

Local Jurisdictions' Evacuation Guidance
and Transportation Support for Hurricane Evacuees

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EXECUTIVE SUMMARY

If a major hurricane threatens the Texas Gulf coast, it will be necessary to evacuate large numbers of residents and transients from areas at risk. State and local officials have designated radio stations for residents of coastal counties to monitor as they travel out of the risk area, but these evacuees also will need information as they drive through transit and host counties. Accordingly, a survey was undertaken of the 92 evacuation, transit and host counties to collect data on the communication methods that local emergency management coordinators (EMCs) plan to use to advise evacuees of hurricane evacuation routes, route conditions, reception area locations, shelter locations, and other important information. The results of this survey are shown in Table 1.

Coastal counties with large populations are capable of planning for evacuations and have done so. However, coastal counties with small populations lack resources and/or motivation to do any hurricane evacuation planning, although there are notable exceptions such as Kleberg County. EMCs in sparsely populated inland counties lack resources and training, which results in a lack of planning for hurricane evacuations and, in some cases, even the willingness or ability to participate in a survey of their planning achievements. Finally, some EMCs were unaware of their county's status as host or transit counties, either because they were new on the job or had not been contacted by DEM about this issue.

Precise estimates of the number of people that need transportation assistance are not available. Only ten of the 22 EMCs in evacuation counties could supply numerical estimates of their transit dependent populations and several of these mentioned getting their data from the presentations on the DEM website. However, all of these EMCs expected that the number of transit dependent evacuees would be quite low. They also expected most people to have friends or relatives who will pick them up in case they need to evacuate, which is consistent with the findings from research on past disasters. Data from the US Census and the Texas Health and Human Services Commission were reviewed to supplement the survey, and indicate that local emergency managers should target low income and elderly populations to make sure all who need to evacuate have means of transportation.

If a major hurricane threatens the Texas Gulf coast, it will be necessary to evacuate large numbers of residents and transients from areas at risk. State and local officials have designated radio stations for residents of coastal counties to monitor as they travel out of the risk area, but these evacuees also will need information as they drive through transit and host counties. Accordingly, a survey was undertaken to collect data on the communication methods that local emergency management coordinators (EMCs) plan to use to advise evacuees of hurricane evacuation routes, route conditions, reception area locations, shelter locations, and other important information.

STUDY METHODS

Survey Sample

There are 92 evacuation, transit, and host counties for hurricane evacuations in the state of Texas. The list of evacuation, transit, and host counties was obtained from the *Hurricane Planning* presentations on the DEM Hurricane website, which can be found at <<http://www.txdps.state.tx.us/dem/documents.htm#hurricane>>. Names and telephone numbers of EMCs and emergency management directors (EMDs) were gathered from the Governor's Division of Emergency Management (DEM) *Directory of Texas Emergency Management Officials* (February 2002). Telephone interviews were conducted during February and March, 2002. Attempts were made to reach each EMC in the sample and repeat calls were made until contact was made. Interviews were completed with 84 of the listed counties, including all of the evacuation counties. Attempts to reach the eight remaining EMCs were terminated after ten unsuccessful calls.

Interview Procedure

Telephone interviews were conducted during February and March, 2002 that consisted of two principal questions:

1. What radio stations do you EMCs to use to provide information about hurricane evacuation routes and shelter locations to evacuees?
2. What other methods besides radio do EMCs plan to use to disseminate this information?

EMCs were allowed to respond freely to both of these questions, but also were specifically asked if they intended to use roadside signs, fixed or mobile electronic message boards, reception stations, other methods. In addition, EMCs in evacuation

counties were asked to estimate how many people in their jurisdictions would need transportation in case of an evacuation.

RESULTS

Table 1 displays the survey data, with Column 1 showing the county name (listed alphabetically) and Column 2 showing the County Type (i.e., evacuation, transit, or host county). It should be noted that some counties are listed as having multiple types because their roles vary with a hurricane's impact point. Column 3 indicates the Study Area with which a county is associated. Some counties are listed as being associated with more than one Study Area, usually because they are expected to host evacuees from more than one Study Area. Column 4 lists the radio stations from which evacuee information will be transmitted and Column 5 shows the other methods that are expected to be used to provide evacuee information. Finally, Column 6 presents the information about transit dependent population size. "NA" means that this question is not applicable to this county because it is not an evacuation county.

The data from Table 1 indicate that coastal counties with large populations are capable of planning for evacuations and have done so. However, coastal counties with small populations lack resources and/or motivation to do any hurricane evacuation planning, although there are notable exceptions such as Kleberg County. EMCs in sparsely populated inland counties lack resources and training, which results in a lack of planning for hurricane evacuations and, in some cases, even the willingness or ability to participate in a survey of their planning achievements. Finally, some EMCs were unaware of their county's status as host or transit counties, either because they were new on the job or had not been contacted by DEM about this issue.

In connection with the number of people needing transportation, it is clear that precise estimates are not available. Only ten of the 22 EMCs in evacuation counties could supply numerical estimates of their transit dependent populations and several of these mentioned getting their data from the presentations on the DEM website. However, all of these EMCs expected that the number of transit dependent evacuees would be quite low. They also expected most people to have friends or relatives who will pick them up in case they need to evacuate, which is consistent with the findings from research on past disasters.

Table 1: Data from the Telephone Survey of Texas Emergency Managers

County	County Type	Study Area	Radio Stations	Other Methods	Transit Dependent Population
Anderson	H	GSA	NOAA Weather Radio 162.45 AM	None	NA
Angelina	H	SSA GSA	KJCS 103.3 FM KYKS 105.1 FM KRBA 1340 AM	TXDOT blue signs	NA
Aransas	E	CSA	KOUL, K99 KOUNO	None	No precise estimate, but EMC said that during evacuation for Bret, they were prepared to handle 160 people, and only 20 showed up at the staging area (Live Oak Elementary)
Atascosa	H	CSA VSA			NA
Austin	H	GSA MSA	KNUZ 1070 AM	None	NA
Bandera	H	CSA	None	None	NA
Bastrop	H	GSA MSA CSA	Updating	Updating	NA
Bee	H	MSA CSA	KTYX 97.9 FM KICK 105.7 FM	None	NA
Bell	H	GSA	None	None	NA
Bexar	H	GSA MSA CSA VSA	WORI 1200 AM	Mobile signs, Reception Center at McCreeless Mall	NA
Blanco	H	CSA	None	None	NA
Brazoria	E	GSA	KHOU KTRH 740 AM	Up to cities	Probably <1%

Brazos	H	GSA MSA	KAGC AM KAGC/KKYS FM KAMU FM KBMA FM KMBV FM KORA FM KHLR FM KTAM AM KZTR FM KTEX FM KWHI FM KTSR FM WTAW AM KZNE AM	A Traffic Control Point at SH 6 and FM 1179 will direct evacuees to the Reception Center at Brazos Center (1179 Briarcrest Drive just east of SH 6)	NA
Brooks	H	CSA VSA	KPSO 106.3 FM	Reception Centers at South end of the county (Walmart) and East end of county (VFW hall)	NA
Burleson	H	GSA MSA	106.5 FM	At one time they planned to use deputies at Somerville to guide evacuees, but now they are too low on staff for this task.	NA
Caldwell	H	GSA MSA CSA	Relies on Gonzales, Travis and Hays county stations	Sheriff and PD put up road blocks at 183 and 180, on 183 just outside Lockhart	NA
Calhoun	E	MSA	Relies on Victoria radio stations	TXDOT blue signs	No public transportation in county, do not know how many might need help, but thinks number is negligible and easy to handle.

Cameron	E	VSA	KGBT AM KBOR KURB KKPS 99.5 FM KBFM 104 FM		Approximately 13-14 %
Chambers	E	SSA	KTRH 740 AM KSHN 99.9 FM	2 mobile signs from TXDOT	<5%
Colorado	H	GSA MSA	KULM 98.3 FM	None	NA
Comal	H	GSA MSA CSA	WOAI 1200 AM KKYX 680 AM	None	
Dallas	H	SSA GSA	KRLD 1040 AM	None	NA
Dewitt	T, H	GSA MSA CSA	Relies on Victoria and San Antonio stations	Have thought about asking DPS to put up signs routing traffic around Cuero	NA
Dimmitt	H	CSA			NA
Duvall	T	CSA VSA	KOPY	None	NA
Falls	H	GSA			NA
Fayette	H	GSA MSA	KVLG 1570 AM KBUK 104.4 FM	Has made signs to put up on 71 and 290 directing traffic to reception center either at school or city hall (when school is in session)	NA
Fort Bend	H	GSA MSA	Relies on EAS system for GSA	Police will ask for signs as needed	NA
Frio	H	CSA			NA

Galveston	E	GSA	KTRH 740 AM KGBC	Will talk to TXDOT and Transtar to put up signs as needed, I-45 has electronic signs in place	Unknown
Gillespie	H	CSA	KFAN 107.9 NOAA Weather Radio	Have access to mobile message boards, can use if needed	NA
Goliad	T	MSA CSA	Relies on Victoria radio stations	Working with TXDOT to put up mobile message boards saying no shelter available	NA
Gonzales	H	GSA MSA CSA	KCTI 106.3 AM	Updating plan	NA
Gregg	H	SSA GSA	KYKX 107.5 FM KOOI 106.5 FM	None available, will ask TXDOT	NA
Grimes	H	GSA	KBTX 92.5 FM Aggie 96	Have investigated signs, no money available	NA
Guadalupe	H	GSA MSA CSA	KWED 1580 AM WOAI 1200 AM	Have used banner and signs directing people to continue through county, plan to put sign up on 123 south of town to direct people to 1580 a m for information	NA
Hardin	E, T	SSA	KSET	DPS, Sheriff and PD put up signs	NA

Harris	E, H	SSA GSA MSA	KTRH 740 AM	Electronic message boards available on major highways	Approximately 4-5% of population
Harrison	H	GSA	KCUL 92.3 FM 1410 AM	No plans for signs, available from TXDOT if needed	NA
Hays	H	GSA MSA CSA			NA
Hidalgo	H	VSA	KURY 710 AM KFBM 104.1, 100.3 KIWW 96.7 FM KVMV 96.9 FM KPSA 99.5 FM	Only TXDOT signs	NA
Houston	H	SSA GSA	KIVY 1290 AM, 92.7 FM KBHT 93.5 FM	None	NA
Jackson	E, T	MSA	Relies on Victoria stations	No signs, law enforcement at main intersections	Unknown
Jasper	E, T, H	SSA GSA	KJAS 103.7 FM EAS	Electronic signs on SH96	<100 people
Jefferson	E	SSA	KLVI 560 AM KFDM KBMT KBTB	TXDOT blue signs	EMC estimates 6-11% of population. 7500 people took buses in the evacuation for Hurricane Andrew.
Jim Hogg	H	CSA VSA	Relies on Alice station	Signs on 16, 359, 1017, 285	NA
Jim Wells	H	CSA VSA			NA
Karnes	H	MSA CSA	No station in county	Reception stations: 181 & 72, 123 & Calvert	NA

Kendall	H	GSA CSA	Relies on San Antonio stations	Sign on IH 10 to guide people to reception station in WalMart parking lot	NA
Kenedy	E	CSA	Kleberg County EMC also covers Kenedy County.	See Kleberg	See Kleberg
Kerr	H	CSA	WOAI (San Antonio) KJ 97 KSAT	None	NA
Kleberg	E	CSA	KLUX 89.5 FM Low-wattage emergency radio 530 AM	Have a local contractor who will do signs quickly as needed, have recommended using TXDOT mobile message boards	Unknown, but very small.
La Salle	H	CSA VSA			NA
Lavaca	H	GSA MSA	KHLT 1520 AM KTXM 99.9 FM	None	NA
Lee	H	GSA MSA	None	Put up signs directing traffic to evacuation routes or shelters as needed.	NA
Liberty	E, T	SSA GSA	KSAN 99.9 FM Also relies on Houston stations	Will probably use mobile message board	NA
Live Oak	H	CSA VSA	KTSA	None	NA
Matagorda	E	MSA	KMKS 102.5 FM KIOX 96.9 FM	None	Unknown

McClennan	T	GSA	Has not had any communication from DEM on hurricane evacuation planning	None	NA
McMullen	T	CSA VSA	Relies on San Antonio stations	Works with Red Cross on Sheltering and signage.	NA
Medina	H	GSA CSA	KCWM 1460 AM	Coordinate with DPS	NA
Milam	H	GSA	KMIL 1330 AM KRXT 98.5 FM	Volunteer FDs in Cameron ((City Park on 77) and Rockdale (KC Hall parking lot on 79) put up tents with coffee and information on shelters, which are provided by churches	NA
Montgomery	H	SSA GSA	KTRH 740 AM KSTR	"It would be dysfunctional"-not my job!	NA
Nacogdoches	H	SSA	KYKS 103 FM Q107 107.7 FM KFOX 105.5 FM KSFA 86.6 AM	Law enforcement in charge of putting up signs and reception stations.	NA
Newton	E, T, H	SSA	KJAE 107.2 FM	None	

Nueces	E	CSA	<p><i>No planning at county level, all hurricane evacuation planning for the county is done by Corpus Christi.</i></p> <p>CC EMC says they use the following:</p> <p>KEDT 90.3 FM KEYS 1440 AM KLUX 89.5 FM CH 6 87.1 FM</p>	Mobile electronic message boards are available in Corpus Christi.	Corpus Christi EMC says that 4-5% of the population, or about 3,000-4,000 people may need transportation.
Orange	E	SSA	KOGT 1600 AM KLVI 560 AM	TXDOT mobile signs	<10 %?
Polk	H	SSA GSA	KETX 1440 AM 1650 Weather Radio	Only TXDOT blue signs	NA
Refugio	E, T	CSA	No stations in county	No plans yet, EMC is new, working on plans	NA
Rusk	H	GSA	KMUE 101.5 FM KWRD 1470 AM	EMC is new to job and is updating plans that date from 1988	NA
Sabine	H	SSA	KTBL 1240 AM	Police on main roads direct people to the Sheriff's office, where they are directed to open shelters	NA
San Augustine	H	SSA	KDET	None	NA
San Jacinto	H	SSA GSA	KYKS 105.1 FM	None	NA

San Patricio	E, T, H	CSA	KEYS 1440 AM KRYX 1360 AM KKTU 99.1 FM KMXR 93.9 FM KJAB 99.9 FM KUNO 1400 AM KOUL 103.7 FM KLHB 98.3 FM KLTG 96.5 FM	No money for their own signage	<1%
Shelby	H	SSA GSA	KDET 930 AM KQ?? 100.5 FM KYKS 105.1 FM 103.5 FM KORI 104.7 FM	None	NA
Smith	H	GSA	EAS 600 AM	None	NA
Starr	H	VSA	KCTM 103.1 FM KGBT	Sign outside of Rio Grande City, telling where to go for shelter information, usually parking lot of large store. Shelter provided by Ft. Ringo School District. Also has to cope with evacuees from Mexico.	NA
Tarrant	H	SSA GSA	WBAP 820 AM KRLD 1080 KLIS 570 AM	None	NA
Travis	H	SSA MSA CSA	EAS-AWAC system hits all radio stations at once, main ones are KLBK 93.7 FM KASE 101.7 FM	Electronic system on I-35, put up signs on 290 and 183 for storms near Louisiana border. Need accurate estimate of how many they should expect.	NA

Trinity	H	SSA	KJCS 103.3 FM KYDS 105.1 FM	Only signage is TXDOT blue Hurricane route signs.	NA
Tyler	H	SSA	Relies on Beaumont and Lufkin stations	TXDOT signs, is working on agreement with gas stations and restaurants to stay open and put up mobile signs	NA
Uvalde	H	CSA	KBOU 1400 AM KYUF	Barricades on 83 south of town and 90 east, directing evacuees to reception station at Civic Center. Red Cross does sheltering.	NA
Victoria	E, T	GSA CSA	EAS KVIC	No signs, checkpoints with DPS, Sheriff, PD	NA
Walker	H	SSA GSA	KSAM KMVL KSTAR	Plans to use signs to direct people to shelters in Huntsville or to proceed north when these shelters fill up. Plans to put police out on evacuation routes to answer questions and help in case of emergency.	NA

Waller	H	GSA	None	None; the worst problem is an underpass on 281 near Prairie View that always floods in rain	NA
Washington	H	GSA MSA	KULF 94.1 FM KTTX 106 FM	FD will put up signs and have reception area on 290 for traffic from Houston, on 36 for traffic from Sealy	NA
Webb	H	CSA VSA	KURE 106.1 FM, 1490 AM KHMW 102.3 FM KJBZ 98.1 FM	TXDOT signs	NA
Wharton	H	GSA MSA	KULP 1390 AM KTRH 740 AM KIOX 96.9 FM 102.5 FM	Will do signs with TXDOT; most intersections will be manned. They drill every year with surrounding counties and DPS.	NA
Willacy	E	VSA	KRGV KGBT KFOX	None	<11 % of total pop.
Williamson	H	GSA MSA	Relies on Austin stations	None	NA
Wilson	T, H	MSA	KWCB FM	None	NA
Zapata	H	CSA VSA			NA

These data are further supported by data from a survey of the disabled, elderly, and low income populations in 78 Texas counties that was conducted by the Office of Community Transportation Services of the Texas Health and Human Services Commission (Spanhel 1998). Selected results of this survey are shown in Table 2.

Table 2: Data from *Transportation Needs Survey*

Population Segment	% Owning Car or Truck	% Of Those Whose Vehicle is in Good Working Order	% Of Those Not Owning Car or Truck That Have Access to Car or Truck
Disabled	64%	90%	41%
Elderly	68%	87%	10%
Low Income	36%	65%	47%

These data show that different segments of the population vary in their evacuation needs. The majority of the disabled population surveyed own a car or truck, most of these have vehicles in good working order, and a high percentage of those that do not own a vehicle have access to one. An even larger percentage of the elderly own their own car or truck, and most of these vehicles are in good working order. However, few of the elderly who do not own a vehicle have access to one. Finally, the Low Income group is least likely to own a vehicle and also is least likely to own one in good working order, but a high percentage have access to someone else's vehicle. Local emergency managers should therefore target low income and elderly populations to make sure all who need to evacuate have means of transportation.

US Census data were used to estimate the number of people in each of the five study areas without their own vehicles (see Table 3). In general, EMCs expect that the school buses available to them for use in evacuations will be more than adequate for the numbers requesting transport.

Table 3: Estimated Population Without Their Own Vehicle

Study Area	County	Population w/o Vehicle	Percentage w/o Vehicle
SSA	Newton	545	9.8
	Jasper	1,136	8.4
	Hardin	926	5.2
	Orange	2,371	7.5
	Jefferson	10,010	10.8
	Chambers	454	5.0
	Liberty	1,766	7.6
MSA	Calhoun	1,508	7.0
	Jackson	1,391	9.0
	Matagorda	4,082	10.0
	Victoria	6,489	7.0
GSA	Brazoria	11,190	4.0
	Galveston	24,945	9.0
	Harris	301,959	8.0
CSA	Refugio	288	9.6
	San Patricio	1,656	7.5
	Aransas	531	5.8
	Nueces	10,455	9.5
	Kleberg	1,330	12.2
	Kenedy	23	16.7
VSA	Willacy	721	12.9
	Cameron	11,305	11.6

Regional Radio Stations

Many of the Emergency Managers contacted for this survey were unsure which radio stations they would use to provide information to people on evacuation routes. In some cases, there is no radio station located in the county, and stations in neighboring counties might or might not be used. Lists of the frequencies used by the NOAA Weather Radio and Emergency Alert Systems are available on the web at: <http://www.sbehou.org/eas1.html>. Maps showing the coverage of NOAA Weather Radio stations are available online at: <http://205.156.54.206/nwr/nwrbro.htm>.

Table 4 shows the data on NOAA Weather Radio frequencies for Texas coastal counties, and Table 5 shows the EAS stations. It is expected that communications over these stations will be supplemented by use of the FM and AM stations the EMCs reported that are shown in Table 1.

Table 4: NOAA Weather Radio Stations

Study Area	Service area	Broadcast City	Call Letters	Frequency
VSA				
	Cameron, Willacy	Pharr	KHB33	162.400
	Cameron, Willacy	Brownsville	WWG34	162.550
CSA				
	Kleberg, Nueces, San Patricio, Aransas, Refugio	Corpus Christi	KHB41	162.550
MSA				
	Aransas, Calhoun, Jackson	Port O'Conner	WXL26	162.475
	Calhoun, Victoria, Jackson	Victoria	WXK34	162.400
	Matagorda, Brazoria	Bay City	WWG40	162.425
GSA				
	Brazoria, Galveston, Harris, Chambers	Galveston	KHB40	162.550
	Brazoria, Galveston, Harris, Chambers, Liberty	Houston	KG68	162.400
SSA				
	Liberty	Lake Livingston	KXI55	162.500
	Jefferson, Hardin, Orange, Jasper, Newton	Beaumont	WXK28	162.475
	Newton, Jasper	Burkeville	KXI54	162.425

Table 5: EAS Local Primary Stations

Study Area	County	EAS District	Broadcast City	Call Letters	Frequency
	Orange	12	Beaumont	KLVI KFDM	560 Channel 6
	Hardin	12	Beaumont	KLVI KFDM	560 Channel 6
	Jasper	12	Beaumont	KLVI KFDM	560 Channel 6
	Jefferson	12	Beaumont	KLVI KFDM	560 Channel 6
	Newton	12	Beaumont	KLVI KFDM	560 Channel 6
	Chambers	13	Houston	KTRH KPRC	740 950
	Liberty				
GSA					
	Harris	13	Houston	KTRH KPRC	740 950
	Galveston	13	Houston	KTRH KPRC	740 950
	Brazoria	13	Houston	KTRH KPRC	740 950
MSA					
	Matagorda	13	Houston	KTRH KPRC	740 950
	Jackson	24	Victoria	KVIC KRNX	95.1 1340
	Victoria	24	Victoria	KVIC KRNX	95.1 1340
	Calhoun	24	Victoria	KVIC KRNX	95.1 1340

CSA					
	Refugio	22	Corpus Christi	KZFM KNCN	95.5 101.3
	Aransas	22	Corpus Christi	KZFM KNCN	95.5 101.3
	San Patricio	22	Corpus Christi	KZFM KNCN	95.5 101.3
	Nueces	22	Corpus Christi	KZFM KNCN	95.5 101.3
	Kleberg	22	Corpus Christi	KZFM KNCN	95.5 101.3
	Kenedy	17	Brownsville	KFRQ KGBT	94.5 98.5
VSA					
	Willacy	17	Brownsville	KFRQ KGBT	94.5 98.5
	Cameron	17	Brownsville	KFRQ KGBT	94.5 98.5

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REFERENCES

Spanhel, Cynthia. 1998. *1998 Transportation Needs Survey*. Prepared for Momentum under contract to the Office of Community Transportation Services of the Texas Health and Human Services Commission.

UPDATED TASK LIST

<u>Map</u>	<u>Page</u>
Surge map (Hurricane Categories 1-5): Yang insert page number and print hardcopy	
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Wind map (Hurricane Categories 1-5): Yang insert page number and print hardcopy	
SSA	9-8 to 9-12
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Risk Area map: Yang insert page number and print hardcopy	
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Inland Evacuation map: Yang insert page number and print hardcopy	
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