

Chapter 3

Evacuation Decision Making Process

Some of the most important products developed as a part of the FEMA/USACE hurricane evacuation studies and delivered to local and state officials have been evacuation decision-making tools. These tools are (decision arc¹) maps and tables as well as computer software such as HURREVAC. These products graphically tie together real-time storm characteristics with HES produced hazards, shelter and clearance time data. Their purpose is to give emergency management directors a means of retrieving Technical Data Report information without having to dig through a report during an emergency. Evacuation decision tools provide guidance and assistance to decision makers as to when an evacuation should begin relative to a specific hurricane, its associated wind field, forward speed, probabilities, forecast track, and intensity.

Discussions initiated by the FEMA/USACE study teams with local and state officials regarding the evacuation decision process focused on the following questions:

- When was the Emergency Operating Center fully activated?
- What prompted the decision to activate?
- What study products/decision aides were used to decide when to evacuate?
- What study products/decision aides were used to decide who should evacuate?
- Was HURREVAC used?
- When was the evacuation directive issued?

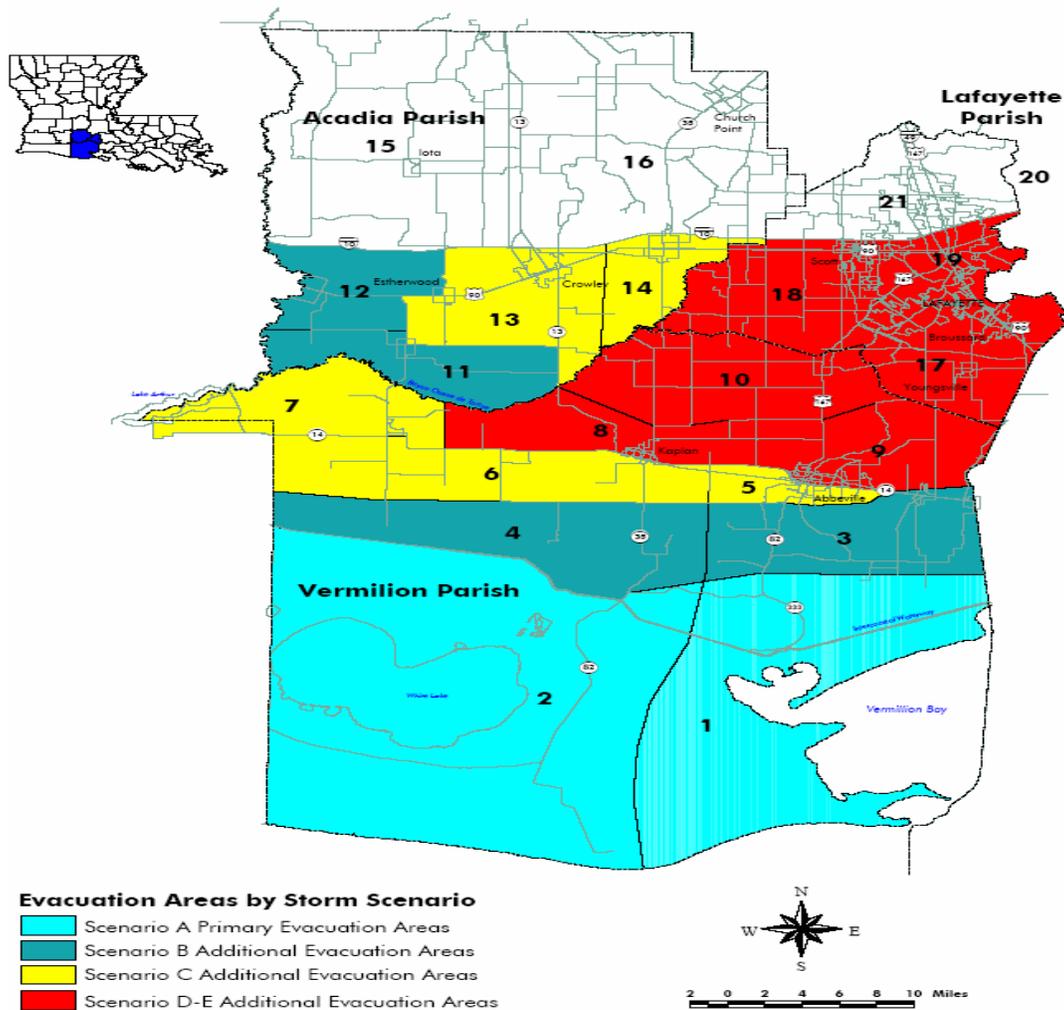
Table 3-1, located at the end of this chapter, provides a summary of the responses and information gathered from each parish and county. In general, most jurisdictions use and are satisfied with the HURREVAC program. Many parishes and counties stated that the HURREVAC program was very reliable but that the inland winds predicted were inaccurate to the actual force of the winds inland. Many parishes and counties also use other commercial tracking programs. Some parishes and counties still use the decision arc systems developed in

¹ A decision arc is an arc drawn a certain distance from the center of a county that shows when an approaching storm reaches an extent to where evacuation should commence for that county.

the old HES studies. Many areas use the evacuation zones developed in the older studies. Most local jurisdictions desire evacuation zone systems that can be easily described over radio and TV to convey to their residents. Additionally SLOSH models and surge maps were consulted in some jurisdictions. Many parishes and counties were still geared up when Lili began to threaten the United States because the storm occurred so quickly behind Isidore. Unfortunately this also may have contributed to the lack of response by residents.

Figure 3-1 shows an example of an evacuation zone map.

Figure 3-1



Recommendations:

1. Update clearance time data and incorporate into the HURREVAC program.
2. Conduct extensive training and refresher sessions with emergency managers on the HURREVAC and SLOSH Model Display program.
3. Review evacuation zones for parishes and counties and update if needed.
4. Work with state and locals to refine evacuation zone concepts.



A decision-making meeting in Vermilion Parish, Louisiana.

***NOTE:** When Hurricane Lili threatened the US coastline in the Gulf of Mexico it was a category 2 hurricane except for brief interim period in the last few hours of approach when it unexpectedly experienced a dramatic increase of intensification to a category 4 hurricane. Therefore, most of the evacuation decision-making by the various local agencies was based on a less intense storm. At the same time, state and local agencies were considering the forecasted track of the storm, respectful of the possibility that a more eastward track would require a much more complex evacuation scenario because it would have involved the New Orleans area. State officials were coordinating with local governments to assure that evacuees in the “lower” or coastal area parishes had time and a clear roadway to travel out of harm’s way.*

As it turned out, Lili experienced a sudden decrease of intensification alleviating the dilemma. In other words, the storm’s unexpected peak and valley occurred at a time when it would have been too late to manage a huge evacuation effort of the New Orleans area. State and local officials had enough confidence in the forecast that the track of the storm (and its most severe winds and surge) would continue its track west of the New Orleans area. Evacuation planners must consider the unique circumstances as described above to evaluate Clearance Times and shelter demand.

Table 3-1 Executive Decision Process Summary

Location	Time EOC was Activated	What Prompted Decision to Activate	Study Products/Aids used in Decision Making	Time of Evacuation/# of Evacuees	Did Study Products Work Well
Louisiana					
Acadia	10/1/02 – noon	Weather channel; internet; history	HURREVAC; decision arcs; SLOSH Models	10/1/02 – 4pm voluntary 10/2/02 – 11 am mandatory and recommended – less than 10 % left	Good, but additional training always helpful
Ascension	Yes, time not known	Storm’s position	HURREVAC	10/2/02 – noon voluntary, less than 10 % evacuated	Excellent
Assumption	Yes, time not known	Storm	HURREVAC	Not provided	Good; could use additional training on SLOSH Models
Calcasieau	9/31/02 – 9 am	National Weather Service, internet	HURREVAC; SLOSH Models	10/2/02 - 9 am 30% of parish left	SLOSH Models could be more user friendly

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Iberia	10/2/02 – 9 am	Knowledge of events, NWS	HURREVAC; Decision Arcs; SLOSH; TIDES	10/3/02 – 8 am 60% of population evacuated	SLOSH Models need to address shoreline erosion; inland winds on HURREVAC
Jefferson	Isidore- 9/24/02 8:30 Lili – 10/2/02 - 10 pm	History of storms	HURREVAC; SLOSH	10/2/02 – 9 am	SLOSH Models do not take into account heavy coastline erosion from all the storms in recent years
Jefferson Davis	Yes, time unknown	HURREVAC	HURREVAC; Decision Arcs	10/2/02 – noon Less than 10 % evacuated	Always need for additional training
Lafayette	10/1/02 – 7:30 am	HURRTRAK; HURREVAC	HURREVAC; Decision Arcs; SLOSH; HURRTRAK	10/2/02 – 8 am- voluntary evacuation	Good, SLOSH Models need to be reviewed for coastline issues
Lafourche	Yes, time unknown	Internet, NWS		Mandatory orders given to Golden Meadows	Excellent

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Orleans	Isidore – 9/24/02 – 8 am Lili – 10/1/02 – 8 am	Recent storm history		No orders given	
Plaquemines	Yes, time unknown		HURREVAC	10/1/02 - 5 pm Voluntary order 10/2/02 – 10 am Mandatory order 3825 people evacuated	Good
St. Bernard	Yes		HURREVAC; SLOSH Models	10/2/02 9 pm voluntary orders	Need additional training on SLOSH models
St. Charles				No evacuation orders given	

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St. James	Yes		HURREVAC; SLOSH Models	No evacuation orders given	Good
St. John the Baptist	10/1/02 – 8 am	History	HURREVAC; SLOSH Models; TIDES; HURRTRAK; Decision Arcs	60% of parish evacuated	Need additional staff and training for them
St. Martin	10/2/02	Storm position	HURREVAC; SLOSH Models	10/2/02 – 9 am 10% of parish evacuated	Inland wind speed on HURREVAC not accurate
St. Mary	10/2/02 – 9 am	Storm knowledge	HURREVAC	10/3/02 – 8 am 60% of parish	Inland winds in HURREVAC are not accurate; SLOSH Models need re-evaluation

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Tammany	Not Applicable				
Tangipahoa	Not Applicable				
Terrebonne	8 am	History of storms	HURREVAC	8 am – mandatory orders issued for both events	Need additional training on SLOSH models use
Vermilion	10/1/02 – 6 am	National Weather Service Advisory	HURRTRAK RM/Pro 2002; LSU Climatologic website; HURREVAC; SLOSH Models	10/1/02 - 85% of parish residents	Well
Alabama					
Statewide	Autuaga: 9/25/02 -9 am Montgomery: 9/25/02 – 6pm Dale: 9/26/02 – 7 am Jefferson: 9/26/02 partial	Calls to National Hurricane Center			

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Baldwin	9/24/02 – 6am partial 9/25/02 – 6 am full	National Weather Service; National Hurricane Center	HURREVAC; HURRTRAK; Surge Maps	Not available; population of county very low, so # of evacuees is hard to determine	Good, could always use additional training
Mobile	9/24/02 2 pm Lili – 10/2/02 – 1 pm, partial activation	National Weather Service; National Hurricane Center	HURREVAC; HURRTRAK	9/25/02 - 10 am 85% Dauphin Island 10/2/02 – 11 am 30% Dauphin Island	Good, could always use additional training
Florida: Additional/on-going training with hurricane evacuation decision-making tools is always helpful; they become “out -of –sight”, “out -of –practice”					
Mississippi					
Statewide	Yes	HURREVAC, conference calls	HURREVAC		Good
Hancock	Yes, time unavailable	National Weather Service, internet, local weather, knowledge of evacuation zones	HURREVAC	Unavailable	Well

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Harrison	Isidore- 9/24/02 – 8 am Lili – 10/2/02 – 8 am	National Weather Service	HURREVAC, Decision Arcs, SLOSH Models, TIDES	Isidore – 9/25/02 – 6 am Lili – 10/2/02 – 4:30 pm	Need on-going training
Jackson	Yes, both events, time and dates not provided		HURREVAC	Unavailable	HURREVAC needs to display intermediate advisories
Texas					
Statewide	9/23/02 – 8 am		HURREVAC; HURRTRAK; SLOSH Models		Excellent
Chambers	9/30/02 – 8 am	Storm position	HURREVAC; SLOSH Models; Decision Arcs	Not provided	Excellent
Galveston	Yes, time and date not provided	National Weather Service, history of storms	HURRTRAK; HURREVAC; Decision Arcs	5000	Good
Jefferson	County – yes; City of Beaumont – no	Storm history	Decision Arcs, TIDES	40-60% of population	Need additional training
Orange	9/30/02 – 8 am	National Weather Service	HURREVAC	55,250	Good