

PROGRAM COMPARISON REPORT

RAPID DISASTER RECOVERY HOUSING PROGRAM
JANUARY, 2015

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PROGRAM COMPARISON REPORT INTRODUCTION

The Program Comparison Report serves as an appendix of sorts and includes materials that underlie the actions recommended in the Policy Recommendations and undertaken in the Technical Guide. The Program Comparison Report was generated by identifying post-disaster reports for every hurricane that has struck the Gulf and Atlantic Coasts since 2005 (including Katrina and Rita). This yielded forty (40) reports and articles, most of which covered only pieces of the recovery effort (case management, design, construction, etc.). These documents were systematically compared to one another to develop an understanding of issues and obstacles that have arisen repeatedly across comparable disasters as well as issues that may be more context-dependent.

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1.0 INTRODUCTION

The Rapid Housing Recovery Pilot Program (known as RAPIDO in the Lower Rio Grande Valley) is part of a state directed initiative to test ideas for the production and replacement of housing of federally declared disasters in Texas (State of Texas 2009). The pilot program is administered through the Texas General Land Office (GLO), which is tasked with distributing allocations of Community Development Block Grant Disaster Recovery (CDBG-DR) from the U.S. Department of Housing and Urban Development (HUD) to assist households recovering from Hurricanes Dolly and Ike in 2008. When Hurricane Ike hit Galveston Island and the Houston metropolitan area, it was the most destructive storm since the infamous 1900 storm. When Hurricane Dolly hit the south Texas coastline it was considered the most destructive storm to hit the Rio Grande Valley in 41 years. Both hurricanes left entire neighborhoods underwater and many families were displaced due to the severe damage of housing stock. Texas entered into a second phase of housing disaster recovery (DR2), which uses guidelines listed in the Natural Disaster Housing Reconstruction Plan created by an advisory committee in late 2010.

PROGRAM COMPARISON REPORT INTRODUCTION

Along with DR2, the temp-to-perm program goals are to design a 'temp-to-perm' home that would allow residents to participate in the outcome of their future permanent house. The temporary-to-permanent concept (i.e. temp-to-perm) is a disaster housing solution, whereby a temporary house is constructed rapidly after a disaster and a permanent house would grow and be constructed from the temporary house "core" component over time. The temp-to-perm RAPIDO Demonstration Project is meant to provide a single-housing solution that will meet both the needs of temporary and permanent housing processes. To do this, the demonstration program proposes the construction of a temporary house within 30 days of a disaster to transition into a permanent house within 90 to 120 days. The temp-to-perm RAPIDO Demonstration Project will construct 20 homes that test the feasibility of large-scale production with local and resident input. Houston, Galveston, and the Lower Rio Grande Valley have been identified as participants and funds are distributed through their respective Council of Governments (COG). Each COG is responsible for administering the pilot program in their community either independently or through contracts with other organizations. Specific communities were targeted within Houston, Galveston, and the Lower Rio Grande Valley in an effort to help residents that were originally overlooked during the first phase of recovery efforts in 2008. The program develops homes that emphasize the quality design, outreach, and education, in order to create shared vision and goals that are accepted by the community.

In order to successfully deploy the temp-to-perm housing solution four teams were created--Outreach and Community Participation, Case Management and Social Services, Construction and Design, and Policy--to identify strengths, weaknesses, strategy options, and policy implications. Teams gathered monthly to review progress, and seek insight from team advisors regarding policy development. The result was the creation of three interrelated reports: the Policy Recommendations, the Technical Guide, and this Program Comparison Report.

The DRH Program Comparison Report provides context and background to housing recovery. First, it describes the disaster management cycle and the role recovery plays after a disaster and as mitigation for the next disaster. Second, it specifically describes housing recovery and the evolution of federal, state, and local governments' responsibilities in disaster recovery. Next, it analyzes forty articles and case studies that address housing recovery. Five areas where gaps may occur in the temp-to-perm housing process were identified:

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- Damage Assessments,
- Outreach,
- Case Management,
- Design, and
- Construction.

The analysis quantifies these categories based on understood obstacles and promising practices in the literature. Several themes emerge where gaps occur and offer best practice solutions within the five categories including:

- Communication
- Proper personnel and training
- Use of community-based organizations
- Community participation
- Multi-sector partnerships and collaboration
- Knowledge and mapping of the vulnerable populations
- Pre-procurement of services
- Long-term planning pre-disaster

With these themes, the Program Comparison Report provides evidence that supports the Policy Recommendations and the Technical Guide. These documents describe a housing recovery program for Texas that will speed the transition from temporary housing to permanent housing as a way to foster resilience in Texas communities and abate social and economic impacts.

DISASTER MANAGEMENT PHASES

2.0 DISASTER MANAGEMENT PHASES

Over the years, disaster management has moved beyond the focus of the emergency response itself and toward an understanding of the phases a community should go through before, during, and after a disaster. The impacts of disasters can linger for years and the work of minimizing impacts can be broken down into four phases of disaster management--mitigation, preparedness, response and recovery (Phillips, 2009). Planning for each phase should be ongoing to reduce the overall disaster impacts. These phases have also been utilized to allocate programmatic tasks and appropriate funding.

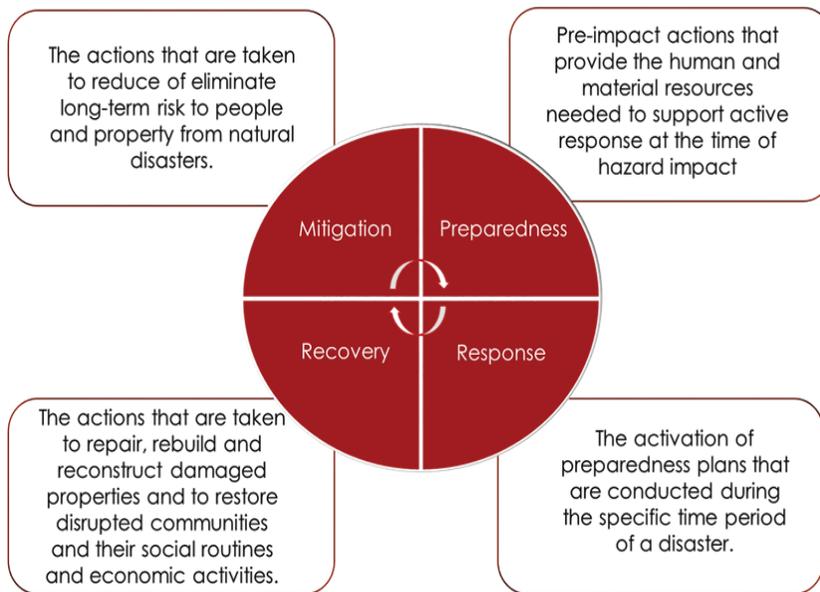


Figure 1. Disaster Management Cycle

2.1 MITIGATION

All activities that reduce or eliminate hazard exposures or minimize their effects. Mitigation activities are designed to reduce the impact of disasters by introducing two main reduction methods: structural mitigation and non-structural mitigation. Structural mitigation includes structural hardening activities to absorb disaster impacts, such as infrastructure improvements, levees, dams, seawalls, etc. Non-structural mitigation activities can include zoning and land use controls to prevent occupation of high hazard areas. Other non-structural activities can include educational programs, insurance programs, warning systems, etc¹.

1. For a review of mitigation strategies, see Masterson, J.H., W.G. Peacock, S. Van Zandt, H. Grover, L.F. Schwarz, and J.C. Cooper, Jr. 2014. *Planning for Community Resilience: A Handbook for Reducing Vulnerability to Disasters*. Washington, DC: Island Press.

DISASTER MANAGEMENT PHASES

2.2 PREPAREDNESS

Preparing to handle an emergency event. Preparedness activities include planning, coordination between agencies, training programs, and assessments on all the necessary elements that will be needed during the response phase. Typical preparedness strategies include recruiting personnel for emergency services, the development of aid agreements and MOUs (Memoranda of Understanding), trainings and education efforts, conducting exercises to test the capacity of the existing plan, and coordinating with community-based organizations that provide safety nets for the most vulnerable.

2.3 RESPONSE

Dealing with the event of the disaster. Emergency response in the US shows a gradual expansion of government involvement as local and state responders require support. Response activities focus on saving lives. The main activities include: search and rescue, providing food, shelter and clothing, and the transition to long-term recovery. For example: the management of donations and volunteers, conducting damage assessments, securing temporary housing, restoring lifelines, and clearing debris.

2.4 RECOVERY

Working to restore communities to previous or an improved condition. Many activities can be considered as part of the recovery process. For example: rebuilding, reconstruction, restoration, rehabilitation, restitution are considered components of disaster recovery.

Short-term recovery -calls for temporary measures to get critical services and facilities up and running to a functional state as well as efforts to house affected populations. Short-term recovery can take days to weeks after the disaster (Haas, Kates, & Bowden, 1977).

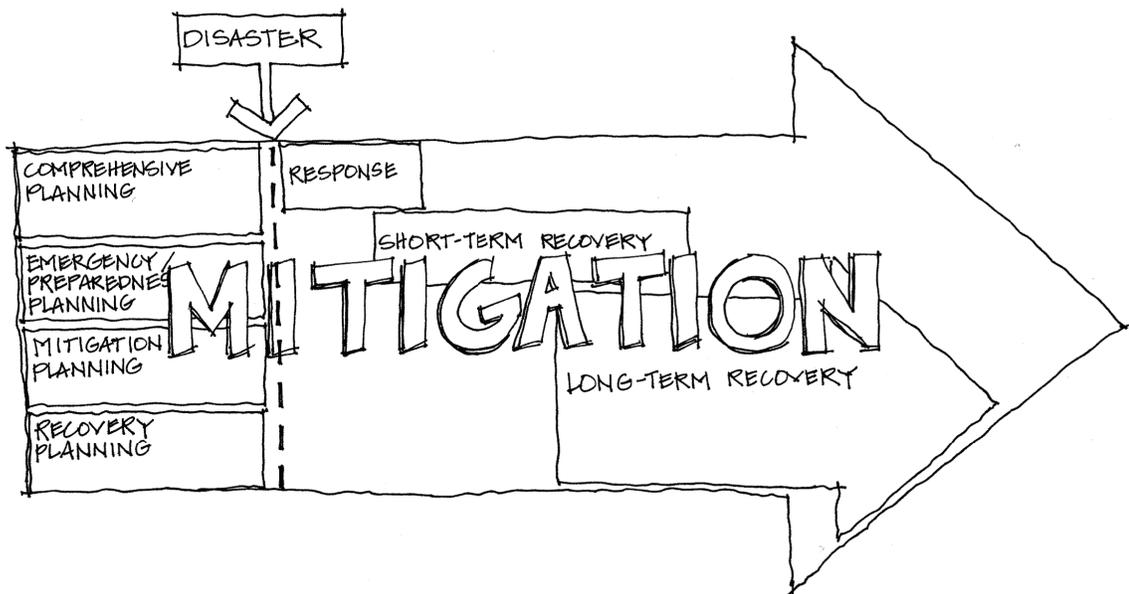
Long-term recovery - focuses on reconstruction and returning a community to a full operational state, usually lasting several months to years after the disaster (Haas, Kates, & Bowden, 1977; Masterson, Peacock, Van Zandt, Grover, Schwarz, & Cooper, 2014).

Typical recovery activities include disaster debris cleanup, financial assistance to individuals and governments, rebuilding of infrastructure and key facilities, full restoration of lifeline services, housing recovery, and health care.

DISASTER MANAGEMENT PHASES

While the disaster management phases, as displayed in Figure 1, have allowed practitioners and researchers to visualize the cyclical nature of activities for disasters, it does not fully portray the interconnectedness of each disaster phase. The following image (Figure 2), attempts to reimagine the disaster phases along a timeline. Prior to the disaster itself, planning activities should take place in communities. Plans to mitigate, prepare to respond to, and recover from disasters, along with consistency in city and regional plans--such as comprehensive plans--is critical. Mitigation activities should be ongoing in a community, to ultimately eliminate the exposure to hazards all together. The response to the disaster, is relatively short in comparison to other phases, usually lasting between days and a few weeks. Recovery is one of the longest phases due to short-term and long-term recovery activities. Short-term recovery can begin during the response and should transition resources to address temporary solutions. Long-term recovery takes much longer to achieve, anywhere from months after a disaster to years. Traditionally, most disaster planning and activities have focused on the response and preparedness of the response. While preparedness and response is a critical component and saves lives, the disaster literature points to a needed emphasis on mitigation and recovery planning and activities.

Figure 2. Mitigation Arrow



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3.0 HOUSING RECOVERY

Housing recovery is a cornerstone to the whole community's recovery. As anyone who has experienced a disaster knows, the road back to permanent housing is long. Four typical phases of housing recovery, identified by researcher EL. Quarantelli, are emergency sheltering, temporary sheltering, temporary housing, and permanent housing (1995; see Figure 3).

Emergency sheltering is typically sought out for protection from a disaster and in the immediate aftermath of an event. Temporary shelter refers to structures used for a short period during the initial displacement period. Depending on the severity of the disaster event, individuals may be able to return home after this period. Typically, disaster victims transition from temporary shelters to temporary housing until permanent housing is established. Temporary houses are typically more private facilities for individuals and families to facilitate the establishment of daily routines. It is during the temporary housing phase, that the household begins to recover and reestablish a sense of normalcy in their lives (Johnson, 2007). Most remember the aftermath of Hurricane Katrina and large number of trailers for disaster victims. Trailers and other temporary structures are considered temporary housing. During this time, individuals and families are applying for permanent housing assistance to make needed repairs or to replace damaged homes. The temporary housing phase can drag on for years in some cases, and can become somewhat of a default permanent housing solution. Permanent housing is the fully recovered housing situation and the goal for communities and households.

Ideally, permanent housing, that meets all the daily needs of residents, is achieved as soon as possible following a disaster event. As survivors move through these sheltering and housing phases they progressively reestablish daily routines. The transition between these phases often involves further disruption of daily life and activities making it difficult for survivors to fully recover. The rebuilding of these routines is directly linked to the quality of housing obtained throughout the recovery process.

There are many difficulties that occur when transitioning from temporary to permanent housing. These difficulties are not unique to just the United States and "researchers all over the world have found that many households simply converted temporary housing into permanent housing because they lacked sufficient resources to procure or reconstruct permanent housing" (Masterson et al.,

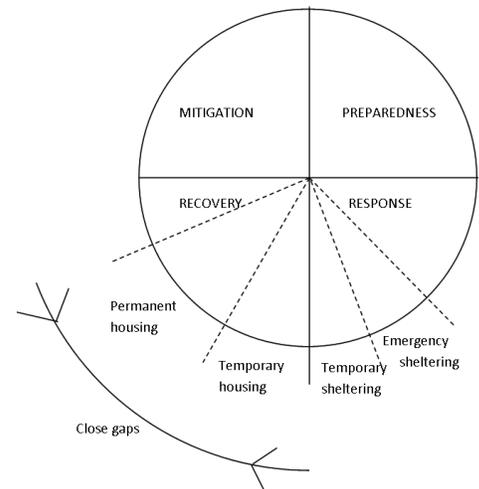


Figure 3. Housing Cycle

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2014). Some populations face hardships before disasters that make them less able to prepare for, respond to, and recover from disasters. Marginalized populations before disasters have a more difficult time recovering from disasters due to perhaps unstable incomes, insufficient savings, access to enough credit or perhaps enough technical knowledge to expedite the process. Such populations are at greater risk of experiencing longer periods of displacement. There is also the possibility that temporary housing could become permanent when displaced households cannot, or refuse to return to their pre-disaster home (Bolin 1994; Bolin and Stanford 1991; Haas, Kates, and Bowden 1977; Masterson et al, 2014). The amount of time varies greatly in the transitioning from sheltering to housing due to the amount of resources one has (Peacock, Dash, & Zhang, 2005). A program to support a temp-to-perm housing solution must be more than just a basic solution. This should provide what is required to return to normal life, such as proximity to the former place of residence, the desired support structure of the neighborhood to maintain successful living and guidance on the procedures and process to lead to permanent housing (Johnson, 2007). Due to these difficulties, the process can range anywhere from weeks to months and even years.

3.1 THE EVOLUTION OF RECOVERY IN THE UNITED STATES

In 1974, Congress passed the Disaster Relief Act to establish a process for federal assistance to affected communities and the Federal Emergency Management Agency (FEMA) was established in 1979. FEMA brought together many agencies and departments under one roof to handle emergency and disaster related issues in the United States. The original principles of FEMA were to, 1) anticipate, prepare for, respond to major civil emergencies; 2) use all available resources most efficiently; 3) be extensions of missions of current agencies, whenever possible; and 4) closely link hazard mitigation activities with emergency preparedness and response functions (Ad Hoc Subcommittee on Disaster Recovery, 2009). The focus was on effective response to emergencies and disasters, the preparation for the response, and the mitigation of hazards to ultimately reduce and eliminate the need for response. Recovery was not a part of the original focus, in and of itself.

In 1988, the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) established federal disaster relief policies and procedures. Most federal disaster policies and practices today

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stem from this piece of legislation, which described the need and procedures for a managerial framework of disaster response under a set of Emergency Support Function (ESF) annexes within the Federal Response Plan. Originally there were twelve annexes, each annex describing agencies, departments, and organizations that play a role and are to be 'activated' based on the characteristics of the disaster and the need of the public. This framework builds off the philosophy that disasters ultimately occur at the local level, where emergency responders are on the ground to provide support (Perry & Lindell, 2007). The emergency support functions (ESFs) were intended to be a logical extension of the daily responsibilities of local emergency managers, police and fire departments and other response-oriented fields (Quarantelli, 1999). If the disaster is at a scale that goes beyond the capacity of local agencies, the state's ESF agencies are activated to provide support. If the scale of the disaster goes beyond the capacity of state resources, federal ESF agencies are activated to provide support. Generally, FEMA pursues the role as a partner to states and tribal nations to facilitate coordination or response and relief efforts. However, recovery was not specifically addressed in the legislation.

Today there is little coordination between federal, state and local organizations for recovery, in part, because there was not a regular necessity for coordination, as with emergency personnel (Quarantelli, 1999). The lack of attention for recovery was evident in 1990 when only two trainings were available annually on mitigation and recovery through FEMA's emergency management training program (Rubin & Popkin, 1990). However, while there seemed to be little evidence of attention to recovery in practice, FEMA has attempted to navigate the "interaction and decision making among a variety of groups and institutions, including households, organizations, businesses, the broader community and society" (Mileti, 1999, p. 240). For example, ESF 6- Mass Care included sheltering and temporary housing for victims—short-term recovery components. With this support function, the agency began to handle the loss of available housing (Ad Hoc Subcommittee on Disaster Recovery, 2009).

While the Stafford Act did not specifically address recovery, it established new funding streams to speed short-term recovery. The Public Assistance (PA) program made available funds for debris removal and critical infrastructure and facilities repair, such as sewage systems, water, schools, government facilities, and etc. Cost-sharing between local or state and federal levels to rebuild infrastructure and public facilities was established, taken from the Mt. St. Helen's eruption where the state assisted in covering 25% of the costs (Ad

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Hoc Subcommittee on Disaster Recovery, 2009). Funds for recovery projects and grants for hazard mitigation and planning were also made available in the legislation.

In 2004, three more annexes were added to the Emergency Support Functions: ESF 13- Public Safety and Security; ESF 14- Long-Term Community Recovery, and ESF 15- External Affairs. The inclusion of ESF 14-Long-term Community Recovery marks a shift in FEMA's principles and scope, broadening recovery to 'long-term community recovery,' to help communities beyond immediate response and short-term recovery.

3.1.1 THE 2005 & 2008 HURRICANE SEASONS

Less than a year after the addition of ESF 14, the impact of Hurricanes Katrina and Rita quickly surpassed local and state capacity to handle response and recovery. In addition, it soon became evident the federal government also could not handle catastrophes of this magnitude (Ad Hoc Subcommittee on Disaster Recovery, 2009). At the time, under the updated Stafford Act, FEMA was expected to handle temporary housing for victims (Ad Hoc Subcommittee on Disaster Recovery, 2009). After Katrina for example, 150,000 trailers were ordered and still thousands of households were on wait lists. Each trailer cost roughly \$59,000, totaling \$5.5 billion in federal expenses (Ad Hoc Subcommittee on Disaster Recovery, 2009).

Trailers were the main solution following Katrina and Rita, due to legal interpretations of what FEMA could do under the Stafford Act. Specifically, the law was interpreted by FEMA leadership that FEMA could not provide funds for rental repairs, greatly limiting housing options, particularly for low-income households (Ad Hoc Subcommittee on Disaster Recovery, 2009). As a result, injustices and inequities permeated the entire recovery process. In some instances, FEMA delayed or denied assistance to qualified disaster victims, particularly for low-income households and minorities after Katrina (Hooks & Miller, 2006). In reality, it seemed FEMA's assistance was designed more for higher-income families that had alternative financial assistance options, than for low income families who were completely dependent on assistance from FEMA (Hooks & Miller, 2006). This left many, those with the greatest need, without options for recovery. When applicants did qualify, resources were slow to obtain. Still other housing programs were used at the time, though to a lesser degree, but also exposing major problems. For example, the Section 403 Hotel program, a temporary housing solution for victims,

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created confusion and unpredictability as FEMA incrementally extended occupancy status, meaning tenants did not know if they'd be allowed to continue living in their current situation month-to-month. Likewise, the Rental Program, which provided vouchers to tenants, had several deadline changes, creating confusion and frustration among tenants and landlords alike. There were also flawed public assistance programs to help communities get back up and running (Ad Hoc Subcommittee on Disaster Recovery, 2009). These factors contributed to slow recovery following Katrina and Rita and exposed the ill-equipped recovery process under FEMA.

Prior to the creation of FEMA, the US Department of Housing and Urban Development (HUD) provided recovery assistance to communities. This is a logical step, because HUD's mission is to "create strong, sustainable, inclusive communities and quality affordable homes for all" (HUD, Mission). Since FEMA's creation, it has largely taken on all roles pertaining to disasters, including housing recovery. Following Katrina however, HUD was given authority to provide housing, but only to public housing clients affected by the hurricanes--a fraction of the total housing demand (Ad Hoc Subcommittee on Disaster Recovery, 2009). FEMA could have but chose not to give more authority to HUD due to concerns that HUD could not provide and support the large demand. (Ad Hoc Subcommittee on Disaster Recovery, 2009). That is, because HUD traditionally provided vouchers only for existing housing, many thought the limited housing choices available following a disaster would be insufficient to support the demand (Ad Hoc Subcommittee on Disaster Recovery, 2009).

From the criticisms following the 2005 hurricane season, FEMA and HUD agreed to work closely together to form the Disaster Housing Assistance Program. When Hurricane Ike struck the Texas coast in 2008, many looked to see improvements in the programs and the recovery effort as a whole. Unlike Hurricanes Katrina and Rita, in Hurricane Ike, the Disaster Housing Assistance Program (DHAP-Ike) limited the use of funds to purchase mobile homes or trailers and instead, housing vouchers were utilized. Unfortunately, because there was a shortage of rental housing, and housing in general, many residents were forced to find housing far from their pre-disaster homes. Prior to Hurricane Ike, typically only single-family homes received assistance. In December of 2008, a pilot program was created through the Federal Assistance to Individuals and Households (IHP) program to provide assistance to qualified multi-family properties.

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3.2 FEDERAL GOVERNMENT

While the 2005 and 2008 hurricane seasons exposed deficiencies in the federal capacity to recover from disasters, these catastrophic events also created a window of opportunity (Birkland, 1997)—to improve the recovery process. To this end, in 2009, President Obama directed the U.S. Department of Homeland Security, which houses FEMA, and the U.S. Department of Housing and Urban Development (HUD), to develop a Long-Term Disaster Recovery (LTDR) working group to provide guidance on community recovery following a disaster. The LTDR working group released the National Disaster Recovery Framework (NDRF) in September of 2011.

Today when a disaster exceeds the capacity of state, local and tribal recovery programs the federal government provides assistance through the NDRF. This NDRF was designed to be paired with the ESF annexes and the new National Response Framework (NRF). The NDRF specifies that FEMA is the federal agency responsible for disaster response and HUD is the federal agency responsible for long-term housing recovery. When a disaster occurs, support functions within the NRF are to be activated. Once the disaster response begins to move to the recovery phase, responsibility transitions from the NRF to the NDRF.

3.2.1 KEY PLAYERS & STAKEHOLDERS

Just as response to disasters is scalable, the NDRF is intended to be scalable. Whether a disaster is presidentially declared or whether the disaster can be handled locally, the framework still applies. Federal assistance in disasters acts as supplemental to state and local resources, primarily because of the notion that emergencies and disasters are best handled at the local level. Only 1 percent of all disasters are presidentially declared disasters, meaning that state and local resources do not have the capacity to handle such wide-scale damage (Schwab, 1998). When local and state governments do not have the resources, the federal government provides assistance.

There are key players at each scale that focus on recovery. The NDRF establishes a Federal Disaster Recovery Coordinator, State or Tribal Disaster Recovery Coordinators, Local Disaster Recovery Managers, and Recovery Support Functions (RSF). Recovery Support Functions help activate key players to accomplish tasks and support efforts to recover. The Recovery Support Functions include Recovery Planning and Capacity Building; Economic, Health and Social Services; Housing; Infrastructure Systems; and Natural and Cultural Resources.

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These RSFs are different from the Emergency Support Functions (ESF) found in the National Response Framework. ESFs timeframe exist within days to weeks following a disaster, while RSFs may overlap ESFs, but their timeframe exists months to years following a disaster. Each ESF transitions and hands over responsibilities to RSFs once response efforts are managed. Specifically for housing recovery RSF Community Planning and Capacity and RSF Housing are relevant.

RSF Community Planning and Capacity is coordinated by FEMA. The primary agencies providing support are FEMA and the Department of Health and Human Services (HHS) and thirteen other supporting agencies. A primary goal of the support function is to help organize, plan, manage, and implement recovery. Some of the key achievements of the RSF is to promote mitigation planning and to incorporate it and recovery into local community plans and initiatives. Another important component is to develop local leadership capacity through cross-training stakeholders, such as emergency managers, city managers, planning staff, economic development staff and other local officials, and nonprofit and private sector partners. It strives to utilize partnerships with extension programs, universities, national professional association, nongovernmental organizations to expand resources. The RSF also maintains communications in in preparation for recovery between all partners.

RSF Housing is coordinated by HUD with primary agencies being FEMA, the Department of Justice, HUD, and the U.S. Department of Agriculture. Supporting Organizations include Corporation for National and Community Service (CNCS), Department of Corrections (DOC), Department of Education (DOE), Environmental Protection Agency (EPA), Department of Health and Human Services (HHS), Small Business Administration (SBA), US Access Board, Department of Veterans Affairs (VA), American Red Cross (ARC), National Voluntary Organization Active in Disasters (NVOAD). The primary goals of the support function is to “address pre- and post- disaster housing issues and coordinate and facilitate the delivery of resources in the rehabilitation and reconstruction of destroyed and damaged housing and to develop new accessible, permanent housing options” (FEMA, 2011). FEMA is the coordinating agency under the National Response Framework (NRF) for ESF #6, now named Mass Care, Emergency Assistance, Temporary Housing, and Human Services. ESF 6 is able to move an individual or family from response, immediately after the disaster, where the primary concerns are mass evacuations, sheltering, distribution of supplies, donations management, support for dependents and pets through to short-term and long-term

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recovery with temporary housing and repair loan assistance as well as non-housing loss concerns such as crisis counseling, case management, unemployment services, legal services, and other service programs (FEMA, 2011). The expanded ESF 6 is strongly linked to RSF Housing and RSF Health and Social Services. In a disaster, FEMA activates ESF 6 to respond to immediate needs of victims. As the ESF 6 role diminishes, HUD activates the Housing RSF which ramps up and assumes activities and roles. A part of the challenge is this period of transition from ESF #6 to Housing RSF.

3.3 STATE GOVERNMENT

States have been referred to as the 'linchpin' between federal policies and funding and local need during disasters (Sandler and Smith 2013; Smith and Flatt 2011). When disasters occur that exceed the capacity of a local government, the state can designate the area a state declared disaster to support local needs. When a disaster occurs that exceeds the capacity of the state, the state calls on the federal government to declare a presidential disaster. States vary widely in their own capacity and ability to assist local governments, but are recognized with having three influential powers. First, states can influence resources to address local needs. States take the role of distributing federal funds and their own share of funds to local governments. Unfortunately, many states have reduced budgets to address disaster needs, effectively increasing total disaster costs (NEMA, 2012). Second, states affect the timing of recovery through their own pre-event capacity, their ability to address and assist socially vulnerable populations, and the equitable access and distribution of funding (Smith 2011). Third, states can influence resources through the vertical and horizontal linkages they connect with. States with strong vertical connections have strong relationships and regular interactions with the federal level and local levels. States strong in horizontal linkages works effectively across its own agencies and other state level departments.

States play the central role in coordinating recovery activities. States typically help localities understand federal policy and regulations; create state programs that address local needs; and train, educate, and provide outreach to localities (Durham and Suiter 1991; Smith 2011). The state recovery section coordinates damage assessments, "prepares disaster declaration requests for the Governor's signature, and deploys staff to the affected area to coordinate the overall recovery process". Specifically states collect damage assessments from local governments. Within the TDEM Disaster Recovery Manual

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(TDEM-62) damage assessment matrices are provided for local guidance. Hurricane Ike Round 2 Housing Guidelines, Texas General Land Office (GLO) has revised requirements to include photographic documentation and narrative descriptions of damages. The state also serves as a link with other recovery partners, like HUD and voluntary groups that are responding to community needs. The state provides direct funding for residential construction and serve as contact for federal resources. During a presidentially declared disaster there are a number of funding opportunities the state can allocate. For instance, TDEM Recovery staff carry out the Individual Assistance program, and aid entities and organizations through the Public Assistance program (<http://www.txdps.state.tx.us/dem/Recovery/> October 17, 2014). Unfortunately, there is little funding and guidance for pre-disaster recovery planning initiatives from the federal to state levels (Smith forthcoming). Even with the passage of PKEMRA and the relatively new NDRF policy framework, there is little incentive for state and local governments to plan for recovery (Smith, forthcoming). Currently, whether states and localities receive funding is dependent on the pre- and post-disaster planning activities they undertake, although there is no such incentive for recovery planning. The states of Florida and Oregon have created programs to help localities develop pre-disaster recovery plans (Smith forthcoming).

3.3.1 KEY PLAYERS & STAKEHOLDERS

The governor plays the key role in emergency management activities because the authority and responsibility is vested within governor's office. The National Governor's Association (NGA) has recognized that recovery activities might be better suited in a policy focused office instead (Durham and Suiter, 1991). Under the National Disaster Recovery Framework, the Texas Division of Emergency Management (TDEM) is the state agency responsible for disaster response and the Texas General Land Office is responsible for disaster housing recovery. Texas Department of Housing and Community Affairs (TDHCA) and the Texas Department of Rural Affairs (TDRA) were the agencies responsible for housing recovery prior to 2011.

The following is a list of all state agencies which provide primary or support roles in recovery (State of Texas Emergency Management Plan Draft 05/2012):

- Primary responsibility of NDRF at the state comes from the Texas Division of Emergency Management.
- Texas General Land Office- manages 19 million acres of state owned land; responsible for clearing public beaches

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following a disaster, conducts oil spill prevention and response; recovery support; and is the primary role in long-term recovery.

- American Red Cross helps with recovery efforts –emergency shelter, and cash vouchers for temporary housing, emergency home repair.
- Office of Attorney General- represents the state in civil matters, such as insurance, banking, financial litigation
- Texas Animal Health Commission.
- Texas Commission on Environmental Quality- responsible for managing state’s water resources and to be sure they are clean and healthy for environment and people
- Texas Comptroller of Public Accounts- monitors and approves expenditures of state funds, estimates state revenues in order to certify legislative appropriations. Primary functions include administration, funds management, and central administration.
- Texas Department of Aging and Disability Services provide services and support to people who are aging or have disabilities.
- Texas Department of Assistive and Rehabilitative Services help disabled find work
- Texas Department of Insurance monitoring company handling of disaster claims for compliance and solvency concerns, issuing emergency licenses to adjusters who come to Texas following a disaster, and maintaining and testing TDI’s Disaster Recovery Plan.
- Texas Department of State Health Services primary agency for health response. Texas Department of Transportation maintenance and construction of state highways
- Texas Forest Service-provides support in recovery; coordinated plan for forest fire protection
- Texas Procurement and Support Services provides state agencies/customers with goods and services-manages fleets, alternative fuel vehicles, office machine repair,
- Texas Workforce Commission provides workforce development and career development services
- The Salvation Army-provide emergency shelters, recovery support
- Texas Department of Information Resources- operates a disaster-recovery site to prevent loss of information

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3.3.2 STATE ROLE IN RECOVERY

- The state allocates CDBG-DR funding from HUD to COGs for residential construction and serve as contact for federal resources.
- Collects damage assessments from local gov't provides a request for presidential disaster declaration to FEMA.
- If the disaster is declared a national disaster from the president and FEMA arrives, the State serves as intermediary to the affected areas.
- Also it should serve as a link with other recovery partners, like HUD.
- Provide resources to voluntary groups that are responding to community needs.

3.4 LOCAL GOVERNMENT

Local governments take the lead role in managing disaster recovery. From an emergency response perspective, disasters occur at the level. It is at the local level where residents interact with their government more frequently--as opposed to state and federal levels--with things like the regulation of land use, building permits and construction, and civic services, like police, fire, schools, and infrastructure needs. The local government provides access to the participation in democratic processes that are not always possible at higher levels of government. Because of residents' connection with local government, it is fitting that disaster recovery would also primarily take place at the local level. Unfortunately, many recovery programs provide little opportunity for the community to engage in the process. The measuring stick that is often held to public participation practices is Sherry Arnstein's ladder of engagement, which ranges from non-participation to full citizen control (Arnstein 1969). Many recovery programs have limited involvement and employ passive methods of informing, consultation, or placation. This exchange of information between the public and the program administrators is typically based on generalized assumptions gathered from a small sample of participants or from outside programs. As the mode of participation moves up the ladder, participants are more and more engaged in designing the process itself. A grassroots movement where leadership of the recovery process comes directly from the beneficiaries or disaster victims themselves is an example. Ideally, participation informs the recovery process.

Community participation in post-disaster housing projects in developing countries provides examples. In El Salvador, beneficiaries

HOUSING RECOVERY

were engaged through requirements to physically construct portions of their homes and participate in “grassroots” social committees that were actually initiated by the program administrators themselves. These programs did little to create a sense of “community” and furthermore, efforts by participants to form an independent local representative body were eventually stifled by program administrators out of fear of losing control of the process. The top-down design of this engagement process was so rigid by the time participants were involved that the program was unsuccessful in meaningfully engaging residents and unable to fulfill its social goals. In Columbia, the recovery program was conducted by a group of local organizations already working in the area when the disaster occurred. The program required beneficiaries to use existing social and organizational networks as conduits to the recovery organization. The approach left most of the control in recovery process up to the individual participant and resulted in increased user satisfaction and efficient resource allocation. Early involvement in pre-disaster recovery planning with local community leaders will help ensure their needs are met and voices heard. Ideally, establishing relationships with local governments and community-based organizations should occur far in advance of a disaster event.

Local governments also play a key role in executing and implementing plans. The majority of mitigation measures and state and federal requirements are adopted, codified and enforced at the local level. It is often up to the local government to adopt and enforce state and federal standards (i.e. NFIP, IBC, IRC). Unfortunately, the capacity of local governments varies widely. Currently, there are no established standards or mandates for local governments to play a role in recovery and there is no specific policy in place to support housing recovery, in particular. According to standard emergency management actions by phases, recovery for local governments entails:

- Identifying unsafe structures and the recommendation of structures for condemnation,
- monitoring restoration activities,
- reviewing building codes and land use regulations for possible improvements, and
- communicating effectively with disaster victims (Brazos County Recovery Plan).

In reality, these are not the only activities that should take place in recovery, but should include a range of local service providers that engage with the community to fully understand and address local needs and values.

HOUSING RECOVERY

3.4.1 KEY PLAYERS & STAKEHOLDERS

Housing recovery should involve the whole community. A whole community approach utilizes the strengths and capacities of all facets of a community, including individuals and households, the private sector, the nonprofit sector, and the local government. At the local level this includes:

The Natural Disaster Housing Reconstruction plan (NDHR) made several recommendations on how to best handle recovery in Texas. Counties and Cities are the local entities that are responsible for disaster response. The Local Emergency Management Plan (LEMP) is approved by TDEM and FEMA in order to qualify for disaster funding. The Council of Government (COG) is the local entity responsible for long-term disaster recovery. COGs are recommended as regional coordinators for recovery because they play a role in supports all jurisdictions, counties and cities.

HUD typically allocates Community Development Block Grant (CDBG) disaster recovery grants or funding assistance to states. CDBG funds are only to be spent in areas with low- to moderate-income populations and based on damage assessments. Funding from HUD and the General Land Office (GLO) are divided up by a formulary process to COGs to distribute CDBG funds to their regions. The board of directors of the COG determines how to spend money within HUD's regulations. COGs provide a recommendation of how the region intends to distribute their portion of funding to foster long-term community recovery that is forward-looking and focused on permanent restoration of infrastructure, housing, and the local economy. The Methods of Distribution (MODs) are a regional breakdown by community and between housing and non-housing activities. The COG also develops MODs and utilizes the LEMP for funding (The Natural Disaster Housing Reconstruction). The Mitigation Action Plan is approved by GLO and HUD in order to qualify for CDBG disaster funds.

It is important to better connect strategies and initiatives of the COG to county and local governments. The NDHR recommended that COGs develop an Emergency Housing Procedures Manual to provide counties and cities with technical and financial assistance. The Procedures Manual should detail the efficient recovery of housing as well as the quality and aesthetic nature. The NDHR also recommended that COGs should release an RFP for architects to develop housing reconstruction designs with public input. Pre-bid contracts would then be developed. The State suggested that within

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the Planning and Capacity Building fund of the CDBG, \$1 million should be marked for Disaster Housing Reconstruction Planning. This would allocate \$250,000 to four COGs annually.

The NDRF recommends the appointment of a Local Disaster Recovery Manager (LDRM). The LDRM would oversee pre-disaster responsibilities and serve as the main point of contact for local recovery with the state, tribal governments, and neighboring local governments (NDRF). The LDRM would be the local expert on recovery and would manage the many players that are needed to recover and carry out a recovery plan. The NDRM would ultimately develop the recovery plan, train and coordinate exercises to properly carry out that plan and foster resilient and sustainable development practices (NDRF). At this time, the NDRF has not been implemented at the local level in Texas and there are not designated LDRMs.

3.4.2 LOCAL ROLE IN RECOVERY

EMERGENCY MANAGER:

- Local emergency managers or other specified personnel document local damages (damage assessment, windshield assessment, door to door) to be sent to the state.
- Local emergency managers provide oversight for the State, the Federal Government and the Volunteers Work during the disaster response.

COGs:

- COGs provide oversight for the State, the Federal Government and the Volunteers Work during the long-term disaster recovery.
- COGs or jurisdictions remove debris from roadways, yards, and homes (the federal government may pay up to 75% of these costs).

MUNICIPALITIES:

- Municipal planning office complete building inspections and provide building permits, which must comply with local codes and ordinances and state and federal regulations (NFIP and environmental clearance).
- Municipalities are responsible of perform electrical, plumbing and systems inspections.

LOCAL VOLUNTEER ORGANIZATIONS:

- Local volunteer organizations and VOADs provide Outreach or Case Management services in coordination with the COG.

PROGRAM COMPARISON CATEGORIES

4.1 PROGRAM DESIGN

To implement a successful disaster housing recovery program, the programmatic design is just as important as the housing design itself and challenges in executing a housing recovery program continue to take place. Top-down programs tend to make more resources available, but also come with administrative processes that reduce the ability to innovate at a local level. At the same time, limited local capacity can reduce the overall effectiveness of grassroots mobilization (Wilbanks 2009). The housing recovery demonstration program approach includes the way in which households are funneled through the disaster housing recovery process.

To identify the issues and obstacles in the temporary to permanent housing recovery process a content analysis of housing recovery reports, articles, and policies was conducted. A qualitative evaluation of 40 articles and reports were assessed focusing on disasters from 2005 to present in the United States. Five overall categories were identified as broad phases where gaps occur in the temp-to-perm housing recovery process, including:

- Damage assessment,
- Outreach,
- Case management,
- Design decisions, and
- Construction

These five categories are somewhat linear, but often occur simultaneously and in parallel. In general, damage assessments are performed to determine the extent of damage, which directly impacts the recovery funds a household can receive. Once the damage assessment is complete an outreach team will identify significantly damaged areas and/or those in the greatest need in order to funnel them toward appropriate resources. Once disaster victims are identified, case managers determine their eligibility for federal and state financial assistance to rebuild. During this time, design decisions about the construction of the temp-to-perm housing should be conducted where the household interact with designers to provide input toward the final outcome of their home. Finally, the actual construction of temp-to-perm housing should take place efficiently and sustainably. Even though they are separate categories there is significant amount of overlap between the categories. This is especially visible between outreach and case management along with design decisions and construction. There were still enough differences to keep them as separate categories, but since all of these categories are a part of an entire process there will be some overlap.



Figure 4. Program Comparison Report Categories

PROGRAM COMPARISON CATEGORIES

Of the 40 articles and reports assessed, 13 of them covered damage assessment, 15 covered outreach, 14 covered case management, 15 covered design decisions, and 20 covered construction. Some of the articles and reports covered a singular topic and some covered several, as seen in Table 1. Each category is evaluated based on the issues and obstacles that emerge and the best practices that have been identified in the literature. A meta-analysis was performed in order to quantify the frequency of issues and best practices in the literature. If an issue or best practice was mentioned multiple times, it was flagged. The higher the frequency the flags for a particular issue of best practice, the higher the relevance. There is no research currently known that compares housing recovery reports and articles to identify issues and best practices of the five topic areas.

Table 1: Articles and Reports Compared and Analyzed.

TITLE	DAMAGE ASSESSMENT	OUTREACH	CASE MANAGEMENT	DESIGN DECISIONS	CONSTRUCTION
Case Management with Displaced Survivors of Hurricane Katrina: A Case Study of One Host Community.			X		
Case Management with Hurricane Katrina Survivors: Perspectives of Case Managers and Supervisors			X		
Closing Gaps in Local Housing Recovery Planning for Disadvantaged Displaced Households					X
Council on Accreditation- Disaster Recovery Case Management			X		
Creating a Safe Harbor after Hurricane Katrina: A Case Study of the Bayou La Batre Alternative Housing Pilot Program		X		X	X
CRS Report for Congress-Hurricane Katrina: Social Demographic Characteristics of Impacted Areas	X				
Developing a More Viable Disaster Housing Unit: A Case Study of Mississippi Alternative Housing Pilot Program		X		X	X
Digging Deeper: Participation & Non-Participation in Post Disaster Community Recovery		X			
Disaster Case Management Program Guidance	X	X	X		
Disaster Housing Assistance Program (DHAP) Case Management Guidelines			X		
Emergency Housing Program Research and Recommendations		X	X	X	X
Far From Home	X		X	X	X
Federal Immediate Disaster Case Management		X	X		
FEMA'S Disaster Declaration Process: A Primer	X				
Field Damage Survey of New Orleans Homes in the Aftermath of Hurricane Katrina	X				
GAO: Hurricane Katrina Improving Federal Contracting Practices in Disaster Recovery Operations					X
Handbook of Disaster Research	X	X			X
Housing Recovery in the Gulf Coast Phase 1: Results of Windshield Observations in Louisiana, Mississippi, & Texas	X				

PROGRAM COMPARISON CATEGORIES

TITLE	DAMAGE ASSESSMENT	OUTREACH	CASE MANAGEMENT	DESIGN DECISIONS	CONSTRUCTION
Hurricane Katrina Improving Federal Contracting Practices in Disaster Recovery Operations: Testimony before the Committee on Government Reform					X
Hurricane Sandy Rebuilding Strategy		X			
Impediments to Recovery in New Orleans' Upper and Lower Ninth Ward: One year after Hurricane Katrina	X				
National Disaster Recovery Framework	X				
National Disaster Housing Strategy		X	X	X	X
Natural Disaster Housing Reconstruction Plan	X	X	X	X	X
NVOAD Long-Term Recovery Manual	X	X	X		
OIG- Effectiveness and Costs of FEMA's Disaster Housing Assistance Program- AUG 2011			X		X
OIG- Effectiveness and Costs of FEMA's Disaster Housing Assistance Program- AUG 2011				X	X
OIG- Unless Modified, FEMA's Temporary Housing Plan will Increase Cost by an Est. \$76 million Annually- June 2013				X	X
RAND Study- Navigating the Road to Recovery		X	X		
Rapid Housing Recovery Program Research Summary		X		X	X
Rebuilding or Recovering? Considering Sustainability in the Context of Disaster Rehousing	X	X		X	X
Research Trends of Post Disaster Reconstruction: The Past and the Future					X
Resourcing Challenges Post-Disaster Housing Reconstruction: A Comparative Analysis				X	X
Returning to a New Normal- Texas Disaster Case Management Pilot Project		X	X		
SERRI Project				X	X
Sustainable Disaster Recovery: Operationalizing an Existing Agenda		X			
TDHCA: Community Development Block Grant Disaster Recovery Program Hurricanes Ike & Dolly Round 2	X				X
The Barriers to Environmental Sustainability in Post-Disaster Settings: A Case Study of Transitional Shelter Implementations in Haiti					X
The effects of housing assistance arrangements on household recovery: an empirical test of donor-assisted and owner-driven approaches				X	
TOTAL	13	15	14	13	20

PROGRAM COMPARISON CATEGORIES

4.2 DAMAGE ASSESSMENT

Damage assessment is an appraisal that is performed after the disaster in order to determine the amount of damage that an area has received. It is a “mechanism used to determine the impact and magnitude of damage and the resulting unmet needs of individuals, businesses, the public sector, and the community as a whole” (McCarthy, 2011). There are two phases of damage assessments that take place following a disaster. The first is the preliminary damage assessment (PDA) is an estimate of damage in an area and subsequently more generalizable. Under the Stafford Act, a PDA is required to be completed within 10 days of a disaster to determine whether or not damage is at a scale that exceeds state and local capabilities (NVOAD, 2004). The team that conducts the PDAs generally consists of a state official, a representative from that area’s regional FEMA office, a local official that has knowledge of the area, and sometimes representatives from the American Red Cross and Small Business Administration (McCarthy, 2011). The governor will use damage assessments to assess what types of programs are necessary for the recovery process to begin. Damage assessments determine the amount of money HUD and FEMA will allocate to states to then disperse locally.

The second phase of damage assessment is conducted in greater detail to determine how much damage each home received during a disaster. The detailed assessment determines flood and/or structural damage and calculates the actual cost of damage. The damage assessment identifies ‘substantial damage’, or structures or properties where damage is greater than its actual value, as determined by local building officials or floodplain managers. Upon completion of the final damage assessment, the total loss figure is calculated and finalized through a formulary process by FEMA. The available funds procured from federal disaster recovery grants can then be allocated to states. In Texas, funding is then allocated to Council of Governments (COGs) to be dispersed to the appropriate areas.

4.2.1 ISSUES & OBSTACLES

Thirteen of the forty articles evaluated discussed damage assessments. Of those thirteen, seven articles identified the methodology, or how the damage assessment was conducted as a major concern. In general, the damage assessment process is protracted; surveying and assessing every home for the amount of damage is lengthy and costly. Oftentimes, there are not enough inspectors (Far From Home), ultimately slowing the eligibility process for housing assistance. Following Hurricane Katrina, damage and impact assessments

PROGRAM COMPARISON CATEGORIES

created large lag times, because of the overwhelming amount of homes to inspect and the lack of certified inspectors (National Disaster Housing Reconstruction Advisory Committee, 2010). In some instances, slow assessments took as long as three months and in some cases, assessments were left incomplete (Far From Home). While FEMA has the staffing capacity--10 regional offices located throughout the United States--to conduct damage assessments for a disaster event, it often relies on contracted temporary employees during a major disaster or multiple disasters (McCarthy, 2011). Following hurricanes Katrina and Ike, FEMA's prolonged damage assessment process stalled eligibility for Section 408 housing program applicants. In order to expedite the process, FEMA attempted to use satellite data, but many have concerns of the accuracy and consistent methodological approach of damage assessments (Far From Home).

Because the amount of money a property receives is dependent on the outcome of the damage assessment, the methodology to conduct the assessment must be thorough and consistent. Many have found estimates may differ depending on which damage assessment methodology is used (Gabe, Falk, McCarthy). In any one disaster there may be multiple ways a damage assessment is completed based on who it is performed by (McCarthy, 2011). Depending on the agency performing the damage assessment, an inspector may assess different outcomes. It was also found that "even though a set of common guidelines was established and a set of cross-calibration activities were conducted, due to the subjective nature of damage rating exercise, it is difficult to be completely precise in the damage assessment" (Franco, Green, Khazai, Smyth, & Deodatis, 2010). For instance, damage assessments of properties performed by the Association of Community Organization for Reform Now (ACORN) were deemed less damaged than the neighborhoods surrounding it, which was true for the lower ninth ward (Field Damage Survey of New Orleans Homes in the Aftermath of Hurricane Katrina). Other damage assessments placed blanket assessments on particular areas, drawing a line in the sand of who and who was not affected, leaving those just outside the affected area at a disadvantage. The variation in training and inconsistency in the methodological process has created large discrepancies in housing assistance.

Disinterested inspectors are hard to come by and many have been found to be biased in reporting (Franco, Green, Khazai, Smyth, & Deodatis, 2010). For instance, the condition of the home prior to the disaster is taken into account when calculating the damage received. Many inspectors associated the poor condition of the home pre-

PROGRAM COMPARISON CATEGORIES

disaster with the resulting severity of damage post-disaster. This was especially the issue after Hurricane Katrina in the Upper and Lower Ninth Ward (Green, Bates, & Smyth, 2007). The location of the property and the condition of the neighborhood pre-disaster also resulted in biased damage assessments—more impoverished areas received less damage assessment values. Ultimately, poorer neighborhoods with significant damage received less assistance than other neighborhoods. While damage assessments may not be considered overtly discriminatory, the implications for funding assistance result in proportionally fewer resources for low income and minority households. Also, the challenge of reaching severely damaged properties and interior assessments of severely damaged homes was a limiting factor (Franco, Green, Khazai, Smyth, & Deodatis, 2010). Obstructed pathways, to physically reach a home to conduct a damage assessment, resulted in incomplete assessments or approximate value determinations based on surrounding areas—also known as location bias. During Hurricane Katrina, many damage assessments had a location bias toward less damaged areas. Another inconsistency occurred in the length of time between the disaster and the damage assessment. In the lower ninth ward damage assessments that were completed later were more detailed and resulted in assessments portraying less damage than those inspected soon after the disaster event.

Other issues in conducting damage assessments included communication between the inspector and a representative of the property. One requirement was that households must be present during the times of inspections in order for residents to be eligible for funding assistance. In some cases, the communication of the inspection date was not relayed to the households, which ultimately led to delays and limited assistance (Far From Home). Other uncertainties and ambiguities occurred, including disparate FEMA flood maps actual property layouts. There were discrepancies between the field observations and published flood maps, resulting in vague determinations for actual flood damage and unreliable damage assessments (Franco, Green, Khazai, Smyth, & Deodatis, 2010).

4.2.2 PROMISING PRACTICES

In all thirteen articles assessed that discussed damage assessments, two best practice themes emerged—mapping and connecting to local organizations.

PROGRAM COMPARISON CATEGORIES

Six of thirteen articles described geographical information systems (GIS) mapping as a way to determine areas that are likely to have received damage. By using social vulnerability mapping to determine where the most vulnerable populations exist, areas that may receive more damage can be predicted (Van Zandt et al, 2012). Conducting social vulnerability mapping prior to a disaster can help prioritize efforts in the immediate recovery.

Three out of thirteen articles discuss the need for local/nonprofit organizations throughout the process. Local governments should work with nonprofits and local groups to “train community residents and business owners, recruit PDA volunteers, [and] expand on citizen corps efforts”(FEMA, 2011, p.92). Jurisdictions should use VOAD groups and the architecture community to quickly triage the damages of the housing stock to identify which units can be salvaged and which ones cannot (Natural Disaster Housing Reconstruction Advisory Committee, 2010). Then with the creation of maps, nonprofits can conduct damage assessments by identifying where the most severe damages exist in the community (Wilson, unpublished manuscript).

Table 2. Reports Addressing Damage Assessment

TITLE	ISSUES	BEST PRACTICES	
	HOW IT IS CONDUCTED	USE OF GIS MAPPING	USE OF LOCAL/NON-PROFIT ORGANIZATIONS
CRS Report for Congress-Hurricane Katrina: Social Demographic Characteristics of Impacted Areas	X	X	X
Handbook of Disaster Research	X	X	
Natural Disaster Housing Reconstruction Plan		X	X
Rebuilding or Recovering? Considering Sustainability in the Context of Disaster Rehousing			X
Far From Home	X		
Field Damage Survey of New Orleans' Upper and Lower Ninth Ward: One Year After Hurricane Katrina	X	X	X
FEMA's Disaster Declaration Process: A Primer	X		
National Disaster Recovery Framework	X		
Housing Recovery in the Gulf Coast Phase 1: Results of Windshield Observations in Louisiana, Mississippi, & Texas			X
Disaster Case Management Program Guidance	X		
TDHCA: Community Development Block Grant Disaster Recovery Program Hurricanes Ike & Dolly Round 2			
NVOAD Long-Term Recovery Manual			
TOTAL	7	4	5
PERCENTAGE	54%	31%	38%

PROGRAM COMPARISON CATEGORIES

4.3 OUTREACH

Outreach is the activity of identifying populations that will need funding assistance to rebuild homes following the disaster and is the practice of conducting local public awareness activities through targeted community interaction. The point of outreach is to identify eligible aid recipients and enroll them in the program to receive housing recovery assistance. Often it is imperative to identify vulnerable populations and other special needs populations, including individuals with disabilities, children, elderly, individuals with limited English proficiency, low-income residents, minorities, and people who have unmet disaster-caused needs. Outreach for housing recovery is conducted through local organizations, VOADs, faith-based organizations, and state organizations. The outreach process includes development of an outreach plan (National Team), implementation of the plan (Regional and Local Teams), and monitoring and adjustment of the plan as needed (Regional and Local Teams) (Federal Immediate Disaster Case Management). Successful outreach in housing recovery acknowledges the community's challenges and advocates for their needs to be addressed.

4.3.1 ISSUES & OBSTACLES

Of the 40 comparison articles, 15 were related to outreach (see Table 3). Of those 15, eight specifically mention the issues pertaining to socially vulnerable populations. In order for outreach to be successful, communities need to be able to identify the location of residents, particularly socially vulnerable populations (Acosta, Chandra, & Feeney, 2010). Identifying and reaching out to socially vulnerable populations is a critical step for outreach workers and a whole community recovery. Since Hurricane Katrina, there are still a variety of thought son ways to best conduct outreach. Several articles described unawareness of the location of socially vulnerable populations as an obstacle to successful outreach. The main form of outreach conducted following Hurricane Katrina, Rita, and Ike utilized a FEMA contact list. In Hurricanes Katrina and Ike, the list that was provided by FEMA for outreach did not have correct contact information for clients (AgriLIFE Extension; Acosta, Chandra, & Feeney, 2010). In Gulfport, Mississippi, call-centers had a difficult time reaching out to applicants using FEMA's contact information database (Natural Disaster Housing Reconstruction Advisory Committee, 2010). In Biloxi, Mississippi, letters were sent out to households, but oftentimes families had already moved. Outreach workers hand delivered many letters to applicants to make sure that they received them, a slow and tedious process (Abt Associates and Amy Jones &

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Associates, 2009, p. 7). The inability to reach community members, particularly those in the greatest need is the largest impediment to providing housing assistance.

4.3.2 BEST PRACTICES

In all fifteen articles that discuss outreach, three best practice themes emerge—**the use of community-based organizations, developing and managing a long-term outreach process, and developing inter-organizational partnerships and collaboration.**

To identify vulnerable populations who are still in need of help **community-based organizations (CBOs) and networks that already exist in the community should be utilized.** Using these organizations, with already established trust, can help gain access to these populations and bridge the gap between government programs (FEMA, 2013) (Wilson, unpublished manuscript). Six of the fifteen articles on outreach discuss the importance of CBOs, which are so effective because they already understand the context, the residents' needs, and have greater accountability (AgriLIFE Extensions) (Wilson, unpublished manuscript). By giving assistance to CBOs, that already service low-income populations and promote self-sufficiency, communities and ultimately increase community capacity (Wilson, unpublished manuscript). CBOs are also a part of a longer-term outreach process—four of fifteen articles cite longer outreach as a critical component of outreach. Getting residents involved early—which CBOs already do—need to be a part of pre-disaster outreach effort. Outreach workers can help prepare families, such as getting critical paperwork in line for eligibility, in the event of disaster.

Finally, the literature cites 10 of 15 articles on outreach that describe **the value of inter-organizational partnerships and collaboration.** Working relationships between local, regional, state, and federal agencies, and public and private organizations need to be established prior to a disaster, which may include such activities as “sharing information, ideas, knowledge, and resources with one another and with those affected” (AgriLIFE Extension). Several studies found that local organizations and residents have local knowledge in the community and sharing knowledge can implement change (Emergency Housing Research & Recommendations, 2013, p. 10).

PROGRAM COMPARISON CATEGORIES

Table 3. Reports Addressing Outreach

TITLE	ISSUES	BEST PRACTICES		
	IDENTIFYING VULNERABLE POPULATIONS	USE OF COMMUNITY BASED ORGANIZATIONS	LONG-TERM OUTREACH PROCESS	INTER-ORGANIZATIONAL PARTNERSHIPS & COLLABORATION
Creating a Safe Harbor after Hurricane Katrina: A Case Study of the Bayou La Batre Alternative Housing Pilot Program	X			
Developing a More Viable Disaster Housing Unit: A Case Study of Mississippi Alternative Housing Pilot Program	X			
Disaster Case Management Program Guidance		X		
Emergency Housing Program Research and Recommendations	X	X	X	X
Hurricane Sandy Rebuilding Strategy	X	X		X
National Disaster Housing Strategy	X		X	X
Natural Disaster Housing Reconstruction Plan	X			X
NVOAD Long-Term Recovery Manual				X
Rapid Housing Recovery Program Research Summary		X		X
Rebuilding or Recovering? Considering Sustainability in the Context of Disaster Rehousing		X	X	
Returning to a New Normal- Texas Disaster Case Management Pilot Project	X	X		X
RAND Study- Navigating the Road to Recovery	X			X
Federal Immediate Disaster Case Management-Concept of Operations				X
Digging Deeper: Participation and Non-Participation in Post-Disaster Community Recovery			X	X
Handbook of Disaster Research			X	
TOTAL	8	6	5	10
PERCENT	53.3%	40.0%	33.3%	66.7%

4.4 CASE MANAGEMENT

Prior to Hurricane Katrina there were few guidelines on how disaster case management should be performed. Navigating through the complex bureaucracy of obtaining funding assistance for housing is a challenge for individuals and families. The role of the case manager is to walk disaster victims through an eligibility process to determine and funnel funding assistance and resources to victims based on disaster-related unmet needs (FEMA, 2013). Case managers often provide a direct connection between the disaster victim and the services they require. They hold an important position in the recovery process by having unique knowledge of individual needs and the resources available to serve them. Disaster survivors who do not have effective case managers to guide them through the process can fall through the cracks in the system and may never receive the resources they require for long-term recovery. They are

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particularly important in providing resources to socially vulnerable populations (Acosta, Chandra, & Feeney, 2010). Case managers in housing recovery ultimately help participants toward self-sufficiency by assisting victims from shelters to temporary housing and to permanent housing (HUD, 2008). It is the intent that case managers advocate for their caseload and work with other organizations to meet their needs (Hall, 2010).

The primary goal of disaster case management systems is to develop a plan for addressing disaster-related unmet needs in the community (Bell, Madden, et al. 2010) Previous research on social service provision following disasters “indicate(s) the need for responders to be flexible, seek out survivors, coordinate services with multiple agencies, work with limited information, and intervene at the individual, organizational, and societal levels” (Bell, Madden, et al. 2010, p. 218). Key elements to case management success identified by Bell and colleagues are client motivation (individual effort to engage in programs), resource availability (actual active programs), and case manager’s effort (staying informed of current resources available).

The typical functions of case managers are the identification of clients, performing a needs assessment, planning for recovery, connection with services, monitoring outcomes, and advocating for clients to ensure all needs are met (Bell 2008). The relationship between disaster victim and case manager revolves around resource availability and knowledge. The more informed and connected case managers are to current recovery resources, the more prepared they are to link disaster victims with the most appropriate means to meet their needs.

Though housing is a large part of recovery, other needs such as securing employment and access to transportation are also important to meeting long-term recovery goals. It is unlikely that one program will meet all the recovery needs of an individual or family, so several resources must be utilized to build back their community. The case manager plays an especially important role in fulfilling the mission of long-term recovery by combining the available resources into a comprehensive individual recovery strategy. In essence, the success of one recovery program is not only dependent on its own operation, but also the successful utilization of the other programs available in the community to meet the needs of individual survivors. Effective case management provides a vital bridge between programs and disaster survivors to enable full recovery.

PROGRAM COMPARISON CATEGORIES

4.4.1 ISSUES & OBSTACLES

In all, 13 articles discussed case management with issues and obstacles ranging from miscommunication, training, inconsistency, tracking and documentation, and caseload size. A lack of communication was discussed in six of thirteen articles. Miscommunication occurred because there were ambiguous roles and responsibilities of case managers, as well as, unclear roles and responsibilities among all levels of agencies involved (AgriLIFE Extension). Case managers noted that information was slow to obtain and some clients and case managers misunderstand the documentation process (AgriLIFE Extension). Four of thirteen articles also discussed the lack of training as a contribution to miscommunication. Not only that, but there was widespread inconsistencies in terminology, qualifications, and triage. For instance, across the variety of case management organizations, there were different definitions for special needs population, leading to inconsistent measurements. Also, there were different qualifications and triage criteria for clients across different organizations making the process confusing for disaster victims. Generally, a triage system is filtered and organized by need—those most in need are at the front of the line. With inconsistent triage approaches creates situations where some with the greatest need may be left out or in waiting for services.

Another recurring issue came in tracking and documentation (5 of 13 articles) reports cited difficulty tracking client location and needs to measure progress and duplication in data entries causing confusion. The case management organizations that helped during the Hurricane Ike DCM-P stated that having a streamlined documentation process would help significantly. Redundancy of paperwork was common, along with the amount of time it took to get clients through the application process (AgriLIFE Extension). If they would have had a consistent, streamlined process they would have been able to get clients through in a sufficient manner. Also, some clients had several different case managers during the process, which led to mistrust, confusion, and delays. In two of the thirteen articles, caseload sizes were widely inconsistent, resulting in case managers that felt overloaded and unable to provide quality assistance. The caseload size of 35:1 that was recommended by the State of Texas and FEMA seemed to be too many for case managers. Another factor that impacted the caseload size was the proximity of case managers to clients (AgriLIFE Extension). The proximity of clients to other clients and the severity of needs should be taken into consideration when developing an appropriate caseload size. Common issues consistent throughout reports were the collection

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of proper documentation to meet eligibility requirements. Proof of ownership, clear title, and heirship documentation are all required for housing assistance, documentation that is often difficult to access in disaster stricken areas. Settling all estate and property tax issues beforehand management was nearly non-existent.

4.4.2 BEST PRACTICES

Of the 13 articles that discuss case management three best practice themes emerge **the use of local community-based organizations, inter-organizational collaboration, and strategies to develop a streamlined application process.** As seen in outreach, **local organizations** have been cited (4 of 13 articles) as a more effective group to provide case management, because there is an established reputation and trust with residents. In the Hurricane Ike DCM-P the three providers that delivered the case management all had a direct link to the communities that they worked with (AgriLIFE Extension). The grass-roots, bottom-up approach is considered a successful way to established case management.

Ten of the thirteen articles found that **inter-organizational partnerships and collaboration** to be an important piece to the success of the case management process. The importance of the involvement and support from all parties involved throughout the disaster cycle for the sharing of knowledge that is useful to implementing productive changes in the way programs are designed and conducted. Organizational and working relationships between different levels of governmental agencies need to be established prior to a disaster (AgriLIFE Extension). Continued progress towards a long-term working relationship is ideal. With the established relationships in place, the process of information sharing can take place, which is important for all parties that are involved. This includes full disclosure and transparency to create consistency as a community works toward common goals.

Six of thirteen articles discuss the importance of an **effective triage system** to streamline client intake and recommend a consistent triage system across organizations. It has been found that simplifying the process by “[establishing] a project-wide communications system, [developing] a project-wide electronic document database to capture and store predetermined documents from each client,... [creating] a set of project-wide application forms, and [establishing] a memorandum of agreement (MOU) to share predetermined information with partnering organizations” can increase efficiency

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(AgriLIFE Extension, p. 113). This core process would be accessible by all providers with clear deliverables that are specific, measurable, and realistic (Acosta, Chandra, & Feeney, 2010; AgriLIFE Extension). This type of centralized system, would allow a client to fill out one set of paperwork to be qualified for any number of resources available (AgriLIFE Extensions). Within the system, establishing a simple timeline for clients and participants with clear goals and a plan for each client that they want to achieve throughout the process would foster communication and reduce confusion. Finally, using a centralized system for tracking, such as CAN, TAAG, or The Benefit Bank, across all providers can help streamline the tracking process and facilitate frequent contact with clients. The establishment of the Coordinated Assistance Network (CAN) following the September 11 attacks provided a platform for organizations working in the community to share information about the resources available. A web-based intake process standardized the case management approach in order to more quickly link clients with resources (Coordinated Assistance Network 2010). The utilization of systems such as this can greatly improve the coordination and effectiveness of recovery efforts.

Table 4. Reports Addressing Case Management

TITLE	ISSUES			BEST PRACTICES	
	COMMUNICATION	TRACKING & DOCUMENTATION	CASE LOAD SIZE	USE OF LOCAL ORGANIZATIONS	STREAM-LINED PROCESS
Disaster Case Management Program Guidance		X			X
Natural Disaster Housing Reconstruction Plan	X			X	X
National Disaster Housing Strategy					X
RAND Study- Navigating the Road to Recovery	X	X		X	X
Returning to a New Normal- Texas Disaster Case Management Pilot Project	X	X	X	X	X
Council on Accreditation- Disaster Recovery Case Management		X			X
Federal Immediate Disaster Case Management			X		X
OIG- Effectiveness and Costs of FEMA's Disaster Housing Assistance Program- AUG 2011		X			
Case Management with Displaced Survivors of Hurricane Katrina	X				
Case Management with Hurricane Katrina Survivors	X				
Disaster Housing Assistance Program (DHAP) Case Management			X		X
Emergency Housing Program Research and Recommendations	X				X
NVOAD Long-Term Recovery Manual				X	X
Far From Home					
TOTAL	6	5	3	4	8
PERCENT	42.9%	35.7%	21.4%	28.6%	57.1%

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4.5 DESIGN DECISIONS

The design of the home is a critical component to a housing recovery program. Many physical and cultural factors must be considered when rebuilding housing. Reconstruction efforts should take into consideration short-term and long-term needs of residents. Often the housing needs of survivors shortly after a disaster are very different five or ten years later. A sustainable design solution must not only work to provide for a rapid transition from temporary housing to permanent housing, but should also be adaptable to future needs of households.

In addition to meeting the appropriate design requirements, homes should also be constructed with multiple hazards in mind. Since coastal regions are at a greater risk of experiencing hurricanes and flooding, special consideration of wind and water hazards should be taken.

The damage anticipated by wind events varies with intensity and may cause wall failures, roof structure failure, chimney damage, uprooting of vegetation, failure of foundation, and damage from airborne debris. Building practices in wind hazard areas should place emphasis on the method and materials used in connecting building elements, such as walls, roof, foundation, and cladding materials used on roofs and walls. Utilizing reinforced connections and impact-resistant building materials may decrease the degree of loss experienced during a wind event. The method of attachment and quality of workmanship play a large role in preventing wind damage.

The Texas Windstorm Insurance Association (TWIA) regulates the issuance of windstorm and hail insurance policies in the state. This insurance is only provided in designated catastrophe areas which include the counties of Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kenedy, Kleberg, Matagorda, Nueces, Refugio, San Patricio, Willacy, and parts of Harris County. To be eligible for this insurance, structures must comply with either the 2006 International Residential Code with Texas Revisions, or the 2006 International Building Code with Texas Revisions unless otherwise stated in the manual. Specific wind speed resistance requirements are designated for each wind zone. In most cases structures are required to be inspected by an inspector appointed by the Commissioner of Insurance. Inspections are performed during construction for the foundation, rough framing, final framing, and exterior mechanical equipment. Each inspection phase considers specific characteristics of wind resilient construction referred to in the TWIA Plan of Operation.

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GENERAL PRINCIPLES FOR UNIT DESIGN

DURABILITY

Meet or exceed local building codes, particularly windstorm requirements.

ACCESSIBILITY

Consider accessible design for residents with mobility impairments. This may be required.

VISITABILITY

At least one 36" entry door should be on an accessible route and provide an accessible route throughout the first floor. This also may be a requirement for state or federal recovery funding. If required, refer to federal and state government code requirements for single-family affordable housing. This is particularly challenging for units with a pier and beam foundation that raises finish floor out of the floodplain.

ENERGY EFFICIENT PERFORMANCE

Meet Energy Star rating with a HERS index target of 80. To meet this rating the design must incorporate energy efficient options for cooling and heating equipment, envelope, windows, doors, water heater, thermostat, ductwork, lighting, and appliances.

WATER EFFICIENT PERFORMANCE

Minimum 20% reduction of indoor water use as compared to the Energy Policy Act of 2005 or local code, whichever is more stringent.

SPACE, LIGHT AND FUNCTION

Provide storage, access to daylight and views in all regularly occupied rooms, and operable windows.

AFFORDABILITY

All work must not only meet project budget goals, but also consider maintenance and operational costs of the building in the future.

INDOOR-AIR QUALITY

Use low emitting interior materials and install bathroom exhaust fans and kitchen range hoods exhausted to the exterior for moisture control.

INDOOR-AIR QUALITY

Use low emitting interior materials and install bathroom exhaust fans and kitchen range hoods exhausted to the exterior for moisture control.

FLEXIBILITY AND EXPANDABILITY

Meet local codes and consider sidewalk adjacency. Use water-wise and non-invasive adapted plant species in landscape and collect rainwater for irrigation.

RESPONSIVE TO LOCAL CONTEXT

Consider the existing neighborhood fabric and involve community stakeholders in design decisions.

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POTENTIAL WIND LOAD FAILURES INCLUDE

WOOD FRAME GABLE END ROOF STRUCTURE

These structures are susceptible to significant lateral loads and must be heavily braced from within the roof structure. Plywood sheathing is not a sufficient stiffener for the roof diaphragm. More aerodynamic roof structures such as the hip roof are recommended in place of the gable.

ROOF TRUSS BRACING

Lack of adequate truss bridging, lateral bracing, and cross bracing at end trusses are typical reasons for roof structure failure in wind events.

ROOF SHINGLES

Insufficient or incorrect securing of shingles can lead to significant roof damage. Shingles should be rated for high-wind areas and a water-resistant roof membrane should be applied to prevent water damage in the vent shingles are removed.

MASONRY WALLS

Vertical reinforcement is key in resilient masonry construction. Typical failures include poor mortar joints between the wall and slab, lack of tie beams, poor horizontal reinforcing, tie-columns, tie-anchors, and misplaced or missing hurricane straps between walls and roof structure.

FOUNDATION CONNECTIONS

Inadequate sill-to-masonry and sill-to-concrete foundation connections may allow the entire house to pull off the foundation. Ensure that connections provide a continuous load path from roof to foundation.

GARAGE DOORS

Wind can cause deflection in the garage door and induce excessive deformation of the entire system causing the door to separate from the structure. The breach of this opening can lead to extensive internal damage to the structure. Single car garage doors tend to perform better than double car doors in wind events.

DOUBLE ENTRY DOORS

These tend to fail at the center pin location and expose the interior to outside elements.

Windows Systems

Windows are particularly prone to failure and tend to dramatically increase damage to the house upon failure. Storm shutters and plywood coverings reduce wind damage to windows. The use of impact resistant glazing systems is also recommended.

Flooding and high velocity surge waters along the gulf coast can generate floating debris and cause erosion, damaging structures along the way. Water is also an incredibly destructive agent to many standard building materials. Physically avoiding flood prone areas

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should always be the first recommendation in rebuilding housing. Avoidance will reduce future costs for homeowners and ultimately create more resilient communities. Where that is not possible, elevating structures and equipment above potential flood levels and incorporating water resistant materials can reduce the potential damage from flood events.

POTENTIAL FLOOD INDUCED FAILURES & MITIGATION PRACTICES INCLUDE

FOUNDATION WALLS

Hydrostatic pressure foundation walls leads to failure and displacement of the structure. Walls made of un-reinforced masonry are particularly vulnerable. Sufficient openings in foundation walls help maintain a continuous load path around the structure. It is important that these openings not to be too high or obstructed in a flood event.

ELEVATE STRUCTURES

Elevating a structure to the base flood elevation established by FEMA is one of the best ways to prevent flooding of structures in the floodplain. Freeboard requirements to elevate homes 12 inches or more above the floodplain further reduce damage risk. Elevating mechanical equipment with the building is also advised. Slender columns offer little resistance to lateral loads that can occur from flooding and debris. Accounting for gravity and lateral loads, not just elevation, should be considered in designing appropriate bracing. Consider the possibility of trapping debris when designing supports for elevated structures. Cross-bracing closely spaced piles, grade beams and other components may trap debris and transfer floor and wave loads to the structure.

ANCHOR MATERIALS IN THE FLOODPLAIN

Unanchored materials become dangerous floating debris in a flood event. Residents located in the floodplain should routinely ensure that fuel tanks, mechanical equipment and other potentially dangerous items are anchored to the ground.

BREAKAWAY ELEMENTS

Elements that break away from the main structure can cause some of the worst and most preventable damage in a flood event. Walls designed to breakaway should not produce debris that is capable of damaging structure. Elements such as decks and patios should be structurally independent of buildings and constructed to break away without producing damaging debris. Stairs and ramps should be designed and constructed to resist flood loads and to minimize transfer of flood loads to foundation, or break away without causing damage.

FLOOD RESISTANT MATERIALS

Flood resistant materials should be used in areas below flood elevation. This includes structural steel that may be exposed to salt water, salt spray, or other corrosive agents. This structural steel should be hot dipped galvanized after fabrication and other metal components should also be used in all open or vented areas.

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Design decisions should also involve the future residents, guided by designers and outreach workers. As previously stated, it is important to provide housing solutions that satisfy the geographic and spatial needs of families working to resume their daily routines. Design decisions not only impact the future homeowner, but influence neighborhoods and communities. It is important that the design of the home fits the needs of the household as they move through the temp-to-perm process and is accepted by the community. By including the applicant in the design process of their home, they have the ability to add a more personal touch to what is available to them, which generates a higher level of buy-in, not only to the new property owner, but the community and the program as a whole.

4.5.1 ISSUES & OBSTACLES

In all but 4 of the 15 related articles, the issue of community acceptance of housing designs emerged. Out of all the housing recovery pilot programs since Hurricane Katrina, the main issue, in all instances, was the community's acceptance of the temporary and permanent homes. In many instances, the residents were not fully informed of the temporary to permanent housing transformations. Many people did not realize the Katrina Cottages--a temp-to-perm home after Hurricane Katrina--were a permanent housing solution. The timeline and process was not relayed and many residents did not fully understand the temporary house was a step towards the final permanent housing outcome. For the Alabama Alternative Housing Pilot Program (AHPP) team, there was lack of clear communication to the community because of the quantity of service areas and generally overextended. It also became difficult to deliver accurate and timely information to the community because plans were continuously changing and it was cited that "providing concrete information about the units' standards and a model home for people to walk through could help minimize rumors and speculation" (Abt Associates and Amy Jones & Associates, 2009, p. viii). An important finding of pilot housing programs in Mississippi and Louisiana following Hurricane Katrina was that managing community expectations was vital to the perceived success or failure of a re-housing approach. Due to their late adoption following the disaster event, both programs struggled to satisfy growing resident expectations of unit size and construction schedule as they progressed through the recovery process.

Additional concerns were raised related to fair compensation and residual effect of post-completion values. Following Katrina, residents felt that the style of homes did not fit with the character of the

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neighborhood (Natural Disaster Housing Reconstruction Advisory Committee, 2010; Abt Associates and Amy Jones & Associates, 2009). Many residents feared that the aesthetic quality and size would lower their property values. The Katrina Cottages were thought to be too small in size, resembling a trailer and akin to ‘outsider housing’ (Wilson, unpublished manuscript). Because temporary housing was associated with FEMA trailer camps, many residents feared similar conditions in their communities. In the MAHP, a county supervisor said that if the homes had come on a flatbed rather than on wheels residents would have been more apt to acceptance (Abt Associates and Amy Jones & Associates, 2009). The stigma of low quality housing coupled with the permanent nature of the homes resulted in extreme measures from jurisdictions. Many jurisdictions only permitted temp-to-perm units on private residential lots if a FEMA trailer was previously located on site, if there was evidence that they were building a permanent structure, or if local zoning codes allowed modular or manufactured homes (Natural Disaster Housing Reconstruction Advisory Committee, 2010; Abt Associates and Amy Jones & Associates, 2009). Such reactions “constrained the ability of households to participate in the decision making process, including design locations and reconstruction of damaged homes” (Andrews et al, 2013, p. 18).

The site selection of the temp-to-perm housing also contributes to community acceptance. Private sites are preferred in non-floodplain areas. Temp-to-perm construction on private sites minimally displaces residents, provides community continuity, and is cost effective. When households are able to rebuild in their previous community, it significantly increases capacity for recovery, as it “determines whether an occupant’s social network, community resources, and employment opportunities remain intact during the recovery process” (Perkes, 2012, p. 13). Unfortunately, many mobile homes that were purchased after Katrina could not be placed back on private properties if they were located in floodplains (Disaster, A.H.S.O, 2009). Instead, commercial sites or groups sites are an alternative option. Typically, displacing residents by selecting sites away from private property leads to rejection of temp-to-perm housing solutions. Many group sites were not well accepted in the communities where they were located. To incentivize host communities to participate, FEMA paid “impact fees” (Far From Home). To construct the Katrina Cottages, there were lengthy processes for obtaining properties, slowing housing recovery and contributing to mounting frustration with housing solutions (National Disaster

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Housing Reconstruction Advisory Committee, 2010). The longer the time elapsed to construction housing after a disaster, the more negative the recovery outlook is perceived (Abt Associates and Amy Jones & Associates, 2009).

Managing the community's expectations is critical to determine the success or failure of a housing program. In general, a "lack of understanding and consultation with affected communities, have sometimes resulted in poor site selection for resettlement, or socially and culturally inappropriate housing layouts and design leading in administrative failures" (Andrew, Arlikatti, Long, & Kendra, 2013).

4.5.2 BEST/PROMISING PRACTICES

Of the 13 articles that discuss design decisions, there are two best practice themes in the literature—**'Grow Home Approach' and local aesthetics.**

Six of thirteen articles discussed a 'Grow Home Approach', which **emphasizes the design of the home to grow and transition along with the differing needs of the household from temporary housing to permanent housing.** A household's needs may be drastically different immediately after a disaster verses months to years after a disaster--moving through disaster phases, emergency sheltering, temporary sheltering, temporary housing, and permanent housing (Perkes, 2012). The life cycle approach takes into consideration the different phases that a resident will go through as they move through the recovery process. Households stated that during the Mississippi Alternative Housing Program (MAHP) it was easier to begin to return to their basic daily routines when having a larger, semi-permanent house (Perkes, 2012). This is one of the main benefits of the temp-to-perm housing solution and a successful housing program--residents are established in a temporary house quickly to make the transition to permanent housing more efficient.

Residents can work with the case managers and designers in order to make design decisions that are tailored to fit their long-term needs. When a resident becomes involved in the design decisions of what their new home will look like, it empowers the occupants. Perkes found that the more input a resident had on the decisions to their home the more successful the recovery process was (Perkes, 2012). Gives them a sense of control to be able to accommodate their new home to fit their specific needs whatever those needs may be. Maintaining a balance between offering them choices and

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maintaining a sense of efficiency with the process. With the Gulf Coast Community Design Studio (GCCDS), clients were pre-qualified for the home details. The design team would perform a site analysis ahead of time before meeting with the client, this allowed them to have an idea of what was going to work and what was not, based on the client's needs (Wilson, unpublished manuscript). The client and designer also discussed what components of the client's damaged home they liked and disliked (Wilson, unpublished manuscript). The purpose of this was to get them to talk about the relationships between different rooms within their home to give the designer a better understanding. With the clients' story and the options that the design team presented to them they were able to do some quick variations of their already previous design (Wilson, unpublished manuscript). Even though the design team was changing floor plans around to cater to the each client the basic structural details and wall selections stayed the same so this did not add much time onto the recovery process (Wilson, unpublished manuscript). Other considerations for design choices include materials and uses for temporary and permanent housing (Abt Associates & Amy Jones & Associates, 2009).

Finally, eight of thirteen articles discuss the importance of **culturally sensitive housing designs**, appropriate for local aesthetics. The selection of materials for rebuilding houses should mirror cultural norms (Chang, 2010). Materials considered must take into consideration local motifs (Chang, Wilinon, Potanfaroa, & Seville, 2010). Neighborhood amenities should be worked into the community design. This will help maintain the community character along with maintain the attractiveness and desirability of the neighborhood for the long haul (Abt Associates and Amy Jones & Associates, 2009). The cultural design requirements may play as much of a role in meeting long-term recovery needs as the more classically utilitarian building necessities. The MAHP took into consideration the style of the homes that are built in the coastal South area when designing the Cottages. The majority of the homes in this area are the "shotgun" style homes with a front porch. The Cottages standing seam metal roof continues this design along with the variety of bright exterior colors (Abt Associates and Amy Jones & Associates, 2009). This choice of color allowed the units to fit in with the local aesthetics (Abt Associates and Amy Jones & Associates, 2009). With the GCCDS homes, local aesthetics with the current urban fabric was a priority primarily because they were largely infill construction and not one master-planned community (Wilson, unpublished manuscript). In all, a home should also be designed and structured in ways to establish a sense of community and help residents reconnect with their community.

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Table 5. Reports Assessing Design Decisions

TITLE	ISSUES		BEST PRACTICES	
	COMMUNITY ACCEPTANCE	SITE PLACEMENT	"GROW HOME APPROACH"	FITTING IN WITH LOCAL AESTHETICS
Creating a Safe Harbor after Hurricane Katrina: A Case Study of the Bayou La Batre Alternative Housing Pilot Program	X	X		X
Developing a More Viable Disaster Housing Unit: A Case Study of Mississippi Alternative Housing Pilot Program	X	X		X
Emergency Housing Program Research and Recommendations	X		X	
National Disaster Housing Strategy	X		X	
Natural Disaster Housing Reconstruction Plan	X			X
OIG- Future Directions of FEMA's Temporary Housing Assistance Program- DEC 2011	X	X		X
OIG- Unless Modified, FEMA's Temporary Housing Plans will Increase Costs by \$76 Million- (June 2013)		X		
Rapid Housing Recovery Program Research Summary	X		X	X
Rebuilding or Recovering? Considering Sustainability in the Context of Disaster Rehousing	X		X	X
SERRI Project	X	X	X	X
Resourcing Challenges Post-Disaster Housing Reconstruction: A Comparative Analysis				X
Far From Home		X		
The effects of housing assistance arrangements on household recovery: an empirical test of donor-assisted and owner-driven approaches			X	
TOTAL	9	6	6	8
PERCENT	69.2%	46.2%	46.2%	61.5%

4.6 CONSTRUCTION

The construction of housing is the final phase assessed in the housing recovery literature and comes with a variety of challenges. While the construction process may appear to begin post-disaster, it really should begin long before, because "ad hoc arrangements after a disaster seem to be unable to perform well to alleviate resource shortages in the long run" (Chang, Wilkinson, Potangaroa & Seville, 2010, p. 250). A significant amount of planning goes into a proper temp-to-perm housing construction process prior to a disaster event and "the absence of pre-event planning and preparedness, the inadequacy of efficient and flexible institutional arrangements, and the lack of proactive engagement of the construction industry into disaster management are underlying contributions to undermining resourcing performance in a post-disaster event" (Chang, Wilkinson,

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Potangaroa, & Seville, 2010, p.250). The construction process includes permitting and inspections, the procurement of materials, and the construction of homes. Solutions like the one proposed in this program, which are intended to transition from a temporary to permanent housing solution, must comply with zoning and building code regulations applicable for both temporary and permanent development. The following describes the issues and best practices identified in the literature.

4.6.1 ISSUES & OBSTACLES

Twenty articles were evaluated in all, posing a number of issues and obstacles including—choice of contractors and local building codes and ordinances. Five of twenty articles discussed the variety of issues that come with contractors. Many states have laws that require cities to go through a competitive bidding process to select a contractor. This bidding process often slowed down the process and forced many pilot programs to make changes to their designs due to the cost of construction and high bids (Abt Associates & Amy Jones & Associates, 2009). While this does make the process more competitive for contractors, many still experienced high costs associated with contractor's bids. For instance, the Alternative Housing Pilot Programs (AHPP) bids were higher than expected, reducing the number of units able to be built (Office of Inspector General (OIG, 2011). In the past, there was a small pool of contractors to choose from, because FEMA required private contractors (Individual Assistance-Technical Assistance Contractors), typically large multinational companies. This stalled local business and housing recovery because local companies were not hired and money was not circulating back through the local economy (Disaster, A.H.S.O, 2009). On the other hand, construction materials were hard to come by because larger commercial orders were preferred to smaller ones (Abrahams, 2014).

Although the disaster recovery process has its own emerging set of regulations and mandates, they must still fit within the constraints of the current zoning and regulations of the affected area. Building codes and regulations were an obstacle, cited eight of twenty times. Many cities became less lenient with zoning the more time that passed after the disaster (Abt Associates & Amy Jones & Associates, 2009; OIG 2011). A significant number of issues came about during the transition process of temp-to-perm housing following Katrina. Many jurisdictions would not allow the former home with temp-perm home on the same parcel (Natural Disaster Housing Reconstruction Advisory Committee, 2010). An example of such mandates were that “before the hurricane many of the jurisdictions made efforts

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through zoning and code enforcement to remove mobile homes as a permanent housing resource in their jurisdictions or permitted them to be installed only in designated areas” (Abt Associates & Amy Jones & Associates, 2009). This prohibited the temp-to-perm process to take place. Other related regulations included that manufactured homes do not meet the residential zoning minimum square footage requirements along with the temporary homes not meeting the municipalities’ setback requirements.

Working with a range of jurisdictions to design and build housing proved to be time-consuming. Following Katrina, memorandums of understanding (MOUs) were developed to agree on the design choices for disaster housing in communities. MOUs had to be tailored for each jurisdiction in MAHP, (Abt Associates and Amy Jones & Associates, 2009). The MOUs were used to give precise instructions in how the Cottages would be used in each jurisdiction. The reason for their use was because before the hurricane many of the jurisdictions permitted the use of mobile homes through zoning and code enforcement. Since each jurisdiction had different rules and regulations on where the Cottages could be placed, the non-profit decided that they needed to create a separate MOU for each jurisdiction so that the Cottages would be allowed (Abt Associates and Amy Jones & Associates, 2009). Also, modifications to the designs and construction occurred depending on the jurisdiction, all of which slowed housing recovery (Abt Associates and Amy Jones & Associates, 2009).

As previously discussed, in areas where there was little community acceptance of designs jurisdictions used zoning and code enforcement to limit the construction of temp to perm housing (Abt Associates and Amy Jones & Associates, 2009) (Wilson, unpublished manuscript). Federal regulations also limited the use of temp-to-perm structures, as FEMA requirements prohibited permanent installation of temporary to permanent homes in Coastal High Hazard Areas and floodplains (Natural Disaster Housing Reconstruction Advisory Committee, 2010). Rebuilding in the same area after a documented disaster now eliminated that area from being low risk. With it being a high risk area it was not suitable for long-term housing with the increased probability disaster could occur again.

4.6.2 BEST PRACTICES

Three major best practice themes emerged from the literature—**local contractors, pre-procurement, and sustainable development.**

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Using one pre-determined local or regional contractor, who is more in tune with local needs and cultural considerations was recommended in four of the twenty articles. Benefits to purchasing locally is that it will help stimulate local economies this not only brings purchasing power back to the local economy but it create a higher demand for more jobs as well (Abrahams, 2014). This also cultivates more investment by local labor and citizens into the success of the community. By using one local contractor to coordinate the efforts of the rebuilding, this will benefit all aspects of efficiency and consistency. The Alabama AHPP chose to use one general contractor to manage construction and was said to enhance collaboration and help reduce the chances of multiple contractors causing delays (Abt Associates & Amy Jones & Associates, 2009). Using one contractor can also cut down on the time for the bidding process (Natural Disaster Housing Reconstruction Advisory Committee, 2010). Using local contractors is a benefit due to the fact that they will be familiar with the local permitting and inspecting regulations. In the MAHP program they contracted with a local haul and install company to help ensure that the installation was coordinated with the permitting and the applicant preparation. This haul and install also served as a transition area where the homes were delivered and inspections can be done along with any repairs. This made the installation process go more smoothly and allowed them to make sure that all the units were consistent (Abt Associates & Amy Jones & Associates, 2009).

Pre-procurement was recommended in six of twenty articles. Pre-procurement identifies vendors, contractors, materials, supplies, and services pre-disaster that will be at the ready to be deployed in the event of a disaster (Woods, 2006). Florida's Division of Emergency Management developed a pre-procurement database that identified supplies and services needed (Woods, 2006). A major factor in why pre procurement is done, is the effort to control costs of materials when available. Material cost historically goes up significantly after the onset of a disaster. In an instance where materials have not been pre-procured another tool that is useful is joint purchasing and shipping, which cuts costs, speeds procurement, and limits the total transportation (Abrahams, 2014). With the vendors and contractors pre procured, communities can also give advanced expectation levels and parameters to work within. As seen in MAHP, "uniform design standard that could be shared with housing providers and manufacturers in advance of an emergency could shorten production time and improve quality of the units" (Abt Associates & Amy Jones & Associates, 2009). A flexible approach to the unit design and construction allowed the Alabama AHPP team to make modifications

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throughout the development process (Abt Associates and Amy Jones & Associates, 2009).

Sustainable development was also cited in three of the twenty articles that discussed construction. Sustainable houses can be environmentally sustainable, economically sustainable and socially sustainable. One of the biggest misconceptions is that sustainable development is not an option when it comes to disaster recovery. Sustainability is absolutely possible when rebuilding and by implementing these principles into the construction phase, as well as, the entire housing recovery process can lead to resilience and robustness of the built environment (Yi & Yang, 2014). An important aspect to successfully implementing sustainable development is by setting goals and involving stakeholders before the construction process (Yi & Yang, 2014). The phrase “building back better” should be used in conjunction with “building back safer” which not only incorporates building more aesthetically pleasing but also in a way that incorporates a more sustainable use of the land and resources available. Incorporating sustainable development into the housing recovery process is mainly based upon the pre-procuring of services as mentioned previously. Other forms of sustainable development are more holistic, or “alternative designs with flexible and interchangeable materials, proactive processing of waste from deconstruction, and coordinated recycling and reuse, can also be new research topics that respond to the challenges of construction waste reduction and resourcing problems during post disaster reconstruction” (Yi & Yang, 2014,p.28). Rubble reuse programs used for non-load-bearing structures can also be a part of a sustainable housing program. An example of this was that rubble reused as an aggregate for concrete blocks and in concrete slabs (Abrahams, 2014). By utilizing reuse programs communities can alleviate an additional hurdle in the recovery process. By reusing previous material it has shown that communities have adapted more quickly. A similar route for success involves the inclusion of the community in the sustainability efforts (Abrahams, 2014). The ability to construct homes in this way considers long-term longevity and resilience.

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Table 6. Reports Addressing Construction

TITLE	ISSUES		BEST PRACTICES		
	CONTRACTORS	BUILDING CODES & ZONING REGULATIONS	USE OF LOCAL CONTRACTORS	PRE-PROCURING	SUSTAINABLE DEVELOPMENT
Closing Gaps in Local Housing Recovery Planning for Disadvantaged Displaced Households				X	
Creating a Safe Harbor after Hurricane Katrina: A Case Study of the Bayou La Batre Alternative Housing Pilot Program	X		X		
Developing a More Viable Disaster Housing Unit: A Case Study of Mississippi Alternative Housing Pilot Program		X			
Emergency Housing Program Research and Recommendations		X			
Far From Home		X			
GAO: Hurricane Katrina Improving Federal Contracting Practices in Disaster Recovery Operations					
Handbook of Disaster Research					X
Hurricane Katrina Improving Federal Contracting Practices in Disaster Recovery Operations			X	X	
National Disaster Housing Strategy		X			
Natural Disaster Housing Reconstruction Plan	X	X	X	X	
OIG- Future Directions of FEMA's Temporary Housing Assistance Program- DEC 2011	X				
OIG- Unless Modified, FEMA's Temporary Housing Plan - June 2013	X	X			
Rebuilding or Recovering? Considering Sustainability in the Context of Disaster Rehousing		X	X		
Research Trends of Post Disaster Reconstruction: The Past and the Future					X
Resourcing Challenges Post-Disaster Housing Reconstruction: A Comparative Analysis				X	
SERRI Project		X		X	
TDHCA: Community Development Block Grant Disaster Recovery Program Hurricanes Ike & Dolly Rd 2	X				
The Barriers to Environmental Sustainability in Post-Disaster Settings: Transitional Shelter Implementations in Haiti				X	X
OIG- Effectiveness and Costs of FEMA's Disaster Housing Assistance Program-Aug 2011					
Rapid Housing Recovery Program Research Summary					
TOTAL	5	8	4	6	3
PERCENT	27.8%	44.4%	22.2%	33.3%	16.7%

PROGRAM COMPARISON CATEGORIES

5.0 CONCLUSION & RECOMMENDATIONS

The relationship between the categories covered in the comparison report need to become a part of what is known as the RHRPP approach. By integrating the findings of the comparison report into the RHRPP process there is a higher rate for the ability to successfully complete the recovery process. The main areas highlighted through the comparison report that should be included in the RHRPP process are; Communication, proper personnel and training, use of local/nonprofit organizations, community participation, multi-sector partnerships and collaboration, knowledge of vulnerable populations, the pre procuring of services, and long-term process that starts way before a disaster occurs. These highlighted topics are the most influential when trying to perform a recovery process. Regardless of the category (i.e. damage assessment, construction, etc.), these main points were evident in the subject matter. With these main ideologies found in the report, they do not simply relate to their own topics but have relevance to each other and can impact multiple areas. It has been found that they also cannot lead to the highest levels of success by utilizing them individually. These areas must be used in conjunction with one another due to their increased rates of success when used together. An underlying theme that must be constant throughout the process is effective communication. This includes communication between all parties involved during all steps of the process. Looking at the role of the case manager displays the importance of the connectivity between the main themes found. The case manager must be part of a local organization that has made steps prior to a disaster to help be prepared for its recovery. The case manager would need to be familiar with its vulnerable populations as well as a knowledge of pre procured services before events took place. In doing so, previous partnerships will have been made while the case manager was preparing and training for a disaster recovery situation. This will create a solid foundation for the case manager to achieve success through a long-term process. A housing recovery approach needs to be implemented as a whole and each and every category is important to lead to a successful completion of the housing recovery process. Along with all steps to the housing recovery process it should guarantee households the right to move, right to stay, and right to have a say. Giving people the option of moving back to their original neighborhoods they should be able to do so. As mentioned previously that the greatest success has come from the households that are able to rebuild and recover within their same neighborhood.

PROGRAM COMPARISON CATEGORIES

Along with including all of these main points throughout, the order of events is equally as important. This process must start with the damage assessment in that when large areas and or neighborhoods have substantial damage and it is negatively publicized through the media along with any preconceived notions on how the area was prior to the storm severely impacts the way in which that area will recover. This was seen in the Lower Ninth Ward after Hurricane Katrina, in that with all the bad publicity and severe damage many did not believe that this neighborhood was worth rebuilding. This obviously did not take into account the lives, culture, and historical factors that is what made this area known for what is it today prior to the storm. (Green, Bates, & Smyth, 2007). All of the categories covered relate back to the disaster management process and how it is important for the cycle to be integrated into communities. Although this process focuses on the recovery aspect there are certain measures that need to be done throughout all phases of the system. One would be viewed as successfully completing the recovery process when they are in long-term housing while regaining their role in the community permanently and able to return to everyday life.

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