

FEMA

Prepared by:

**National Planning Center of Expertise
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National Hurricane Program Office**

**State of Alabama
Post Storm Assessment: Hurricanes Gustav and Ike
Final Report - December 2009**

**STATE OF ALABAMA
POST STORM ASSESMENT: HURRICANES GUSTAV AND IKE**

FINAL REPORT

Prepared for:

Federal Emergency Management Agency
National Hurricane Program



FEMA

Prepared by:

U.S. Army Corps of Engineers
National Planning Center of Expertise for
Coastal Storm Damage Reduction
National Hurricane Program Office



And



U.S. Army Corps
Of Engineers ®
Mobile District

And



Dewberry®

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EXECUTIVE SUMMARY

Since 1980, the Federal Emergency Management Agency (FEMA's) National Hurricane Program (NHP) has developed Hurricane Evacuation Studies (HES) as a service to State and local emergency managers, to provide a sound technical basis for their hurricane evacuation planning and decision-making. The HES products analyze and provide objective data on the following evacuation planning variables: Hazard, Vulnerability, Behavior, Transportation and Shelter. Following almost every significant storm since 1980 (the exception were Hurricanes Katrina and Rita in 2005), a Post-Storm Assessment (PSA) of the HES products has been conducted under the authority and funding of the hurricane's recovery operations, to determine the accuracy of the HES products and foster improvement of their methodologies as warranted. The PSA also serves as a review of other tools and products provided by the NHP, as well as emergency management data collection and analysis efforts of the Federal government in general, and the FEMA Directorates in particular, to ensure that these efforts are coordinated for maximum effect and efficiency.

This PSA for the State of Alabama was conducted in response to Hurricane Gustav, which entered the Gulf of Mexico early on August 31st, 2008 as a Category 3 storm on the Saffir-Simpson Scale (SSS) and 36 hours later made landfall near Cocodrie, LA, as a Category 2 storm; and Hurricane Ike, which entered the Gulf of Mexico on late on September 9th as a Category 1 storm and 3 ½ days (84 hours) later made landfall on Galveston Island, TX, as a Category 2 storm. Hurricane Ike and Gustav provided an opportunity to answer several key questions regarding major FEMA-Corps hurricane evacuation study planning efforts:

- Did local and state officials use the products produced in these HES studies?
- Were study data regarding storm hazards, behavioral characteristics of the threatened population, shelter information, evacuation clearance times, and decision making tools accurate and reliable?
- Which study products were most useful and which least useful - what improvements could be made to current methodologies and products?

The PSA was conducted by interviewing local and State emergency managers who responded to the storm to obtain data on the utilization of NHP products and tools, including the HES for the area. Study teams consisting of representatives from FEMA, the U.S. Army Corps of Engineers, and Dewberry visited with these communities and individuals throughout the State of Alabama. Media representatives in the storm threatened area were also interviewed to determine the extent of public information provided to the threatened areas and whether they used any of the HES products to alert the public of the approaching storm. A questionnaire covering the NHP's products and tools, including the components of the HES, was developed and utilized to capture pertinent data for the assessment. Internet searches, interviews and contacts with other agencies were also conducted. All the collected data is compiled, analyzed and published in the following report.

Meetings were conducted with representatives from the Baldwin and Mobile County Emergency Management Offices, the Alabama Emergency Management Agency (AEMA) and local TV, radio and print media in Mobile County. These meetings were conducted in each county emergency operating center (EOC) the week of June 22, 2009.

The main issues that surfaced in these sessions were:

Local: A major topic was the use of HURREVAC as a decision assistance tool and the need for additional training for the software. The possibility of retrofitting shelters and critical needs facilities so that critical needs populations can safely be sheltered in place or close to home was discussed. Additional shelter spaces are needed locally along with a state-wide evacuee tracking system, and greater involvement with the HLT during storm events. The importance of the ELT and ETIS were stressed along with the need for real-time traffic data. The heightened expectations of the public for assistance during the evacuation process were a major concern and the importance of better public information and preparedness materials was also a major topic. All expressed a concern with the age of the existing HES and the need for an update.

State: The major issues and topics of discussion during the State agency meeting were the problems associated with sheltering evacuees from other states. Louisiana evacuees were bussed into Alabama and the State was left with the task of providing proper support and services. Many concerns focused on the need for a state-wide evacuee and shelter tracking system.

Media: The media meetings were not well attended and the main issues discussed were the desire of the media to have more access to the EOC and to decision makers. More localized public information materials were also a topic of discussion. Generally, relationships between the emergency management agencies and the media were very good and most conducted and/or participated in annual hurricane expos and public information seminars to kick-off the hurricane season.

A significant amount of data was collected during this assessment on topics related to and issues encountered by the State and Locals during a storm. Included in these topics were: vulnerable populations affected by the storm, the shelters utilized for in-state as well as out-of-state residents, the behavioral tendencies of the threatened populations, how well the transportation networks performed and whether contra-flow was utilized, how evacuation decisions were made, the extent of public information provided to the public, and whether other FEMA programs had a positive or negative effect on the response to the storm.

Some of the main gaps and issues that were raised included:

- Provider evacuation states must work to become more self-sufficient in sheltering their own evacuated public seeking safe shelter. Instead of farming evacuees out to other states, host states should EMAC shelter management teams to the evacuating state to help manage their shelter capacity capability.

- The need for a statewide evacuee tracking system that can be monitored in real time and coupled with a statewide shelter data base.
- Requesting coastal states to house evacuees from other coastal states without compromising the capability to house their own residents.
- The age of the Alabama's most recent HES and the need for a complete update of the HES, including new surge and evacuation zone maps, a new behavioral analysis and an updated transportation analysis.
- The fact that public expectations have been raised and how the public has been conditioned to rely on support from the Government in disaster situations. This attitude must be changed.
- The use of contra-flow to facilitate evacuations. It was NOT used during Ike or Gustav but locals must be prepared for the future.
- The need for better communications between state agencies in neighboring states to alleviate the traffic bottlenecks on the east/west corridors.
- Progress has been made in the public information and mass communication arenas but more needs to be done for future storms.
- ETIS, or any new similar tool that is developed, needs to incorporate new traffic flow tracking technologies that have become available.
- The HAZUS and SLOSH models need to be more user-friendly and more training is needed for these tools.
- More training is needed for HURREVAC. With the 2010 version of HURREVAC currently being beta tested, everyone will need training on the new version prior to the start of the 2010 Hurricane Season
- New GIS-based tools containing comprehensive data to assist decision makers and emergency managers are needed.
- Although the sun was out and the storm center tracked well to the south and west, Ike caused storm surge and wave impacts along the Alabama Coast. Forecast products and warnings issued may not have adequately communicated the threat, which impacted evacuation decision making and emergency response. There is concern about how to address this situation so it does not happen again in the future.
- Elderly populations are not likely to utilize mass bus, plane and train evacuation methods. Generally, this population does not want to seek shelter 100's of mile from their home in a community that is unfamiliar to them. Katrina demonstrated this fact. 85% of all Katrina deaths in LA were over the age of 50. 65% were over the age of 65.

Finally, an analysis of the HES data and products currently available to the emergency managers was conducted. Issues discussed consisted of whether and how HES products were utilized, how accurate they were during these storm events and if the users had recommendations for improving or enhancing the products.

The findings exemplify that the HES data and products, although well known and readily available, are outdated and do not accurately depict how evacuations are issued in the state. For these reasons, the HES data and products were not always fully utilized in the decision making process. Many times, past experiences with previous storm events were the determining factor when making important evacuation decisions. The Governor issued general evacuation orders, leaving local emergency management agencies to decide on more specific locations to be evacuated. The use of the official evacuation zones from the HES was not widespread. In Baldwin County, for example, the official evacuation zones were being revised and new zone maps were not yet approved. More training on the HES products and how to best utilize them is sorely needed.

Major recommendations from this post-Gustav and Ike effort include:

1. Coastal states need to house their own residents to prevent compromising the capability of neighboring States to shelter their own residents. (Example: While housing out-of-state evacuees for Gustav, AEMA could not plan to house Alabama's local residents for Ike).
2. FEMA should consider modifying the Pre-disaster Declarations Program so that host states are able to assist evacuees with Individual Assistance in a timely manner.
3. Provide an easy-to-use, maintainable GIS Based tool containing the HES and other data that will assist local emergency managers with planning and decision making.
4. Simplify and speed up the mitigation process for retrofitting structures for use as shelters under FEMA's 406 Hazard Mitigation Program.
5. Make it easier to apply for and receive Federal mitigation funds for projects under construction that need design modifications to retrofit for use as shelters.
6. Increase installation of permanent, protected real-time traffic counters.
7. Expand the use of other Intelligent Transportation Systems (ITS) for traffic management programs such as ETIS (Evacuation Traffic Information System) and provide real-time traffic movement data.
8. HLT members need to regain permission from FEMA to contact local EM officials directly during storm events.
9. Develop a separate forecast/warning product for storm surge to address potential surge impacts both inside and outside of the hurricane/tropical storm warning area. Although never under a hurricane/tropical storm warning, the coastal counties of Alabama experienced storm surge and wave impacts from Hurricane Ike.

10. Keep the *Introduction to Hurricanes* planning courses for EM Directors in Miami at the NHC and consider offering the course more frequently.
11. Improve North and South roads for coastal evacuees. Examples include: Highway 59 in Baldwin County and Highway 98 in Mobile County.
12. Consider use of Southern Link two-way radio and wireless phone as national best practice.
13. Continue to expand the use of culturally modern tools such as Twitter, Facebook and Web blogs, building on actions taken by the Alabama EMA.
14. Inclusion of local EM Directors in state EOC conference calls and communications.
15. Language and cultural barriers need to be addressed.
16. Re-entry plans for coastal communities need to be developed.
17. Develop a procedure to allow Event Management Software to accept and display alerts and timetables from HURREVAC

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1 INTRODUCTION

OVERVIEW

The Federal Emergency Management Agency's National Hurricane Program (NHP) helps protect communities and residents from hurricane hazards through various projects, activities, funding and technical support. The program is a multi-agency partnership involving numerous Federal agencies, including: FEMA, the U.S. Army Corps of Engineers (USACE). The National Oceanic & Atmospheric Association (NOAA) and the National Weather Service (NWS). Traditionally, the main product produced by the NHP has been the Hurricane Evacuation Study (HES), which uses national consensus standard methodologies to develop analyses and decision-making tools for population protection from hurricanes. State and local governments use the planning assumptions and decision-making tools provided by the NHP to plan for and implement hurricane protection and evacuation decisions.

A traditional HES includes the following five (5) components:

Hazards Analysis – quantifying potential wind speeds, surge inundation areas, water depths and other hurricane hazards that could be produced by a combination of hurricane intensities, approach speeds, approach directions, and tracks that have a reasonable meteorological probability of occurrence within the study area. The Sea, Lake and Overland Surges from Hurricanes (SLOSH) model from the National Oceanic and Atmospheric Administration (NOAA) is used to predict the storm surge heights and inundation areas.

Vulnerability Analysis – identifying the areas, populations, and critical facilities that are potentially vulnerable to flooding and extraordinary wind damage under various hurricane threats;

Behavioral Analysis –developing assumptions about how the population in and around the vulnerable area will react to threats of hurricanes;

Shelter Analysis – identifying shelter locations, capacities, demand, and vulnerability; and

Transportation Analysis – calculating evacuation clearance times for a range of hurricane threats, helping to define the evacuation roadway network and evaluating and recommending traffic control measures or highway improvements needed for improved traffic flow.

Another main product of the NHP is the annual update, maintenance and operation of HURREVAC, the decision assistance software package developed to provide a “real-time” user interface for emergency managers. HURREVAC combines the hurricane forecast products of the National Hurricane Center with data from the HES and provides a “smart picture” that emergency managers can use to track the storm and make evacuation and preparedness decisions.

The NHP also offers a unique training program held annually at the National Hurricane Center (NHC) in (Miami, FL) to train State and local emergency managers and decision-makers in the use of the HES products and to provide an overview of NHC operations, procedures and products.

POST STORM ASSESSMENT

Following almost every significant storm since 1980 (the exceptions were Hurricanes Katrina and Rita), a Post-Storm Assessment (PSA) of the HES products has been conducted under the authority and funding of the hurricane's recovery operations, to determine the accuracy of the HES products and foster improvement of their methodologies as warranted. The PSA also serves as a review of other tools and products provided by the NHP, as well as emergency management data collection and analysis efforts of the Federal government in general, and the FEMA Directorates in particular, to ensure that these efforts are coordinated for maximum effect and efficiency.

This PSA for the State of Alabama was conducted in response to Hurricane Gustav, which entered the Gulf of Mexico early on August 31st, 2008 as a Category 3 storm (SSS) and 36 hours later made landfall near Cocodrie, LA, as a Category 2 storm (SSS); and Hurricane Ike, which entered the Gulf of Mexico on late on September 9th as a Category 1 storm (SSS) and 3 ½ days (84 hours) later made landfall on Galveston Island, TX, as a Category 2 storm (SSS). Study teams for Hurricanes Gustav and Ike representing FEMA, the Corps of Engineers and the contractor visited with local and state officials throughout the areas of the State that directly responded to the storm or were directly or indirectly impacted by the event. Coastal and inland counties of Alabama were interviewed. Meetings conducted and counties represented are shown on Figure 1-1.

Discussion with local emergency management officials focused on study products and their use relative to the evacuation decision process, evacuation clearance time, sheltering, and public information. Discussions with state officials centered on the role the state played in the evacuation process, including the use of study products in communicating with local officials and the media. Media representatives were asked to focus on study related materials that they possessed and that were broadcast to the general public. The participants also addressed the types of materials and public information products that they would like to have.

This report documents the findings of the PSA study team to include an assessment of the effectiveness of HES products provided to State and local emergency managers, how the products were used for each storm, and the recommendations for their improvement.

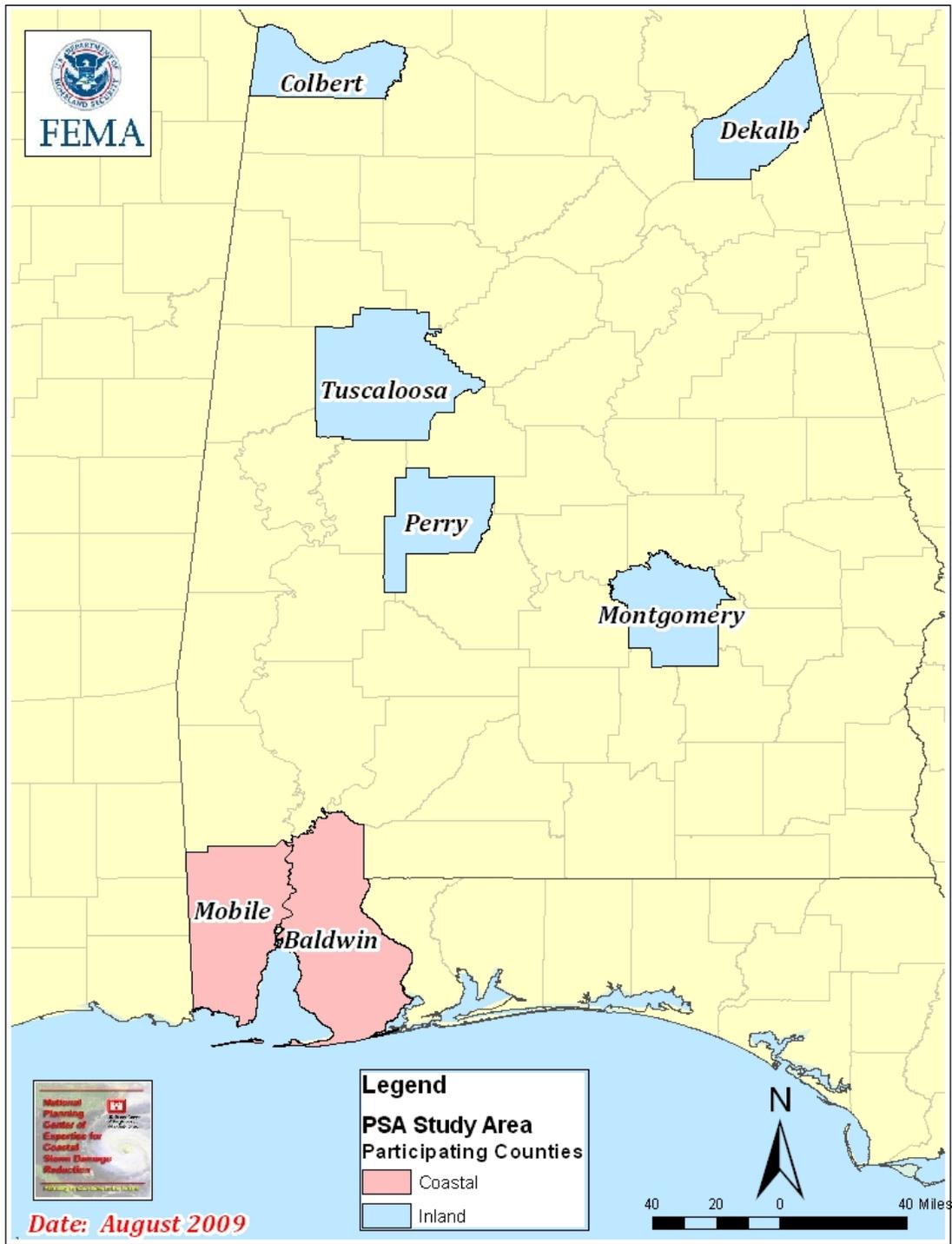


Figure 1-1: PSA Study Area

1.1 STUDY AUTHORITY

The authority for this study is Interagency Agreement (IAA) HSFEHQ 09-X-0045 and the corresponding Statement of Support between FEMA and the USACE, entered into under the Economy Act, 31 U.S.C. 1535. The IAA and Statement of Support authorize the USACE to conduct this PSA on behalf of FEMA. The USACE Mobile District contracted with Dewberry under Contract # W91278-06-D-0064, Task Order # 0002 for assistance with conducting this PSA.

1.2 STUDY AREA

The study area included the coastal counties of Mobile and Baldwin and the inland counties of Colbert, DeKalb, Perry, Montgomery and Tuscaloosa (Figure 1-1). These inland counties offered support to the coastal Alabama counties during Hurricane Gustav. Community colleges in these inland counties served as shelters for evacuees from Louisiana. Tuscaloosa County also provided valuable support with the heavy traffic on Interstate 59 caused by evacuees from Louisiana and Mississippi.

1.3 HURRICANE IMPACTS

HURRICANE GUSTAV

Storm Summary:

Hurricane Gustav formed from a tropical wave that moved off the coast of Africa on August 13, 2008. Westerly shear prevented Gustav from gaining tropical storm strength until August 25th northeast of Bonaire. Later that day, Gustav strengthened into a hurricane with maximum sustained winds of 80 knots before making landfall in Haiti. After significantly weakening over Haiti, Gustav emerged as a tropical storm with maximum sustained winds of 40 knots. Continuing westward, Gustav encountered the warm waters of the northwestern Caribbean Sea, allowing for rapid intensification on August 30th before making landfall on the Isle of Youth, Cuba. Gustav weakened from a Category 4 (130 knots) to tropical storm from the interaction with Cuba. Continuing into the Gulf of Mexico, Gustav regained some strength, making landfall near Cocodrie, LA as a Category 2 storm with maximum sustained winds of 90 knots. The full NHC Tropical Cyclone Report for Hurricanes Gustav and Ike can be found online at http://www.nhc.noaa.gov/pdf/TCR-AL072008_Gustav.pdf and http://www.nhc.noaa.gov/pdf/TCR-AL092008_Ike.pdf, respectively.

Baldwin County:

Baldwin County officials issued a voluntary evacuation to residents in the Fort Morgan area and people living along streams and rivers that usually flood. Storm surge damaged beaches and caused areas around Fort Morgan to flood. Two shelters were opened and housed 370 people.

Mobile County:

Mobile County issued a voluntary evacuation of residents generally south of I-10 and in areas east of I-65 that usually flood. Nine shelters were opened and housed 2000 people. Several of the shelters had evacuees from Mississippi and Louisiana. Several areas had high water from storm surge. The causeway was closed as were many streets near downtown Mobile due to high water. Bayou Sara in Saraland rose out of its banks and 53 residents had to be evacuated. The Bayou rose to the second highest reading ever.

Rainfall:

The most noticeable affects from Hurricane Gustav were a result of the heavy rains that fell over Baldwin and Mobile Counties. Reports in southwest Baldwin County noted water overflowing ditches and flooding most roads with up to several feet of water, making them impassible for hours. In central, southern and eastern portions of Mobile County, the storm tide prevented proper drainage of roads and small streams, causing floods on many roads. In Saraland, Chickasaw, and Pritchard, a combination of rainfall and expanded wind field of the storm caused flooding and damage after the storm had passed. Table 1-1 and Figure 1-2 show the total rainfall from Hurricane Gustav.

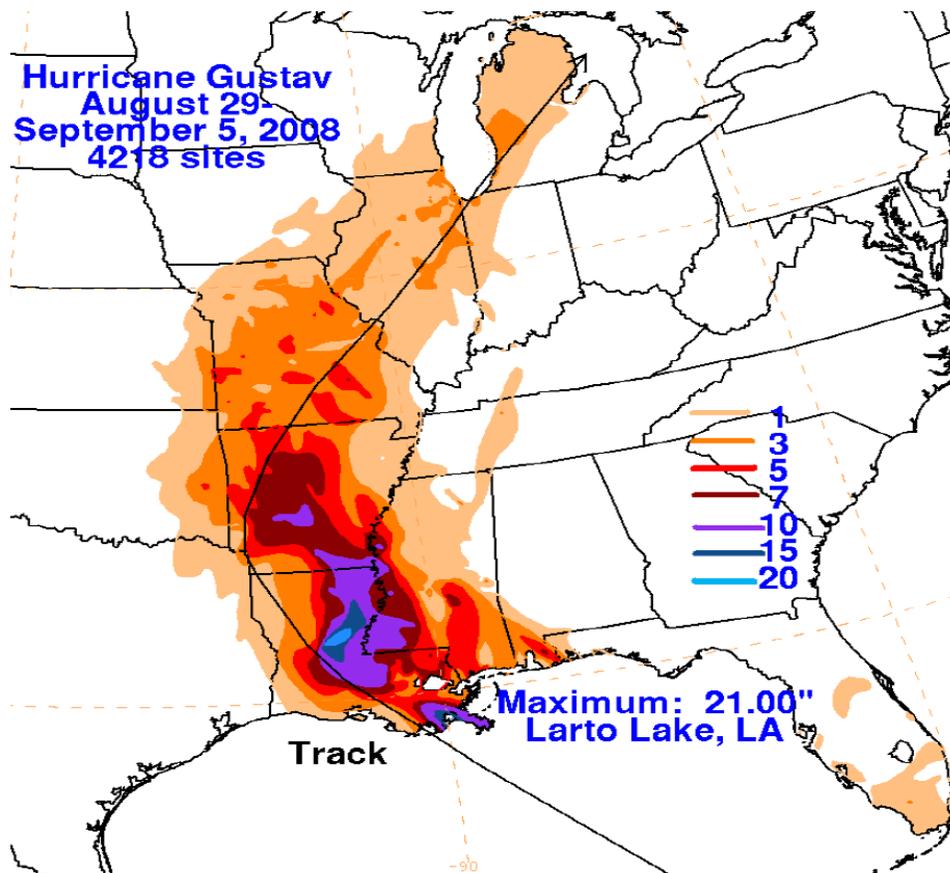


Figure 1-2: Storm Total Rainfall Map for Hurricane Gustav From NWS Post Hurricane Gustav Tropical Cyclone Report

Table 1-1: Storm Total Rainfall-Hurricane Gustav*

City/Town	Lat/Lon	County	Rainfall (in)
Loxley	30.61 -87.75	Baldwin	8.40
Fairhope	30.52 -87.90	Baldwin	4.61
Elberta	30.41 -87.60	Baldwin	3.04
Robertsdale	30.97 -88.72	Baldwin	7.46
Leakesville	31.15 -88.56	Green	3.76
McLain	31.10 -88.83	Green	3.37
Saraland	30.82 -88.07	Mobile	7.32
Semmes	30.77 -88.26	Mobile	3.83
Downtown Mobile**	30.69 -88.04	Mobile	3.01
Downtown Mobile**	30.69 -88.04	Mobile	8.82
Downtown Mobile**	30.69 -88.04	Mobile	8.03
Downtown Mobile**	30.69 -88.04	Mobile	6.31
2 SW Downtown Mobile**	30.69 -88.04	Mobile	5.65
2 WSW Downtown Mobile**	30.69 -88.04	Mobile	3.52
University of South AL	30.69 -88.18	Mobile	3.28
1W Downtown Mobile	30.68 -88.06	Upper Mobile	5.51
Prichard	30.73 -88.09	Upper Mobile	5.23

* Data collected from NWS Mobile/Pensacola Gustav Post-Tropical Cyclone Report.

**Most of the downtown Mobile reports were from Weatherbug sites at fire stations around the city.

Wind:

The wind impacts in Alabama from Hurricane Gustav were minimal. The highest observed sustained wind speed was 46 knots at Middle Bay Light, AL and strongest recorded gust of 53 knots at Fort Morgan. Table 1-2 shows observed wind speeds and gusts in knots for all stations operating in Alabama that saw significant weather. The wind swaths of Hurricane Gustav are presented in Figure 1-3. The past wind swath graphic was obtained from hurricanemapping.com and represents a composite of observed wind ranges from past advisories.

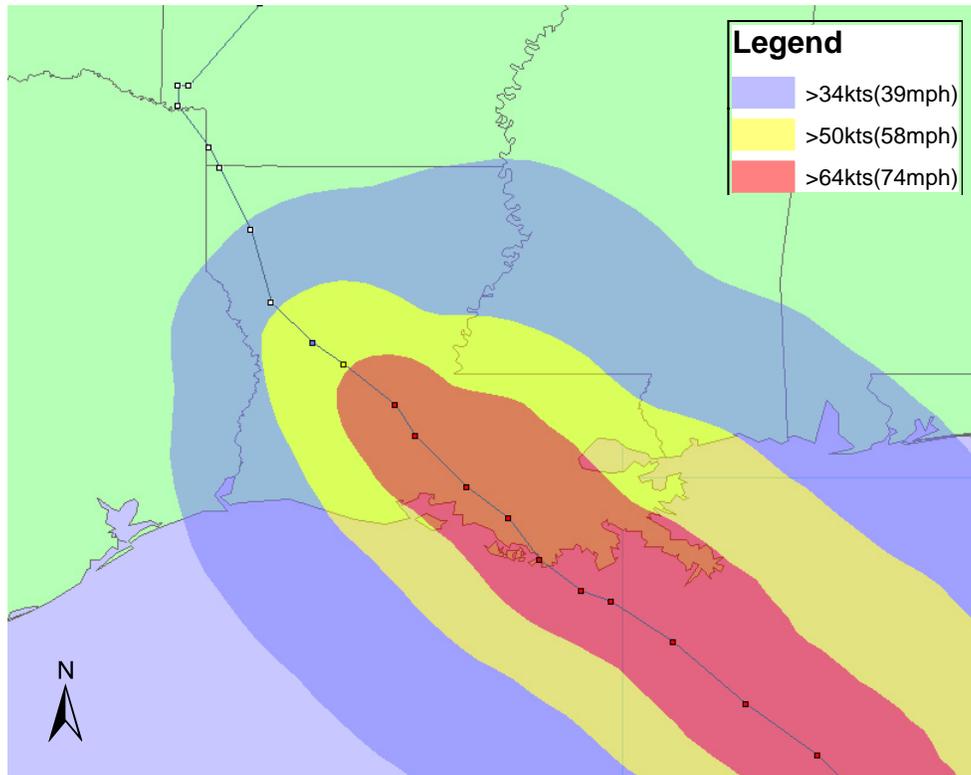


Figure 1-3: Past Wind Swath of Hurricane Gustav from HurricaneMapping.com

**Table 1-2: Lowest Sea Level Pressure/Maximum Sustained Winds and Peak Gusts—
Hurricane Gustav**

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed		
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC) ^a	Sustained (kt) ^b	Gust (kt)
International Civil Aviation Organization (ICAO) Sites					
KBFM – Mobile Brookley 30.64N 88.07W	01/0852	1004.7	01/1900	32	44
KJKA – Gulf Shores 30.29N 87.67W			01/1900	26	40
KMOB – Mobile Regional 30.67N 88.24W	01/0902	1004.4	01/2056	23	38
Coastal-Marine Automated Network (C-MAN) Sites					
DPIA1 – Dauphin Island 30.24N 88.07W 13.5m	01/1100	1003.3	01/1400	36	52
National Ocean Service (NOS) Sites					
MCGA1 – Mobile Coast Guard 30.65N 88.06W 16.6m	01/0848	1004.9	01/1816	28	39
8734673 – Fort Morgan 30.23N 88.03W	01/0824	1000.9	01/0930	43	53
University Networks					
DPHA1 – Dauphin Island DISL 30.25N 88.08W 14.0m	01/0722	1002.7	01/0722	39	
MBLA1 - Middle Mobile Bay DISL 30.44N 88.01W 10.0m	01/0646	1001.0	01/1244	46	

Surge:

Storm surge damage from Hurricane Gustav was minimal in Alabama. Most storm surge damage occurred along beachfront areas and on Dauphin Island. The maximum storm tide elevation observed (tide gauge) was 7.5 feet (datum unknown) at Fort Morgan in Baldwin County (data from Mobile/Pensacola Post-Tropical Cyclone Report). Dauphin Island saw storm tide heights of 4.2 feet and Bayou La Batre experienced 6.2 feet of storm tide (datum unknown). A four million dollar berm on the west end of Dauphin Island was destroyed by the surge from Gustav at the Mobile Coast Guard station, there was a 6.7 foot observed storm tide. Table 1-3 shows the maximum observed storm tides for operating tide gage stations in Mobile and Baldwin Counties. Figure 1-4 shows the SLOSH model output of surge heights for Hurricane Gustav. Surge height tags are placed at gauge locations listed in Table 1-3.

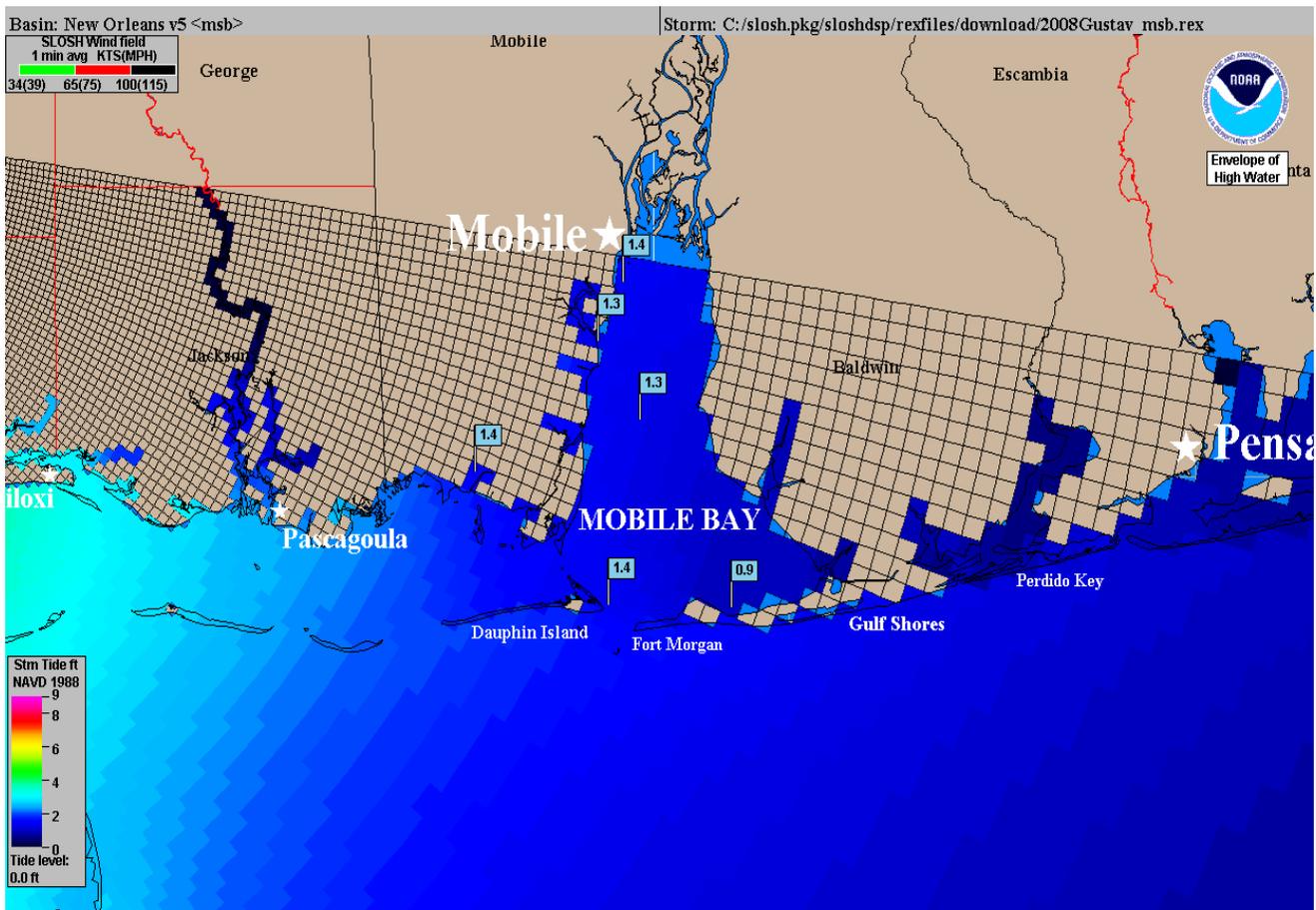


Figure 1-4: Storm Surge Heights from the New Orleans SLOSH Basin for Hurricane Gustav

Table 1-3: Maximum Storm Surge and Storm Tide during Hurricane Gustav

County	Gauge Location	Surge (ft)	Tide (ft)	Date/Time	Beach Erosion
Mobile	Bayou La Batre	5.50	6.20	01/1526	Unknown
Mobile	Dauphin Island	3.50	4.20	01/1617	Major
Baldwin	Fort Morgan	6.90	7.50	01/1433	Moderate
Mobile	Mobile Bay	4.40	5.10	01/1711	Unknown
Mobile	Middle Bay	3.90	4.60	01/1552	Unknown
Baldwin	Perdido Pass	3.20	3.90	01/1830	Unknown
Mobile	Mobile State Docks	4.20	4.90	01/1912	Unknown
Mobile	Coast Guard Sector Mobile	6.00	6.70	01/2012	Unknown

Tornadoes:

There was a report of 1 tornado touching down in Elberta, Baldwin County, AL. It was rated an EF-0 on the enhanced Fujita scale, causing minor damage to a mobile home and several trees down.

HURRICANE IKE

Storm Summary:

Hurricane Ike developed from a vigorous tropical wave that emerged off the west coast of Africa on August 29th, passing over the Cape Verde Islands on the 30th. The wave gradually became better organized during the next two days. Tropical Depression #9 advisories were initiated by 10 AM CDT September 1st, with the depression being upgraded to Tropical Storm Ike by 4 PM CDT.

Ike strengthened only modestly through September 2nd. By 4 PM CDT September 3rd, Ike was upgraded to a category 1 hurricane, and rapidly strengthened the next 12 hours to a category 4 hurricane by 4 AM CDT on September 4th, some 900 miles northeast of the Leeward Islands of the Eastern Caribbean. Ike made landfall across Great Inagua Island (southernmost Island of the Bahamas) as a category 4 hurricane on the morning of September 7th, plowing into the Northeast Coast of Cuba as a category 3 hurricane later that evening. Ike crossed Cuba overnight, and emerged into the Caribbean Sea the morning of September 8th. For the next 24 hours, Ike hugged the southern coast of Cuba as a minimal hurricane, eventually crossing the western tip of Cuba midday on September 9th.

Once Ike emerged into the Gulf of Mexico, the storm began tracking more northwestward in response to a weakness in the upper level ridge. During this time, the central pressure gradually fell from 968 mb upon entering the Gulf to 944 mb by the evening of September 10th. What was unusual was the relatively low maximum sustained winds of 100 mph associated with this pressure, and the large envelope of winds associated with Ike. Ike continued to grow in size overnight. By 10 AM CDT on September 11th, Aircraft Reconnaissance measured Ike's tropical storm wind swath to be approximately 450 miles wide, with a hurricane force wind swath of 180 miles.

Ike continued tracking towards the Upper Texas Coast, becoming better organized and developing an eye. Ike made landfall on Galveston Island at 2:10 AM CDT September 13th as a strong category 2 (based on 110 mph sustained winds) and a central pressure of 952 mb.

Baldwin County:

Major beach erosion occurred from Fort Morgan to Perdido Pass. The beach was heavily damaged from Gustav and had not recovered before Ike hit. The road to Fort Morgan was closed due to high water. Water covered Highway 59 in Gulf Shores and several other roads near the coast were flooded. The storm surge and flooding from Ike was nearly the same as Gustav, despite the fact that Ike was several hundred miles to the west of Gustav's track. Fort Morgan received nearly the same surge for both events. The battering waves, as high as 15 feet, coupled with high tides and re-deposited sand in coastal roads and driveways due to high surf warranted immediate evacuation efforts when residents and visitors became trapped in their homes. Although emergency calls were only for a brief period and were handled by emergency management staff and local mutual aid the waves continued to affect the coastal area for three days.

Mobile County:

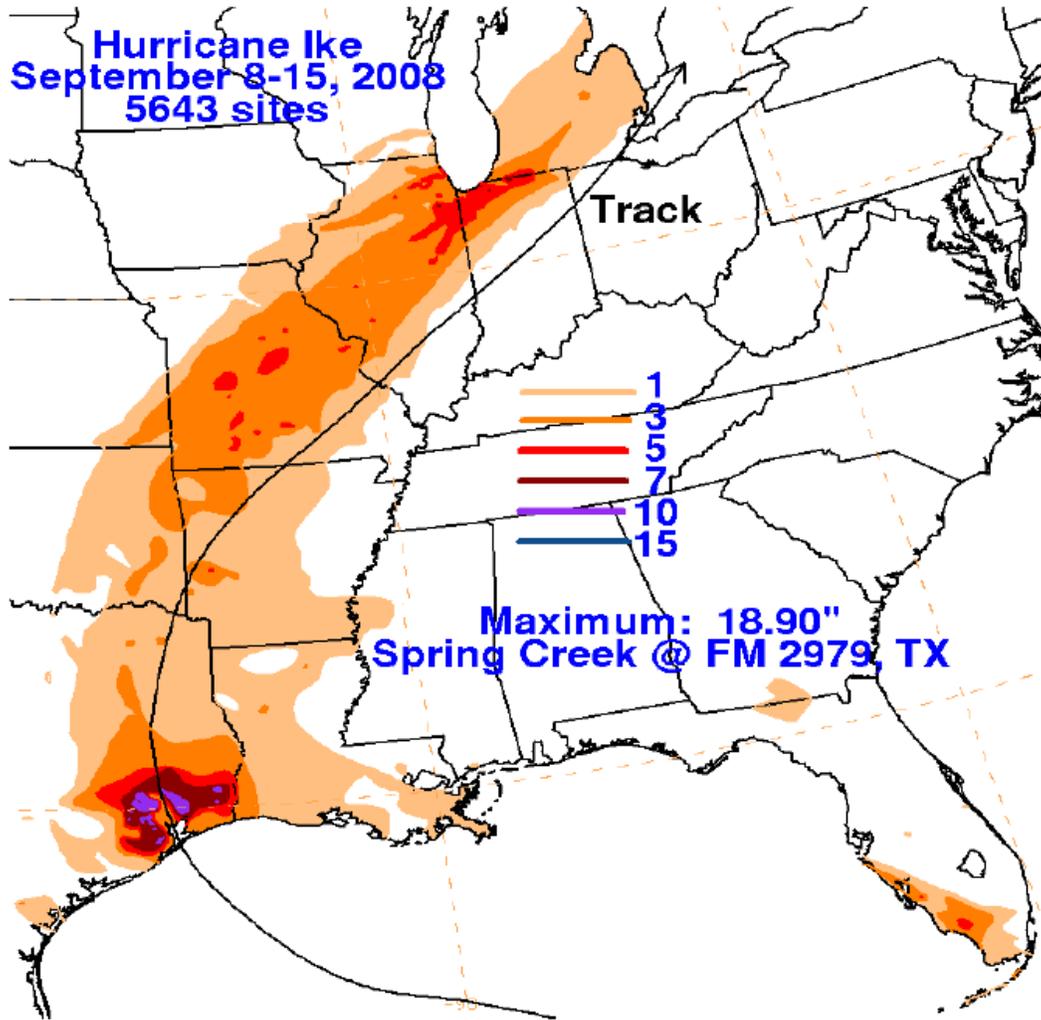
Dauphin Island suffered major damage from high water from the storm tide and surge. The road to the island was closed during the times of high tide for two days. Water and sand covered the west end of Dauphin Island. Water Street in downtown Mobile was covered by water (Figure 1-5). Streams along the Bay came out of their banks due to higher tides being pushed further inland.



Figure 1-5: Mobile Fire-Rescue firefighters push a flooded minivan from the floodwaters on Water Street in downtown Mobile

Rainfall:

No significant rainfall was measured in Alabama as a result of Hurricane Ike. Figure 1-6 shows the total rainfall associated with Hurricane Ike.



**Figure 1-6: Storm Total Rainfall Map for Hurricane Ike
From NWS Post Hurricane Gustav Tropical Cyclone Report**

**Table 1-4: Lowest Sea Level Pressure/Maximum Sustained Winds and Peak Gusts-
Hurricane Ike**

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed		
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC) ^a	Sustained (kt) ^b	Gust (kt)
Coastal-Marine Automated Network (C-MAN) Sites					
DPIA1 – Dauphin Island 30.24N 88.07W 13.5m	12/2205	1001.03	11/1550	37	56
NOAA Buoy 42040	11/2050	1006.0	11/1150	34	47

Wind:

The only significant wind observation from Hurricane Ike was at the Dauphin Island C-MAN station, which measured a sustained wind of 37 kts with a maximum wind gust of 56 kts. Table 1-4 shows observed wind speeds and gusts in knots for all stations operating in Alabama that saw significant weather. The wind swaths of Hurricane Ike are presented in Figure 1-7. The past wind swath graphic was obtained from hurricanemapping.com and represents a composite of observed wind ranges from past advisories.

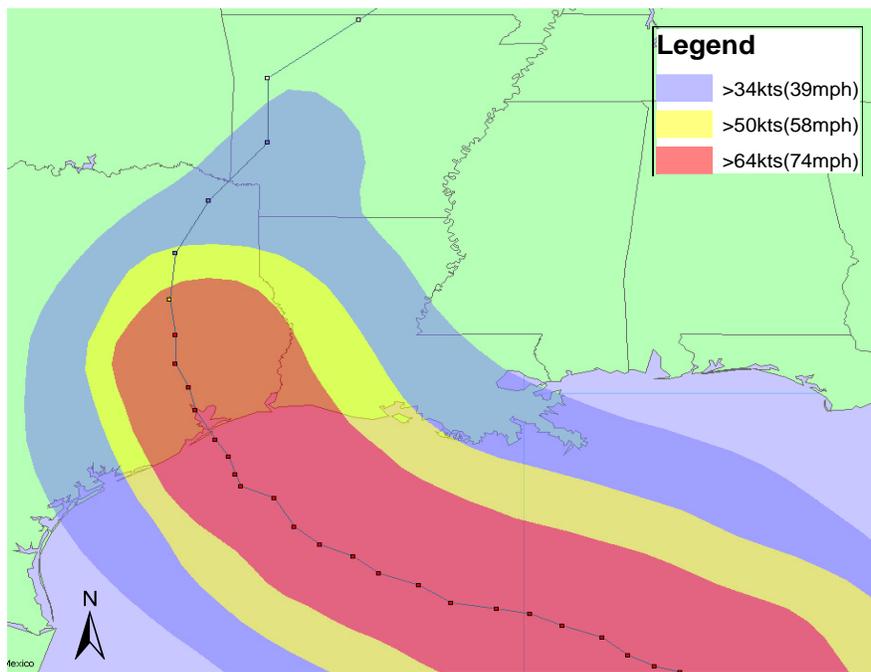


Figure 1-7: Past Wind Swath of Hurricane Ike from HurricaneMapping.com

Table 1-5: Maximum Storm Surge and Storm Tide during Hurricane Ike

County	City/Town or Location	Surge (ft)	Tide (ft)	Date/Time	Beach Erosion
Mobile	Bayou La Batre	3.93	5.43	12/1430	Minor
Mobile	Dauphin Island	3.12	4.50	11/1548	Major
Baldwin	Fort Morgan	6.25	7.75	11/1448	Major
Mobile	Mobile State Docks	3.20	4.83	12/1554	None
Mobile	Coast Guard Sector Mobile	2.82	5.25	12/1546	Unknown
Mobile	Middle Bay	2.98	4.48	12/1506	Unknown

Surge:

As the hurricane grew in size, the large wind field pushed water towards the coastline well before Ike’s center made landfall. While the track of Ike brought the closest point of approach (CPA) around 350 miles south of Alabama, storm surge and heavy erosion were observed. On average, storm tide observations were in the 4-5 foot range, with Fort Morgan seeing a storm tide of 7.75 feet. Major erosion was noted at several sites along the coast, due mainly to large breaking waves. Table 1-5 shows the maximum recorded surges by NOS and USACE tide gauges.

Tornadoes:

No tornadoes were reported in the state of Alabama as a result of Hurricane Ike.

STORM DAMAGE

Damage assessments were performed for the Baldwin County Public Assistance Project. The storm damage estimates for private properties, utilities and municipalities were submitted by Kim Stivener, Baldwin County Damage Assessment Coordinator, and are displayed in Tables 1-6, 1-7 and 1-8 respectively. Total damage estimates were approximately \$4.5 million dollars with the majority of the damages being associated with damages to the eroded beaches and parks of Gulf Shores.

Damage assessments for Gustav and Ike were performed for the Mobile County Public Assistance Project. The storm damage estimate for protective measures, private properties, municipalities and utilities were submitted by John Kilcullen, Mobile County Director of Plans and Operations, are displayed in Table 1-9. Total damage estimates were approximately \$8.3 million dollars with the majority of the damages associated with Dauphin Island to repair the roads, water system and electrical utility system.

**Table 1-6: Baldwin County Public Assistance Project Worksheet Summary—
Municipalities Private Property**

Type of Property	Major Damage	Minor Damage	Affected	Dollar Loss
Houses	0	3	16	\$53,000
Multi-Family	1	2	5	\$123,000
Business	0	1	1	\$20,000
Total	1	6	22	\$196,000

**Table 1-7: Baldwin County Public Assistance Project Worksheet Summary—
Utilities Public & Private Non-Profit**

Utility Company	# of Meters served	Debris Clearance	Protective Measures	Road Systems	Water Control	Bldgs & Facilities	Public Utility	Other	Total
Riveria Utilities	53,000	\$0	\$0	\$0	\$0	\$0	\$40,000	\$0	\$40,000
Alabama Power	10,000	\$0	\$0	\$0	\$0	\$0	\$300	\$0	\$300
Baldwin County EMC	65,777	\$0	\$0	\$0	\$0	\$0	\$20,000	\$0	\$20,000
TOTAL	128,777	\$0	\$0	\$0	\$0	\$0	\$20,000	\$0	\$60,300

**Table 1-8: Baldwin County Public Assistance Project Worksheet Summary
Municipalities Public & Private Non-Profit**

Community	Debris Clearance	Protective Measure	Road Systems	Water Control Facilities	Bldgs & Equipment	Public Utility	Other Parks	Total
Daphne	\$30,000	\$20,000	\$0	\$0	\$0	\$0	\$0	\$50,000
Spanish Fort	\$0	\$0	\$0	\$0	\$0	\$40,000	\$0	\$40,000
Foley	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Elberta	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bay Minette	\$0	\$0	\$0	\$0	\$0	\$50	\$0	\$50
Silverhill	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Robertsdale	\$0	\$11,800	\$12,700	\$0	\$6,290	\$0	\$0	\$30,790
Gulf Shores	\$5,000	\$35,800	\$0	\$0	\$10,000	\$65,000	\$4,000,000	\$4,115,800
Orange Beach	\$1,200	\$3,065	\$0	\$0	\$1,500	\$0	\$0	\$5,765
Fairhope	\$0	\$8,153	\$0	\$0	\$0	\$2,025	\$0	\$10,178
Loxley	\$0	\$3,442	\$0	\$0	\$0	\$4,839	\$0	\$8,281
Summerdale	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL	\$36,200	\$82,260	\$12,700	\$0	\$17,790	\$109,889	\$4,000,000	\$4,250,686

**Table 1-9: Mobile County Public Assistance Project Worksheet Summary
Municipalities Public & Private Non-Profit**

Community	Debris Clearance	Protective Measure	Road Systems	Water Control Facilities	Bldgs & Equipment	Public Utility	Other /Parks	Total
Mobile County	\$50,000	\$50,000	\$206,000	\$0	\$3,000	\$0	\$12,000	\$321,000
City of Mobile	\$99,375	\$900,704	\$15,000	\$0	\$0	\$0	\$0	\$1,015,079
Bayou La Batre	\$0	\$5,000	\$0	\$0	\$0	\$0	\$0	\$5,000
Chickasaw	\$33,000	\$2,500	\$5,000	\$1,500	\$10,000	\$20,000	\$5,000	\$77,000
Citronelle	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Creola	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dauphin Island	\$720,825	\$0	\$613,750	\$3,562,500	\$70,250	\$1,550,000	\$176,800	\$6,694,125
Mount Vernon	\$0	\$1,250	\$0	\$0	\$0	\$0	\$0	\$1,250
Prichard	\$0	\$30,000	\$0	\$0	\$0	\$0	\$0	\$30,000
Saraland	\$0	\$15,000	\$0	\$0	\$0	\$0	\$0	\$15,000
Satsuma	\$0	\$10,000	\$0	\$0	\$0	\$0	\$0	\$10,000
Mobile County EMA	\$0	\$42,895	\$0	\$0	\$12,568	\$0	\$0	\$55,463
Mobile County Public Schools	\$0	\$102,642	\$0	\$0	\$0	\$0	\$0	\$102,642
TOTAL	\$903,200	\$1,159,991	\$839,750	3,564,000	\$95,818	\$1,570,000	\$193,800	\$8,326,559

2 STUDY COORDINATION

Meetings were conducted with State and local emergency management agencies, local media outlets and other agencies and organizations with a role in the Gustav and Ike hurricane events. These organizations were critical to the post storm assessment process as they provided much of the information needed to determine the utilization and effectiveness of the HES products used.

The HES products, tools and clearance times developed during the HES process provide State and local governments with decision assistance information, data and support during hurricane events. The interviews of these agencies and groups, and the sharing of information between the groups, is critical to the success of the PSA as their use, accuracy and effectiveness of HES products can best be measured during an actual event. Recommendations for improvements and additions were solicited.

2.1 KICK-OFF MEETING

The kick-off meeting for the state of Alabama Post Storm Assessment for Hurricanes Gustav and Ike was held in the Emergency Operations Center of Mobile County, Alabama on May 7, 2009. The meeting was hosted by Mobile County EMA and chaired by John Eringman, USACE Mobile District HES Study Manager. Meeting participants are shown in Figure 2-1. The purpose of the meeting was to review the PSA Scope of Work, the proposed questionnaires and to discuss the proposed interview schedule and the interview process. A description of the kick-off meeting including the agencies represented, the information presented, the issues raised, and decisions made is detailed below.

AGENCIES REPRESENTED

- FEMA
- USACE, Mobile District
- Alabama EMA
- Mobile County EMA
- Baldwin County EMA
- Dewberry

TOPICS PRESENTED/DISCUSSED

- Overview of the Scope of Work
- Evacuation zones
- Clearance times
- Updating HURREVAC
- More hurricane awareness and preparedness education for the public
- Mitigation and retrofitting
- Sheltering
- The best way to engage the interviewees so they would not feel that FEMA and State were there to critique the way they managed the preparedness, evacuation or the recovery process
- Public perception of storm surge/water damage versus wind damage



Figure 2-1: Participants of the Kick-Off Meeting for the Post Storm Assessment of Hurricanes Gustav and Ike for Alabama

ISSUES RAISED

During the discussions these prevailing sentiments evolved:

- The EM community must continue to encourage self preparedness of its citizenry
- Local EMAs expressed that updating the HES and increasing public outreach were the top priorities for funding
- There is a need for more shelters closer to the coast to alleviate long distance evacuations
- Expensive mass evacuation contracts are not sustainable. Some feel that the money spent on contracts to carry out mass evacuations would be better spent on building new shelters closer to the evacuation zones (i.e., the \$94 million dollars spent on planes, trains, and buses for the mass evacuation during Hurricane Katrina and a \$50 million air evacuation contract)

- Since Katrina, the attitude of emergency managers has changed from large-scale mass evacuations to a more local “run from the water, hide from the wind” approach
- The lead time associated with most pre-event contracts often requires actions to be initiated well in advance of the storm’s arrival, thus skewing resource allocations.
- There is a need for improved coordination of pet sheltering. Local emergency management would like to increase coordination with Alabama Department of Transportation during the evacuation process
- The cost of gasoline affected the public’s decision of whether or not to evacuate

2.2 INTERVIEW QUESTION DEVELOPMENT

Three sets of Post Storm Assessment questionnaires; Local, State and Media, were developed by FEMA, the Army Corps of Engineers and Dewberry for the interview and data collection process. The questionnaires for the Gustav and Ike Post Storm Assessment were modified and updated from past versions of the questionnaire utilized in prior post storm assessments. A questionnaire specifically designed for inland counties was discussed and recommended for future post storm assessments. Draft survey documents were presented to State and local EMAs and the contractor for review and comments, and then finalized by the FEMA/USACE study team. The main topics covered by the questionnaires included vulnerability, shelter, behavioral, transportation, evacuation and public information data. The final draft was approved after the PSA Kick Off meeting on May 7, 2009 in Mobile, Alabama. The final documents are available in Appendices B (Local), C (State), and D (Media).

2.3 DATA COLLECTION

There was general willingness to share data/information and participate in the project from all of the local groups and agencies that attended the interview meetings. Table 2-1 shows the groups and agencies that were contacted and/or queried for post storm information during the PSA. Agencies that were unable to attend the interview personally were asked to complete the questionnaire and return it to either their local emergency management director or the contractor. For future studies, we recommend that information and data be collected and interview meetings be held within a shorter time frame post storm.

Additionally, Impact-Action Timelines were created to depict the Hurricane Gustav and Ike story in Alabama. Each timeline includes: the storm’s position and intensity, actions taken by the NHC, NWS, and State and Local emergency management (i.e., recommended evacuations), and storm surge impact. Two NOAA tide gauge locations, Dauphin Island and Pensacola Bay, were selected to illustrate the surge heights observed in each storm. These locations were selected for their geographic coverage of the study area and their data accessibility in HURREVAC’s tide module during Hurricanes Gustav and Ike. Both timelines can be found in Appendix F.

Table 2-1: Groups and Agencies Contacted during the Post Storm Assessment of Hurricanes Gustav and Ike for Alabama

Emergency Management Agencies	Public Agencies	Media
Federal Emergency Management Agency (FEMA)	Alabama Department Human Resources (ADHR)	WKRK-TV
United States Army Corps of Engineers – Mobile District	Alabama Department of Public Health (ADPH)	Fox 10 TV
Alabama Emergency Management Agency (AEMA)	Alabama Department of Agriculture (ADA)	NBC 15 TV
Baldwin County Emergency Management Agency	Alabama Department of Conservation and Natural Resources (ADCNR)	Clear Channel Radio
Mobile County Emergency Management Agency	Alabama Department of Transportation (ADOT)	WCSN - FM
Colbert County Emergency Management Agency	Alabama State Department of Education (ASDE)	United Way 2-1-1
Tuscaloosa County Emergency Management Agency	Governor’s Office of Faith-Based and Community Initiatives (FBCI)	---
Perry County Emergency Management Agency	American Red Cross (ARC)	---
DeKalb County Emergency Management Agency	Alabama Community College System (ACCS)	---
---	Alabama Department of Corrections (ADOC)	---

3 LOCAL INTERVIEWS

The PSA interview process provided the study team the opportunity to document the evacuation decision making process, and overall experiences of the local county EMA's during Hurricanes Gustav and Ike. Discussions centered on the tools and products that were used by emergency managers to make evacuation decisions, how they felt the public reacted to the situation, any specific issues and problems that were encountered, their interaction with State and Federal Government officials, and ideas for improved tools and products that would be useful in future events.

3.1 INTERVIEW PROCESS

Post Storm Assessment study teams consisting of representatives from FEMA, the Corps of Engineers, and the contractor interviewed local officials throughout the impacted areas. A FEMA representative led the meeting and was assisted by the Corps and contractor. Meeting photos are presented in section 3.3.

Three local meetings were conducted for the state of Alabama. Meetings were conducted individually with each coastal county. Inland counties were interviewed together in a group session. The meeting locations are listed in Table 3-1 and a map showing the locations of the meetings is shown in Figure 3-1. Participants generally consisted of State and local emergency management personnel, shelter coordinators, first responders and other support agencies. Appendix A lists the participants in attendance at each meeting.

3.2 INTERVIEW RESULTS

SUMMARY – HURRICANE GUSTAV

Before and during the arrival of Hurricane Gustav, Baldwin and Mobile County Emergency Management personnel used many of the hurricane products available to assist with their evacuation decisions. Major exceptions were ETIS and SLOSH in Baldwin and the clearance times in Mobile. HURREVAC and storm surge maps were the most useful products in providing information to local and civic officials. Additionally, HURREVAC was used to monitor the storm track and wind speeds, and to assist in the overall decision making process. Baldwin County did not use SLOSH because it was not user-friendly and Mobile County did not use many of the HES study products because they are outdated. Due to increased building and development in the area, the results of the 2001 study are no longer deemed to be accurate. Both counties evacuated residents from storm surge areas based on their knowledge of historically flood-prone areas and by monitoring USGS stream/rain gage levels. Many Louisiana and Mississippi residents evacuated to the coastal areas of Baldwin County, unaware of the voluntary evacuation notices issued there. Subsequently, these out-of-state evacuees had to be relocated from the surge prone areas once again. No critical facilities were impacted in either county but major beach erosion occurred. A single tornado was reported in Baldwin County during Hurricane Gustav.

Table 3-1: Local Interview Meeting Locations

Date	Time	Event	Location	Interviewer
June 22, 2009	1:00 p.m.	Baldwin County Local Interview	Baldwin County EOC 23100 McAuliffe Dr. Robertsdale, AL 36567	William Winn, FEMA Representative
June 23, 2009	8:30 a.m.	Mobile County Local Interview	Mobile County EOC 348 N. McGregor Ave. Mobile, AL 36608	William Winn, FEMA Representative
June 24, 2009	9:00 a.m.	Alabama Inland Counties	5898 County Rd. 41 Clanton, AL 35046	Vic Jones, FEMA Representative

A mandatory evacuation order was issued by the Governor of Alabama in conjunction with the local authorities of both counties. River, lake and beach fronts and flood-prone areas were evacuated. The order was issued in a timely manner and was determined politically based on past experience and historic knowledge of flooding in the area. Some minor language barriers were experienced with Cambodian, Vietnamese, Russian and Spanish speaking residents. Both counties stated they would like to be involved with the HLT during conference calls involving other states and counties to facilitate better coordination efforts and improve the decision making process during storm events. Currently the HLT does not initiate calls to local EMAs.

Untimely communication from the County Commission delayed the decision to evacuate in Baldwin County. Communication inoperability between the Alabama Department of Transportation and the states of Florida and Mississippi led to traffic bottlenecks on east/west corridor highways in Mobile County. The issue was quickly resolved through an evacuation liaison team conference call.

Five inland Alabama counties participated in the inland county PSA interview. Representatives from DeKalb, Perry and Tuscaloosa Counties attended the meeting. Colbert and Montgomery Counties completed the interview questionnaire and forwarded directly via email to the Contractor. Like most central and northern Alabama counties, these five counties offered assistance to several coastal and southern counties of the state during Hurricanes Gustav and Ike. During Hurricane Gustav, they were heavily involved with traffic assistance and/or sheltering utilizing the two year college system. Montgomery and Tuscaloosa Counties dealt primarily with traffic issues while Colbert, DeKalb and Perry Counties dealt primarily with sheltering issues. With little or no notification, shelters were opened for evacuees bused into the state from Louisiana. The buses were in disarray, trashed and highly unsanitary when they arrived at the shelters. There was little or no damage from winds and rains reported by the inland counties. The shelters were immediately presented with many problems including medical issues, mental health issues, drugs and gangs. Although the host state MOU between Alabama and Louisiana stated that AL was not supposed to receive any special needs patients, 159 were received. Local ambulances were used to transport evacuees to hospitals, pharmacies and care centers. Many Louisiana evacuees needed special transportation to get back home.

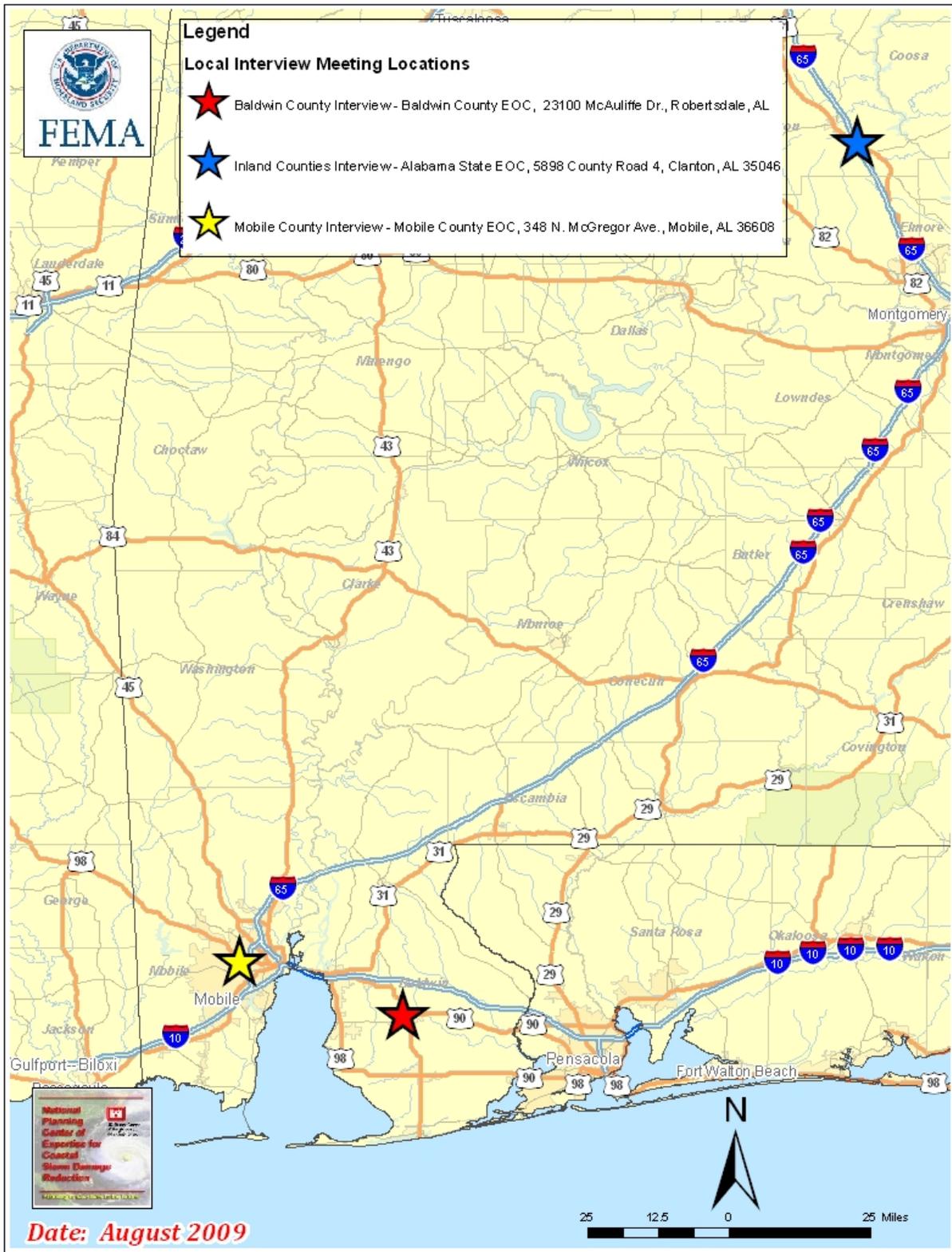


Figure 3-1: Map of Local Interview Meeting Locations

SUMMARY- HURRICANE IKE

Almost immediately following Hurricane Gustav, the State of Alabama and its coastal counties were preparing for Hurricane Ike, while still hosting approximately 13,000 out-of-state evacuees from the previous storm. Tracking further west than Gustav, Hurricane Ike initially appeared to present a less threatening situation to Baldwin and Mobile Counties than Hurricane Gustav. However, as the hurricane grew in size, the large wind field pushed water towards the coastline bringing unexpected storm surge and heavy beach erosion to the coastal counties well before Ike's center made landfall in Texas. Erosion and damaged beaches from Hurricane Gustav allowed the storm surge from Ike to extend much further inland than if the berms had been intact.

During the week of September 8th thru 12th, The Baldwin and Mobile County Emergency Management Agencies worked very closely with the National Weather Service to monitor Hurricane Ike as it made its way across the Gulf of Mexico. The NWS conducted daily webinars to keep the agencies as well as others informed of the storms projected path and associated hazards. Coastal Flood Warnings issued for the coastal areas advised the Counties of the possibility of rip currents, gusty winds, minor-moderate beach erosion and tides of 3-5 feet.

Mobile County emergency managers reported that their office was notified by the Warning Coordination Meteorologist of the Mobile National Weather Service that Hurricane Ike would probably cause extra high water levels and high wave action along the Alabama coast. They also monitored HURREVAC's tide module to keep track of these rising water levels. Additionally, Mobile County police department provided the EMA with hourly reports on the tidal surge and wave action that took place on the Dauphin Island causeway and West End during the storm. Baldwin County did not utilize any models or specific tools to prepare for the surge other than the advice and guidance provided by the NWS. They did not expect the surge effects to be as severe as they were. Certain portions of Baldwin County experienced battering waves as high as 15 feet.

The EOC of Baldwin County opened under partial activation while Mobile County EOC opened under full activation. No official evacuation orders were issued in Baldwin County but emergency evacuations for over 40 residents were performed beginning the morning of September 11. Mobile County issued evacuation orders for beach fronts and flood-prone areas. Mobile evacuated approximately 9,000 people and 3,000 vehicles for Hurricane Ike. Six Red Cross shelters housing 900 people were opened. One special needs shelter was opened housing 10 people. Alabama inland counties had little to no involvement in evacuation and sheltering during Hurricane Ike.

GENERAL OBSERVATIONS

- There is a need for more training for HURREVAC, HAZUS and SLOSH.
- HAZUS is not user-friendly. Local EMA's do not have time to run model scenarios.
- There is significant need to retrofit local shelters.
- There is a need for more pet shelters.

- The HLT needs to call local emergency managers directly during storm events to provide timely storm information and to develop more rapport with the local county EM teams.
- Baldwin Co. needs more assistance and coordination with traffic control from local law enforcement and/or Alabama National Guard.
- Baldwin Co. needs to develop a debris management plan for post storm debris removal.
- There is a need for better communication tools for foreign language speaking workers and tourists.
- There is a need for a start to finish shelter tracking system that can be monitored in real time.
- There is a need for lodging resources for utility providers after the storm.
- Local EOCs are much more likely to consider activating for storms Post-Katrina than they would have before.
- The safe room program initiated after Katrina experienced too many problems with reimbursement. Currently, no safe rooms are being built in either county.
- Special needs populations may exceed the resources available to assist them.
- There is a need for public notification using cell phones.
- A few inland counties use HURREVAC but many are unfamiliar with the HES products in general.
- There is a need to increase the capability for stream flood monitoring
- There is a need to include inland wind hurricane advisories.
- There is a need for more training of the availability and use of HES products.
- There is a need to do a better job of holding the public accountable for their safety, sheltering, etc.
- Sheltering out of state evacuees from Gustav made sheltering Alabama residents during Ike more of a challenge, and could have posed a major issue if Ike had made landfall in Alabama.
- There is a deteriorating view of government due, in part, to unmet expectations of the public.
- FEMA needs a better mechanism to reimburse regular time for host states that assist in the event.
- There is a need to focus on mitigation and education, not evacuation and sheltering.
- There is a need to reduce distance for evacuations and reduce the number of those evacuating.
- There is a need to retrofit and build shelters with higher wind load ratings.
- Coastal states cannot house evacuees from other coastal states without compromising capability to house their own residents.
- There is a need to re-vamped and re-instate ETIS.
- There is a need to declare pre-disaster declarations at H-72 hours so that States can better support sheltering efforts.
- Lessons learned from East coast storms are not being applied in the Gulf coast and vice versa. Need a better information sharing mechanism.
- There is a need to make plans from bottom up, not top down.

ISSUES RAISED REPEATEDLY

- Better communication/coordination between local, state and federal participants is imperative.
- Local EMA's would like access to the HLT and involvement in its conference calls.
- The public has been conditioned to rely on the federal government for assistance. This practice is not sustainable. Emergency management must stress the public's personal responsibility for their preparedness and evacuation.
- There is a need for more training for HURREVAC and HAZUS.
- There is a need to provide federal funds to help retrofit critical facilities.
- There is a need for uniformity from state to state regarding evacuation.
- There is a need for a better way to track and keep up with shelter capacities.
- There is a need to increase public outreach and educational programs.
- Evacuation programs need a change of philosophy. Each state should be responsible for managing its own evacuees. Should not have to rely so heavily on neighboring states for assistance.
- FEMA's mitigation grant process could be simplified and used for new construction of critical needs shelters
- More emphasis should be placed on retrofitting facilities to shelter in-place rather than long-distance evacuations.

3.3 MEETING PHOTOS



Figure 3-2: Photos from Local Interviews in Mobile and Baldwin Counties

4 STATE INTERVIEW

The PSA interview process provided the study team the opportunity to meet with various State officials to document the evacuation decision making process, and overall experiences of the Alabama EMA during Hurricanes Gustav and Ike. Discussions centered on the tools and products that were used by emergency managers at all levels to make evacuation decisions, how they felt the public reacted to the situation, any specific issues and problems that were encountered, their interaction with State and Federal Government officials, and ideas for improved tools and products that would be useful in future events.

4.1 INTERVIEW PROCESS

Post Storm Assessment (PSA) study teams consisting of representatives from FEMA, the Corps of Engineers, and Dewberry visited with State officials in the State EOC in Clanton, AL. The FEMA representative led the meeting and was assisted by the Corps and contractor. The contractor was retained to accompany the study team and document all relevant findings, and assist where necessary. Meeting photos are presented in section 4.3.

The State interview meeting was held in a group setting at the Alabama EOC. The meeting location is listed in Table 4-1 and shown in Figure 4-1. Participants included State Emergency Management personnel, law enforcement officers, Red Cross shelter personnel, representatives from the Department of Public Health, Department of Agriculture, Department of Human Resources, Department of Conservation, Department of Transportation, State Department of Education and various emergency response agencies. A list of meeting participants can be found in Appendix A.

Table 4-1: State Interview Meeting Locations

Date	Time	Event	Location	Interviewer
June 25, 2009	8:30 a.m.	Alabama State Interview	Alabama EMA 5898 Country Road 41 Clanton, AL 35046	Victor Jones, FEMA Representative

4.2 INTERVIEW RESULTS

State of Alabama Summary – Hurricane Gustav

The State of Alabama PSA Interview was well attended with approximately thirty people participating. Most of discussion centered on Hurricane Gustav as Hurricane Ike was considered by most in attendance to be a non-event in Alabama. During Gustav, the State EOC was fully activated. The State was involved in conference calls with all participating authorities before, during and after Gustav. The most important products used for decision making by the State were SLOSH, evacuation maps and HURREVAC. The least useful products were shelter locations and many of the HES study products. Most participants agreed that a new HES study is needed. There is a need for a tool such as ETIS that can address information sharing capabilities between neighboring States. The tool should be able to incorporate new traffic flow tracking technologies and real-time traffic counts. Consensus prevailed that the mitigation process is broken and needs attention. The process of obtaining funding for mitigation projects is lengthy and inefficient.

Alabama assisted the State of Louisiana by serving as a host state and by sheltering approximately 13,000 evacuees. There were 99 Red Cross Shelters and 3 Special Needs Shelters opened. Alabama two year colleges and Jefferson County's Red Cross emergency shelters were also utilized. Many medical special needs patients went to regular shelters, creating serious caretaking issues. The main problems experienced in state-supported shelters were location confusion, lack of security, shortage of food, overcrowding and limited staff. Pet sheltering was difficult because shelters at two year colleges could not allow pets to remain with their evacuee owners. Louisiana evacuees were bused to Alabama shelters with little or no notification, dropped off and abandoned with no plan in place for re-entry. This created huge logistical problems for Alabama. As a result, the State initiated "Operation Roll Tide," a coordinated program that rounded up stranded Louisiana evacuees and bused them back to pick up points for re-entry to their home state.



Figure 4-1: Map of State Interview Meeting Location

State of Alabama Summary – Hurricane Ike

GENERAL OBSERVATIONS

- ETIS, or a similar tool, needs to be reconsidered and enhanced to incorporate new technologies.
- Changes are needed in the mitigation program to improve and simplify FEMA's mitigation grant process.
- There is a need for an updated HES Study for Alabama including updating the evacuation clearance times.
- There is a need for a State shelter management team to facilitate staff and resources, prioritize shelter sites, and develop feeding plans for shelters.
- There is interest in using HAZUS as a planning tool, however it is a complex program and more training is needed.
- There is a need for more training on HURREVAC.
- There is a need for more portable signage to better display evacuation traffic information.
- A majority of the issues faced by in Alabama shelters during Gustav were caused by out-of-state evacuees.
- There is a need for a pet sheltering Standard Operating Procedure (SOP).
- There is a need for Federal assistance with public information on re-entry.
- There is a need for a state re-entry plan which can easily be communicated with host states.

ISSUES RAISED

- Host states need to have assistance from evacuating states and FEMA for sheltering operations.
- There is a need for comprehensive pet sheltering plans.
- There is a need to identify and catalog the State's transportation resources and to develop a plan to address any shortages
- The State recommends that the FEMA HMA Safe Room Guidelines should be reassessed, as they may be overly restrictive, and seem to make it difficult for states/locals to construct safe shelters near coastal areas. This may contribute to increased numbers of people evacuating. FEMA should consider increasing the flexibility of the HMA safe room policy.
- The State feels that FEMA should not promote coastal states to serve as host states for evacuations. This may reduce some of the issues with transporting/sheltering evacuees across State lines, and would allow States to focus on sheltering their own populations.
- The State feels that FEMA should consider focusing on reducing the number of people evacuating and the distance that evacuees need to travel to seek safe shelter, rather than focusing on mass evacuations. Mass evacuations are too expensive. The State would like to use that funding to build shelter capability rather than focusing on mass evacuation to other states.

4.3 MEETING PHOTOS



Figure 4-2: Photos from the State Interview in Clanton, Alabama

5 MEDIA INTERVIEWS

The media interviews were conducted with media outlets in the coastal study area. The intent was to gather information about the broadcast or print media relating to the hurricane threat and when and how the information was disseminated. Other discussion centered on how evacuation orders or recommendations were communicated and presented to the public, the type of coordination that took place with government officials and other media outlets, and how the media felt their actions impacted the public reaction and response.

5.1 INTERVIEW PROCESS

Post Storm Assessment (PSA) study teams consisting of representatives from FEMA, the Corps of Engineers, and the contractor met with media representatives from the Mobile media market. Several media representatives attended the Baldwin County local EMA session as well. Local EMA representatives from Mobile and Baldwin counties handled the invitations to the media representatives. Meeting photos are presented in section 5.3.

The FEMA representative led the meeting with assistance from the Corps and contractor. The contractor was retained to accompany the study team, document all relevant findings and assist when necessary.

The Media interview was held in a group setting at the Mobile County EOC. The meeting location is listed in Table 5-1 and shown in Figure 5-1. Appendix A lists those individuals who attended the meeting.

Table 5-1: Local Media Interview Meeting Location

Date	Time	Event	Location	Interviewer
June 23, 2009	1:00 p.m.	Alabama Local Media Interview	Mobile County EOC 348 N. McGregor Ave. Mobile, AL 36608	William Winn, FEMA Representative

5.2 INTERVIEW RESULTS

Alabama Local Media Summary – Hurricane Gustav and Hurricane Ike

The Alabama Local Media Interview was held in the Mobile County EOC and was attended by eighteen people. The meeting was facilitated by FEMA representative, William Winn. Local media has access to both Baldwin and Mobile County EOCs but are not allowed in the EOC situation rooms during a storm event. All media representatives said they would prefer to have inside access to the local EOCs and to be able to have personal phone contact with the EOC directors. They would also like to receive fax versions of evacuation maps and sheltering locations. They felt their working relationships with the local EM office was good but could be improved by having an Open House pre-hurricane season, media access to the EOC, streaming Audio/Video and stronger and timelier post storm assessments. Television station representatives said they would like to have a live feed into the EOC during events and a media day training session on how the EOC works.

Information from the EOC is disseminated by email to the media and kept in simple verbal messages. Local media derives most of its storm information from the Baldwin and Mobile EOCs and the National Weather Service. They would like to have one live video feed to all outlets.

The media understands the evacuation zone delineation but feel that the public understanding of those zones is limited. During the post storm recovery process the most beneficial piece of information for the local media is knowing when evacuees have been cleared to return.

GENERAL OBSERVATIONS

- Media sharing techniques could be improved by utilizing websites, WebEOC, and email updates.
- Media would like to provide a live streaming video over the internet for evacuees out of the network coverage area.
- Media would like more visual images provided to them for use on air: i.e., evacuation routes and maps of shelter locations.
- Media would like to be supplied with standard graphics at a pre-season training session.
- Media would like shelter locations provided in digital format.
- Public does not understand the difference between surge heights and elevation above sea level.
- Media would like to start a Media Task Force in the EOCs.
- Need to get away from the Saffir-Simpson scale as it is misleading the public.

ISSUES RAISED REPEATEDLY

- The SS storm category should be down played by media. Rather, the focus should be on storm impacts, not storm category.
- There is a need for live audio/video feeds of information from the EOC to media outlets.
- There is a need to address and overcome the countless “instant meteorologists” that provide inaccurate and misleading information to the public during storm events.
- There is a need for live media presence in the EOC during storm event.

5.3 MEETING PHOTOS



Figure 5-2: Photos from the Media Interview

6 POST-STORM DATA COLLECTION

Available post-storm data was collected from meetings with affected communities and questionnaire responses, literature/internet searches and from contacts with relevant agencies to analyze the utilization, accuracy and availability of the NHP's current products and tools, and to identify where gaps in data and information may exist. Attempts were made to collect existing data such as: vulnerable populations and critical facilities affected by the storms, utilization and availability of evacuation shelters used in the events, behavioral trends, perceptions and expectations of the evacuating population, the transportation resources and activities during the events, the events surrounding the actual evacuation and the information released to the public. The use and effectiveness of other FEMA programs related to hurricanes was also assessed and analyzed.

6.1 VULNERABILITY DATA

OVERVIEW

The vulnerability analysis of the HES identifies the population potentially at risk to hurricane impacts. The vulnerability related data presented below was gathered from the interview questionnaires and several phone interviews with different personnel in the EOCs of Baldwin and Mobile Counties. The general opinion of those interviewed was that these two hurricanes were primarily heavy rain events. Baldwin County evacuated a small number of people while Mobile County evacuated a large number of people, but mainly as a precautionary measure. Other than surge damage to utilities on the barrier islands, erosion on the beaches and low lying roads, the overall impact on vulnerable populations and properties was fairly minimal.

HURRICANE GUSTAV

During Gustav, Baldwin County issued its voluntary evacuation order to residents of the beach front areas of Gulf Shores, Fort Morgan and West Beach. Approximately 40 people, primarily tourists, were ordered to evacuate from these areas. Roads were impacted by storm surge and the beaches were severely eroded. The barrier dunes were not damaged significantly. A few people on the Seminole and Styx Rivers had to be rescued by county responders due to rising waters. No mobile home populations were impacted.

During Gustav, Mobile County issued its voluntary evacuation order to residents of Dauphin Island, mobile homes, low-lying areas and flood-prone areas. Gustav eroded beaches and berms on the west end of Dauphin Island and some low roads were impacted. Dauphin Island's roads, water system and sewer system were damaged. Approximately 9,000 people were evacuated. No mobile home populations were impacted.

HURRICANE IKE

During Ike, a voluntary evacuation order was issued to the vulnerable populations on the beach fronts and flood prone areas of Baldwin County. A small area of Gulf Shores was evacuated. The event was basically a heavy rain event with some high wind gusts. In Mobile County, the berms on beaches of western Dauphin Island that were damaged during Gustav allowed for more surge water to enter during Ike. Grand Bay and Bayou La Batre also received some surge water damage. The impact from heavy rains, rising water and wind gusts was considered to be minor in the County.

HURRICANE EVACUATION ZONES

The Post Storm Assessment for Hurricanes Gustav and Ike addresses the accuracy and usefulness of the vulnerability data provided in the most recent HES. Evacuation zones from the 2001 HES for Mobile County were updated in the aftermath of Hurricane Katrina. The evacuation zone map in Baldwin County, as presented in the HES, was in effect for the 2009 hurricane season. However, a new evacuation zone map has been developed but has not been officially adopted by the County. Figures 6-1 and 6-2 show the evacuation zones as they are presented in the 2001 study. Figure 6-3 presents the updated evacuation zones for Mobile County and the 2001 HES evacuation zones for Baldwin County. Figure 6-4 shows the recently developed zones for Baldwin County that are scheduled to go into effect next hurricane season.

In the interview process, local emergency managers reported that evacuation orders were issued for beachfront property, low-lying and flood-prone areas and mobile homes. Neither coastal county in Alabama reported using the evacuation zones from the 2001 HES study in their evacuation process.

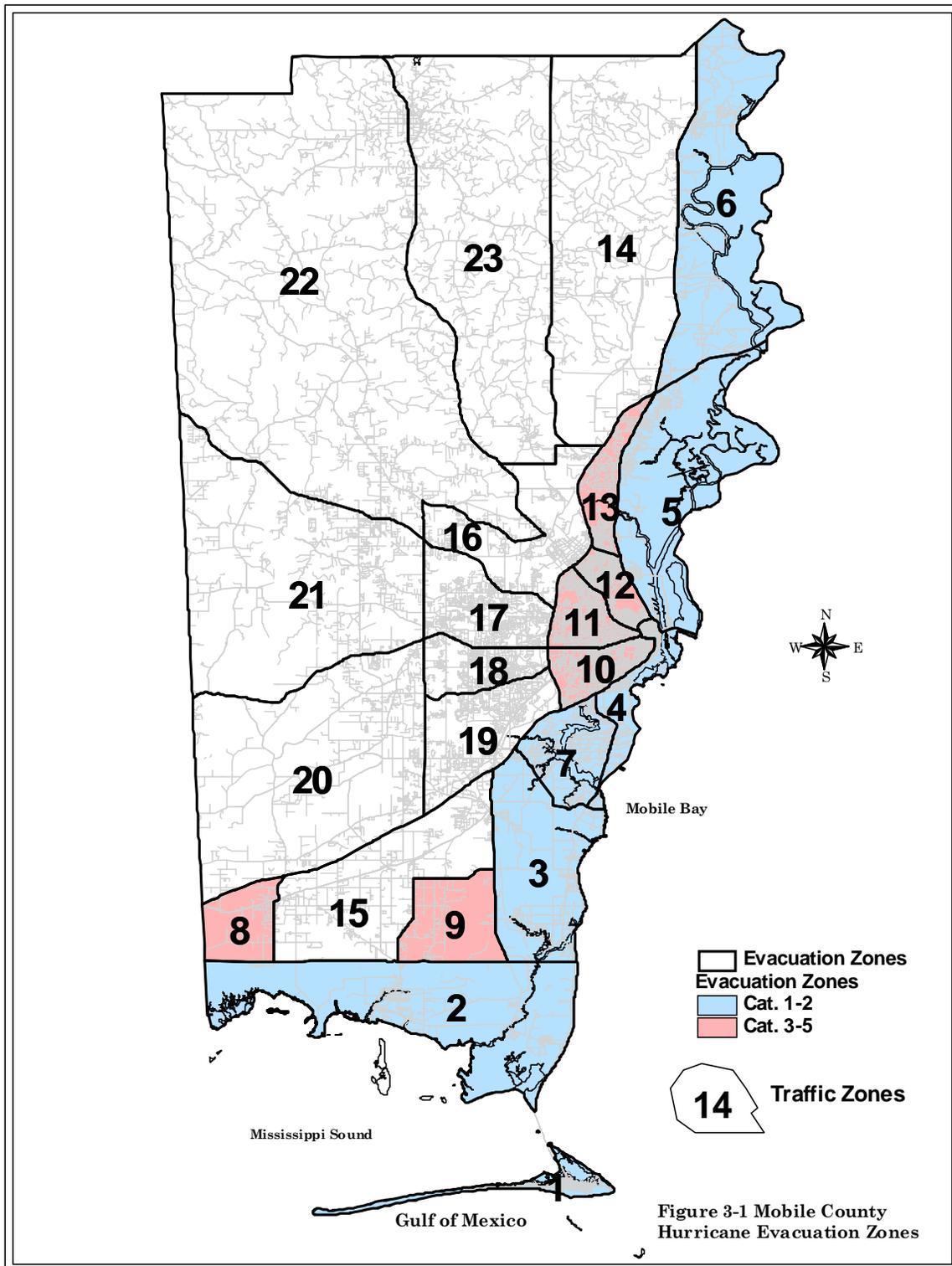


Figure 6-1: Mobile County Hurricane Evacuations Zones from 2001 HES

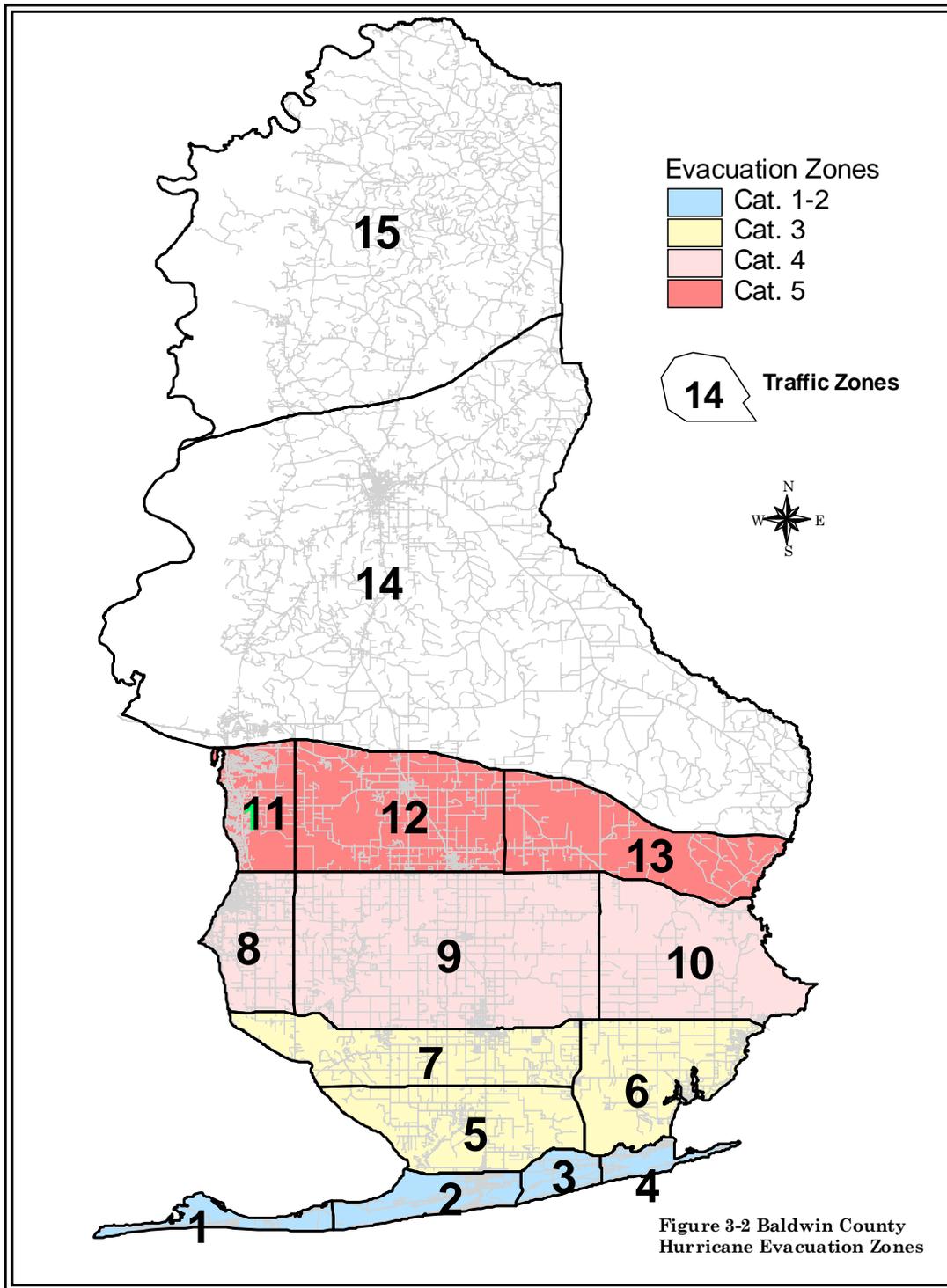


Figure 3-2 Baldwin County Hurricane Evacuation Zones

Figure 6-2: Baldwin County Hurricane Evacuations Zones from 2001 HES

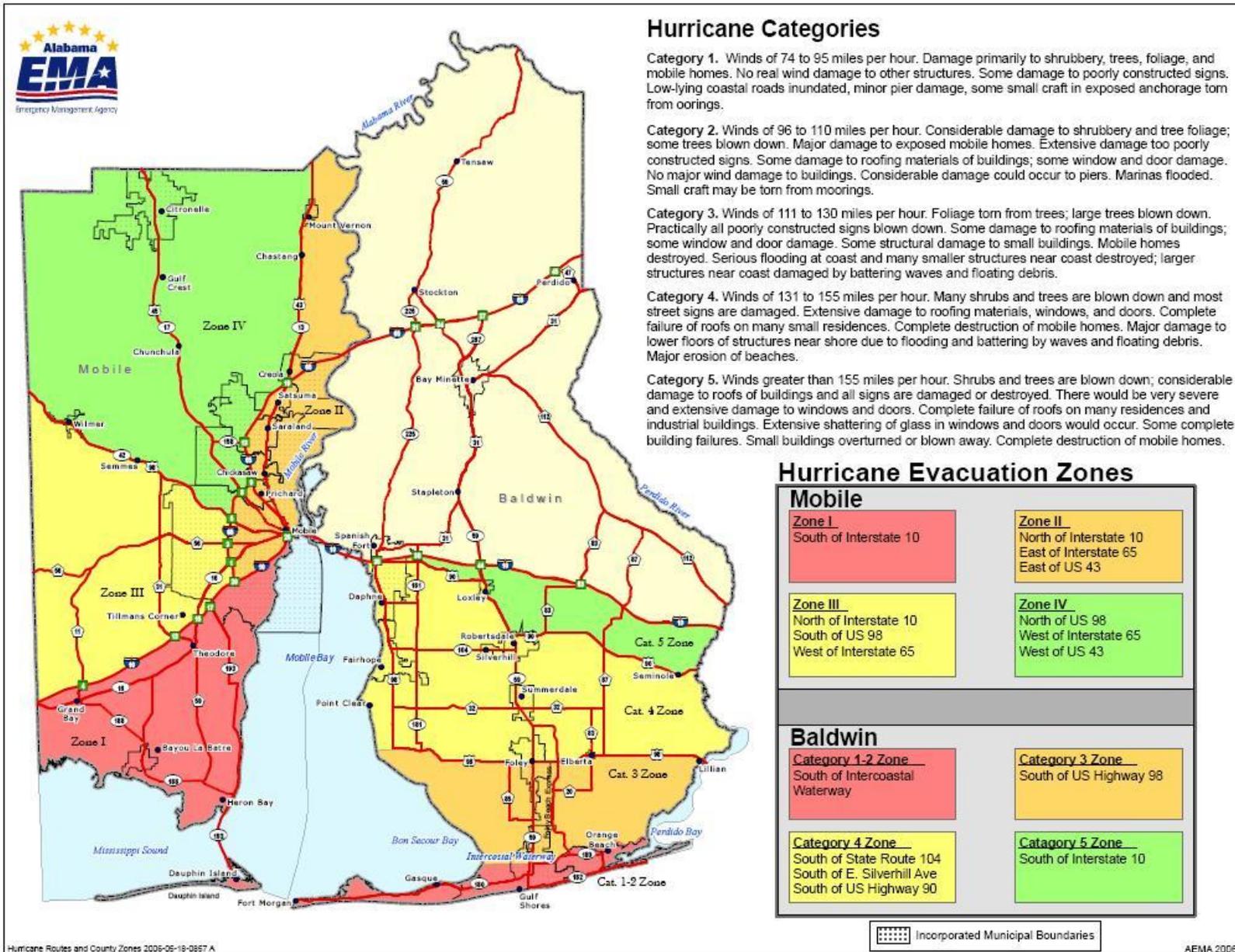


Figure 6-3: Current Evacuation Zone Map for Mobile and Baldwin Counties

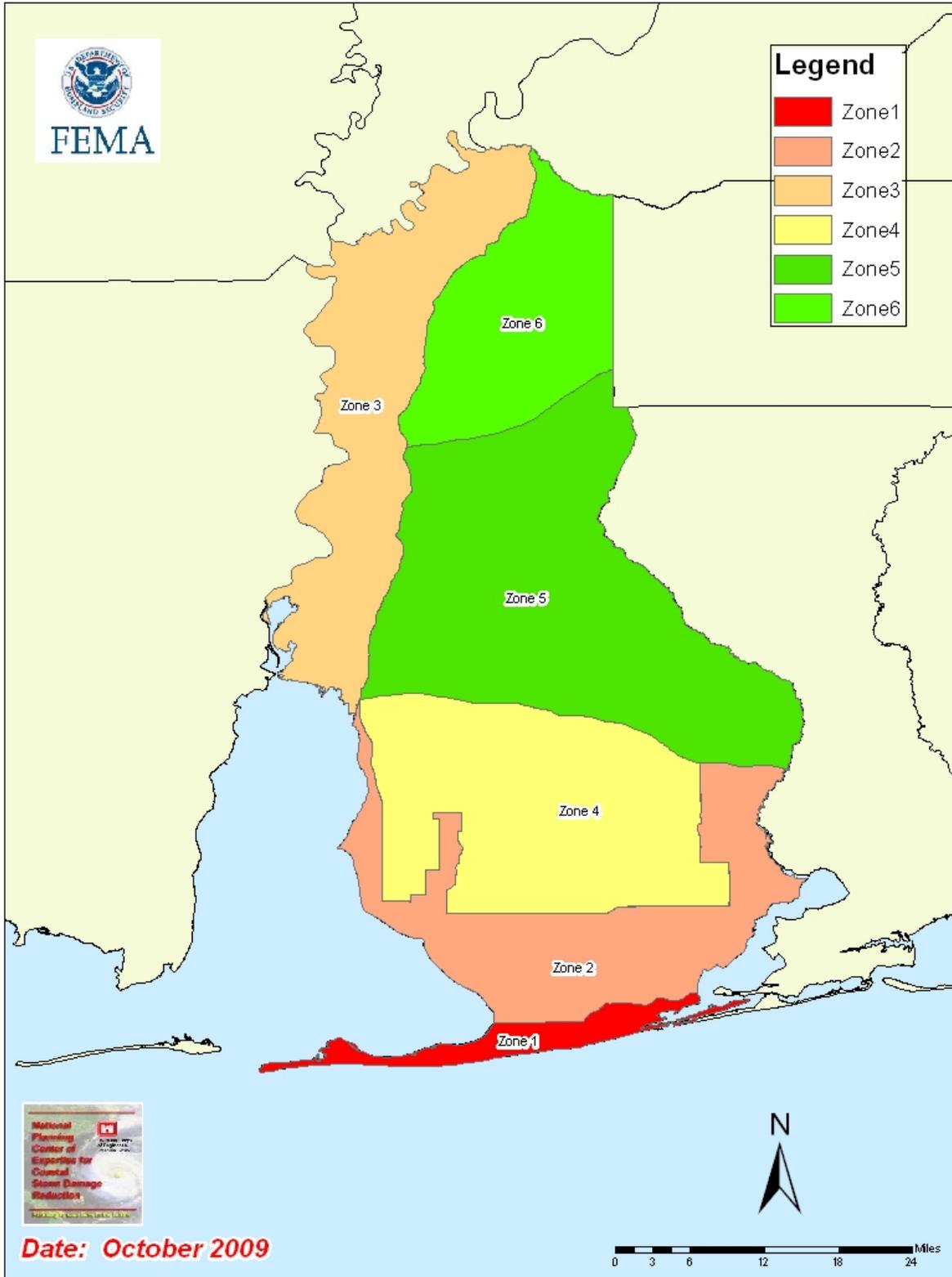


Figure 6-4: Proposed Evacuation Zone Updates for Baldwin County

VULNERABLE POPULATION

Base population, housing unit and vehicle ownership data used in the HES was initially developed using 2000 census counts. These data were then supplemented and updated with traffic analysis zone data obtained from planning organizations and urban transportation studies. Tourist population and dwelling unit data was developed through state, regional and local planning agencies, travel bureaus, trade associations and chambers of commerce. When aggregated by evacuation zone and combined with tourist occupancy rates and various public behavioral assumptions, this demographic data is crucial to calculation of evacuating vehicles, shelter demand and clearance times.

The rate of growth in Mobile County has been slow, with only a 1.6% increase between 2000 and 2008. On the other hand, the population of Baldwin County is estimated to have increased 24.5% between 2000 and 2008.¹ Baldwin County has far more mobile homes than the national average 20.7% of the population compared to 6.9% nationally. This results in nearly 15,000 mobile home households that will have to be evacuated for any hurricane, including a Category 1. While the percentage of households living in mobile homes is lower than in Baldwin County, it nevertheless results in more than 16,000 in Mobile County.

Table 6-1 reflects the increases in population and housing units in Mobile and Baldwin counties since the HES data was developed. These increases constitute one of the primary reasons for initiation of a new transportation analysis and lend credence to the argument for an update of the behavioral portion of the study as well.

While the table does not detail population or housing unit increases by evacuation zone, it is reasonable to assume those increases in surge areas are at least as large as county-wide increases. Emergency managers interviewed in Baldwin County indicated that growth has occurred primarily in the southern, or coastal, end of the county. Despite the significant growth of population and housing units throughout most of these counties, there has been only slight growth in the number mobile home units. Assuming evacuation of these areas to nearby shelters, additional volumes of background traffic should be factored into the region's new clearance times in future transportation analyses.

¹ Federal-State Cooperative for Population Estimates and Projections. U. S. Census.
http://cber.cba.ua.edu/edata/est_prj.html

Table 6-1: HES Study Area Population Growth

County	Population		
	2000 Census	2008 Estimate	Percent Change
Mobile County	399,843	406,309	1.6%
Baldwin County	140,415	174,439	24.2%

Compared to the 2001 HES, there appears to be a larger population of mobile home residents and an overall increase in the general population, especially in Baldwin County. The number of individuals with special needs, as well as those who would require transportation assistance during evacuation, has also grown steadily since 2001. Generally speaking, the population vulnerable to hurricane impacts has increased since the last HES study was conducted. The population data used in the vulnerability analysis of the current Alabama HES is nearly a decade outdated, compromising the utility of the HES as an effective tool for local emergency management. Additionally, storm damage from Hurricanes Gustav and Ike, particularly in the form of beach erosion, has compromised coastal barrier dunes and berms that were designed to mitigate storm impacts. With these natural buffers degraded these vulnerable coastal populations are placed at even greater risk.

In conclusion, the demographic data presented in the hurricane evacuation study is outdated and reflects population information based upon the 2000 census, lessening its effectiveness as an evacuation planning resource. The data contained in the study was generally not used for evacuation in Hurricanes Gustav and Ike.

“SAFE ROOMS”

Hurricane winds are a force to be reckoned with as coastal states make decisions on building codes. Extreme winds can create stresses on structures that frequently cause connections between building components to fail. Extensive testing and design by several universities and wind engineering research facilities have led to the development of guidelines and specifications for retrofit and construction of structures called “Safe Rooms.” They can easily be built into new homes and some shelter designs can be added to existing homes provided the homes are not located in a storm surge or flood prone area.

During this study all participants from the coastal and inland counties of Alabama were asked if they were aware of the use and success of any “Safe Rooms” during Hurricane Gustav and Ike. No instances of use or success of use were reported.

POTENTIAL FACILITIES FOR RETRO-FITTING

A common attitude that seemed to prevail throughout this study was the need for support of building and/or retrofitting facilities to house special needs and other at risk populations. Most individuals that participated in the interviews consistently expressed the desire to concentrate on retrofitting existing construction or upgrading new construction to provide protection to people in areas vulnerable to hurricane impacts. Funding would best be spent on “hardening” critical facilities and critical transportation needs origin facilities for protecting locals as opposed to the resource-intensive evacuations and relocations of past storms.

Both Baldwin and Mobile counties were asked to provide a list of critical facilities in priority order that they would retrofit provided funds were available. The facilities are identified in Tables 6-2 and 6-3 and their locations are shown in Figure 6-5.

Table 6-2: Mobile County Potential Retrofit Facilities

Priority for Retrofit	Name	Address	Lat/Lon	Facility Type	Ownership	Occupant Capacity
1	Saraland High School	401 Baldwin St. Saraland, AL 36571	30.831261 N 88.064355 W	School (used as a shelter)	Government	500
2	Theodore High School	6201 Swedetown Rd. Theodore, AL 36582	30.54543 N 88.186565 W	School (used as a shelter)	Government	475
3	Jon Archer Ag Center	1070 Schillinger Rd. Mobile, AL 36608-5298	30.713073 N 88.225510 W	Ag Center Offices	Government	175
4	Mobile Co. Fairgrounds	1035 Cody Rd. N Mobile, AL 36608	30.711646 N 88.20789 W	Buildings/ Grounds	Government	200

Table 6-3: Baldwin County Potential Retrofit Facilities

Priority for Retrofit	Name	Address	Lat/Lon	Facility Type	Ownership	Occupant Capacity
1	Central Baldwin Middle	24545 Highway 59 S Robertsdale, AL 36567	30.582753 N 87.72785 W	School (used as a shelter)	Government	543
2	Robertsdale High School	21630 Hwy 59 Robertsdale, AL 36547	30.540419 N 87.70675 W	School (used as a shelter)	Government	573
3	Fairhope High School	1 Pirate Dr. Fairhope, AL 36532	30.497992 N 87.88355 W	School (used as a shelter)	Government	905
4	Foley High School	1 Pride Pl. Foley, AL 36535	30.3815 N 87.68943 W	School (used as a shelter)	Government	891
5	Baldwin County High	1 Tiger Dr. Bay Minette, AL 36507	30.893594 N 87.79431 W	School (used as a shelter)	Government	1,156

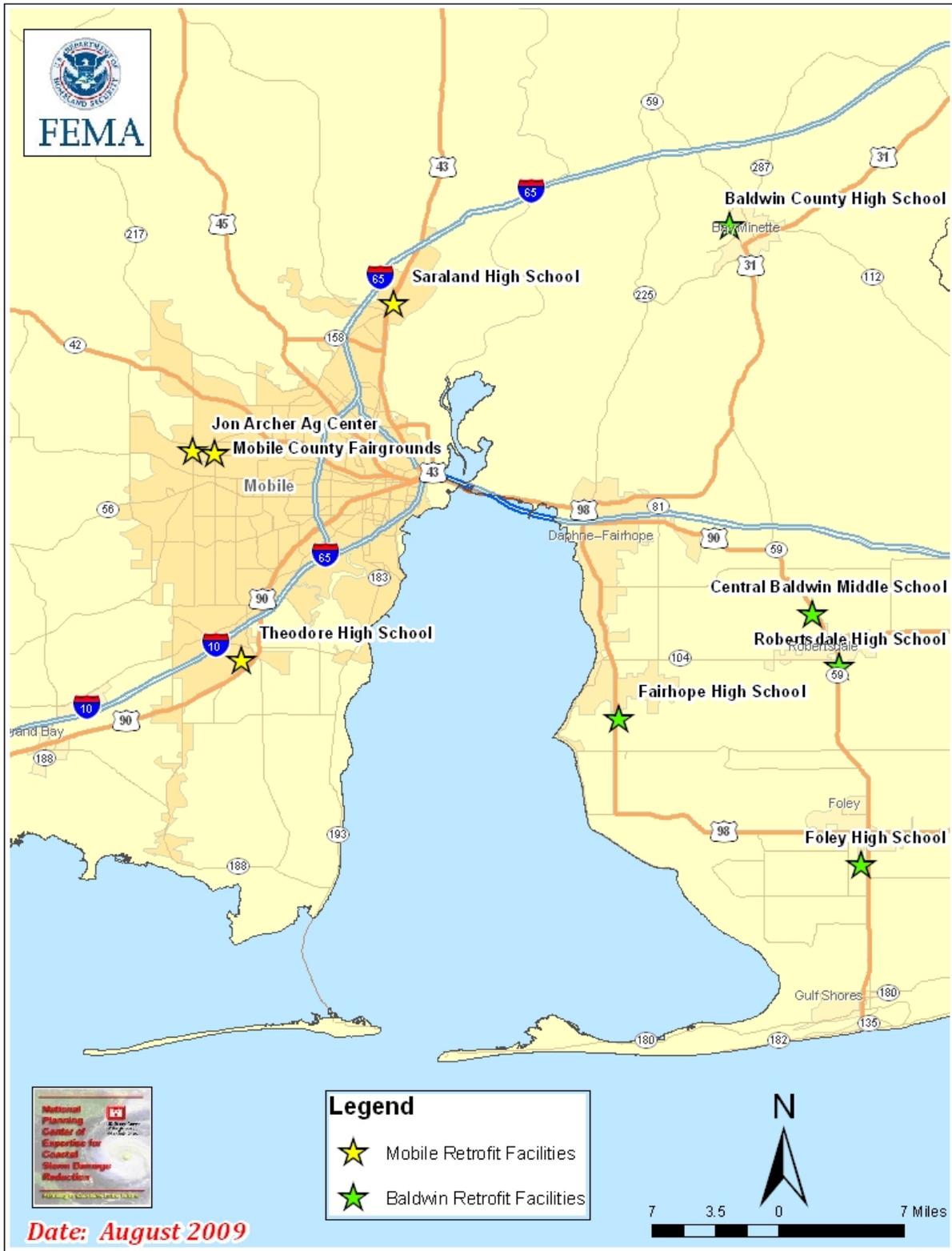


Figure 6-5: Potential Retrofit Facilities in Mobile and Baldwin Counties

6.2 SHELTER DATA

OVERVIEW

The purpose of this section is to show the actual shelter use in Alabama during Hurricanes Gustav and Ike and compare it to predicted shelter use and capacity data from existing HES studies. This task also included collecting and documenting shelter data and usage for hosting out-of-state evacuees. The contractor worked with the American Red Cross (ARC) and other shelter supporting agencies and organizations to obtain information on the actual number of people sheltered during these events. An evaluation of the shelter management techniques utilized in Alabama was conducted and assessed to identify needs for improved management and data collection and sharing. Several other shelter management systems in other states were evaluated to determine if any of their features would satisfy the shelter management needs of Alabama.

Note:

State-level Alabama participants in this study reported they opened shelters only for Hurricane Gustav. Mobile County reported opening some shelters for Ike, independent of the State². This report first describes the Alabama shelter model for general population, medical special need and pet shelters. The report then describes Gustav shelter operations and repatriation. A list of shelter numbers and types per county has been compiled from multiple databases and is shown in Table 6-9.

THE ALABAMA SHELTER MODEL AND PLAN

On March 31, 2009, the State of Alabama published its “Alabama Shelter and Mass Care Support Strategy Plan” that outlines roles and responsibilities in the State’s Emergency Operations Plan (EOP). Through the Strategy/Plan, The Alabama Sheltering and Mass Care Task Force operates under guidance from Federal and State government to “affirm and fulfill basic sheltering and mass care responsibilities and roles at the state level...build capacities to provide a broad range of flexible and cost-effective sheltering options...establish and maintain a common operating picture in the State’s relationship with each local operating group that assists in operating shelter and mass care sites.” The intent of the Strategy and Plan is to continue to develop local and State shelter capabilities and to develop innovative approaches for people with special needs and for household pets.

Under the EOP, The Alabama Department of Human Resources is the lead agency in mass care for the State under ESF #6. The American Red Cross (ARC) is the main support agency for shelters under ESF #6. The Alabama Department of Post Secondary Education and the Alabama Community College System (ACCS) may provide or support shelters or host reception operations as requested by the governor. The Alabama Department of Corrections self-

² Mobile County indicated they opened six ARC shelters hosting 900 for Hurricane Ike and one special needs shelter for 10 residents. The average hour time was 12 and average number of days stayed was 2. For Gustav, Mobile indicated they opened 10 shelters for 2980 evacuees; one special needs shelter for 20 people and 1 pet shelter for 60 animals. The average resident stayed 24 hours and one day.

evacuates and shelters its inmates when evacuation of a facility is necessary. Additional agencies that provide shelter support include the Alabama Departments of Economic and Community Affairs, Education, Homeland Security, Mental Health and Mental Retardation, Public Health, Public Safety, Senior Services, Transportation, Veterans Affairs, Youth Services (youth shelter in place or alternative shelters are arranged), Military Department, the Governor's Offices on Disability and of Faith-Based and Community Initiatives and the Voluntary Agencies Active in Disaster (VOAD) as well as local emergency managers, the Salvation Army (shelter assistance or management, fixed or mobile feeding). Pet and Medical Needs Shelters are addressed below. Alabama served as a host state for evacuees from nearby states. For Gustav, at least half of all evacuees were from the State of Louisiana.

According to the Alabama Bay Area Transportation Assisted Evacuation Annex:

"The magnitude of the event will influence the sheltering decision. During small localized events, such as hazmat spills or low impact widespread events such as Category 1 hurricanes, sheltering will be conducted in the County. Widespread high impact events will trigger sheltering and transport outside of the County. Out of county sheltering triggers for Mobile county includes Category 3 hurricane and higher. Out of county sheltering triggers for Baldwin County includes Category 4 hurricane and higher. The decision on where to shelter will be made the County Emergency Management in conjunction with State Emergency Management."

SHELTER TYPES IN ALABAMA

Overview

General population shelters in Alabama are generally supported by the American Red Cross (ARC). Some independent shelters may open and may receive support from the ARC or other agencies. Medical needs shelters (MSN is the term used in Alabama) are managed by the State Departments of Public Health and Human Resources. Some counties may open shelters for first responders and others such as utility workers. Both of Alabama's two coastal counties have hardened shelters. The ones in Baldwin County have been built to resist most hurricanes; the ones in Mobile County cannot withstand winds above a category 3.

In Alabama, there are 65 centralized and two independent county health departments. For the 65 centralized counties, the Department of Public Health supports sheltering. For the independent counties, the local county health departments staffs shelters. The bulk of this report describes General Population (GP) shelters which served the majority of the population.

Site Selection

The ARC follows internal ARC 4496 criteria for site selection (last revised January 2002), with an emphasis on locating shelters outside of the surge zone although exceptions can be made. In Mobile County, there are two methods used for site selection. One method is to locate shelter sites outside of surge zones using surge maps from the Hurricane Evacuation Study (HES). The other method is to locate shelters outside of any official evacuation zone. Using the latter method would mean that ARC shelters could not be located within Mobile County since its four evacuation zones cover the entire county. However, the ARC was able to ask the National office for an exception and can locate shelters in some portions of Mobile County.

The Alabama Department of Postsecondary Education is in the process of identifying potential sites beyond those currently in use (for county locations that host ACCS shelters, see Table 6-6). Some sites have been eliminated because of potential road flooding or proximity to a floodplain. Some become temporarily unavailable for various other reasons. For example, tornado damage to one high school caused classes to be relocated to the local community college, disabling its use for sheltering. Out of 64 ACS locations, there are approximately 24-26 that could be used in 2009. These facilities are set up for 50 individuals or less. Some facilities, such as schools, may become unavailable during the duration of sheltering as classes resume session in the fall.

Hardening

The Mobile County Emergency Management Agency lists 21 shelter locations considered appropriate for a Category 3 storm, two for a Category 2 storm and 1 for a Category 1 storm (Table 6-4) to shelter a total of 19,600. Categories were determined based on an American Red Cross Gulf Coast Chapter survey conducted in May of 2007. The 2009 Baldwin County Shelters of Last Resort Operations Plan identifies 11 locations as hurricane shelters; including one medical needs shelter with a total capacity of 7,372 individuals (Table 6-5).

PET SHELTERS

Locations

Efforts are made to co-locate pet shelters close to human shelters so that pet owners can care for their animals. Daily contact is also deemed important for the psychological welfare of both animals and their owners. There are two pet shelters locations that typically open in Alabama. One is in Dothan in a fairgrounds/coliseum location which tends to absorb Florida evacuees and can become cramped for space. Dothan can house 300 small animals and as many as 200 large animals and is co-managed by the State and local emergency management agencies. People can use a local transit bus or other local transportation between the pet and human shelter in order to check on their animals. A second pet shelter is located in Montgomery and is State managed.

The Montgomery shelter can house between 3,000 and 6,000 small animals and up to 1,500 large animals. This facility offers large barns with concrete floors and has a water source. The State also has companion animal trailers that can house up to 60 pets in units provided by the American Veterinary Medical Association. In addition to evacuee pets, rescue groups may bring in animals. When that happens, the animals are scanned for microchips and kept separate from other animals. A few ACCS shelter sites are located in proximity to local humane shelters/pounds. According to the Alabama Bay Area Assisted Transportation Evacuation Annex, "pets may be given identification tags that, when scanned, matches them with the evacuee/owner family, entered into the tracking system, assessed for stress and injury, and triaged for appropriate care."

Management

Animal shelter efforts are managed under ESF #11 and coordinated by the U.S. Department of Agriculture (USDA) and its Animal and Plant Health Inspection Service (APHIS) in conjunction with the Alabama Department of Agriculture and Industries. ESF #11, operating under the Human Services Branch, coordinates evacuation and sheltering of household pets and service animals; the Alabama Department of Agriculture and Industries provides guidance, personnel and planning. Pet sheltering in Alabama is dependent on local management and resources with State resources to support those efforts. Local efforts may rely on humane societies, local veterinarians and similar partners. There is currently no State law for pet shelters in Alabama.

Hardening

Alabama Pet shelters are not certified for hurricane winds but are considered sufficiently far enough away from the coast to withstand such effects. Baldwin County reports a need for a pet sheltering facility.

Gustav. The State did not open pet shelters for Gustav but the local humane society in Montgomery did take in 70 animals, mostly dogs. Baldwin County independently reported providing for some pets in local shelters.

MEDICAL NEEDS SHELTERS (MSN)

Locations

Medical special needs shelters (MSNs) can be located at 17 sites around the State. All have air conditioning and usually house Alabama residents (some exceptions occurred for Gustav). The sites are all located close to major evacuation roadways and close to urban centers that offer hospital and other medical resources. All meet ADA requirements but accessibility can vary. The State prefers to have MSN shelters located close to general population shelters so that if the MSN reaches capacity, some caregivers can be housed at the GP site. MSNs ideally are also located close to the pet shelters so that visits can take place, as such interaction is considered good for mental health of both pets and their owners. Every MSN has a backup generator that may be onsite or brought in by the AEMA. A MSN is considered a “shelter of last resort” in Alabama. The MSN is geared to provide power, air conditioning, food and medical oversight but not treatment.

Management

The State Department of Public Health, which manages the MSN, pre-stages kits for nurses, social workers, administrators, clerical and others. Trailers are also pre-loaded with cots and medical supplies. All are deployed on an as-needed basis. For hurricanes, the State tries to deploy teams from the northern part of the State on the assumption that southern teams may be evacuating. Each MSN can shelter 50 people, preferably in pods of 25 patients with two teams each on separate 12 hour shifts. A team usually consists of 2 nurses, 2 aides, 1 administrator, 1 social worker and 1 environmentalist. The number can be increased as needed, particularly if caregivers are not present or high acuity (highly vulnerable, higher risk) patients enter the MSN. Nurses follow written protocol for patient conditions. An EMT is assigned to every shelter as are armed security officers.

DHR manages registration and the facility itself to coordinate meals, handle power outages and similar problems. Some sites have kitchens and if they don't, food is brought in. Meals may be provided by the ARC, Salvation Army, local restaurants or others. As soon as patients register, social workers begin working on discharge planning which can be challenging because of complex health conditions or because of difficulty returning home to a damaged area that may lack local health care services.

Shelters at ACCS post secondary sites are visited in the morning and evening by public health nurses who make rounds to assess needs although 9-1-1 is used for emergencies. Shelter residents can be transferred to an MSN through a State- or locally-provided vehicle or sent to a hospital.

Hardening

Each MSN has a safe area to protect the residents from high winds, including tornadoes.

AD HOC SHELTERS

Alabama did not have many ad hoc shelters for Gustav (in contrast to the Katrina experience). Some who came via privately owned vehicles returned to shelters familiar to them from their Katrina stay which prompted some of the ad hoc sheltering that occurred for Gustav. The Red Cross provided some support to some locations with enough evacuees. The ARC is making a concerted effort to reach out to these locations.

HOTELS AND MOTELS

There were no major issues with tourists for Gustav. At the time of year when these storms occurred, many coastal tourists are Alabama residents and simply returned home as the storm approached. However, Alabama reported that inland motels and hotels did fill up with local and out of state evacuees.

SHELTER ACTIVATION PROCESS

At the start of any tropical formation in the Atlantic, the Alabama Emergency Management Agency (AEMA) begins to monitor and track its movement. The State commences an H-matrix (H = hourly) countdown as early as 120 hours from landfall. Storms that form in the Gulf of Mexico can reduce the time available. In general, the following activities occur at these specified times:

- H-120. ARC begins to alert staff, notify vendors, contractors and partners. Louisiana, through an MOU, begins conference calls to discuss potential evacuation. AEMA reviews plans, updates personnel assignment and prepares to activate the Hurricane Plan.
- H-102. Louisiana activates State bus contract.

- H-96. AEMA activates the EOC at Level 3; ARC contacts local EMAs. Alabama College System mobilizes local team leaders. Food, ice and water contracts are activated, transport supplies and equipment are activated; Louisiana initiates fuel contract. Voluntary evacuation is initiated. Roles are reviewed by ARC with college staff and shelter manager is designated. AEMS begins process to open shelters.
- H-84 to H-72. ARC activates shelters and contracts. AEMA EOC goes to level 2. Louisiana MOU is activated
- H-72. Alabama Reception Centers are fully operational; bus evacuation begins from Louisiana. Shelters are stocked with food. AEMA, ARC, and ACS coordinate and communicate closely through briefings, situation reports and frequent contact.
- H-60. New Orleans City Assisted Evacuation Plan begins.
- H-54. Louisiana begins bus evacuation for general population.
- H-50. Louisiana begins coordination with neighbor states on evacuation.
- H-48. AEMA EOC activation moves to level 1. ARC continues response activities. ACS mobilizes support teams. AEMA announces mandatory evacuations. DPS identifies shelters and collection points for stranded persons. ACS begins opening shelters.
- H-40. Baldwin County evacuations start.
- H-24. AEMA completes evacuations; Louisiana buses arrive in Alabama. Reception Centers are fully operational. ARC ensures that clients and workers in shelters are safe. ACS reassesses staffing and transportation needs. Frequency of contacts and situation reports increases among key partners. DPS initiates contraflow for I-65 as a last resort.
- L + 48. [Landfall plus 48 hours]. ARC continues sheltering. ACS reassesses needs.
- L + 72. ARC continues sheltering. ACS assists transporting evacuees to consolidated shelters and coordinates with ARC.
- L + 96. ARC continues sheltering. ACS finishes consolidation.
- L + 240 (ten days). Repatriation to Louisiana is as complete as possible.

MOVEMENT TO SHELTERS FOR HURRICANE GUSTAV

GP shelters provided for two kinds of evacuees including those that came by bus from Louisiana and those who self-evacuated. Approximately 50% of shelter residents were Louisiana bus evacuees. Louisiana residents arrived first followed by those who self-evacuated by private vehicle, mostly from Alabama. Both populations generally followed the timeline described above.

In-state Evacuation

Jefferson County usually takes the bulk of Mobile and other coastal evacuees. Overflow can go into Shelby and Tuscaloosa Counties if needed. The community infrastructure is not there in rural areas especially for the types of population expected to arrive.

Host State Reception

Louisiana commenced bus evacuations through a formal MOU with Alabama serving as a host state. Under the plan, effective at the time of Ike and Gustav, approximately 4,000 were to go initially to Jefferson County (Birmingham and area). The Governor eventually agreed to accept 10,000 by bus which entered along the I-59/I-20 highway at the state's welcome center. Upon arrival, Alabama realized that evacuees had not been properly pre-screened and dispatched EMTs to conduct rapid triage and screening. Although the MOU prohibited MSN patients, there were 159 MSN individuals on the buses. One problem exacerbating evacuee medical conditions was related to the bus transportation. Some bus passengers were not allowed to leave the bus for up to 14 hours (some longer). Some busses had food and water on board but in the cargo hold and did not stop en route. Upon arrival in Alabama, some evacuees had deteriorated medically. Alabama subsequently opened two MSNs. Additional public health nurses were sent to the GP shelters for some individuals that needed medical care. It should be noted that the AL/LA MOU has since been cancelled.

SHELTER LOCATIONS AND POPULATIONS

Overview

Alabama believes that approximately 9,000 people evacuated from Louisiana into Alabama, arriving through the Sumter Reception Center on I-59 at mile marker one in Alabama. Total peak numbers in Alabama shelters reached 11,970. Detailed shelter information can be found in Table 6-7.

Non-ACCS Shelters

Based on American Red Cross data (see Table 6-6), there were 43 total Non-ACCS shelters; 22 were ARC managed, and 2 were ARC supported. Sixteen opened as ARC partners. One medical special needs shelter was opened by DPH although both Mobile and Baldwin Counties independently reported operating special needs shelters. The first Non-ACCS shelters opened on August 30 in Montgomery where 42 stayed the first night. Most non-ACCS shelters peaked by September 2 or 3 and all closed by September 6 except Birmingham/Jefferson County which peaked at 1,483 on September 5 due to consolidation and to facilitate a repatriation bus plan. The maximum peak for Non-ACCS Alabama shelters was 6,263 on September 1. By September 5 that figure dropped to 3,356 and on September 6, only 31 people remained in a Mobile ARC-managed site.

ACCS Shelters

Thirty-four ACCS shelters opened including 11 non-designated, 16 ARC partners, 4 ARC managed and 3 ARC supported. The ACCS shelters opened on August 31 and peaked on September 1. Numbers dropped rapidly after landfall. The largest facility was an ARC managed site at Wallace State College in Cullman County with 1,171 residents. Shelton State Community College in Tuscaloosa peaked at 600. Overall the range of shelter residents went from two to 1,171. The maximum numbers of residents in ACCS was 5,707 on September 1, a number that remained over 50,000 through September 4, dropped to 1,514 on September 5 and to zero on September 6.

SHELTER ISSUES

Similar to other states, Alabama shouldered responsibility for a wide range of shelter residents, many from other States. For example, buses evacuated opposing gang members separately but coincidentally ended up in the same shelter, causing anxiety for both residents and shelter staff. A number of other bus passengers were methadone patients in Louisiana. Upon leaving Louisiana during the evacuation, these methadone patients were given up to 7 days of methadone. Upon arriving in Alabama, some had used all of their allotment and began to withdraw. In Alabama, the Department of Mental Health legally has to administer methadone rather than the Department of Public Health. Since the patients did not have their medical records, the DMH had to re-do medical histories and initiate proper treatment. Baldwin County also reported shelter problems with drug use.

There were some community concerns about safety although few incidents were reported. Local law enforcement provided security for shelters along with assistance from the National Guard. Repatriation of evacuees to Louisiana emerged as the single largest logistical challenge.

REPATRIATION AND "OPERATION ROLL TIDE"

Closing shelters depends on the ability to process and return evacuees back to their home. At the end of the first week of Gustav sheltering, evacuees heard that New Orleans was "open." People became impatient and frustrated, wanting to return home. However, Louisiana apparently did not have a bus contract in place to return evacuees. Alabama did not have funds available to repatriate people either by bus or to support those who left via self-evacuation. Because many arrive resource-depleted, they require funding or transportation to go back home. Some people do become ill, deteriorate while under evacuation or require hospitalization. There are no State funds to repatriate those who become sick or hospitalized. Some hospitals discharge and sent patients "home" (as in out of the hospital) but did not know if a home was safe to return to. AEMA developed a repatriation plan and requested Louisiana to state that it was safe to send the evacuees home.

A draft repatriation plan termed "Operation Roll Tide" was developed by Alabama on September 4, 2008. The concept of operations involved using a Louisiana Bus Contract to help with transporting evacuees back to Louisiana. The effort used approximately 130 buses. A Vehicle Staging Area (VSA) in Jackson, Mississippi was relocated to the Alabama State Fairgrounds in Birmingham. An additional 67 buses were available in Alabama. Buses were prepared, sanitized, fueled and loaded with food and water at the VSA and given GPS tracking. Buses were assigned to a convoy or "chalk" and escorted to a pre-staging area near the shelters by DPS. FEMA Community Relations, the ACCS, the ARC and DHR prepared and informed shelter residents for departure. The Louisiana EOC notified the AEMA EOC when they were ready and the AEMA sent buses to shelters. The convoy, escorted by DPS, proceeded to I-59 in Sumter County and I-10 in Mobile County. Jefferson County evacuees were taken to a central hub for pick-up. Operation Roll Tide ended on Friday, September 5.

A few individuals who missed the buses along with some individuals in hospitals or other circumstances were assisted through the State, public health, civic organizations and others. Although some MSN patients could have gone home on the bus or by air, most were sent via ambulance at a cost of \$3,500 per patient. Louisiana paid for these expenses through EMAC.

**Table 6-4: Mobile County Shelters/Evacuation Centers for 2009/2010
(Source: Mobile County School System and Mobile County Emergency
Management Agency)**

Shelter Location	Capacity	Generator Status	Wind Load
On-Site Generator Shelters			
Baker High	1500	On-Site Generator	Cat 3
Belsaw/Mt. Vernon Elementary	1000	On-Site Generator	Cat 2
Burns Middle (Medical Needs)	600	On-Site Generator	Cat 3
Causey Middle	400	On-Site Generator	Cat 3
Collins-Roads	600	On-Site Generator	Cat 3
LeFlore High	1000	On-Site Generator	Cat 1 (in flood zone)
McDavid Jones Elementary	1000	On-Site Generator	Cat 3
Meadowlake Elementary	1000	On-Site Generator	Cat 3 (EMA 1 st responder site)
O'Rourke Elementary	500	On-Site Generator	Cat 3
Satsuma High	1500	On-Site Generator	Cat 2
Semmes Middle	600	On-Site Generator	Cat 3
Theodore High	1000	On-Site Generator	Cat 3
Vigor High	2000	On-Site Generator	Cat 3
Transfer Switch Shelters			
Denton Middle	1500	Transfer Switch	Cat 3
Eichold-Mertz Elementary	600	Transfer Switch	Cat 3
Ella Grant Elementary	400	Transfer Switch	Cat 3 (100 yr floodplain)
E.R. Dickson Elementary	400	Transfer Switch	Cat 3
Haskew Elementary	400	Transfer Switch	Cat 3
Shepard Elementary	400	Transfer Switch	Cat 3
Wilmer Elementary	600	Transfer Switch	Cat 3
Shelters without Generators			
Collier Elementary	400	No Generator	Cat 3
Craighead Elementary	400	No Generator	Cat 3
Davidson High	800	No Generator	Cat 3 (Sheriff's Office Only)
Forrest Hill Elementary	400	No Generator	Cat 3
Robert E. Lee Elementary	200	No Generator	Cat 3

**Table 6-5: Hurricane Shelters of Last Resort for Baldwin County, Alabama
(Source: Adapted from Baldwin County Emergency Management Agency)**

Shelter	Type	Description
Bay Minette Middle School	Special Needs	Shelter solely for the Association of Retarded Citizens of Baldwin County.
Fairhope Satellite Courthouse	Electrical Support	Shelter solely for individuals who require electricity to sustain life support functions.
Foley Satellite Courthouse	Electrical Support	
Daphne East Elementary School	Public Mass Care (co-locates electrical support patients)	Shelters for the general population
Baldwin County Coliseum	Public Mass Care (co-locates medical needs patients)	
Baldwin County High School	Public Mass Care	
Fairhope High School	Public Mass Care	
Foley High School	Emergency Responder	Shelters solely for designated emergency responders.
Robertsdale High School	Emergency Responder	
Central Baldwin Middle School	Senior Citizen	Shelter for senior citizens, aged 55 & over, who are independent, self sufficient, and who do NOT have physical or mental conditions requiring medical or nursing oversight.
Baldwin County Level II Community Shelter	Medical Needs	Shelters solely for individuals who HAVE physical or mental conditions requiring limited medical or nursing oversight.

Table 6-6: Shelter Information for Hurricanes Gustav and Ike

Alabama County Hurricane Gustav	Type of Shelter	#Open shelters	First date of evacuee arrivals	Maximum Population	Last day residents reported staying in shelter
Baldwin*	Independent	1	9/1	258	9/2
	ACS/ARC Managed	1	9/1	108	9/3
Calhoun	ARC Managed	1	8/31	81	9/4
	ARC Partner	1	8/31	35	9/4
Chilton	ARC Supported	1	9/3	100	9/4
	ARC Partner	1	9/4	25	9/4
Clarke	ACS/ARC Partner	1	9/1	21	9/1
Colbert	ACS	1	9/1	459	9/4
Conecuh	ACS	1	8/31	76	9/2
Covington	ARC Supported	1	9/1	50	9/2
	ACS/ARC Supported	1	8/31	2	9/1
Cullman	ACS/ARC Managed	1	8/31	1171	9/4
Dallas	ACS/ARC Partner	1	9/1	196	9/4
DeKalb	ARC Managed	1	9/1	153	9/2
	ACS/ARC Partner	1	9/1	278	9/4
Etowah	ARC Managed	1	8/31	38	9/4
	ACS/ARC Partner	1	8/31	164	9/4
Fayette	ACS/ARC Managed	1	9/1	386	9/4
Franklin	ACS/ARC Supported	1	9/1	116	9/4
Houston	ARC Supported	1	9/1	88	9/4
	ACS/ARC Partner	1	8/31	2	8/31
Jefferson	ARC Partner	2	8/30 and 9/1	228	9/2, 9/4
	ARC Managed	4	8/31	3182	9/5
	MSN	1	9/4	39	9/4
	ACS/ARC Partner	2	8/31	484	9/5
	ACS	1	8/31	250	9/5
Lee	ARC Partner	1	8/31	193	9/5
	ACS	1	9/1	80	9/5
Limestone	ACS	2	Both open 9/1	529	9/1 and 9/5
Madison	ACS/ARC Partner	1	9/1	155	9/4
Marion	ACS	1	8/31	154	9/5
Marshall	ACS/ARC Partner	1	9/1	155	9/4
Mobile**	ARC Managed	9	All open 9/1 but one	1929	All close 9/2 but one 9/4
	ARC Partner	2	All open 9/1 but one	265	All close 9/2 but one 9/4
Montgomery	ARC Partner	5	3 open 8/31; 2 9/1	481	Four close 9/5, one closes 9/4
Morgan	ARC Partner	1	8/31	48	9/3
Perry	ACS/ARC Partner	1	9/1	225	9/4
Randolph	ACS/ARC Partner	1	9/3	139	9/4
Russell	ACS/ARC Partner	1	9/1	27	9/2
Shelby	ARC Managed	1	9/1	286	9/5

Alabama County Hurricane Gustav	Type of Shelter	#Open shelters	First date of evacuee arrivals	Maximum Population	Last day residents reported staying in shelter
Talladega	ARC Managed	1	9/3	31	9/3
Tuscaloosa	ARC Managed	1	8/31	370	9/4
	ACS/ARC Managed	1	8/31	600	9/4
Walker	ARC Partner	2	9/2	95	9/5
	ACS	1	9/1	375	9/5
Washington	ARC Managed	1	8/31	12	9/1

Source: American Red Cross. ACS refers to Alabama College System where community colleges, technical colleges, state universities and others are used for shelter purposes. *Baldwin County independently reported opening 1 ARC shelter for 50-100 people, 1 special needs shelter for 20 residents and a county shelter for 340. Baldwin County's shelter operations were open about 2 days. They did not open any shelters for Ike.

**Mobile County indicated they opened six ARC shelters hosting 900 for Hurricane Ike and one special needs shelter for 10 residents. The average hour time was 12 and average number of days stayed was 2. For Gustav, Mobile indicated they opened 10 shelters for 2980 evacuees; one special needs shelter for 20 people and 1 pet shelter for 60 animals. The average resident stayed 24 hours and one day.

6.3 BEHAVIORAL DATA

OVERVIEW

The purpose of this section is to collect and analyze all available behavioral surveys performed by Federal, State and Local agencies and by Universities for residents, tourists, etc. of Alabama who were asked to evacuate or were subject to a potential evacuation. This data would then be used to better understand the behavioral reactions and response of the impacted public during Hurricanes Gustav and Ike. An evaluation of the available collected behavioral data was to have been made and a report written on the adequacy of the surveys, their merits or deficiencies and how they compared to previous studies done in Alabama. As a result of the analysis, a recommendation would be made assessing the need for additional surveys to be conducted in Alabama to address the behavioral tendencies of the population of Alabama affected by future storms. An extensive search was made to locate any such behavioral survey or study. Unfortunately, there have been no post-Gustav or post-Ike behavioral surveys located.

PROCESS

A literature review of academic and commercial sources was completed in an attempt to locate behavioral studies relative to either Hurricane Gustav or Ike in Alabama. Calls for information were put on several disaster-related newsletters and posted on internet forums. All of the major disaster centers and disaster researchers were contacted to locate any research that has been done, or is currently in progress. Emails were sent to a total of 38 persons in disaster-related or emergency management fields. A table of behavioral assessment contacts is found in Appendix I.

No behavioral work for either Hurricane Ike or Hurricane Gustav in Alabama was located. One researcher, Dr. Shirley Laska at the University of New Orleans, attributes this to “researcher fatigue,” given the extensive research that has been completed or is currently underway related to Hurricane Katrina.

Alabama was included in the FEMA/USACE Hurricane Post Storm Assessment for Hurricanes Opal and Erin in 1996. The 2001 Alabama Hurricane Evacuation Study did not include new behavioral data but referred to the Opal behavioral study. The latest post-storm behavioral analysis located for Alabama was completed in 2005 after Hurricane Ivan. In both the 2001 and 2005 behavioral studies, the size of the survey sample in Alabama was no larger than 200 in each coastal county. Increasing the number of Alabama residents in the sample would undoubtedly increase the response rate and precision of future behavioral studies. Additionally, in the Hurricane Ivan Behavioral Analysis, over half (53%) of the Alabama sample population were not located in an evacuation zone. Figure 6-6 shows the distribution of the sample population as it was presented in Table 2 of the Hurricane Ivan Behavioral Analysis.

The latest hurricane evacuations in Alabama were for Hurricanes Gustav and Ike. Evacuation orders were given for Hurricane Gustav in both Baldwin and Mobile Counties. In Baldwin County, mandatory evacuation orders were given for river, lake and beach front and other areas prone to historic flooding. Similarly, in Mobile County mandatory evacuation orders were given for all islands, beach front properties – all those in the Category 1 Storm Surge Zone.

Table 2. Total Sample by Regions and Risk Zones*

Evacuation Zone	Louisiana		Alabama		Mississippi		FI Panhandle		FL Keys	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cat 1+	0	0	73	14	152	45	71	7	0	0
**No Evac. Zone Data Assume 1+	1232	100	0	0	0	0	0	0	102	100
Cat 3+	0	0	101	20	65	19	100	10	0	0
Cat 4+	0	0	65	13	60	18	144	14	0	0
No Evac Zone	0	0	267	53	65	19	703	69	0	0
Total	1232	100	506	100	342	100	1018	100	102	100

* Weighted to make proportional to population

Figure 6-6: Distribution of Hurricane Ivan Behavioral Survey Population by Evacuation Zone

Evacuation was recommended for those in mobile homes and on rivers and lake fronts. The Mobile County orders were estimated to have involved 11% of the county population. However, it is estimated that only about 5% actually complied with the orders. This was estimated to include approximately 10,500 people and 3,500 vehicles that evacuated within the county and 36,000 people and 12,000 vehicles that evacuated through the county. There were no estimates available for Baldwin County. For Hurricane Ike, Baldwin County issued voluntary evacuation orders for beach front and flood prone areas. Mobile County issued a mandatory evacuation order for all islands, beach front properties, those areas prone to historic flooding. Also included in this order were those in a Hurricane Category 1 Storm Surge Zone, voluntary evacuation for hospitals and healthcare facilities, those in the Category 2 Storm Surge Zone, mobile homes, and rivers and lake fronts. Once again, it was estimated that about 11% of the population was involved in the orders and about 5% actually evacuated. No estimates were available for Baldwin County. No behavioral studies have been conducted relative to these evacuations.

Recently, a Critical Transportation Needs (CTN) survey was conducted in Mobile and Baldwin Counties by the Institute of Public Opinion Research (IPOR). The purpose of the study was to determine an estimate of the number of individuals who would need public transportation in order to evacuate. While the IPOR findings related to evacuation rates and CTN were much higher than expected, they nevertheless should draw attention to the very real possibility that there are likely to be higher demands for transportation in future hurricanes than past evacuation history might indicate. It would be useful to have another survey address this issue in order to support or refute the numbers.

In summary, there is an outstanding need for an updated behavioral assessment for the HES in Alabama. The events and affects from recent storms in Alabama (Katrina, Ivan, Gustav and Ike) have rendered the current behavioral assessment unusable and ineffective.

6.4 TRANSPORTATION DATA

OVERVIEW

The purpose of this section is to collect all available real time evacuation data through interviews with emergency management officials, requests to State and Local department of transportation, and law enforcement officers regarding the number of vehicles involved in the evacuations as well as the clearance time required for the overall evacuation. Any traffic control measures were to be noted and any problem areas were to be identified. Results of the findings were to be compared to the HES clearance times and the State's clearance times where applicable. State officials were to be asked to assess the usefulness of the existing transportation analysis and the possible need for a new analysis.

METHODOLOGY

For this study, a combination of questionnaires and interviews were used to collect information relative to the transportation issues associated with the evacuation of Mobile and Baldwin Counties. The questionnaire produced good responses in Mobile County. Follow-up telephone interviews were more productive along with independent research.

SURVEY AND TARGETS

A local emergency management questionnaire, which includes specific transportation interview questions, is located in Appendix B. The questionnaire was sent to emergency management officials and first responders in each county, and included specific questions to addressing the evacuation roadway network. A summary of participating officials is presented in Appendix A. Mr. George Conner, State Maintenance Engineer, and Tim Glass, State Traffic Engineer, of the Alabama DOT and Mr. John E. Murphy, Jr. Deputy Director of Public Works of Mobile County provided verbal input for this analysis.

EVACUATION PROCESS AND ROAD NETWORK – GUSTAV

Evacuation orders were issued for specific areas of each County. The points of origin for the evacuees were the flood-prone areas of the two counties, particularly those areas lying along the local water bodies, including, but not limited to the beach towns, like Fort Morgan, Gasque, Gulf Shores, Orange Beach, Perdido Beach, Point Cedar, Battles Wharf and Romar Beach in Baldwin County. Other evacuees came from the Mobile area plus beach areas, including but not limited to Bayou La Batre, Bayou Coden, Dauphin Island, Heron Bay, Alabama Port, Faustmas, Mon Louis, Smithport, Bailey's Corner, Sunny Cove and Belle Fountain, in Mobile County.

The orders issued for Baldwin County applied to an undetermined percentage of the overall population. Information could not be gathered to determine the percentage of persons asked to evacuate compared to estimates actually complying with the evacuation order. The orders issued for Mobile County represented approximately 11% of the total County population. Of this count, approximately 5% complied with the evacuation order. Of the total persons complying with the evacuation order in Mobile County, approximately 1% used local shelters versus leaving the County. Mobile County also reported the success in early evacuating at-risk populations which comprised approximately 5% of the total evacuating population.

Once the evacuation orders were issued, Mobile County reports a normal public response while Baldwin County reports a fast public response. Mobile County encouraged residents to evacuate using I-65, Hwy 43 and Hwy 45 North. Traffic volume on these road networks and other local roads was estimated to be normal. Baldwin County encouraged residents to evacuate using Hwy 59. Traffic volume on this and other local road networks was estimated to be normal. Likewise, inland counties also reported normal traffic volumes during this evacuation event.

Mobile County estimates approximately 10,500 people and 3,500 vehicles evacuated within the County and 36,000 people and 12,000 vehicles evacuated through or to the County. Baldwin County reported a small number of persons and vehicles evacuated within, through or to the County. The hurricane evacuation route map for Alabama is shown in Figure 6-7.

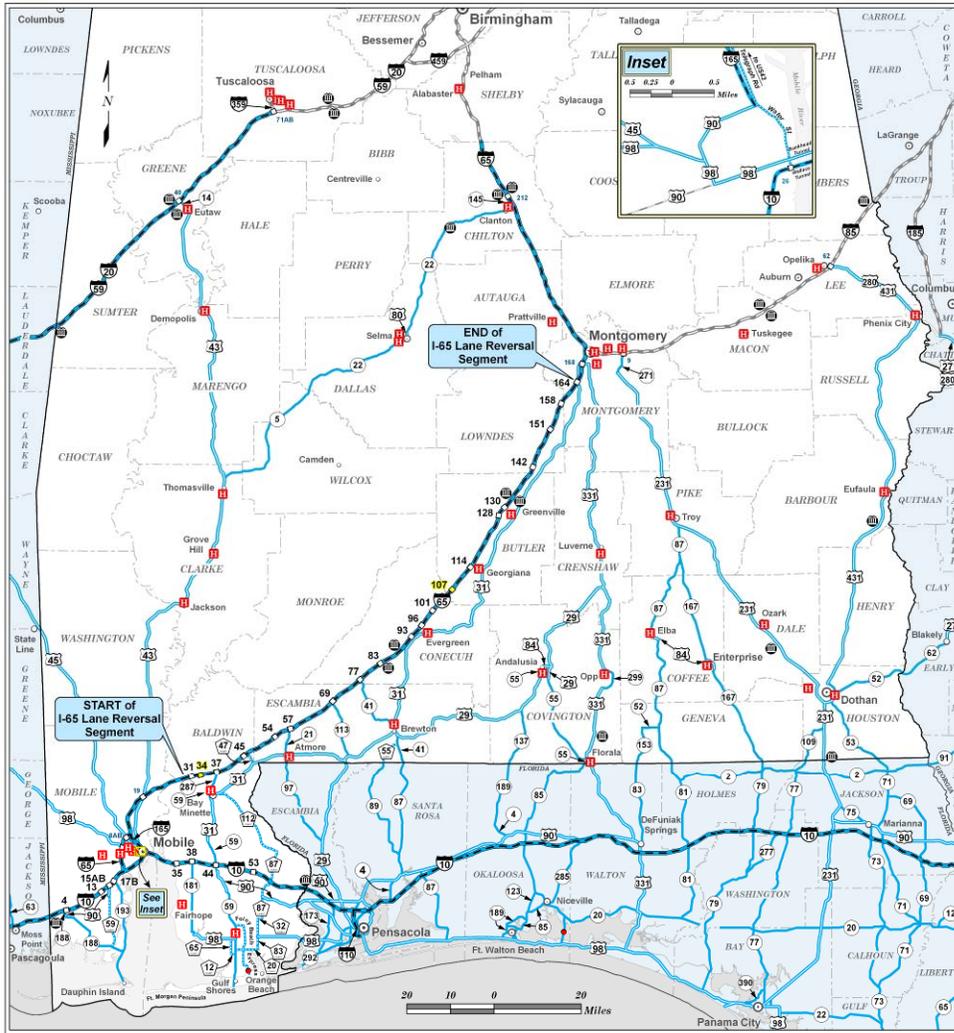
Both Counties reported little to no significant traffic problems experienced during the evacuation process. Of the traffic conditions reported, Alabama DOT reported congested traffic on I-10 and I-65 due to out-of-state traffic demand. The DOT confirmed that reports of heavy congestion on the I-10 tunnel under Mobile River were false. The backup was created by a lane drop west of the tunnel. DOT said that traffic in the tunnel was heavy but steady-flowing. Their website has real-time displays for most of their 30 CCTVs.

EVACUATION PROCESS AND ROAD NETWORK – IKE

Evacuation orders for Hurricane Ike were issued for similar areas in each county. Both Counties recognized the evacuation participation rate was low. Baldwin County reported a low evacuation participation rate. Mobile County attributed it to a minimization of storm impacts from the local media. Minimizing the impacts resulted in a minimized concern of the general public.

Once the evacuation orders were issued, Mobile County reports a slow public response while Baldwin County reports little to no public response. Mobile County encouraged residents to evacuate using I-65, Hwy 43 and Hwy 45 North. Traffic volume on these road networks and other local roads was estimated to be light. Baldwin County did not encourage the use of any particular road network and did not estimate the traffic volume for this event. For this event, inland counties reported normal traffic volumes.

Mobile County estimates approximately 9,000 people and 3,000 vehicles evacuated within the County and 36,000 people and 12,000 vehicles evacuated through or to the County. Baldwin County did not provide estimates for the topic but did mention that neither persons nor vehicles evacuated within, through or to the County.



2008 Hurricane Evacuation Routes 10 Interstate 14 State Route 25 US Highway 12 County/Local Rd Toll Bridge	ALDOT Interstate Centerlines* ALDOT US Highway Centerlines* <small>* National Atlas Data for Alabama States</small> Welcome Center or Rest Area	State Line County Line Major/Minor City Coastal/Upland Water	ALDOT GIS GROUP Projection: UTM Zone 16N Datum: WGS84 Software: ArcMap 9.2
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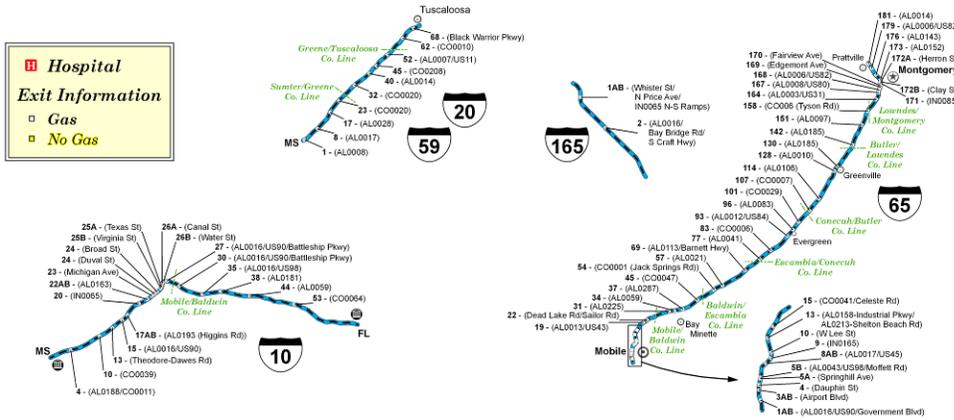


Figure 6-7: AL DOT Hurricane Evacuation Roadway Map

ACTUAL/PREDICTED CLEARANCE TIMES AND PROBLEMS

Mobile County reported that a projected clearance time of 22 hours versus an actual clearance time of 16 hours for Ike and 24 hours for Gustav. Other interviewed respondents said the 24 hour clearance seemed too long. It was thought that a 100% evacuation would produce serious problems. The relatively small response rate in Baldwin County coupled with the lack of any reported serious congestion leaves the clearance time issue rather moot. Clearance time appears to not be a function of time to “clear the queue” but rather, when the last evacuee decided to leave on a discretionary basis. No congestion was reported on any of the evacuation routes by the counties and there was no reported traffic queue to analyze relative to a “time-to-dissipate” standpoint. However, the Alabama DOT reported some congestion on I-65 and I-10 created, for the most part by out of state evacuees from Louisiana and Mississippi.

TRAFFIC CONTROL MEASURES AND PROBLEMS

Special traffic control measures included deployment of mobile VMS, roving incident management trucks and officers, state highway patrol officers. Existing ITS assets included permanent VMS and Highway Advisory Radio that were used. The state’s contraflow personnel were deployed for Gustav (but not used) and were put on standby for Ike. Mobile and Baldwin Counties suggested that additional law enforcement personnel are needed for traffic management/control. The Alabama DOT reported that I-65 is set up for contraflow operations but lane reversal was not utilized for Ike or Gustav.

Even though problems were not serious, the respondents did offer many suggestions to improve the management and performance of the traffic control system, including:

- There is a need for real-time/intelligent traffic data/management systems
- There is a need for more local public shelters
- There is a need for an updated Hurricane Evacuation Study for Alabama
- There is a need for better inter-agency coordination-The ELT could assist with this
- There is a need for more CCTVs and VMS systems
- There is a need for more traffic count stations
- There is a need for access to all state CCTVs
- There is a need for capacity improvements to certain roadways to relieve bottlenecks
- There is a need for a new north-south Interstate highway to help evacuations.
- There is a need for National-level set-aside highway funding for evacuation purposes.
- There is a need for real-time route diversion information for news outlets
- There is a need for added lanes on critical routes
- There is a need for a 24-hour traffic model
- There is a need for more leadership and regional coordination teleconferences by FEMA/FHWA (ELT-ETIS)

No problems were reported relative to evacuating tourists and at-risk populations with origins and destinations outside the County. Baldwin County reported an evacuating population of “zero” for Hurricane Ike and a “small number” for Gustav. The respondents did not respond to the numerical size of the evacuating population and hard data was not available. Mobile County reported traffic bottlenecks on the east/west corridors while Baldwin County reported its evacuation traffic condition as, “typical stop-and-go traffic.”

The on-file hurricane evacuation study was reported as somewhat “useful” but out of date. Attempts have been made to update the data by local EM officials who conduct a dry-run before hurricane season each year. The plan to evacuate at-risk populations is thought to be a good plan (busing) and no problems were reported during Ike or Gustav. However, the DOT reported that the HES has probably underestimated the impact of out of state traffic on the Alabama system and should be updated to include a realistic assessment of out of state traffic.

CRITICAL TRANSPORTATION NEEDS (CTN)

In June 2009, a behavioral survey was developed and conducted in Mobile and Baldwin Counties. The purpose of the study was to obtain data from transportation dependent citizens, including critical transportation needs (CTN) subset populations, to assess needs and numbers of the individuals who are likely to be dependent on public transportation for an evacuation. Two surveys were conducted in each county, one utilizing the Rapid Cast automated system and the other conducted by the Institute for Public Opinion Research (IPOR) using Computer Assisted Telephone Interviewing (CATI) methodology.

The results of the surveys estimated that 3,000 people or 1,200 households will need transportation in Baldwin County for a Category 1 or 2 hurricane, and 9,000 people or 3,700 households needing transportation for Category 3, 4 or 5 storms. For Mobile County, the estimates are 15,200 people or 5,600 households needing transportation for Category 1 or 2 storms, and 32,300 people or 11,900 households needing transportation in order to evacuate for Category 3, 4 or 5 hurricanes.

Figure 6-8 shows the location of the study respondents who indicated they would need transportation.



Figure 6.8: Locations of Households with Transportation Needs (IPOR Survey Results)
 From the Alabama Hurricane Evacuation Project Critical Transportation Needs (CTN) Assessment

While the IPOR findings related to evacuation rates and CTN are no doubt on the high side, they nevertheless should draw attention to the very real possibility that there are likely to be higher demands for transportation in future hurricanes than past evacuation history might indicate. Planning for the transport of up to 30,000 people in the case of Mobile County for a major hurricane is a difficult and expensive undertaking. Other ways to begin to address the Critical Transportation Needs of coastal Alabama include:

- Education and outreach programs on evacuation zones to reduce the amount of over-evacuation and promote evacuation necessary for safety;
- Initiatives encouraging people to find own transportation;
- Providing more shelter space inside each county.
- Active implementation/maintenance of a centralized special needs/CTN registration system.

6.5 EVACUATION DATA

OVERVIEW

Post storm data collection for the State of Alabama resulted in varied information collected from the two local coastal counties. From the collected surveys, it appears Mobile County initiated a more aggressive evacuation effort during Ike while Baldwin County had a much more scaled back effort. Both counties exercised similar efforts during the Gustav threat. Limited information was obtained from inland counties and of the information collected, there were common themes recommending a more coordinated effort in evacuation decision making and evacuation communication. Tables 6-7 and 6-8 provide a summary of the responses and information on evacuation gathered from each county.

EVACUATION DECISION MAKING – GUSTAV

Evacuation orders for both Baldwin and Mobile Counties were issued by the Governor of Alabama in consult with the Alabama Emergency Management Agency. While the general evacuation order was issued by the Governor's office, the areas in which to initiate the evacuation process were left to local emergency management for coordination

Baldwin County issued evacuation orders on August 30, 2008 for river, lake and beach front and other areas prone to known historic flooding. Mobile County issued evacuation orders for all islands, beach front properties, those areas prone to historic flooding, and those persons located in a Hurricane Category 1 Storm Surge Zone. Mobile County issued a voluntary evacuation order county-wide specifically targeting hospitals and healthcare facilities and those persons located in a Hurricane Category 2 Storm Surge Zone. Mobile County also recommended evacuation considerations of mobile homes and manufactured homes, rivers and lake fronts and other persons located in a Hurricane Category 3-5 Storm Surge Zone.

For Baldwin County, the areas targeted for evacuation were decided by local officials based on historic flooding. Information was not provided to make a definitive decision as to the utilization of HES products, established storm surge maps or other USACE / FEMA produced documents. In Mobile County, the areas targeted for evacuation were decided upon by elected officials based on HES products to include existing storm surge maps as well as historic flooding. For both Counties, officials reported the areas targeted in the evacuation orders were sufficient for the threat.

The evacuation orders were distributed in a variety of formats common to both counties. These formats include television, radio, and internet. Baldwin County also utilized newspaper postings, meeting with officials, and mass email. Mobile County also utilized telephone notifications and mass fax capabilities.

Language barriers were noted in submitted data from both Counties; however the challenges experienced did not hinder evacuation activities. Baldwin identified trouble with Spanish and Russian speaking persons. Mobile County reported trouble with Spanish and lesser issues with Vietnamese, Cambodian, Laotian and German. Mobile County was able to mitigate many language barrier challenges by utilization of volunteer interpreters from the University of South Alabama and various volunteers from local faith based organizations.

EVACUATION DECISION MAKING – IKE

Unlike the evacuation orders issued for Gustav, any evacuation decisions during Ike were made at the local level in both coastal counties. In Baldwin and Mobile counties, evacuation orders were decided upon by local county officials in consult with the Alabama Emergency Management Agency.

In Baldwin County, no evacuation orders were given because the County did not anticipate a need to evacuate nor did they expect the severity of the weather received. Emergency Evacuations for over 40 residents were performed beginning the morning of September 11. Mobile County issued a voluntary evacuation order for hospitals and healthcare facilities, those persons located in a Hurricane Category 2 Storm Surge Zone and all other residents county-wide. Mobile County issued a Mandatory evacuation order for all islands, beach front properties, those areas prone to historic flooding, and those persons located in a Hurricane Category 1 Storm Surge Zone. Mobile County also recommended evacuation considerations of mobile homes and manufactured homes, rivers and lake fronts and other persons located in a Hurricane Category 3-5 Storm Surge Zone.

Information was not provided to make a definitive decision as to the utilization of HES products, established storm surge maps or other USACE / FEMA produced documents. In Mobile County, the areas targeted for evacuation were decided upon by elected officials based on HES products to include existing storm surge maps as well as historic flooding. While Mobile County reported the areas targeted in the evacuation order were sufficient for the threat, Baldwin reported the areas targeted in the evacuation order were not sufficient for the threat and also noted that evacuation should have been initiated earlier.

The evacuation orders for Hurricane Ike were distributed in the same formats utilized during Hurricane Gustav and similar language barriers were experienced.

EVACUATION TIMING – GUSTAV

Both counties reported the evacuation orders were issued in a timely manner. Baldwin County reports the timing of the evacuation orders was a political decision and utilized HURREVAC, along with and Crown Weather and Weather Underground websites in evacuation timing. Mobile County reported the utilization of the predicted clearance times available from the HES as a significant tool in their decision making. The HES clearance time estimated approximately 22 hours was needed to evacuate the threatened areas. Mobile County reports this timing was appropriate for the threat.

Both Counties reported little to no significant problems with tourist posing a problem to the evacuation process. Mobile County indicated the evacuation process was initiated approximately 48 hours prior to any storm impacts. This provided sufficient time to announce and manage the evacuation process. Mobile estimated the evacuation process took approximately 24 hours total. Baldwin County did not report the length of the evacuation process.

EVACUATION TIMING – IKE

Mobile County reported the evacuation orders were issued in a timely manner, while Baldwin County reported the evacuation order was not issued in sufficient time. This is a common theme throughout the survey regarding the Ike evacuation effort. Baldwin County reports the timing of the evacuation orders was a political decision and based their evacuation timing on previous knowledge of historic flooding areas. Mobile County reported the utilization of the predicted clearance times available from previous HES as a significant tool in their decision making. The HES clearance time estimated approximately 22 hours was needed to evacuate the threatened areas. Mobile County reports this timing was appropriate for the threat.

Both Counties reported little to no significant problems with tourist posing a problem to the evacuation process. Mobile County indicated the evacuation process was initiated approximately 48 hours prior to any storm impacts. This provided sufficient time to announce and manage the evacuation process. Mobile estimated the evacuation process took approximately 16 hours total. Baldwin County did not report the length of the evacuation process.

**Table 6-7: Evacuation Decision Process Summary--
Hurricane Gustav Evacuation Assessment**

Hurricane Gustav						
Location	Time EOC was Activated	Source of Information to Trigger Evacuation	Time Evacuation Order was Issued	Number Evacuated	What Study Products/Decision Aids were Used in Decision Making	Was HES Data Used
Mobile County	8/30/08	Political decision by Governor and State EMA	7:00 a.m.	Within Mobile Co.: 10,500 Through Mobile Co.: 36,000	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH	NO, Outdated, Least Helpful Product
Baldwin County	8/30/08	Political decision by Governor and State EMA	7:00 a.m.	Small number of people from Gulf Shores 40	HURREVAC, Websites (Crown Weather and Weather Underground)	Did not use.
AEMA	8/28/08	Political decision by Governor and State EMA	3:22 p.m. CDT Level 3	N/A	HURREVAC, TIDES	No, Outdated

**Table 6-8: Evacuation Decision Process Summary—
Hurricane Ike Evacuation Assessment**

Hurricane Ike						
Location	Time EOC was Activated	Source of Information to Trigger Evacuation	Time Evacuation Order was Issued	Number Evacuated	What Study Products/Decision Aids were Used in Decision Making	Was HES Data Used
Mobile County	9/10/08	Local county officials in concert with AEMA	Not Listed	Within Mobile Co. 9,000 Through Mobile Co.: 30,000	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH	No Outdated
Baldwin County	9/10/08	Local county officials in concert with AEMA	Not Listed	None	Historic Flooding	No
AEMA	9/10/08	AEMA	07:00 a.m. CDT Level 3	N/A	HURREVAC, TIDES	No, Outdated

6.6 PUBLIC INFORMATION/MEDIA DATA

OVERVIEW

The purpose of this section is to determine the extent of public information that was released and whether messages were clearly disseminated and understood by the public. Any special public information “tools” that were utilized were addressed. Recommendations for any unexplored communication conduits for future storm events will be presented.

FINDINGS

From a review of the comments submitted by media, county officials, and state officials, it appears that the emergency management agencies and media are working collaboratively to collect and disseminate information to the general public. However, they still face several challenges. For example, local emergency management and media outlets covering the evacuating area feel that their messages are not always accessible to the evacuating public once they have left the immediate region. Another challenge is that the messages are not being acted upon by those who are threatened. Some may feel that the threat is less than projected, others are simply unwilling or unable to evacuate safely on their own.

All of the agencies indicate the use of a wide variety of information sources and technology to receive information about the hurricane. There are multiple references in the collected data to the use of information from local National Weather Service Offices (WFOs), the National Hurricane Center (NHC), commercial weather data sources such as Crown Weather and Weather Underground, and other sources of meteorological information. Additional information is being sought from websites of state and federal emergency management agencies. HURREVAC was a highly utilized tool for local EMA’s, who could easily produce map images to convey storm information to public officials.

Agencies collectively identify multiple ways in which to receive and disseminate information on local activities and situations in their communities. They maintain ongoing relationships with local print and broadcast media (radio and television); many of them mention the use of their EMA websites and blogs to provide information to the public. Several comments were noted about the use of new social media programs such as Twitter to “push” information out to the public that has the capability and interest to receive it. For those segments of the general public who are not able to access information electronically, EMA agencies continue to provide awareness material in a printed format through brochures and pamphlets.

In general, processing and sharing of information occurs in an expeditious manner. For the most part, EM agencies are making the effort to coordinate the delivery of their public information with other agencies within their state and even across state borders as circumstances dictate. Most, if not all, agencies indicate that they have ongoing interaction with the media in their area both pre-season as well as during the response and recovery phases of a weather related emergency. EMs are providing controlled access to the EOCs so that the media can report accurately on the situation without impeding the operations activity of the agencies gathered in the EOC.

Respondents felt that information was going out fairly smoothly to the public and being received by them. The delivery of information has proved to be most efficient during the initial stages of preparation and evacuation as compared to when evacuees are in transit to a shelter or other lodging outside of their local area.

There appears to be a high level of satisfaction with the interaction and communication with the NWS. Local EMA's also expressed satisfaction with the media, likely due to the ongoing relationships established with the frequency of hurricane threats to the Gulf Coast. While several of the survey respondents commented that there is still need for improvement in the public information areas of communication and information dissemination, progress has been made in regard to this need over the years. This viewpoint might need to be tempered however due to the consensus of both public sector and media representatives that the two hurricane events were relatively minor in terms of magnitude and duration.

6.7 OTHER FEMA PROGRAMS

OVERVIEW

In the aftermath of Hurricanes Katrina, Rita, Gustav and Ike, and the loss of life associated with these storms, the Federal Government has become more pro-active in its assistance to State and local governments during evacuation events. Aircraft, motor coaches, trains, ambulances and other types of resources to assist with the evacuation of segments of the population in need of transportation assistance have been provided to State and local governments in subsequent storm events. Millions upon millions of dollars have been spent providing these resources to assist in these evacuation events. As a result, the expectations of the public for assistance during a hurricane event have been raised to a level never before seen, and many in the emergency management community now fear that if these resources are not provided in the future, lives could be lost as certain segments of the population will delay their efforts to self-evacuate and not be able to evacuate safely. This section attempts to assess the usage of these resources and the affects it has had on the public at risk.

PRE-EVENT DECLARATIONS

Assessments of hurricane disasters and “near-misses” in recent years have highlighted that not only are there public sector costs associated with the landfall of a tropical weather event or even the pre-event activities such as sheltering and evacuation, but that there are also economic impacts to the public as well as the private sector when a hurricane threatens an area. Loss of revenue during a hurricane season can have a significant impact on the viability of a business. The impact would appear to be directly related to the frequency of the event and inversely related to the size of the business. Pre-Event Declarations allow for government and private sector resources to activate early ensuring adequate time is allowed for response and mitigation measures to initiate and finalize. Pre-declaring an event also supports greater public/private partnerships maximizing resources available to respond to the threat.

GAP ANALYSIS

Since Katrina, studies have been completed in many coastal communities to gauge the needs of that community. Comprehensive studies have compared the communities need with the community’s ability to support those needs. When the need surpasses the ability, a gap is defined and planning efforts are initiated to mitigate the gap. In some cases, the State and/or Federal government may be required to assist in mitigating the identified gap. The State of Alabama recommends that FEMA make funding available to address these identified gaps. The GAP Analysis is intended to be used only as a planning tool and may not represent the actual need during the storm. Planning practices encourage planning for the worse and hoping for the best. It’s important to recognize, however, many factors are considered when preparing to respond to the threat. For Gustav and Ike, some notable factors include:

- Severity of the Storm – A lesser category hurricane results in a lesser response.
- Media Advertisement – The attention or lack of attention given to the threat has a significant impact to the response.
- Previous Events – Repeated response to a threat resulting in a “non-event” results in the “crying wolf” syndrome. Response to repeated event causes a slow response.
- Government Recognition – Confidence in the local government’s ability to recommend and direct a response effort is critical. Lack of government confidence results in minimal response.
- Education – Educating the public about the threats potentially affecting the area is critical in the decision making process.

Local governments must evaluate the above factors and work with the State and Federal governments to fill the recognized shortfalls for each particular threat. Regardless of the event, all response efforts must be managed at the lowest possible level. It is incumbent on the local government to manage the response and meet all recognized obligations for managing that event prior to requesting assistance from the State and Federal governments.

PUBLIC AWARENESS

In Baldwin and Mobile Counties, each community issued similar evacuation orders during Gustav and Ike. Community response to both events was marginal in Mobile County and minimal in Baldwin County. This reiterates the statements above that public perception and public understanding of the threat is paramount to the success of mitigating life safety.

Many planning and preparedness programs have developed a variety of tools for local communities to utilize in decision making. Products such as the Hurricane Evacuation Study, HURREVAC, SLOSH, Gap Analysis, and local emergency management planning clearly document the threat and required actions and resources to mitigate the threat. This information must be clearly and regularly shared with the community in an effort to ensure a comprehensive understanding of the threat and appropriate personal protective measures required to make informed decisions. This information must also be made available in multiple languages and multiple formats to maximize the distribution of material to as many economic and societal demographics as possible. Public education is a critical factor in reducing the dependence on the local government.

7 FINDINGS AND RECOMMENDATIONS

As in past Post Storm Assessments, interviews with Local and State emergency managers and responders were conducted to ascertain if the available HES products and information for the areas affected by the storms was utilized, was accurate, was easy to use and whether the data and products were in need of updating, revising or improving. Questionnaires were developed and utilized to collect appropriate information and assessments of HES data and products. Completed questionnaires and minutes from each meeting were collected and consolidated into a “summary” document for each type of respondent (local, State and media). These “summaries” were then reviewed and analyzed and consistent themes and recommendations were recorded.

7.1 VULNERABILITY ASSESSMENT

OVERVIEW

A typical vulnerability analysis determines the population, critical facilities and infrastructure that would be vulnerable to the affects of various storm events. Generally, the evacuation zone maps are prepared in the vulnerability analysis portion of a HES utilizing the storm surge maps as a basis for determining the appropriate zones to evacuate for a particular category of storm. With the understanding that much more needs to be done in the way of supporting comprehensive hurricane preparedness, the vulnerability analysis should be expanded to include a myriad of other community resources and areas that are at risk from a storm’s impacts and effects. Examples include commercial and business properties, infrastructure (roads, bridges) communications facilities, water and waste water facilities and other community features and assets that could suffer damages from winds and surge. It may take 15 hours to evacuate but if a major storm strikes a community, it may take 15 years to recover. More needs to be done to assist communities in planning and preparing for storm impacts other than the evacuation of the population.

VULNERABLE POPULATION

The vulnerable population is comprised of all persons residing within the area subject to storm surge and the residents of mobile homes located above expected flood levels. It is important to note the special provisions for those living in mobile and manufactured homes. With development of new evacuation zones for Baldwin County, new populations that may have considered themselves “safe” from hurricane impacts under the old zones should now be targeted and educated about the threat of surge and winds in their area.

SURGE MAPS

Many of the areas interviewed for Gustav and Ike feel that updated surge maps are needed. Recent storms have changed the bathymetry of the coastline and new maps should take these changes into account. There is still a wide variety of technology being used to produce the mapping around the country and within the interviewed areas. The various agencies of the Interagency Coordinating Committee on Hurricanes (ICCOH) should continue to review past and present methodologies and technologies on a regular basis to determine the most cost-effective and user-friendly formats that state and local agencies should consider.

FEMA and other federal and state agencies, including NOAA and the USACE, are securing and incorporating new data from LIDAR (Light Identification and Detection and Ranging) systems to increase as well as improve quality of maps. FEMA's multi-million dollar Map Modernization program should benefit not only floodplain mapping efforts but also storm surge maps.

TRANSPORTATION NEEDS

To the extent possible, population data developed for each evacuation zone should include an estimate of the numbers of persons who do not have access to a private vehicle and, consequently, would have to rely on public transportation in an evacuation.

While transportation for the elderly and ill residing in Special Needs (health-related) facilities should be the responsibility of the individual facilities, provision of adequate special emergency transportation for those in private homes is usually a responsibility of local emergency management officials. Mobile and Baldwin Counties should be encouraged to update their comprehensive, coordinated hurricane evacuation plans to address these special needs populations, including when to leave, specific destinations, and pre-arranged transportation.

7.2 SHELTERING ASSESMENT

OVERVIEW

A thorough assessment of the activities that took place during these events associated with shelter usage for in-State as well as out of State residents was conducted. The results of that assessment and the recommendations that were made are presented in this section.

ALABAMA HES (2001) COMPARISON TO GUSTAV AND IKE

Mobile County indicated they opened six ARC shelters hosting 900 for Hurricane Ike and one special needs shelter for 10 residents. The average hour time was 12 and the average number of days stayed was two. For Gustav, Mobile indicated they opened 10 shelters for 2,980 evacuees; one special needs shelter for 20 people and one pet shelter for 60 animals. The average resident stayed only one day. ARC data indicate that there were 9 ARC managed shelters and 2 ARC supported shelters for a total of 2,104 shelter residents. In comparison to the 2001 HES list of available shelters (and assuming there was no or minimal change in the number of shelters since then), Mobile County used approximately 58% of its available shelters for Gustav/Ike.

Baldwin County independently reported opening one ARC shelter for 50-100 people, one special needs shelter for 20 residents and a county shelter for 340. Baldwin County's shelter operations were open about two days. They did not open any shelters for Ike. ARC data for Baldwin County indicate that one independent shelter opened for 258 people. A second ARC supported location opened through the Alabama Community College System for 108 people.

While in-state evacuees were the minority of the sheltered population for Gustav and Ike, shelters were opened for Alabama residents. Hotels and motels reportedly filled up rapidly and the majority of in-state evacuees are believed to have stayed with family or friends or simply remained at home for these two storms. The majority of evacuees during Gustav and Ike came from out-of-state, with the bulk shelter population from Louisiana. A greater number of shelters were opened during Gustav and Ike compared to Hurricanes Erin and Opal. Rather, the 2001 HES report indicates that few shelters were opened or used for these storms. For Erin and Opal, a greater number of evacuees opted to stay with family and friends than utilize public shelters. Future HES studies should specifically address sheltering of out-of-state evacuees as the most recent storms to impact Alabama sheltered mostly out-of-state residents.

RECOMMENDATIONS AND OBSERVATIONS

- Efforts are underway to consolidate shelters into larger facilities capable of hosting up to 1,500 people. Some possible locations do not have enough restrooms or proper sewage systems to handle such numbers, especially over an extended period of time (beyond 24-72 hours). Such consolidation appears to be a trend along coastal states.
- Baldwin County reports a need to retrofit facilities to improve sheltering and reduce long distance evacuations. Many new schools are being constructed so it would be beneficial to retrofit them during the construction phase to save money in the long run. Mobile County would also like to retrofit schools, community centers, the Fairgrounds, the Agriculture center, a new race track, and new sports complex as possible shelter

locations. They are interested in retrofitting more schools, but can only retrofit during summer in order to reduce disruption during the school year.

- Baldwin County reports a need for a complete shelter tracking system.
- Funding is needed in Alabama to purchase and pre-position basic resources for pet shelters. For as little as \$500 per shelter site it would be possible to purchase crates, food and water bowls, harnesses, food and other basic supplies. Baldwin County reports a need for a pet shelter location.
- More para-transit services are needed, particularly for bused evacuees.
- Host states may face resource and financial challenges in taking care of their in-state populations in the face of back-to-back storms.
- FEMA needs to revisit reimbursement for travel assistance to return home. The ambulance costs could have been significantly reduced. Individuals in personally-owned vehicles (POVs) need greater assistance during re-entry. Sending ambulances from one state to another is not a sustainable practice. Alabama had an abundance of FEMA-supplied ambulances where Mississippi did not. However, Alabama could not send theirs ambulances across state lines for use in Mississippi. The allocation and usage of Federal resources needs to be addressed.
- Inland states need to increase capacity to serve as host states to reduce burden on neighboring coastal states that may be impacted by a hurricane or back-to-back storms.
- Communications across FEMA regions could be enhanced particularly regarding transportation and repatriation of evacuees.
- FEMA needs to revisit mitigation strategies to harden existing facilities. Solutions may be as simple as shutters for shelters. Retrofit for specific facilities including hospitals, nursing homes and similar places should be emphasized. Funding to remove generators out of the basements in hospitals is necessary, especially in older hospitals.
- It is not financially feasible to build a facility that would be used only once or twice a year as a hardened shelter as revenue does not exist for maintenance. Baldwin County recommends hardening schools currently under construction as a means to save costs.

7.3 BEHAVIORAL ASSESSMENT

OVERVIEW

A literature search of any behavioral studies that were conducted in the aftermath of Hurricanes Gustav and Ike was conducted to determine if there were any new behavioral findings or assessments. The results of the search indicated that there were no newly completed studies published for either of these storms.

NARRATIVE

Household evacuation decision-making is a complex process involving the consideration of multiple factors. A number of variables have been found to be correlated with evacuation decisions in past behavioral research: an official evacuation notice, critical transportation needs, gender of the decision-maker, pets, income, education, hurricane experience/perception of threat, type of housing unit, presence of children and/or older household members, just to name a few. The bottom line is that most people pay attention to hurricane threats and base their evacuation decisions on their evaluation of the safety of their home as a shelter, the storm conditions, and their household circumstances, all of which are constantly evolving. Behavioral responses for a past storm may or may not indicate the type of response that is likely to occur in the future. Each storm is unique and characteristics of both the hurricane and the threatened population are likely to affect an individual's decision to evacuate. This is particularly relevant in places such as Baldwin County which have many areas of new development.

RECOMMENDATIONS

Based on interviews and the data collected (section 6.3), existing behavioral studies in the State of Alabama are outdated or invalid, and new behavioral studies need to be conducted. For the following reasons, it is recommended that a new behavioral analysis be conducted in Alabama:

- No behavioral work has been located for these two storms;
- The latest Hurricane Evacuation Study for Alabama was completed in 2001. It presented behavioral data obtained from a small sample of Mobile and Baldwin county residents about their experience in Hurricanes Opal and Erin in 1996;
- The latest Behavioral Analysis in Alabama was completed in 2005 for Hurricane Ivan. Again, the assessment only sampled a relatively small number of Alabama residents as the surveys included residents from Florida, Alabama, Mississippi, and Louisiana;
- The area has experienced significant growth and changing demographics since the previous studies were released;
- There was considerable evacuation for these storms in Alabama;
- Recent estimates of those needing public transportation could be tested with new data.

A key recommendation from the Hurricane Opal Post Storm Behavioral Assessment (1996) should be highlighted, as it is presented again in the 2001 HES and is still relevant today; “Given the huge increases in housing units in Baldwin County Alabama, a high priority should be given to a restudy of the Alabama counties.” Another recommendation would be to increase the sample size of Alabama residents in future surveys in order to increase the precision of the behavioral study for the State.

SUMMARY

Although hurricane forecasts call for many behavioral responses, evacuation has the broadest consequences. Many people wait until the last minute, putting themselves and others at risk. Others may evacuate when they would be safer at home. And large numbers of those who should evacuate from storm surge and low-lying areas do not. Facing this complexity, forecasters and emergency managers need to know how and when people will respond to hurricane warnings.

Behavioral assessments must better integrate the specificity of qualitative research with the quantitative modeling required to predict aggregate evacuation rates and timing. Getting large numbers of people out of densely populated, threatened areas requires knowing how long evacuation will take. Longer clearance times require earlier warnings, although the lower accuracy of longer-lead-time forecasts means more evacuations and more false alarms. Transportation engineers can model clearance times if they have good data on the number of people who will evacuate from each location, as well as where and when they will go. Traffic issues also feed back into the decision process as people learn from past experience and media coverage. Other activities, such as preparation, mitigation, and education, also depend on forecasts in crucial ways and have implications for evacuation itself. New HESs should include variables that predict the effects of all conditions specific to each location.

Further research on evacuation behavior needs to focus on methodologies to integrate different geographic scales (i.e., street level to state or regional level) and time scales (i.e., minute-by-minute to multiple days) into models that incorporate subjective and objective elements. Research with this scope can address such concerns as the effect on evacuation timing of commuting, school schedules, the feedback effects of news about traffic delays on evacuation route selection, and the refusal to evacuate versus shadow evacuation (i.e., people evacuating from outside the official evacuation zone). Above all, evacuation behavior research has to be multidisciplinary given the complexity of communication and decision making issues, economic and societal impacts, organizational and infrastructure constraints, and the dynamic nature of evacuation responses.

7.4 TRANSPORTATION ASSESSMENT

OVERVIEW

Interviews were conducted with Alabama Department of Transportation and local emergency management officials to attempt to determine actual evacuation clearance times for these two storm events and how the results compared to the published clearance times in the latest HES. As a result of the assessment, a recommendation was to be made as to whether a new transportation analysis is required for the State. No traffic modeling or calculations were performed for this assessment.

LIMITATIONS

The data provided through the questionnaires was not sufficient to provide definitive or quantitative assessments of clearance time issues, evacuation volumes, choke points, delays, and/or definitive recommendations to correct or mitigate specific problems. Follow-up interviews improved the situation, but hard data was often not available. However, the lack of definitive information suggests a host of recommendations relative to actual evacuation data collection assessments, and other studies or research needed to correct data voids and avoid these problems in the future. Updates to the out-of-date Hurricane Evacuation Studies for individual and collective coastal counties in Alabama were also suggested in the surveys.

ACTUAL CONDITIONS MONITORING AND REPORTING

First, it is readily apparent that responsibility (and funding) for measuring and evaluating the “actual” conditions during an evacuation is needed, and a post-evacuation report should be prepared. A specific agency needs to be tasked with evaluating, monitoring and recording all of the transportation-related elements of an actual evacuation. This task would include a report documenting the timing and duration of evacuation of tourists and at-risk populations and the general population. It would also include traffic count monitoring, queue formation and dissipation statistics, critical link observation, and evaluation of the performance of all traffic control measures. Redundant hourly traffic counts on all evacuation routes should be made before and during the evacuation period. The increase in volumes should be summarized and congestion should be timed and mapped.

UPDATES

Since Ike and Gustav did not produce a large-scale evacuation and its attendant problems, an update of the previous HES should be done to determine if the critical links have sufficient capacity to discharge a maximum traffic load under a Category 5 worst-case evacuation threat. If insufficient capacity is detected, directional capacity improvements on deficient links should be provided based on actual measured deficiencies at specific locations. In addition, added in-county sheltering could be provided, if needed. Ike and Gustav did not pose a perceived serious threat, so the “actuals” for these storms cannot be used to formulate a worst-case plan, nor can they be used to formulate specific capacity-improvement recommendations.

RECOMMENDATIONS

Many of the suggestions that were offered on the survey forms and by interviewees should be taken seriously. Federal Highway Administration funds for Intelligent Transportation Systems (ITS) are available and can be used to finance CCTV cameras, permanent traffic count stations (on critical links and evacuation routes). The Emergency Operations Center (EOC) should have video access to all highway CCTV facilities. Set-aside funding should be considered for highway assets for evacuation purposes. New CCTVs should target critical link choke points. Real-time traffic data, by traffic counters or other means, should be collected and made available to all radio/TV stations on a real-time basis, along with route-selection advisories based on instantaneous reporting of actual queue-formation and delay. Either remote or in-field manual management of traffic signals should be enhanced, based on the comments received. A trained traffic engineer with experience in congestion management should be located in the EMOC as part of the evacuation team directing the traffic management efforts.

Based on the survey, additional hurricane evacuation signage is probably required, including, possibly, variable message signs at critical evacuation route selection locations. Both counties expressed a need for more law enforcement personnel to help manage traffic. One entity called for an update to the existing Hurricane Evacuation Study. The fact that Mobile County expressed that through-traffic was quadruple the volume of home-based evacuating traffic, underlines the need for multi-county or multi-state regional planning to account for inter-county traffic impacts. In one case, evacuees from other counties occupied hotel rooms in another county, only to be re-evacuated later, as the threat followed them up coast.

SUMMARY

In summary, much work remains to be done relative to monitoring and reporting actual evacuation transportation statistics during an actual evacuation event. Funding and responsibility for this task need to be identified. There is also a need to update previous hurricane evacuation studies and project a worst-case scenario upon the area to test the 24-hour capacity of the transportation system and insure that clearance time objectives can be met. If desirable clearance times cannot be met, specific capacity improvements need to be identified, funded and implemented quickly.

7.5 EVACUATION DECISION MAKING ASSESSMENT

OVERVIEW

Information collected from field surveys resulted in a variety of recommendation for improvements to evacuation coordination, managing the evacuation process and communicating the evacuation message across County and State boundaries. Utilization of HURREVAC and the SLOSH models were not found to be consistent between Mobile and Baldwin Counties. Both Counties did, however, indicate that HURREVAC was used generously to communicate storm dynamics to emergency management partners and senior elected officials.

HURREVAC OPERATION

HURREVAC was used in both Counties to analyze the conditions and forecast of the storm; and represented the primary medium by which to brief partners and elected officials. Baldwin County used HURREVAC to track and evaluate the current and project dynamics of each storm (i.e. path, forward movement, wind fields, and wind speed.) This information assisted in evaluating the community's evacuation decision timing through the occasional use of the systems decision arc mapping function. Mobile County used HURREVAC to track storms and maintain awareness through usage of the timelines, decision tree and scheduling box functions allowing for specific user inputs to assist in estimating the timeline for arrival of winds. Similar to coastal continues, inland counties used HURREVAC to track storm dynamics and review other National Hurricane Center products.

Baldwin and Mobile Counties indicated excellent performance from the HURREVAC application with a rank of 5 (scale of 1-5, with 5 representing excellent). Both Counties also rated HURREVAC with a score of 5 regarding the ease of use and confirmed staff has been adequately trained to operate the tool.

Varying opinions between Baldwin and Mobile Counties regarding HURREVAC's specific components were offered. Baldwin County scored excellent (score of 5) the clearance time, wind swath, error cone and 5-day forecast functions; while scoring slightly less than excellent (score of 4) the decision arc and surge map functions. Mobile County used most of the HURREVAC functions identified on the survey and all received a slightly less than excellent (score of 4) rating. Mobile County confirmed usage of the decision arc; surge maps, clearance times, wind swath, error cone and 5-day forecast functions.

SLOSH OPERATION

Utilization of SLOSH varied among the collected surveys. Baldwin County noted these models have been rarely used since Hurricane Ivan and Hurricane Dennis. Mobile County used SLOSH to brief elected officials on the probability of damage, where that damage is estimated to occur, and where the most significant impacts are probable. As expected, inland counties did not indicate SLOSH was used for either event.

Mobile County indicated the ease of use and performance of SLOSH was excellent (score of 5) and confirmed staff has been adequately trained on how to use the tool. Baldwin County indicated they were moderately unsatisfied with the performance of SLOSH by assigning a score of 2 (score 1-5, with 5 being excellent). Likewise, Baldwin also indicates the ease of use for the product was moderately unsatisfactory with a score of 2. Baldwin confirms staff has been partially trained to operate the tool; however, the overall rating for SLOSH remained moderately unsatisfied (score of 2).

RECOMMENDATIONS

Evacuation Decision Making

1. Ensure more coordinated efforts to communicate through group conference calls with neighboring states and counties when discussing and deciding evacuation decisions. (ELT)
2. Focus more on historic and potential storm impacts to identify evacuation areas versus the standard of decision making based on category storm surge levels.
3. Ensure better coordination between coastal states. (ELT)
4. Offer best practices case studies to guide the local community in future evacuation decision making efforts.
5. Develop an online map locator tool to assist in identifying the evacuation area a person may reside in.
6. Develop a phone internet locator system for identifying and communicating with populations in defined evacuation zones.

Evacuation Timing

1. When an evacuation order is given through the Governor's office, flexibility should be extended to the local community to establish evacuation priorities and movement.

Evacuation Process and Road Network

1. Coordinate support of more law enforcement and National Guard assets to assist in traffic management, staffing traffic control points.
2. Communicating the message proves to be difficult with non-English speaking populations. Offer more guidance and technical assistance in providing better communication tools to adequately alert these workers and tourists.
3. Develop a start to finish shelter tracking tool to assist the local emergency management agency in tracking the duration of the evacuation process.
4. Install additional traffic cameras along major evacuation routes and allow the emergency management entities access to the Alabama Department of Transportation's traffic camera database.

5. Ensure better communication with state-to-state Department of Transportation representatives to assist in relieving bottlenecks from Eastern and Western evacuees.
6. Coordinate a more cooperative relationship with local media partners to reduce the differing opinions distributed to the general public. Doing so will reduce the amount of confusion and support higher evacuation participation rates.
7. Evacuation destinations should never exceed 100 miles. Coordinate evacuation routes and inland shelter destinations with 100 miles of the coast.
8. Consolidate the list and numbers of CTN requirements by stressing the personal responsibility to prepare for and implement a personal evacuation plan.
9. During a mandatory evacuation order, develop a program which streamlines insurance claims and reimbursement policies.
10. Coordinate more advanced notice of evacuation initiation and provide an estimated time of evacuee arrival at shelter locations.

HURREVAC

1. Offer more training opportunities. Utilize the train-the-trainer to build up a cadre of state/local persons to assist in training personnel.
2. Improve the ease of use of the pre-storm timelines function.

7.6 PUBLIC INFORMATION/MEDIA ASSESSMENT

OVERVIEW

The purpose of this section is to utilize the results from the previous public information/media assessment, to develop recommendations for improvements for notifying the public, and to determine if additional public information “tools” for future storm events could be utilized or developed.

RECOMMENDATIONS

While a few of the survey respondents mentioned the use of Public Information Officers (PIO) and a Joint Information Center (JIC) for coordination and dissemination of information, this type of activity which is so important to achieving the “one voice” cohesiveness for public information during an emergency is not being done in all locations. Although it is probably not possible for every county to have a full-time emergency management PIO, a recommendation is made that this function be worked into the operational plans of all counties to ensure that a person trained in Public Information duties can be assigned to this role when needed.

The survey comments about communication within and between the State EOCs is of concern, as much of what occurs at the local level during an event such as a hurricane (with its wide area of impact across multiple counties and states) can be influenced in either a positive or negative manner by the flow of information at a higher level. The low ranking score from one of the Inland Alabama Counties appears to be related to a “no notice” arrival of evacuees from Louisiana for which they were not prepared. While resources will always be stretched during an emergency with a large scope especially in the area of shelter operations, it is vital that information be shared in a timely manner to maximize the use of what resources are available. It is recommended that additional work be done to make currently available programs such as SouthernLink more effective or widely used.

Better information to improve the public’s awareness of the meaning of evacuation and storm zones was identified by the Alabama Media Interview group. While the use of Geographic Information Systems (GIS) programs has enabled planners and emergency managers to better identify which geographical areas are likely to suffer higher storm impacts and get this information to the media in graphic form, work should be done to “personalize” the graphics to better show the citizens what actually is expected to occur in their area. Having a large area shaded in a particular color does not project the impact level as well as having a picture of the local grocery store surrounded by high water up to the rooftop if this is indeed the likely scenario. GIS programs can support this “behind the scenes” feature; it is actually being implemented in the National Flood Insurance Program (NFIP) floodplain mapping for riverine events as well as in recent projects for coastal impacts of wave activity. A recommendation is made to incorporate this capability into HES and local graphics to help increase the understanding and acceptance of the information by the general population when they access the data electronically through interactive maps on websites or see information presented on television broadcasts.

The Evacuation Traffic Information System (ETIS) has been used in the past to help coordinate the flow of evacuees to shelter locations in an area or through the area to other destinations. Traffic flow on major arterial roads becomes of great concern when dealing with a potential large scale hurricane event impacting multiple highly populated areas; especially problematic is an event which threatens to impact multiple states which have to share evacuation routes. Getting people to safety expeditiously is imperative; the alternative of travelers being stranded on roadways when the strong winds begin is unacceptable. According to survey respondents in Alabama, the ETIS program appears to have become somewhat dysfunctional and underutilized. These two hurricanes were relative “non-events” for Alabama. A recommendation is made to re-evaluate the use of this program in the coastal states at the earliest possible time to ensure that the tool will be robust enough to serve the needs of the State of Alabama and others when a larger hurricane threatens the area. Real time traffic movement data must be provided.

Survey comments and group discussion at both the Alabama Media Interviews meeting and the Alabama Emergency Management Agency (AEMA) meetings brought up concerns about the effectiveness of the 211 program in the area. According to the 211 website (<http://www.211.org/>), the United Way 2-1-1 Alabama program covers counties in parts of Southern Alabama including Mobile and Baldwin. According to the organizations website (<http://www.uwsa211.org/index.html>), the program has limited hours of operation and also does not currently cover Baldwin County. The mission statement is to provide emergency assistance support covering all phases of an emergency including prevention, planning, response and recovery (in times of disaster).

There is particular reference to locating nearby storm shelters and getting information on hurricane evacuation routes. Links on the website related to shelter locations and travel information provide some information, but it is mostly in the form of phone numbers to call for further information. The information also appears to be incomplete in terms of areas where programs are available. If the State of Alabama is going to rely on the program to answer inquiries from citizens during evacuations, the system needs to be improved. A recommendation is made to make the program more robust in terms of available data and hours of operation during emergency situations.

Much more information is available in the Behavioral section of this assessment as to why or why not and when citizens will choose to take action to evacuate. It is mentioned in this section because of the importance of highlighting in public information materials both pre-season and during activation that the primary responsibility to have an evacuation plan falls on the individual. People should not be relying on the local or federal government to be providing all of the logistical and financial support to get them to a place of increased safety if they actually have the means to support their own evacuation.

While evacuations were not widespread in Alabama counties for either of these two hurricane events, anecdotal comments during some of the meetings indicate that more and more people are choosing not to identify and/or provide actions and finances but rather anticipating that local, state or even federal resources will be provided to everyone. This statement is not meant to include those individuals who are truly unable to provide their own means to self-evacuate due to financial or other situations, but rather those who have such resources but choose not to expend them. A recommendation is made that a study be done to determine the costs associated with recent large evacuations to identify how significant this concern is and the amount of funds that have been expended to determine if the money associated with this activity could be better spent on local sheltering programs to provide safety in their immediate area. This information could then be included in updated public awareness materials for distribution to the public and the media.

In regard to the use of technology to improve communications, one suggestion that was brought forward by a survey respondent was the use of emergency notification systems to strategically deliver hazard information to areas of the community by phone. These notification systems could be used to advertize the threat and potential impacts of the storm as well as where to get further information related to shelter locations. While this technology has been available for more than twenty-five years, it is still not widely available due to cost which usually must be borne at the local level. This type of service would eliminate the need for time-consuming personal door-to-door notification or law enforcement vehicles driving through neighborhoods using vehicle sirens and public address systems. In addition to increasing the speed at which community notifications could be accomplished, an added benefit of the specificity of the alert process would be that public safety personnel could be freed up to perform other more essential duties. Such systems would be an effective tool not only during the evacuation stage of the hurricane event, but also during the recovery phase for keeping people sheltered outside of their community aware of local information as the systems effectively utilize both land lines and cellular phones. A recommendation is made to research the possibility of providing this service universally across the coastal counties of Alabama and Mississippi.

7.7 OTHER FEMA PROGRAMS

OVERVIEW

State and Local emergency managers deal with a myriad of FEMA programs, requirements and guidelines in their everyday activities. The purpose of this section is to assess how these programs influenced decision making of emergency management agencies and the general public, including gaps in data or technical services and tools needed to execute this new approach with emphasis on critical transportation needs. The section also investigates how Federal activities assisting in the evacuations have altered the traditional approach to hurricane evacuation and have changed public expectations.

PRE-EVENT DECLARATIONS

Response to any event must be managed at the lowest possible level. In large scale and regional events, support to the local communities must be authorized early by the State and Federal governments. In doing so, this allows the local government to initiate actions early and promotes public-private partnerships. Pre-declarations also allow for early evacuation of special needs populations and other persons having critical transportation needs (CTN). Due to the sensitivity of these populations, it's prudent to plan their evacuation prior to the general population evacuation to minimize the commute and ensure a safe evacuation process. This too, however, must be taken into consideration as the dynamics of the threat weighed against the local ability to respond and the community's awareness and responsiveness to the guidance issued by local officials.

GAP ANALYSIS

The National Incident Management System (NIMS) defines preparedness as "a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response." This 'preparedness cycle' is one element of a broader National Preparedness System to prevent, respond to, recover from, and mitigate against natural disasters, acts of terrorism, and other man-made disasters. The local emergency management agency supports preparedness by developing policies, ensuring adequate plans are in place and are validated, defining necessary capabilities required to address threats, providing resources and technical assistance to jurisdictions, and integrating and synchronizing preparedness efforts throughout the community.

Local, State and Federal partnerships to determine the support required to respond to a threat has produced a sound foundation in ensuring maximum preparedness for the community. Anticipating local needs have resulted in clear communication with the State and Federal government to ensure rapid deployment of those services and resources needed for the community. It does, however, represent a perceived expectation on the State and Federal government to step in and resolve any challenges experienced by the local. It must be clearly understood, these coordination efforts with the State and Federal government must be considered a last resort option. Once shortfalls have been defined, it is the responsibility of the local government to resolve those shortfalls through planned coordination efforts to reduce the need from State and Federal governments. The primary function of any local government is the protection of lives and property. It's incumbent on the local government to provide all required services for their community to maximize the response effort and to protect lives and property. As the gaps are identified, it is recommended the State guide the local government in soliciting and arranging local contracts and agreements to mitigate those gaps.

PUBLIC AWARENESS

A common comment from this post storm assessment and many others from previous reports is the importance of and shortfalls in communicating hazard and protective measure information to the populations. Public education is a key component in ensuring community response and personal decision making. An informed and educated public recues the necessity on the government to provide support.

A trend recognized post Katrina represents an expectation from the general public of the government providing transportation and evacuation assistance (monetarily and with all basic human services). This is an absolute contradiction to all levels of planning. Personal preparedness is paramount in minimizing life safety issues. It must be emphasized at all levels of government the importance of personal responsibility. Educating the public on the potential threats affecting the community and personal protective measures required to respond to the threat will assist in minimizing the need for government support.

The need to more effectively communicate the risk grows as the vulnerable population in coastal areas grows in number and ethnic diversity. It is recommended funding be made available specifically targeting public education campaigns to assist the local government in communicating the threat and the personal protective measures required for a variety of economic and societal demographics.

7.8 NEW TOOLS AND PRODUCTS

The wealth of base community data available within a community is generally not available to a decision maker in a format or in an easy to use tool that can assist decision makers with timely and difficult decisions. Every community would greatly benefit from a tool set that contains base community data applicable to various department roles and functions and that could be queried to provide answers to questions needed to make timely and accurate decisions.

The vulnerability analysis depicts the areas, populations, facilities, infrastructure, critical facilities, institutions and community areas subject to a storm's hazards. Other facets of a community that are vulnerable to the hazards of a particular storm event are also analyzed. This process is cumbersome and time consuming and generally not done utilizing GIS based tools.

A better method to accomplish this would be to utilize a base layer of satellite imagery or aerial photography of the community or study area compiled in a seamless raster file of the area in question. Overlaid on this would be base layers, such as streets, lakes and rivers, counties, parishes and city boundaries. Enhanced layers would become more visible as the user zoomed in. These layers would include SLOSH MEOW/MOM outputs, water depth information for a given hurricane category (i.e. how much water depth from storm surge would be expected utilizing a grid subtraction from SLOSH and land elevations), hurricane evacuation zones, evacuation routes, road closure locations, housing stock, business data, hotel/motel/condo locations, building footprints, shelter locations, critical facilities and any other data important to the decision maker. All data would be able to be queried, allowing such parameters as building value, number of people, land type (allowing the capability of debris parameterization), and transportation capabilities to be viewed and analyzed.

Emergency managers could add real-time data layers onto the maps and these images could be displayed and saved on a central server for multiple agency use. In the field, vehicles and critical personnel's positions could be displayed in real-time, allowing centrally located personnel to make critical decisions in real-time, with knowledge of where their personnel, resources and critical infrastructure is located. Post-storm coordination would be facilitated with emergency managers (EMs) to allow them to be able to predict areas where the worst damage would most likely have occurred, and be able to respond quickly to those areas for search and rescue and infrastructure damage inspections. New cell phone location technologies could be applied to monitor the location and movement of the population.

A web-based tool with maps and analytics containing dashboards for different Emergency Support Functions would be most beneficial. Utilizing web based mapping tools from sources such as ESRI or other geospatial technologies, a GIS-based tool could be developed to allow both EMs and the general public to view and download critical hurricane information, such as real-time wind fields, storm surge inundation areas, watches and warnings and other real-time NWS data pre, during, and post hurricane landfall events. The tool would allow decisions to be made in a timely manner using the web interface, allowing the user to view multiple layers and make real-time queries.

CHEMS was introduced to State and Local emergency management agencies during the PSA interview process. All participating parties expressed an interest in the concept and would like to learn more about the idea.

The strategy, proposed by the NHP, is to augment the traditional HES process with an expanded suite of products and services known as Comprehensive Hurricane Emergency Management Strategies (CHEMS). The CHEMS would include the suite of HES analyses and products, but would also offer data and products associated with Community Storm Impact; Business Mitigation & Recovery Analysis; Re-Entry Analysis; Communication Assessment; Technology Analysis; and Training. The purpose would be to allow the state and local emergency managers to choose those products and tools that are best suited to meet their evacuation planning needs, and to incorporate federal level support from outside the traditional HES process as well.

The system described above could be integrated in the overall incident management and decision support tools already in use by the emergency management community (e.g., WebEOC). Numerous jurisdictions have implemented the incident command system, and have integrated planning activities within defined operational periods during a disaster or emergency. CHEMS data and products will be useful only to the extent that they are consistent with, and complimentary to, the tools already in use by the emergency management community. As described previously, most—if not all—existing decision support tools are easily customized to incorporate new data and information in a useable format. New CHEMS data and products should be “packaged” in a fashion that would allow for use by and through these existing systems.

The utilization of real-time hazards data and additional analyses of the effects a storm has on a community coupled with new, easy to use GIS technology would provide emergency management officials at all levels with the tools needed to better mitigate, prepare, respond and recover from any hazard.

There should be a set of basic standards for any of the tools mentioned above for inputs and outputs to the tools. Analysis need to be holistic in nature, but filterable for specific data that is being looked for. Information on demographics, economics (including insurance and costs avoided), visualizations, transportation systems and other community data are needed in order to make global decisions but they need to also be able to be filtered for a particular ESF or ICS function for those doing the basic work. Any new system also needs to have funding for its creation as well as a plan and funding for its maintenance, including training and exercises. More information on this process was requested.

APPENDICIES

APPENDIX A: MEETING ATTENDANCE SHEETS

Table A-1: Kick-Off Meeting Attendance Sheet

First Name	Last Name	Affiliation	State	Phone	Email
John	Eringman	USACE	AL	251-928-6265	John.r.eringman@usace.army.mil
Brandon	Bolinski	FEMA	GA	770-220-5430	brandon.bolinski@dhs.gov
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Charlisa	Ussery	AEMA	AL	205-280-2220	Charlisa.ussery@ema.alabama.gov
Walt	Dickerson	MCEMA	AL	251-460-8000	wdickerson@mcema.net
Ronnie	Adair	MCEMA	AL	251-460-8000	radair@mcema.net
John	Kilcullen	MCEMA	AL	251-460-8000	jkilcullen@mcema.net
Leigh Anne	Ryals	BCEMA	AL	251-972-6807	lryals@co.baldwin.al.us
Bill	Massey	Dewberry	GA	678-530-0022	bmassey@dewberry.com
Betty	Morrow	Dewberry	FL	305-812-2125	betty@bmorrow.com
Mike	Purvis	Dewberry	GA	678-530-0022	jpurvis@dewberry.com

Table A-2: Mobile County Local Meeting Attendance Sheet

First Name	Last Name	Title	Affiliation	State	Phone	Email
William	Winn	FEMA Representative Beaufort County Director of Public Safety)	Beaufort County	South Carolina	843.470.3100	wwinne@bcgov.net
Cresitello	Donald	Project Planner	USACE	NY District	917.790.8608	Donals.c.cresitello@usace.army.mil
Patrick	Tritz	Emergency Management Planning Branch Director	State of Alabama	Alabama	205.280.2270	patrick.tritz@ema.alabama.gov
Mike	Evans	Emergency Management Plans and Operation Director	Mobile County	Alabama	251.460.8000	mevans@mcema.net
Ronnie	Adair	Emergency Management Deputy Director	Mobile County	Alabama	251.460.8000	radair@mcema.net
Walt	Dickerson	Emergency Management Director	Mobile County	Alabama	251.460.8000	wdickerson@mcema.net
Bill	Massey	Senior Project Manager Hurricane and Emergency Management Programs	Dewberry	Georgia	678.530.0022	bmassey@dewberry.com
Lauren	Hand	Emergency Management Specialist	Dewberry	Georgia	678.530.0022	lhand@dewberry.com
Betty	Morrow	Emergency Management Specialist	Dewberry	Georgia	678.530.0022	bmorrow@dewberry.com

Table A-3: Baldwin County Local Meeting Attendance Sheet

First Name	Last Name	Title	Affiliation	State	Phone	Email
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Charlisa	Ussery	Emergency Management Planner	State of Alabama	Alabama	205.280.2220	charlisa.ussery@ema.alabama.gov
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Renee	Cook		Baldwin	Alabama	251.972.6807	drcook@co.baldwin.al.us
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Roy	Wulff		Baldwin County EMA	Alabama	251.972.6807	rwulff.co.baldwin.al.us
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Table A-4: Inland Counties Meeting Attendance Sheet

First Name	Last Name	Title	Affiliation	State	Phone	Email
William	Winn	FEMA Representative Beaufort County Director of Public Safety)	Beaufort County	South Carolina	843.470.3100	wwinne@bcgov.net
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Table A-5: State Meeting Attendance Sheet

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Charles	Johnson	Emergency Welfare Services/Safety	Alabama Dept. of Human Resources	Alabama	334.242.9280	Charles.johnson@dhr.alabama.gov
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Donald	Brooks	Game and fish Division Lieutenant	Alabama Department of Conservation	Alabama	334.242.3261	Donald.brooks@dcnr.alabama.gov
Kyle	Eskridge	Training Officer/Emergency Services Branch Dep. Dir.	AEMA	Alabama	334.290.0862	kylee@ema.alabama.gov
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First Name	Last Name	Title	Affiliation	State	Phone	Email
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Charlisa	Ussery	Sr. Emergency Management Planner	State of Alabama	Alabama	205.280.2220	charlisa.ussery@ema.alabama.gov
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Table A-6: Local Media Meeting Attendance Sheet

First Name	Last Name	Affiliation	State	Phone	Email
Jan	Preslar	UW 2-1-1	AL	251-431-5100	jpreslar@lifelinesmobile.org
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Walt	Dickerson	MCEMA	AL	251-460-8000	wdickerson@mcema.net
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APPENDIX B: LOCAL INTERVIEW QUESTIONNAIRE AND RESPONSES

HURRICANE IKE AND GUSTAV POST-STORM ASSESSMENT MOBILE COUNTY EMERGENCY MANAGEMENT COMPONENT

*This assessment is designed to evaluate the effectiveness of the National Hurricane Program's Hurricane Evacuation Study (HES) Products within your jurisdiction as it applied to your experience during the recent hurricane threat. It is also intended to identify any specific needs or recommendations that you may wish to share relating to FEMA's overall Hurricane Program. It is not designed to evaluate you nor your response to the event. Rather it is designed to help FEMA better serve you in the future. **Please complete this assessment prior to your scheduled interview.***

GENERAL

1. Of the following products, which were readily available for your use?

<input type="checkbox"/> ETIS	<input type="checkbox"/> Evacuation Maps	<input checked="" type="checkbox"/> Clearance Times
<input type="checkbox"/> Shelter Locations	<input type="checkbox"/> Local Hurricane Plan	<input checked="" type="checkbox"/> HURREVAC
<input type="checkbox"/> SLOSH	<input type="checkbox"/> HES Study	<input checked="" type="checkbox"/> Storm Surge Maps
<input type="checkbox"/> Other Documents: _____		
2. Of the information provided to you, which items were considered most important? Explain

<input type="checkbox"/> ETIS	<input type="checkbox"/> Evacuation Maps	<input checked="" type="checkbox"/> Clearance Times
<input type="checkbox"/> Shelter Locations	<input type="checkbox"/> Local Hurricane Plan	<input checked="" type="checkbox"/> HURREVAC
<input type="checkbox"/> SLOSH	<input type="checkbox"/> HES Study	<input checked="" type="checkbox"/> Storm Surge Maps
<input type="checkbox"/> Other Documents: _____		
3. Which items were found to be the least helpful? Explain

<input type="checkbox"/> ETIS	<input type="checkbox"/> Evacuation Maps	<input type="checkbox"/> Clearance Times
<input type="checkbox"/> Shelter Locations	<input type="checkbox"/> Local Hurricane Plan	<input type="checkbox"/> HURREVAC
<input type="checkbox"/> SLOSH	<input checked="" type="checkbox"/> HES Study	<input type="checkbox"/> Storm Surge Maps
<input type="checkbox"/> Other Documents: _____		

The HES is outdated, has not been updated since 2000. New population shifts and vulnerable areas.

4. Please describe your partnerships with private companies and/or civic groups to assist in a public outreach program for your community.
Works closely with Local Emergency Planning Committee (LEPC), Voluntary Organizations Active in Disaster (VOAD), Volunteers of America (VOA), and Volunteer Mobile, Inc.
Has pre storm meeting with Walmart and Home Depot.
5. Discuss how HURREVAC is generally used during a hurricane event.
HURREVAC is used to track storms looking at timelines and the decision tree. Used the scheduling box and section where specific inputs can be added. Used to identify timeline for arrival of winds.
6. Discuss how SLOSH or the SLOSH Display Model is generally used during a hurricane event.
To show elected officials the probability of damage and where it will be. To identify where the most significant impacts could occur. To determine where we will have the most problems & prepare search and rescue teams.
7. What mitigation efforts, if any, were initiated or participated in before or during these events?

Elevated generators and lift stations at sewer and water facilities. Fortified some structures and shelters by taking existing buildings and retrofitting. Working with Volunteers Of America to identify a facility for special needs.

8. Of these mitigation efforts, were they successful? Please Explain.

Yes. Long term recovery after Katrina.

9. Please list any critical facilities that were impacted by wind, surge or freshwater flooding by these storms.

IKE: Road, Water, and sewer damage on Dauphin Island.

GUSTAV: _____

10. Please list the locations, quantity and type of "vulnerable" or "special needs" populations that were impacted by these storms.

IKE: N/A

GUSTAV: Opened the Medical Needs Shelter for 20 people.

11. Did your community provide transportation resources to "critical transportation populations" Please list the types of transportation provided, the amount and the locations to which these populations were taken.

Yes. We used the Metro Transit and Public School buses to move critical transportation needs residents to shelters. 10% - 15% to pet shelters. Moved about 400 people from Southern Mobile County.

12. Are you aware of any instances where "safe rooms" were utilized during these storms and whether their use was successful.

IKE: No (Hard to get money reimbursed for safe room program after Katrina. People will not admit to having a safe room)

GUSTAV: No

13. Are there critical facilities within your community (outside the surge area) that could be retrofitted for hurricane protection so that their residents could potentially "shelter in place" and not have to be evacuated? Please provide a list with locations. Are any of these "critical transportation needs" origin facilities whose residents require government assistance to evacuate?

Yes, we would like to retrofit schools, community centers, the Fairgrounds, Agriculture center, new race track, and new sports complex. There has been discussion on using funds to improve a building and the complex. Very interested in retrofitting more schools, but can only retrofit during summer, cannot disrupt education and class time.

HURRICANE LIAISON TEAM (HLT)

1. If you utilized FEMA's Hurricane Liaison Team, how would you rate the service received?

Unsatisfactory -----Excellent
1 2 3 4 5

N/A not aware of and has no contact with HLT

2. Did you participate in the HLT teleconferences during these event? Were these conferences helpful? Please explain.

IKE: No

	Unsatisfactory -----				Excellent
HURREVAC	1	2	3	4	5
SLOSH	1	2	3	4	5
TIDES	1	2	3	4	5
ETIS	1	2	3	4	5
HAZUS	1	2	3	4	5
Other	1	2	3	4	5

4. Of the tools utilized, how could they be enhanced or improved?

HURREVAC Not sure

SLOSH _____

TIDES _____

ETIS _____

HAZUS _____

Other _____

5. Of the tools utilized, has staff been adequately trained to operate the tools?

HURREVAC	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
SLOSH	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
TIDES	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input checked="" type="checkbox"/> Not Applicable
ETIS	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input checked="" type="checkbox"/> Not Applicable
HAZUS	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable

6. If HURREVAC were utilized, how would you rate these program components?

	Unsatisfactory -----				Excellent
Decision Arcs	1	2	3	4	5
Surge Maps	1	2	3	4	5
Clearance Times	1	2	3	4	5
ETIS	1	2	3	4	5
Shelter Information	1	2	3	4	5
Wind Swath	1	2	3	4	5
Error Cone	1	2	3	4	5
SLOSH	1	2	3	4	5
5-day Forecast	1	2	3	4	5

EVACUATION AND DECISION MAKING

1. Did your jurisdiction issue evacuation orders? IKE

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
Mobile County						

Did your jurisdiction issue evacuation orders? GUSTAV

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
	8/31/08	7 am			8/31/08	10 am

2. Please describe how the State assisted you in the evacuation and decision making process.

IKE: Conference Call with EMA Director and Governor.

GUSTAV: Conference Call with EMA Director and Governor.

3. In retrospect, were the appropriate areas evacuated? If insufficient, please explain. IKE
 Insufficient for the Threat Sufficient for the Threat Excessive for the Threat
-

In retrospect, were the appropriate areas evacuated? If insufficient, please explain. GUSTAV
 Insufficient for the Threat Sufficient for the Threat Excessive for the Threat

4. If evacuation orders were issued, please indicate which areas were targeted.
 (Please use "V" for Voluntary, "M" for Mandatory, and "R" for Recommended)

IKE

"R" Mobile Homes/Manufactured Homes
 "V" Healthcare Facilities
 "R" River/Lake Fronts
 "M" Islands
 "M" Beach Fronts
 "M" Flood Prone Areas
 "V" Countywide

"M" Category 1 Surge Zone
 "V" Category 2 Surge Zone
 "R" Category 3 Surge Zone
 "R" Category 4 Surge Zone
 "R" Category 5 Surge Zone

Other: _____

GUSTAV

"R" Mobile Homes/Manufactured Homes
 "V" Healthcare Facilities
 "R" River/Lake Fronts
 "M" Islands
 "M" Beach Fronts
 "M" Flood Prone Areas
 "V" Countywide

"M" Category 1 Surge Zone
 "V" Category 2 Surge Zone
 "R" Category 3 Surge Zone
 "R" Category 4 Surge Zone
 "R" Category 5 Surge Zone

Other: _____

5. How was the public notified of the evacuation orders? If different for either storm, please note.

<input checked="" type="checkbox"/> Television	<input type="checkbox"/> Loudspeaker / PA	<input checked="" type="checkbox"/> Radio
<input type="checkbox"/> Newspaper	<input type="checkbox"/> Meetings	<input checked="" type="checkbox"/> Internet
<input checked="" type="checkbox"/> Telephone	<input checked="" type="checkbox"/> Mass Fax	<input type="checkbox"/> Mass Email
<input type="checkbox"/> Other Methods:		

6. Were the evacuation orders issued in a timely manner? If not, please explain.

IKE: Yes

GUSTAV: Yes

7. How were evacuation areas determined? If different for either storm, please explain.

<input checked="" type="checkbox"/> HES Products/Storm Surge Maps	<input type="checkbox"/> History of Wind Damage
<input type="checkbox"/> FIRM Maps	<input checked="" type="checkbox"/> Political Decision
<input checked="" type="checkbox"/> History of Flooding	<input type="checkbox"/> Other: _____

8. What language barriers were experienced as it relates to the evacuation process?

No barriers that hampered activities. Mostly Spanish. Other languages include Vietnamese, Cambodian, Laotian, German. We use volunteer interpreters from the University of S. Alabama. A representative is assigned to speak to the leader of each community. Churches and Temples also used to reach non-English speaking population

9. How can FEMA further assist in the decision making process. Do you have recommendations for tools or products that would assist you?

Phone internet locator system for evacuation zones throughout the state

EVACUATION ROADWAY NETWORK

1. How would you rate the capacity of the evacuation routes in relation to vehicular demand?
 Unsatisfactory ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- Excellent

2. Do you have traffic management plans that would facilitate the evacuation process? Please define.

Yes. Law enforcement handles this.

3. What specific measures were taken to facilitate the evacuation process for this event?
 Barricades Traffic Control Points Lock Down Drawbridges
 Roving Vehicle Assistance Coordinated Traffic Lights AM Radio Messages
 Highways Reversal Message Signs Traffic Redirect
 Others:

IKE

GUSTAV

4. What is the estimated number of people and vehicles evacuating for IKE?

	Estimated People	Estimated Vehicles
Evacuating WITHIN your Community	<u>9,000</u>	<u>3,000</u>
Evacuating THROUGH or TO your Community	<u>36,000</u>	<u>12,000</u>

What is the estimated number of people and vehicles evacuating for GUSTAV?

	Estimated People	Estimated Vehicles
Evacuating WITHIN your Community	<u>10,500</u>	<u>3,500</u>
Evacuating THROUGH or TO your Community	<u>36,000</u>	<u>12,000</u>

5. What percentage of your population was asked to evacuate, and estimate how many complied?
 IKE

	Percentage Asked to Evacuate	Estimate of how Many Complied
	11%	5%

 GUSTAV

	Percentage Asked to Evacuate	Estimate of how Many Complied
	11%	5%

6. What percentage used local shelters instead of leaving the area?

1% used local shelters instead of leaving area

7. In your opinion, what factors increased or decreased the percentage of those choosing to evacuate?

Media and landfall prediction of the storm. No concern from the media equalled no concern from the public.

8. Was the early evacuation of at-risk populations successful? What were the response rates for these groups (including tourists) and what percentage of the total evacuating population did these groups account for?

Yes. 5%

9. How would you rate the public's response to the evacuation notice? IKE

Slow Response Normal Response Fast Response

How would you rate the public's response to the evacuation notice? GUSTAV

Slow Response Normal Response Fast Response

10. Please identify which evacuation routes were advocated to the public.

IKE: I-65, Hwy 43, Hwy 45 North

GUSTAV: I-65, Hwy 43, Hwy 45 North

11. How would you rate the traffic volume during this evacuation event? IKE

Light Normal Heavy Congested

How would you rate the traffic volume during this evacuation event? GUSTAV

Light Normal Heavy Congested

12. Did you have predicted clearance times available from a previous Hurricane Evacuation Study? If so, did you find the clearance times appropriate? What were they? Did your actual clearance time come close to the redirected clearance time? By how much?

IKE Yes, 22 hours, appropriate for this storm

GUSTAV Yes, 22 hours, appropriate for this storm

13. Did the tourist occupancy pose a significant problem not addressed by the clearance times in the HES?

IKE No, limited tourist population in Mobile County

GUSTAV

14. Please provide the timetable for each evacuation order given according to a target population (i.e. nursing homes, mobile homes, tourists, flood zones, etc.) By how many hours did each targeted evacuation order precede actual landfall?

Both Storms - 48 hours for all citizens and groups

15. Please provide an overall estimate as to how long the evacuation process took.

IKE 16 hours

GUSTAV 24 hours

16. What is the longest commute time reported?

IKE: N/A

GUSTAV: N/A

17. What significant traffic problems were experienced during the evacuation for IKE? None

- Unanticipated Volumes
- Inadequate Traffic Control
- Diversions from Others
- Inadequate Signage
- Downed Trees
- Congestion and Traffic Jams
- Uncoordinated Traffic Signals
- Flooded Roads
- Damaged Roads
-
- Accidents and Stalled Autos
- Uncoordinated Evac Timing
- Construction
- County Roads Blocked
- Other: _____

What significant traffic problems were experienced during the evacuation for GUSTAV? None

- Unanticipated Volumes
- Inadequate Traffic Control
- Diversions from Others
- Inadequate Signage
- Downed Trees
- Congestion and Traffic Jams
- Uncoordinated Traffic Signals
- Flooded Roads
- Damaged Roads
-
- Accidents and Stalled Autos
- Uncoordinated Evac Timing
- Construction
- County Roads Blocked
- Other: _____

18. Please describe when and where major congestion (stop-and-go traffic) occurred on which major, critical evacuation routes. How long did the congestion last? When did it recede? Describe where any congestion remained at the time of landfall, if any.

Mobile County did not have any major congestion

19. If roadways were reversed, where and when did this occur? Should it have occurred earlier? How much earlier? Were there any operational problems or issues with the reversible roadways? Describe them. Describe the plan for reversing each roadway. If no roadways were reversed, should roadway reversibility be considered? When?

Were not reversed

20. How can the Hurricane Program assist in alleviating some of these problems?

Not Sure

21. Please describe how the evacuation process and traffic management can be improved.

Better Coordination between coastal states

Install more camera & traffic counters

Have access to cameras from ALDOT

Better communication with ALDOT, Better communication with Mississippi and Florida, Relieve bottleneck from Eastern and Western evacuees, ETIS could help but it is shut down, Smart Trafficking,

COMMUNICATIONS AND PUBLIC INFORMATION

1. From which agencies and or products did you receive event information?

<input type="checkbox"/> FEMA Regional Office	<input checked="" type="checkbox"/> Other State Agencies	<input type="checkbox"/> Local EMAs
<input checked="" type="checkbox"/> HURREVAC	<input type="checkbox"/> HLT / ELT	<input checked="" type="checkbox"/> Local Weather Office
<input checked="" type="checkbox"/> The Weather Channel	<input checked="" type="checkbox"/> Commercial Media	<input checked="" type="checkbox"/> Internet
<input type="checkbox"/> Other: <u>Chamber of Commerce</u>		

2. How was local information distributed to you?

<input checked="" type="checkbox"/> Telephone	<input checked="" type="checkbox"/> Fax	<input checked="" type="checkbox"/> Email
<input checked="" type="checkbox"/> Website	<input checked="" type="checkbox"/> Interview	<input checked="" type="checkbox"/> Press Conference
<input type="checkbox"/> Video / Tape	<input checked="" type="checkbox"/> Pamphlets / Brochures	<input checked="" type="checkbox"/> Mass email groups
<input type="checkbox"/> Other Documents: _____		

3. How timely was the information?

IKE: Adequate

GUSTAV: Adequate

4. How do you distribute local information to the media?

<input checked="" type="checkbox"/> Telephone	<input checked="" type="checkbox"/> Fax	<input checked="" type="checkbox"/> Email
<input checked="" type="checkbox"/> Website	<input checked="" type="checkbox"/> Interview	<input checked="" type="checkbox"/> Press Conference
<input type="checkbox"/> Video / Tape	<input checked="" type="checkbox"/> Pamphlets / Brochures	<input checked="" type="checkbox"/> Mass email groups
<input type="checkbox"/> Other Documents: _____		

5. Was information coordinated with other local agencies to ensure "one-voice" cohesiveness?

Yes

6. Do you allow the media access to the EOC?

Yes through scheduled visits with EOC, The media room is insufficient according to the media personnel

7. Have you conducted specific planning or coordination sessions with the media this year?

Yes No Pre-Season Post-Season

8. Was technical jargon explained in a manner that could be easily communicated to the public? If no, please explain.

Yes

9. Please define which website(s) you use to access storm and event information.

National Hurricane Center, Local Weather Services, Weather Underground, Crown Weather

10. Please describe how you disseminate received information to the general public.

Connect County (reverse 911), Media, PSA's Fax, Emails, Web Page.

Tried not to take non essential calls. Referred no essential calls to 211 and fed that system information that was pushed out of the EOC

11. Did you experience problems disseminating information to the evacuating public? Please explain.

Information too Complicated Information Inaccurate Not Enough Information
 Untimely Information Population Apathy Lack of Political Support
 Other Problems:

Did not experience problems.

12. Do you believe the evacuating public experienced problems in receiving the following information?

Evacuation Decision Info Evacuation Routes Evacuation Detours
 Travel Time Estimates Traffic Congestion Info Storm Information
 Other Problems:

No

13. How would you rate overall communications and information dissemination during these events?

	Unsatisfactory-----Excellent				
Within State EOC	1	2	3	4	5
Between State EOCs	1	2	3	4	5
Within Jurisdictions	1	2	3	4	5
Between Jurisdictions	1	2	3	4	5
With the NWS	1	2	3	4	5
With the Media	1	2	3	4	5

14. How can information dissemination be improved?

FEMA can provide a National Affordable Alert Notification System similar to reverse 911.
Look into Rapid Cast usage to cut local costs. The reverse 911 system jams the system with
phone calls and is inundated with calls from the system.

15. How can communication methods be improved?

National Alert Notification System, Getting up to speed on Facebook and Twitter

SHELTERING

1. Please define the total number of shelters opened and the estimated number of people who sought shelter during IKE in your jurisdiction.

SHELTER	Number Opened	Estimate of People Sheltered
Red Cross	<u>6</u>	<u>900</u>
Special Needs	<u>1</u>	<u>10</u>
Faith Based	<u> </u>	<u> </u>
Other	<u> </u>	<u> </u>

Please define the total number of shelters opened and the estimated number of people who sought shelter during GUSTAV in your jurisdiction.

SHELTER	Number Opened	Estimate of People Sheltered
Red Cross	<u>10</u>	<u>2980</u>
Special Needs	<u>1</u>	<u>20</u>
Faith Based	<u> </u>	<u> </u>
Other (Pet)	<u>1</u>	<u>60</u>

2. Was the availability of the shelters sufficient for the needs of the evacuating public? If not, please explain.

Ike Yes
Note: Shelter capacity could have withstood closer to 13,000 but there are not enough
resources to operate the shelters. DHR has 500 employees but only 50 during the storm.
Because the staff was maxed out we could not open more shelters or accept more people
GUSTAV Yes

3. Were the shelters opened in an adequate time frame as it related to the evacuating public?

IKE: Yes 10 hours before TS force winds
GUSTAV: Yes

4. Were "Refuges of Last Resort" utilized in addition to public shelters?

IKE: N/A
GUSTAV: N/A

5. Please define what mutual aid sheltering agreements you have with neighboring jurisdictions..

Mobile County EMA does not, AEMA does

6. What was the average length of time the shelters remained open for IKE?

Average Hours 12 Average Days 2

What was the average length of time the shelters remained open for GUSTAV?

Average Hours 24 Average Days 1

7. What problems, if any, were reported in the opened shelters during IKE? None

- Location Confusion
- Overcrowding
- Shortage of Staff
- Flooding
- Wind Damage
- Loss of Utilities
- Lack of Security
- Shortage of Shelters
- Unanticipated Medical Issues
- Shortage of Food
- Shortage of Supplies
- Other:

What problems, if any, were reported in the opened shelters during GUSTAV? None

- Location Confusion
- Overcrowding
- Shortage of Staff
- Flooding
- Wind Damage
- Loss of Utilities
- Lack of Security
- Shortage of Shelters
- Unanticipated Medical Issues
- Shortage of Food
- Shortage of Supplies
- Other:

8. Please describe how the state wide sheltering process can be improved.

Not answered

COMPREHENSIVE HURRICANE EMERGENCY MANAGEMENT STRATEGY (CHEMS)

FEMA is broadening the role of the Hurricane Evacuation Study into a more comprehensive approach called the Comprehensive Hurricane Emergency Management Strategy or CHEMS for short. The HES will now become a component of the more comprehensive program.

1. Please define which of the following components of the Hurricane Evacuation Study need improvement and please indicate how the component can be improved.

Transportation Analysis Update road network data, Discuss traffic monitoring systems

Behavioral Analysis Update based on more recent storm experience

Vulnerability Analysis

Hazards Analysis

Shelter Analysis

Decision Making

2. Please define which of the following components of a *Re-entry Analysis* would benefit the community and indicate how the component should be developed.

- Decision Making _____

- Communication Process Best practices for communicating with public i.e. 1-800-GoHome

- Storm Damage Impact Detailed probabilities damage assessment

- Roadway Network Traffic control devices & techniques
Consideration/Alternatives _____

3. Please define which of the following components of a *Business Mitigation and Recovery Analysis* would benefit the community and indicate how the component should be developed.

- Mitigation Assessment _____

- Impact Assessment _____

- Economic Impact Need an assessment tool tailored to the jurisdiction

- Recovery Analysis _____

- Post Storm ESF 14 Long term Recovery process
Redevelopment Planning _____

4. Please define which of the following components of a *Community Storm Impact Analysis* would benefit the community and indicate how the component should be developed.

- Coastal Erosion _____
Mapping / Analysis _____
- Construction/Mitigation _____
Analysis _____
- Economic Impact _____

- Inland Flooding Analysis _____

- Utility Damage Analysis _____

- Critical Facility Analysis _____

- Post Storm Security _____
Needs Assessment _____

5. Please define which of the following components of a *Recovery Analysis* would benefit the community and indicate how the component should be developed.

- Debris Management _____
Planning _____

Mutual Aid Planning

Long Term Sheltering

Post Storm
Redevelopment Planning

Public Health Issues

Catastrophic Impact
Planning

Temporary Housing
Assessment

6. Please define which of the following components of a *Communication Assessment* would benefit the community and indicate how the component should be developed.

Real Time
Communication
Assessment

Public Information
Process Analysis

7. Please define which of the following components of a *Technology Analysis* would benefit the community and indicate how the component should be developed.

GIS Application
Assessment

Enhanced Decision
Tool Updates/Creation

8. Please define which of the following components of a *Disaster Mitigation Analysis* would benefit the community and indicate how the component should be developed.

Building Code Impact
Analysis

Zoning Analysis

Community Rating
System Assessment

Facility Performance
Assessment

HAZUS Implementation

9. What other products or tools would help you in preparing for and responding for future hurricane or tropical storm events?? Please elaborate.

Increase expectations from the public
Folks from other states come into Alabama and have expectations like everything would be provided for them.
Peoples expectation affected by economic conditions
Raised expectations definitely negatively impact local evacuees
Evacuees act privileged in local restaurants
Gas prices rise and people cannot or won't leave on their own
The evacuation system was very poor and treated humans as livestock

OTHER COMMENTS

1. Please provide other comments that would assist FEMA, local emergency management offices, and State Emergency Management Offices in preparing for, responding to, and recovering from an event.

The evacuation system was very poor and treated humans as livestock. I believe it will be an error in judgment to ever expect the folks from LA to willingly climb aboard an evacuation bus. For many, it would have been better to stay at home and chance the flood. The conditions were terrible aboard the buses, and that made even a large, hot, overcrowded group shelter attractive.

– DeKalb County Alabama

The deteriorating view of government we now experience is due, in part, to unmet expectations. We have to do a better job of holding the public accountable for their own safety, sheltering, housing, etc..., and not encouraging citizens to think that FEMA or anyone else is going to hand out gift cards and hotel rooms. We should focus on mitigation and education, not evacuation and sheltering. The positive side of all of this is that many volunteers had the opportunity to serve, and we had a great sheltering experience in DeKalb County.

DeKalb County stands ready to assist with future sheltering needs, and will continue to treat evacuees as guests/neighbors, no matter what state they call home. - DeKalb County Alabama

Share Information – Mobile County

Best Practices – Mobile County

Media influencing public to stay – Mobile County

Increase funding for all hazards preparedness

Allow communities to establish priorities

THANK YOU FOR YOUR TIME AND ASSISTANCE IN COMPLETING THIS MOST IMPORTANT DOCUMENT.

HURRICANE IKE AND GUSTAV POST-STORM ASSESSMENT BALDWIN COUNTY EMERGENCY MANAGEMENT COMPONENT

*This assessment is designed to evaluate the effectiveness of the National Hurricane Program's Hurricane Evacuation Study (HES) Products within your jurisdiction as it applied to your experience during the recent hurricane threat. It is also intended to identify any specific needs or recommendations that you may wish to share relating to FEMA's overall Hurricane Program. It is not designed to evaluate you nor your response to the event. Rather it is designed to help FEMA better serve you in the future. **Please complete this assessment prior to your scheduled interview.***

GENERAL

1. Of the following products, which were readily available for your use?

- | | | |
|--|--|--|
| <input type="checkbox"/> ETIS | <input checked="" type="checkbox"/> Evacuation Maps | <input checked="" type="checkbox"/> Clearance Times |
| <input checked="" type="checkbox"/> Shelter Locations | <input checked="" type="checkbox"/> Local Hurricane Plan | <input checked="" type="checkbox"/> HURREVAC |
| <input type="checkbox"/> SLOSH | <input checked="" type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: <u>Updated transportation section of HES</u> | | |

2. Of the information provided to you, which items were considered most important? Explain

- | | | |
|---|---|--|
| <input type="checkbox"/> ETIS | <input type="checkbox"/> Evacuation Maps | <input checked="" type="checkbox"/> Clearance Times |
| <input type="checkbox"/> Shelter Locations | <input type="checkbox"/> Local Hurricane Plan | <input checked="" type="checkbox"/> HURREVAC |
| <input type="checkbox"/> SLOSH | <input type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: <u>HURREVAC really helped with information to local & civic officials</u> | | |

3. Which items were found to be the least helpful? Explain

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> ETIS | <input type="checkbox"/> Evacuation Maps | <input type="checkbox"/> Clearance Times |
| <input type="checkbox"/> Shelter Locations | <input type="checkbox"/> Local Hurricane Plan | <input type="checkbox"/> HURREVAC |
| <input checked="" type="checkbox"/> SLOSH | <input type="checkbox"/> HES Study | <input type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

4. Please describe your partnerships with private companies and/or civic groups to assist in a public outreach program for your community.

Convention Center and Visitors Bureau public relations through Paula Tillman
Ads in telephone book for evacuation routes and zones
Newspapers and billboards
Brochures in City Hall

5. Discuss how HURREVAC is generally used during a hurricane event.

Tracking path, wind fields, forward movement, wind speed, time modeling, evacuation decisions, Sometimes use decision arc mapping.

6. Discuss how SLOSH or the SLOSH Display Model is generally used during a hurricane event.

Not used since Ivan and Dennis Storms

7. What mitigation efforts, if any, were initiated or participated in before or during these events?

moved people out of storm surge areas using USGS stream/rain guage

8. Of these mitigation efforts, were they successful? Please Explain.

Forced to accept folks from LA & MS. They stayed in coastal area vacation spots and had to be re-evacuated.

11. Of the tools utilized, has staff been adequately trained to operate the tools?

HURREVAC	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
SLOSH	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
TIDES	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
ETIS	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
HAZUS	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Not Applicable

12. If HURREVAC were utilized, how would you rate these program components?

	Unsatisfactory -----				Excellent
Decision Arcs	1	2	3	4	5
Surge Maps	1	2	3	4	5
Clearance Times	1	2	3	4	5
ETIS	1	2	3	4	5
Shelter Information	1	2	3	4	5
Wind Swath	1	2	3	4	5
Error Cone	1	2	3	4	5
SLOSH	1	2	3	4	5
5-day Forecast	1	2	3	4	5

Need training on Tide portion of HURREVAC

EVACUATION AND DECISION MAKING

10. Did your jurisdiction issue evacuation orders? IKE - Voluntary

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
Mobile County						

Did your jurisdiction issue evacuation orders? GUSTAV - Mandatory

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time

11. Please describe how the State assisted you in the evacuation and decision making process.

IKE: Local

GUSTAV: State Governor

Need law enforcement assistance to keep traffic flowing . Critical intersection must be identified and supported by law enforcement or National Guard.

12. In retrospect, were the appropriate areas evacuated? If insufficient, please explain.IKE

Insufficient for the Threat Sufficient for the Threat Excessive for the Threat
Evacuations needed to be done ahead of time

In retrospect, were the appropriate areas evacuated? If insufficient, please explain. GUSTAV

Insufficient for the Threat Sufficient for the Threat Excessive for the Threat

13. If evacuation orders were issued, please indicate which areas were targeted.

(Please use "V" for Voluntary, "M" for Mandatory, and "R" for Recommended)

IKE:

Mobile Homes/Manufactured Homes
Healthcare Facilities
River/Lake Fronts
Islands
XBeach Fronts
XFlood Prone Areas
Countywide

Category 1 Surge Zone
Category 2 Surge Zone
Category 3 Surge Zone
Category 4 Surge Zone
Category 5 Surge Zone

Other: _____

GUSTAV: **Small Number**

Mobile Homes/Manufactured Homes
Healthcare Facilities
X River/Lake Fronts
Islands
X Beach Fronts
X Flood Prone Areas
Countywide

Category 1 Surge Zone
Category 2 Surge Zone
Category 3 Surge Zone
Category 4 Surge Zone
Category 5 Surge Zone

Other: _____

14. How was the public notified of the evacuation orders? If different for either storm, please note.

N/A

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Television | <input type="checkbox"/> Loudspeaker / PA | <input checked="" type="checkbox"/> Radio |
| <input checked="" type="checkbox"/> Newspaper | <input checked="" type="checkbox"/> Meetings for officials | <input checked="" type="checkbox"/> Internet |
| <input type="checkbox"/> Telephone | <input type="checkbox"/> Mass Fax | <input checked="" type="checkbox"/> Mass Email |
| <input type="checkbox"/> Other Methods: | | |

15. Were the evacuation orders issued in a timely manner? If not, please explain.

IKE: **No**

GUSTAV: **Yes**

16. How were evacuation areas determined? If different for either storm, please explain. **N/A**

- | | |
|---|---|
| <input type="checkbox"/> HES Products/Storm Surge Maps | <input type="checkbox"/> History of Wind Damage |
| <input type="checkbox"/> FIRM Maps | <input checked="" type="checkbox"/> Political Decision |
| <input checked="" type="checkbox"/> History of Flooding | <input type="checkbox"/> Other: USGS Gauges, Weather Services |

17. What language barriers were experienced as it relates to the evacuation process? **Spanish and Russian**

18. How can FEMA further assist in the decision making process. Do you have recommendations for tools or products that would assist you?

Wants group conference call with neighboring states and counties for coordination purposes. Like the products available

EVACUATION ROADWAY NETWORK

22. How would you rate the capacity of the evacuation routes in relation to vehicular demand?
Unsatisfactory -----Excellent
 1 2 3 4 5

23. Do you have traffic management plans that would facilitate the evacuation process? Please define.
Need law enforcement assistance to keep traffic flowing. Critical intersections must be identified and supported by law enforcement or National Guard.

24. What specific measures were taken to facilitate the evacuation process for this event?
 Barricades Traffic Control Points Lock Down Drawbridges
 Roving Vehicle Assistance Coordinated Traffic Lights AM Radio Messages
 Highways Reversal Message Signs Traffic Redirect
 Others:

IKE
GUSTAV: Barricades, Traffic Control Points, Traffic Redirection

25. What is the estimated number of people and vehicles evacuating for IKE? **None**
Estimated People Estimated Vehicles
Evacuating WITHIN your Community
Evacuating THROUGH or TO your Community

What is the estimated number of people and vehicles evacuating for GUSTAV? **Small Number**
Estimated People Estimated Vehicles
Evacuating WITHIN your Community
Evacuating THROUGH or TO your Community

26. What percentage of your population was asked to evacuate, and estimate how many complied?
IKE: **N/A**
GUSTAV: **N/A**

27. About what percentage of the total population evacuated? What percentage *should* have evacuated? What percentage used local shelters instead of leaving the area?
N/A

28. In your opinion, what factors increased or decreased the percentage of those choosing to evacuate?
N/A

29. Was the early evacuation of at-risk populations successful? What were the response rates for these groups (including tourists) and what percentage of the total evacuating population did these groups account for?

N/A

30. How would you rate the public's response to the evacuation notice? IKE
 Slow Response Normal Response Fast Response

How would you rate the public's response to the evacuation notice? GUSTAV
 Slow Response Normal Response Fast Response

31. Please identify which evacuation routes were advocated to the public.

IKE:

GUSTAV: Hwy 59

32. How would you rate the traffic volume during this evacuation event? IKE
 Light Normal Heavy Congested

How would you rate the traffic volume during this evacuation event? GUSTAV
 Light Normal Heavy Congested

33. Did you have predicted clearance times available from a previous Hurricane Evacuation Study? If so, did you find the clearance times appropriate? What were they? Did your actual clearance time come close to the redirected clearance time? By how much?

IKE

GUSTAV: Political Decision

34. Did the tourist occupancy pose a significant problem not addressed by the clearance times in the HES?

IKE **N/A**

GUSTAV **N/A**

35. Please provide the timetable for each evacuation order given according to a target population (i.e. nursing homes, mobile homes, tourists, flood zones, etc.) By how many hours did each targeted evacuation order precede actual landfall?

N/A

36. Please provide an overall estimate as to how long the evacuation process took.

N/A

37. What is the longest commute time reported?

IKE: N/A

GUSTAV: N/A

38. What significant traffic problems were experienced during the evacuation for IKE? N/A

- Unanticipated Volumes Congestion and Traffic Jams Accidents and Stalled Autos
- Inadequate Traffic Control Uncoordinated Traffic Signals Uncoordinated Evac Timing
- Diversions from Others Flooded Roads Construction
- Inadequate Signage Damaged Roads County Roads Blocked
- Downed Trees _____ Other:

What significant traffic problems were experienced during the evacuation for GUSTAV? N/A

- Unanticipated Volumes Congestion and Traffic Jams Accidents and Stalled Autos
- Inadequate Traffic Control Uncoordinated Traffic Signals Uncoordinated Evac Timing
- Diversions from Others Flooded Roads Construction
- Inadequate Signage Damaged Roads County Roads Blocked
- Downed Trees _____ Other:

39. Please describe when and where major congestion (stop-and-go traffic) occurred on which major, critical evacuation routes. How long did the congestion last? When did it recede? Describe where any congestion remained at the time of landfall, if any.

Typical stop & go traffic

40. If roadways were reversed, where and when did this occur? Should it have occurred earlier? How much earlier? Were there any operational problems or issues with the reversible roadways? Describe them. Describe the plan for reversing each roadway. If no roadways were reversed, should roadway reversibility be considered? When?

N/A

41. How can the Hurricane Program assist in alleviating some of these problems?

N/A

42. Please describe how the evacuation process and traffic management can be improved.

N/A

COMMUNICATIONS AND PUBLIC INFORMATION

13. From which agencies and or products did you receive event information?

- FEMA Regional Office
- HURREVAC
- The Weather Channel
- Other:
- Other State Agencies
- HLT / ELT
- Commercial Media
- Local EMAs
- Local Weather Office
- Internet

14. How was local information distributed to you?

- Telephone
- Website
- Video / Tape
- Other Documents: _____
- Fax
- Interview
- Pamphlets / Brochures
- Email
- Press Conference
- Mass email groups

15. How timely was the information?

IKE: OK

GUSTAV: OK

16. How do you distribute local information to the media?

- Telephone
- Website
- Video / Tape
- Other Documents: _____
- Fax
- Interview
- Pamphlets / Brochures
- Email
- Press Conference
- Mass email groups

17. Was information coordinated with other local agencies to ensure "one-voice" cohesiveness?

Conversations with Mobile and Pensacola

18. Do you allow the media access to the EOC?

Yes press conference

19. Have you conducted specific planning or coordination sessions with the media this year?

- Yes
- No
- Pre-Season
- Post-Season

20. Was technical jargon explained in a manner that could be easily communicated to the public? If no, please explain.

N/A

21. Please define which website(s) you use to access storm and event information.

NOAA website, Crown Weather.com, Weather Underground

22. Please describe how you disseminate received information to the general public.

Public Information Office

23. Did you experience problems disseminating information to the evacuating public? Please explain.

- Information too Complicated
 Information Inaccurate
 Not Enough Information
 Untimely Information
 Population Apathy
 Lack of Political Support
 Other Problems: _____

Nothing communicated until it was too late. Problems with county Commission

24. Do you believe the evacuating public experienced problems in receiving the following information?

- Evacuation Decision Info
 Evacuation Routes
 Evacuation Detours
 Travel Time Estimates
 Traffic Congestion Info
 Storm Information
 Other Problems: _____

No problem

13. How would you rate overall communications and information dissemination during these events?

	Unsatisfactory-----Excellent				
Within State EOC	1	2	3	4	5
Between State EOCs	1	2	3	4	5
Within Jurisdictions	1	2	3	4	5
Between Jurisdictions	1	2	3	4	5
With the NWS	1	2	3	4	5
With the Media	1	2	3	4	5
With FEMA	1	2	3	4	5

14. How can information dissemination be improved?

With timely information from state EMA

16. How can communication methods be improved?

N/A (No answer)

SHELTERING

9. Please define the total number of shelters opened and the estimated number of people who sought shelter during IKE in your jurisdiction.

SHELTER	Number Opened	Estimate of People Sheltered
Red Cross	_____	_____
Special Needs	_____	_____
Faith Based	_____	_____
Other	_____	_____

Please define the total number of shelters opened and the estimated number of people who sought shelter during GUSTAV in your jurisdiction.

SHELTER	Number Opened	Estimate of People Sheltered
Red Cross	1	50-100
Special Needs	1	20
Faith Based	_____	_____
Other (County)	1	340

10. Was the availability of the shelters sufficient for the needs of the evacuating public? If not, please explain.

Ike

 GUSTAV Yes

11. Were the shelters opened in an adequate time frame as it related to the evacuating public?

IKE: Yes 10 hours before TS force winds

 GUSTAV: Yes

12. Were "Refuges of Last Resort" utilized in addition to public shelters?

IKE: N/A

 GUSTAV: N/A

13. Please define what mutual aid sheltering agreements you have with neighboring jurisdictions..

N/A

14. What was the average length of time the shelters remained open for IKE?

Average Hours _____ Average Days _____

What was the average length of time the shelters remained open for GUSTAV?

Average Hours _____ Average Days 2 _____

15. What problems, if any, were reported in the opened shelters during IKE? N/A

- Location Confusion
- Overcrowding
- Shortage of Staff
- Flooding
- Wind Damage
- Loss of Utilities
- Lack of Security
- Shortage of Shelters
- Unanticipated Medical Issues
- Shortage of Food
- Shortage of Supplies
- Other:

What problems, if any, were reported in the opened shelters during GUSTAV? None

- Location Confusion
- Overcrowding
- Shortage of Staff
- Flooding
- Wind Damage
- Loss of Utilities

- Lack of Security
- Shortage of Shelters
- Unanticipated Medical Issues
- Shortage of Food
- Shortage of Supplies
- Other: Problems with people with drugs

16. Please describe how the state wide sheltering process can be improved.

COMPREHENSIVE HURRICANE EMERGENCY MANAGEMENT STRATEGY (CHEMS)

FEMA is broadening the role of the Hurricane Evacuation Study into a more comprehensive approach called the Comprehensive Hurricane Emergency Management Strategy or CHEMS for short. The HES will now become a component of the more comprehensive program.

10. Please define which of the following components of the *Hurricane Evacuation Study* need improvement and please indicate how the component can be improved.

- Transportation Analysis

- Behavioral Analysis

- Vulnerability Analysis

- Hazards Analysis

- Shelter Analysis

- Decision Making

11. Please define which of the following components of a *Re-entry Analysis* would benefit the community and indicate how the component should be developed.

- Decision Making

- Communication Process

- Storm Damage Impact

- Roadway Network Consideration/Alternatives

12. Please define which of the following components of a *Business Mitigation and Recovery Analysis* would benefit the community and indicate how the component should be developed.

- Mitigation Assessment

- Impact Assessment _____

- Economic Impact _____

- Recovery Analysis _____

- Post Storm
Redevelopment Planning _____

13. Please define which of the following components of a *Community Storm Impact Analysis* would benefit the community and indicate how the component should be developed.

- Coastal Erosion
Mapping / Analysis _____

- Construction/Mitigation
Analysis _____

- Economic Impact _____

- Inland Flooding Analysis _____

- Utility Damage Analysis _____

- Critical Facility Analysis _____

- Post Storm Security
Needs Assessment _____

14. Please define which of the following components of a *Recovery Analysis* would benefit the community and indicate how the component should be developed.

- Debris Management
Planning _____

- Mutual Aid Planning _____

- Long Term Sheltering _____

- Post Storm
Redevelopment Planning _____

- Public Health Issues _____

- Catastrophic Impact
Planning _____

- Temporary Housing
Assessment _____

15. Please define which of the following components of a *Communication Assessment* would benefit the community and indicate how the component should be developed.

Real Time
Communication Assessment _____

Public Information
Process Analysis _____

16. Please define which of the following components of a *Technology Analysis* would benefit the community and indicate how the component should be developed.

GIS Application
Assessment _____

Enhanced Decision
Tool Updates/Creation _____

17. Please define which of the following components of a *Disaster Mitigation Analysis* would benefit the community and indicate how the component should be developed.

Building Code Impact
Analysis _____

Zoning Analysis _____

Community Rating
System Assessment _____

Facility Performance
Assessment _____

HAZUS Implementation _____

18. What other products or tools would help you in preparing for and responding for future hurricane or tropical storm events?? Please elaborate.

POST STORM RECOVERY

6. During the recovery process, what information would be most beneficial to you?

N/A _____

7. With limited communications capabilities, how is information managed?

N/A _____

8. What significant traffic problems experiences during the re-entry for this event? N/A
- | | | |
|---|--|--|
| <input type="checkbox"/> Unanticipated Volumes | <input type="checkbox"/> Congestion and Traffic Jams | <input type="checkbox"/> Accidents and Stalled Autos |
| <input type="checkbox"/> Inadequate Traffic Control | <input type="checkbox"/> Uncoordinated Traffic Signals | <input type="checkbox"/> Uncoordinated Evac Timing |
| <input type="checkbox"/> Diversions from Others | <input type="checkbox"/> Flooded Roads | <input type="checkbox"/> Construction |
| <input type="checkbox"/> Inadequate Signage | <input type="checkbox"/> Damaged Roads | <input type="checkbox"/> County Roads Blocked |
| <input type="checkbox"/> Downed Trees | <input type="checkbox"/> | Other: |
-

9. How can the Hurricane Program assist in alleviating some of the problems encountered?

10. During Re-Entry, how will information be coordinated and disseminated to the general public?

ANALYSIS OF OTHER FEMA PROGRAMS AND EVACUATION ASSISTANCE

Did the results of the FEMA "Gap Analysis" plan a role in your planning and evacuation efforts? How and to what extent.

N/A

Did the Federal assisted evacuation efforts (ie. Aircraft, bus, train, other) help or hinder your efforts to safely evacuate your threatened populations from your community? Do you feel that your populations will expect similar support from the Federal; Government in the future? Please explain.

- a) With Feds taking on more responsibility it makes it more difficult for the locals to meet expectations. Public has been conditioned to rely on Federal government for handouts, transportation, shelter, food, etc. Expert government intervention.
- b) People are willing to remain due to cost of evacuating and uncertainties
- c) Need more focus on shelters in place rather than auto evacuations

OTHER COMMENTS

2. Please provide other comments that would assist FEMA, local emergency management offices, and State Emergency Management Offices in preparing for, responding to, and recovering from an event.

- a) Provide hotels for utility providers after storm
- b) Undercutting contracts for ice, buses, etc

THANK YOU FOR YOUR TIME AND ASSISTANCE IN COMPLETING THIS MOST IMPORTANT DOCUMENT.

EMERGENCY OPERATIONS CENTER

9. At what time was the State Emergency Operations Center Activated for IKE? For GUSTAV? N/a Yes, Full Act.
 Not Activated Partial Activation Full Activation(XXXXXXX)
 Date ____/____/____ Date ____/____/____
 Time ____/____/____ Time ____/____/____

10. Did your organization have a presence in, or have access to, LOCAL Emergency Operations Centers during these events?
 IKE _____
 GUSTAV Yes, the Field Coordinator _____

11. If so, was this helpful in the information collection process? Please Explain.
 Yes _____

12. If so, did you feel your organization was made part of the local EOC team? Please Explain.
 Yes _____

TECHNOLOGICAL

13. Please identify which tools assisted you in making decisions for both events.
 HURREVAC x Website x HAZUS
 ETIS(not running well) SLOSH x Tides
 Other x State EMA sites _____
 (From flooding caused by Ike)

14. Of the tools utilized, how would you rate their performance? If different for a storm, please explain.
- | | | | | | | |
|-------------|----------------------|-----|---|-------|-----|----------------|
| | Unsatisfactory ----- | | | | | -----Excellent |
| HURREVAC | 1 | 2 | 3 | 4 | (5) | (5) |
| SLOSH | 1 | 2 | 3 | (4) | 5 | 5 |
| TIDES | 1 | 2 | 3 | 4 | 5 | 5 |
| ETIS | 1 | 2 x | 3 | 4 | 5 | 5 |
| HAZUS (-1)x | 1 | 2 | 3 | 4 | 5 | 5 |
| Other | 1 | 2 | 3 | 4 | 5 | 5 |

 Hazus too hard to use. Not user friendly. Too slow

15. Of the tools utilized, how would you rate their ease of use? If different for a storm, please explain.

	Unsatisfactory	-----			Excellent
	1	2	3	4	5
HURREVAC	1	2	3	4	5x
SLOSH	1	2	3	4x	5
TIDES	1	2	3	4	5
ETIS	1	2 x	3	4	5
HAZUS	1 x	2	3	4	5
Other	1	2	3	4	5

16. Of the tools utilized, how could they be enhanced or improved?

HURREVAC	More training	More Speed
SLOSH		
TIDES		
ETIS	More speed and timeliness	
HAZUS		
Other		

17. Of the tools utilized, has staff been adequately trained to operate the tools?

HURREVAC	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Applicable	Not	<input type="checkbox"/> Need More Training
SLOSH	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Applicable	Not	<input type="checkbox"/> Need More Training
TIDES	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Applicable	Not	<input type="checkbox"/> Need More Training
ETIS	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Applicable	Not	<input type="checkbox"/> Need More Training
HAZUS	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Applicable	Not	<input type="checkbox"/> Need More Training
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Partially	<input type="checkbox"/> Applicable	Not	<input type="checkbox"/> Need More Training

18. If HURREVAC were utilized, how would you rate these program components?

	Unsatisfactory	-----			Excellent
	1	2	3	4	5
Decision Arcs	1	2	3 x	4	5
Surge Maps	1	2	3	4x	5
Clearance Times	1	2x	3	4	5
ETIS	1	2x	3	4	5
Shelter Information	1x	2	3	4	5
Wind Swath	1	2	3	4	5x
Error Cone	1	2	3	4 x	5
SLOSH	1	2	3	4x	5
5-day Forecast	1	2	3	4	5x

45. Does the State have plans to implement lane reversal on any major evacuation corridor?

If yes, Please define.

Yes, contra flow plans were put in place to use as last resort. I-65, MP31, SR225, to MP164 (US 31)

46. Does the State have any other traffic management plans that would facilitate the evacuation process?

If yes, please define.

DOT/DPS monitoring, managing counting, lane restrictions are restored ----Advanced signage—Whole network

47. What traffic problems were experienced during the evacuation for this event?

IKE

GUSTAV

48. Do you have an estimate of the number of people and vehicles evacuating for IKE.

	Estimated People	Estimated Vehicles
Evacuating WITHIN the State	_____ N/A	_____
Evacuating THROUGH or TO the State	_____	_____

Do you have an estimate of the number of people and vehicles evacuating for GUSTAV.

	Estimated People	Estimated Vehicles
Evacuating WITHIN the State	_____ N/A	_____
Evacuating THROUGH or TO the State	_____	_____

49. If roadways were reversed, where and when did this occur? Should it have occurred earlier? How much earlier? Were there any operational problems or issues with the reversible roadways? Describe them. Describe the plan for reversing each roadway. If no roadways were reversed, should roadway reversibility be considered? When?

Need to know how to place signs effectively.

50. Please describe how the State can assist in improving the evacuation process and traffic management.

Expect to use Contra Flow but want to use only as a last resort. DOT does not own enough message signs

COMMUNICATIONS AND PUBLIC INFORMATION

25. From which agencies and or products did you receive event information?

- | | | |
|---|---|---|
| <input type="checkbox"/> FEMA Regional Office | <input type="checkbox"/> Other State Agencies | <input type="checkbox"/> Local EMAs |
| <input type="checkbox"/> HURREVAC | <input type="checkbox"/> HLT / ELT | <input type="checkbox"/> Local Weather Office |
| <input type="checkbox"/> The Weather Channel | <input type="checkbox"/> Commercial Media | <input type="checkbox"/> Internet |

Other: All agencies and products are used. EMITS
 211 _____

26. How did you receive local event information?

- | | | |
|---------------------------------------|--|--|
| <input type="checkbox"/> Telephone x | <input type="checkbox"/> Fax | <input type="checkbox"/> Email x |
| <input type="checkbox"/> Website x | <input type="checkbox"/> Interview | <input type="checkbox"/> Press Conference |
| <input type="checkbox"/> Video / Tape | <input type="checkbox"/> Pamphlets / Brochures x | <input type="checkbox"/> Mass email groups |
| <input type="checkbox"/> | Other | Documents: |

 EMITS _____

27. How did you distribute information to the media?

- | | | |
|---|--|--|
| <input type="checkbox"/> Telephone x | <input type="checkbox"/> Fax x | <input type="checkbox"/> Email x |
| <input type="checkbox"/> Website x | <input type="checkbox"/> Interview | <input type="checkbox"/> Press Conference x |
| <input type="checkbox"/> Video / Tape | <input type="checkbox"/> Pamphlets / Brochures x | <input type="checkbox"/> Mass email groups x |
| <input type="checkbox"/> Other Documents: _____ | | |

28. How timely was the information?

 IKE – N/A

 GUSTAV Very Timely

29. Please list which website(s) you use to access storm and event information.

 State agencies, Local EMAs, Weather Underground

30. Please describe how you disseminate received information to the general public.

 Via satellite, news releases, call in center, news conference and by phone calls

31. Please describe how you disseminate received information to the evacuating public.

 Radio stations for car radios/ Websites/ ALDOT call center

32. Did you experience problems disseminating information to the evacuating public? Please explain for each storm.

- | | | |
|---|--|---|
| <input type="checkbox"/> Information too Complicated | <input type="checkbox"/> Information Inaccurate | <input type="checkbox"/> Not Enough Information |
| <input type="checkbox"/> Untimely Information | <input type="checkbox"/> Lack of Political Support | |
| <input type="checkbox"/> Other Problems: <u> With </u> 800# for people dialing to receive information _____ | | |

Make it available again.

- By improving its performance and reporting capabilities
- Allowing automatic data uploads/ updates/ more real time
- 5/10/15/ minute intervals
- Forecasting
- Maps

SHELTERING

17. Please define the total number of shelters opened and the estimated number of people who sought shelter during IKE.

SHELTER	Not Opened	Number Opened	Estimate of People Sheltered
Red Cross		___ N/A ___	_____
Special/Medical Needs		_____	_____
Faith Based		_____	_____
Other		_____	_____

Please define the total number of shelters opened and the estimated number of people who sought shelter during GUSTAV.

SHELTER	Number Opened	Estimate of People Sheltered
Red Cross	___ 99 ___	___ 11,000 ___
Special/Medical Needs	___ 3 ___	___ 50 ___
Faith Based	___ 0 ___	___ 0 ___
Other	___ 27 ___	___ 1,000 ___

18. Was the availability of the shelters sufficient for the needs of the evacuating public? If not, please explain.

IKE N/A

GUSTAV YES

19. Were the shelters opened in an adequate time frame as it related to the evacuating public?

IKE N/A

GUSTAV Yes

20. Were any shelters affected by storm damage?

IKE N/A

GUSTAV YES

5. Please define what mutual aid sheltering agreements you have with neighboring jurisdictions.

MOUs with Alabama 2 Year Colleges and State of Louisiana. Red Cross (Most problems were associated with the Louisiana evacuees.

6. What was the average length of time the shelters remained open for **IKE**?

Average Hours _____ Average Days _____

What was the average length of time the shelters remained open for **GUSTAV**?

Average Hours _____ Average Days 5

7. What problems, if any, were reported in the opened shelters during **IKE**? N/A

- Location Confusion
- Overcrowding
- Shortage of Staff
- Flooding
- Wind Damage
- Loss of Utilities
- Lack of Security
- Shortage of Shelters
- Unanticipated Medical Issues
- Shortage of Food
- Shortage of Supplies
- Other:

What problems, if any, were reported in the opened shelters during **GUSTAV**?

- Location Confusion x
- Overcrowding x
- Shortage of Staff x
- Flooding
- Wind Damage
- Loss of Utilities
- Lack of Security x
- Shortage of Shelters
- Unanticipated Medical Issues
- Shortage of Food
- Shortage of Supplies
- Other:

8. Please describe how the state wide sheltering process can be improved.

HURRICANE EVACUATION STUDY (HES) COMPONENT EVALUATION (NEEDS UPDATING)

1. Did the State utilize any element of the Hurricane Evacuation Study in your decision making process? Please Explain.

2. What problems, if any, did you experience with the Hurricane Evacuation Study technical data?

3. Please provide recommendations for improvements to the elements of the Hurricane Evacuation Study.

Transportation Analysis

Need real-time transportation model to include the ability to track real-time movements of populations and vehicles

Possible means could include the use of Intelligent Transportation Systems (ITS) or cell phone tracking technology.

Behavioral Analysis

Vulnerability Analysis

Hazards Analysis

Shelter Analysis

Decision Making

COMPREHENSIVE HURRICANE EMERGENCY MANAGEMENT STRATEGY (CHEMS)

FEMA is broadening the role of the Hurricane Evacuation Study into a more comprehensive approach called the Comprehensive Hurricane Emergency Management Strategy or CHEMS for short. The HES will now become a component of the more comprehensive program.

1. Please indicate following components of a *comprehensive Hurricane Preparedness Study* would benefit the State and indicate how the component can be developed.

Re-entry Analysis

Business Mitigation and Recovery Analysis

Community Storm Impact Analysis

Recovery Analysis

Communications Assessment

Technology Analysis

Disaster Mitigation Analysis

2. What other products or tools would help you in preparing for and responding for future hurricane or tropical storm events?? Please elaborate.

POST STORM RECOVERY

1. During the recovery process, what information would be most beneficial to you?
We have to get the people home. Many will not leave. Angry host state due to breakdown of communication with Louisiana. Need Federal assistance with public information on re-entry.

2. With limited communications capabilities, how is information managed?
RECU (Regular Evacuation Coordination Unit) . Would rank re-entry analysis as a top priority. Host state needs to develop a re-entry plan, especially for those evacuees checked into hospitals.

3. What significant traffic problems did you experience during the re-entry for this event?

<input type="checkbox"/> Unanticipated Volumes	<input type="checkbox"/> Congestion and Traffic Jams	<input type="checkbox"/> Accidents and Stalled Autos
<input type="checkbox"/> Inadequate Traffic Control	<input type="checkbox"/> Uncoordinated Traffic	<input type="checkbox"/> Uncoordinated Evac Timing
<input type="checkbox"/> Diversions from Others	<input type="checkbox"/> Signals	
<input type="checkbox"/> Inadequate Signage	<input type="checkbox"/> Flooded Roads	<input type="checkbox"/> Construction
<input type="checkbox"/> Downed Trees	<input type="checkbox"/> Damaged Roads	<input type="checkbox"/> County Roads Blocked
	<input type="checkbox"/> Other: __Getting	people to leave the shelters_____

4. How can the Hurricane Program assist in alleviating some of the problems encountered?
Not answered

5. During Re-Entry, how will information be coordinated and disseminated to the general public?
Not answered

APPENDIX D: MEDIA INTERVIEW QUESTIONNAIRE AND RESPONSES

HURRICANE IKE AND GUSTAVPOST STORM ASSESSMENT LOCAL MEDIA COMPONENT

*This assessment is designed to evaluate the effectiveness of the National Hurricane Program Hurricane Evacuation Study (HES) products within your jurisdiction as it applied to your experience during the recent hurricane threat. It is also intended to identify any specific needs or recommendations that you may wish to share relating to FEMA's overall Hurricane Program. It is not designed to evaluate you nor your response to the event. Rather it is designed to help FEMA better serve you in the future. **Please complete this assessment prior to your scheduled interview.***

GENERAL SUPPORT

1. What type of support was provided by the local emergency management office for this event?

- Would like to have media staff in the EOC – Good
- Would like storm follow-up to happen sooner to event
- No problem with requesting and receiving information
- Personal phone contact with EOC directors needed
- Fax version of shelter location & evacuation maps
- Stats on website

2. How would you rate the support provided to you by your local emergency management office?

OK -----Excellent
1 2 3 4 5

2. Did the counties make HURREVAC graphics available to your organization? If so, was it useful?

3. Of the following products, which were readily available for your use?

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Evacuation Zones/Areas | <input type="checkbox"/> Evacuation Maps | <input type="checkbox"/> Clearance Times |
| <input checked="" type="checkbox"/> Shelter Locations | <input type="checkbox"/> Local Hurricane Plan | <input type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> SLOSH | <input type="checkbox"/> HE Technical Data Report | |
| <input type="checkbox"/> Other Documents: _____ | | |

4. Of the information available to you, which items were considered most important and why?

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Evacuation Zones/Areas | <input type="checkbox"/> Evacuation Maps | <input type="checkbox"/> Clearance Times |
| <input checked="" type="checkbox"/> Shelter Locations | <input type="checkbox"/> Local Hurricane Plan | <input type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> SLOSH | <input type="checkbox"/> HE Technical Data Report | |
| <input type="checkbox"/> Other Documents: _____ | | |

5. Which items were found to be the least helpful?

- | | | |
|---|--|---|
| <input type="checkbox"/> Evacuation Zones/Areas | <input type="checkbox"/> Evacuation Maps | <input type="checkbox"/> Clearance Times |
| <input type="checkbox"/> Shelter Locations | <input type="checkbox"/> Local Hurricane Plan | <input type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> SLOSH | <input checked="" type="checkbox"/> HE Technical Data Report | |
| <input type="checkbox"/> Other Documents: _____ | | |

6. Does your organization participate in specific training or coordination sessions with the local emergency management office? How often are these scheduled? Please identify.

Some pre-season coordination with Baldwin – Not usually involving media training

7. What can be done to improve your working relationship with the local emergency management office?

- Pre Hurricane Season Open House
- 211 – Un211 has training with EOC – very supportive
- Web-EOC with Media Access would be great
- Streaming Audio / Video would be great
- Stronger & timely post storm assessments
- National media creates trouble – easier to work with local media outlets
- No international Media yet (like South Carolina)

8. Did your organization have a presence in the Emergency Operations Center during this event? If so, was this helpful?

Yes need more – desire live feeds and media day training for better understanding how EOC works

INFORMATION DISSEMINATION

34. When deciding what local evacuation information data to disseminate concerning the approaching storm, was the information coordinated with the local emergency management agency to ensure “one-voice” cohesiveness and coordination?

- EOC keeps verbal messages as simple as possible
- “Just the facts” for written Info
- NWS, Baldwin, Mobile EOC’s where most info derives
- Via email correspondence keep simple, informed, maps, official EOC word

35. How was emergency management and HES information made available to your organization?

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Telephone | <input checked="" type="checkbox"/> Fax | <input checked="" type="checkbox"/> Email |
| <input type="checkbox"/> Website | <input type="checkbox"/> Interview | <input type="checkbox"/> Press Conference |
| <input type="checkbox"/> Video / Tape | <input type="checkbox"/> Pamphlets / Brochures | <input type="checkbox"/> Mass email groups |
| <input type="checkbox"/> Other Documents: _____ | | |

36. How timely was the information?

Not answered

37. Please describe which methods you utilize to disseminate received information to the general public.

- | | | |
|---|--------------------------------------|---|
| <input checked="" type="checkbox"/> Television | <input type="checkbox"/> Radio Media | <input checked="" type="checkbox"/> Website |
| <input checked="" type="checkbox"/> Mass Email | <input type="checkbox"/> Mass Fax | <input type="checkbox"/> Sponsor Program |
| <input type="checkbox"/> Other Methods: Considering Facebook, Twitter for WKPG using meteorology college students, telephone, website 211 | | |

38. Did you experience problems disseminating information to the evacuating public? Please explain.

- | | | |
|--|---|--|
| <input type="checkbox"/> Information too Complicated | <input type="checkbox"/> Information Inaccurate | <input checked="" type="checkbox"/> Not Enough Information |
| <input type="checkbox"/> Untimely Information | <input type="checkbox"/> Population Apathy | <input type="checkbox"/> Lack of Political Support |
| <input checked="" type="checkbox"/> Other Problems: Untimely for UN211 | | |

39. Do you believe the evacuating public experienced problems in receiving the following information?
- Evacuation Decision Info Evacuation Routes Evacuation Detours
 Travel Time Estimates Traffic Congestion Info Storm Information
 Other Problems: Real time announcements on air & website – national groups. Is this a visible threat? Should I expand my personal resources?

40. Please list the general types of public information on the approaching storm and the local emergency management evacuation information you disseminated. Do you think this information was understood by the public? Please explain.

- Cone of uncertainty
- Category – told more about these
- Mention impacts – make people aware not alarmed

41. Were any specific public information tools utilized during the event? If so, please explain.

No – Not on these two minor storms

42. How can the local emergency management office improve their data distribution methods for the media outlets? Are there any other communication conduits that could be utilized for future events?

Web site enhancement – one feed to all outlets – Live video feed – too many instant meteorologists

RESEARCH AND STATISTICS

1. Are you aware of and understand the different evacuation zones for the variety of different storms for each jurisdiction in your media market? Do you have the evacuation zone maps for your coverage area? What format is best for you?

Media understands well – sometimes public doesn't-JPG – web Hosted pictures displayed on television

2. If so, are these evacuation zones easy to explain to the general public? What suggestions do you have for improving the zones?

Make visual reference to well known public area – publicize elevation of these landmarks for potential flooding info

3. Are you familiar with any current Mitigation projects occurring in your jurisdiction that will reduce the storm risk factors?

Most media not aware one listed mitigation program that are ongoing

4. Would past statistics on hurricane evacuations and post storm damages assist you in informing the public? How?

Most No – one said very helpful

POST STORM RECOVERY

6. During the recovery process what information would be most beneficial to your media market?

When safe to return

7. With limited communications capabilities, how would information dissemination be managed?

WKRG Only cell phone issues – radio & internet –Southern Link – satellite phones

8. How can you assist local officials in disseminating information during the recovery process? Do you have a presence in the local Emergency Operating Center AFTER the storm?

TV-Post Storm just as important as pre storm

OTHER COMMENTS

1. Please provide other comments, which would assist FEMA, the local emergency management office, and other media outlets in preparing for, responding to, and recovery from an event.

Resource Available

Local presence in EOC (TV)

Battery powered TV's will not work in HD world

New studios

APPENDIX E: COLLECTED DATA

SHELTERING ANALYSIS CONTACTS AND REFERENCES

Agencies Consulted:

- Alabama Emergency Management Agency
- Alabama Department of Post-Secondary Education
- American Red Cross, State Disaster Services
- Alabama Department of Public Health, Center for Emergency Preparedness
- Alabama Department of Public Health, Bureau of Professional & Support Services
- Alabama Department of Agriculture and Industries, Emergency Programs

Documents Consulted:

- *Alabama Hurricane Evacuation Study Technical Data Report*, USACE.
- *Alabama Shelter and Mass Care Support Strategy Plan*, March 31, 2009, Alabama Sheltering and Mass Care Task Force.
- *Alabama Bay Area Transportation Assisted Evacuation Appendix*, Alabama Emergency Management Agency, Federal Emergency Management Agency, and Transportation Management Services, LLC. (Draft April 2009).
- *Alabama Host State General Evacuee Return Annex, "Operation Roll Tide"*, Alabama Emergency Management Agency.
- American Red Cross Gulf Coast Chapter, *Mobile County School System Shelter Inspection Summary*, May 2007.
- *Baldwin County Shelters of Last Resort Operations Plan*, Baldwin County Emergency Management Agency, June 2009.
- *Hurricane Ike and Gustav Post-Storm Assessment Local Emergency Management Component*, Conducted by Dewberry for Baldwin and Mobile Counties, Alabama.
- *Shelter Database*, American Red Cross, Disaster Services (Alabama).
- *Standards for Hurricane Evacuation Shelter Selection*, American Red Cross.

BEHAVIORAL ANALYSIS CONTACTS AND REFERENCES

Contact	Affiliation	Findings
Anderson, Tom	LSU	No. Ref. to Rachel Dowty
Baker, Jay	FL State U	No. Referred me to several others
Burnap, John	Emerg.Mgt Yahoo Group	Sent out announcement
Collins, Jennifer	U of So FL	No.
Cutter, Susan	U of So Carolina	
Davis, Denise	First responder	Anecdotal
Friedin, Lex	UT @ Houston	Some qual.data w/disabled
Hayden, Mary	NCAR	Qual.surveyw/Morss
Hayden, Mary	NCAR	
Laska, Shirley	UNO	No. Ref. to Sam Brody
Lazo, Jeff	NCAR	
Lewis, Carol	TX Southern	
Lindell, Mike	Texas A & M	Reentry Survey after Ike in TX
Morss, Rebecca	NCAR	Post-Ike in Galveston
Peacock, Walter	TAMU Hazards Center	Van Zandt & Lindell
Petty, Richard	Inst. For Reh. & Research Indep. Living Research Utilization	Some data in Houston after Rita
Phillips, Brenda	OK State	No. referred me to Laura Stough and Lex Frieden U of Houston
Phillips, Lauralee	TX Engr.Extn.Services	Researching impacts of Ike. Will keep eye out for evac.
Pielke, Roger	University of Colorado	
Quintana, Joan	Texas Engr.Extension Insitute Texas A&M	
Renne, John	U of New Orleans	No. Referred me to Carol Lewis
Ritchie, Jay	MS State No.Gulf Inst.	no response
Schwartz, Rob	U of Akron (EM)	QR after Ike
Senkbeil, Jason	U of Alabama	QR submitted. 2 manuscripts ready. Rest stop interviews LA only
Sims, Robert	U of New Orleans	Gustav quality of life study in LA
Sims, Robert Thomas	UNO	Quality of Life Post-Gustav in LA
Stein, Robert	Rice	PP - Harris Co Ike
Stough, Laura	Texas A & M	
Suhayda, Joseph	LSU Hurricane Center	NO.
Tierney, Kathleen	U of CO	No.
Tobin, Graham	University of South FL	No response
Van Zandt, Shannon	Texas A & M	After Ike in Galveston. Have report. Face & Mail
Voight, Tony	TX Transportation Institute	Sent survey & results
Wachtendorf, Tricia	U of Delaware	No. Referred to Gavin Smith
Webb, Deborah	Texas Engr. Extension Serv.	No longer there Referredme to Joan Quintana
Weller, Susan	Ut Med Branch-Galveston	Qual. Non-evacuators Ike in Galveston
Wenger, Dennis	National Science Foundation	Only knew about Van Zandt project
Smith, Gavin	DHS Ctr of Excellence	

APPENDIX F: STORM IMPACTS AND ACTIONS TIMELINES FOR HURRICANES GUSTAV AND IKE

Hurricane Gustav Timeline for Alabama										
Date/Time (GMT)	Storm Location		Storm Intensity		Stage	NHC/NWS Actions	Mean Low Level Water Level (ft)		State Actions	Local Actions (Mobile and Baldwin Counties)
	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind (kts)			Dauphin Island Station ID: 8735180	Pensacola Bay Station ID: 8729840		
Thursday, August 28, 2008										
0:00	18.8	75.1	999	40	tropical storm		-0.15	0.01		
6:00	18.1	75.4	995	45	"		0.45	0.43		
12:00	17.9	75.7	984	60	"		1.63	1.48		
15:00					"		1.69	1.74	State EOC Activates Level 3	Shelters Open in Mobile and Baldwin Counties.
18:00	18	76.2	984	60	"		1.11	1.35		
Friday, August 29, 2008										
0:00	17.8	77	987	60	"		0.14	0.27		
6:00	18	77.7	990	55	"		0.45	0.44	State EOC Activates Level 2	
8:00					"		0.85	0.77	Governor Riley issued a State of Emergency for Alabama.	Gulf Coast Convention and Visitors Bureau collection of data on occupancy rates in hotels and condos along the Gulf Coast.
10:00					"		1.31	1.09	The State received a statewide Emergency Disaster Declaration for Hurricane Gustav (FEMA 3292-EM) for emergency protective measures.	Weather Briefing for Hurricane Gustav. Baldwin County Commission meets to approve a Local State of Emergency request to be in place at noon on 8/30/08
11:00					"		1.47	1.24		Conference call with AEMA to discuss evacuation of Baldwin and Mobile counties
12:00	18.3	78.4	989	50	"		1.34	1.36		
18:00	18.8	79.2	984	65	Cat 1 hurricane		1.29	1.48		
Saturday, August 30, 2008										
0:00	19.2	80	975	75	"		0.4	0.48		
6:00	19.7	80.8	968	85	Cat 2 hurricane		0.52	0.46		Mobile and Baldwin County EOCs activate.
8:00					"		0.7	0.67	Request opening shelters in support of Louisiana.	
10:00					"		0.93	0.89	College shelters on standby and some ARC shelters open.	
12:00	20.7	81.6	955	110	Cat 3 hurricane		1.19	1.17		Baldwin County Commission issues a Local State of Emergency. Evacuation Order Issued for Fort Morgan Peninsula, Plash Island, all low lying, surge and flood prone areas in unincorporated Baldwin County and all areas south of Fort Morgan Road in the City of Gulf Shores. Evacuation orders issued for all islands, beach front properties, and flood prone areas.
15:00					"		1.52	1.45		The Baldwin County Commission opened the Baldwin County Coliseum for mass care/general population sheltering as well as medical special needs. The shelter was operated in conjunction with the Alabama Department of Public Health.
17:00					"		1.53	1.63	Buses depart Louisiana. Total expected in Jefferson County, 4,000.	
18:00	21.6	82.6	943	125	Cat 4 hurricane		1.45	1.54		
20:00					"		1.18	1.28	Two-Year colleges activated.	
21:00					"	Hurricane Watch issued to High Island, Texas to the Alabama/Florida border including New Orleans and Lake Ponchartrain. Tropical Storm Watch issued East of the Alabama/Florida border to Ochlockonee River, Florida.	1.02	1.15		

Date/Time (GMT)	Storm Location		Storm Intensity		Stage	NHC/NWS Actions	Mean Low Level Water Level (ft)		State Actions	Local Actions (Mobile and Baldwin Counties)
	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind (kts)			Dauphin Island Station ID: 8735180	Pensacola Bay Station ID: 8729840		
Sunday, August 31, 2008										
0:00	22.7	83.4	950	120	Cat 4 hurricane		0.86	0.8		
6:00	23.6	84.4	960	105	Cat 3 hurricane		0.99	0.88	Request cots, blankets, MRE's, towels, shower facilities, security, medical help, etc., all in support of evacuees.	
9:00					"	Hurricane Watch changed to Hurricane Warning for Cameron, Louisiana to Alabama/Florida border including New Orleans and Lake Ponchartrain. Tropical Storm Watch changed to Tropical Storm Warning for Alabama/Florida border to Ochlockonee River, Florida.	1.03	1.01		
12:00	24.8	85.5	961	100	"		1.35	1.14		
18:00	25.9	86.7	960	95	Cat 2 hurricane		1.73	1.72		
Monday, September 01, 2008										
0:00	26.9	87.7	953	95	"		1.73	1.44		
6:00	27.9	89	954	95	"		2.56	2.41		
9:00						Hurricane Warning changed to Tropical Storm Warning for Mississippi/Alabama border to the Alabama/Florida border. Tropical Storm Warning discontinued East of the Alabama/Florida border.	3.09	3.04		
12:00	28.8	90.3	955	95	"		3.54	3.69		
14:00					"		3.91	4.07 (max)		
17:00					"		3.96 (max)	4.01		
18:00	29.8	91.4	958	85	"		3.89	3.95		
Tuesday, September 02, 2008										
0:00	30.7	92.3	971	60	tropical storm		3.12	3.27		
3:00					"	All coastal warnings discontinued.	3.17	2.97		
6:00	31.4	93.1	981	40	"		2.95	2.65		
12:00	32.1	93.5	989	30	tropical depression		2.22	1.81		
18:00	32.7	93.9	993	20	"		1.5	1.38		
Wednesday, September 03, 2008										
0:00	33.2	93.9	995	20	"		1.5	1.57		
6:00	33.7	94.3	997	20	"		1.87	2.05		
12:00	33.8	94.4	997	20	"		1.43	1.52		
18:00	34	94.4	998	20	"		1.15	1.29		
Thursday, September 04, 2008										
0:00	34.3	94.1	998	15	"		1.5	1.56		
6:00	34.8	93.4	999	15	"		2.2	2.12		
12:00	36.2	92.3	1000	15	extratropical cyclone		1.46	1.55		
18:00	38.5	90.7	1000	20	"		0.85	0.95		
Friday, September 05, 2008										
0:00					"		1.29	1.31	State EOC deactivation. Termination of Local State of Emergency.	
12:00					"		1.29	1.31	All buses have left Jefferson County.	

Hurricane Ike Timeline for Alabama

Date/Time (GMT)	Storm Location		Storm Intensity		Stage	NHC/NWS Actions	Mean Low Level Water Level (ft)		State Actions	Local Actions (Mobile and Baldwin Counties)
	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind (kts)			Dauphin Island Station ID: 8735180	Pensacola Bay Station ID: 8729840		
Sunday, September 07, 2008										
0:00	21.2	70.3	947	115	Cat 4 hurricane		0.93	1.09		
6:00	21.1	71.6	947	115	"		2.03	1.97		
12:00	21	72.8	947	110	Cat 3 hurricane		1.82	1.92		
18:00	21	74	946	105	"		0.82	0.96		
Monday, September 08, 2008										
0:00	21.1	75.2	945	115	Cat 4 hurricane	Mobile NWS issues a Coastal Flood Warning. Risk of rip currents along coastal areas, minor beach erosion, 3-5 feet above normal	0.74	0.8		
6:00	21.1	76.5	950	100	Cat 3 hurricane		1.88	1.76		
12:00	21.1	77.8	960	85	Cat 2 hurricane		2.08	1.95		
18:00	21.2	79.1	964	75	Cat 1 hurricane		1.01	1.07		
Tuesday, September 09, 2008										
0:00	21.5	80.3	965	70	"		0.84	0.86		
6:00	22	81.4	965	70	"		1.75	1.69		
12:00	22.4	82.4	965	70	"		2.27	2.19		
18:00	22.7	83.3	966	65	"		1.3	1.39		
Wednesday, September 10, 2008										
0:00	23.1	84	968	65	"	Coastal Flood Warning. Risk of rip currents along coastal areas, minor beach erosion, 3-5 feet above normal tides.	0.89	0.97		Partial Activation of Mobile and Baldwin County EOCs.
6:00	23.4	84.6	964	70	"		1.58	1.7	State EOC Activates Level 3	
12:00	23.8	85.2	959	80	"		2.44	2.47		
18:00	24.2	85.8	958	85	Cat 2 hurricane		2.16	2.14		

Date/Time (GMT)	Storm Location		Storm Intensity		Stage	NHC/NWS Actions	Mean Low Level Water Level (ft)		State Actions	Local Actions (Mobile and Baldwin Counties)
	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind (kts)			Dauphin Island Station ID: 8735180	Pensacola Bay Station ID: 8729840		
Thursday, September 11, 2008										
0:00	24.7	86.4	944	85	Cat 2 hurricane	Coastal Flood Warning. Risk of rip currents along coastal areas, moderate beach erosion, 3-5 feet above normal tides.	1.75	1.76		
6:00	25.1	87.1	945	85	"		2.45	2.61		Emergency evacuation of over 40 residents from Baldwin County.
9:00					"	Tropical Storm Warning issued for Alabama/Mississippi border to Cameron	3.11	3.17		
12:00	25.5	88	946	85	"		3.85	3.82		
15:00					"	Tropical Storm Warning modified to Alabama/Mississippi border to Morgan City	4.19	4.29 (max)		
16:00							4.33 (max)	4.29		
18:00	25.8	88.9	952	85	"		4.11	4.15		
Friday, September 12, 2008										
0:00	26.1	90	954	85	"	Coastal Flood Warning. Risk of rip currents along coastal areas, moderate beach erosion, 3-5 feet above normal tides.	3.36	3.48		
6:00	26.4	91.1	954	90	"		3.53	3.53		
12:00	26.9	92.2	954	90	"		4.11	3.83		
18:00	27.5	93.2	954	90	"		3.61	3.41	Governor issues State of Emergency Proclamation.	
Saturday, September 13, 2008										
0:00	28.3	94	952	95	"		2.59	2.46		
6:00	29.1	94.6	951	95	"		2.56	2.3		
9:00					"	Tropical Storm Warning discontinued for Alabama/Mississippi Border to Morgan City	2.73	2.52		
12:00	30.3	95.2	959	85	"		2.93	2.79		
18:00	31.7	95.3	974	50	tropical storm		2.64	2.56		

APPENDIX G: PROJECT DVD (PDF OF REPORT, MAPS, AND COLLECTED DATA)