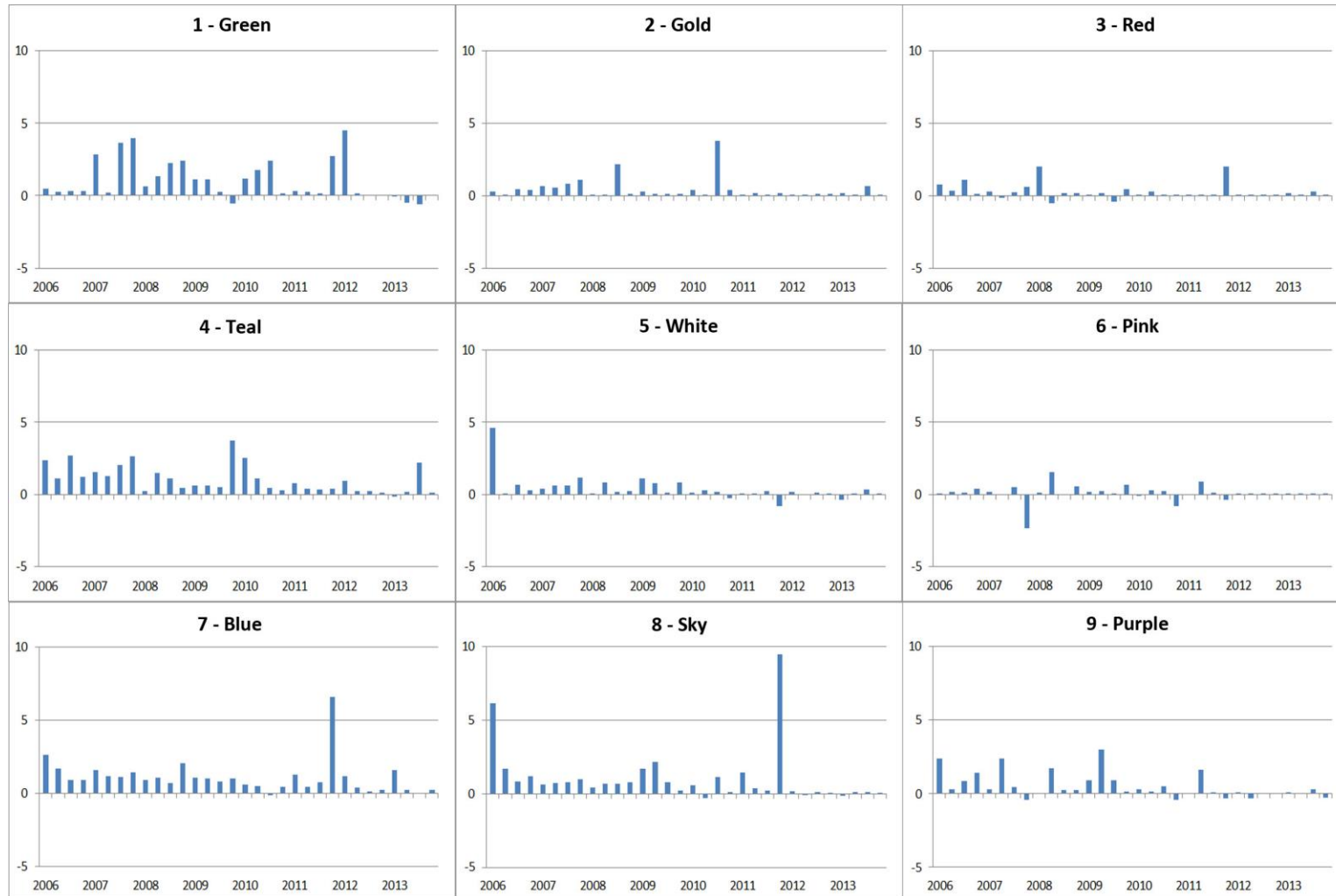
Figure 6.5 Reconstruction indicator nested means by SOM node group

Nodes to the right and upper right edges of the SOM (i.e., red, pink, white, gold, purple) display relatively more stable trends, where indicator values remain close to zero and any construction or demolition that did happen occurred in short spurts during the first few years of recovery, 2006-2009. Pink and purple nodes show the highest frequencies of demolition—the pink group shows negative means seven times and the purple group five times during the recovery period. Pink and purple tracts include places like Point Cadet and Downtown Biloxi, Downtown Long Beach, Gaston Point in Gulfport, and Downtown Bay St. Louis. Spatially all of these nodes to the right and upper right in the SOM are urban tracts in Harrison and Jackson counties (Figure 6.6).
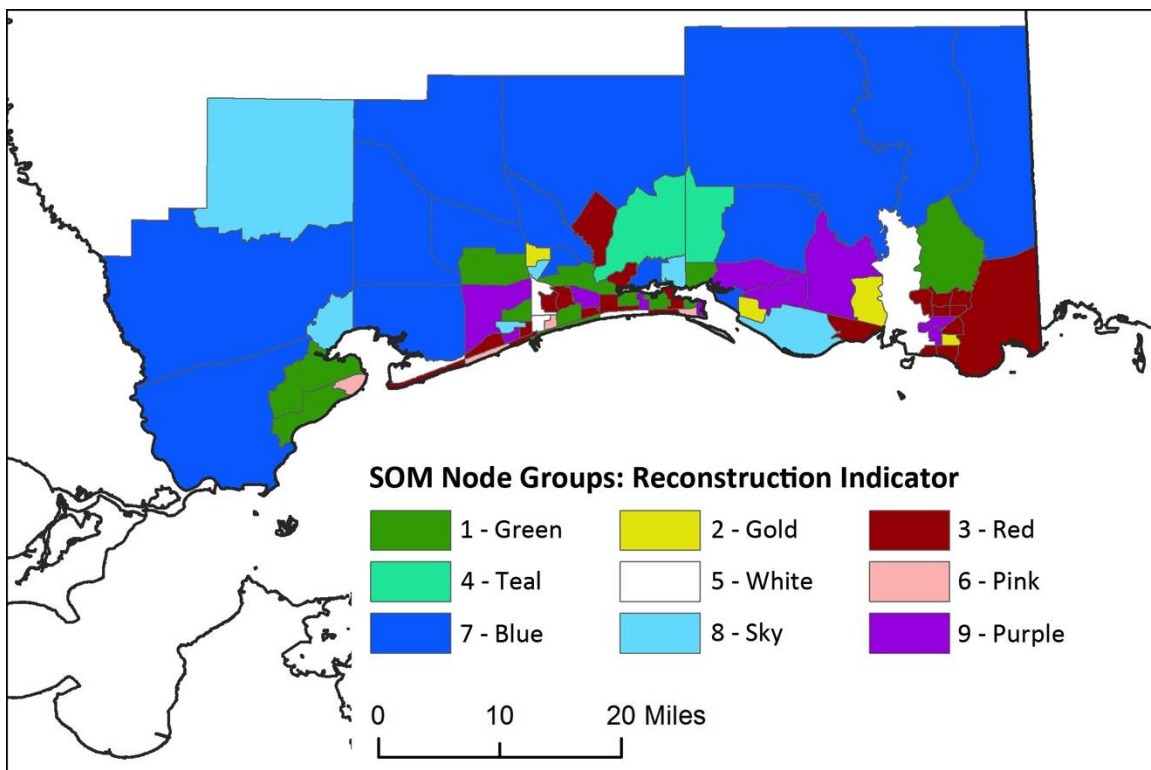
Figure 6.6 Tract map of SOM node groups based on reconstruction

Nodes toward the left and lower left edges of the SOM (i.e., green, blue, sky, teal) display more pronounced construction trends (Figure 6.4). The green node shows a delayed start in construction, which began in full force by early 2007 and continued in four successive waves through the recovery period. Conversely, in blue, teal, and sky groups, large-scale reconstruction had already begun by 2006 (Figure 6.5) and was less episodic compared to construction in green tracts. Figure 6.6 indicates these trends may be spatial and suggests a relationship with the areal expansion phenomenon observed in other recoveries (Haas et al. 1977, Hagelman et al. 2013). It is possible that delayed construction in the green tracts, which tend to be more urbanized (i.e., Waveland, Bay St. Louis, East Gulfport, and bayfront sections of Biloxi), may be due to complications of demolition, permitting, elevating, and/or construction affordability; whereas in teal, blue, and sky tracts comprising mostly undeveloped, rural or urban-rural fringe areas north of I-10, the relative ease of building led to construction early on.

Another pertinent commonality between these four groups is the tendency for construction to continue into the long-term recovery period: 2010-2013. Blue and teal tracts show continual construction in the long-term, while more urbanized green tracts showed two distinct waves of rebuilding that happened in 2010 and in late 2011, perhaps linked to dispersal of Mississippi Development Authority monies (Diane S, resident interviews in Blue Meadow, Dunbar 2010-11). The building spree that dominates blue and sky tracts in the last quarter 2007 is due to new addresses added in D'Iberville around the Promenade Shopping Center, new construction in downtown

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Ocean Springs, and development in sparsely populated Wade, Mississippi, in Jackson County where the proportion of addresses added seems large.

6.3.5 Repopulation

Using the smallest SOM array, the algorithm once again identifies nine distinct clusters for repopulation trends (Figure 6.7). Similar to the blue group in the reconstruction indicator, here the red cluster (n=25) contains nearly a third of tracts and acts as a control group. Indicator values for the red group remain stable near zero throughout the recovery time period (Figure 6.8). A strong spatial pattern is evident (Figure 6.9)—all inland, rural tracts that sustained lower damage during Hurricane
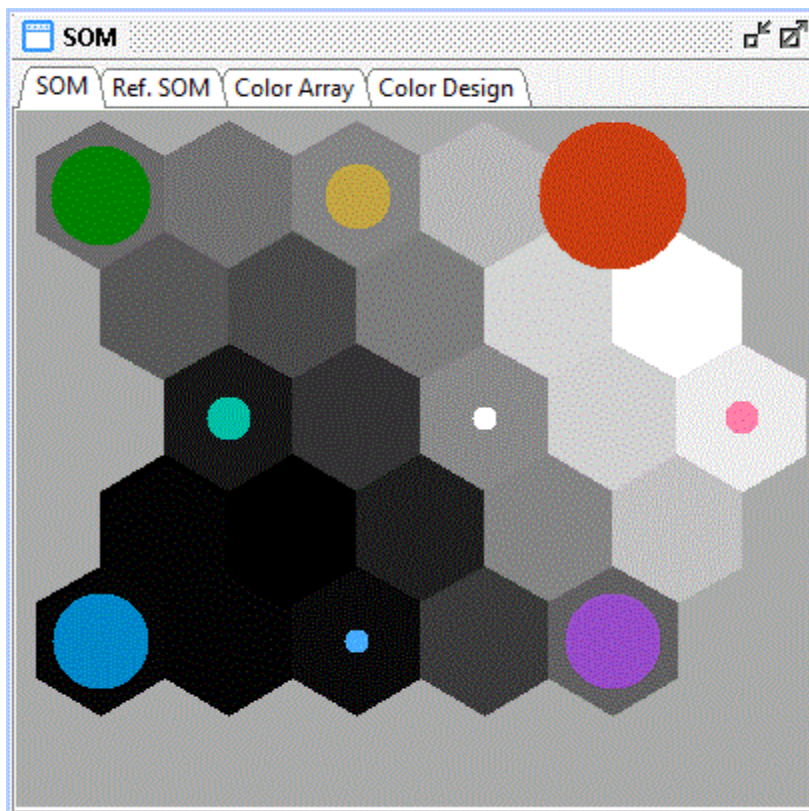
Figure 6.7 SOM node diagram for repopulation index
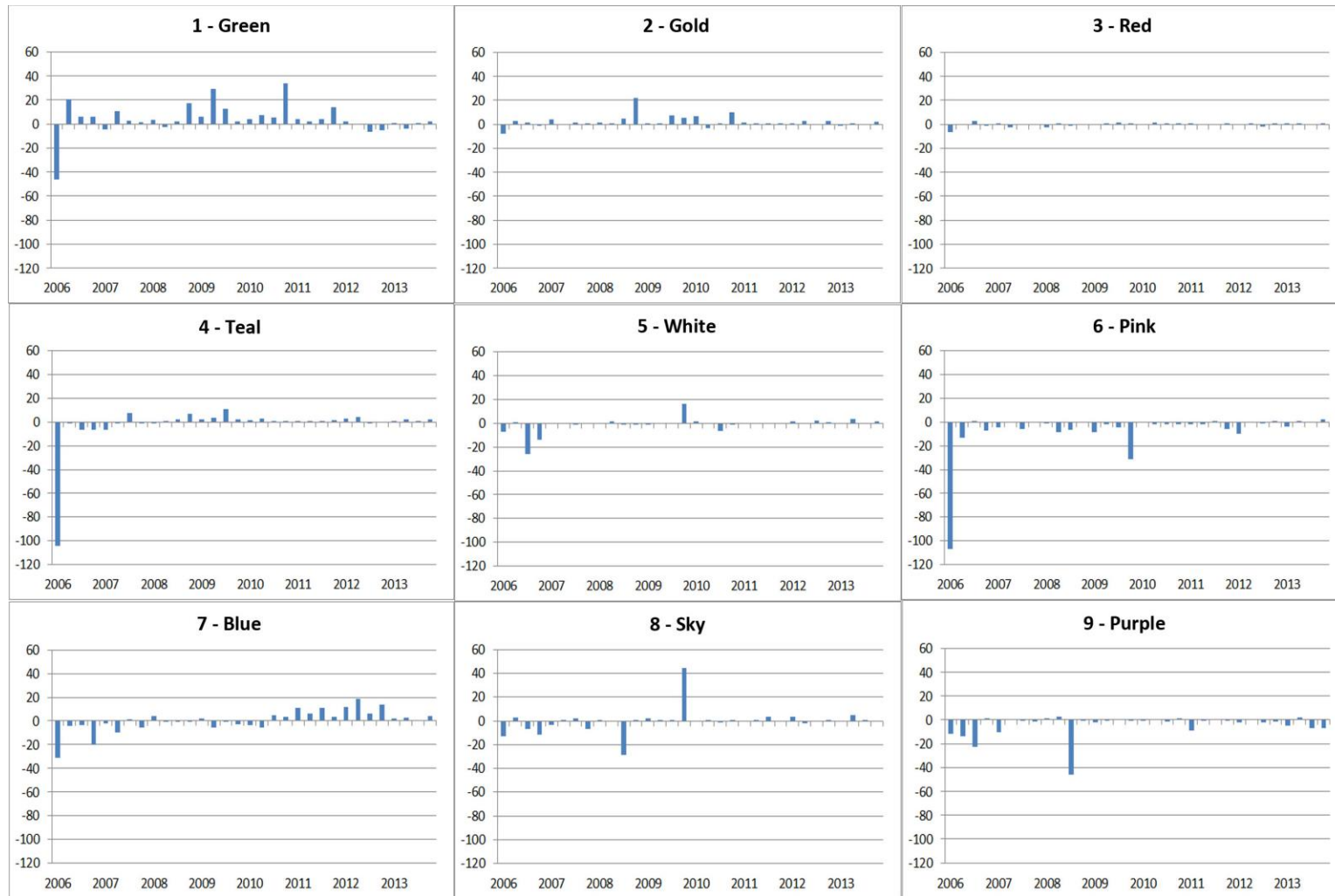
Figure 6.8 Repopulation indicator nested means by SOM node group
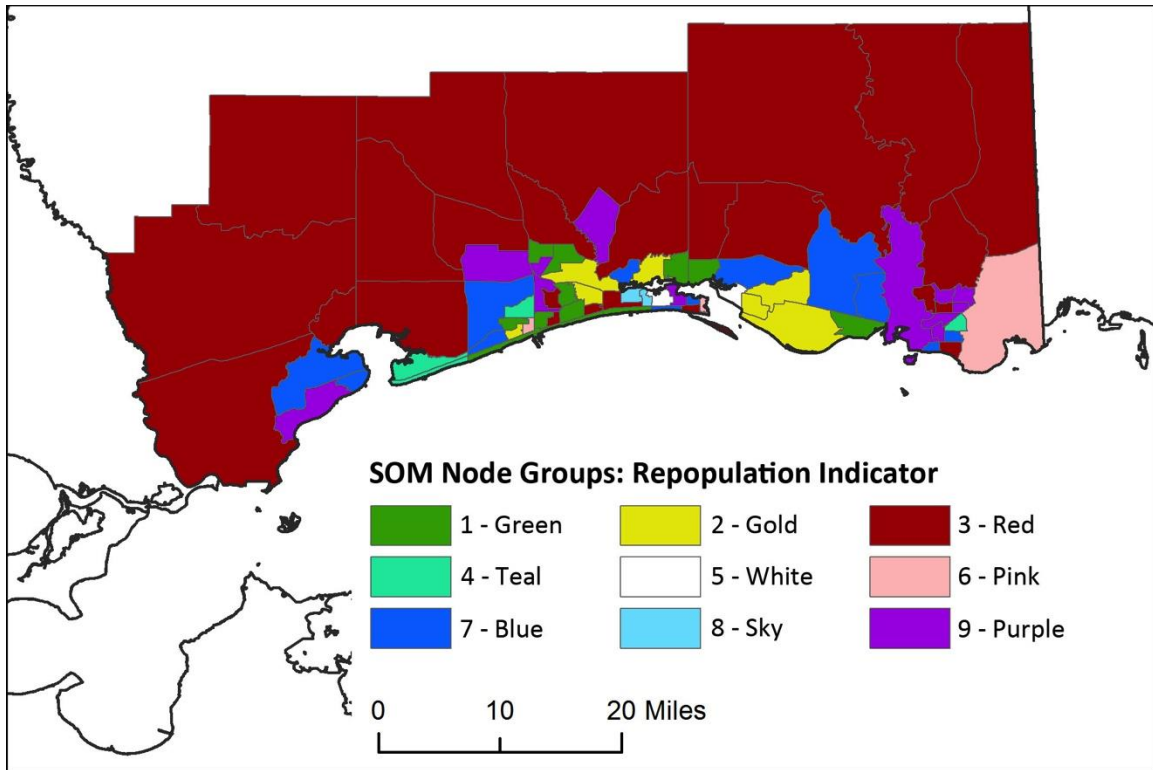
Figure 6.9 Tract map of SOM node groups based on repopulation

Katrina cluster in the red group along with middle to upper class urban tracts in Gulfport (north of the tracks), Pascagoula, and Moss Point that were also less exposed.

The green group is the next largest. It contains many of the south-facing beachfront and bayfront tracts from central Harrison to western Jackson County that received fast-moving storm surge. In these locations, the first one to four blocks from the beach were slabbed. Several middle and lower middle class inland Gulfport tracts, including the Navy Seabee Base also fall into this category. After initial vacancies for the first quarter of 2006, these places experienced several periods of population return in a) mid-to-late 2006, b) late 2008-2009, and c) late 2010, and d) late 2011.

The blue cluster includes areas like Bay St. Louis, inland Long Beach, Old Fort Bayou (northern Ocean Springs), Biloxi's West Beach and the traditionally African-American Division Street corridor. These places experienced waves of vacancies throughout 2006 and 2007 and only recently saw slow but consistent growth from 2011 to 2012. Overall, these seem to be places where residents are returning or relocating, but such relocation is incremental and not driven by large-scale tract-style residential developments.

Tracts assigned to the purple node are marked by sustained vacancies during 2006 and another brief but severe wave of vacancies in the middle of 2008. Waveland and Biloxi's Benachi Avenue corridor near Keesler's east gate (site of a major public housing development) experience the highest vacancy scores in 2006. Tracts hit hardest in 2008 were heavily African-American and flood prone. These places included Turkey Creek and Turn Key neighborhoods in Gulfport (north and west of the airport), northern Pascagoula, and the Kreole area of Moss Point. Retail business vacancies may have also contributed to these tract scores since retail corridors along Highway 49 in Gulfport and Highway 90 in Pascagoula are included. Further investigation would be required to test this supposition.

Tracts in the gold group did not experience widespread vacancies but have enjoyed periods of moderate population growth in 2008-2010. Higher-elevation, inland areas of Ocean Springs and North Biloxi and North Gulfport neighborhoods that hug I-10 are members of this group. Teal and pink groups are both marked by their extreme vacancy scores in early 2006, but there the similarity ends. For Pass Christian (teal),

2009 was the only year that saw repopulation in the recovery period—trends are stable otherwise. Point Cadet in Biloxi seems to be the driver of the pink group. This neighborhood experienced precipitous declines immediately after Katrina in 2006, and has been sustaining vacancies ever since—the largest spurt of vacancies in late 2009. It is unclear to what extent the recession was a player in this trend and not simply recovery barriers like insurance requirements, flood heights, social support, or rebuilding costs. Based on the SOM, the white group, which is tied for the smallest group size, is most similar to the red group noted for its stability. Delayed vacancies in late 2006 are due to Keesler Air Force Base, while downtown Ocean Springs drives the one brief spurt of reoccupancy in late 2009. This indicator does not pick up on the sudden addition of base addresses that occurred in 2010, confirming the indicator's usefulness as measure of repopulation that is distinct from construction.

6.3.6 Home Improvement

The SOM algorithm produces nine nodes from the home improvement loan indicator (Figure 6.10). Unlike in previous runs with reconstruction and repopulation indices, tracts are more evenly distributed between nodes with no node containing more than 16 tracts. The largest SOM groups are: pink (n=16), purple (n=12), green, gold, and sky (each n=10).
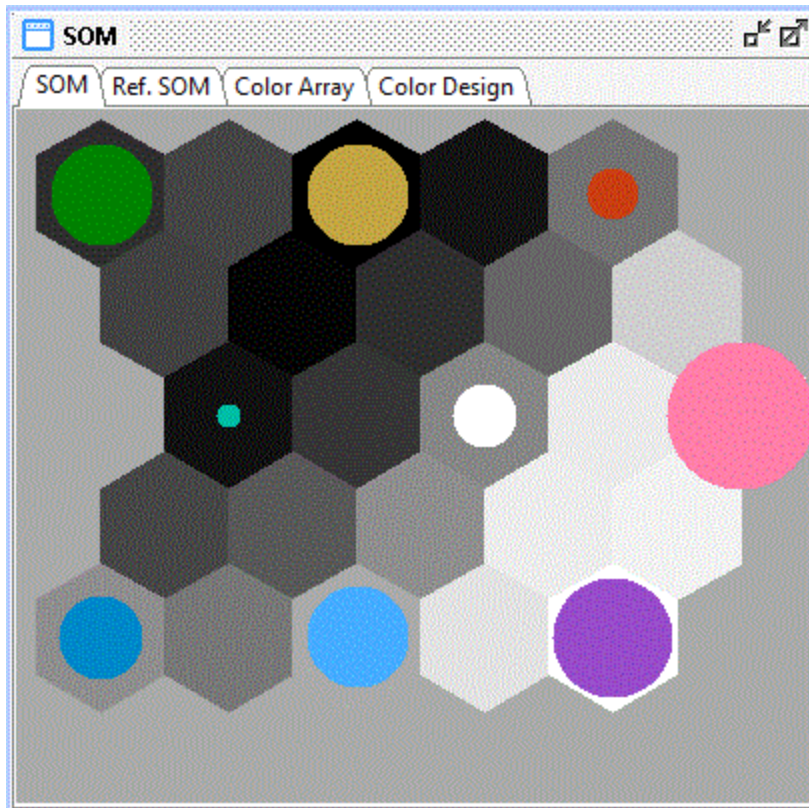
Figure 6.10 SOM node diagram for home improvement loan
index

The pink trend line is the only one that peaked in the first year of HMDA data

collection, 2007, and decreased consistently throughout the recovery period (Figure

6.11). I surmise that the pink group contains many people who fall into the "haves"

group able to fix up their homes and return to normal quickly (Interview, Mary). My

supposition is supported by the spatial pattern shown in the SOM map (Figure 6.12) that

places in the pink group both Harrison County beachfront tracts south of the tracks,

which were devastated by storm surge, along with suburban areas like North Gulfport,

Gulf Park Estates, and Old Fort Bayou, which experienced minimal damage from rain

and wind (Interviews: Connie, Thomas, Vincent). I hypothesize that a lack of sensitivity
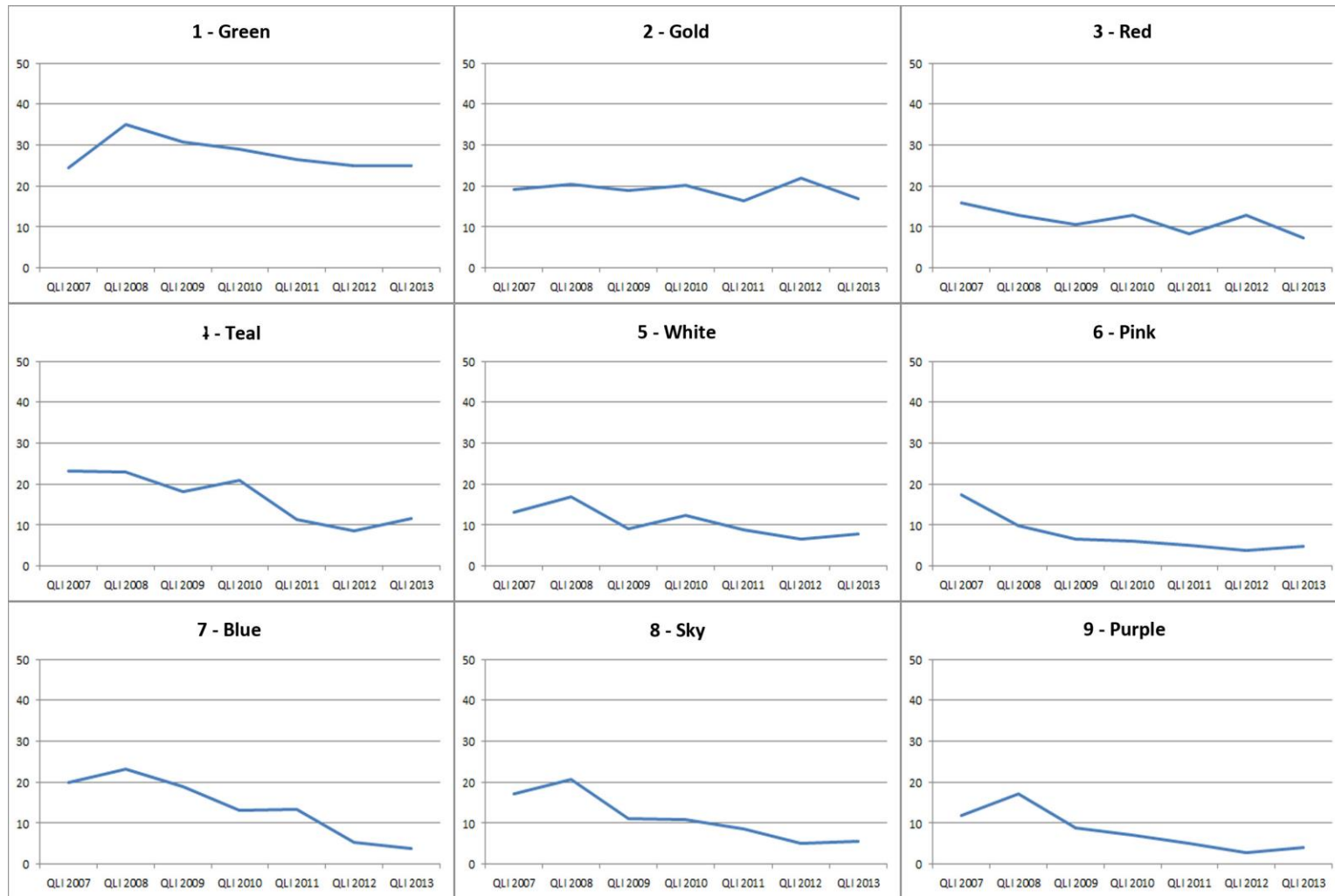
Figure 6.11 Home improvement indicator nested means by SOM node group
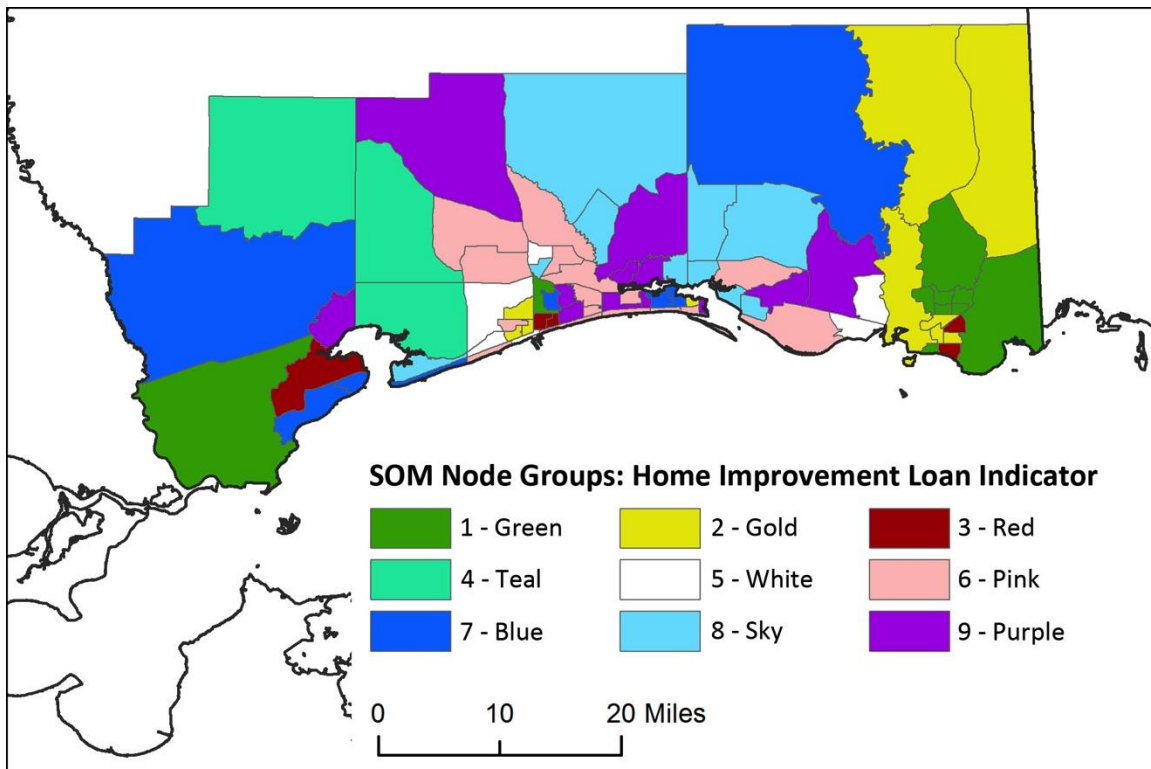
Figure 6.12 Tract map of SOM node groups based on home improvement

among affluent residents near the beach and a lack of exposure among less affluent

residents inland resulted in these groups receiving quick financing to make repairs early

in the recovery timeline. It was in 2007 that residents reported first noticing a social

recovery divide forming (Interviews: Mary, ESL Focus Group 2).

The nested means shown on the purple trend line indicate a similar pattern; only

financing for repairs was delayed. SOM nodes confirm the relationship between the

pink group and purple group, whose percentage of improvement loans peaked in 2008

instead. Areas in purple include upper-middle income areas like Diamondhead, middle-

income areas like North Biloxi, and poor areas like East Biloxi. In general, SOM nodes

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located toward the lower right corner of the SOM diagram show lower proportions of improvement loans throughout the recovery period, with a peak in 2007 or 2008 (Figures 6.13 and 6.14). SOM nodes located toward the upper left corner tend to show higher percentages of loans originated for improvement throughout the period.

Secondary disasters beyond Hurricane Katrina may also explain some of the nuances in the improvement loan trend lines. For instance, the national recession and housing glut that began in 2008 may also be a culprit in fueling the downturn in the proportion of home loans after that year. It is difficult to separate the effects of the recession from the effects of Katrina, however, and according to residents' perspectives, these events as experienced together were perceived as part of the recovery process (Figure 6.13).

Hurricane Isaac seems to feature in the home improvement dataset as well: green, gold, and red nodes seem to collectively bear the signature of this event. First, tracts in the green group show the highest proportion of improvement loans overall (Figure 6.11). Values in 2008 top one-third of all loans. The elevated trend remains throughout long-term recovery, with values only dropping to 25% of loans, which begs the question why did this number not decrease more after Katrina repairs were finished? Perhaps repetitive losses are to blame. Second, the gold group, whose trend is most similar to the improvement loan trend observed in green tracts according to the SOM nodes, shows an uptick in the proportion of home loans for improvement in 2012, the year Isaac hit. The proportion of home improvement loans among the gold tracts is

Figure 6.13 Participant photos showing effects of the recovery and recession: (a) Justin's undeveloped land he cannot build on without first selling (b) his slabbed, empty lot, (c) Ellen's photos of abandoned duplexes and (d) flipped properties remaining for sale, (e) Rose's photo of damaged and abandoned housing, Waveland, and (f) Cal's photo of ubiquitous for sale signs in luxury areas

lower than for the green, holding at around 20%. Third, although the red group is proportionally much lower, this trend displays the same 2012 peak as the gold trend.

When mapped together, these three groups show a clear spatial pattern (Figure 6.14). Green tracts include areas severely impacted by Isaac flooding (Pearlington in western Hancock County, Turn Key in Gulfport, and Helena and Moss Point in Jackson County) and tornadoes (beachfront neighborhoods of Pascagoula). Pearlington and the Kreole area of Moss Point are also high repetitive loss areas for flooding. Gold and red areas contiguous to the green tracts include other areas affected by wind damage, heavy rainfall, and minor flooding (Bay St. Louis, Turn Key again, East Biloxi's low-lying
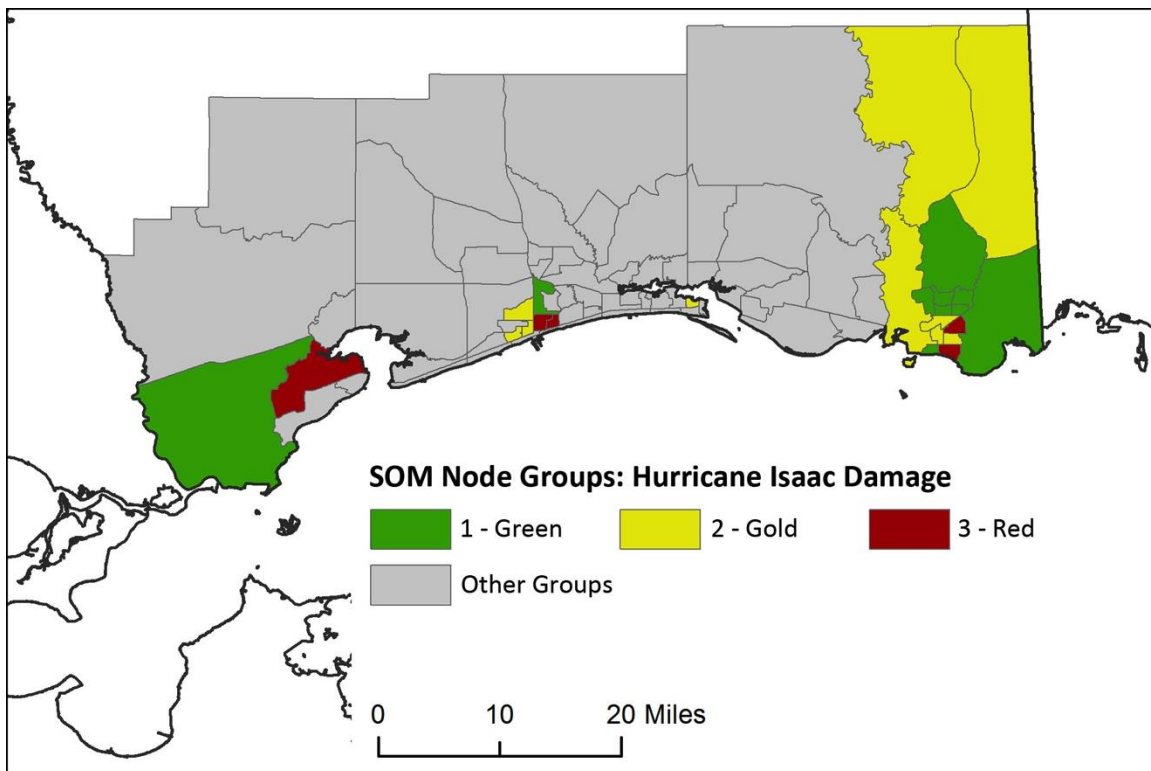
Figure 6.14 Tract map showing nodes with Hurricane Isaac damage from home improvement loan indicator

bayfront, and large sections of Jackson County affected by excessive rains and a dam breach). Damage surveys undertaken by HVRI in 2012 confirmed the location of recovery activities due to Isaac impacts.

6.3.7 Home Purchase

Overall, patterns in the nine nodes for home purchase loans (Figure 6.15) seem less to do with recovery and more to do with general economic conditions. Nearly every trend line shows some sign of the recession (Figure 6.16). Dips in the proportion of loans originated for home purchase occur in all by the teal node—these rural tracts in northern Harrison County did not follow national trends.
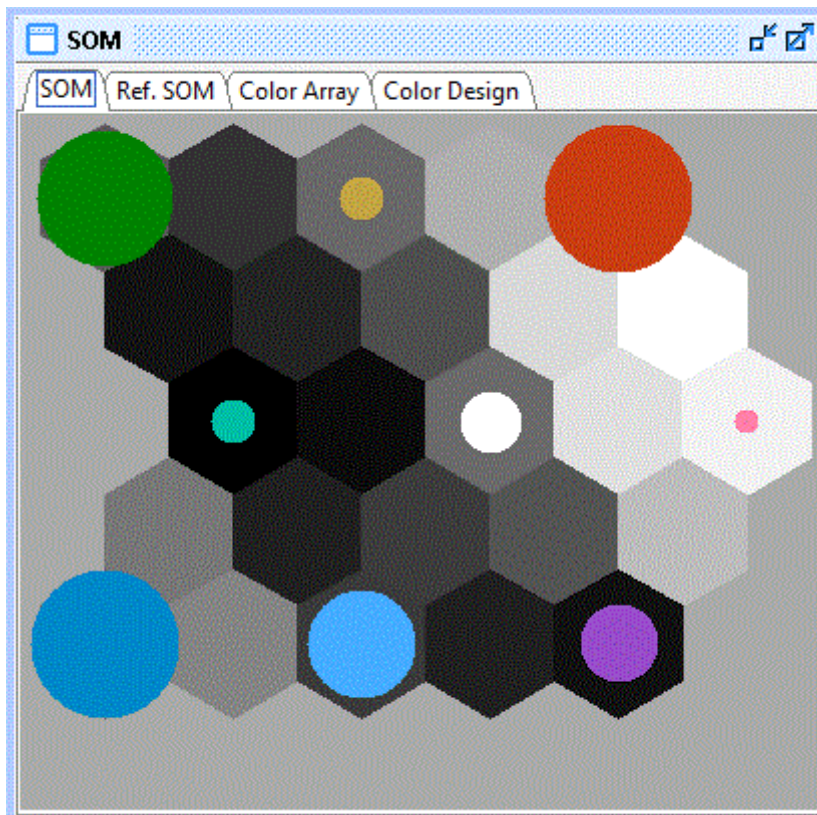
Figure 6.15 SOM node diagram for home purchase loan index
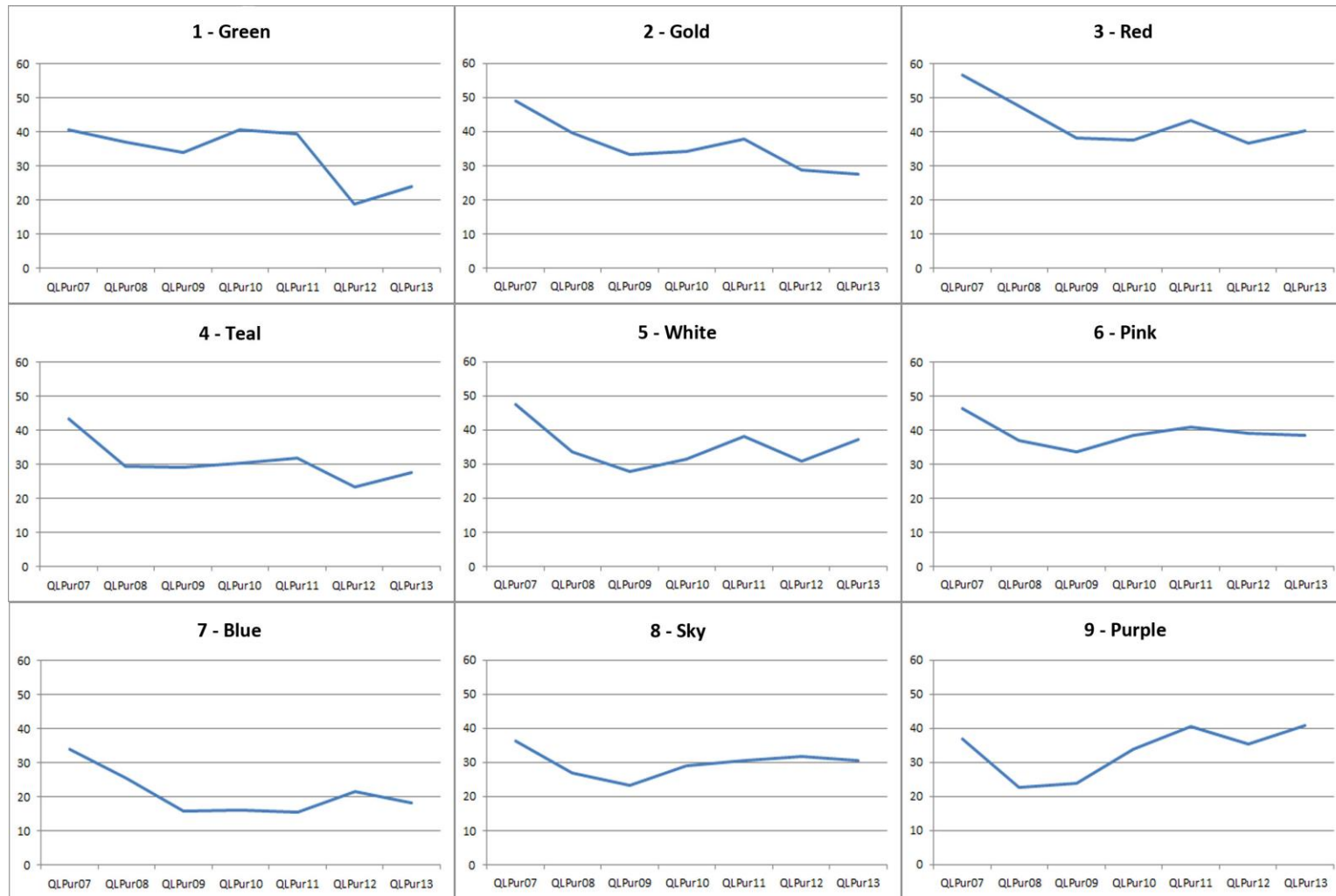
Figure 6.16 Home purchase indicator nested means by SOM node group

Spatially, red and pink tracts mirror the same spatial patterns as pink and purple groups from home improvement (Figure 6.17). These include Harrison County beachfront tracts, areas in North Gulfport, Gautier, and Gulf Park Estates. The proportion of loans originated for home purchase in these areas is highest, averaging around 40% across the recovery period. Red tracts in particular showed the highest rate of loans for purchase in 2007, suggesting a large degree of residential mobility and permanent resettlement during short-term recovery. Interviewees did confirm the residential migration to North Gulfport post-Katrina and the accompanying development (Interviews: Allison, Connie, Elaine, Justin, Mai, Stephen).
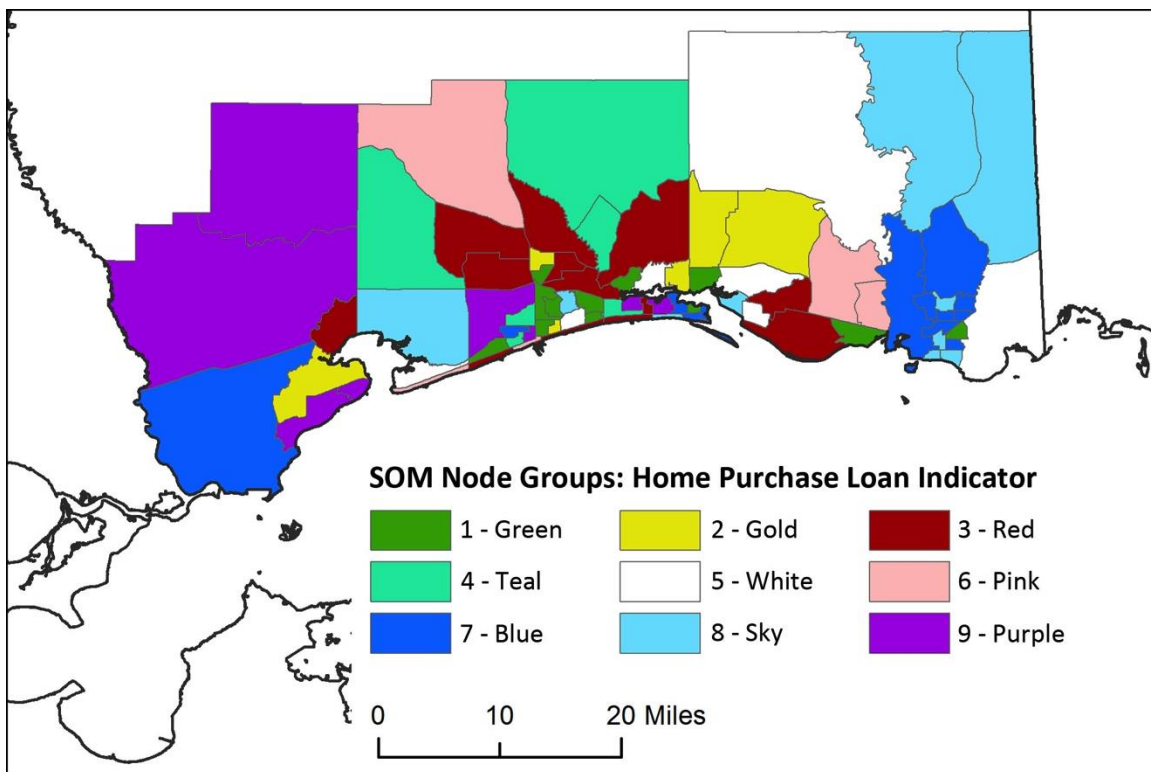
Figure 6.17 Tract map of SOM node groups based on home purchase

Similarly, blue and sky nodes include many areas in Hancock and Jackson County like Pearlington and Moss Point that were affected by Isaac and appeared in the gold and green groups for home improvement loans. Tracts assigned to blue and sky nodes have a slightly more diffuse spatial pattern by comparison, particularly in Harrison County. These nodes, which include portions of East Biloxi as well, may be more related to general economic depression and disinvestment, hence the low rates of loans for home buying. Rates in the blue areas are the lowest of any SOM group by far, averaging 20% between 2007 and 2013.

Green tracts—the other dominant group in the SOM—include many urban Gulfport neighborhoods where the proportion of loans for home purchase dropped precipitously in 2012-2013. It is unclear whether this drop is due to fall-out from 2012's Biggert-Waters Act restructuring NFIP qualifications, whether the drop may be an effect of an unusually large proportion of loans originated for Isaac repairs in areas like the Turn Key / Highway 49 corridor, or both.

6.4 Comparison

In this section I describe test results that compare differences of means in qualitative indicator scores aggregated to the tract level between groups of tracts clustered using the SOM technique. I both recovery speed and recovery outcome indicators computed using raw difference and the average normalized difference aggregation methods. Distributions of these two particular indicators have a central zero and tend to normal, making the ANOVA appropriate. Considering the small group sizes possible within some of the SOM-generated nodes—this a function of low sample

size of n=80 tracts on the Mississippi Gulf Coast—I structure ANOVAs to only compare means of SOM groups with greater than 10% of the tract dataset (more than 8 tracts). This step reduces the likelihood for unequal variances between groups and gives the analysis slightly more explanatory power. I tabulate means for all SOM groups, and where there are insufficient numbers of tracts to include groups in the statistical analysis but pertinent patterns exist, I elaborate qualitatively.

6.4.1 Reconstruction Comparison

Results from ANOVAs based on reconstruction groups reveal that P values are generally lower for speed indicators than for outcome indicators (Table 6.4). This suggests that construction and demolition may be more closely related to residents' perceptions of recovery progress rather than their judgments on satisfactory or unsatisfactory recovery outcomes. Only the means of tract-level speed values averaged by participant were shown to differ between reconstruction nodes identified by the SOM (p<.10). I used only the four largest groups in the ANOVA (See Figure 6.5): green (urban, delayed construction in waves), purple (urban, punctuated construction/demolition), blue (rural, sustained construction), red (urban, stable). The high alpha level suggests a weak relationship. Levene's test (p<.10) confirms that this could be due to unequal variances, although the Brown-Forsyth test—based on median values rather than means—reports equal variances. High positive skewness of this particular indicator may be driving these test results (see Table 6.1).

Table 6.4 ANOVA results comparing means of participant-based indicators between reconstruction SOM nodes

Indicator Type	Raw Difference	Averaged Per Person Difference
Speed	F = 1.2256 P = .3091	F = 2.5118 P = .0680*
Outcome	F = 0.1743 P = .9133	F = 0.0650 P = .9782

As a precaution, I run a nonparametric Kruskal-Wallis test to compare the groups based on their ranks, and again the result is weak significance (χ^2=7.4243; p<.10). Wilcoxon tests on each pair show significant differences between the stable red tracts and both green tracts (p<.05) and blue tracts (p<.05) (For map, see Figure 6.6). This implies that residents do recognize new development in previously undeveloped areas and sudden waves of construction in affected areas as distinct patterns compared with areas stagnant in reconstruction. On average, residents identified these stagnant urban areas as the slowest group (Table 6.5). This red group was also the only one to receive a negative mean indicator score. Tracts in the blue group received the second lowest mean speed score perhaps not because residents distinctly rated these areas lower, but because not many residents identified features in these areas at all. Despite the total areal size of tracts in this rural blue group, only 43 of 420 recovery features are located in these areas, and of these features, only 24 of them (6%) are related to recovery speed. This finding supports earlier assertions that the extent of one's activity space is a major determinant of their recovery perceptions. Considering groups not a part of the statistical analysis, places that received the fastest average indicator scores were tracts in the sky group. Not surprisingly, these fastest tracts included Crossroads Shopping

Center in North Gulfport and D'Iberville—places with growing agglomerations of businesses constructed post-Katrina. Residents' use of businesses as perceptual indicators of recovery speed is well evidenced by results of the participatory mapping exercise.

Table 6.5 Means of averaged per person speed values in reconstruction SOM nodes

SOM Group	Color Group	Mean Averaged Per Person Speed	N	ANOVA
0	Green	0.036	12	Yes
8	Purple	0.019	10	Yes
6	Blue	0.017	15	Yes
2	Red	-0.019	22	Yes
7	Sky	0.079	6	No
4	White	0.044	5	No
3	Teal	0.039	2	No
1	Gold	0.027	4	No
5	Pink	0.020	4	No

6.4.2 Repopulation Comparison

Results from ANOVAs based on the repopulation groups show lower P values for outcome indicators—a pattern opposite that observed for the reconstruction indicator, where speed indicators showed lower P values (Table 6.6). This finding implies a link between residents' satisfaction with the end results of recovery and the presence (or absence) of people in neighborhoods. The means of raw outcome values show significant differences at the .10 confidence level between the largest four repopulation/vacancy indicator clusters produced by the SOM (Table 6.6). Levene's test shows equal variances between these four groups, lending credence to the results.

Table 6.6 ANOVA results comparing means of participant-based indicators between repopulation SOM nodes

Indicator Type	Raw Difference	Averaged Per Person Difference
Speed	F = 0.2943 P = .8294	F = 0.1875 P = .9045
Outcome	F = 2.6472 P = .0574*	F = 2.1594 P = .1026

Individual differences of means tests (Table 6.7) show significantly different and more successful outcomes were identified in within tracts in the green category versus those in red (P=.023) or purple groups (P=.012). Tracts in the green group (See map, Figure 6.9) included heavily impacted areas along the central Harrison beachfront where significant community improvements (i.e., Jones Park and Harbor, Downtown Gulfport, Davis Avenue in Long Beach) were identified as recovery successes (Maps: Brad, Dave, Ellen, Jared, Justin, Sonya, Stephen). D'Iberville and St. Martin with their business development (Maps: Linh, Patricia, Thomas, Wanda) and ethnic services (Maps: Hanh, Vien) for displaced East Biloxi Vietnamese residents are included in this successful green group along with the Seabee Base and areas in central and north Gulfport where people relocated post-Katrina, buying existing houses or building new ones (Interviews: Linh, Mary, Stephen, Thomas). These places differed from the control group (red) with relatively stable repopulation/vacancy trends and the purple group, which includes Waveland and other flood prone areas with retail corridors and lower-middle income residential areas. Places in this purple group, though successful on average as evidenced by a positive raw outcome score, have the least satisfactory recovery outcomes.

Table 6.7 Means of raw difference outcome values in repopulation SOM nodes

SOM Group	Color Group	Mean Outcome	N	ANOVA
0	Green	4.00	13	Yes
6	Blue	1.33	12	Yes
2	Red	1.16	15	Yes
8	Purple	0.33	12	Yes
3	Teal	6.25	4	No
4	White	5.00	2	No
1	Gold	1.43	7	No
5	Pink	1.33	3	No
7	Sky	1.00	2	No

By contrast, some of the smallest SOM groups actually displayed the most satisfactory outcome scores. The teal category (Pass Christian including Timber Ridge and Henderson Point) displays the most satisfactory recovery of any group, followed by the white category (Downtown Ocean Springs / Keesler Air Force Base). Judging by the landscape, Pass Christian might not initially seem like a success story; however, among the successes that residents consistently counted here were better, stronger, and appropriately scaled municipal buildings (Interviews: Chantel, Elaine, Fred, Olivia), resilient church congregations (Interviews: Chantel, Olivia), and small clusters of residents who rebuilt in the midst of vast, still-unpopulated areas (Interviews and Maps: Elaine, Fred, Mary, Olivia). Residents who spoke about Ocean Springs noted the downtown area's enhanced sense of place and beautification efforts undertaken during the recovery process (Interviews: Brad, Dave, Jared, Patricia, Sonya) along with the efficiency with which elected officials here utilized grant monies to fund betterment (Interviews: Dave, Jared, Patricia).

6.4.3 Home Improvement Loans Comparison

Results from ANOVAs based on the home improvement loan indicator suggest

several significant relationships, but no clear signature showing that links with perceived

outcomes are more or less pertinent than links with recovery speed. Although the

nested means of stratified raw speed scores showed no significant differences between

SOM groups, when these nested means were computed from participant averages of

recovery speed, there were differences between the means (F = 3.9850, p<.01) (Table

6.8). Variances between SOM groups were equal in this case.

Table 6.8 ANOVA results and Welch's ANOVA results comparing means of participant-
based indicators between home improvement loan SOM nodes

Indicator Type	Raw Difference	Averaged Per Person Difference
Speed	F = 1.7798 P = .1466	F = 3.9850 P = .0067***
Outcome	F = 3.8107 P = .0085*** Unequal Variances Levene: F = 4.2597, P<.01 Brown-Forsythe: F = 2.3790, P<.10 Welch's ANOVA F = 3.0540 P = .0368**	F = 2.2625 P = .0746* Unequal Variances Levene: F = 3.1422, P<.05 Brown-Forsythe: F = 2.9650, P<.05 Welch's ANOVA F = 1.4518 P = .2466

Multiple comparisons based on student's t-tests show significant differences

between the each of the SOM groups with highest per person averaged speeds—sky

(p<.01) and pink (p<.05)—and each of the two lowest—green and gold (Table 6.9). It is

not surprising that these SOM groups with the most extreme participant indicator

scores should show differences. The relative accuracy in the ranking of these participant

speed scores in relation to the proportion of improvement loans averaged over the

recovery period, however, is worthy of note (Table 6.10). Among the extremes, the

groups of tracts identified as fastest had the lowest average percentages of

improvement loans. The reverse is also true where the slowest tracts had the highest

average percentages of improvement loans. The sky group is the only one out of rank

order. The high participant ranking is likely due to the presence of retail businesses

generally classified as fast recovery, which is not represented by the HMDA-based

indicator that only references home loans.

Table 6.9 Means of averaged per person speed values in home improvement loan SOM
nodes

SOM Group	Color Group	Mean Averaged Per Person Speed	N	ANOVA
7	Sky	0.08259	10	Yes
5	Pink	0.04727	16	Yes
8	Purple	0.02401	12	Yes
1	Gold	-0.02369	10	Yes
0	Green	-0.03036	10	Yes
6	Blue	0.01482	8	No
4	White	0.00337	6	No
2	Red	-0.00209	5	No
3	Teal	-0.01786	3	No

Table 6.10 Means of averaged per person speed values compared to the average
percentage of home improvement loans by SOM node

SOM Group	Color Group	Mean Averaged Per Person Speed (Ranking)	Average Percentage of Improvement Loans, 2007-2013 (Ranking)	N
7	Sky	0.08259 (1st)	11.30 (3rd lowest)	10
5	Pink	0.04727 (2nd)	7.64 (1st lowest)	16
8	Purple	0.02401 (3rd)	8.08 (2nd lowest)	12

SOM Group	Color Group	Mean Averaged Per Person Speed (Ranking)	Average Percentage of Improvement Loans, 2007-2013 (Ranking)	N
1	Gold	-0.02369 (8th)	19.14 (8th lowest)	10
0	Green	-0.03036 (9th)	27.97 (9th lowest)	10
6	Blue	0.01482	13.95	8
4	White	0.00337	10.67	6
2	Red	-0.00209	11.53	5
3	Teal	-0.01786	16.69	3

ANOVAs between improvement loan SOM groups based on outcome indicators both showed significant differences (raw: p<.01; averaged per person: p<.10); however, the distributions violated the heteroscedasticity condition (Table 6.8). Welch's ANOVA was run on each outcome indicator, instead, to check for between-group differences in means. Only the raw outcome indicator showed significance (p<.05).

Comparing SOM group means (Table 6.11), areas showing the most successful outcome scores tended to be those with lowest average percentages of loans over the recovery period—the sky, purple, and pink groups. Those groups with the least successful outcome scores are generally those with the highest average percentages of improvement loans. The teal group was the only one to receive an outcome score in the failure range (less than zero). Since residents rarely commented on any recovery activities from the teal areas (DeLisle, northern Hancock County) and infrequently mapped features there, these low numbers of recovery features are likely driving the low outcome score rather than any inherent relationship between residents' perceptions and trends in improvement loans here.

Table 6.11 Means of raw difference outcome values in home improvement loan SOM nodes

SOM Group	Color Group	Mean Outcome	N	ANOVA
7	Sky	4.3000	10	Yes
8	Purple	4.3000	12	Yes
5	Pink	3.1250	16	Yes
0	Green	0.5000	10	Yes
1	Gold	0.4000	10	Yes
4	White	2.5000	6	No
2	Red	2.4000	5	No
6	Blue	1.5000	8	No
3	Teal	-1.3333	3	No

One similarity between residents' perceptions and home improvement loan trends that should be noted, however, is the tendency for residents' raw outcome scores and averaged per person speed scores to match the SOM node layout (Figure 6.10). Nodes with the fastest recovery progress and most successful outcomes, whose curves are similar based on the algorithm, cluster at the lower right corner of the SOM, while the slowest, least successful places are those won by nodes at the upper left. This pattern highlights that home improvement, or repair, which is widely referenced by residents regardless of their damage level (Interviews: Gina, Natalie, Rose, Thomas), is an integral element of the recovery process and a pertinent judgment factor in its success.

6.4.4 Home Purchase Loans Comparison

ANOVAs for SOM nodes generated based on trends in home purchase loan originations do not show any significant differences in perception of speed or outcome between groups (Table 6.12). After finding unequal variances in both the raw outcome

and averaged per person speed indicator values, Welch's ANOVAs were run to test for

differences between perceptual indicator means of the SOM groups. Again, no

significant differences were found, confirming the hypothesis that trends in home

purchase loans are unrelated to residents' perceptions of the recovery process and its

end results.

Table 6.12 ANOVA results and Welch's ANOVA results comparing means of participant-based indicators between home purchase loan SOM nodes

Indicator Type	Raw Difference	Averaged Per Person Difference
Speed	F = 0.6678 P =.5763	F = 1.0999 P = .3593 Unequal variances Levene: F = 1.3397, P<.05 Welch's ANOVA F = 0.7914 P = .5108
Outcome	F = 1.2015 P =.3204 Unequal Variances Levene: F = 0.7773, P<.05 Welch's ANOVA F = 1.2533 P = .3141	F = 0.8554 P = .4713

6.5 Findings

This third research question asked whether there were differences between

these participant recovery assessments and recovery indicators based on quantitatively

derived secondary data. This question was important because the status of recovery is

often uncritically approximated with metrics of reconstruction, repopulation, repairs, or

residential turnover without verification of whether spatial disparities in the recovery

process shown by these measures match with recovery disparities as seen through recovering residents' viewpoints. Aggregating participant map data by tract in a GIS and comparing it against clusters of tracts with similar trends in longitudinal built environment, population, and housing metrics showed that differences did exist between qualitative assessments and quantitative indicators in terms of which indicators matched better with residents' assessments of recovery as a temporal process (i.e., speed) and recovery as an outcome. Three of the four quantitative indicators held some form of credence when tested against residents' assessments.

Table 6.13 summarizes where significant relationships did exist between the indicators based on participant assessments (x axis) and indicators computed from secondary data (y axis). The reconstruction indicator more closely aligned with assessments of recovery speed, while repopulation aligned better with residents' assessments of recovery outcomes. Home improvement loans were identified as a potential indicator for locating the effects of secondary disaster—flooding from Hurricane Isaac in this case—and they showed sufficient agreement with spatial patterns in assessments of both recovery speed and outcome. Trends in home purchase, on the other hand, were unrelated to residents' assessments of recovery but are perhaps linked to larger scale processes associated with the Great Recession and short-term housing market glut. It is also noteworthy that neither aggregation method used to combine participant assessments was universally comparable to the secondary data metrics. Hence, aggregation methods are of supreme importance when using participant-derived data to diagnose recovery.

Table 6.13 Summary of relationships between qualitative and quantitative indicators

	Recovery Process (Speed)	Recovery Outcome (Outcome)
Reconstruction	X	--
Repopulation	--	X
Home Improvement	X	X
Home Purchase	--	--

CHAPTER 7

CONCLUSION

7.1 Summary of Findings

This study on long-term recovery of the Mississippi Gulf Coast operationalized a

mixed methodology, first, to investigate residents' self-attributed meanings and

assessments of recovery in their communities, and second, to compare these qualitative

assessments against quantitative measurements of common recovery proxies. The

study's purpose was two-fold: first, to build upon conceptual recovery knowledge, and

second, to illustrate that bottom-up, place-based approaches are valuable and

complimentary to top-down, quantitative approaches utilized for recovery policy

implementation. Three research questions that explored meanings, assessments, and

indicators of recovery were posed at the outset of this study. With each question, I

examined a different type of recovery landscape constructed using situated knowledge

of the physical landscape that was visual, spatial, and place-based, respectively. A

bottom-up approach is shown to be useful precisely because it can interrogate these

constructed landscapes from which perceived recovery disparities in the physical

landscape emerge. The interlocking methods employed in this bottom-up approach

increase the power of this study's findings.   I summarize the findings below based on

analysis from each research question.

7.1.1 The Meaning of Recovery

The first question asked what the recovery of place meant to local residents. Photo elicitation, follow-up interviews, and cursory analysis of spatial patterns on participant-labeled maps revealed the following:

- Six unique meanings of recovery were identified: 1) Commemoration, 2) Betterment, 3) Sensory experience, 4) Materiality, 5) Adjustments to activity space, 6) Changing functions of spaces

- Three standpoints on recovery existed based on residents' levels of place attachment, life stage, physical and social mobility, and whether they had an international migration experience. These standpoints were: 1) Long-timers who mostly focused on commemoration and activity space meanings, 2) Newcomers who mostly focused on changing functions of spaces (particularly economic functions) and materiality meanings, and 3) Immigrants who mostly focused on betterment at both the community and individual levels.

- Residents perceived distinct temporal phases of short-term and long-term recovery separated by a transition phase. The transition was experienced in lighter-damaged areas first and progressively later in areas with greater damage.

- Commemoration in short-term recovery centered on replacement, while commemoration in long-term recovery focused on preserving sense of place without compromising future needs, disaster preparedness, or community vision.

- Improvements made in the name of betterment competed with commemorative meanings in long-term recovery

- Definitions of public and private space, as well as who was entitled to own and use these spaces, were renegotiated in long-term recovery. In the heaviest damaged areas formerly private spaces became more public.

7.1.2 Participant Recovery Assessments

The second research question asked: how do local residents assess recovery progress and recovery outcomes? Systematic analysis of residents' labeled maps of the Mississippi Coast contextualized with their interview remarks produced the following findings:

- Businesses were fast to recover, particularly casinos and big box stores.

- Housing was recovery was slow and unsatisfactory.

- Public, community, and mixed-use features, together, represented the largest proportion of features demonstrative of recovery, which were deemed largely successful.

- Damage to one's home affected how residents assessed recovery. Those with housing damage assessed community recovery relative to their home, their neighbors' homes, and public features. Those receiving no damage assessed recovery by business openings.

- Lower income residents more often assessed recovery based on businesses, while higher income residents assessed recovery based on mixed-use features.

- Older residents identified more recovery failures and more public features.

- Younger residents identified more mixed-use places typically associated with entertainment.

- Longer-term residents identified recovery that was slow, but successful, often citing community features.

- Newcomers equated the return of businesses with recovery.

7.1.3 Assessments Versus Indicators

The third research question examined differences between qualitative participant recovery assessments and quantitative recovery indicators. Aggregating participant map data by tract in a GIS and comparing it against groups of tracts with similar indicator trends resulted in the following findings:

- Reconstruction patterns aligned with assessments of recovery speed.

- Repopulation patterns aligned with assessments of recovery outcomes.

- Home improvement loans matched closely with residents' assessments of recovery speed and outcomes; however, the aggregation method had an effect on whether assessments matched indicators.

- Home improvement loans were indicative of secondary disaster impacts— flooding from Hurricane Isaac in this case

- Trends in home purchase were unrelated to recovery assessments.

7.2 Discussion

While this study reaffirms previous findings from recovery research such as the areal expansion of development (e.g., Haas et al. 1977, Hagelman et al. 2012), the importance of businesses as indicators of rapid recovery (e.g., Xiao and Van Zandt 2012),

the satisfaction with purposefully designed community gathering spaces (e.g., Corser and Gore 2008), and the short-lived but powerful altruistic behaviors in recovery (e.g., Richardson et al. 2014), it also makes several new contributions. First, this study adds another case study to the small but growing body of literature on long-term recovery from a large-scale catastrophe. Case studies of these types of events are necessary to determine whether sociological processes, understandings of disaster recovery, or emergency management best practices do, in fact, differ between major disasters and larger catastrophic events (Quarantelli 1999, NRC 2006, Rubin 2009).

Second, the visual and spatial methods implemented (i.e., participatory photography and mapping), which were made possible by the visual evidence still observable in the physical and social landscape nearly a decade after Hurricane Katrina's catastrophic impact, showed how recovery activities are linked across multiple scales of analysis. Instead of a recovery model in which communities and regions recover faster than smaller units like households (Bolin 1982), this study showed that community recovery is vital to the assessment of a successful individual and household recovery. Whether successful recovery is evidenced in the form of businesses operating nearby, the presence of community features like churches or harbors being in good, working order, or simply the adaptive and active use of spaces once occupied by humans, neighborhood and community recovery do not precede household recovery, rather they are formative of it.

A third contribution, theoretical in nature, relates to the meanings of recovery as commemoration and as betterment. Rather than two mutually supportive processes

occurring in tandem or two concurrent and unrelated processes, findings from this study exposed the tension that exists between commemoration and betterment, suggesting that a refinement of phase four in Kates' 10-10-10 model (Kates and Pijawka 1977) is warranted. The erasure of features within the core impact zone (Pais and Elliott 2008) precipitate these commemoration versus betterment struggles and reveal the spatiality of such tensions in long-term recovery. Evidence from this study shows that the concept of commemoration in recovery should be broadened to include commemoration of the place that existed pre-storm and not simply commemoration of the disaster event itself, as in the 10-10-10 model (Kates and Pijawka 1977, Kates et al. 2006). Such an expansion in the way commemoration is conceived in recovery acknowledges the intrinsic links between place and memory that drive individual-level assessments of community recovery. It also claims a foothold for the application of human geographical ideas (i.e., landscape, memory, authenticity) and participatory, feminist methods in future disaster recovery research.

Implementation of an intersectional approach to identity in recruiting and in qualitative analysis illuminates a fourth contribution of this study: the utility of higher-order socio-demographic information in conceptualizing recovery and making the process more efficacious for residents. There is a need for more robust socio-demographic indicators to anticipate how residents will assess recovery progress and outcomes. This study showed that life stage, place attachment, age and occupation, mobility, citizenship status, and migration experience were formative of resident's recovery standpoints and provided more explanatory power than mere race, ethnicity,

or gender breakdowns (NRC 2006). Information that intersects multiple constituent identities, specific to the study location, is required to inform local leaders on how to undertake projects that will be deemed successes. This contribution, therefore, is both methodological and practical in nature.

The National Disaster Recovery Framework (FEMA 2011) outlines nine core principles that guide recovery activities. Of these, four could receive better practical execution by adopting a place-based, intersectional approach: 1) individual and family empowerment, 2) leadership and local primacy, 3) resilience and sustainability, and 4) psychological and emotional recovery. Participatory methods that engage with the landscape through residents' situated vantage points not only help with emotional healing through empowerment (e.g., Wang and Burris 1994, McIntyre 2003), they also provide a localized forum for guiding leaders in community-level decision making. Methods for monitoring recovery that acknowledge residents' understandings and assessments also have the potential to expose ways in which community-wide efforts aimed to increase disaster resilience or improve environmental sustainability may undercut household-level resilience. Conversely, residents' own actions aimed at economic or infrastructure resilience may be found to attenuate community preparedness for future disaster events.

7.3 Limitations

The current study's research design is not without limitations. A lack of longitudinal inquiry is perhaps the study's largest flaw. Data on the meaning of recovery and participants' assessments of community recovery were only collected at only one

time step, so any findings about the temporal changes in the meaning of recovery or

even the evolution of differing standpoints on recovery must take this into account.

Likewise, this study does not show how community features used in residents' recovery

assessments might vary over time.   On the other hand, reflection on recovery after the

fact exposes processes that may be taken for granted by residents in the thick of

recovery. This type of memory-based study is essential to view alongside others that

rely on data collected at several points during the recovery process.

A second limitation is the study's failure to inquire specifically about residents

expectations for recovery. While the photo elicitation prompts and questions guiding

participatory mapping centered on visual and spatial evidence of recovery that was

occurring, residents' comments in the interview revealed that recovery was strongly

based on individual visions of place and the functions it should perform. Residents, in

effect, held mental maps of what their ideal recovered communities should look like,

but this study did not tap these mental maps explicitly as a point for comparison to what

was actually rebuilt. The inclusion of questions or prompts to elicit expectations for

recovery would be useful in future studies that attempt to gauge recovery success or

failure through the eyes of residents themselves.

A third limitation of the current study is the sheer volume of data generated by

the methods and the messiness of analysis. This study argued for the utility of assessing

the recovery process based on the visual landscape, and photographic data do present a

huge repository of recovery information. When the focus of visual evidence is on the

meaning of photographs, however, and not necessarily on their contents or location,

automated pre-processing of the data is prohibitive and qualitative analysis time-consuming.

Finally, case studies by their very nature have limited applicability when taken at face value, but they are essential to the genesis of new theoretical knowledge. Although specific instances of recovery, rebuilding, rehabilitation, and reoccupation cited in the post-Katrina Mississippi case are not generalizable, the meanings of recovery and the types of issues that frame long-term recovery could be. Similarly, metrics found to match with residents' recovery assessments in Mississippi could be helpful when applied to other areas recovering from catastrophic-level disaster impacts.

7.4 Future Research

The findings and limitations of this research mark paths for future inquiry. Drawing upon several examples of long-term commemoration versus betterment struggles at the household and community levels, future recovery research should examine the multi-scalar dynamics of resilience policy implementation, with a focus on local effects. Questions remain as to how community-wide policies are (or are not) translated into action by property owners and residents, and whether their efforts support or undermine sustainable development goals and disaster resilience benchmarks. Additionally, how might bolstering one form of resilience (i.e., economic, infrastructure) be detrimental to another form of resilience (i.e., social, community capital)? The long-term recovery and mitigation phases of the disaster cycle provide the best opportunities to investigate these processes and initiate change because places and populations are already undergoing rapid changes working toward stabilization.

The centrality of restoring function to impacted spaces and honoring local heritage and sense of place in rebuilding efforts underscore the significance of social memory in the disaster recovery process. Iconic landmarks and spaces, significant for cultural reasons, proved to be focusing points for conflict in long-term recovery. This finding demonstrates the need for future studies assessing not only the biophysical and social vulnerability of people who might be in harm's way, but also performing vulnerability assessments of cultural resources exposed to hazards, since they represent the place identities of an area's social communities. Such assessments should be key facets of pre-disaster recovery planning, with the potential for generating institutional resilience as common interest communities, community development corporations, non-profits, and planning bodies work together for a common goal.

A third avenue for future research emanates from findings on participant recovery assessments and methods used for gleaning spatial recovery information: the development of a recovery VGI app. Similar to *in situ* crisis mapping during the response phase of a disaster, current smartphone technology provides the means for collecting valuable recovery data from residents throughout the longer-term recovery process. In light of the difficulties of obtaining public opinion about recovery, the effectiveness of a place-based, visual approach to recovery used in the current study, and the need for methods for processing the vast amount of data produced by such an approach, a recovery VGI app could more efficiently translate public opinion into data for decision-making by municipal leaders, regional planners, and emergency managers at the state and county levels.

Regardless of the form recovery VGI technology takes, it is abundantly clear that its development, along with broader studies on recovery, must incorporate the concept of mobility. Understanding mobility patterns of different kinds (i.e., physical mobility, modes of transportation, circulation, activity space, social ascendancy, displacement, domestic and/or international migration) is vital in equitably representing residents' embodied views of their own recovering communities. To date, few studies examine multiple types of mobility in the recovery phase or note how they may work together to complicate the process for residents and decision makers. Future methodologies must also account for the movement of people in order to assess the stability and sustainability of recovering neighborhoods.

A number of other questions arise from this study's findings. Do disasters make places more or less public and democratic? How might multivariate clustering with self-organizing maps help organize place-based recovery assessments, perhaps gleaned through a VGI smartphone app? What is the sensitivity of participant-derived indicators to different agglomeration methods and weighting techniques? How might the meanings of recovery differ in a non-Westernized culture or in a developing country context? What intersections of identity might prove most meaningful in differentiating these meanings?

These lines of future recovery inquiry will undoubtedly continue to pursue the dual, guiding questions of "recovery for whom?" and "recovery to what?" that aim to better represent social and spatial recovery processes with equity as a goal. Findings from this study suggest that the inclusion of two important questions that presage

these, however: "recovery from where?" and "recovery to where?" The pre-disaster

place provides the geographic context and physical setting for the disaster to occur, with

residents situated in their various social locations. The place that is damaged by the

disaster, erased by its impacts, altered by human hands through recovery policy, and

either commemorated or forgotten by its people forms the visible record of post-

disaster recovery. This physical landscape acts as the stage for the next event.

Resilience, sustainability, memory, and identity are all bound up within residents'

constructed landscapes of the places rebuilt through successive disasters. Knowing the

place itself, both from above with indicators and from within through embodied

interaction, is a prerequisite for understanding the recovery process. This foundational

relationship secures a firm position for geography in the future study of disaster

recovery.

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Recruitment Letter

Dear Coastal Mississippi Resident,

My name is Ronald Schumann. I am a doctoral student at the Hazards and Vulnerability Research Institute within the Geography Department at the University of South Carolina. With support from the National Science Foundation (Award 1301830), I am conducting research as part of my doctoral dissertation, and I would like to invite you to participate.

I am studying resident perspectives on long-term community recovery following Hurricane Katrina along the Mississippi Coast. Your insights and experiences will help improve methods for assessing recovery progress at the local level after future disasters.

What is asked of you: If you decide to participate, you will be asked to meet with me to complete a short survey, independently take pictures of recovery in your community, and participate in a follow-up interview and mapping exercise at a later date. The first meeting should last about 45 minutes. The follow-up meeting should last between one and two hours. Both meetings will take place at a mutually agreed upon time and place. The interview and mapping exercise will be audio recorded so I can accurately reflect on what is discussed. Only I and my faculty advisor will have access to the recordings. You will receive compensation for photo processing costs as part of the study. There is also a small monetary incentive for participating.

Voluntary participation and confidentiality: Participation in this study is completely voluntary. You may opt not to participate at all. Should you choose to participate, you are also free to withdraw from the study at any time. The responses you give will be held confidential. Your name and your responses will never be linked. They will be stored separately on password protected computers behind locked doors. The results of the study may be published or presented at professional conferences, but your identity will not be revealed.

I am happy to answer any questions you may have about this study. You can reach me by phone (504.450.4793) or email (schumanr@email.sc.edu). You may also direct

questions to my faculty advisor, Dr. Susan Cutter (scutter@sc.edu). If you have any questions about your rights as a research participant, you may contact the Office of Research Compliance at the University of South Carolina at 803.777.7095. If you or someone you know would like to participate, please contact me to set up a meeting. Thank you for your consideration.

Best regards,

Ronald L. Schumann, III
Ph.D. Candidate
Hazards and Vulnerability Research Institute
Department of Geography
University of South Carolina

Research on Long-Term Recovery:
Participants Wanted

Coastal Mississippi residents are needed to take part in doctoral dissertation research on long-term community recovery. This research will help improve methods for assessing recovery progress at the local level after future disasters.

What is asked of participants?
Residents are asked to share their recovery experiences since Hurricane Katrina through photographs and an interview. If you decide to participate, we will set up two meetings at a time and place convenient for you. The first meeting should last no more than 45 minutes, and the second will be between one and two hours long. At the first meeting, you will be asked to complete a short survey, and you will be given a prompt that you will use to independently take pictures of recovery in your community. At the second meeting we will discuss your photos in an interview, and you will take part in a short mapping activity.

Participant Pool:
A diverse pool of experiences is sought. Men and women of all ages, races, and occupations are needed from Hancock, Harrison, and Jackson Counties. You must be at least 18 years of age to participate. Space is limited.

Confidentiality:
Your participation in this study is confidential. Your name and any responses you give will be stored separately behind locked doors and on password protected computers. The findings of this research may be presented in academic journals and at professional conferences, but your name will never be released.

Compensation:
Photo processing costs are covered as part of the study. Participants who complete the entire study receive $40.

To find out more information about this study, or if you or someone you know would like to participate, please contact:

Ronald Schumann
Ph.D. Student
Hazards and Vulnerability Research Institute
Department of Geography
University of South Carolina
Phone: 504.450.4793
Email: schumanr@email.sc.edu

1) Impacts
- Tell me about how you and your household were affected by Katrina.
- What impacts did your neighborhood receive?

2) Secondary Impacts
- Were you affected by the BP Oil Spill, Hurricane Isaac, or the Economic Downturn? If so, how?
- Do you know anyone who was affected? How so?
- What effect did these secondary events have on the community?

3) Assistance
- Did you receive aid or help? Tell me about the process.

4) Recovery Process
- How long did it take to get back into your home/business/church?
- What have been the biggest obstacles to recovery facing your community?
- What were the big turning points for you?
- Was anyone you know (in your community) displaced? Where did they go? Are they back / planning to return?

5) Long-Term Recovery
- What are the big issues facing your community in long-term recovery now and over the next few years?
  - Name the top three.
  - How would you prioritize these issues?
- On a scale from 0 to 100 percent, how complete is the recovery in your neighborhood? In your community?

6) Meaning of recovery
- What does "recovery" mean to you? Are you recovered now?
- When will you recover, and how will you know that recovery is complete?

7) Specific Asks: these were prompted as I knew more about issues facing each municipality.

- How has _____ affected the recovery of your community?
  - Insurance rates / Wind pool / Homeowner's
  - New base flood elevations
  - Biggert-Waters / removal of grandfather clause
  - Biloxi zoning laws/no zero lot lines/10 foot setbacks
  - Property inheritance issues
  - Overgrowth / abandonment / blighted properties / lots for sale
  - New community centers / parks
  - Volunteer labor
  - FEMA monies / Governor's Aid Program / CDBG monies
  - Mississippi Development Authority monies
  - Improvements at the Port of Gulfport
  - Downtown Gulfport building façade renovations
  - Biloxi baseball stadium
  - New casinos / 800 foot line
  - Oyster / fishing moratorium
  - Federal Case Management program

APPENDIX C: ESL FOCUS GROUP GUIDE

Consent:
Translators read the following consent script in Spanish and Vietnamese:

"Thank you for volunteering to participate in this research on community recovery after Hurricane Katrina along the Mississippi Coast. This study will help improve methods for assessing recovery progress after future disasters. Your participation is completely voluntary, and you can choose not to participate or withdraw at any point. The responses you give and your names will be confidential, but the results of the study may be published or presented at professional conferences."

Opening:
"I am interested in recovery and how places change after a disaster. There is often a lot of movement of people afterward, and I am interested in your experiences as newcomers to this recovering area."

Warm Up:
Focus group members wrote their first name and country of origin on self-adhesive nametags. We went around the room making self-introductions using the following prompts:
1. Tell us your name and what country you are from.
2. When and why did you move to Biloxi?

Guiding Questions:
1. Tell me about the biggest challenges you and your family have faced in getting settled here in Biloxi.
    a. Did the recovery from Hurricane Katrina impact your situation?
    b. How have you tried to overcome these challenges?

2. Tell me about the sources of support that have helped you get settled here.
    a. What people or organizations have been important?
    b. Who helped find work?
    c. Who helped find housing?
    d. Who helped find services and social activities?

3. What are the biggest changes you've noticed in the area since you moved to the Mississippi Coast?
    a. Any changes in the people (attitudes / types of people you meet)?
    b. Any changes in the city (buildings, natural features, services or businesses)?
    c. Any change in the sense of place (culture)?

4. Do you think Biloxi / the Mississippi Coast will be a permanent home or a temporary stop for you and your family? Why?

Mapping Exercise:

The large area map of the Mississippi Coast was posted on a bulletin board. Focus group members were given markers and the following prompt:
- Label a place that is important to your community.

Focus group members were given five minutes to come up to the map and mark 1-2 places. After everyone has returned to their seats, we then went around the room sharing each other's places:
- Tell me what you marked and why.

Closing:

Focus group participants were given one last opportunity to share anything else they would like regarding disaster recovery or their experience as immigrants moving to Mississippi. Participants were also given the opportunity to ask questions of the researcher at this point.

Questions for the researcher from the audience from the two focus groups included:
1. What is your ethnic background? Do you work with immigrants often? How have you experienced racism?
2. Where are you originally from and why did you come to Mississippi?
3. What is your educational background, and how did you get interested in this topic?
4. What are you going to do with our opinions?

Participants were thanked for their participation. The researcher also discussed why their opinions mattered and how they would be incorporated in the larger research project. After the focus group, nametags were collected and retained in a confidential notebook as a record of focus group participants. This record was stored securely in a locked filing cabinet in a locked office in accordance with the data management plan.

Pseudonym	Race/ Ethnicity	Gender	Age	City	Interview Date
Anna*	White	Female	28	Long Beach	30-Jun-13
Brad	White	Male	43	Biloxi	31-Jan-14
Cal**	White	Male	77	Waveland	16-Nov-14
Carol***	White	Female	Young Old (60s)	Diamondhead	26-Nov-13
Chantel	Black	Female	50	Pass Christian	31-Jan-14
Cong	Vietnamese	Male	61	Biloxi	14-Nov-13
Dave	White	Male	41	Waveland	31-Jan-14
Dieu	Vietnamese	Female	44	Biloxi	25-Nov-13
Elaine	White	Female	52	Pass Christian	30-Jan-14
Ellen	Black	Female	61	Gulfport	22-Nov-13
Fred	White	Male	61	Pass Christian	23-Dec-13
Gina	Black	Female	Middle Aged (60s)	Pass Christian	22-Nov-13
Hanh	Vietnamese	Female	65	D'Iberville	24-Nov-13
Jared	White	Male	28	Waveland	31-Jan-14
Jim***	White	Male	69	Diamondhead	26-Nov-13
Justin	White	Male	34	Gulfport	26-Nov-13
Kimberly*	White	Female	28	Long Beach	30-Jun-13
Linh	Vietnamese	Female	21	Biloxi	30-Jan-14
Marcel	Black	Male	72	Biloxi	30-Jan-14
Mary	White	Female	67	Biloxi	22-Nov-13
Natalie	White	Female	58	Waveland	30-Jan-14
Olivia†	White	Female	70	Pass Christian	26-Nov-13
Patricia	Black	Female	66	Biloxi	23-Nov-13
Paul††	White	Male	Old (70s)	Waveland	27-Nov-13
Quy	Vietnamese	Female	64	Biloxi	14-Nov-13
Rose	White	Female	73	Waveland	14-Nov-13
Royce	White	Male	46	Vancleave	21-Nov-13
Ruby**	White	Female	Old (70s)	Waveland	16-Nov-14
Sonya	White	Female	67	Gulfport	31-Jan-14
Stephen	Black	Male	Middle Aged (40s)	Long Beach	21-Nov-13

Pseudonym	Race/ Ethnicity	Gender	Age	City	Interview Date
Thomas	Vietnamese	Male	20	Ocean Springs	30-Jan-14
Vien	Vietnamese	Male	67	D'Iberville	15-Nov-13
Vincent	Black	Male	26	Ocean Springs	21-Nov-13
Wanda	Black	Female	55	Biloxi	16-Nov-13

*Pilot participants

**Married couple, husband and wife interviewed, demographics and photos from husband only

***Married couple, husband and wife interviewed, demographics from husband only, no photos

†Did not complete photos due to health, scheduling

††Interview only

Pseudonym	Race/ Ethnicity	Gender	Occupation / Organization	Interview Date
Allison*	White	Female	Public housing	Aug 2013
Connie	Black	Female	Resident	Aug 2013
Cora**	Black	Female	Faith-based NGO	Aug 2013
Dean	White	Male	Public schools	Sept 2013
Eric	White	Male	Clergy	Aug 2013
George***	White	Male	Resident	Sept 2013
Ginny**	White	Female	Faith-based NGO	Aug 2013
Harold***	White	Male	Resident	Sept 2013
Julie†	White	Female	Faith-based NGO	Aug 2013
Mai	Vietnamese	Female	Social advocacy NGO	Nov 2013
Paula†	White	Female	Faith-based NGO	Aug 2013
Ruth***	White	Female	Resident	Sept 2013
Shannon	White	Female	Public schools	Sept 2013
Sheila	Black	Female	Social advocacy NGO	Sept 2013
Will*	White	Male	Public housing	Aug 2013
*Same office, interviewed together				
**Same office, interviewed together				
***Family, interviewed together				
†Same office, interviewed together				

Appendix F: Background Survey Instrument

1. **Where do you currently live?**

   Street Address: _____

   City, State Zip: _____

   Neighborhood: _____

   Did you live in the same location before Hurricane Katrina?   ☐ Yes   ☐ No

   If no, where?

   Street Address: _____

   City, State Zip: _____

   Neighborhood: _____

2. **What impacts did your home receive from Hurricane Katrina?**
   (Mark all that apply)
   ☐ Wind or Roof Damage
   ☐ Storm Surge
   ☐ Fresh Water Flooding
   ☐ Water Damage Not from Flood or Surge
   ☐ Trees Down or Other Damage to Property

3. **Did your household have any impact from Hurricane Isaac?**   ☐ Yes   ☐ No
   (Mark all that apply)
   ☐ Wind or Roof Damage
   ☐ Storm Surge
   ☐ Fresh Water Flooding
   ☐ Water Damage Not from Flood or Surge
   ☐ Trees Down or Other Damage to Property

4. **Did your household have any impact from the BP Oil Spill?**   ☐ Yes   ☐ No
   (Mark all that apply)
   ☐ Tar Balls / Oil Slick on Property or Nearby
   ☐ Health Impacts
   ☐ Financial Impacts
   ☐ Reduction in Work, Wages, or Hours
   ☐ Other: _____

5. **Where do you currently work?**

   Employer: _____

   City/Town: _____

6. **Describe your current position / type of work:**
   _____

7. **In what industry is your job?**
   _____

8. **Which best describes your job?**
   ☐ Hourly ☐ Salary ☐ Commission

9. **Did you work in the same job during Hurricane Katrina?**   ☐ Yes   ☐ No
   If no, where?

   Employer: _____

   City/Town: _____

10. **Describe your position then:**
    _____

11. **In what industry was your job?**
    _____

12. **Which best describes this job?**
    ☐ Hourly ☐ Salary ☐ Commission

13. **Do you have any other sources of income?**
    (i.e., Social Security, Disability, Food Stamps, Child Support)
    _____

14. **What forms of insurance did you have before Hurricane Katrina?** *(Mark all that apply)*
    ☐ Homeowner's Insurance
    ☐ Renter's Insurance
    ☐ National Flood Insurance
    ☐ State Wind Pool
    ☐ Other: _____
    ☐ Uninsured

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15. **What forms of recovery assistance did you receive?**
    (Mark all that apply)
    ☐ FEMA Individual Assistance
    ☐ MEMA Assistance
    ☐ SBA Loan
    ☐ Private Bank Loan
    ☐ Help from family & friends
    ☐ Help from volunteer / charitable groups
    Specify: _____
    ☐ Other: _____

16. **How long have you lived on the Mississippi Coast?** _____ *years*

17. **What is your hometown?**

    City/Town: _____

    County: _____

18. **What is your age?** _____ *years*

19. **How would you define your race or ethnicity?**

    _____

20. **Which describes your marital status?**
    ☐ Never married, never lived with a partner
    ☐ Married or living with a partner
    ☐ Separated
    ☐ Divorced or formerly lived with a partner
    ☐ Widowed

21. **Are you male or female?** ☐ Male ☐ Female

22. **How many children do you have?** _____

23. **What ages were they at the time of Hurricane Katrina?**
    (Mark all that apply)
    ☐ Infant
    ☐ Preschool Age
    ☐ Elementary Age
    ☐ High School Age
    ☐ College Age or Young Adult

24. **How many of your children were living with you before Hurricane Katrina?** _____

25. **How many people were in your household before Hurricane Katrina?** _____

26. **How many people are currently in your household?** _____

27. **Are you responsible for other people such as a parent, aunt, uncle, or other elderly relatives? If so, who?**

    _____

28. **What is your household income?**
    ☐ Less than $21,000
    ☐ $21,000 - $41,999
    ☐ $42,000 - $62,999
    ☐ $63,000 - $83,999
    ☐ Over $84,000

29. **Which of the following best describes your current education?**
    ☐ Less than high school
    ☐ Some high school
    ☐ High school diploma / G.E.D.
    ☐ Vocational/Trade/Business School
    ☐ Some college or 2 year degree
    ☐ Finished 4 year (Bachelor's) degree
    ☐ Master's or Doctorate degree

30. **If you relocated multiple times between Hurricane Katrina and now, please indicate these other places of residence below:**

Address 1:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 2:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 3:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 4:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 5:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 6:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 7:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

Address 8:

Street Address: _____

City, State Zip: _____

Neighborhood: _____

From (Month/Year):_____

To (Month/Year):_____

About the Interview Process
This interview guide includes all questions posed to residents during the second meeting. Questions are a combination of those used to interview key informants in initial interviews, photo prompts from the photo elicitation instructions, and more detailed clarification questions on residents' own meanings for recovery.

The interviews were conducted in a semi-structured style, so the choice of which questions to ask or the wording of the questions varied slightly according to resident responses on the background survey. The photographs each resident provided also steered the conversation. Questions were also asked as prompts to invite reflection on the spatiality of community recovery during the participatory mapping exercise. These are grouped together below in a separate section.

Interview Questions

1) Impacts (optional warm-ups if there was no initial meeting beforehand)
- Tell me about how you and your household were affected by Katrina.
    - Did you evacuate? Where did you go?
    - Were you displaced? Describe that process.
    - When did you decide to return?
- What impacts did your neighborhood receive?

2) Secondary Impacts
- Were you affected by the BP Oil Spill, Hurricane Isaac, or the economic downturn? If so, how?
- Do you know anyone who was affected? How so?
- What effect did these secondary events have on the community?

3) Assistance
- Did you receive aid or help? Tell me about the process.
- What were your primary sources of aid?

4) Recovery Process

Community Level
- How do you define your own "community"?

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- o Where is it?
- o Who is included?
- What have been the biggest obstacles to recovery facing your community?
- How has the community changed as a result of the recovery process?
  - o Has there been a change in who lives here?
  - o Has the sense of place changed?
  - o Have the social dynamics changed?
  - o Have there been changes in the natural environment?
- Do any of your photos show tension between groups or organizations during recovery?
  - o What is the cause of these tensions (racism, class differences, government regulations, personality conflicts)?
- Choose one (1) photograph that shows the aspect of your community's recovery that you are <u>most proud</u> of. Why?
- Choose one (1) photograph that shows the aspect of your community's recovery that you are <u>least proud</u> of. Why?
- Was anyone you know (in your community) permanently displaced?
  - o Where did they go?
  - o Are they back / planning to return?

Household / Individual Level
- How long did it take to get back into your home/business/church?
- What have been the biggest challenges for you in recovery?
- What were the big turning points for you?
  - o Tell me about the high points and low points in the process.
  - o Did faith or spirituality play a role in recovery?

5) Long-Term Recovery

Community Level
- What are the big issues facing your community in long-term recovery now and over the next few years?
  - o Name the top three.
  - o How would you prioritize these issues?
- On a scale from 0 to 100 percent, how complete is the recovery in your neighborhood? In your community? On the Mississippi Coast?
- (If participant lived through Hurricane Camille as well): How did the recovery after Camille differ from the recovery after Katrina?

6) Meaning of recovery
- Choose one or two (1-2) photographs that best represent the idea of "community recovery."
  - o Why did you pick these?

- o Tell me about what is happening.
- What does "recovery" mean to you? Are you recovered now?
- When do you expect you will recover?
- How will you know that recovery is complete?
- Have you ever heard of recovery to a "new normal"?
  - o Has the Mississippi Coast reached a "new normal"?
  - o Tell me what that phrase means to you.
- Is the Mississippi Coast better prepared for future disasters?
- Are you familiar with the word "resilience"?
  - o What is your understanding of the concept?
  - o Has the Mississippi Coast become more or less resilient through the recovery process? Why?

7) Closing
- Do you have any other thoughts on recovery that you would like to share?
- What advice would you offer to others who are going through the disaster recovery process?

Participatory Mapping Exercise

Map Orientation:
Using a (PURPLE) marker,
- Label your house
- If it helps, you can also label your place of work on the map.

Using a (BLACK) marker,
Shade the places where recovery has been fast, in your opinion.
- How did you know recovery was happening?
- What kind of recovery was this?
  - o Was this demolition or reconstruction?
  - o Was this economic activity?
  - o Was this a place that people congregated?
- Why do you think these places showed signs of recovery first?

Using a (BLUE) marker,
Shade places where recovery has been slow, in your opinion.
- How did you know recovery was happening in these places?
- What kind of recovery was this?
  - o Was this demolition or reconstruction?
  - o Was this economic activity?
  - o Was this a place that people congregated?
- Why do you think these places were slow to show signs of recovery?

Using a (GREEN) marker,
Shade places that have been most successful in recovery. (Places you are satisfied with / "good" recovery, in your opinion).

- Is recovery complete here? How do you know this?
- What is going on here?
    - Have structures been rebuilt?
    - Has business activity returned?
    - Are people living, working, or recreating here?
    - Does this place look and feel like it used to, or better than it used to?

Using a (RED) marker,
Shade places that have been the most unsuccessful in recovery. (Places you are dissatisfied with / "bad" recovery, in your opinion).

- Do you think recovery has stalled in these places, or is it still occurring?
- How do you know?
- What seems to be lacking in these places?
    - Have structures been rebuilt?
    - Has business activity returned?
    - Are people living, working, or recreating here?
    - Does this place look and feel like it used to, or is it different?

Closing

Thank you very much for your time. I really appreciate your willingness to share your perspective. By sharing your experience, you will help us to better understand the long-term recovery process on the ground and improve how we assess the progress of neighborhood and community recovery after future disasters.

- Is there anyone you know who might be willing to participate?
- If I have any further questions, would it be okay to contact you by phone or email?

Thank you again for sharing your story!

[Present participant with compensation ($40.00)]

Directions:
During the next few weeks, use either your camera or the disposable camera provided to respond to the following two prompts. You should take 10-15 pictures for each.

1. *Go and take pictures of things (objects, people, landmarks, scenes, locations, etc.) <u>around your house</u> that show the recovery that has taken place or is happening now.*

2. *Go and take pictures of things (objects, people, landmarks, scenes, locations, etc.) <u>around your neighborhood and community</u> that show the recovery that has taken place or is happening now.*

As you begin to plan your photographs, reflect on:
- What does "recovery" from disaster mean to you?
- How do you define your own "community"? (Where is it? Who is included?)
- What were the biggest challenges faced by you, your family, and your neighbors while recovering from Hurricane Katrina?
- What were the biggest turning points during recovery for your family and your community?
- How has the "sense of place" or "feel" of your community and the Mississippi Coast, in general, changed because of the recovery process?

After you have taken your pictures:

<u>If you used your own camera:</u>
Please keep the photos on your camera until the next meeting. Bring the cords so we can hook up your camera to my computer and view the images during our next meeting. You may also download your pictures onto a CD or removable USB (Flash) drive.

<u>If you used a disposable camera:</u>
Please let me know when you have finished taking pictures. I will arrange a time to come pick up your camera, and I will get the prints developed for our next meeting. You will receive a copy of your photos to keep.

Questions?

If you have any questions while completing this exercise, please don't hesitate to contact me by phone (504.450.4793) or email (schumanr@email.sc.edu). I look forward to chatting with you about your photos during our next meeting. Thank you for your continued participation!