



FEMA

Prepared by: National Planning Center of Expertise
for Coastal Storm Damage Reduction
National Hurricane Program Office

**State of Mississippi
Post Storm Assessment: Hurricanes Gustav and Ike
Final Report – March 2010**

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

FINAL REPORT

Prepared for:

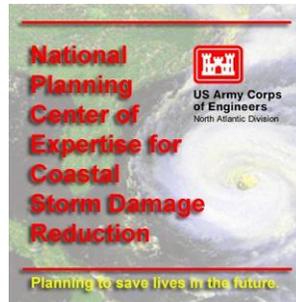
Federal Emergency Management Agency
National Hurricane Program



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®

March 2010

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 exceptions were Hurricanes Katrina and Rita in 2005), a Post Storm Assessment (PSA) of the HES products has been conducted to determine the accuracy of the HES products and foster improvement of their methodologies as warranted. The PSA also serves as a review of tools and products provided by the NHP, to ensure that these efforts are coordinated for maximum effect and efficiency.

This PSA for the State of Mississippi was conducted in response to Hurricane Gustav, which made landfall near Cocodrie, LA, as a Category 2 storm (on the Saffir-Simpson Hurricane Scale) on September 1 2008, and Hurricane Ike, which made landfall on Galveston Island, TX, as a Category 2 storm on September 13. Both storms reached a peak intensity of Category 4 with Gustav producing maximum sustained winds of 135 knots, and Ike producing maximum sustained winds of 125 knots, before weakening upon entering the Gulf of Mexico. Both storms were also notable for their large wind field.

Hurricanes Ike and Gustav provided an opportunity to answer several key questions regarding the NHC 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. Study teams consisting of representatives from FEMA, the U.S. Army Corps of Engineers (USACE), and Dewberry visited with these communities and individuals throughout the State of Mississippi. Meetings were conducted with representatives from the Hancock, Harrison and Jackson County Emergency Management Offices, the Mississippi Emergency Management Agency (MEMA). These meetings were conducted in each county emergency operations center (EOC) the week of June 22, 2009. Media representatives in the storm threatened area were also contacted to determine the extent of public information provided and whether they used any HES products. Three questionnaires were developed and utilized to capture pertinent data. Internet searches, interviews and contacts with other agencies were also conducted. All the collected data is compiled, analyzed and published in this report.

The main issues that were raised during the assessment along with recommendations for their improvement are listed in the following table:

Topic	Issue	Recommendation
Hurricane Evacuation Study	Hurricane Katrina changed the landscape of coastal Mississippi and invalidated much of the data in the 2002 Mississippi HES.	Conduct a complete update of the HES.
	Hurricane study products provide valuable information for evacuation timing and decision making but are sometimes misunderstood or underutilized by local emergency management agencies.	Emphasize the availability of HES study products in the study areas and provide training on their utilization.
	More training is needed for emergency management decision makers due to new technology innovations and turnover at the local level.	Keep the <i>Introduction to Hurricanes</i> planning course in Miami and consider offering it more frequently.
Technology and Technical Data Report	The HURREVAC software program is dependent on updated information after completion of a new study.	Hurricane Study Mangers should coordinate with the State to ensure that individual modules in HURREVAC are updated with current HES study data, especially clearance times.
	More training is needed at the State and local levels on HURREVAC, SLOSH and HAZUS.	FEMA and USACE, in cooperation with State and local agencies, should conduct training workshops for HURREVAC, SLOSH and HAZUS. Initiate training and develop training materials for HURREVAC 2010.
	Higher than expected surge heights have been occurring in coastal areas outside of the NHC warned areas.	Develop a tool to display potential surge areas for locations outside of the SLOSH predicted area.
	Currently, emergency managers do not have a method to assimilate the wealth of data in an HES Technical Data Report (TDR) in order to assess community vulnerability and make timely decisions.	Develop an easy to use GIS tool containing HES and other data to assist local emergency managers for planning and decision making.

Evacuation and Decision Making	Risk maps and evacuation zones vary in format and quality between HES study areas depending on the latest guidelines and standards used at the time of the product development.	Federal and State authorities should provide specific guidance for including inland counties in the HES process.
		NHP should develop decision assistance tools and materials to assist communities in the decision making process. LIDAR, GIS applications and FEMA's Map Modernization program should be considered when developing these tools.
Evacuation Roadway Network	Post-storm re-entry requires immense coordination between multiple local, State and Federal agencies and a clear, open line of communication to evacuees.	Update the Mississippi/Louisiana Bi-State Study to investigate the Comprehensive Hurricane Emergency Management Strategy (CHEMS) concept and new technologies to track real-time movement of population and assist with planning for re-entry issues.
	Tracking of population movement in real-time situation is very difficult.	
	Unanticipated traffic flows into Mississippi from Louisiana have caused traffic congestion.	
	Adequate fuel supply for evacuation and re-entry is a problem.	
Communication and Public Information	State and local officials are concerned that many people are still not taking appropriate protective actions, including evacuation in a timely manner, despite a relatively high level of hurricane vulnerability and hurricane history.	Update and expand public education campaigns and stress personal accountability from the evacuating public.
	Public expectations have been raised and the public has been heavily conditioned to rely on support from the Government in disaster situations.	
	Real-time information should be provided to the evacuating public in a timely manner.	Continue to expand the use of culturally modern tools such as Twitter, Facebook and web blogs.
	State and local emergency management seek more communication from the community during storm events.	Increase communication between the Hurricane Liaison Team (HLT), states and locals during the off-season. Provide support for locals to build relationships with states, local weather service offices, and the HLT to better exchange information during storm events.

Sheltering	More facilities should be made available as safe hurricane evacuation shelters in areas closer to the coast following inspections and concurrence by the appropriate parties.	Conduct a behavioral analysis in adjacent states to determine potential shelter needs from out-of-state evacuees and allow states to plan for in-state sheltering of residents.
	Evacuees from adjacent states have taxed shelter availability in the State.	

The findings exemplify that the HES data and products, although well known and readily available, were not always fully utilized in the decision making process. The use of the official evacuation zones from the HES was not widespread. Additionally, interview results indicated that the 2006 evacuation zones and clearance times for Hancock and Jackson counties, created outside of the HES process, were not utilized by local emergency management in their decision making process during Hurricanes Gustav and Ike. Many times, past experiences with previous storm events were the determining factor when making important evacuation decisions. More training on the HES products and how to best utilize them is sorely needed.

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1 INTRODUCTION

The 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, 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 and heights 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.

Following almost every significant storm since 1980 (the exceptions were Hurricanes Katrina and Rita), a 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 Mississippi 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 three and a half 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 Mississippi 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.

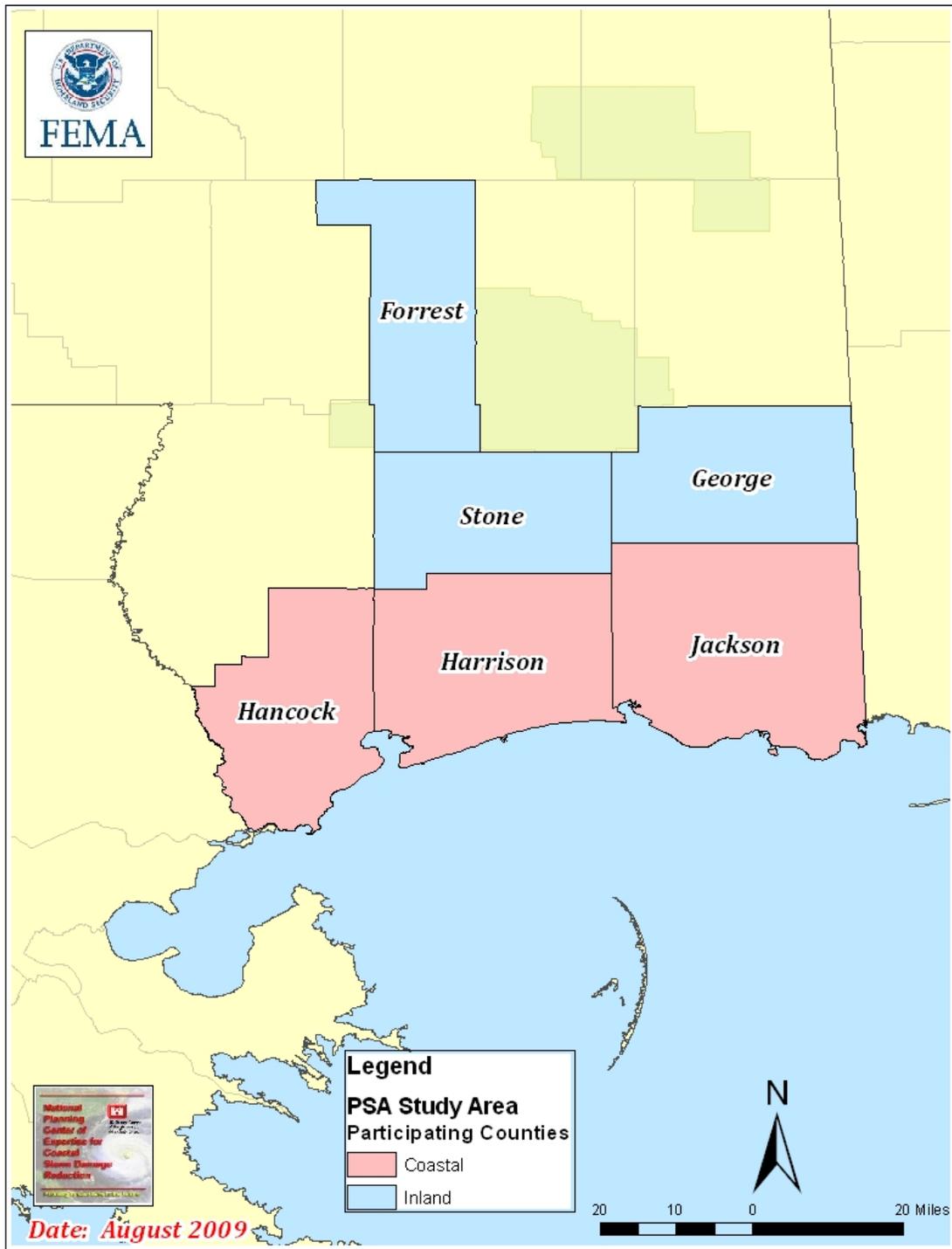


Figure 1-1: PSA Study Area

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 Hancock, Harrison and Jackson and the inland counties of Forrest, Stone, and George (Figure 1-1). These inland counties offered support to the coastal Mississippi counties during Hurricanes Gustav and Ike.

1.3 HURRICANE IMPACTS

1.3.1 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, Hurricane 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. Hurricane 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 Hurricane Gustav can be found online at http://www.nhc.noaa.gov/pdf/TCR-AL072008_Gustav.pdf.

Surge:

Moderate storm surge heights were observed throughout the coastal communities of Mississippi. At the Bay Waveland Yacht Club NOAA tide gauge, a storm tide of 10.93 ft was observed. Table 1-1 shows the maximum observed storm surge and storm tide for operating stations in the coastal counties. The storm tide represents the actual level of sea water resulting from the astronomic tide combined with the storm surge. Figure 1-2 shows the SLOSH model output of surge heights for Hurricane Gustav. The Hurricane Gustav rexfile was only produced for the New Orleans V5 (msb) SLOSH basin, which may explain the lower predicted surge values. The Mobile SLOSH basin was not run for Hurricane Gustav.

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

County	City/Town or Location	Storm Surge ¹	Storm Tide ²	SLOSH ³	Date/Time (UTC)	Beach Erosion
Jackson	Pascagoula NOAA	4.55	5.38	2.2	01/1300	Unknown
Jackson	Pascagoula Port Dock	5.69	6.59	2.1		Unknown
Hancock	Bay St. Louis	9.86	10.92	4.5	01/1618	Moderate
Hancock	Bay Waveland Yacht Club	9.89	10.93	4.5	01/1312	Unknown
Harrison	Back Bay of Biloxi USGS	7.30	8.17	3.1	01/1445	Unknown

1. Storm surge is in feet above Mean Lower Low Water (MLLW).

2. Storm tide is in feet above MLLW.

3. The SLOSH value is in feet and referenced to the National Geodetic Vertical Datum of 1929 (NGVD29). The value was taken from the SLOSH display program V1.61c. The rexfile used for Hurricane Gustav was provided by the National Hurricane Center as part of the SLOSH Display installation. The Hurricane Gustav rexfile was only provided for the New Orleans V5 (msb) SLOSH basin.

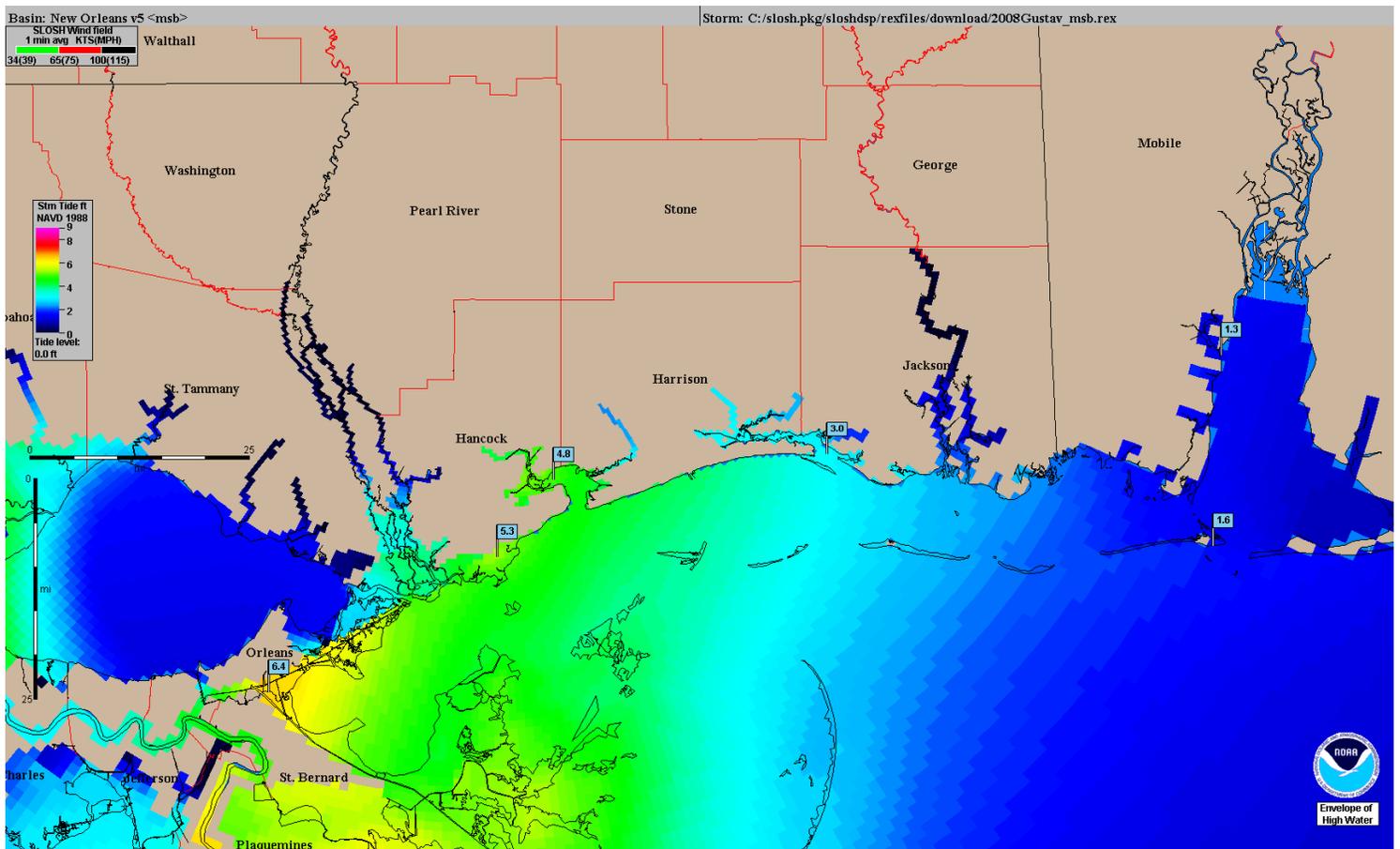


Figure 1-2: Projected Storm Surge Heights from the New Orleans SLOSH Basin for Hurricane Gustav

Wind:

The wind impacts in Mississippi from Hurricane Gustav were more significant in the inland counties of Mississippi than what were observed at the coast. Wind gusts greater than 60 mph were observed in the city of Natchez. These widespread wind gusts caused extensive damage throughout southwest Mississippi. Tropical storm force gusts were observed in other inland counties, with the cities of Jackson, Vicksburg and Hattiesburg observing minor damage from these gusts. Table 1-2 shows observed wind speeds and gusts in knots for all stations operating in Mississippi 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 several advisories.

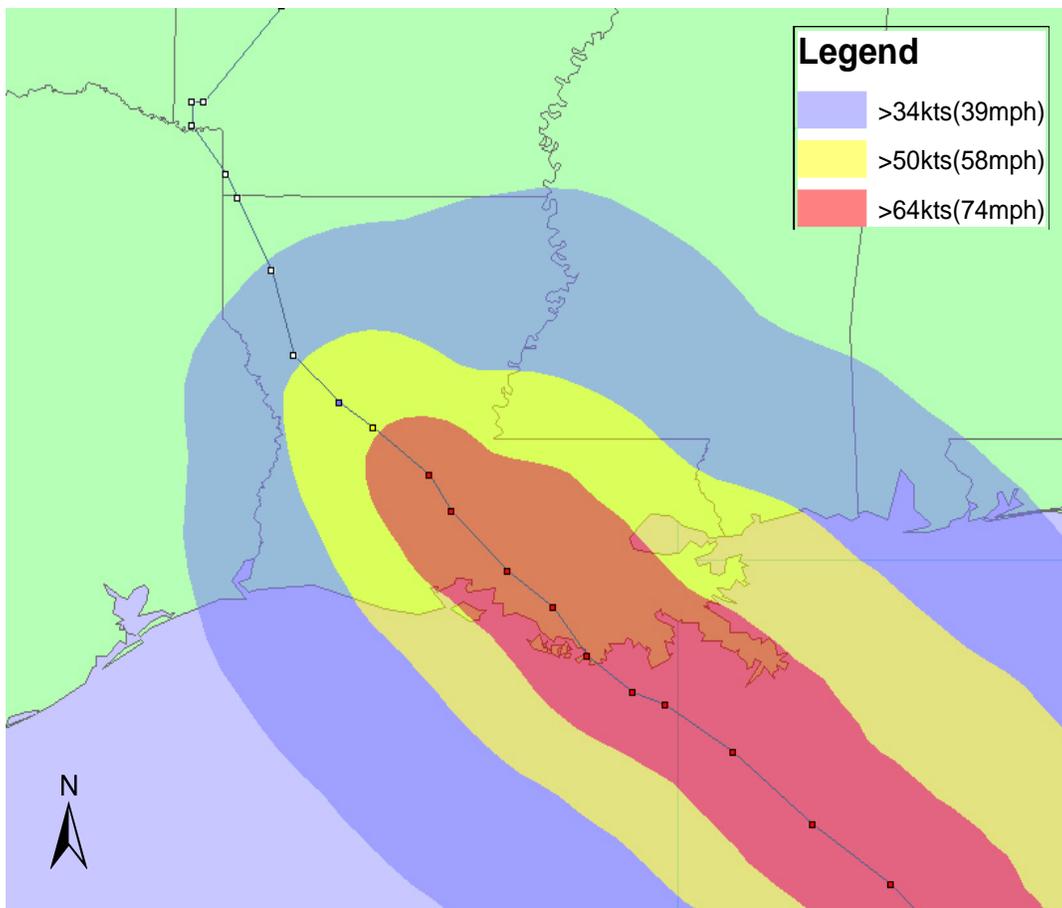


Figure 1-3: Past Wind Swath of Hurricane Gustav from HurricaneMapping.com

**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					
KBIX – Biloxi Air Force Base 30.43N 88.92W	01/1114	1001.4	01/1519	39	53
KCBM – Columbus 32.27N 88.35W	01/2205	1011.5		21	
KGLH – Greenville 33.28N 90.98W	03/2323	1003.7	02/1940	25	37
KGPT – Gulfport Airport 30.40N 89.07W	01/1053	1000.7	01/1439	45	64
KGWO – Greenwood 33.29N 90.05W	04/0045	1005.6	02/1452	26	32
KHBG – Hattiesburg 31.16N 89.15W	01/1145	1004.4	02/1310	29	41
KHEZ – Natchez ¹ 31.36N 91.17W	01/2145	997.3	01/1900	24	38
KJAN – Jackson International 32.19N 90.04W	02/0056	1005.8	02/0227	25	39
KMCB – McComb Airport 31.18N 90.47W	01/2023	998.3	01/2339	28	47
KMEI – Meridian 32.20N 88.44W	01/2145	1009.1	01/1800	21	30
KPIB – Pinebelt 31.28N 89.20W	01/1845	1006.1	01/2100	20	29
KPQL – Pascagoula Airport 30.46N 88.53W	01/1053	1003.0	01/1802	27	40
National Ocean Service (NOS) Sites					
WYCM6 – Bay Waveland Yacht Club 30.33N 89.33W 10.0m	01/1312	997.7	01/1442	47	58
8741003 - Petit Bois 30.22N 88.50W	01/1036	1000.6	01/1418	39	54
8741094 – Pascagoula Port Rear Range 30.34N 88.51W	01/1006	1002.1	01/1018	41	52
8741501 – Pascagoula Port Dock C 30.35N 88.57W	01/1100	1002.1	01/1730	38	51
8744707 – Gulfport Outer Range 30.23N 88.98W	01/1100	998.2	01/1424	47	60

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed		
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC) ^a	Sustained (kt) ^b	Gust (kt)
8745651 – Gulfport West Pier 30.33N 89.08W	01/1100	999.2	01/1430	47	62
Remote Automated Weather Stations (RAWS)					
BDEM6 – Bude 31.41N 90.85W			01/2105	20	44
BLCM6 – Black Creek 30.85N 89.03W			01/1400	17	42
CYSM6 – Copiah 31.95N 90.38W			02/0009	20	34
MPAM6 – Pike County 31.18N 90.48W 10.0m			02/0109	27	45
SNCM6 – Sandhill Crane NWR 30.45N 88.66W 10.0m			01/1551	16	37
Other Government Agencies					
BBM6 – Back Bay of Biloxi USGS 30.42N 88.89W 3.0m			01/1445	30	44
GDXM6 – Grand Bay NERRS 30.36N 88.42W 10.0m	01/0745	1004.0	01/1430	33	41
GRPL1 – Grand Pass USGS 30.12N 89.25W	01/1145	991.6	01/1145	56	
OFBM6 – Old Fort Bayou USGS 30.42N 89.83W 3.0m			01/1515		54
Public/Other					
PRKNS – Gautier GCCC 30.39N 88.65W 10.0m	01/1015	1002.0	01/1414	36	
WLOXT – Biloxi WLOX-TV 30.39N 89.00W 10.0m	01/1045	1001.0	01/1415	33	

a Date/time is for sustained wind when both sustained and gust are listed.

b Sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min.

Tornados:

Numerous tornados were reported by the National Weather Service. None of these tornados were extremely powerful, with all being rated as either an EF0 or EF1 on the Enhanced Fujita (EF) scale. Reports indicate that several homes were destroyed, but the majority of the damage was minor, including damage to roofs, small and unstable structure, and downed trees and power lines.

Rainfall:

The most noticeable affects from Hurricane Gustav were a result of the heavy rains that fell over southwest Mississippi. In Washington County, it is estimated that close to 2,000 homes were flooded. In other counties, reports of washed out bridges, damages roads, and crops damages by the heavy rains were reported. Figure 1-4 and Table 1-3 show the total rainfall from Hurricane Gustav.

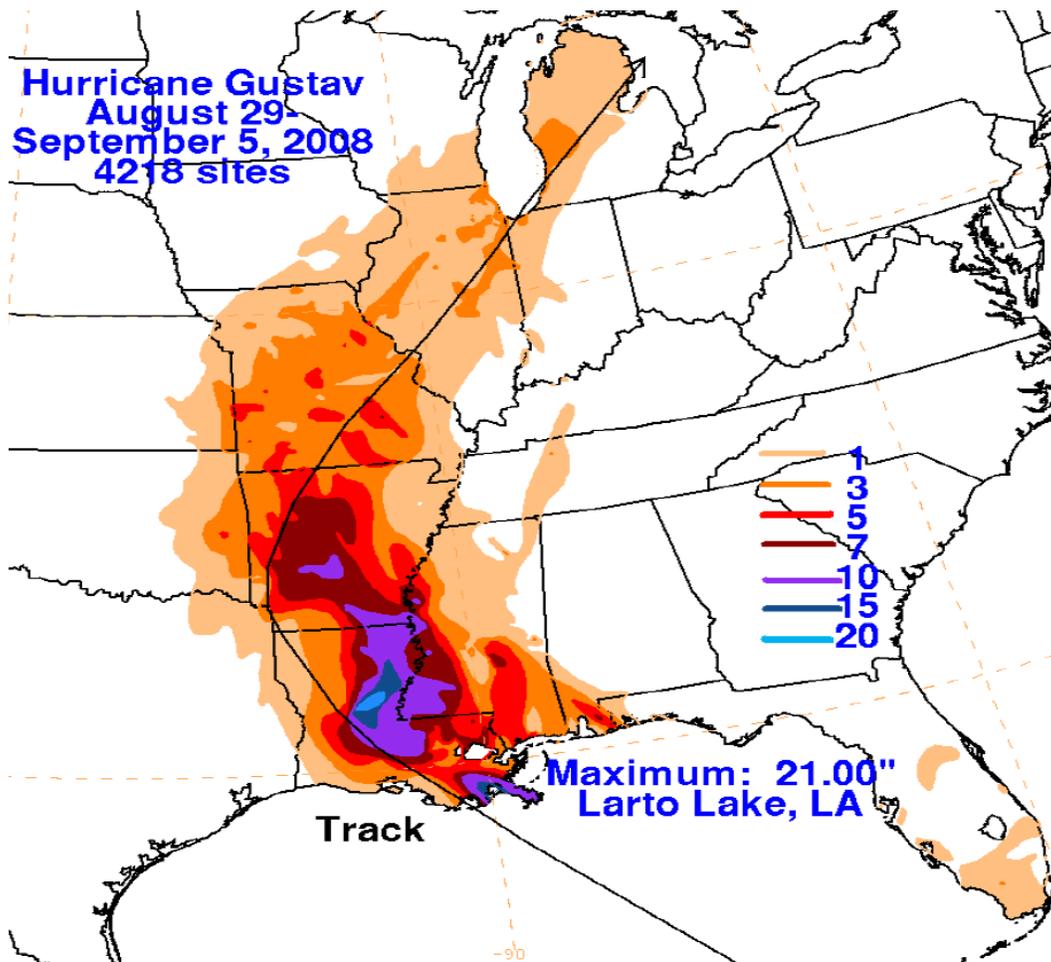


Figure 1-4: Storm Total Rainfall Map for Hurricane Gustav
http://www.nhc.noaa.gov/pdf/TCR-AL072008_Gustav.pdf

Table 1-3: Hurricane Gustav Total Rainfall

City/Town	Lat/Lon	County	Rainfall (in)
Pascagoula	30.24 -90.47	Jackson	4.61
Ocean Springs	30.40 -88.80	Jackson	3.27
1 N Ocean Springs	30.41 -88.80	Jackson	9.70
5 SW Hattiesburg	31.31 -89.31	Forrest	5.85
Hattiesburg	31.31 -89.31	Forrest	6.42
8.20 WSW Hattiesburg	31.31 -89.31	Forrest	6.35
0.7 NNW Hattiesburg	31.31 -89.31	Forrest	4.94
Hattiesburg	31.31 -89.31	Forrest	4.62
Perkinston	30.15 -89.14	Stone	3.77
Wiggins	30.85 -89.14	Stone	3.03
Merrill	30.97 -88.72	George	3.67
Agricola	30.80 -88.52	George	3.19

*from the Post-Tropical Cyclone Reports of Hurricane Gustav from NWS New Orleans, http://www.srh.noaa.gov/lix/?n=psh_gustav and Mobile, http://www.srh.noaa.gov/mob/?n=gustav_psh.

1.3.2 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 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. Hurricane 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. Hurricane Ike crossed Cuba overnight, and emerged into the Caribbean Sea the morning of September 8th. For the next 24 hours, Hurricane 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. Ike continued to grow and 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. 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. The full NHC Tropical Cyclone Report for Hurricane Ike can be found online at http://www.nhc.noaa.gov/pdf/TCR-AL092008_Ike.pdf.

Surge:

As the hurricane grew in size, the large wind field pushed water towards the coastline well before Hurricane Ike's center made landfall. The storm surge and flooding from Hurricane Ike was nearly the same as Hurricane Gustav, despite the fact that Hurricane Ike was several hundred miles to the west of Hurricane Gustav's track. Moderate erosion was noted at several sites along the coast, due mainly to large breaking waves. Table 1-4 shows the maximum recorded surges by National Ocean Service (NOS) tide gauges. No SLOSH runs were completed that would show surge heights in Mississippi.

Table 1-4: Maximum Storm Surge and Storm Tide during Hurricane Ike

County	City/Town or Location	Storm Surge	Storm Tide	Date/Time (UTC)	Beach Erosion
Harrison	Gulfport	3.62	4.46	11/1142	Moderate
Hancock	Bay Waveland Yacht Club	5.81	7.62	12/1342	Moderate
Jackson	Pascagoula NOAA	4.07	5.43	12/1306	Unknown

1. Storm surge is in feet above MLLW.
2. Storm tide is in feet above MLLW.

Table 1-5: 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)
KPQL – Pascagoula Airport 30.46 -88.53	12/2206	1010.8	11/1621	24	34
KMCB – McComb Airport 31.18 -90.47	12/2310	1007.5	13/1711	23	30
KGPT – Gulfport Airport 30.40 -89.07	12/2122	1009.1	12/1236	25	39
KASD – Slidell Airport 30.35 -89.82	12/2149	1007.5	12/1925	28	39
KBIX – Biloxi Air Force Base 30.43 -88.92	12/1018	1010.4	12/1138	28	32
KNBG – Belle Chasse Naval Air Station 29.82 -90.03	12/2252	1006.5	12/1149	30	46
WYCM6 – Bay Waveland Yacht Club 30.33 -89.33	12/2136	1008.4	12/1118	19	23

a Date/time is for sustained wind when both sustained and gust are listed.

b Sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min.

Wind:

During Hurricane Ike, Mississippi had no sustained winds that were observed greater than tropical storm force (34 kts). Several locations did observe peak gusts close to or greater than 40 kts. Table 1-5 shows observed wind speeds and gusts in knots for all stations operating in Mississippi 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 several advisories.

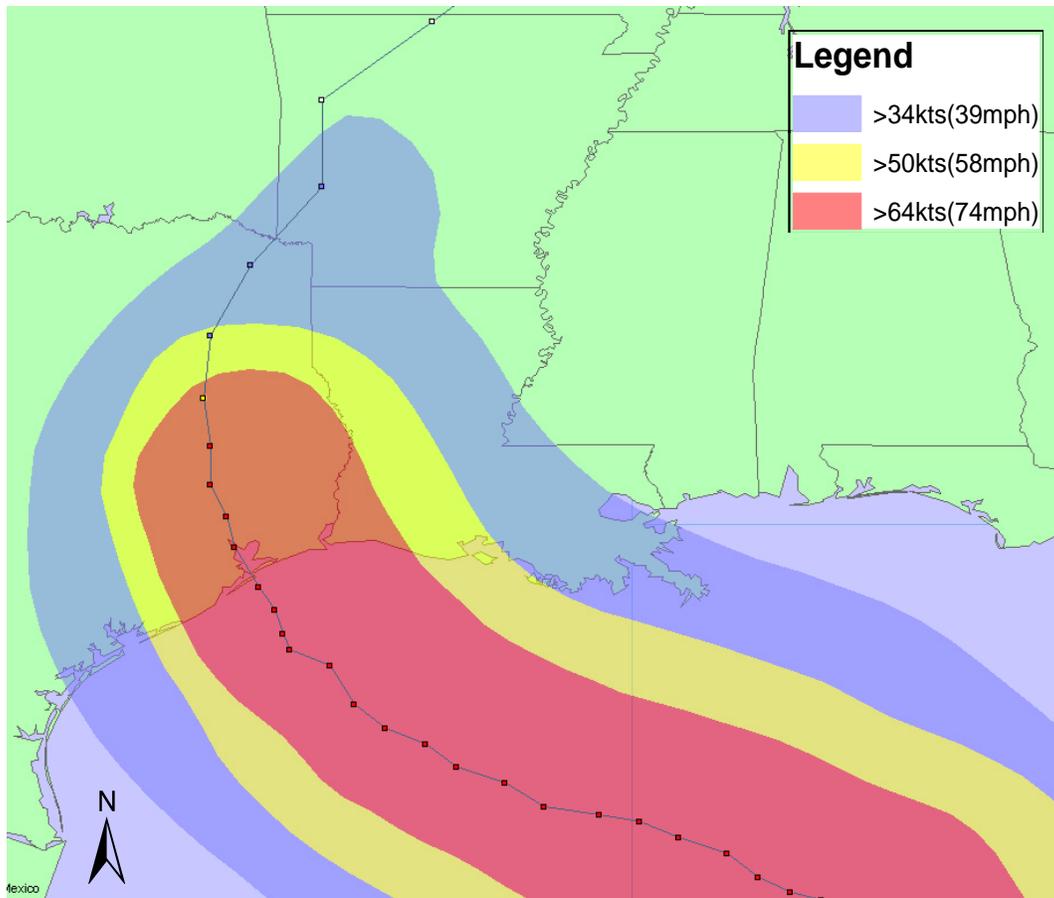


Figure 1-5: Past Wind Swath of Hurricane Ike from HurricaneMapping.com

Tornados:

No tornados were reported in the state of Mississippi as a result of Hurricane Ike.

Rainfall:

No significant rainfall was measured in Mississippi as a result of Hurricane Ike, as illustrated in Table 1-6 and Figure 1-6.

Table 1-6: Hurricane Ike Total Rainfall

City/Town	Lat/Lon	County	Rainfall (in)
Gulfport	30.38 -89.07	Harrison	0.03
Pascagoula	30.36 -88.55	Jackson	0.12

*from the Post-Tropical Cyclone Report of Hurricane Ike from NWS New Orleans,
http://www.srh.noaa.gov/lix/?n=psh_ike.

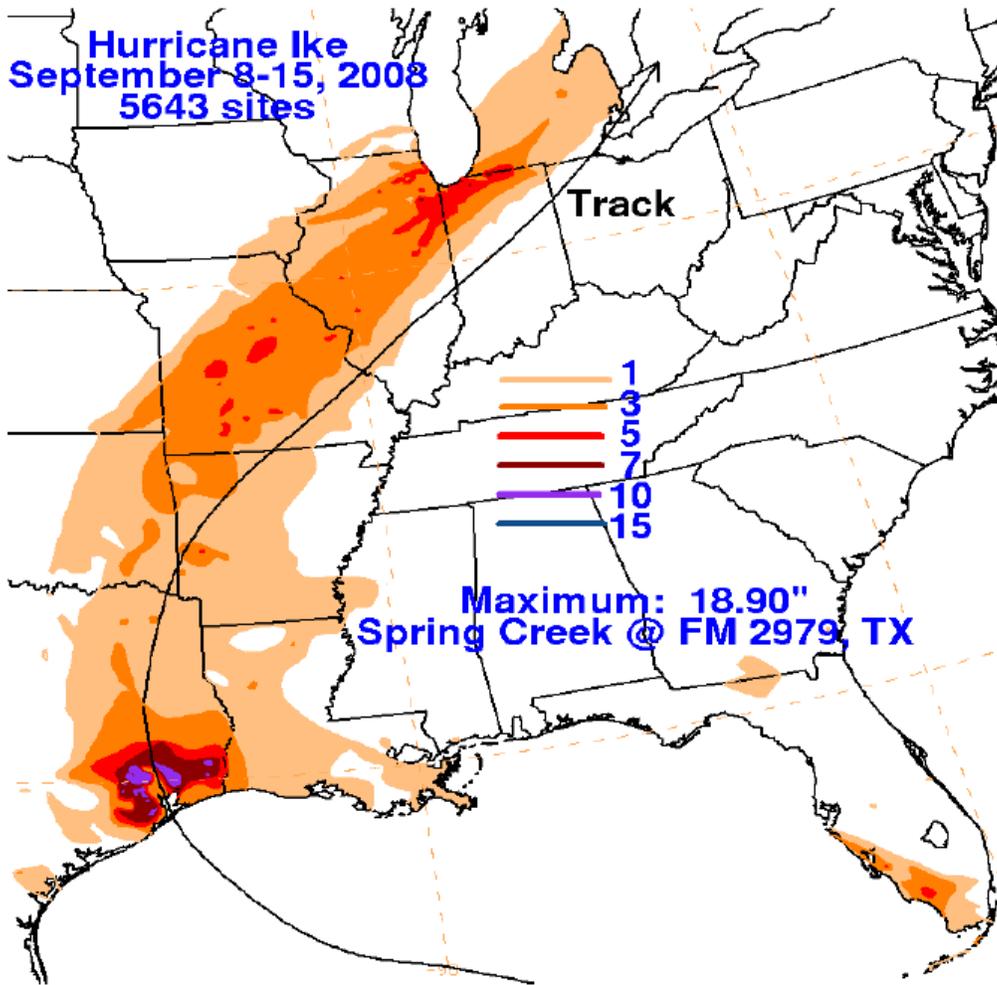


Figure 1-6: Storm Total Rainfall Map for Hurricane Ike
http://www.nhc.noaa.gov/pdf/TCR-AL092008_Ike.pdf

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 Hurricanes Gustav and Ike events. These organizations were critical to the PSA process as they provided much of the information needed to determine the utilization and effectiveness of the HES products used. The HES products and clearance times developed during the HES process are the main data and tools utilized by state and local governments in the decision making process 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 can best be measured during an actual event. Recommendations for improvements and additions were solicited.

2.1 KICKOFF MEETING

The joint kickoff meeting to discuss the PSA of Hurricanes Ike and Gustav for Mississippi and Alabama was held in the Emergency Operations Center of Mobile County, Alabama on May 7, 2009. 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. The meeting was hosted by Mobile County EMA and chaired by John Eringman, USACE Mobile District HES Study Manager. However, local emergency managers from the coastal counties in Mississippi were unable to attend the kickoff meeting.

2.2 INTERVIEW QUESTION DEVELOPMENT

Three sets of PSA questionnaires; state, local, media, were developed by FEMA, USACE and Dewberry for the interview and data collection process. The questionnaires for the Hurricane Gustav and Ike PSA were modified and updated from past versions of the questionnaire utilized in prior PSAs. 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 kickoff meeting. 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.

Table 2-1: Groups and Agencies Contacted during the PSA of Hurricanes Gustav and Ike for Mississippi

Emergency Management Agencies
Federal Emergency Management Agency (FEMA)
United States Army Corps of Engineers – Mobile District
Mississippi Emergency Management Agency (MEMA)
Hancock County Emergency Management Agency
Harrison County Emergency Management Agency
Jackson County Emergency Management Agency
Stone County Emergency Management Agency
George County Emergency Management Agency
Forrest County Emergency Management Agency
Public Agencies
Mississippi Department of Human Services (MDHS)
Mississippi Department of Health (MSDH)
Mississippi Board of Animal Health
Mississippi State University (MSU)
Mississippi Department of Transportation (MDOT)
American Red Cross (ARC)
Media
Sun Herald News

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

PSA 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.

Four local meetings were conducted for the state of Mississippi. 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 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, Hancock, Harrison and Jackson County Emergency Management personnel used most of the hurricane products available for evacuation decisions with the exception of ETIS. HURREVAC and Storm Surge Maps were the most useful products in providing information to the local and civic officials. HURREVAC was used to track the storm and its associated wind fields and the tide module was used to monitor water levels. All three counties moved people out of the storm surge areas based on storm surge maps, historic flood patterns, and lessons learned from previous storms. Several critical facilities were impacted in each county. Hancock County lost their E-911 radio tower and the use of their county government facility. Harrison County had port damage on the harbor, damage to the sewer pump stations and road damage to several state, county and city roads. Jackson County received some storm surge flooding damage to its coastal areas and low lying bayous.

Table 3-1: Local Interview Meeting Locations

Date	Time	Event	Location	Interviewer
June 22, 2009	1:00 p.m.	Hancock County Local Interview	Hancock County EOC 6069 Cuevas Town Road Kiln, MS 39556	Vic Jones, FEMA Representative
June 23, 2009	8:30 a.m.	Harrison County Local Interview	Harrison County EOC 1801 23 rd Ave. Gulfport, MS 39501	Vic Jones, FEMA Representative
June 23, 2009	1:00 p.m.	Jackson County Local Interview	Jackson County EOC 600 Convent Street Pascagoula, MS 39567	Vic Jones, FEMA Representative
June 24, 2009	1:00 p.m.	Mississippi Inland counties	Stone County Courthouse 323 Cavers Ave. Wiggins, MS 39577	Vic Jones, FEMA Representative

A mandatory evacuation order was issued by the Governor of Mississippi in conjunction with the local authorities in these three counties. River/lake fronts, beach fronts and flood prone areas were evacuated. The order was issued in a timely manner and was determined politically due to the history of flooding in the area. Some minor language barriers were experienced with Vietnamese and Spanish speaking people. All counties stated they would like to be involved with the HLT with conference calls involving other states and counties for coordination and decision making purposes during storm events.

All three counties worked as a cohesive group and coordinated with the tier counties of Forrest, Stone and George, inland counties located about 60 miles from the coast. While Hancock County reported very few problems, Harrison and Jackson counties reported several problems with communication and heavy traffic issues during the evacuation. They felt that communication and coordination between Local and State agencies could be improved. Evacuees from Louisiana heading east on I-10, created traffic congestion and bottlenecks with the Mississippi evacuees evacuating north on Highway 49 and I-59. Forrest County reported that the I-59 contra-flow was uncoordinated and disorderly.

Hancock County opened one shelter, housing 250 people. Harrison opened nine shelters, five by the Red Cross and four by the county. Jackson County opened three regular shelters, one special needs and one pet shelter. The Red Cross also opened five shelters in Jackson County. The main issue during post storm recovery was re-entry. Many evacuees were reported to be shelter hopping from state to state, creating problems with tracking those sheltered.

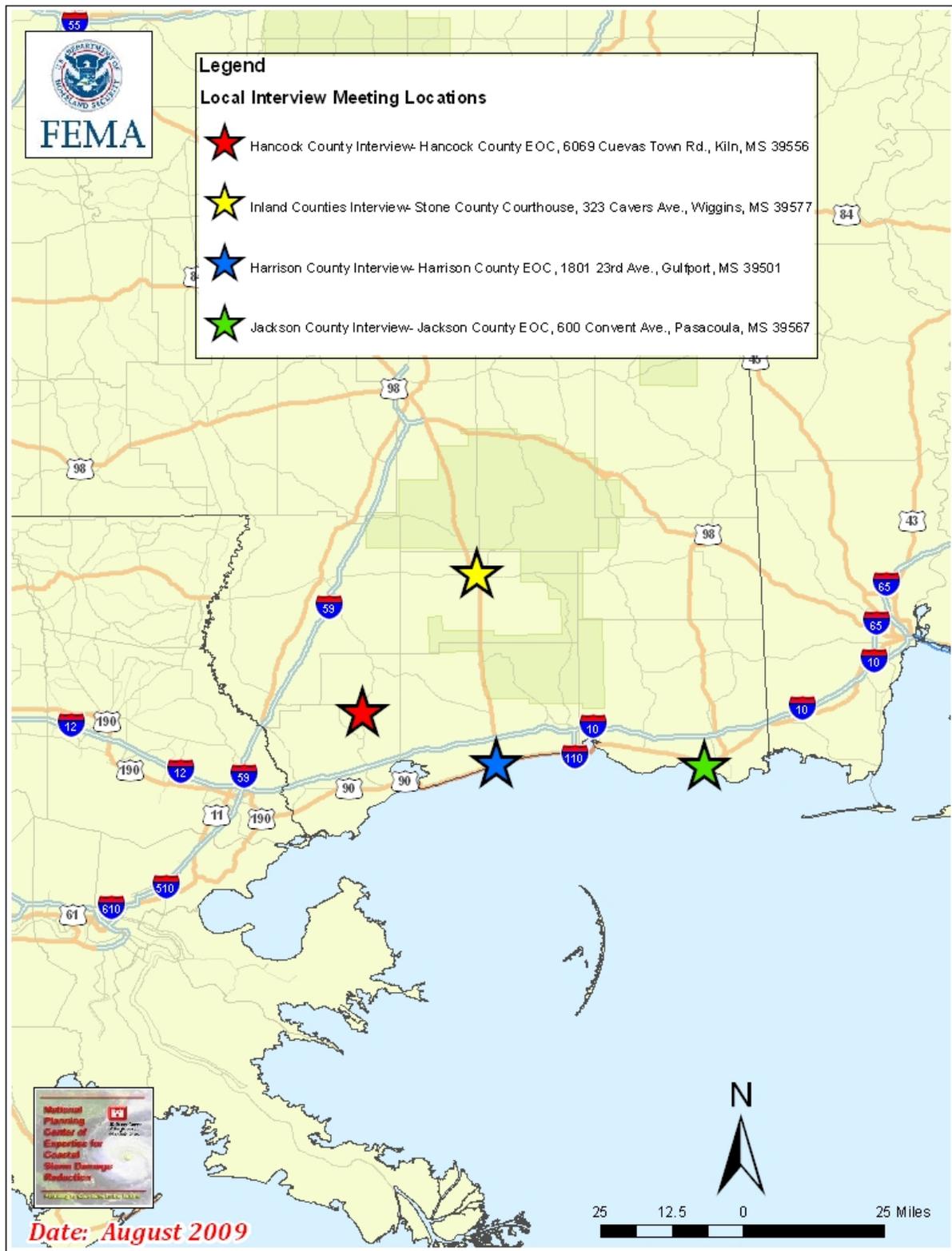


Figure 3-1: Map of Local Interview Meeting Locations

Summary—Hurricane Ike:

Almost immediately following Hurricane Gustav, the State of Mississippi and its coastal counties started preparing for Hurricane Ike while still hosting many out-of-state evacuees from the previous storm. These evacuees were part of the agreement between the States to “host” neighboring State’s evacuees. Tracking further west than Hurricane Gustav, Hurricane Ike initially appeared to present a less threatening situation to Jackson, Harrison and Hancock counties than Hurricane Gustav. However, as the hurricane grew in size, the large wind field pushed water towards the coastline bringing storm surge and heavy beach erosion to the coastal counties well before Hurricane Ike’s center made landfall in Texas.

All three counties worked as a cohesive group and coordinated with the inland counties of Forrest, Stone, and George. The NWS conducted daily webinars to keep the agencies informed of the storms projected path and associated hazards. Emergency management directors were notified of the potential for higher than normal tides, possible surge and coastal flooding prior to and throughout the event. The counties also monitored local tide gauges and utilized HURREVAC’s tide module to keep track of rising water levels.

Coastal Flood Warnings were first issued on Wednesday, September 10, 2008 and continued through Saturday, September 13, 2008. These coastal flood warnings, presented in the NWS Hurricane Local Statements, reflected three to five feet above normal tides on Wednesday, which increased to six to eight feet above normal on Thursday and remained anomalously high into Saturday before slowly abating.

Hurricane Ike prompted the three coastal counties to open their EOC’s under partial activation. The County opened one Red Cross shelter during Hurricane Ike, while still housing Louisiana evacuees from Hurricane Gustav. Harrison County reported surge damage along the coast and inner harbors. They did not report any openings of shelters for Hurricane Ike. Jackson County had several road closures due to flooding. Jackson County opened a safe haven at the Gautier Community Center for coastal evacuees.

3.3 OBSERVATIONS REGARDING NHP PRODUCTS AND TOOLS

- The NHP should create additional materials and brochures for outreach and public relations.
- 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.
- Keep the *Introduction to Hurricanes* planning courses for EM Directors in Miami at the NHC.
- Develop a start to finish shelter tracking system that can be monitored in real-time.
- Develop a geo-coded debris tracking database tool in GIS.
- Develop a damage assessment mapping tool.
- Develop procedures and funding programs to collect surge, and wind data collection immediately following an event.
- Conduct additional training for HURREVAC, HAZUS and SLOSH.
- Develop a user-friendly training module for the SLOSH Model.

- Develop training modules on the availability and utilization of HES Products.
- Develop guidance for providing more pet shelters co-located with general population shelters.
- Develop “Real-Time” traffic modeling/tracking systems for State and local authorities use.

3.4 OTHER OBSERVATIONS NOTED

- Improved communication/coordination between local, state and federal participants is imperative.
- Local EMA’s want the HLT to contact them directly during storm events. They want to be involved in the HLT conference calls.
- The public has been conditioned to rely on the federal government for assistance. This practice is not sustainable. Emergency management should stress the public’s personal responsibility for their preparedness and evacuation.
- Programs and funding are needed to help retrofit critical facilities for shelters and other uses.
- Better coordination is needed and more uniformity from state to state during evacuations. The ELT once provided this service.
- A State to State shelter tracking program showing locations, capacities and availability is needed.
- Evacuation programs need a change of philosophy. Each state should be responsible for managing its own evacuees. State “evacuee hosting” programs should be re-examined.
- 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.
- Local emergency management agencies would like to offer their input for improving FEMA’s mitigation programs.
- FEMA reps need to stay on site longer with fewer personnel changes in order to prevent interruptions to the post-storm recovery process.
- Consider holding a conference to connect coastal directors from the Gulf States and the Atlantic for idea sharing and coordination.
- Find funding sources to retrofit and build shelters with higher wind load ratings. East-West evacuation routes (I-10) can serve as viable options in some areas to support North-South evacuation routes. Too often these routes are ignored when developing evacuation routes.
- Shelter usage was low throughout the risk and host areas.

3.5 MEETING PHOTOS



Figure 3-2: Photos from Local Interviews

4 STATE INTERVIEWS

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 Mississippi 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 local and Federal Government officials, and ideas for improved tools and products that would be useful in future events.

4.1 INTERVIEW PROCESS

A PSA study team consisting of representatives from FEMA, the Corps of Engineers, and Dewberry visited with state officials at the Mississippi State EOC in Pearl, Mississippi. The FEMA representative led the meeting. Dewberry was retained to accompany the study team and document all relevant findings. Meeting photos are presented in Section 4.3.

Participants included State Emergency Management personnel, highway patrol officers, Red Cross shelter personnel, Board of Animal Health, Department of Transportation, Department of Health, and Department of Human Services. A list of meeting participants can be found in Appendix A.

4.2 INTERVIEW RESULTS

State of Mississippi Summary – Hurricane Gustav:

The State of Mississippi PSA Interview was well attended with approximately 14 people participating. Most of the issues discussed were about Hurricane Gustav because Hurricane Ike was considered by most in attendance to be a non-event in Mississippi. During Hurricane Gustav, the State EOC was fully activated. The most important products used for decision making by the State were HURREVAC and WebEOC. The least useful were ETIS and SLOSH. Most participants agreed that a new HES study is needed as the current HES was completed prior to Hurricane Katrina and the Mississippi landscape was totally altered by that event. As a result of the post-Hurricane Katrina study to update the clearance times that was conducted in 2006 under the direction of the Mobile District of the USACE, Jackson and Hancock Counties made revisions to their evacuation zones (Figure 6-4) and clearance times for these zones were developed. There is no evidence that these new maps were ever “officially” adopted, printed and distributed to the public. Harrison County retained the same evacuation zones from the previous HES. Also, ETIS was discussed and the need to re-vitalize the ELT and the ETIS Model was mentioned as a need. Consensus prevailed that FEMA’s 406 Hazard Mitigation Program is broken because of the difficulty and lengthy process of obtaining funding to retrofit structures for use as shelters. The State was involved in conference calls with all participating authorities before, during and after Hurricane Gustav.

The two major issues during Hurricane Gustav were evacuation and sheltering. Mississippi opened 114 Red Cross shelters and four special needs shelters, housing 14,280 and 287 people respectively. The primary problems in the shelters were location confusion, overcrowding, unanticipated medical issues and that many of the evacuees had no money with which to return home. The issue of “Host” State evacuee operations was discussed and the general consensus was that each State should make plans to take care of their individual residents as much as possible.

The evacuation of Louisiana began at 6:00 a.m. on August 29 by reversing the roadways on I-10 into Mississippi. The decision for road reversal was made by both Governors. However, due to the immense congestion and bottlenecks that occurred on I-10, the contra-flow actions were discontinued. Contra-flow was also issued on Interstate Highways 55 and 59.

State of Mississippi Summary – Hurricane Ike:

The State EOC was activated for Hurricane Ike. However, this storm was not heavily emphasized during the interview process. The State considered the storm to be a relative non-event for Mississippi. The interview questionnaires garnered very few responses related to Hurricane Ike.

4.3 OBSERVATIONS REGARDING NHP PRODUCTS AND TOOLS

- ETIS, or a similar tool, needs to be reconsidered and enhanced to incorporate new technologies.
- Should conduct a total update of the HES for Mississippi as the effects of Hurricane Katrina have totally invalidated the previous HES data.
- Need to provide more training on HURREVAC now that HURREVAC 2010 is available.
- Should develop pet sheltering guidelines and Standard Operating Procedures (SOP).
- Should develop a state re-entry plan which can easily be communicated with host states.
- Guidance, procedures and funding for re-entry planning should be provided.

4.4 OTHER OBSERVATIONS NOTED

- Changes are needed in the mitigation program to improve and simplify FEMA’s mitigation grant process.
- There is interest in using HAZUS as a planning tool, however it is a complex program and more training is needed.
- More portable signage is needed to provide the evacuating population with up-to-date information.
- A majority of the issues faced by Mississippi in shelters during Gustav were caused by out-of-state evacuees from Louisiana.
- Evacuating states must provide assistance (shelter managers, supplies, resources, etc.) to host states during events.

4.5 MEETING PHOTOS



Figure 4-2: Photos from the State Interview in Pearl, Mississippi

5 MEDIA INTERVIEWS

A media interview meeting was scheduled during the PSA process to assess how the media coordinates and communicates with both the local EOC but also how hurricane emergency information and evacuation notices are conveyed to the public. The majority of the media outlets along the Gulf coast of Mississippi were invited to the meeting by the Harrison County emergency management office. 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. Only one media representative attended the meeting and he was from the local newspaper.

The media 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. Having only one representative from the media was in attendance may not provide a total perspective of the interaction between the EOC and the media.

5.1 INTERVIEW PROCESS

A PSA study team consisting of representatives from FEMA, the Corps of Engineers, and Dewberry met with the media representative from Biloxi who observed and/or reported on Hurricanes Gustav and Ike throughout the directly impacted areas. The FEMA representative led the meeting. Dewberry was retained to accompany the study team, document all relevant findings and assist when necessary. A meeting photo is presented in Section 5.3.

The Mississippi Media Interview was held at the Harrison County EOC at 1801 23rd Ave in Gulfport, Mississippi. The meeting was facilitated by Vic Jones from FEMA with assistance from Rupert Lacy, EOC Director for Harrison County. Appendix A lists those individuals who attended the meetings.

5.2 INTERVIEW RESULTS

Mississippi Local Media Summary – Hurricane Gustav and Hurricane Ike:

During the two storm events, several of the local media representatives spent time in the State EOC in Jackson, Mississippi. Due to the many available Public Information Officers there, receiving and distributing information to the public was done efficiently. Also, the likelihood of power outages was lower at the State EOC than in the coastal counties.

The one media representative expressed that he had an excellent relationship with all the EOCs but hoped to foster more personal relationships with each of the local emergency management directors. Information is primarily disseminated through e-mail and newspaper web blogs during the hurricane season. The newspaper's website and blog are the primary location for the public to find information on the storms. The one media representative reported that the main issue of concern for the public is the decision whether or not to evacuate.

The representative has no problem explaining the difference between evacuation and storm surge zones and stated that Emergency Management offices are keeping them abreast and well informed about mitigation efforts in Mississippi. In general, the one representative was very pleased with their relationship with the emergency management agencies.

During post storm recovery, information about re-openings of businesses, restaurants, airports, stores, etc. is vital. The media always sends at least one person to the State EOC to keep information flowing and have plans in place for continued newspaper distribution during and after disasters. State and local EOCs involve the media in post storm meetings.

The media would like more access to FEMA and State level officials after the storm. Relationships with local Emergency Management are good but more pre-storm access and interview opportunities with State and FEMA were recommended.

5.3 OBSERVATIONS NOTED

- 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 and may attempt to this the next time a storm threatens.
- 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.
- 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 for broadcast media during storm events.

5.4 MEETING PHOTO



Figure 5-2: Photo from the Media Interview in Harrison County

6 POST-STORM DATA COLLECTION

Available post-storm data was collected from meetings with affected communities as well as questionnaire responses, literature/internet searches and from contacts with relevant agencies. This data was used to analyze the availability, accuracy and utilization of the HES products and tools, and to identify where gaps in data and information may exist. Issues discussed consisted of whether and how HES products were utilized, how accurate they were during Hurricanes Gustav and Ike and if the users had recommendations for improving or enhancing the products. The components of the Mississippi HES are listed along with their dates of completion in Table 6-1.

Data were collected on 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.

Table 6-1: Age of Mississippi HES Components

Mississippi HES	
HES Component	Completion Date
SLOSH Model (MS Sound Basin)	1999
Surge Maps	1999
Vulnerability Analysis	1999
Behavioral Analysis	2000
Transportation Analysis	2001
Technical Data Report (TDR)	2002
Interactive CD	2002

6.1 VULNERABILITY DATA

The vulnerability analysis of the HES identifies the population potentially at risk to hurricane impacts. The vulnerability related data for Hurricanes Gustav and Ike was gathered from the interview questionnaires and several phone interviews with different personnel in the EOCs of Hancock, Harrison and Jackson counties. The general opinion of those interviewed was that these two hurricanes were minor events. Hurricane Gustav was primarily a heavy rain event and Hurricane Ike had only marginal impact along beachfront areas. Other than some higher than expected water levels and minor damage to some roads and harbors, the overall impact on vulnerable populations and properties was fairly minimal.

6.1.1 HURRICANE GUSTAV

During Hurricane Gustav a mandatory evacuation was ordered for the vulnerable populations on the islands, beach fronts and flood prone areas of Hancock County. The county government building and E-911 tower were impacted. Approximately 250 people were sheltered locally. No vulnerable or special needs populations were impacted. In Harrison County, approximately 20,000 people were evacuated from the islands, beach fronts and flood prone areas. There was damage to the harbors, Highway 90, State Road 605, some city roads and sewer pump stations. Jackson County experienced some minimal water surge impacts in its coastal areas and low lying bayous. Only 22 people were bused to local shelters in Jackson County. No mobile home populations were impacted in Mississippi as a result of Hurricane Gustav.

6.1.2 HURRICANE IKE

During Hurricane Ike, a mandatory evacuation order was issued to the vulnerable populations on the beach fronts and flood prone areas of Hancock County. The E-911 radio tower was once again impacted by gusty winds. The storm brought occasional wind gusts but minimal rainfall. In Harrison County, minor damage was reported in Back Bay of Biloxi and FEMA-issued manufactured homes and “Katrina Cottages” experienced moderate wind damage. Hurricane Ike’s impact on Jackson County was reported as minimal. The overall impact from rain and wind gusts in all three counties was considered by emergency management officials to be minor, however, higher than normal tides and moderate beach erosion to the coastal counties were reported.

6.1.3 HURRICANE EVACUATION ZONES

Using information from the SLOSH model, the vulnerability analysis provides estimates of the potential damages and casualties that could result from storm surge and wind forces associated with various hurricanes. The evacuation zones in the Mississippi HES were completed in 2001 and are defined by three storm scenarios; Evacuation Scenario A (Category 1 and 2), B (Category 3) and C (Category 4 and 5).

In an effort to ensure a more orderly evacuation when a major hurricane approaches, Hancock and Jackson counties adopted new evacuation zone scenarios before the start of the 2006 hurricane season. These new zones, not created as part of the Mississippi HES, are defined by only two storm scenarios that follow existing roadway networks; Evacuation Scenario A (Category 1 and 2) and Evacuation Scenario B (Category 3, 4 and 5). The two zone format was chosen to improve residents' ability to accurately identify their risk areas and to provide emergency management officials in Hancock and Jackson counties a better method to disseminate evacuation information to the public. Figures 6-1 through 6-3 show the evacuation zones as they appear in the 2002 Mississippi HES. An overlay of the alternate 2006 evacuation zones for Hancock and Jackson counties with the 2001 Mississippi HES zones is presented in Figure 6-4.

For Hancock County, the north-south delineation between both zones is based generally upon roads in the eastern portion of the county. NASA's Stennis Space Center is located in the western portion of the county and includes an exclusion zone where no residences are located. The delineation lines in Hancock County do not follow roads in the western portion of the county, but continue along the parallels established by the roadways in the east. The Category 1 and 2 zone is separated from the Category 3-5 zone by the Kiln-DeLisle Road and continues along this parallel west. The northern boundary of the Category 3-5 zone is the intersection of State Road 43 and State Road 603 and continues along this parallel west.

For Jackson County, the north-south delineation between both zones is based directly upon roads. The Category 1 and 2 zone is separated from the Category 3-5 zone by the US Route 90. The official description of the zone is all areas south of US Hwy. 90, west of Washington Avenue north to Leymoyne Blvd. west to the Harrison Jackson County Line and including all low lying areas along rivers and bays subject to tidal surge. The northern boundary of the Category 3-5 zone is Interstate 10. The official description of the zone is all areas south of Interstate I-10 and including all low lying areas along rivers and bays subject to tidal surge.

The intent of the PSA for Hurricanes Gustav and Ike is to address the accuracy and usefulness of the vulnerability data provided in the most recent (2002) Mississippi HES. The general consensus, obtained from PSA questionnaire responses, was that local emergency management utilized neither 2002 HES evacuation zone maps nor the new 2006 evacuation zones in their decision making process during Hurricanes Gustav and Ike. Rather, personal experience and known locations of historic flooding were used to issue evacuation orders to low-lying and flood-prone areas.

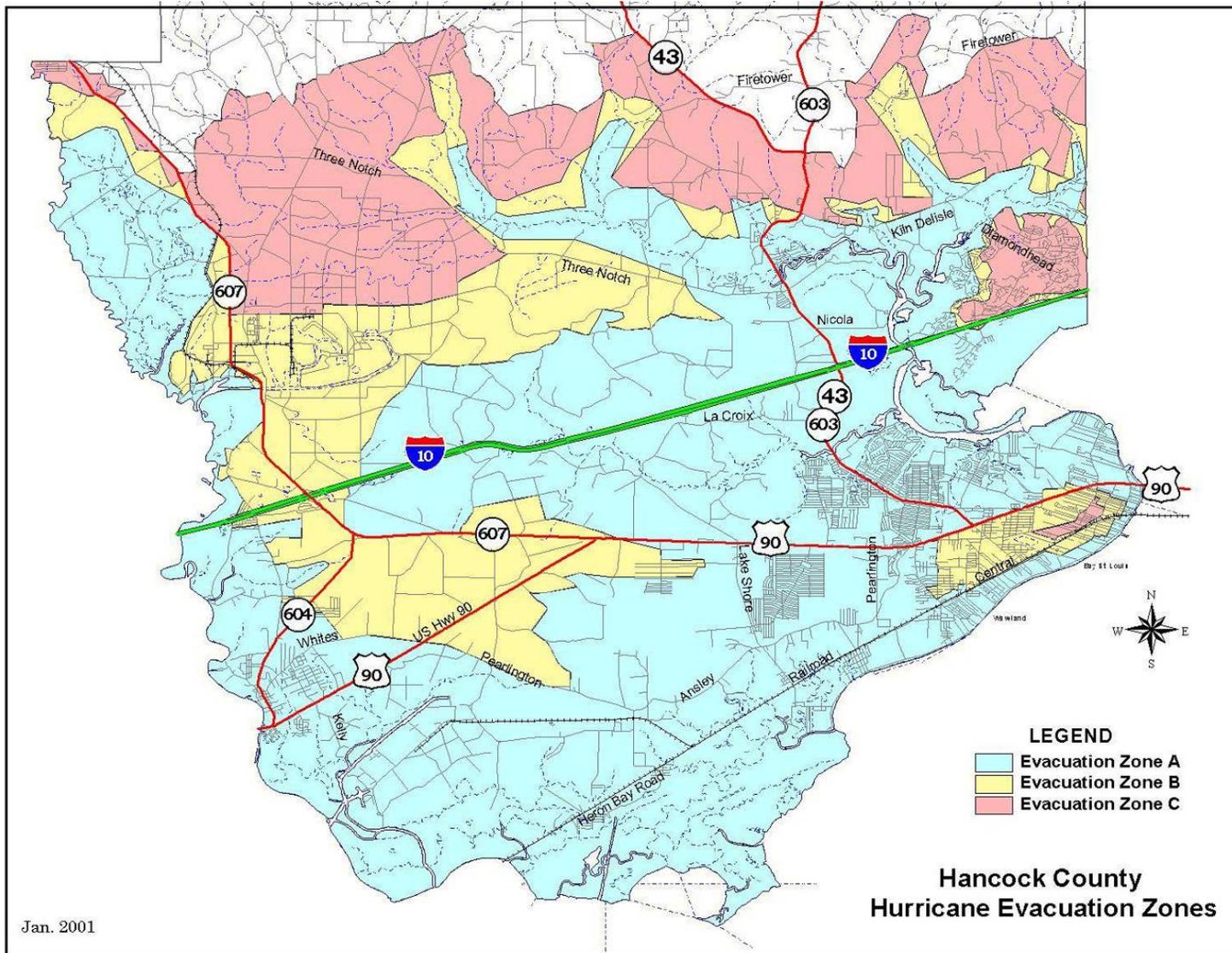


Figure 6-1: Hancock County Hurricane Evacuations Zones
<http://chps.sam.usace.army.mil/USHESdata/Mississippi/HancockMapSelectPage.htm>

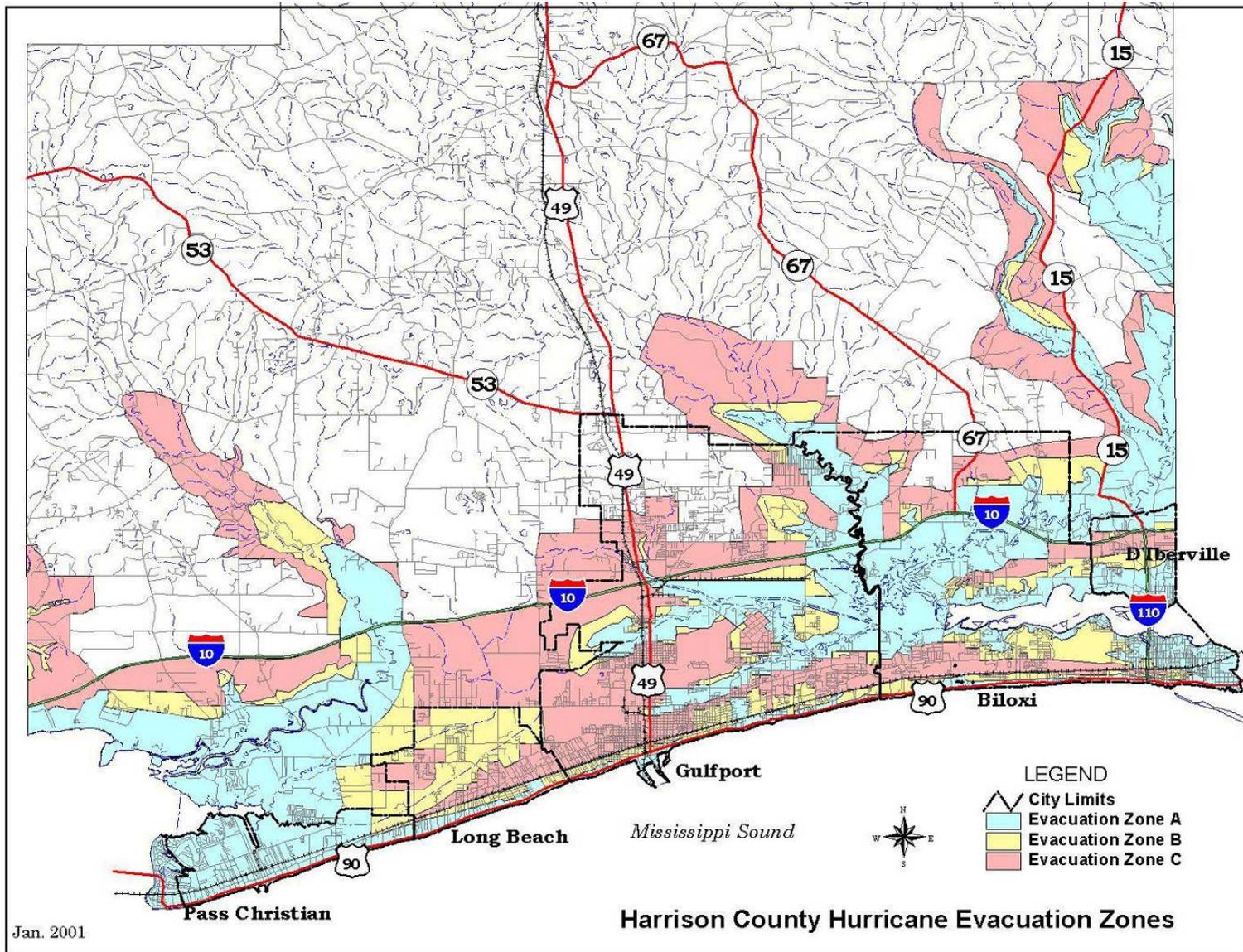


Figure 6-2: Harrison County Hurricane Evacuations Zones
<http://chps.sam.usace.army.mil/USHESdata/Mississippi/HarrisonMapSelectPage.htm>

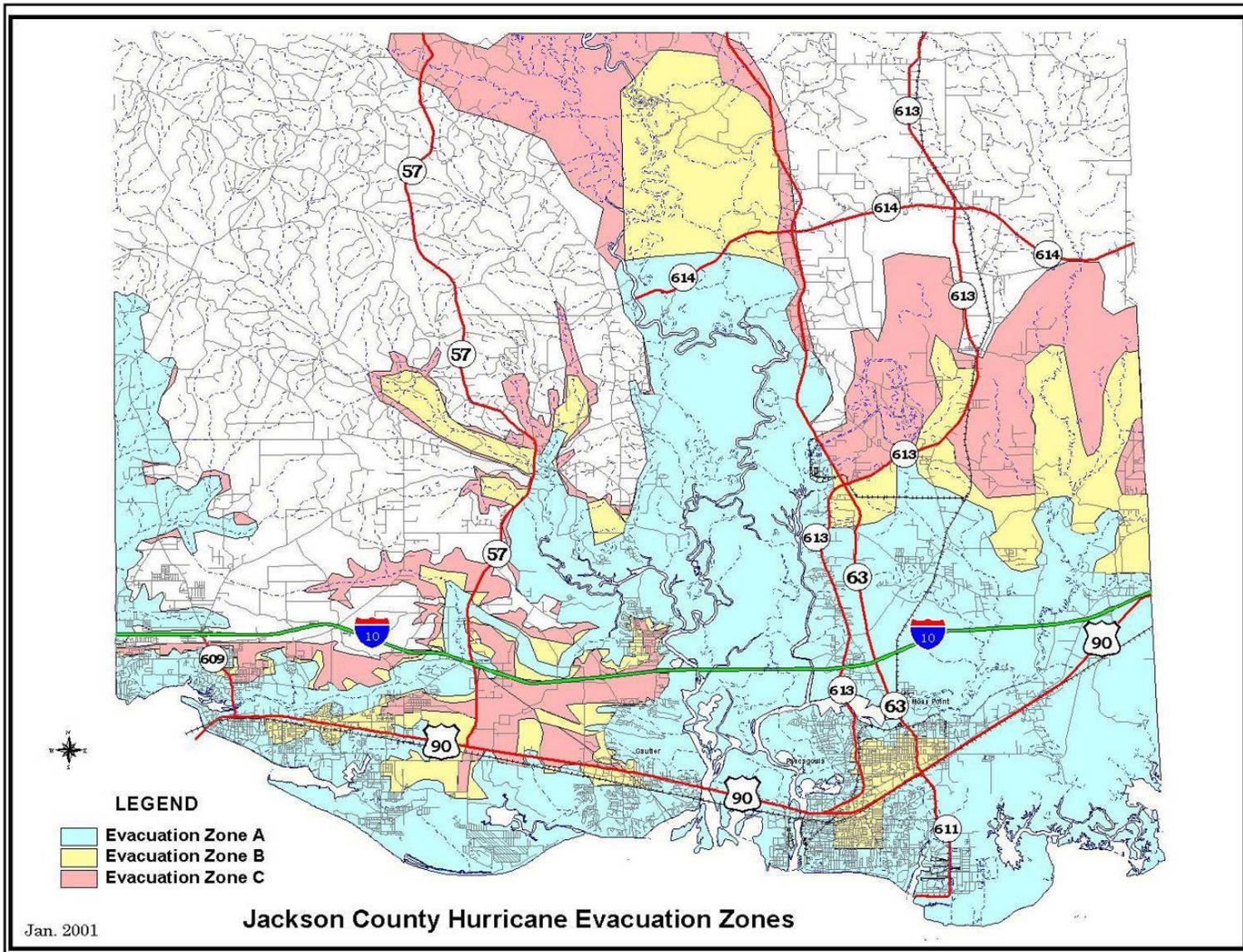


Figure 6-3: Jackson County Hurricane Evacuations Zones
<http://chps.sam.usace.army.mil/USHESdata/Mississippi/HarrisonMapSelectPage.htm>

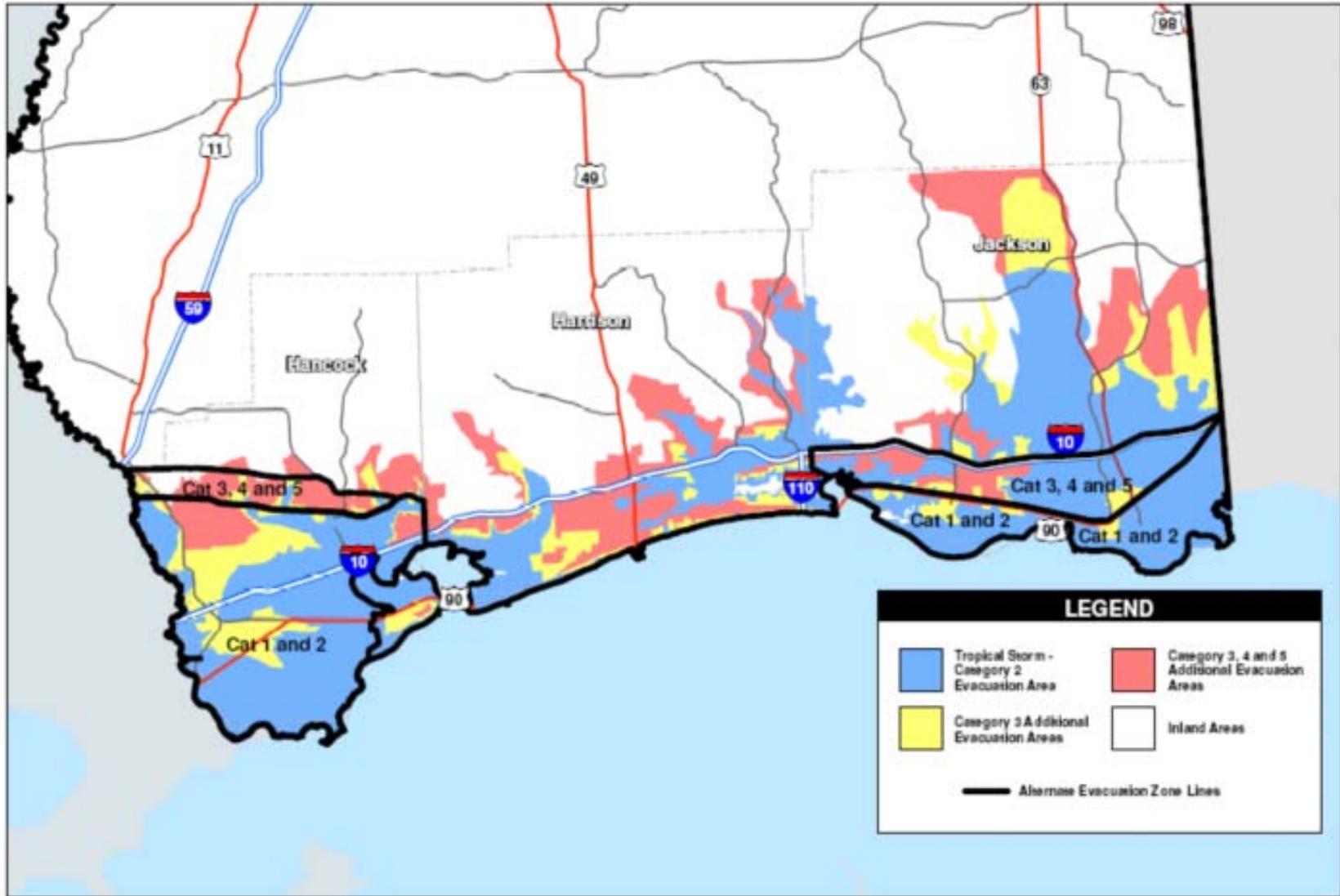


Figure 6-4: Mississippi HES and Updated 2006 Evacuation Zone Comparison
http://chps.sam.usace.army.mil/USHESdata/Clearancetimeupdates/SELAandMS/figure_3-3.htm

Table 6-2: HES Study Area Population Growth

County	Population		
	2000 Census*	2008 Estimate*	Percent Change
Hancock County	42,969	40,170	-6.6%
Harrison County	189,606	178,460	-5.9%
Jackson County	131,420	130,694	-0.6%

*Data obtained from U.S. Census Bureau

6.1.4 VULNERABLE POPULATION

Base population, housing unit and vehicle ownership data used in the Mississippi 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 was crucial in calculating of evacuating vehicles, shelter demand and clearance times.

The three coastal counties in Mississippi have experienced a decrease in population since 2005, due to the effects of Hurricane Katrina. Table 6-2 reflects the decrease in population in Hancock, Harrison and Jackson counties since the HES was developed. While the table does not detail population change by evacuation zone, it is reasonable to assume decreases in surge areas are at least as large, if not larger, than county-wide decreases. Since Katrina made landfall in 2005, the area has been slow to recover. Although the immediate population had decreased, casinos have returned in large numbers and this adds a significant risk to the effects of hurricanes and tropical storms as the tourist industry has been restored to a great extent. The coastal region is a desirable tourist attraction and summer vacation spot, which adds a significant number of people and vehicles to any evacuation scenario.

Growth and recovery are expected in the coming years, but the population still has not rebounded to pre-Katrina levels. As such, the demographic data presented in the 2002 Mississippi HES is not characteristic of the current population, lessening its effectiveness as an evacuation planning resource for local emergency management.

Recognizing the crucial demographic changes, along with the updated evacuation zones in Hancock and Jackson counties, FEMA and USACE agreed to conduct a new transportation analysis in 2006 to update HES clearance times. The updated clearance times were presented to the counties, however; it is unclear how the counties conveyed these times to the public. These updated clearance times are summarized in Table 6-3. The results of the interviews indicated that the new clearance times were not widely utilized by local emergency management in their decision making process during Hurricanes Gustav and Ike.

Table 6-3: 2006 Evacuation Clearance Times vs. 2002 HES Clearance Times

Original Evacuation Scenarios	New Evacuation Scenarios	Rapidly of Response/ Tourist Occupancy	Hancock County		Harrison County		Jackson County	
			HES Evac Zones	New County Evac Zones	HES Evac Zones	HES Evac Zones	New County Evac Zones	
Scenario A (Cat 1-2)	Scenario A (Cat 1-2)	Low Tourist Occupancy						
		Rapid response	5	7	16	13	12	
		Medium response	6	8	17	14	13	
		Long response	9	11	18	15	14	
		High Tourist Occupancy						
		Rapid response	6	8	19	16	13	
		Medium response	8	10	20	17	14	
		Long response	9	12	21	18	15	
Scenario B (Cat 3)		Low Tourist Occupancy						
		Rapid response	8	n/a	22	21	n/a	
		Medium response	9	n/a	23	22	n/a	
		Long response	10	n/a	24	23	n/a	
		High Tourist Occupancy						
		Rapid response	11	n/a	25	25	n/a	
		Medium response	12	n/a	26	26	n/a	
		Long response	13	n/a	27	27	n/a	
Scenario C (Cat 4-5)	Scenario B (Cat 3-5)	Low Tourist Occupancy						
		Rapid response	14	15	31	27	24	
		Medium response	15	16	32	28	25	
		Long response	16	17	33	29	26	
		High Tourist Occupancy						
		Rapid response	16	16	34	30	25	
		Medium response	17	17	35	31	26	
		Long response	18	17	36	32	27	

6.1.5 “SAFE ROOMS”

Hurricane winds are a significant hazard that must be accounted for as coastal states decide on building codes. Extreme winds can create stresses on houses 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 shelters called “Safe Rooms.” They are easily 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 Mississippi were asked if they were aware of the use and success of any “Safe Rooms” during Hurricane Gustav and Ike. Forrest County, an inland county, reported the use of one “Safe Room.” No other instances of use were reported by any of the other coastal or inland counties.

6.1.6 POTENTIAL FACILITIES FOR RETROFITTING

A common attitude seemed to prevail throughout this study. 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.

Hancock, Harrison and Jackson 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 6-4, 6-5 and 6-6, respectively. Their locations are identified in Figure 6-5 and their locations relative to storm surge areas are presented in Figures 6-6 through 6-8.

All three counties provided a list of facilities to be considered for a potential retrofit project. Hancock County listed two, Harrison County listed four and Jackson County listed eight facilities. Both of Hancock County’s listed facilities are outside of the Category 5 surge inundation zone while two of the four facilities in Harrison County were located outside of the Category 5 inundation zone. Jackson County listed two facilities that are outside of the Category 5 surge inundation zone and the remaining six were in the Category 3-5 zones. It should be noted that the facilities located within a surge zone are generally located at elevations above the surge heights and have do not have a history of flooding during past events.

Table 6-4: Hancock County Potential Retrofit Facilities

Priority	Name	Address	Lat/Lon	Type	Owner	Capacity	Location
1	West Hancock Elementary School	23353 Hwy. 43 Picayune, MS 39466	30.52020N 89.50610W	School	Government Hancock Co. School System	1000	Outside of Surge Zone
2	Hancock North Central Elementary School	6122 Cuevas Town Road Kiln, MS 39556	30.50305N 89.44074W	School	Government Hancock Co. School System	600	Outside of Surge Zone

Table 6-5: Harrison County Potential Retrofit Facilities

Priority	Name	Address	Lat/Lon	Type	Owner	Capacity	Location
1	Harrison County Adult Detention Center	10451 Larkin Smith Drive Gulfport, MS 39503	30.4380294N 89.0552943W	County Jail	County	Unknown	Category 4 Surge Zone
2	County Farm VFD	13243 County Farm Rd. Gulfport, MS 39503	30.4812464N 89.185357W	Fire Department	County	Unknown	Outside of Surge Zone
3	Cuevas VFD	22338 Fire Station Rd. Pass Christian, MS 39571	30.358N 89.214W	Fire Department	County	Unknown	Category 4 Surge Zone
4	Saucier VFD	23560 Old Still Road Saucier, MS 39574	30.633N 89.138W	Fire Department	County	Unknown	Outside of Surge Zone

Table 6-6: Jackson County Potential Retrofit Facilities

Priority	Name	Address	Lat/Lon	Type	Owner	Capacity	Location
1	East Central Community Center	4300 State Highway 614 Moss Point, MS 39555	30.649951N 88.535607W	Community/Recreational	Government	100	Outside of Surge Zone
2	Singing River Hospital	2809 Denny Avenue Pascagoula, MS 39581	30.375217N 88.532165W	Medical	Government	Unknown	Category 4 Surge Zone
3	Ocean Springs Hospital	3109 Bienville Blvd. Ocean Springs, MS 39564	30.41276N 88.781772W	Medical	Government	Unknown	Category 4 Surge Zone
4	Jackson County Civic Center	2902 Shortcut Road Pascagoula, MS 39567	30.380663N 88.533245W	Long Term Shelter	Government	Unknown	Category 3 Surge Zone
5	Vancleave Fire Dept.	5117 Ballpark Road Ocean Springs, MS 39565-9572	30.522487N 88.692571W	Fire	Government	Unknown	Outside of Surge Zone
6	Gautier Convention Center	2012 Library Lane Gautier, MS 39553	30.392685N 88.642272W	Shelter	Government	Unknown	Category 4 Surge Zone
7	Moss Point High School	4924 Weems Street Moss Point, MS 39563	30.412881N 88.549157W	Shelter	Government	Unknown	Category 5 Surge Zone
8	East Side Roads	10825 Hwy.63 Moss Point, MS 39562	30.498462N 88.537388W	Road Department	Government	Unknown	Category 3 Surge Zone



Figure 6-5: Potential Retrofit Facilities in Hancock, Harrison and Jackson Counties

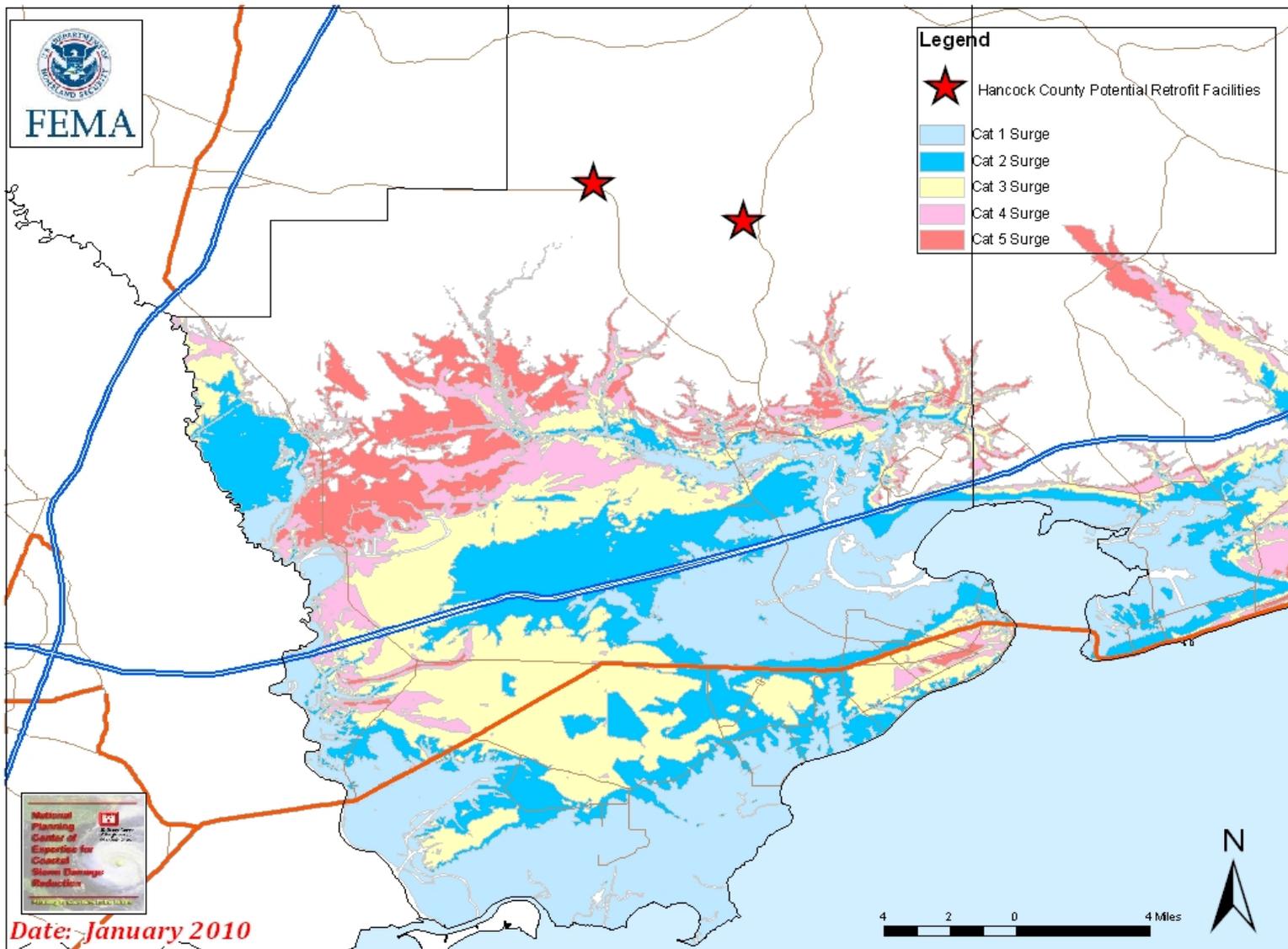


Figure 6-6: Hancock County Potential Retrofit Facilities

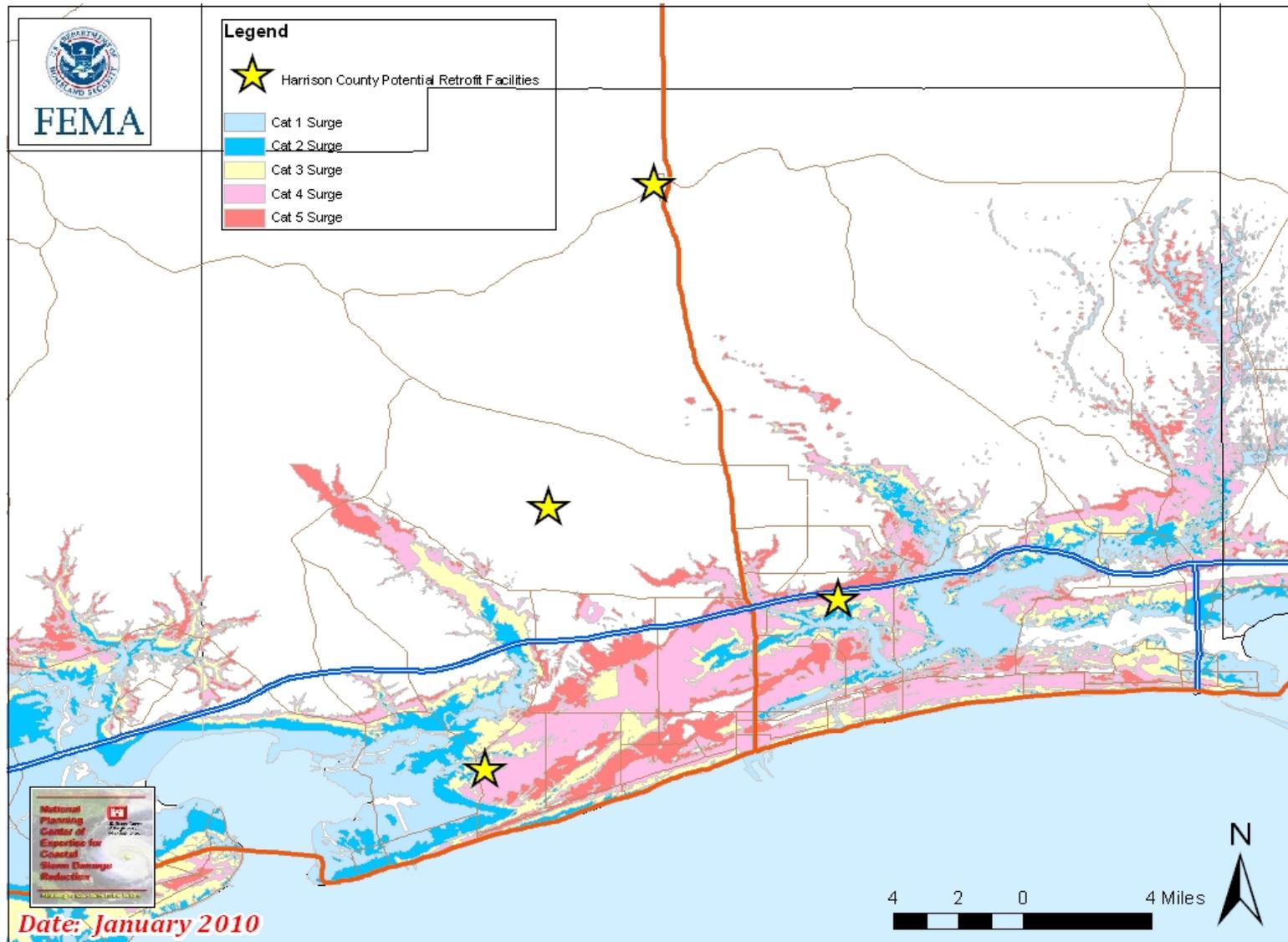


Figure 6-7: Harrison County Potential Retrofit Facilities

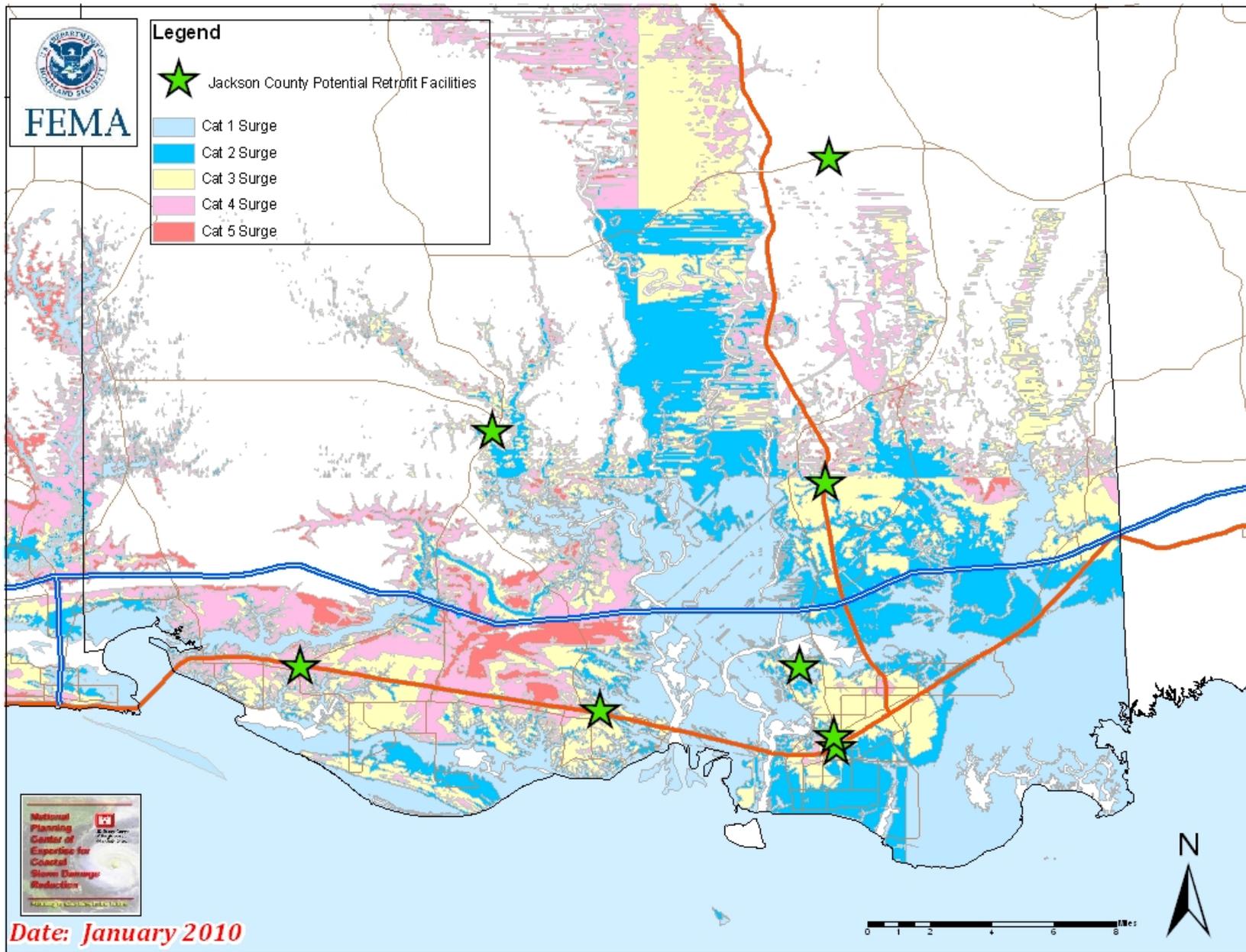


Figure 6-8: Jackson County Potential Retrofit Facilities

6.2 SHELTER DATA

The purpose of this section is to show the actual shelter use for Mississippi for 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 use to host 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 Mississippi 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 there are features in them that would satisfy the shelter management needs of Mississippi.

This report first describes the Mississippi shelter model for general population, medical special needs and pet shelters. The report then describes Gustav and Ike shelter operations. A table of shelter numbers and types per county has been compiled from multiple databases and is shown in Table 6-7.

6.2.1 MISSISSIPPI SHELTER MODEL AND PLAN

Overview:

In Mississippi, sheltering takes place under the State Plan which follows the National Response Framework. Under Emergency Support Function (ESF) #6 Mass Care, Housing and Human Services are coordinated by the Mississippi Department of Human Services. Overall, there is a close working relationship between the ARC and the Mississippi Emergency Management Agency in the State to manage shelters, although Harrison and Hancock County may at times operate shelters independently of the State system. The ARC is working with regional councils across the nine MEMA regions to pull teams together around evacuation and issues. Collaboration is increasing and overall, it is perceived that Gustav/Ike sheltering efforts went well. The State's policy is to not open shelters below I-20, although some may open as a last resort for straggling evacuees. Shelter locations depend on the storm path and size. Evacuation shelters (pre-storm) will open as well as post-evacuation shelters for those unable to go home as a result of the storm. Shelters are never to be opened in the path of the storm. For Mississippi, the close time between Gustav and Ike meant that sheltering efforts overlapped.

Site Selection:

The ARC assesses locations in conjunction with the fire marshal. Shelters must meet ARC 4496 criteria. Once the ARC determines that shelter criteria have been met, they sign a shelter agreement with churches and other locations to establish ARC managed or ARC supported sites. State Medical Special Needs Shelters (MSNS) are opened by the Alabama Department of Public Health (see more below). The ARC, Salvation Army and Southern Baptists may provide various levels of support particularly food. Some independent sites do open and may receive support from other organizations.

General Population Shelters:

General population shelters are usually managed or supported by the American Red Cross (ARC). Additional primary agencies for ESF#6 include the Department of Human Services, the Division of Medicaid, the Mississippi Emergency Management Agency and the Department of Education. Other state agencies as well as the Mississippi Voluntary Organizations Active in Disaster (VOAD) provide support. According to the state emergency operations plan (ESF#8) shelters have identified in all Mississippi counties and are listed in the Mississippi Shelter Resource Directory. Local government shoulders the main responsibility for sheltering citizens and will contact relevant agencies to commence mass care. Emergency Law 33-15 directs local government to help with staffing emergency shelters. All shelters are considered local sites which are opened and/or requested by the county EMA director. The county contacts the State (MEMA) to open shelters although it is possible that the ARC will be contacted directly by the county since people know each other and have worked together previously. Based on previous experience, MEMA and the ARC assume that 10% of the evacuating population will go to shelters. The Mississippi HES data estimates that five to 15 percent of the evacuating population will utilize shelters. MEMA shelter staff works together with the ARC to send information to the State Public Information Officer (PIO) who will then announce the locations of open shelters to the evacuating public. The Mississippi Shelter Task Force works together to create and implement the shelter plan. The State uses the 80% mark as the "full" indicator for shelter and then opens more.

Hardening:

Several shelters that meet FEMA 361 standards exist in the State. Hancock County is preparing six new shelters that will be ready in 18-24 months.

Special Medical Needs Shelters:

Special Medical Needs Shelters (termed SMNS in Mississippi) are coordinated by the Mississippi Department of Health (MSDH) along with the Department of Rehabilitation Services and the Division of Medicaid. Locations for SMNS are at community and junior colleges. MSDH employs a Special Medical needs Shelter Coordinator and a SMN Logistics Director in its Office of Emergency Planning and Response. This office has conducted extensive planning, coordination and training since Hurricane Katrina when the State did not have any SMNS. MSDH also coordinates evacuation of medical special needs as part of their assigned ESF#8 responsibilities. MSDH also assists at general population shelters for those in need of specialized medical care and can provide nursing support to shelters as needed per the state emergency operations plan for ESF#6.

Pet Shelters:

Pet and animal shelters are coordinated through the Mississippi Board of Animal Health. Pet shelters are supported under ESF#11 through the MS Board of Animal Health and the MS Department of Agriculture and Commerce which activates the Mississippi Animal Response Team (MART). ESF #11 also coordinates with ESF #6 to co-locate pet and human shelters. In Mississippi, most pet shelters are located in close proximity to general population shelters. For Gustav and Ike, though pets were separated from owners, they were conveniently close by and easy to visit. The State also brought in temporary mobile units with wire cages. Larger animals (horses, cows, goats) were sheltered at the Jackson County Fairgrounds which is located near the

coliseum in Jackson. The fairgrounds/coliseum in Meridian also offers this co-location between pets and owners. Nonprofits provided some support for animals.

Shelter Activation:

Similar to Alabama and Texas, Mississippi uses an hourly countdown to commence shelter operations depending on the location of the hurricane. At 120 hours before landfall, when a hurricane is still in the Atlantic, shelter partners move staff and resources into shelter locations. A storm in the Gulf of Mexico, which can occur faster, means that shelter operations may commence 72-96 hours prior to landfall. At 96 hours before landfall, evacuees begin to arrive from Louisiana, usually prompted by the arrival of a hurricane in the Gulf of Mexico. Between 96 to 72 hours before landfall, shelters open north of I-20. Six shelter zones exist across the state and all are located north of the I-20 corridor. Hattiesburg will open shelters but not prior to landfall due to their location south of I-20.

A massive one million square foot storage facility in Hattiesburg serves the entire Gulf Coast for the ARC. It is the biggest warehouse in the ARC system and is ideally located along I-59 and with short access to I-20, I-10 and I-65. All coastal states draw from this warehouse including Mississippi. Contents include mass care shelter supplies including cots and blankets that can be shipped across the Gulf Coast region.

Evacuee Arrival:

Two main streams of hurricane evacuees enter the shelters. The coliseum in Jackson typically fills up first with evacuees from Louisiana, followed by shelters in the City of Meridian. Gustav moved faster than expected and there were issues initiating contraflow in Mississippi. Louisiana also sent evacuees earlier than anticipated which created significant bottlenecks on I-59 and I-10, filling up shelters along these routes earlier and faster than expected. A bottleneck then developed along I-20 and gas stations ran out of fuel. One Amtrak train intended to pass through Mississippi from Louisiana to Tennessee stopped in Jackson because of a problem with the tracks. Some residents were removed to MSNS.

At 48 to 72 hours prior to landfall, residents along the Mississippi coast begin evacuation. Most people take their own transportation north although limited bus transportation was available in 2008. In-state evacuees usually do not move far from their homes and some sheltered in their own cars until the storms passed. Approximately 500 Mississippi residents used the planned bus evacuation from the coast, most of them from Harrison County. Local EMAs handle the bus evacuation. Hancock County reported they used county buses to take people to county shelters. They also used a state bus at a pickup site.

Post-Storm Shelters:

A large multi-purpose center hosting 1,200 filled up in Hattiesburg right after Gustav passed and residents went home a few days later.

6.2.2 GUSTAV AND IKE SHELTER OPERATIONS

Shelter Numbers and Demographics:

For Gustav and Ike, about 14,300 people used general population shelters. Approximately 85% came from Louisiana with a few from Texas. It is anticipated that out of state numbers may decrease over time as Louisiana increases its shelter capacities. Mississippi is technically not a host state for Louisiana but hosted approximately 12,155 out of state evacuees from Louisiana. For Hurricanes Gustav and Ike, 182 shelters opened and ranged in size from shelters housing 15-20 people to larger facilities exceeding 250 residents. The range of shelter residents was from a low of 35 to a high of 2,500. The Mississippi Gulf Coast Red Cross estimates that about 2,500 South Mississippians used shelters. Coupled with the 85% estimate, it appears that between 2,500-2,745 shelter residents were intrastate evacuees. An overview by county can be found in Table 6-4.

Hancock County indicated that approximately .007% of their population went to shelters. About 250 went to local shelters and 52 went to Jackson County shelters. Hancock County indicated they opened one ARC shelter for Ike and one ARC shelter for Gustav, housing about 250 total residents. ARC data suggest larger numbers that would include non-residents (see Table 6-4). Numbers from shelters at Stennis Space Center on August 31 totaled 1,000 people (300 at Stennis Space Center Building #2105 which closed 9/1; 450 at Building #2204 and 250 at Building #1105 with both closing on 9/3). ARC Data indicate opening 1 ARC Managed shelter in Harrison County (Harrison Central Elementary in Gulfport) on August 31 for 250 people and closing it on September 4. Two ARC partner shelters opened at Harrison Central High School and Lizana Elementary in Gulfport on August 31. The high school hosted 1,710 and the elementary took in 550. The ARC also managed two senior centers that served as shelters. Lymon Senior Citizen Center in Gulfport opened on 9/11 and closed 9/12 with 100 people assisted according to ARC data. The North Woolmarket Senior Center in Biloxi opened on September 2 and closed on September 3; numbers are not available for this location.

The American Red Cross indicates that supplying a large number of shelters has become difficult. Consequently, the ARC is consolidating shelters and expects to open only 60-80 larger shelters in the future. Some ad hoc shelters are expected to continue opening. These ad hoc shelters tend to fall south of I-20 particularly where contra flow out of Louisiana ends at the Mississippi border. Since Katrina, the ARC has reached out to these shelters (usually located within the faith community) and provided training. The ARC is encouraging consolidation of the shelters into larger worship locations with support (food, laundry, etc.) from smaller congregations and inviting them to become ARC partners. Shelter operations in these locations and with these groups are expected to be different in the future.

Shelter Issues:

Similar to other states, shelter residents often arrived with complicating personal circumstances that included issues with drugs, alcohol, mental health medical conditions not serious enough to qualify for a medical special needs shelter. These personal circumstances raise concern for the nursing staff in the shelters. In the Jackson shelters, approximately 5% of the shelter residents were pre-disaster homeless. The State is now working on an armband and meal ticket system to avoid repeat trips for additional food and to better assess needed resources.

Repatriation:

Most shelter residents come from lower income or lower middle income households. Many arrived without resources to return home and are often not eligible for FEMA or other disaster assistance because their homes were not damaged. Because of their economic situation, it was difficult to help them return home after Gustav. As these shelterees observed Ike approaching the coast, they wisely chose to stay in Mississippi. After the threat passed from Ike, the ARC coordinated with a variety of voluntary agencies to get people back home. Agencies, churches and other partners provided funding for gas or offered gift cards. The State experienced some difficulty getting some pre-disaster homeless with returning to Louisiana and some may have remained in the Jackson area. Louisiana and Texas advised their residents to stay put after Gustav as Ike approached which elongated shelter efforts in Mississippi.

6.2.3 SPECIAL MEDICAL NEEDS SHELTERS

Overview:

There are eight SMNS available within the state, all located at community colleges through pre-existing agreements. Those sites include locations in Wesson, Raymond, Whitfield, Hattiesburg, Poplarville, Lucedale, Perkinston, and Summit and have a total capacity of 1,196. The 80-85% mark is similar to that used in other states in order to avoid overfill when self-evacuees arrive. The community colleges were selected because they have food, are at well known sites, offer signage and onsite security and are State-owned. The community colleges also offer allied health degree programs which can provide additional staff (agreements are being worked out at present). All sites have generators and AC units (purchased through grants) and kitchens for all facilities. A wireless connection has been made available at all community colleges through grant funds, providing access to telemedicine personnel in Jackson (the ER doctor associated with the telemedicine site is also the State's medical director). MSDH pre-stages railroad-car type storage containers with cots, supplies, and administrative materials at all shelters. There is a food service agreement with the community colleges which are increasingly able to meet specific dietary needs. Communications tools including satellite phones are made available through an agreement with Cellular South. Boxes with heat sensitive items are kept at the State's main office.

Nine public health districts with two teams per district provide staffing. Each team includes nurses, administrators, logistics staff, security, social workers and environmentalists (to insure safety in food, water, etc.). MSDH tries to rotate teams from the districts; all must be ready to open up and receive patients in 12 hours. Staff teams work 3 days x 12 hours and rotate out on the fourth day. To date, they have been able to open in four hours or less. They have been able to identify and secure additional resources, such as mechanical lifts, as those needs appear in shelters. The State is currently working with a logistics company to develop layouts for the shelters. Agreements with pharmacies provide refills free of charge if a patient has a medicine bottle or prescription. There is a detailed plan and stepwise, practical resource guide in place for the MSNS; these materials are updated annually.

Hardening for Medical Special Needs Shelters:

The three southernmost locations are not appropriate for category 3 storms or beyond and are not well-suited for severe or sustained wind load. A significant advancement is in the works through FEMA's Hazard Mitigation Grant Program (HMGP), State and local funding. FEMA requires a 75% to 25% state and local match to receive HMGP funding. A site in Wiggins (approximately 35 miles north of Gulfport on the coast) will feature up to 20,000 square feet of space by 2011 and is designed as a SMNS. The site will have a kitchen, bath, staff area and storage along with ambulance bays, parking, and loading docks. The Stone County EOC will share the site with the State Department of Public Health. The site will be used as a shelter and as a forward staging command area. The facility will exceed FEMA 361 standards and provide shelter to 150 patients and 150 caregivers. Medical eligibility will be required coupled with nursing triage for use by evacuees.

Gustav/Ike SMN Shelters:

The state opens SMN shelters as the existing ones fill up. The MSDH opened three medical special needs shelters with fairly low numbers for both Gustav and Ike. As a hurricane approaches the coast, MSDH will notify colleges and contractors to standby. MEMA will make a request to MSDH to open SMNS. Typically, SMN open the day before mandatory evacuation commences as was the case with Gustav/Ike. Transportation occurs through an agreement with the Department of Education which uses school buses, including para-transit. Bus evacuation from the coast moves into a staging area where triage occurs. An MOU with 52 ambulances supports medical/special needs evacuation.

The first SMN shelter opened up on August 30, 2008 at 4p.m at Hinds Community College in Raymond. A total of 134 residents had entered by the second night. The majority of people were coastal residents with some from Louisiana via personal cars or by train. Specific criteria had to be met for SMN eligibility such as those in need of support for routine care, those who require ambulatory care, need help taking medication or managing medical conditions or who have specified medical issues (e.g., ostomy, stable cancer, stable oxygen, dressings). Caregivers were allowed to come and residents were advised on what to bring. Pets were accommodated on the Hinds CC campus; service animals were allowed inside the shelter as well. Hinds was open for five days. A second SMN opened at Pearl River Community College in Hattiesburg on September 2 and remained open two days. Pets were not accommodated at this shelter but service animals were allowed. The U.S. Public Health Service is assessing an air base in Meridian as another possible FMS location. Hudspeth Regional Center is designated for out of

state evacuees. For Gustav, a nursing home from Louisiana relocated to Hudspeth and was supported by a Federal Medical Station for a total of 72 patients over four days. Another nursing home located to Jackson State University supported by nursing home staff for 81 patients, lasting 4 days.

SMNS patients included a mix of medical conditions including pediatric residents, people with mental disorders, some hospice, some dialysis (available through county providers) and some seniors in need of oxygen support. Few brought medical records except for the nursing homes, which also brought medical carts. Registration procedures allow for a medical history and identification of a physician.

Discharge planning commences when patients arrive and social workers are designated to work on discharge planning. County-level EMA provide assessments of home damage to see if patients can return. FEMA provides ambulances and buses to transport people home.

Related Sheltering Matters:

Louisiana has an agreement with Memphis, Tennessee to take evacuees arriving by train. During Gustav and Ike, problems with the tracks in Tennessee prompted an unscheduled stop in Jackson. The ARC provided meals while the tracks were repaired and evacuees could move on to Tennessee. No medical triage was reported for train passengers. Some buses originally routed to Alabama stopped in Hattiesburg for shelter which is below the I-20 mark for shelters.

Hardened Facilities:

According to MEMA, there are two shelters in Biloxi and Gulfport that are FEMA 361 compliant. These chapters have a capacity of 1,500 individuals for a total of 3,000. They have experienced some challenges with generator capacity. Both will be ARC managed general population shelters in future events.

Table 6-7: General Population Shelters in Mississippi, Hurricanes Gustav and Ike*

Mississippi County Hurricanes Gustav and Ike	Type of Shelter	# Open Shelters	Open Date	Maximum Population	Close Date
Adams	ARC Managed	1	8/31	100	9/4
	ARC Supported	2	NA	250	9/4
	ARC Partner	1	8/31	250	9/4
Clay	ARC Managed	1	8/31	350	9/4
Copiah	ARC Partner	1	8/30	125	9/6
Forrest	ARC Managed	1	9/1	2500	9/6
George	ARC Managed	5	8/31	1171	9/1-2
Greene	ARC Managed	1	8/31	100	9/1
Grenada	ARC Supported	2	8/31	61	9/4
	ARC Partner	1	8/31	155	9/4
Hancock	ARC Managed	4	8/31	1250	9/1-5
Harrison	ARC Managed	3**	8/31-9/11**	1630**	9/2-12**
	ARC Partner	3	8/31	3975+	9/2-4
Hinds	ARC Managed	5	8/30 -9/2	1118	9/4-8
	ARC Partner	2	8/30-31	375	9/2-4
	Independent	1	8/31	35	9/4
Issaquena	ARC Managed	1	8/31	NA	9/4
Jackson	ARC Managed	4	8/31 - 9/11	1558***	9/2-12
Jones	ARC Managed	1	8/30	1000	9/4
Lafayette	ARC Supported	1	8/31	75	9/5
Lauderdale	ARC Managed	2	8/30-31	NA	9/6
Lee	ARC Managed	1	8/31	500	9/5
Leflore	ARC Partner	1	8/30	150	9/4
Lincoln	ARC Partner	2	8/31	300	9/4-5
Madison	ARC Managed	1	8/31	100	9/3
	ARC Partner	2	8/31	350	9/4-5
Marion	ARC Managed	1	8/31	50	9/2
Neshoba	ARC Managed	1	8/30-31	NA	9/4-5
Oktibbeha	ARC Managed	1	8/31	NA	9/1
Panola	Independent	1	8/31	125	9/8
Pearl River	ARC Managed	1	8/31	500	9/3
	ARC Supported	2	8/31	580	9/3
	ARC Partner	1	8/31	420	9/3
Perry	ARC Managed	2	NA	675	9/1-4
Rankin	ARC Managed	1	8/30	200	9/4
	ARC Partner	4	8/30-31	650	9/3-4
Simpson	ARC Partner	1	8/30	250	9/4
Walthall	ARC Managed	1	NA	150	9/4
Warren	ARC Managed	6	8/31	100****	9/4
Washington	ARC Partner	1	8/31	400	9/6
Wayne	ARC Partner	1	8/31	1000	9/2
Wilkinson	ARC Supported	1	8/31	200	9/3

*Data obtained from the American Red Cross. Most independent shelters did not report numbers of shelter residents.

**One Harrison County ARC managed shelter opened at the Senior Center on 9/11 through 9/12 for 100 people. Two of the three ARC Managed shelters opened between 8/31 to 9/2 and closed 9/2 to 9/3. Some Harrison County shelter numbers were not available.

***One Jackson County shelter opened on 9/11 and closed on 9/12 although numbers of residents were not reported to ARC officials. Jackson County is believed to be under-reported.

****Warren County totals for the six ARC managed shelters are believed to be under-reported.

+This number may be a double-count of 1710 in a single facility at Harrison Central High School in Gulfport.

6.3 BEHAVIORAL DATA

The purpose of this section is to collect and analyze all available behavioral surveys performed by Federal, State and local agencies and Universities for residents, tourists, etc. of Mississippi 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 behavioral surveys, their merits or deficiencies and how they compared to previous studies done in Mississippi. As a result of the analysis, a recommendation will be made assessing the need for additional behavioral surveys to be conducted in Mississippi to address the behavioral tendencies of the population of Mississippi affected by future storms. Unfortunately, no post-Gustav or Ike behavioral surveys were located.

6.3.1 PROCESS

A literature review of academic and commercial sources was completed in an attempt to locate behavioral studies relative to Hurricane Gustav and Hurricane Ike in Mississippi. Calls were put out 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 39 persons in disaster-related or emergency management fields (Appendix E). No behavioral work for either Hurricane Ike or Hurricane Gustav in Mississippi was located.

Hurricane Gustav made landfall in Louisiana but affected the Mississippi coast with sustained winds around 55 mph and gusts up to 70 mph. A 10- foot surge occurred at Bay Waveland. No deaths were recorded for Mississippi. Hurricane Ike made landfall in Galveston, Texas but coastal Mississippi experienced three to six feet of surge. There were no deaths in Mississippi and the damage was minimal. Mandatory evacuation orders for water front property, flood prone areas and mobile homes were issued for Hurricane Gustav in Hancock and Harrison counties. A mandatory evacuation order was given for the same areas for Hurricane Ike in Hancock County but not in Harrison County.

Evacuation compliance appears to have been low in both storms. This is attributed to the storm's track, but there is no way of verifying this without a behavioral survey.

Mississippi was part of the USACE Hurricane Evacuation Study for Hurricane Georges in 1999. A total of 200 interviews were completed. A second behavioral survey in 2000 included a total of 900 (300 in each coastal county). Results of both these behavioral surveys were included in the 2002 HES. An important finding of the 1999 Georges behavioral survey was that 69 percent of those living in areas under evacuation orders said they did not know about the orders. When behavioral survey participants were asked specifically whether they heard, either directly or indirectly, that officials had called for them to evacuate, a majority (69 percent) said they did not, even in the category 1-2 risk area. Only about 10 percent in the category 1-2 area and five percent in the other zones said they heard *mandatory* evacuation orders.

An important reason for not evacuating that was heard in the Georges behavioral survey was the fear of being caught on the road during evacuation. In the category 1-2 evacuation zone, 85 percent of those who did not evacuate in Georges said they had a concern about being trapped on evacuation routes as the storm arrived, and 75 percent from the category 3-5-evacuation zone gave that same response. This is even higher than responses to that question in places like New Orleans and the Florida Keys. *However, half of the respondents expressing those concerns said they would be willing to evacuate if officials could better monitor the progress of the evacuation and ensure that they did not begin evacuating without adequate time to reach safety.*

One effect of Hurricane Katrina on coastal Mississippi was population loss. According to January 2006 estimates, Harrison County lost about 16.5 percent of its population and Hancock County decreased by more than 24 percent. At the same time recovery workers have come into the area. The effects of these demographic changes, as well as the possible effects of Hurricane Katrina on evacuation intent and behavior are unknown. Similarly, the effect of media coverage of the transportation problems associated with Hurricane Rita in Texas on coastal Mississippi residents is unknown. Since the last behavioral survey for Mississippi was completed in 2000 and also prior to Hurricane Katrina, it is recommended that a new behavioral survey be completed. The survey study area should include Hancock, Harrison, and Jackson coastal counties, and also include the following inland counties, Pearl River, Stone, George, and Forrest.

6.4 TRANSPORTATION DATA

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.

6.4.1 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 the following counties: Hancock, Harrison and Jackson counties, Mississippi. Follow up interviews were held with Mississippi DOT and local officials to collect additional information.

6.4.2 SURVEY AND TARGETS

Local emergency management questionnaires, which include specific transportation interview questions, are located in Appendix B. The questionnaire was sent to emergency management officials and first responders in each county, and included specific questions addressing the - evacuation roadway network. A summary of participating officials is presented in Appendix A.

6.4.3 EVACUATION PROCESS AND ROADWAY NETWORK

A definitive number of evacuating vehicles was not reported by Hancock, Harrison or Jackson counties. Rather the counties reported little to no evacuating vehicles for Hurricane Ike and a small number for Hurricane Gustav. Jackson County reported that 30 percent of its population evacuated for Hurricane Gustav but indicated that only five percent *should* have evacuated. Additionally, Jackson County estimated that approximately 600,000 people evacuated through the County, which led to traffic congestion on its major evacuation routes. Additional data were obtained from Mississippi DOT that detail any use of contra-flow, times, vehicle counts and speed of evacuating traffic during Hurricane Gustav. The roadways represented are I-55 at the Louisiana State Line, I-55 south of Brookhaven, I-59 at the Louisiana State Line, I-59 south of Hattiesburg and I-10 at the Louisiana State Line. The results are displayed in Tables 6-8 to 6-12, respectively.

Evacuation routes used in Hancock County were: I-10, US 90, SR 604, SR 607, SR 603 and SR 53. In Harrison County, the primary evacuation routes were I-10, I-110, US 90, US 49, SR 53, SR 67, and SR 15. Jackson County's major evacuation routes were I-10, SR 63, SR 613 and SR 57. No significant traffic problems were reported on the evacuation routes of Hancock and Harrison counties. Jackson County specifically reported heavy congestion on I-10 East through the county, particularly at exit 609. The hurricane evacuation route map for Mississippi is shown in Figure 6-9.

Table 6-8: Hurricane Gustav Traffic Counts on Interstate 55 at the Louisiana State Line

Date	*Contra-flow All lanes northbound	I-55 at LA State Line					
		Start Time	Vehicle Count Northbound	Speed Northbound	Vehicle Count Southbound	Speed Southbound	Total Vehicle Count
8/30/08		4:00	484	65.5	122	68	606
		5:00	775	65	174	69	949
		6:00	1,440	63	186	69	1,626
		7:00	1,814	64.5	249	72	2,063
		8:00	2,191	62	246	70.5	2,437
		9:00	2,115	63	301	71	2,416
		10:00	2,351	55.5	310	70	2,661
		11:00	2,510	46.5	291	67.5	2,801
		12:00	2,424	51.5	295	71	2,719
		13:00	2,346	59.5	332	73	2,678
		14:00	2,345	49	315	69	2,660
		15:00	2,622	44	287	74	2,909
		16:00	2,553	42	317	69	2,870
		17:00	2,522	32	272	72	2,794
		18:00	2,455	34.5	255	72.5	2,710
		19:00	2,403	33.5	220	74.5	2,623
		20:00	2,464	44	236	70.5	2,700
		21:00	2,238	45.5	196	71	2,434
		22:00	2,256	45.5	210	68.5	2,466
	23:00	1,595	50.5	164	68.5	1,759	
8/31/08		0:00	2,174	48	116	68	2,290
		1:00	2,359	48.5	88	71	2,447
		2:00	2,096	32.5	110	69.5	2,206
		3:00	1,834	17.5	44	55	1,878
		4:00	1,636	17.5	34	44	1,670
	*	5:00	3,183	33.5	102	38.5	3,285
	*	6:00	3,513	34	125	34	3,638
	*	7:00	4,215	41	107	61	4,322
	*	8:00	3,717	52	68	52	3,785
	*	9:00	4,121	50	86	39	4,207
	*	10:00	1,837	57.5	1,423	51	3,260
	*	11:00	2,253	57	1,238	57.5	3,491
	*	12:00	2,291	51.5	1,123	51	3,414
	*	13:00	1,924	57	1,262	54.5	3,186
	*	14:00	1,703	61	1,519	54	3,222
	*	15:00	1,086	64.5	849	58	1,935
	*	16:00	817	63.5	633	62.5	1,450
	*	17:00	882	64	79	59.5	961
	*	18:00	775	66	50	71	825
	*	19:00	573	66.5	57	61.5	630

Contra-flow Total	41,611
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Table 6-9: Hurricane Gustav Traffic Counts on Interstate 55 South of Brookhaven

I-55 South of Brookhaven						
Date	Start Time	Vehicle Count Northbound	Speed Northbound	Vehicle Count Southbound	Speed Southbound	Total Vehicle Count
8/30/08	4:00	372	67.5	147	66.5	519
	5:00	549	69	142	70	691
	6:00	969	66.5	225	66	1,194
	7:00	1,556	67	231	71.5	1,787
	8:00	1,848	68	310	72	2,158
	9:00	2,005	66	334	64.5	2,339
	10:00	1,936	65	380	70.5	2,316
	11:00	2,100	65	354	71.5	2,454
	12:00	2,337	62.5	406	70.5	2,743
	13:00	2,168	65	413	70	2,581
	14:00	2,132	62	392	69.5	2,524
	15:00	2,176	61.5	416	69.5	2,592
	16:00	2,308	64	349	70	2,657
	17:00	2,372	64	379	70	2,751
	18:00	2,136	63.5	326	70.5	2,462
	19:00	2,211	61.5	314	70	2,525
	20:00	1,989	57.5	271	68	2,260
	21:00	2,192	56	258	68.5	2,450
22:00	2,040	54.5	197	69	2,237	
23:00	2,268	53.5	178	71	2,446	
8/31/08	0:00	1,577	61.5	127	71	1,704
	1:00	2,013	58	120	62.5	2,133
	2:00	1,951	57.5	90	66	2,041
	3:00	1,888	52.5	12	57	1,900
	4:00	1,888	50	3	--	1,891
	5:00	1,486	56.5	0	--	1,486
	6:00	2,418	57	3	--	2,421
	7:00	2,682	56.5	3	--	2,685
	8:00	2,653	43.5	7	71.5	2,660
	9:00	2,691	36	8	72	2,699
	10:00	2,687	36	7	72.5	2,694
	11:00	2,630	35	8	71	2,638
	12:00	2,658	32.5	4	57.5	2,662
	13:00	2,579	30.5	5	67	2,584
	14:00	2,567	33.5	4	--	2,571
	15:00	2,553	53.5	13	64	2,566
	16:00	2,728	39.5	7	--	2,735
	17:00	2,594	62	4	72.5	2,598
18:00	2,072	60	3	--	2,075	
19:00	858	64.5	99	64	957	

Total northbound volume of this site during contra-flow hours of site I-55 at LA State Line	35,856
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Table 6-10: Hurricane Gustav Traffic Counts on Interstate 59 at the Louisiana State Line

Date	I-59 at LA State Line						
	*Contra-flow All lanes northbound	Start Time	Vehicle Count Northbound	Speed Northbound	Vehicle Count Southbound	Speed Southbound	Total Vehicle Count
8/30/08		4:00	594	67	148	71	742
		5:00	1,023	66.5	301	71.5	1,324
		6:00	1,509	64.5	403	71	1,912
		7:00	1,712	65.5	447	70.5	2,159
		8:00	1,652	38	514	70.5	2,166
		9:00	2,077	46	511	72.5	2,588
		10:00	1,980	63.5	517	71.5	2,497
		11:00	2,263	64.5	578	72	2,841
		12:00	2,294	65	539	69	2,833
		13:00	2,338	63	504	70.5	2,842
		14:00	2,657	58.5	476	72.5	3,133
		15:00	2,412	61	427	71	2,839
		16:00	2,413	60	424	71	2,837
		17:00	2,584	57	400	72.5	2,984
		18:00	2,513	59	364	71	2,877
		19:00	2,533	59	326	69.5	2,859
		20:00	2,168	54	307	71.5	2,475
		21:00	2,515	46.5	307	72	2,822
		22:00	2,467	52.5	257	70	2,724
	23:00	2,220	47.5	213	70	2,433	
8/31/08		0:00	2,177	50.5	140	71	2,317
		1:00	2,500	32.5	114	70.5	2,614
		2:00	1,994	16.5	40	76	2,034
		3:00	1,953	17.5	6	--	1,959
	*	4:00	2,029	16	636	52.5	2,665
	*	5:00	2,278	32	1,388	51	3,666
	*	6:00	2,260	55	1,480	53.5	3,740
	*	7:00	2,038	32	1,619	52.5	3,657
	*	8:00	1,887	50.5	2,019	21.5	3,906
	*	9:00	1,834	31	2,434	35.5	4,268
	*	10:00	1,406	20	1,602	18	3,008
	*	11:00	1,443	21.5	1,978	18	3,421
	*	12:00	1,319	20.5	1,676	20	2,995
	*	13:00	1,179	17	1,595	15	2,774
	*	14:00	1,277	18	1,161	21	2,438
	*	15:00	942	12.5	151	44.5	1,093
	*	16:00	1,757	44.5	204	58	1,961
	*	17:00	580	64	5	65	585
	*	18:00	456	61	3	--	459
*	19:00	347	61.5	2	--	349	
*	20:00	187	60.5	9	62	196	
*	21:00	115	59	27	59	142	

Contra-flow Total	41,323
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Table 6-11: Hurricane Gustav Traffic Counts on Interstate 59 South of Hattiesburg

I-59 South of Hattiesburg				
Date	Start Time	Vehicle Count Northbound	Vehicle Count Southbound	Total Vehicle Count
8/30/08	4:00	395	91	486
	5:00	639	140	779
	6:00	1,128	179	1,307
	7:00	1,420	234	1,654
	8:00	1,567	205	1,772
	9:00	1,519	280	1,799
	10:00	2,123	298	2,421
	11:00	1,822	336	2,158
	12:00	1,932	351	2,283
	13:00	1,924	354	2,278
	14:00	2,134	317	2,451
	15:00	2,228	330	2,558
	16:00	2,043	323	2,366
	17:00	2,115	285	2,400
	18:00	2,066	269	2,335
	19:00	2,105	242	2,347
	20:00	1,642	302	1,944
	21:00	2,185	317	2,502
	22:00	2,048	273	2,321
	23:00	2,167	155	2,322
8/31/08	0:00	1,946	104	2,050
	1:00	1,477	130	1,607
	2:00	2,227	75	2,302
	3:00	2,057	56	2,113
	4:00	1,897	24	1,921
	5:00	1,490	46	1,536
	6:00	2,221	54	2,275
	7:00	2,141	68	2,209
	8:00	2,363	93	2,456
	9:00	2,177	131	2,308
	10:00	2,203	93	2,296
	11:00	2,235	111	2,346
	12:00	2,157	121	2,278
	13:00	2,245	145	2,390
	14:00	2,257	161	2,418
	15:00	2,022	137	2,159
	16:00	2,032	118	2,150
	17:00	1,941	122	2,063
	18:00	1,636	135	1,771
	19:00	1,390	111	1,501
	20:00	1,470	67	1,537
21:00	1,188	89	1,277	
Total northbound volume of this site during contra-flow hours of site I-59 at LA State Line				35,065

Table 6-12: Hurricane Gustav Traffic Counts on Interstate 10 East of the Louisiana State Line

Date	Start Time	I-10 East of LA State Line				Total Vehicle Count
		Vehicle Count Eastbound	Speed Eastbound	Vehicle Count Westbound	Speed Westbound	
8/30/08	4:00	757	70.5	227	--	984
	5:00	1,155	68.5	323	--	1,478
	6:00	1,784	68.5	385	--	2,169
	7:00	1,917	69	455	--	2,372
	8:00	2,096	68.5	538	--	2,634
	9:00	2,062	68	602	--	2,664
	10:00	2,169	67	692	--	2,861
	11:00	2,271	67.5	747	--	3,018
	12:00	2,431	64.5	688	--	3,119
	13:00	2,846	62.5	692	--	3,538
	14:00	2,810	64	633	--	3,443
	15:00	2,134	39.5	588	--	2,722
	16:00	2,670	42.5	593	--	3,263
	17:00	2,499	54	503	--	3,002
	18:00	2,622	57.5	435	--	3,057
	19:00	2,630	56.5	356	--	2,986
	20:00	2,881	50.5	378	--	3,259
	21:00	2,783	49	326	--	3,109
	22:00	2,748	47.5	462	--	3,210
23:00	2,600	52	356	--	2,956	
8/31/08	0:00	2,616	50.5	280	--	2,896
	1:00	2,505	49.5	228	--	2,733
	2:00	2,451	53	197	--	2,648
	3:00	2,411	52.5	150	--	2,561
	4:00	1,884	57.5	98	--	1,982
	5:00	1,957	54	157	--	2,114
	6:00	394	67	124	--	518
	7:00	303	69	156	--	459
	8:00	375	69.5	135	--	510
	9:00	519	68.5	209	--	728
	10:00	828	68.5	205	--	1,033
	11:00	758	70	197	--	955
	12:00	821	69	202	--	1,023
	13:00	793	71.5	169	--	962
	14:00	660	68	193	--	853
	15:00	581	71.5	197	--	778
	16:00	464	70	156	--	620
	17:00	369	71.5	123	--	492
	18:00	274	69	137	--	411
19:00	266	69.5	78	--	344	
20:00	180	71.5	81	--	261	
21:00	126	67	116	--	242	
Total eastbound volume of this site during contra-flow hours of site I-59 at LA State Line						11,552

6.4.4 ACTUAL/PREDICTED CLEARANCE TIMES AND PROBLEMS

Hancock, Harrison and Jackson counties reported that clearance times were available from the HES. Mississippi DOT reported that the clearance time for a Hurricane Gustav-type storm scenario was 13 hours. In actuality, the evacuation for Hurricane Gustav started at 5:30 am Sunday morning and was clear by 1:00 pm that afternoon; a clearance time of only 7.5 hours. MDOT reported very heavy traffic from Louisiana traffic northbound on I-59, but that the traffic was moving steadily. The Mississippi DOT reported congestion at the terminus of the I-59 contra-flow operation for Hurricane Gustav. (No contra-flow system was used for Hurricane Ike). A three to five mile queue formed where the contra-flow reduced back down to two lanes, but this queue was out of the area of concern and dissipated well in advance of landfall with no consequences to the motorists in the queue. This queue was primarily produced by traffic evacuating from the New Orleans area.

The relatively small evacuating population and mediocre response rates coupled with a low rate of perceived threat did not warrant the use of clearance times in the traditional sense, i.e., by evacuation zone. Rather, clearance times reported for Hurricane Gustav reflect the length of time until the last evacuee decided to leave on a discretionary basis. Jackson County reported a timeframe of eight to 12 hours for populations targeted for evacuation. Explanations for the small response rates were the perception that Hurricanes Ike and Gustav were not presented as a major threat by the media and the vast majority of people decided to simply “ride it out.” Others reported that their experience in traffic during past storms decreased their willingness to evacuate. The evacuating population in Mississippi is considerably smaller than its neighboring states like Louisiana with the greater New Orleans population, which evacuates through Mississippi. The Mississippi DOT also reported issues with Louisiana residents entering Mississippi without sufficient fuel and stopping and asking for help finding gas. Lines at gas station exits backed up onto the freeway and reduced mainline vehicle throughput.

6.4.5 TRAFFIC CONTROL MEASURES AND PROBLEMS

Manual operation of traffic signals was reported as one measure used during the evacuation for Hurricane Gustav. Mississippi DOT reported contra-flow crews were in place for both storm events but only activated the system for Hurricane Gustav. State Troopers and other DOT personnel were stationed at key interchanges to troubleshoot and keep traffic moving when needed. Survey respondents offered several suggestions to improve the management and performance of the traffic control system, including:

- Real-time/intelligent traffic data/management systems
- Update the Hurricane Evacuation Study
- Better inter-agency coordination
- Additional CCTVs
- More traffic count stations
- Access to state CCTVs
- Capacity improvements to relieve bottlenecks

Harrison County indicated that they did not have an issue with traffic congestion on evacuation routes. Hancock County reported normal traffic volumes during Hurricane Ike and heavy volumes for Hurricane Gustav. Despite heavy volumes of traffic during Hurricane Gustav, Hancock County reported that there were no significant traffic problems and rated its highway capacity as excellent. On the other hand, Jackson County was extremely dissatisfied with its evacuation roadway capacity, highlighting that all northbound highways are only two lanes. Another issue brought up in Jackson County was limited fuel availability brought on by the high numbers of evacuating vehicles passing through the county.

No problems were reported relative to evacuating tourists and any necessary evacuation of at-risk populations was completed successfully.

6.4.6 CRITICAL TRANSPORTATION NEEDS (CTN)

Evacuation preparedness plans should consider all persons who do not have access to a private vehicle and therefore would have to rely on public transportation for evacuation. Local government should attempt to arrange for adequate resources to meet the demand for public transportation. Planning for adequate special needs emergency transportation for residents in private homes is often the responsibility of local emergency management officials, while transportation for those in health-related facilities should be the responsibility of the individual facilities. Although detailed information concerning residents of private homes may be difficult to obtain, each local government should develop procedures for maintaining an up-to-date roster of persons likely to need special assistance. Non-ambulatory patients will require transportation that can easily accommodate wheelchairs, stretchers, and, possibly, life-sustaining equipment. Lack of resources for these needs could result in critical evacuation delays and increased hazards for the evacuees. The Special Needs population for each county changes from year to year and requires public cooperation and assistance to maintain an up-to-date listing.

In general, coastal counties reported that the evacuation of nursing homes, hospitals, and disabled person institutions during Hurricanes Gustav and Ike was effective. However, loss of communication impaired the ability to coordinate with these institutions.

Until recently, plans for evacuating sick and disabled persons living independently were less structured than plans for institutionalized persons in the recent past. Mississippi reported having a good understanding of its special needs populations. Critical transportation needs populations, described by the locals as, “people without private vehicles or access to them,” have been a concern in the past but have been specifically addressed post-Katrina in the State’s current Comprehensive Emergency Management Plan. Since Katrina, the state has developed a plan for 1,500 special needs beds using 15 state community colleges and their multiple campuses.

As mentioned previously, Hurricane Katrina exposed multiple transportation and sheltering problems including availability of resources, sanitation, food/water shortages, beds, staffing and commodity shortages and logistical support. By the time Hurricanes Gustav and Ike arrived most of the aforementioned problems had been corrected with no serious complications reported.

Residents with special needs in Mississippi, who need transportation to a shelter are asked to call the Coast Transit Agency at 229-896-8000. All medically-institutionalized persons and facilities have been identified by the Mississippi Department of Health (MDH). In addition, the Mississippi Department of Education (MDE) has an evacuation plan that utilizes Local Education Agency (LEA) district - owned school buses, drivers and school safety officers for security. The Coastal area counties of Jackson, Harrison, Hancock, Pearl River, Stone and George are targeted as priorities for school bus evacuation of residents with special needs. Self-reported evacuation requests by people without private transportation total 1,350 people in these counties. MDE has identified the individuals without transportation in each county and has allocated about 60 school buses to handle these needs. The plan identifies the number of evacuees in each county (ranging from 50 to 300 per county), evacuation points, staging points and properly-equipped shelter locations for each group.

MDE also provides bus transport for MDH-identified persons to Special Needs shelters. Mississippi Department of Health personnel are assigned to the bus staging points for special needs persons and they are responsible for identifying all special needs people and directing them to buses which are routed to Special Needs shelters with the appropriate medical staff and necessary medical equipment (i.e. oxygen bottles, medicine, etc.). MDE is responsible for assigning sufficient buses to MDH at the evacuation points for special needs evacuees, and directing them to the special needs shelters. Mississippi DOT is responsible for keeping all federal/state highways clear for passage of all buses.

MDH has recently purchased 14 “Ambubus” kits which convert buses to accommodate bed-ridden, non-ambulatory persons from hospitals.

In short, while there were problems in the past (pre- and post-Katrina), critical transportation needs problems have been identified, studied and are being resolved by ongoing evacuation planning efforts. Several problems experienced in the past that are being addressed currently are: adequate personnel, provisions of food and water, proper sanitation, and the availability of oxygen tanks and/or medical supplies/equipment if necessary. The mobilization of the MDE’s entire school bus system guarantees adequate bus capacity and the state’s use of their state community colleges for sheltering are major steps toward correcting past problems. Training and exercises should enable these plans to be executed with success in the future.

6.5 EVACUATION DATA

Post storm data collection for the State of Mississippi resulted in varied information between the three local coastal counties. From the collected surveys Hancock, Harrison and Jackson counties indicated similar actions during the response effort of Hurricane Gustav; however response actions during Hurricane Ike differed from County to County. Limited information was obtained from inland counties and of the information collected, there were common themes related to a more coordinated effort in evacuation decision making. Better communication with the evacuating population is recommended. Tables 6-13 and 6-14 provide a summary of the responses and information on evacuation gathered from each county.

6.5.1 EVACUATION DECISION MAKING—HURRICANE GUSTAV

Hancock County issued mandatory evacuation orders on August 31, 2008 for mobile homes, manufactured homes, river, lake and beach front and other areas prone to historic flooding. Harrison County issued a similar order on September 1, 2008. Jackson County issued mandatory evacuation orders in concert with the other coastal counties and also included healthcare facilities and islands.

Evacuation orders and evacuation areas for Hancock, Harrison and Jackson counties were made by local officials in consult with the Mississippi Emergency Management Agency and neighboring counties. Jackson County reports the Mississippi Governor issued an evacuation order which conflicted with the local order. Hancock and Harrison counties did not make mention of a Governor's Evacuation Order.

All three counties utilized HES products in their decision making process. The areas targeted for evacuation were decided by local officials based on historic flooding, storm surge maps and other political sensitive areas. For each County, officials reported the areas targeted in the evacuation orders were sufficient for the threat from these two minor events.

The evacuation orders were distributed in a variety of formats common to all three counties. These formats include television, radio, and internet. Jackson County also utilized a mass email capability and Harrison County also employed the use of the newspaper and local telephones calling systems.

Language barriers were minimal in all three counties. Harrison County noted challenges in reaching Spanish and Vietnamese speaking populations. Hancock County and Jackson County utilized in-house and American Red Cross interpreters to mitigate any language barriers. Language barriers in all three counties did not hinder evacuation activities.

6.5.2 EVACUATION DECISION MAKING –HURRICANE IKE

Hancock and Harrison counties did not issue any evacuation order for Ike. Jackson County issued a voluntary evacuation order for the County. It is undetermined when Jackson County issued the voluntary evacuation order.

Local officials made the decision to not issue local evacuation orders in Hancock and Harrison counties. Likewise, local officials also made the decision to issue voluntary evacuation orders in Jackson County. This decision was based on historical flooding impacts from previous systems. The evacuation order issued in Jackson County was distributed in a variety of formats to include television, radio, internet, and mass email.

Language barriers communicating the storm specific information were minimal in all three counties. Harrison County noted challenges in reaching Spanish and Vietnamese speaking populations. Hancock County and Jackson County utilized in-house and American Red Cross interpreters to mitigate any language barriers. Language barriers experienced in all three counties has minimal to no impact into communicating the message.

6.5.3 EVACUATION TIMING –HURRICANE GUSTAV

Hancock and Jackson counties reported the evacuation orders were issued in a timely manner. Harrison County reports the timing of the evacuation orders was insufficient for the threat and largely could have used more time for low lying areas that were impacted by Storm Surge. Hancock County reported utilization of HES Products and Storm Surge Maps and historical flooding as significant references in their decision making. In addition to historical flooding records, Harrison County also used FIRM Maps as a reference tool. Jackson County used all the before mentioned tools and also referenced utilization of lessons learned and political significance.

Hancock and Jackson counties reported the HES Clearance Times were appropriate for the threat from these two events as they were not major events. Hancock and Jackson counties reported little to no significant problems with tourist occupancy posing a problem to the evacuation process. Jackson County indicated the evacuation process was initiated approximately 12 hours prior to storm impacts. This provided sufficient time to announce and manage the evacuation process. Jackson County also reported that the longest commute time was 20 hours.

6.5.4 EVACUATION TIMING—HURRICANE IKE

Jackson County reported the evacuation order was issued in a timely manner, while Harrison and Hancock counties did not issue an evacuation order for Hurricane Ike.

Hancock and Jackson counties reported the HES Clearance Times were appropriate for the threat. Harrison County did not offer an opinion on the appropriateness of the clearance times.

6.5.5 EVACUATION AND ROADWAY NETWORK—HURRICANE GUSTAV

To facilitate the evacuation process, Hancock County reported utilization of the State Administrative Agency (SAA) and Jackson County reported to use of local radio to assist with traffic management.

Evacuation orders were issued for low-lying and flood prone areas in each county. In Hancock County, approximately 300 residents evacuated. In Jackson County, five percent of the total population evacuated, approximately 6,500 Jackson County residents. Hancock and Jackson counties reported that the early evacuating at-risk populations was successful.

Once evacuation orders were issued, Hancock County reported a normal public response and encouraged residents to evacuate using I-10, US Hwy 19, MS Hwy 43 and MS Hwy 53. Traffic volume on these road networks and other local roads were estimated to be heavy. In spite of the heavy traffic volume, Hancock County reported minimal to no problems during the evacuation process. Jackson County reported normal traffic volume on advertised evacuation routes and rated the overall capacity of the evacuation routes in relation to vehicular traffic as unsatisfactory due to all major north bound evacuation routes are two lanes. Significant traffic management challenges were reported by Jackson County. Some of the notable problems include unanticipated volumes, inadequate traffic control, diversions from other areas, inadequate signage, congestion and traffic jams, uncoordinated traffic signals, accidents and stalled vehicles, uncoordinated evacuation timing and activating the contra-flow plan too early. Information was not provided to estimate challenges in Harrison County.

6.5.6 EVACUATION AND ROADWAY NETWORK—HURRICANE IKE

Hancock County utilized an FM Radio Station and HAM Radio operations to assist during this event to facilitate the evacuation process. Evacuation orders were issued for low-lying and beachfront areas of Jackson County.

Once evacuation orders were issued, the public response was reported as normal with light to normal traffic volume on advertised evacuation routes. No significant traffic management challenges were reported during Hurricane Ike.

**Table 6-13: Evacuation Decision Process Summary
Hurricane Gustav Evacuation Assessment**

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
Hancock County	PARTIAL 08/30/08 FULL 09/04/08	Local Decision in Consult with Regional and State Partners	Mandatory 08/31/08 8:00 am	Within Hancock County: Undetermined Through Hancock County: Undetermined	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH, Local Hurricane Plan	Yes
Harrison County	PARTIAL 08/29/08 FULL 08/30/08	Local Decision in Consult with Regional and State Partners	Voluntary 08/30/08 Morning Recommend 08/31/08 Afternoon Mandatory 09/01/08 Morning	Within Harrison County: Undetermined Through Harrison County: Undetermined	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH, Local Hurricane Plan, Evacuation Maps	Yes
Jackson County	PARTIAL 08/30/08 FULL 08/31/09	Local Decision in Consult with Regional and State Partners	Undetermined	Within Jackson County: 30% Through Jackson County: Undetermined	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH, Local Hurricane Plan, Evacuation Maps, HES Study	Yes

**Table 6-14: Evacuation Decision Process Summary--
Hurricane Ike Evacuation Assessment**

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
Hancock County	PARTIAL 09/10/08 FULL 09/13/08	Local Decision in Consult with Regional and State Partners	None	Within Hancock County: Undetermined Through Hancock County: Undetermined	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH, Local Hurricane Plan	Yes
Harrison County	PARTIAL 09/10/08 FULL None	Local Decision in Consult with Regional and State Partners	None	Within Harrison County: Undetermined Through Harrison County: Undetermined	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH, Local Hurricane Plan, Evacuation Maps	Yes
Jackson County	PARTIAL 09/11/08 FULL None	Local Decision in Consult with Regional and State Partners	Voluntary Undetermined Date and Time	Within Jackson County: Undetermined Through Jackson County: Undetermined	HURREVAC, Storm Surge Maps, Clearance Times, SLOSH, Local Hurricane Plan, Evacuation Maps, HES Study	Yes

6.6 PUBLIC INFORMATION/MEDIA DATA

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

6.6.1 INFORMATION RECEIPT

A variety of sources were utilized to receive event information. Sources common to all surveys were HURREVAC and information from The Weather Channel. The Mississippi Emergency Management Agency also relied on information from the FEMA Regional Office and the Hurricane Liaison Team. Local sources also used information from commercial media, the local National Weather Service office, and neighboring county emergency management agencies. These sources were commonly received utilizing the internet, telephone (land, mobile and satellite), fax, email, radio and television. Common website referenced included the National Hurricane Center, National Weather Service, and Crown Weather. Hancock County also referenced Mike Lane’s Tide Charts; and Jackson County referenced Weather Underground. All surveys indicated information received was timely and utilized in the decision making process. Interviews and surveys with media representatives indicate timely information was received through email and web blogs.

6.6.2 INFORMATION DISSEMINATION

Several methods were employed to maximize information dissemination to the media for notification to the threatened population. The State routed all information through their Public Information Office and also coordinated information dissemination with the local Emergency Management Agencies. The counties considered local media market a valuable tool for information dissemination and kept them well informed of local and regional efforts. To facilitate the partnership, media representatives were granted limited access to the local Emergency Operations Centers. Media representatives report information was disseminated to the public through web blogs, the internet and television. Some challenges were recognized predominately due to end user infrastructure and devices utilized. Power outages on the coast resulted in significant information delays. Additionally, media representatives reported experiencing confusion on evacuation zone, target destination and shelter availability.

During an emergency, one-voice cohesion is vital to ensure a safe and effective response. Hancock, Harrison and Jackson counties worked as a cohesive group to ensure the three Coastal counties were synchronized in their coordination and communication efforts. Additionally, information was shared with inland counties and the State facilitated several conference calls to ensure a coordinated response effort.

6.6.3 MEDIA RELATIONS

From a review of the comments submitted by media, county officials, and state officials, it appears that the emergency managers collect and disseminate information to the general public. Jackson and Hancock County reported hosting specific pre-season coordination sessions with the media and any emergency management related jargon, acronyms or descriptions were explained to facilitate using the media as a tool for information management.

The State of Mississippi utilized the State Public Broadcast System, Digital Message Boards, FM Radio and Remote Highway Signs to communicate information to the evacuating public. However, lack of signage directing evacuees to shelters proved to be a challenge. Additionally, the State's 211 system was not optimal and the 911 tower failed resulting in some misinformation to the news media. While information was blanketed throughout the State, MEMA reports the general public showed a lack of attention to available sources.

Interviews and surveys with media representatives indicate support provided by local emergency management offices was excellent and report that several media representatives spent time in the State and local EOCs. Media representatives confirmed participation with local training and coordination sessions, however, recognize the need for better communication and coordination activities throughout the year.

Overall, Hancock County reported an excellent communication and information dissemination experience within the jurisdiction, between jurisdictions, with the National Weather Service and with local media partners. Jackson County reported excellent communication and information dissemination relations within the jurisdiction, between jurisdictions, with the National Weather Service and with local media partners. However, Jackson County reported an average experience with FEMA and a slightly less than average experience communicating and coordinating information with the State as most of their attention was centered on the Biloxi and Gulfport areas.

The MEMA reported an excellent communication and information dissemination experience within the State EOC, with the National Weather Service, local and national media, and FEMA. State-to-State communication between EOCs was reported as slightly less than average, and communication with evacuees was reported as above average with Mississippi residents but unsatisfactory with residents from Louisiana.

While several of the survey respondents commented that there is still need for improvement in the public information areas of communication and information dissemination, there appears to have been progress made in regard to this need over the years as there were no comments about major failures. 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 FEMA INITIATIVES

The public response and focused attention to the shortfall experienced during Hurricane Katrina resulted in significant adjustments in all levels of life. Corrective actions from all levels of government, the private sector and volunteer organizations have resulted in many cultural and socio-economic realizations and more importantly expectations. The recognized threat to the Mississippi Coast from Hurricanes Gustav and Ike represent a realistic response from both the government and the general public. Even with the heightened attention, focus on program improvement and initiation of protective measure, one prevalent theme resulted from this threat...the general public must take responsibility for their own actions.

6.7.1 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 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. In past storm events, FEMA has generally been reluctant to make a “pre-event” declaration due to the cost associated with a declaration and the uncertainty of the storm’s ultimate landfall location. These decisions are made on a case by case basis so a State cannot assume a pre-event declaration. Once a declaration has been made (either pre or post) Federal funds are made available for a number of purposes, depending on the facts of each event. Private businesses are also affected as once the Federal Government “declares” a disaster situation, the private sector will also respond in earnest to the event.

6.7.2 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. When the need surpasses the ability, a gap is defined and extensive 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. These assets, however, are merely planning tools and may not represent the actual need during the threat period. 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 Hurricanes 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.

6.7.3 PUBLIC AWARENESS

In the three coastal counties, each community issued similar evacuation orders during the Hurricane Gustav threat. Jackson County was the only community to issue an evacuation order (voluntary) for the Hurricane Ike threat. Community response to both events was marginal in each community and for each event. 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 Application, SLOSH modeling, local 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 PSAs, 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. The 2002 Mississippi HES components and their utilization in Hurricanes Gustav and Ike are shown in Table 7-1.

Table 7-1: 2002 Mississippi HES Components and Hurricanes Gustav and Ike Utilization

HES Component	2002 HES Predictions	Actual Hurricane Gustav/Ike Occurrence
Hazards Analysis	Minimal to no surge/wind effects as storm not forecast to make landfall in Mississippi. (Large wind fields not considered in 1999 SLOSH model runs)	Higher than expected surges due to larger than normal wind field of storm.
Vulnerability Analysis	Minimal to minor impacts due to the storm’s track and proximity to the State.	Minimal affects on the population and critical facilities.
Shelter Analysis	Hancock County— 11 shelters listed Harrison County— 29 shelters listed Jackson County— 15 shelters listed	Hancock County— None of listed shelters in HES were used Harrison County— 6 of 29 listed shelters were opened Jackson County— 3 of 15 listed shelters were opened
Behavioral Analysis	HES Behavioral Analysis data not accessed for storms not expected to make landfall.	Evacuation participation rates were low as the storms were not perceived to be a major threat.
Transportation Analysis	Primary evacuation routes were designated for each county.	Designated hurricane evacuation routes were utilized by the limited evacuating population.

7.1 VULNERABILITY ASSESSMENT

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.

7.1.1 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 Jackson and Hancock counties, 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. It is important that a major public education program be implemented in areas where "new" evacuation zones have been developed as the public **MUST** know what emergency management agency plans are in effect and what evacuation zones have been adopted. Evacuation zones **MUST** be communicated to the public and the importance of clearance developed from these zones must be communicated to the decision makers.

7.1.2 SURGE MAPS

Many of the officials interviewed for Hurricanes 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 Light Identification Detection and Ranging (LIDAR) 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.

7.1.3 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. Hancock, Harrison, and Jackson counties should be encouraged to update their comprehensive, coordinated hurricane evacuation plans to addresses these special needs populations, including when to leave, specific destinations, and pre-arranged transportation.

7.2 SHELTERING ASSESSMENT

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.

7.2.1 MISSISSIPPI HES COMPARISON TO HURRICANES GUSTAV AND IKE

The 2002 Mississippi HES indicates 11 possible shelters in Hancock County for a total of approximately 5,000 individuals. None of those shelters are listed as opened locations in the ARC list of shelters that opened for Hurricanes Gustav/Ike. According to ARC data, Hancock County had four ARC managed shelters that opened on August 31. The shelters closed September 1, 2008 to September 5, 2008 and housed a total of 1,250 individuals.

The 2002 Mississippi HES indicates a possible 29 locations for about 18,305 individuals in Harrison County. According to ARC data, there were three ARC managed and three ARC partner shelters open in Harrison County for Hurricanes Gustav/Ike. All locations were listed on the 2002 Mississippi HES indicating that about one-fifth of available shelter locations were used for Hurricanes Gustav/Ike. The majority opened on August 31 with a few opening as late as September 11 (at a senior center). According to a focus group with Harrison County officials, there was one Harrison County ARC managed shelter that opened at the Senior Center on September 11 through September 12 for 100 people. Numbers are not clear for the six overall shelters but appear to include 1,630 at the three ARC managed locations and 1,710 at the three ARC partner shelters, including people that required brief shelter after the storms passed. Shelter locations thus housed about 3,340 individuals out of a capacity of 18,305 or approximately 18 percent capacity. Most shelters closed September 2, 2008 to September 4, 2008.

The 2002 Mississippi HES indicates that 15 locations were identified as shelters with a capacity of 6,950 for Jackson County. For Hurricanes Gustav and Ike, five shelters opened and four hosted evacuees. Of those four, three were listed on the 2002 Mississippi HES indicating that 20 percent of the 2002-identified shelters were used. The East Central Community College was used as the fourth shelter and was not listed as a shelter in the 2002 Mississippi HES. Shelter numbers, which are believed to be under-reported, fell at 1,558 residents or about 22% of the original shelter capacity from the 2002 Mississippi HES.

7.2.2 RECOMMENDATIONS AND OBSERVATIONS

- Community college locations are working well for Mississippi for medical special needs shelters. Colleges have benefited by receiving wireless capacity, air conditioning and generators for gymnasiums.
- An HMGP grant is being used to create a state of the art medical special needs shelter; grants are the best way to accomplish building of hardened facilities for sheltering and need to be continually funded.
- Shelter data are reported to the ARC National Shelter Survey then passed to the Mississippi Department of Health and Human Services for import into MEMA's WebEOC. Those involved in Mississippi shelters are working to expedite data transfer in future events. The transfer is time-consuming and uses valuable staff time because the software packages do not currently "speak" to each other. Shelter partners indicate a need to streamline their shelter data entry procedures. In Harrison County, the ARC reports shelter data to the ARC National Shelter System database while the county has begun to use HURREVAC and emergency managers use WebEOC. A consistent database shared by all involved in sheltering can assist with public announcements of evacuation routing, identification of shelter locations open/full, logistical and resource supply and closing procedures.
- A survey is currently underway for generators needed in shelters. This survey is being conducted through USACE. It is expected that grant funds will be needed to install generators including funding for pads, switches, connections and other necessary resources.
- Louisiana has sent evacuees to Mississippi earlier than anticipated which has caused bottlenecks on I-65 and I-10 as evacuees try to reach shelters. Coordination and communication with Louisiana needs to improve to reduce traffic congestion and allow shelters to be fully prepared to accept evacuees.
- Shelter operations are tending toward consolidation and larger shelters in order to improve logistical coordination and supply. While this seems beneficial for both logistics and repatriation, it may increase the number of challenging residents (e.g., drug use, mental health) which will require pre-planning.
- It can be financially challenging to return home from a shelter. Funding or other options (such as fuel trucks) may need to be made available to assist low-income, self-evacuating households.

7.3 BEHAVIORAL ASSESSMENT

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.

7.3.1 NARRATIVE

It appears that no behavioral studies have been completed in Mississippi after Hurricanes Gustav and Ike. No post-storm data have been collected about the hurricane preparation and evacuation attitudes and behavior relative to these storms. Earlier behavioral work indicated some problems related to the risk assessments made by coastal residents.

Empirical evidence in evacuation after evacuation demonstrates emphatically that the very same people will leave promptly or gradually, depending upon the circumstances of the particular threat. When people believe they have the luxury of taking their time to depart, most tend to do so, even to the point of waiting until the following day to leave rather than travel at night. However, when the urgency of immediate response is successfully communicated to people, they respond very swiftly, even leaving between midnight and daybreak. One other factor was made clear in the Georges survey: very few evacuees leave before officials issue an evacuation notice. Therefore, people are not going to leave in substantial numbers until someone in a position of authority tells them to and then they will leave as promptly as they are told they must. The urgency of evacuations varies because of the error inherent in hurricane forecasting.

The most recent survey in Mississippi did not ask Hurricane Georges evacuees the time of day and date they departed because of the length of time which had passed since the evacuation. However, the earlier post-Hurricane Georges survey in Mississippi did ask that question, and responses conformed to the generalizations stated above. Few evacuees left prior to the first evacuation notices being issued by public officials.

Hurricane Katrina had a profound impact on coastal Mississippi. The devastating effects of surge there should have had a profound effect on evacuation intent. The threat from either Hurricanes Gustav or Ike was not severe. However, given memories of Katrina, it is surprising that more people did not leave for these two storms. Coastal Mississippi has undergone significant population changes since the 2005 post-Ivan study. The expected effects on hurricane response are unknown.

7.3.2 RECOMMENDATIONS

Based on interviews and the data collected (Section 6.3), existing behavioral studies in the State of Mississippi are several years outdated and new behavioral studies need to be conducted. For the following reasons, it is recommended that a new behavioral assessment be conducted in Mississippi:

- No behavioral work has been completed for Hurricanes Gustav and Ike;
- The last HES in Mississippi was in 2005;
- Past surveys indicate insufficient knowledge of risk for those in Category 1 zones;
- The area has experienced considerable population change;
- The effects of Hurricane Katrina on coastal populations in Mississippi are unknown.

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

Interviews were conducted with Mississippi 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.

7.4.1 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. Even if quantitative data were available, the magnitude of the evacuation did not stress the capacity of the transportation system sufficiently to make definitive capacity improvement recommendations nor can any definitive clearance time recommendations be made since the Hurricanes Ike and Gustav scenarios are not severe enough to be a worst case or second worst case scenario. 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 now out-of-date Hurricane Evacuation Studies for individual and collective coastal counties in Mississippi were also suggested in the surveys.

7.4.2 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 Interviews were conducted with Department of Transportation and 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. 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.

7.4.3 UPDATES

Since Hurricanes 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. Hurricanes 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.

7.4.4 RECOMMENDATIONS

Many of the suggestions that were offered on the survey forms 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). Set-asides for hurricane evacuation funding should be considered by Congress. The Emergency Management Operations Centers (EOCs) should have video access to all highway CCTV facilities. New CCTVs should target critical link choke points. Real-time traffic data should be 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 EOC 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. Two 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 one county expressed that through-traffic was quadruple the volume of home-based evacuating traffic, underlines the need for multi-county, multi-state regional planning to account for inter-county/interstate 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 along the coast.

7.4.5 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

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 boundaries. Utilization of HES products was found to be consistent among the three counties. In addition to utilization of HURREVAC and SLOSH models, other local records were utilized to aid in the decision making process. HURREVAC, however, was reported as the main tool used to communicate storm dynamics to emergency management partners and senior elected officials.

7.5.1 HURREVAC OPERATION

HURREVAC was used in each of the three counties to analyze the conditions and forecast of the storm; and represented the primary medium by which to brief partners and elected officials. The counties 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 mapping function.

Hancock County indicated excellent performance from the HURREVAC application with a rank of 5 (scale of 1 to 5, with 5 representing excellent) and Harrison County ranked HURREVAC as a 4. Hancock County rated HURREVAC with a score of 5 regarding the ease of use and confirmed staff has been adequately trained to operate the tool. Harrison County reported HURREVAC's ease of use as a level 3 and confirmed staff has been adequately trained to operate the tool.

Varying opinions between the three counties regarding HURREVAC's specific components were offered. Hancock County scored excellent (score of 5) the clearance time, wind swath, error cone, 5-day forecast, decision arcs, surge maps and SLOSH functions; while scoring slightly better than unsatisfactory (score of 2) the shelter information function. Harrison County scored average (score of 3.5) the clearance time, wind swath, error cone, decision arcs and surge maps functions; while scoring the 5-day forecast as level 3 and the SLOSH function as level 4.

7.5.2 SLOSH OPERATION

Utilization of SLOSH varied among the collected surveys. Hancock County reported SLOSH was utilized to forecast the storm track and amount of storm surge. Harrison County reported utilization of SLOSH to assist in planning County actions.

Harrison County indicated the ease of use and performance of SLOSH was average to slightly above average (scores of 3 and 4) and confirmed staff has been partially trained on how to use the tool. Hancock County indicated the ease of use and performance of SLOSH was average excellent (score of 5) and confirmed staff has been adequately trained on how to use the tool.

7.5.3 RECOMMENDATIONS

Evacuation Decision Making:

1. Encourage better communication between the Hurricane Liaison Team and the local community.
2. Maintain funding for Hurricane Planning Course at National Hurricane Center.
3. Provide funding and coordination for hosting a Coastal Directors Conference_for the Gulf and Atlantic.
4. More information from the State is necessary. Information flow in both directions could be improved. Coordination and communication between the State and county EOC can ALWAYS be improved.
5. Counties should be aware of information released to the media by the State ahead of time. Press Releases had information lapses.
6. The State should send the counties staff support in the forms of decision makers that can be of pertinent use.
7. The State should provide the counties with communication picture boards.

Evacuation Timing:

1. Update community specific clearance times to include triggers for contra-flow activation.
2. Ensure more coordinated efforts to communicate through group conference calls with neighboring states and counties when discussing evacuation timing.

Evacuation Process and Road Network:

1. Encourage the State and FEMA Hurricane Program to assist with product development of evacuation information materials for distribution to the public.
2. Ensure better communication and coordination between local, state and federal agencies. Ensure the local entities are kept in the loop in State and Federal actions.

HURREVAC:

1. Update the shelter tool.
2. Tide information was not always accurate.
3. Add GOES satellite information.

SLOSH:

1. During the Hurricane Planning Course conducted at the National Hurricane Center, add more training on how to use SLOSH.
2. Develop online or remote training modules

7.6 PUBLIC INFORMATION/MEDIA ASSESSMENT

The purpose of this section is to utilize the results from the previous public information/media assessment of the extent of public information that was released and whether messages were clearly disseminated and understood by the public. Another purpose is 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.

7.6.1 RECOMMENDATIONS

Overall, communication receipt, coordination and dissemination resulted in few challenges. From survey information, coordination efforts seem to be cohesive and regular. Challenges are recognized quickly and mitigated. Information exchange seemed coordinated and dissemination to Mississippi residents was efficient. Greater management of road network signage was the most notable concern.

Information Receipt:

1. Encourage local emergency management agencies to get information to media representatives as soon as possible.

Information Dissemination:

1. Utilization of more message boards and directional signs to shelters.
2. Need more hand out materials and brochures for outreach and public education
3. Support a process for the National Hurricane Program to assist in alleviating re-entry challenges through coordinating State-to-State communication and information dissemination to out of state evacuees.

Media Relations:

1. Recommends FEMA supporting local EOCs by providing a representative to work in the local EOC.
2. Communicate better with the three Coastal Emergency Management Agencies to ensure they know the reporters assigned to work in their Emergency Operations Centers.
3. Improve relationship with State and Federal Programs to ensure greater access to FEMA and State level officials pre- and post- disaster.

7.7 FEMA INITIATIVES

The public response and focused attention on the shortfalls experienced during Hurricane Katrina resulted in significant adjustments in public expectations. Corrective actions from all levels of government, the private sector and volunteer organizations have resulted in many cultural and socio-economic realizations and, most importantly, expectations. The recognized threat to the Mississippi Coast from Hurricanes Gustav and Ike represent a realistic response from both the government and the general public. Even with the heightened attention, focus on program improvement and initiation of protective measure, one prevalent theme resulted from this threat. The general public must take personal responsibility for their safety

7.7.1 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. A "Pre-Event" Declaration authorizes the use of Federal funding and relieves the local government of the possibility that they will NOT be reimbursed for emergency expenses. If local funds are spent on emergency measures and the storm does NOT impact the area, the community will NOT be reimbursed by FEMA for these expenses. As a result, many local governments are reluctant to approve spending without knowledge that they will be reimbursed. A Pre-Event Declaration 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 the dynamics of the threat weighed against the local ability the respond and the community's awareness and responsiveness to the guidance issued by local officials.

7.7.2 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.

7.7.3 PUBLIC AWARENESS

A common comment from this PSA 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 easy to use tool that decisions can be made. Most communities would greatly benefit from a tool set that contained base data applicable to their roles and functions 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 MEOWs/MOMs outputs, water depth information for a given hurricane category (i.e. how much water 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. A tool of this type would have been used to display the revised evacuation zones that had been developed during the 2006 clearance time update and it could have been utilized as a public information resource to inform the public of the new zones.

Emergency managers could add real-time data onto 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.

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.

Recently, the NHP has proposed 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.

APPENDICIES

APPENDIX A: MEETING ATTENDANCE SHEETS

Table A-1: Kick-Off Meeting Attendance Sheet

First Name	Last Name	Affiliation	Phone	Email
John	Eringman	USACE	251-928-6265	John.r.eringman@usace.army.mil
Brandon	Bolinski	FEMA	770-220-5430	brandon.bolinski@dhs.gov
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Mike	Purvis	Dewberry	678-530-0022	jpurvis@dewberry.com

Table A-2: Hancock County Meeting Attendance Sheet

First Name	Last Name	Affiliation	Phone	Email
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John	Eringman	U.S. Army Corps of Engineers	251.928.6265	John.r.eringman@usace.army.mil
Victor	Jones	Federal Emergency Management Agency	803.968.7780	vicjones@cmail.com
J. Mike	Purvis	Dewberry – Sr. Project Management Assistant	404.861.2362	jpurvis@dewberry.com
Lisa	Pearl	Dewberry – Sr. Administrative Assistant	678.897.3755	lpearl@dewberry.com

*Did not attend but provided completed questionnaire

Table A-3: Harrison County Meeting Attendance Sheet

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Robert	Jackson	Harrison County EMA	228.865.4075	bjackson@co.harrison.ms.us
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Dwight	Gordon	Pass Christian Fire Chief	228.452.3325	firechief@ci.pass-christian.ms.us
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John	Eringman	US Army Corps of Engineers – Mobile District	251.928.6265	John.r.eringman@usace.army.mil
George	Darnell III	USACE	251.690.3240	George.r.darnell@usace.army.mil
Seth	Jones	USACE- Galveston District	409.766.3068	Seth.w.jones@usace.army.mil
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Table A-4: Jackson County Meeting Attendance Sheet

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John	Eringman	USACE	251-928-6265	John.r.eringman@usace.army.mil
George	Darnell III	USACE	251-690-3240	George.r.darnell@usace.army.mil
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Table A-5: Local Media Meeting Attendance Sheet

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Table A-6: State Meeting Attendance Sheet

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Table A-7: Inland Counties Meeting Attendance Sheet

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Lauren	Hand	Dewberry	678-530-0022	lhand@dewberry.com
John	Eringman	USACE	251-928-6265	John.r.eringman@usace.army.mil
Raven	James	Stone Co. EMA	601-928-3077	rjames@stonecountymys.gov
Loraine	Howell	George Co. EMA	601-947-7557	georgecountyem@bellsouth.net
Carolyn	Nelson	MEMA	601-398-6881	cnelson@mema.ms.gov
Terry	Steed	Forest Co. EMA	601-544-5911	Terry@forresteoc.com
Vic	Jones	FEMA	803-968-7780	vicjones@cmail.com
Bill	Massey	Dewberry	678-530-0022	bmassey@dewberry.com

APPENDIX B: LOCAL INTERVIEW QUESTIONNAIRE AND RESPONSES
7.8.1
HURRICANE IKE AND GUSTAV POST-STORM ASSESSMENT
HANCOCK COUNTY MISSISSIPPI 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 checked="" type="checkbox"/> SLOSH | <input checked="" type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

- Of the information provided to you, which items were considered most important? Explain
- | | | |
|---|--|--------------------|
| <input type="checkbox"/> ETIS | <input type="checkbox"/> Evacuation Maps | 2 Clearance Times |
| <input type="checkbox"/> Shelter Locations | 4 Local Hurricane Plan | 1 HURREVAC |
| 5 SLOSH | <input type="checkbox"/> HES Study | 3 Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

- Which items were found to be the least helpful? Explain
- | | | |
|---|--|--|
| <input type="checkbox"/> ETIS (Not aware of Availability) | <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 checked="" type="checkbox"/> SLOSH | <input checked="" type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

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

Discuss how HURREVAC is generally used during a hurricane event.
HURREVAC was generally used for evacuation times, storm landfall, storm tracking and history, wind data, and advisories. HURREVAC was used in conjunction with Crown Weather, Weather Channel, and SLOSH.

Discuss how SLOSH or the SLOSH Display Model is generally used during a hurricane event.
SLOSH is used to forecast the storm track and the amount of storm surge.

What mitigation efforts, if any, were initiated or participated in before or during these events?
Sand bags were given out to the public. Public was advised of areas of evacuation. Mississippi now has new emergency number, Public Information Line 866-519-MEMA available 8 a.m. to 5 p.m., Monday – Friday.

Of these mitigation efforts, were they successful? Please Explain.
The public used the sandbags. Some of the public ignored evacuation notices of low lying areas.

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

IKE: Southern E-911 Radio Tower Impacted

GUSTAV: Southern E-911 Radio Tower Impacted, County government complex was compromised (Had to disconnect site and haul it out)

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

IKE: None

GUSTAV: None

(No special needs shelters were required for either storm)

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.

IKE: None

GUSTAV: None

(We used County buses to provide transportation to the county shelter and the state bus pick-up site for those not able to provide transportation for themselves.)

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

IKE: None

GUSTAV: None

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?

No there are facilities outside of the surge area that can be retrofitted for shelters in place.

Hancock County presently has only one shelter outside of the surge area. However, mitigation funds have been made available to construct a new EOC at the intersection of Highway 43 and Highway 603.

Also they are beginning construction on Six new shelters, the projected completion time is 18-24 months. These shelters will be used for other county activities when hurricanes are not a threat

HURRICANE LIAISON TEAM (HLT)

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

Not applicable. Hancock County not involved with nor aware of the HLT.

Unsatisfactory -----Excellent

1 2 3 4 5

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

IKE: No, never had a conference call with them.

GUSTAV: No, never had a conference call with them.

How could FEMA’s Hurricane Liaison Team improve services to local EMAs?

The Hurricane Liaison Team needs to contact Hancock EMA and involve them in their program services as well as conference calls.

EMERGENCY OPERATIONS CENTER

At what time was the Emergency Operations Center Activated?

For IKE?

- Partial Activation: Date: September 10, 2008
- Full Activation: Date: September 13, 2008

For GUSTAV?

- Partial Activation Date: August 30, 2008
- Full Activation Date: September 4, 2008

Did your organization have a presence in, or have access to, the STATE Emergency Operations Center during these events?

IKE: Had a MEMA Area Coordinator and FEMA Representative in the EOC

GUSTAV: Had a MEMA Area Coordinator and FEMA Representative in the EOC

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

Yes having a MEMA Representative was very helpful

If so, did you feel your organization was made part of the State EOC team? Please Explain.

Yes, as long as there is a MEMA Area Coordinator in the EOC, communications are good.

TECHNOLOGICAL

Please identify which tools assisted you in making decisions for both events..

- HURREVAC
- Website(s)
- HAZUS
- ETIS
- SLOSH
- Tides
- Other: _____

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	
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 (Web EOC)	1	2	3	4	5	

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

	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	

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

HURREVAC	Good as is
SLOSH	Good as is
TIDES	Good as is
ETIS	_____
HAZUS	_____
Other	_____

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

- HURREVAC
- Yes
- No
- Partially
- Not Applicable

SLOSH Yes No Partially Not Applicable
 TIDES Yes No Partially Not Applicable
 ETIS Yes No Partially Not Applicable
 HAZUS Yes No Partially Not Applicable
 Other Yes No Partially Not Applicable

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

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

The shelter data on HURREVAc is outdated. Hancock used the state Web-EOC for shelter information During Gustav, Hancock EOC was assisted by a local business called N-Vision Solutions, Inc. offering help with the use of HAZNET.

EVACUATION AND DECISION MAKING

Did your jurisdiction issue evacuation orders? **IKE**

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
Hancock County, MS					8/31/08	

Did your jurisdiction issue evacuation orders? **GUSTAV**

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
Hancock County, MS					Sunday 8/31/08	8:00 a.m.

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

IKE – The State is not involved in the evacuation decision the decision is made on the local level by
the county governments
GUSTAV – The State is not involved in the evacuation decision the decision is made on the local
level by the county governments.

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

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

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

IKE

- M - Mobile Homes/Manufactured Homes Category 1 Surge Zone
- Healthcare Facilities Category 2 Surge Zone
- M - River/Lake Fronts Category 3 Surge Zone
- Islands Category 4 Surge Zone
- M - Beach Fronts Category 5 Surge Zone
- M - Flood Prone Areas Other: _____
- Countywide

GUSTAV

- M - Mobile Homes/Manufactured Homes Category 1 Surge Zone
- Healthcare Facilities Category 2 Surge Zone
- M - River/Lake Fronts Category 3 Surge Zone
- Islands Category 4 Surge Zone
- M - Beach Fronts Category 5 Surge Zone
- M - Flood Prone Areas Other: _____
- Countywide

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

- Television Loudspeaker / PA Radio
- Newspaper Meetings Internet (MDOT)
- Telephone Mass Fax Mass Email
- Other Methods:

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

IKE: Yes _____

GUSTAV: Yes _____

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

- HES Products/Storm Surge Maps History of Wind Damage
- FIRM Maps Political Decision
- History of Flooding Other: _____

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

None, Hancock County has its own translators.

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

By getting Hancock County involved in with the HLT

EVACUATION ROADWAY NETWORK

How would you rate the capacity of the evacuation routes in relation to vehicular demand?

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

Do you have traffic management plans that would facilitate the evacuation process? Please define.
 Yes, use existing evacuation routes.

What specific measures were taken to facilitate the evacuation process for this event?

- Roving Vehicle Assistance Coordinated Traffic Lights Lock Down Drawbridges
 Highways Reversal Message Signs AM Radio Messages
 Others: _____ Traffic Redirect

IKE: FM Radio Station WQRZ 103.5 & HAM Radio Organizations
 GUSTAV: State Administrative Agency (SAA)

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

	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?

	Estimated People	Estimated Vehicles
Evacuating WITHIN your Community	_____	_____
Evacuating THROUGH or TO your Community	_____	_____

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

IKE

Percentage Asked to Evacuate	Estimate of how Many Complied
_____	_____

GUSTAV

Percentage Asked to Evacuate	Estimate of how Many Complied
_____	_____

About what percentage of the total population evacuated? What percentage should have evacuated? What percentage used local shelters instead of leaving the area?

Approximately .007% (43,000 population – 250 people in local shelter, 52 people sent to Jackson County)

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

There was a decrease of those evacuating because people determined from the information sources that they were out of harm's way

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 it was successful. Low lying areas, mobile homes, FEMA trailers, casinos, tourists evacuated.

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

Please identify which evacuation routes were advocated to the public.
IKE – All evacuation routes were advocated. I-10, US Hwy 19, MS Hwy 43, and MS Hwy 53
GUSTAV - All evacuation routes were advocated. I-10, US Hwy 19, MS Hwy 43, and MS Hwy 53

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

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

GUSTAV - Yes

Did the tourist occupancy pose a significant problem not addressed by the clearance times in the HES?
IKE - No

GUSTAV - No

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?
All groups evacuated at one time.

Please provide an overall estimate as to how long the evacuation process took.
IKE - Unknown

GUSTAV - Unknown

What is the longest commute time reported?

IKE - Unknown

GUSTAV - Unknown

What significant traffic problems were experienced during the evacuation for IKE?

- | | | |
|---|--|--|
| <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 checked="" type="checkbox"/> Other: No problems encountered | |

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

- | | | |
|---|--|--|
| <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 checked="" type="checkbox"/> Other: No problems encountered | |

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.

No problems encountered

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?

No roadways were reversed in Hancock County

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

Help the county with evacuation materials to hand out to the public.

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

Hancock aware of no problems

COMMUNICATIONS AND PUBLIC INFORMATION

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

How was local information distributed to you?

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

How timely was the information?

IKE – As quickly as we could put it out

GUSTAV - As quickly as we could put it out

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

Was information coordinated with other local agencies to ensure “one-voice” cohesiveness?

Yes. Hancock, Harrison, and Jackson Counties work as a cohesive e group then we coordinate with the tier counties. There were also two State Conference Calls that Hancock participated in.

Do you allow the media access to the EOC?

Yes. Radio WQRZ FM 103.5, TV stations for all three coastal counties, Newspapers, Sea Coast ECHO and the Sun Herald.

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

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

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

N/A

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

National Hurricane Center, National Weather Service, Mike Lanes Tide Charts Crown Weather

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

Through WLOX TV Station, Weather Channel, WQRZ 103.5 Radio station
Sea Coast Echo newspaper, and Sun Herald Newspaper.

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: No problems

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 problems

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

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

Needs more hand ot materials and brochures for outreach

How can communication methods be improved?

No problems encountered

SHELTERING

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> 1 </u>	(unsure of number but many people that evacuated for Gustav had not return by the time Ike landed)
Special Needs	<u> </u>	<u> </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> 1 </u>	<u> 250 </u>

Special Needs _____
 Faith Based _____
 Other _____

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

IKE - Yes

 GUSTAV – Yes, we used state evacuation plan & the one existing shelter

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

IKE

 GUSTAV

Were “Refuges of Last Resort” utilized in addition to public shelters?

IKE - No

 GUSTAV - No

Please define what mutual aid sheltering agreements you have with neighboring jurisdictions.
 No mutual aid agreements per say, However Harrison County and Pearl County will help us if needed.

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 _____

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Location Confusion | <input type="checkbox"/> Overcrowding | <input type="checkbox"/> Shortage of Staff |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Wind Damage | <input type="checkbox"/> Loss of Utilities |
| <input type="checkbox"/> Lack of Security | <input type="checkbox"/> Shortage of Shelters | <input type="checkbox"/> Unanticipated Medical Issues |
| <input type="checkbox"/> Shortage of Food | <input type="checkbox"/> Shortage of Supplies | <input type="checkbox"/> Other: |

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Location Confusion | <input type="checkbox"/> Overcrowding | <input type="checkbox"/> Shortage of Staff |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Wind Damage | <input type="checkbox"/> Loss of Utilities |
| <input type="checkbox"/> Lack of Security | <input type="checkbox"/> Shortage of Shelters | <input type="checkbox"/> Unanticipated Medical Issues |
| <input type="checkbox"/> Shortage of Food | <input type="checkbox"/> Shortage of Supplies | <input type="checkbox"/> Other: |

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

Statewide shelter plans are no longer being utilized.

 Hancock County shelters its residents in their own county

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. (Hancock County has not heard of CHEMS and could not answer the following questions.)

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 _____

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 _____

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 _____

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 _____

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 _____

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 _____

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 _____

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 _____

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

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

Knowing where all outside entities are and have them report to EOC

With limited communications capabilities, how is information managed?

Through Ham Radios and WQRZ Radio Station.

What significant traffic problems experiences 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 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 checked="" type="checkbox"/> Other: None | |

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

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

Through the media and WQRZ Radio

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.

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.

OTHER COMMENTS

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.

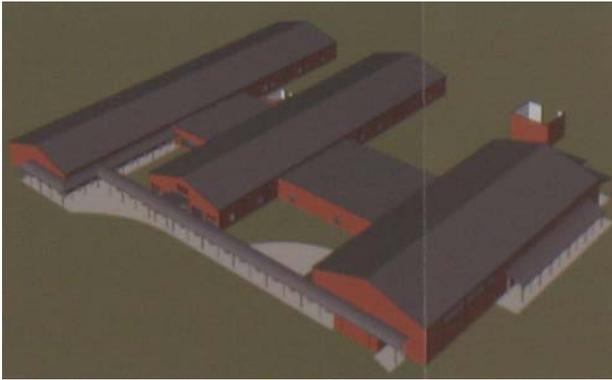
Recommendations:

Hancock County would benefit significantly from having materials and brochures for outreach efforts, evacuation maps that can be handed out to the public, and work stations and computers in their EOC.
Update shelter information in HURREVAC and provide more HURREVAC training.

Observations:

Hancock, Harris, and Jackson counties all confer together when making evacuation decisions. Hancock will be able to shelter up to 7000 people when all shelters are complete. The six new shelters will be self sufficient i.e., food, water, power, sewer, air conditioner, communications, first aid. Hancock uses school system busses when necessary. A sign up list and phone number are available for those that request pick-up

Currently Hancock County is using West Hancock Elementary where they can shelter 2000 people.



West Hancock Elementary School
23350 Highway 43, Picayune, MS 39466
-89.721444 / 30.568295

HURRICANE IKE AND GUSTAV POST-STORM ASSESSMENT HARRISON COUNTY MISSISSIPPI LOCAL 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 type="checkbox"/> Clearance Times |
| <input type="checkbox"/> Shelter Locations | <input checked="" type="checkbox"/> Local Hurricane Plan | <input checked="" type="checkbox"/> HURREVAC |
| <input checked="" type="checkbox"/> SLOSH | <input type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

(Harrison County has started using the shelter locations in HURREVAC but are still using their own shelter plan as a primary source)

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 checked="" type="checkbox"/> SLOSH | <input type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

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

Shelter Locations:

The Red Cross uses The Red Cross National Shelter System (NSS) which stores information regarding over 54,000 potential shelter facilities and is used to track and report shelter information during disasters. This tool is viewed by the Red Cross, the Federal Emergency Management Agency (FEMA) and a growing number of state agencies. This tool enables emergency managers and disaster workers to identify the location, managing agency, capacity, current population, and other relevant information of all shelters operated in response to events.

Harrison County has started using the shelter locations in HURREVAC but is still using its own Shelter plan as a primary source.

Emergency Managers primarily use WebEOC, the web-enabled crisis information management system developed by ESI, as a primary source.

ETIS:

ETIS was not available during the 2008 hurricane season.

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

The County EMA Office serves as the outlet for information during events. They have seasonal meetings to share information with Medical facilities, Hospice & Home Health agencies, and county emergency response agencies. The Counties partnership with the Electrical Power companies, Weather Underground, Accu Weather, and Crown Weather.

Discuss how HURREVAC is generally used during a hurricane event.
HURREVAC is used as a tool to watch storms for planning purposes for evacuation decisions and shelter openings.
The program is also used as a visual aid when debriefing county officials.

Discuss how SLOSH or the SLOSH Display Model is generally used during a hurricane event.
The SLOSH is reviewed by the EMA Office several times to help in planning county actions..

What mitigation efforts, if any, were initiated or participated in before or during these events?
Harrison County began updating their Hazard Mitigation Plan in early 2008.
Agreements were made with the school system to retrofit the schools.
Schools and Fire stations being fitted for panels and steel doors.
Pre-Coordination between Educational facilities and the American Red Cross to provide shelter space.

Of these mitigation efforts, were they successful? Please Explain.
Building Code enforcements are improving designs and structures.
Shelters able to house residents from evacuation areas.

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

IKE
Harbor damage on the port

GUSTAV
Harbor damage on the port, major highway 90, state road 605, city roads, and sewer pump stations.

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

IKE
600 FEMA/MEMA Manufactured Homes

GUSTAV
The number of special needs residents is still a variable left undetermined.
County faces challenges determining what a special needs person is.

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.
The County used its transportation plan to move residents to shelters of last resort.
Used state transportation to transport 495 residents to Jackson, MS
100 people transported to Special Needs Shelters

Are you aware of any instances where “safe rooms” were utilized during these storms and whether their use was successful?

IKE
No information

GUSTAV
No Information

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?

Harrison County Adult Detention Center
 10451 Larkin Smith Dr., Gulfport, MS 39503
 Longitude 89.188 ° W / Latitude 30.477°N
 Harrison County Fire District Stations

County Farm VFD - 13243	County Farm Road, Gulfport, MS 39503
Longitude 89.188 ° W / Latitude 30.477°N	
Cuevas VFD - 22338 Fire Station	Road, Pass Christian, MS 39571
Longitude 89.214° W / Latitude 30.358°N	
Delisle VFD - 25242 Cuevas	Delisle Road, Pass Christian, MS 39571
Longitude 89.264°W / Latitude 30.380°N	
East Harrison VFD - 15519	Highway 15, Biloxi, MS 39532
Longitude 88.919°W / Latitude 30.514°N	
North Woolmarket VFD - 16520	Switzer Park Road, Biloxi, MS 39532
Longitude 88.988° W / Latitude 30.524°N	
Lizana VFD - 16445	Lizana School Road, Gulfport, MS 39503
Longitude 89.233°W / Latitude 30.531°N	
Saucier VFD - 23560	Old Still Road, Saucier, MS 39574
Longitude 89.138°W / Latitude 30.633°N	
Success VFD - 12342	School Road, Saucier, MS 39574
Longitude 89.048°W / Latitude 30.611°N	
West Harrison VFD - 10071	Vidalia Road, Pass Christian, MS 39571
Longitude 89.293°W / Latitude 30.430°N	
West Wortham VFD - 20121	W. Wortham Road, Saucier, MS 39574
Longitude 89.190°W / Latitude 30.571°N	

Community Centers

D'Iberville Civic Center - 10395 Automall Parkway, D'Iberville, MS 39540	
Longitude 88.899°W	Latitude 30.434°N
Good Deeds Community Center - 15101 Madison Street, Gulfport, MS 39501	
Longitude 89.091°W	Latitude 30.402°N
Isiah Fredericks Community Center - 3312 Martin Luther King Dr, Gulfport, MS 39501	
Longitude 89.102°W	Latitude 30.403°N
Saucier Community Center (Senior's Center) - 24006 1st Street, Saucier, MS 39574	
Longitude 89.133°W	Latitude 30.632°N
Success Community Center - 12361 School Road, Saucier, MS 39574	
Longitude 89.041°W	Latitude 30.610°N
West Harrison Civic Center - 4670 West Espy Avenue, Long Beach, MS 39560	
Longitude 89.203°W	Latitude 30.352°N
Woolmarket Community Center - 16320 Old Woolmarket Rd, Biloxi, MS 39532	

Longitude 89.987°W / Latitude 30.521°N

HURRICANE LIAISON TEAM (HLT)

1. If you utilized FEMA's Hurricane Liaison Team, how would you rate the service received?
Unsatisfactory ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- Excellent

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

IKE - No

GUSTAV – Yes (No explanations provided)

3. How could FEMA's Hurricane Liaison Team improve services to local EMAs?
By helping with communication structure between State and Federal participants during the conference calls so they do not last for up to 3 hours.
Need an individual assigned that can set an agenda and conduct the meeting to keep the Participants on point and focused.

EMERGENCY OPERATIONS CENTER

At what time was the Emergency Operations Center Activated?

For IKE?

Not Activated Partial Activation Full Activation
Date : September 10, 2008 Date _____/_____
Time: 7:00 a.m. Time _____/_____

For Gustav?

Not Activated Partial Activation Full Activation
Date: August 29, 2008 Date: August 30, 2008
Time: 7:00 a.m. Time: 8:00 a.m.

Did your organization have a presence in, or have access to, the STATE Emergency Operations Center during these events?

IKE: via telephone and email

GUSTAV: via telephone and email. State Representative was also in the County EOC

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

The states information was not forth coming. Information needs to flow both ways. County needs to know about information being released to the media ahead of time. Press releases had information lapses. The State needs to send Decision makers that can be of pertinent use to the Counties. The press releases had information lapses,

If so, did you feel your organization was made part of the State EOC team? Please Explain.

TECHNOLOGICAL

Please identify which tools assisted you in making decisions for both events..

- HURREVAC Website(s) HAZUS
 ETIS SLOSH Tides
 Other: _____

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	
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	

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

	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	

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

- HURREVAC _____
 SLOSH _____
 TIDES _____
 ETIS _____
 HAZUS _____
 Other WebEOC: Tracking component for request submitted

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

- HURREVAC Yes No Partially Not Applicable
 SLOSH Yes No Partially Not Applicable
 TIDES Yes No Partially Not Applicable
 ETIS Yes No Partially Not Applicable
 HAZUS Yes No Partially Not Applicable
 Other Yes No Partially Not Applicable

HAZUS is not compatible with county computer programs. N-Vision is used instead.

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

Did your jurisdiction issue evacuation orders? IKE

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
Harrison						

Did your jurisdiction issue evacuation orders? GUSTAV

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time
Harrison	8/30/08	morning	8/31/08	Afternoon	9/1/08	Morning

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

IKE – N/A

GUSTAV – State transportation plan used

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
 Low lying areas became surge

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

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

IKE: No Evacuation

- | | |
|--|--|
| <input type="checkbox"/> Mobile Homes/Manufactured Homes | <input type="checkbox"/> Category 1 Surge Zone |
| <input type="checkbox"/> Healthcare Facilities | <input type="checkbox"/> Category 2 Surge Zone |
| <input type="checkbox"/> River/Lake Fronts | <input type="checkbox"/> Category 3 Surge Zone |
| <input type="checkbox"/> Islands | <input type="checkbox"/> Category 4 Surge Zone |
| <input type="checkbox"/> Beach Fronts | <input type="checkbox"/> Category 5 Surge Zone |
| <input type="checkbox"/> Flood Prone Areas | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Countywide | |

GUSTAV

- | | |
|--|--|
| M - Mobile Homes/Manufactured Homes | <input type="checkbox"/> Category 1 Surge Zone |
| <input type="checkbox"/> Healthcare Facilities | <input type="checkbox"/> Category 2 Surge Zone |
| M - River/Lake Fronts | <input type="checkbox"/> Category 3 Surge Zone |
| <input type="checkbox"/> Islands | <input type="checkbox"/> Category 4 Surge Zone |
| M - Beach Fronts | <input type="checkbox"/> Category 5 Surge Zone |
| M - Flood Prone Areas | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Countywide | |

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

- Television
- Newspaper
- Telephone
- Other Methods:
- Loudspeaker / PA
- Meetings
- Mass Fax
- Radio
- Internet
- Mass Email

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

IKE: N/A

GUSTAV: Yes

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

- HES Products/Storm Surge Maps
- FIRM Maps
- History of Flooding
- History of Wind Damage
- Political Decision
- Other: _____

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

Spanish and Vietnamese

Used Dry Erase Picture Boards and pre-planning handouts in all languages

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

Distribution of Communication Picture Boards to all counties and emergency first responders

EVACUATION ROADWAY NETWORK

How would you rate the capacity of the evacuation routes in relation to vehicular demand?

Unsatisfactory -----Excellent

1 2 3 ④ 5

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

What specific measures were taken to facilitate the evacuation process for this event?

- Barricades
- Roving Vehicle Assistance
- Highways Reversal
- Traffic Control Points
- Coordinated Traffic Lights
- Message Signs
- Lock Down Drawbridges
- AM Radio Messages
- Traffic Redirect

Others: _____

IKE _____

GUSTAV _____

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

	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?

	Estimated People	Estimated Vehicles
Evacuating WITHIN your Community	_____	_____
Evacuating THROUGH or TO your Community	_____	_____

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

IKE

Percentage Asked to Evacuate	Estimate of how Many Complied
_____	_____

GUSTAV

Percentage Asked to Evacuate	Estimate of how Many Complied
_____	_____

About what percentage of the total population evacuated? What percentage should have evacuated? What percentage used local shelters instead of leaving the area?

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

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?

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

Please identify which evacuation routes were advocated to the public.

IKE

GUSTAV

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

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

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

IKE

GUSTAV

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?

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

IKE

GUSTAV

What is the longest commute time reported?

IKE

GUSTAV

What significant traffic problems were experienced during the evacuation for IKE?

- | | | |
|---|--|--|
| <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: _____ | |

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

- | | | |
|---|--|--|
| <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: _____ | |

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.

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?

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

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

COMMUNICATIONS AND PUBLIC INFORMATION

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

How was local information distributed to you?

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

How timely was the information?

IKE

GUSTAV

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

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

Do you allow the media access to the EOC?

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

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

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

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

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

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: _____

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: _____

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?

How can communication methods be improved?

SHELTERING

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	_____	_____
Special Needs	_____	_____
Faith Based	_____	_____
Other	_____	_____

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

Ike

GUSTAV

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

IKE

GUSTAV

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

IKE

GUSTAV

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

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 _____

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Location Confusion | <input type="checkbox"/> Overcrowding | <input type="checkbox"/> Shortage of Staff |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Wind Damage | <input type="checkbox"/> Loss of Utilities |
| <input type="checkbox"/> Lack of Security | <input type="checkbox"/> Shortage of Shelters | <input type="checkbox"/> Unanticipated Medical Issues |
| <input type="checkbox"/> Shortage of Food | <input type="checkbox"/> Shortage of Supplies | <input type="checkbox"/> Other: |

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Location Confusion | <input type="checkbox"/> Overcrowding | <input type="checkbox"/> Shortage of Staff |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Wind Damage | <input type="checkbox"/> Loss of Utilities |
| <input type="checkbox"/> Lack of Security | <input type="checkbox"/> Shortage of Shelters | <input type="checkbox"/> Unanticipated Medical Issues |
| <input type="checkbox"/> Shortage of Food | <input type="checkbox"/> Shortage of Supplies | <input type="checkbox"/> Other: |

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.

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

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

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

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

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

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

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

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 _____

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

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

With limited communications capabilities, how is information managed?

What significant traffic problems experiences 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 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: _____ | |

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

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.

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.

OTHER COMMENTS

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.

John Eringman, USACE, gave a brief background on the Post Storm Assessments. He made everyone aware of the BETA version of HURREVAC and the shelter component. Rupert Lacy, Harrison County EMA Director, stated that their use of HURREVAC has been a learning process and teams are continuously learning and populating the database. He also described how the coastal counties; Harrison Jackson, and Hancock constantly coordinate, communicate and work as a team on evacuations, along with the five Harrison County municipalities; City of Biloxi, City of D'Iberville, City of Gulfport, City of Long Beach, and Pass Christian.

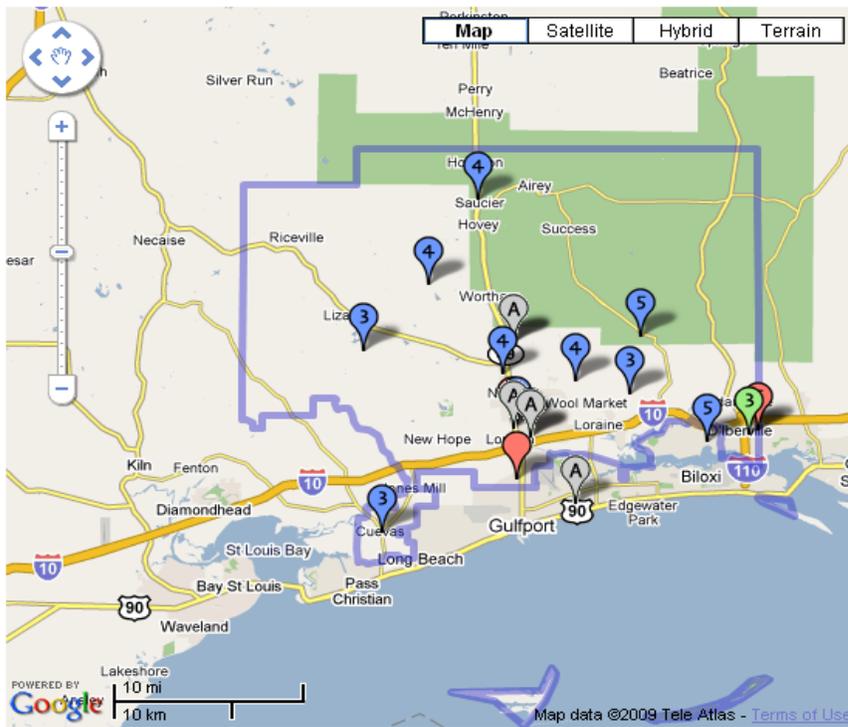
The primary issue they encountered was during the Gustav storm. Highway 90 created shelter issues. Louisiana pulled the trigger and that caused traffic issues on I-10 East. Local Mississippi residents were encouraged to go north thus creating a bottleneck on I-65.

Harrison County is the pivotal county for decisions. Decisions must be based on neighboring states of Alabama and Louisiana. Highway 90 evacuees affect all shelter issues.

Evacuation decisions are made independent of the State

N-Vision is used instead of HAZUS. HAZUS is not compatible with county computer programs

The schools north of I-10 are the primary shelters for Harrison County; Harrison County is presently using mitigation money for retrofitting their fire houses with steel doors.

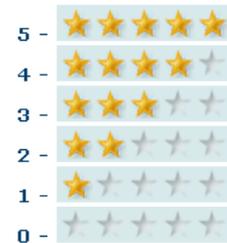


Map Legend:

- Elementary
- Middle
- High
- Alt./Other
- Private

- Harrison County School District Boundary*

The number shown in the marker is the Schooldigger ranking:



P - Private School
A - Alt./Other School

HURRICANE IKE AND GUSTAV POST-STORM ASSESSMENT JACKSON COUNTY MISSISSIPPI LOCAL 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 type="checkbox"/> Shelter Locations | <input checked="" type="checkbox"/> Local Hurricane Plan | <input checked="" type="checkbox"/> HURREVAC |
| <input checked="" type="checkbox"/> SLOSH | <input checked="" type="checkbox"/> HES Study | <input checked="" type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

Of the information provided to you, which items were considered most important? 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 checked="" type="checkbox"/> HURREVAC |
| <input type="checkbox"/> SLOSH | <input type="checkbox"/> HES Study | <input type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: <u>Would like tropical systems picked up before they become named storms.</u> | | |

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 type="checkbox"/> SLOSH | <input type="checkbox"/> HES Study | <input type="checkbox"/> Storm Surge Maps |
| <input type="checkbox"/> Other Documents: _____ | | |

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

Chevron – They have their own GIS system. (Need transport for fuel contract and debris removal contract with private company.)

Discuss how HURREVAC is generally used during a hurricane event.

Most valuable tool of the EMA Director. We allow Fire and First responders to use in a controlled environment.

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

SLOSH

was not used for IKE or GUSTAV. IMPORTANT!! We must keep Hurricane Planning Courses (Training for EMAs) one week long and remain at the Hurricane Center. It should be two parts with more details on SLOSH.

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

406 Mitigation is burdensome and a waste of time. The process is bad. Old construction retrofits are easy. New construction retrofits are difficult. It has been four years since Hurricane Katrina and there still have been no grounds broken on four shelters.

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

Unfunded Mandates

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

IKE Minimal

GUSTAV

Coastal areas and low lying bayous

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

IKE N/A

GUSTAV

We opened our shelters. 22 people were transported in by school buses. They were pre registered through the Red Cross. Residents can also call the EOC. If they don't pass assessments for special needs, then they are transported to a regular shelter.

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.

Special Needs populations are registered by the Red Cross. Ambulances and buses.

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

IKE NO

GUSTAV Rejected the use of "safe rooms".

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?

Jackson County needs shutters for all its shelters. We can shelter all Jackson County residents as long as there is no overflow from other states and counties.

HURRICANE LIAISON TEAM (HLT) Unaware of the HLT

1. If you utilized FEMA’s Hurricane Liaison Team, how would you rate the service received?
Unsatisfactory ----- Excellent
1 2 3 4 5

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

IKE
No but would like to be included.
GUSTAV

3. How could FEMA’s Hurricane Liaison Team improve services to local EMAs?

By following the chain of command. Local EMA should be able to get to HLT concerning local politicians and direct them to the State.

EMERGENCY OPERATIONS CENTER

At what time was the Emergency Operations Center Activated? For IKE? __P__ For Gustav? _Full__

Not Activated IKE Partial Activation Full Activation
Date _9/11___/_08___ Date 8/31/08_
Time _7:00 p.m._____ Time _8:00 a.m._____

Did your organization have a presence in, or have access to, the STATE Emergency Operations Center during these events?

IKE YES
GUSTAV YES

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

YES

If so, did you feel your organization was made part of the State EOC team? Please Explain.

There could be better communication from the State on what they do that impacts the county.

(Jackson County would like to see all data accessible from one program such as HURREVAC)

TECHNOLOGICAL

Please identify which tools assisted you in making decisions for both events..

- HURREVAC
- ETIS
- Other: Crown Weather, Weather Underground
- Tides in HURREVAC not always accurate
- Website(s)
- SLOSH
- HAZUS
- Tides

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
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

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

	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

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

HURREVAC Jackson wants to see GOES satellite images from HURREVAC. Needs to be totally reran for this coast. The Gulf is much shallower now.

SLOSH _____

TIDES _____

ETIS _____

HAZUS _____

Other _____

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

- HURREVAC Yes No Partially Not Applicable
- SLOSH Yes No Partially Not Applicable
- TIDES Yes No Partially Not Applicable
- ETIS Yes No Partially Not Applicable
- HAZUS Yes No Partially Not Applicable
- Other Yes No Partially Not Applicable

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

Did your jurisdiction issue evacuation orders? **IKE**

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time

Did your jurisdiction issue evacuation orders? **GUSTAV**

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time

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

IKE Was a voluntary evacuation for Jackson County

GUSTAV Mississippi Governor caused problem when he made some evacuation decisions.

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

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

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

IKE N/A

- | | |
|--|--|
| <input type="checkbox"/> Mobile Homes/Manufactured Homes | <input type="checkbox"/> Category 1 Surge Zone |
| <input type="checkbox"/> Healthcare Facilities | <input type="checkbox"/> Category 2 Surge Zone |
| <input type="checkbox"/> River/Lake Fronts | <input type="checkbox"/> Category 3 Surge Zone |
| <input type="checkbox"/> Islands | <input type="checkbox"/> Category 4 Surge Zone |
| <input type="checkbox"/> Beach Fronts | <input type="checkbox"/> Category 5 Surge Zone |
| <input type="checkbox"/> Flood Prone Areas | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Countywide | |

GUSTAV

x=Mandatory

- | | |
|---|--|
| <input checked="" type="checkbox"/> Mobile Homes/Manufactured Homes | <input type="checkbox"/> Category 1 Surge Zone |
| <input checked="" type="checkbox"/> Healthcare Facilities | <input type="checkbox"/> Category 2 Surge Zone |
| <input checked="" type="checkbox"/> River/Lake Fronts | <input type="checkbox"/> Category 3 Surge Zone |
| <input checked="" type="checkbox"/> Islands | <input type="checkbox"/> Category 4 Surge Zone |
| <input checked="" type="checkbox"/> Beach Fronts | <input type="checkbox"/> Category 5 Surge Zone |
| <input checked="" type="checkbox"/> Flood Prone Areas | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Countywide | |

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 type="checkbox"/> Telephone | <input type="checkbox"/> Mass Fax | <input checked="" type="checkbox"/> Mass Email |
| <input type="checkbox"/> Other Methods: | | |

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

IKE N/A

 GUSTAV YES Not with the Governor's

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 checked="" type="checkbox"/> FIRM Maps | <input checked="" type="checkbox"/> Political Decision |
| <input checked="" type="checkbox"/> History of Flooding | <input checked="" type="checkbox"/> Other: <u>Historical Lessons Learned</u> |

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

Minor. Red Cross had interpreters.

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

Update clearance times if they trigger contra flow.

EVACUATION ROADWAY NETWORK

How would you rate the capacity of the evacuation routes in relation to vehicular demand?

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

All highways going north are two lanes.

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

Only three roads heading north. Get on one and go.

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__None_____
 GUSTAV__Local Radio_____

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

	Estimated People	Estimated Vehicles
Evacuating WITHIN your Community	____NA____	_____
Evacuating THROUGH or TO your Community	_____	_____

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

	Estimated People	Estimated Vehicles
Evacuating WITHIN your Community	____30%____	_____
Evacuating THROUGH or TO your Community	_____	_____

Fuel was a huge issue because so many other counties passed through Jackson County.

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

IKE

	Percentage Asked to Evacuate	Estimate of how Many Complied
	_____	_____

GUSTAV

	Percentage Asked to Evacuate	Estimate of how Many Complied
	_____	_____

About what percentage of the total population evacuated? What percentage should have evacuated? What percentage used local shelters instead of leaving the area?

5%

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

Increased due to Katrina experience
 Decreased due to the traffic experience

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, successful, normal

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

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

GUSTAV

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

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

GUSTAV Yes, Under normal circumstances clearance times correct

Did the tourist occupancy pose a significant problem not addressed by the clearance times in the HES?
IKE N/A

GUSTAV N/A

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?

We provide information.

Health Department Liaison made the decision

8-12 hours

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

IKE N/A

GUSTAV 8-12 hours

What is the longest commute time reported?

IKE N/A

GUSTAV 20 hours

What significant traffic problems were experienced during the evacuation for IKE? 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: _____ | |

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

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Unanticipated Volumes | <input checked="" type="checkbox"/> Congestion and Traffic Jams | <input checked="" type="checkbox"/> Accidents and Stalled Autos |
| <input checked="" type="checkbox"/> Inadequate Traffic Control | <input checked="" type="checkbox"/> Uncoordinated Traffic Signals | <input checked="" type="checkbox"/> Uncoordinated Evac Timing |
| <input checked="" type="checkbox"/> Diversions from Others | <input type="checkbox"/> Flooded Roads | <input type="checkbox"/> Construction |
| <input checked="" type="checkbox"/> Inadequate Signage | <input type="checkbox"/> Damaged Roads | <input type="checkbox"/> County Roads Blocked |
| <input type="checkbox"/> Downed Trees | <input checked="" type="checkbox"/> Other: _Pulled contra flow trigger at 4:00a.m. when it was still dark_____ | |

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.

Exit 609 on I-10 East all the way through Jackson into Mobile County.

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

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

Better communications between local state, and federal like agencies, i.e., traffic.
Keep locals in the loop.

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

Better coordination

COMMUNICATIONS AND PUBLIC INFORMATION

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

- | | | |
|---|--|--|
| <input type="checkbox"/> FEMA Regional Office | <input type="checkbox"/> Other State Agencies | <input checked="" 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: _____ | | |

How was local information distributed to you?

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Telephone | <input 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 checked="" type="checkbox"/> Video / Tape | <input type="checkbox"/> Pamphlets / Brochures | <input type="checkbox"/> Mass email groups |
| <input type="checkbox"/> Other Documents: _____ | | |

How timely was the information?

IKE N/A
GUSTAV Information was timely

How do you distribute local information to the media?

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

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

yes

Do you allow the media access to the EOC?

Yes, in the media room.

Have you conducted specific planning or coordination sessions with the media this year?
 Yes No Pre-Season Post-Season

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

Yes

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

Crown Weather, Weather Underground

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

See # 4

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: _____ NO _____

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: _____ YES _____

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?

By having a FEMA Rep for GUSTAV

How can communication methods be improved?

Internally

SHELTERING

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	5	
Special Needs	1	
Faith Based		
Other (Pet Shelter)	1	
Regular Shelters for County	3	20 LA families

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

Ike

 GUSTAV Yes

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

IKE

 GUSTAV Yes

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

IKE

 GUSTAV Yes

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

Six coastal and Tier (inland) counties always work together.

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 24 Average Days 1

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Location Confusion | <input type="checkbox"/> Overcrowding | <input type="checkbox"/> Shortage of Staff |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Wind Damage | <input type="checkbox"/> Loss of Utilities |
| <input type="checkbox"/> Lack of Security | <input type="checkbox"/> Shortage of Shelters | <input type="checkbox"/> Unanticipated Medical Issues |
| <input type="checkbox"/> Shortage of Food | <input type="checkbox"/> Shortage of Supplies | <input type="checkbox"/> Other: |

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Location Confusion | <input type="checkbox"/> Overcrowding | <input type="checkbox"/> Shortage of Staff |
| <input type="checkbox"/> Flooding | <input type="checkbox"/> Wind Damage | <input type="checkbox"/> Loss of Utilities |
| <input type="checkbox"/> Lack of Security | <input type="checkbox"/> Shortage of Shelters | <input type="checkbox"/> Unanticipated Medical Issues |
| <input type="checkbox"/> Shortage of Food | <input type="checkbox"/> Shortage of Supplies | <input type="checkbox"/> Other: |

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

N/A

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.

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 _____

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 _____

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 _____

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 _____

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 _____

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 _____

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 _____

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 _____

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

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

Slow response, no PW (project work sheet). Where is the FEMA PW specialist?

With limited communications capabilities, how is information managed?

What significant traffic problems experiences 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 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: _____ | |

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

Not in GUSTAV

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

Over the media

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.

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.

OTHER COMMENTS

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.

Have HLT visit local EM Directors twice a year face to face .
Hurricane Planning Course remaining at the Miami Hurricane Center is very important!
Need a Coastal Directors Conference for the Gulf and Atlantic. Needed badly!!!

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

APPENDIX B: STATE INTERVIEW QUESTIONNAIRE AND RESPONSES

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

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

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

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

- | | | |
|---|---|--|
| <input type="checkbox"/> ETIS | <input checked="" type="checkbox"/> Evacuation Maps | <input type="checkbox"/> Clearance Times |
| <input checked="" 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: _____ | | |

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. How would you rate the communication and support provided by you to the local emergency management offices?

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

5. What can be done to improve the communication flow with the local emergency management offices during storm events?

Communications with the counties need to be improved. ESF 11 Coordinator

Did the State recommend any mitigation efforts before or during these events? Please explain.

Yes - For Radio, Shelters, Pet Evacuation supplies and agreements

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

For the most part, yes, but the mitigation process is very slow.

HURRICANE LIAISON TEAM (HLT) and EVACUATION LIAISON TEAM (ELT)

1. How would you rate the support received from the Hurricane Liaison Team? N/A
Unsatisfactory -----Excellent
1 2 3 4 5

2. How could FEMA's Hurricane Liaison Team improve services to the State?
The State thinks the VTC is useless and not beneficial operationally.

Did the ELT activate for IKE YES ___ NO ___ Did your agency establish an HLT / ELT point of contact for this event?
 Yes No Not Applicable

Did the ELT activate for GUSTAV YES ___ NO ___ Did your agency establish an HLT / ELT point of contact for this event?
 Yes No Not Applicable

Did you participate in the HLT and ELT teleconferences during IKE? Were these conferences helpful? Please explain.
HLT
No
ELT

Did you participate in the HLT and ELT teleconferences during GUSTAV? Were these conferences helpful? Please explain.
HLT - Yes

ELT - Yes MDOT is not getting briefings from the ELT. Not disseminated to the State

Please define which State agencies were involved in the conference calls.
IKE
N/A
GUSAV

If you utilized FEMA's Evacuation Liaison Team, how would you rate the service received?
Unsatisfactory -----Excellent
1 2 3 (4) 5

How could FEMA's Evacuation Liaison Team improve services to the State?
By making sure the ELT summary sheet gets to the State DOTs. Put the summary sheet on HURREVAC. Include information about pets and animals being evacuated when notifying evacuees.

EMERGENCY OPERATIONS CENTER

At what time was the State Emergency Operations Center Activated for IKE? For GUSTAV?

Not Activated Partial Activation Full Activation
 For Gustav, full activation 120 Date ____/____/____ Date ____/____/____
 hours out Time ____/____/____ Time ____/____/____

Did your organization have a presence in, or have access to, LOCAL Emergency Operations Centers during these events?

IKE _____

 GUSTAV - Yes _____

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

Vital _____

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

Yes, in general a good working relationship. _____

TECHNOLOGICAL

Please identify which tools assisted you in making decisions for both events.

HURREVAC Website HAZUS
 ETIS SLOSH Tides
 Other__ Timelines should be able to be shared, possibly on WebEOC. Be careful not to overload WebEOC. _____

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)	
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	

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

	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	

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

HURREVAC	<u>Would like to be a Beta Tester. Need more training.</u>
SLOSH	<u></u>
TIDES	<u></u>
ETIS	<u></u>
HAZUS	<u></u>
Other	<u></u>

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

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)

(Helps decision making plans)

EVACUATION AND DECISION MAKING

Did any of the jurisdictions in the State issue evacuation orders? **IKE**

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time

GUSTAV- Yes, all three counties

Jurisdiction Name	Voluntary		Recommended		Mandatory	
	Date	Time	Date	Time	Date	Time

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

Conference calls twice a day.

Please describe how the State can assist in improving the decision making process.

State can lead the local counties.

EVACUATION ROADWAY NETWORK

How would you rate the capacity of the evacuation routes in relation to vehicular demand? If different for either storm, please explain

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

Please define which measures the State initiated or participated in to facilitate the evacuation.

IKE

GUSTAV

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

If yes, Please define.

N/A – Portable message signs used. Contra flow access to I-10 East to be closed. Influx of Louisiana residents clogging roads

Does the State have any other traffic management plans that would facilitate the evacuation process?
If yes, please define.

Sign plan managed by MDOT. Hwy. 49 local. I-10, I-20

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

IKE – N/A
GUSTAV- None for Mississippi other than problems caused by Louisiana evacuees.

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

	Estimated People	Estimated Vehicles
Evacuating WITHIN the State	_____	_____
Evacuating THROUGH or TO the State	_____	_____

Do you have an estimate of the number of people and vehicles evacuating for GUSTAV.-(not answered)

	Estimated People	Estimated Vehicles
Evacuating WITHIN the State	_____	_____
Evacuating THROUGH or TO the State	_____	_____

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?

For Gustav, yes. For 13 hours. 6:00a.m. August 29th. Initiated by both state governors of MS and LA. The governor of Louisiana started it and it was shut down by the governor of Mississippi. Problems arose with who was in charge. Had to close interchanges due to congestion.

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

Better communication with Louisiana. Use webinar capabilities between the states.

COMMUNICATIONS AND PUBLIC INFORMATION

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

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

How did you receive local event information?

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> Telephone | <input checked="" type="checkbox"/> Fax | <input checked="" type="checkbox"/> Email |
| <input checked="" type="checkbox"/> Website | <input type="checkbox"/> Interview | <input type="checkbox"/> Press Conference |

Video / Tape Pamphlets / Brochures Mass email groups
 Other Documents: ___Radio and Web EOC. Use Webinar and provide locals access. _____

How did you distribute information to the media?

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

How timely was the information?

IKE – No problem

 GUSTAV- Misinformation to the public from news media. Rumor control

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

NHC, Underground Weather , Crown Weather, NOAA

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

IIC, PIOs, News Media, Direct Satellite TV from many stations,

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

Mississippi Public Broadcast System--- Programmed Highway signs—FM radio---Remote Hwy signs

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

Information too Complicated Information Inaccurate Not Enough Information
 Untimely Information Lack of Political Support
 Other Problems: ___211 System did not work well. 911 tower down.

Do you believe the evacuating public experienced problems in receiving the following information- For each storm?

Evacuation Decision Info Evacuation Routes Evacuation Detours
 Travel Time Estimates Traffic Congestion Info Storm Information
 Other Problems: _Information provided to the public. Public showed lack of attention to available sources. _____

10. 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)
With Evacuees	(1) w/LA	2	3	(4) w/MS	5

If different for either event, please explain.

___No signs were pointing out Community Colleges as shelters. Mississippi had liaison offices in the State EOC, Louisiana did not. Digital billboards were used.

11. How can information dissemination be improved?

With the use of more message boards and directional signage for shelters.

EVACUATION TRAFFIC INFORMATION SYSTEM (ETIS)

Has your agency been trained on the functions of ETIS?

- Yes No Partially Not Applicable

Was ETIS used for either storm? IKE YES ___ NO ___ GUSTAV YES ___ NO ___

How often was ETIS updated during the evacuation process for this event? If not used, skip.

- Hourly 6 Hours 12 Hours Once Daily _____ Other

How would you rate ETIS's accuracy when compared to actual traffic volumes during this event?

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

Would the State be interested in devoting a person to serve as an ETIS point of contact for support during operational periods?

- Yes No Partially Not Applicable

Are all recognized evacuation routes included in ETIS?

- Yes No Partially Not Applicable

Did you experience any software/operating problems with ETIS?

- Yes No Partially Not Applicable

How can ETIS be improved to assist in operational decision-making efforts?

Real time automated system needed.

SHELTERING

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	<u>114</u>	<u>14,200</u>
Special/Medical Needs	<u>4</u>	<u>287</u>

Faith Based	_____	_____
Other - Pet Shelter	Hands_____	134
co/located with people shelter		72
	Hudspeth	
	Jackson State	81

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

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

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

IKE

 GUSTAV- YES

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

IKE

 GUSTAV- Shelters generally opened for Louisiana evacuees.

Were any shelters affected by storm damage?

IKE

 GUSTAV- NO

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

Shelter plans with other states that are no longer being done

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 ___3 to 5

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

- Location Confusion
- Flooding
- Lack of Security
- Shortage of Food

- Overcrowding
- Wind Damage
- Shortage of Shelters
- Shortage of Supplies

- Shortage of Staff
- Loss of Utilities
- Unanticipated Medical Issues
- Other:

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

- Location Confusion
- Flooding
- Lack of Security
- Shortage of Food

- Overcrowding
- Wind Damage
- Shortage of Shelters
- Shortage of Supplies

- Shortage of Staff
- Loss of Utilities
- Unanticipated Medical Issues
- Other: Many evacuees had shortage of money to return with

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

With a better re-entry plan for getting people to return home.
 Cost share prevented many counties from opening pet shelters
 Special needs was folks generally could take care of themselves
 Lack of money to return home on.

HURRICANE EVACUATION STUDY (HES) COMPONENT EVALUATION

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

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

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

Transportation Analysis

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.

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

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

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

Information on power outages, debris local issues, restoration problems

With limited communications capabilities, how is information managed?

Satellite radios always work

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 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 checked="" type="checkbox"/> Other: <u>Info as to when they could return home</u> | |

Mandate a "Standard" for traffic counter
Federal funded policies for debris removal
ETIS System traffic counters

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

Getting information disseminated out to out of state evacuees.

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

Statewide Public Radio – Pre-assembled message boards.

APPENDIX D: MEDIA INTERVIEW QUESTIONNAIRE AND RESPONSES

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

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

Sun Herald reporter spent a lot of time in the State EOC during Gustav. Many PIOs were there with instant press releases. Much more information in a safer location than the local coastal EOCs. Relationship with local Director in Gulfport EOC is excellent.

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

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

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

- | | | |
|---|---|---|
| <input type="checkbox"/> Evacuation Zones/Areas | <input type="checkbox"/> Evacuation Maps | <input checked="" 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 type="checkbox"/> HE Technical Data Report | |
| <input type="checkbox"/> Other Documents: _____ | | |

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

- | | | |
|--|---|---|
| <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 type="checkbox"/> HE Technical Data Report | |
| <input type="checkbox"/> Other Documents: _____No Answer | | |
-

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 type="checkbox"/> HE Technical Data Report | |
| <input type="checkbox"/> Other Documents: _____No Answer | | |
-

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

During exercise only

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

N/A

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

Yes, however all three coastal EMs need to know all the reporters that are assigned to their EOCs .

INFORMATION DISSEMINATION

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?

State dealt with contra flow

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

- Telephone
- Website
- Video / Tape
- Other Documents: ___ Web Blog of the newspaper.
- Fax
- Interview
- Pamphlets / Brochures
- Email
- Press Conference
- Mass email groups

How timely was the information?

Good

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

- Television
- Mass Email
- Other Methods: ___ Web Blog
- Radio Media
- Mass Fax
- Website
- Sponsor Program

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

- | | | |
|--|---|--|
| <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"/> Population Apathy | <input type="checkbox"/> Lack of Political Support |
| <input type="checkbox"/> Other Problems: _____ | | |

Yes – Internet and Blogs- Power outages on coast the reason for going to Jackson and State EOC

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

- | | | |
|---|--|---|
| <input type="checkbox"/> Evacuation Decision Info | <input type="checkbox"/> Evacuation Routes | <input type="checkbox"/> Evacuation Detours |
| <input type="checkbox"/> Travel Time Estimates | <input type="checkbox"/> Traffic Congestion Info | <input type="checkbox"/> Storm Information |
| <input checked="" type="checkbox"/> Other Problems: _____Blackberry didn't work | | |
- _____

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.

There was some confusion on which zones were to be evacuated and to the location and availability of shelters

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

Website and Blog

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?

Get the information to the media ASAP. People really want to know whether to leave or stay.

RESEARCH AND STATISTICS

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?

Yes

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

No problem explaining differences between evacuation and storm surge zones.

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

Yes, we are kept abreast and informed. Have written articles about shelters built to FEMA standards and articles on bus issues.

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

Have had some trouble in the past with getting proper data.

POST STORM RECOVERY

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

Information about re-openings: Ex: airports, restaurants, businesses, food stores, etc, Info on roads, and curfews.

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

Always send at least one person to Jackson in case of local power failure. Have a plan in place for continued newspaper distribution.

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?

Yes, we are involved in Post Storm Meetings.

OTHER COMMENTS

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.

We need more access to FEMA and State level officials after the storm
-We have no relationship or pre-storm access to the State and FEMA. Local access is good.
Better communication throughout needed

APPENDIX E: COLLECTED DATA

SHELTERING ANALYSIS CONTACTS AND REFERENCES

Agencies Consulted:

- Mississippi Emergency Management Agency
- American Red Cross, Mississippi Disaster Services
- American Red Cross, State Disaster Services
- Mississippi State Department of Health, Special Medical Needs Shelters
- Mississippi State Department of Health, Special Medical Needs Logistics

Documents Consulted:

- *Month in Review*, American Red Cross, Mississippi Gulf Coast Chapter.
- *Special Medical Needs Shelter Resource Guide*, Mississippi State Department of Public Health.
- *Mississippi Emergency Support Function #6 - Mass Care, Housing, and Human Services Annex*, Mississippi Emergency Management Agency.
- *Mississippi Emergency Support Function #8 - Public Health and Medical Services Annex*, Mississippi Emergency Management Agency.
- *Mississippi Emergency Support Function #11 – Animals, Agriculture and Natural Resources Annex*, Mississippi Emergency Management Agency.
- *Mississippi State Department of Health*, Public News Releases, Hurricane Gustav.
- *Hurricane Gustav Shelters*, 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: PROJECT DVD (PDF OF REPORT, MAPS, AND COLLECTED DATA)