Statewide Regional Evacuation Study

Statewide Behavioral Survey Summary

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Statewide Behavioral Survey Summary

Statewide Behavioral Survey

In the fall of 2007 and the winter of 2008, telephone interviews were conducted with 18,800 residents in the Florida as part of the Florida Statewide Regional Evacuation Study. In each coastal county 400 interviews were completed, and in each non-coastal county 150 were completed. The coastal county interviews were apportioned among the evacuation zones used in each county. Most survey questions dealt with hurricane evacuation and were designed to provide information that would help in transportation modeling and shelter planning. A smaller number of questions dealt with hazards other than hurricanes.

Subject Matter

Most questions dealt with one of the following subjects:

- Preparedness
- Awareness
- Perceived Vulnerability
- Evacuation Intentions
- Actual Response in Past Threats
- Constraints to Evacuation

Uses of the Survey Information

The survey provided a wealth of information useful to emergency management officials in tasks such as designing public education materials, preparing evacuation notices, and accommodating persons with special needs. The primary application of the survey data, in conjunction with findings from other evacuation studies, was to help anticipate how people would respond with respect to five behaviors:

- How many people would evacuate
- When they would leave
- What type of refuge (e.g., public shelter) they would seek
- Where they would travel for refuge
- How many vehicles they would use
Preparedness

Seeing a County Evacuation Zone Map

Residents of coastal counties were asked if they had ever seen a map displaying the evacuation zones designated by their county emergency management officials. Most (72%) said they had seen an evacuation zone map for their county.
Preparedness

Having Internet Access

Asked if they had access to the internet in order to look up hurricane information, 73% said they did. The access is not necessarily in their own home.
Preparedness

Visiting their County Website for Hurricane Information

Although most people said they have internet access for looking up hurricane information, only 24% said they had ever visited their county government website for hurricane information.
Preparedness

Having a Household Evacuation Plan

More than half of the respondents (60%) said their household had a definite evacuation plan in case of a hurricane threat. An additional 13% said they had a plan but it wasn’t very definite.
Awareness

Aware of Living in an Evacuation Zone

Residents of coastal counties were told that their county had identified certain areas that needed to be evacuated due to potential flooding from storm surge and waves in a hurricane. They were then asked if they lived in one of those evacuation areas or not.

Fifty-nine percent of respondents actually living in a category 1 evacuation zone said they live in an evacuation zone. Twenty-six percent of interviewees actually living in a category 3 evacuation zone said they live in an evacuation zone. There was considerable variation among planning regions of the state shown below.

![Chart showing awareness of evacuation zones by Florida region]
Awareness

Knowing the Correct Evacuation Zone

Coastal county residents who said they lived in a surge-defined evacuation zone were provided with a description of the evacuation zone names employed by their county and asked to indicate the zone in which they lived. Overall, including respondents who were unaware they lived in an evacuation zone, few people were able to correctly identify their evacuation zone. Only in southeast Florida, where zones are relatively simple, did a majority of category 1 residents correctly identify their zone.
Awareness

Relationship between Length of Residence and Awareness

Newcomers to the coast, at least in the category 1 evacuation zone, were less likely than others to be aware they lived in an evacuation zone (51% vs. 61%). In category 3 evacuation areas, duration of residence made little difference.

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<tr>
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<th>Cat 3 Zone</th>
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<tr>
<td>&lt; 3 yrs</td>
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</table>
**Behavioral Analysis**

**Awareness**

**Relationship between Visiting County Website and Awareness**

People who had visited their county website for hurricane information were more likely than others to be aware that they lived in an evacuation zone. People with internet access but who had not visited their county website were more likely than respondents with no internet access that they lived in an evacuation zone, at least among residents of category 1 zones.

![Graph showing awareness by having visited county website](image)

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<tr>
<td>Cat 3 Zone</td>
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<td>24</td>
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</tr>
</tbody>
</table>
Awareness

Relationship between Seeing Evacuation Map and Awareness

People who had seen a map of evacuation zones in their county were more likely than others to be aware of living in an evacuation zone. This was true in both category 1 zones (64% vs. 44%) and category 3 zones (30% vs. 15%).
Perceived Vulnerability

Belief that Home Would Flood Dangerously

Hurricanes of three intensities were described to survey participants: a category 2 with winds of 100 MPH, a category 3 with winds of 125 MPH, and a category 4 with winds of 155 MPH – almost a category 5. Respondents were asked if their homes would flood dangerously from storm surge and waves if each of the storms passed directly over their residence.

Too few residents of the highest-risk locations (on the left side of the graph) believe their homes would flood. Too many in non-surge areas of coastal counties and people in non-coastal counties (on the right) believe their homes would flood.
Perceived Vulnerability

Belief Home would be Unsafe from Wind and Water

When asked if their home would be safe, considering both wind and water, in each of the three hurricanes, more people expressed concern than when asked about flooding alone. The relative flatness of the lines suggests that too few are concerned enough to evacuate from the most vulnerable areas (cat 1 zone) and too many might leave from the safest areas (non-surge and non-coastal).

![Graph showing perceived vulnerability](image-url)
Perceived Vulnerability

Wind vs. Wind and Water in Category 2 Hurricanes

This graph places data for category 2 storms from the two previous charts on the same grid. There is little concern about either flooding or wind and flooding in any of the risk areas.
Perceived Vulnerability

Wind vs. Wind and Water in Category 3 Hurricanes

Concern increases considerably for category 3 storms, compared to category 3 storms. The widening of the gap between the two lines indicates a greater concern about wind compared to concern about water among respondents living farther inland from the coast.
Perceived Vulnerability

Wind vs. Wind and Water in Category 4/5 Hurricanes

For category 4 (almost 5) hurricanes, concern about wind and water is nearly as great in inland locations as coastal locations. Concern about flooding decreases significantly in non-surge and non-coastal areas, but remains fairly high, compared to the actual risk in those areas.
Perceived Vulnerability

Site-built vs. Mobile Homes in Category 3 Hurricanes

Mobile home residents believe their vulnerability is considerably greater than that of site-built residents, both near the coast and inland. Similar differences were found for category 2 and category 4/5 storms.
Perceived Vulnerability

Expectation of Being Told to Evacuate

Interviewees were asked if they anticipated that they would be told by officials to evacuate in each of the three hypothetical hurricanes. More people expect to be told to evacuate than believe they would be unsafe (from previous graphs). One interpretation is that some residents believe they will be told to evacuate unnecessarily.

![Expects Evacuation Notice in Cat 2, 3, and 4/5 Storms](image)
Evacuation Intentions

Intended Compliance with Evacuation Notices

When asked if they would evacuate if ordered to do so by public safety officials, the great majority of people said they would, even in category 2 hurricanes. Inland residents were just as likely as coastal residents to say they would evacuate if ordered to do so.
Evacuation Intentions

Intended Evacuation Depending on Evacuation Notice

Mandatory evacuation notices applicable to each of the three hypothetical hurricanes were described to respondents, and respondents were asked if they would leave evacuate in each one. In the previous question interviewees were told to assume that the evacuation order applied to them; in this question survey participants had to discern whether it applied to them or not.

Again a clear majority in all risk zones said they would evacuate, even in a category 2 storm, although not quite as many as in the previous scenario. There was more decrease inland than in the prior scenario.

![Intends to Evacuate in Cat 2, 3, and 4/5 Storms](chart.png)
Behavioral Analysis

Evacuation Intentions

Intended Type of Refuge

Most people said they would go to the homes of friends and relatives (F/R) when they evacuate, followed by hotels and motels (H/M). The percentage saying they would go to public shelters (PS) tended to increase inland, away from the areas of greater vulnerability.
Evacuation Intentions

Intended Location of Refuge

Most people said they would leave their own county when evacuating, and more than one in four said they would go out of state. The percentage saying they would go out of county decreased in areas farther inland from the coast. In-county destinations include people going to places in their own neighborhood (Hood) and elsewhere in their county (County).
Actual Response in Past Threats

Evacuation in Ivan

In each county, residents were asked how they responded in three past hurricane threats. The hurricanes varied among counties, based on information provided by counties. The example below is Hurricane Ivan, showing percent of respondents who evacuated throughout the West Florida region as well as in two specific counties.

Response varied among storms and locations, but in general fewer people evacuated than said they would in the hypothetical scenarios described earlier. The graph below shows only residents of site-built homes in order to indentify “shadow evacuation” which takes place inland of areas told by officials to evacuate. Mobile home evacuation was typically greater than site-built home evacuation.
Actual Response in Past Threats

Evacuation in Floyd

An example of the percentage of respondents evacuating in another storm, Floyd, is shown below. Information about how people have actually responded to hurricanes in locations outside Florida was also considered in projecting how Florida residents would behave in a range of hurricane scenarios.

In the Floyd example below, the threat posed in Georgia and South Carolina was greater than that posed in Florida and North Carolina, resulting in greater evacuation in those states overall. In hurricanes for which evacuation rates from surge-vulnerable coastal areas is higher, shadow evacuation rates are also higher.
Actual Response in Past Threats

Type of Refuge Used in Jeanne

People who said they evacuated in past hurricanes were asked whether they went to a public shelter, the home of a friend or relative, a hotel or motel, or someplace else. The example below is for Jeanne.

The percentage of people going to public shelters was generally lower than the percentage saying they intended to go to public shelters in the hypothetical scenarios presented earlier. However, public shelter use did increase inland, which is consistent with the intended-response data.
Actual Response in Past Threats

Location of Refuge in Charley

Interviewees who said they evacuated in past hurricanes were asked to indicate the location to which they evacuated. Responses varied greatly among storms and locations. Distances traveled by evacuees varied depending on intensity of the hurricane, how early before landfall evacuation notices were issued, and availability of refuge options locally.

The example below is from Charley. Most evacuees did not leave their own county, the percentage going out of county decreased in inland locations.
Actual Response in Past Threats

Evacuation Timing in Opal

Other studies have documented the time when evacuees left their homes. Findings from those studies were used to assess how many evacuees would depart prior to evacuation notices and then how promptly the remainder would leave.

The example below is from hurricane Opal, which resulted in one of the more rapid responses documented. In general fewer than 20% of eventual evacuees depart before evacuation notices are issued, and then people leave as rapidly as they believe they need to in order evacuate safely. Many responses have taken place over a period longer than 24 hours, because officials issued evacuation notices more than 24 hours prior to anticipated landfall.

Cumulative Evacuation in Opal

October 3-4
Obstacles to Evacuation

Needing Assistance in Order to Evacuate

Residents were asked whether anyone in their household would need assistance in order to evacuate. Statewide 9% said someone in the household would need assistance.
Obstacles to Evacuation

Type of Assistance Needed

Of those households in which someone would need assistance in order to evacuate 24% would need just transportation, 46% had a disability or medical attention requiring special assistance, and 22% needed transportation and also had a disability or medical condition.

Considering the entire sample (including households not having anyone needing assistance) 6.1% of the households statewide had someone with a disability or medical condition needing assistance in order to evacuate.
Obstacles to Evacuation

Source of Assistance

In households in which someone would need assistance in order to evacuate most respondents said the assistance would be provided by a friend or relative, either in the household or living elsewhere. Twenty-three percent said assistance would be needed from an agency or organization.

Overall, also considering households with no one needing assistance, 2% of respondents said someone in the home had a disability or medical condition requiring assistance from an agency in order to evacuate.
Obstacles to Evacuation

Registered as Having Special Needs

In homes where someone would require assistance in order to evacuate, only 24% were registered with their county as having special needs in an evacuation. Essentially the same percentage of persons with a disability or medical condition were registered (26%).
**Special Needs Shelter Demand**

Respondents were not asked specifically if they needed special care in a shelter. The graph below shows the percentage of homes in the overall statewide sample saying that someone had a disability or medical condition requiring assistance AND who said they would evacuate to a public shelter.

Anticipated demand for shelters in these households increased inland, just as anticipated demand for public shelters generally increased inland.

Most respondents lived in site-built homes. Mobile homes were more 50% more likely than site-built homes to have someone needing evacuation assistance.

![Graph showing special needs households intending to use public shelters](image)
Obstacles to Evacuation

Obstacles other than Transportation and Special Needs

People were asked if there were any obstacles, other than transportation and special needs, that would prevent them from being able to evacuate. Slightly more than one-in-ten replied affirmatively, that they did face such obstacles.

Has Obstacles to Evacuation
Other than Transportation and Special Needs

- No
- Yes

88
12
Obstacles to Evacuation

Types of Obstacles

Respondents saying there was an obstacle that would prevent their being able to evacuate were asked to indicate the nature of the obstacle or obstacles. The most commonly expressed constraint was having a pet to care for.

Figures in the graph below apply to households indicating that they had obstacles that would prevent their evacuation. Applied to the entire sample (including households with obstacles) just 4% said that pets would prevent their ability to evacuate.

The relatively small numbers are consistent with findings following evacuations when people are asked they didn’t evacuate. The great majority of non-evacuees say they didn’t believe it was necessary, rather than citing constraints such as transportation, special needs, and obstacles such as those shown here.
Obstacles to Evacuation

Households with Pets
In the overall statewide sample 54% of the respondents said they had pets.
Obstacles to Evacuation

Aware of Public Shelter Policies about Pets

Pet owners were asked if they were aware that most public shelters do not allow pets inside the shelter. The overwhelming majority (91%) said they knew about the policy.
Obstacles to Evacuation

Effect of Pet Policy on Evacuation

Respondents with pets were asked if the policy banning pets from most public shelters would keep them from evacuating. Only 6% said the policy would prevent their evacuating.

Most people don’t evacuate to public shelters, nor do they plan to, whether they own pets or not. Studies of response in actual evacuations have shown that pet owners either evacuate as often as non-pet owners or the difference is very small (i.e., 5%).

![Pet Policy Would Prevent Evacuation Graph]
Obstacles to Evacuation

Pet Plans

Most people with pets say they will take them with them to their destination when they evacuate. Eleven percent of pet owners say they intend to evacuate to public shelters.
Historical Trends in Evacuation Behavior

Evacuation Rates

There are a number of factors that complicate comparing behavior over time. The threats themselves vary from storm to storm, the distribution of interviews within an area varies among counties and evacuation zones, and actions taken by public officials vary. With those caveats in mind, West Florida has experienced a larger number of hurricane threats during the past three decades than other areas of the state, and evacuation rates documented in surveys conducted after a number of those storms is shown below. Although evacuation in Ivan and Dennis was lower than in earlier strong storms, the interviews were distributed over a larger geographical area, in which the threat varied.
Intention to Evacuate

Although people don’t always do what they say they will do, intention to evacuate is one indicator of what people are inclined to do. Variations in intention to evacuate from place to place or time to time is probably an accurate reflection of variations in the relative likelihood of evacuating. Surveys conducted in Broward and Miami-Dade Counties following Andrew, following Floyd, and in the SRES survey show some variation over time but no clear trend up or down.
Historical Trends in Evacuation Behavior

Perceived Safety

Beliefs about one’s safety is a better predictor of evacuation rates than intention to evacuate. In the Tampa Bay area, the percentage of people believing it would be unsafe to stay in their homes in category 3 hurricanes, considering both wind and water, was slightly greater in 2007 than in 1995.
Historical Trends in Evacuation Behavior

Perceived Safety

In Northeast Florida there has been a slight decrease in perceived safety since 1997. The value now is the same as the value in the Tampa Bay area.
Historical Trends in Evacuation Behavior

Intended Use of Public Shelter

Fewer evacuees typically go to public shelters than say they would. Nevertheless, variations in intention to use public shelters is probably a good reflection of variations in actual shelter use. South Florida shows a nationwide trend of less reliance on public shelters that started around 1989.
Historical Trends in Evacuation Behavior

Actual Use of Public Shelter

Actual use of public shelters in the Tampa Bay area also reflects the tendency for evacuees to rely less on public shelters over time. Elena was in 1985, Georges in 1998, and Charley in 2004. Shelter use in Elena was probably magnified by the timing of the late timing of the evacuation.
Historical Trends in Evacuation Behavior

Actual Use of Public Shelter

The trend since Bertha in 1996 Northeast Florida has also been downward. The five percent shelter use in Frances is typical of shelter use in most locations today, although it can vary within locations.
Historical Trends in Evacuation Behavior

Intention to Evacuate Out of County

In many counties there are safe areas where evacuees can take refuge, and out-of-county trips usually increase the total time required to complete an evacuation. Despite efforts since Floyd to discourage out-of-county trips, intentions to do so in South Florida have increased.
Historical Trends in Evacuation Behavior

Actual Evacuation Out of County

In the Tampa Bay area a larger percentage of evacuees went out of county in Charley than in Elena and Georges. However, the late timing of the Elena evacuation probably left less time for evacuees to leave the area, and the number of people leaving in Georges was small. Nevertheless, this is a behavior that needs to be tracked closely in case a trend is developing.
Other Hazards

Few Floridians have ever evacuated for hazards other than hurricanes, and most don’t expect to ever be affected by any of the four hazards asked about in the survey. However, most say they would evacuate if told to do so. Intended use of public shelters is generally consistent with the percentage of people saying they would use shelters in hurricanes, but higher than the number that actually use public shelters in hurricanes. Most but not all respondents said they would shelter in place (i.e., not evacuate) if asked to do so in hazardous material and nuclear power plant accidents. Questions about nuclear power plants were asked only in counties in which at least part of the population is in the 10-mile Emergency Planning Zone, but the sample was not selected to include just the residents who lived in the EPZ in those counties.

<table>
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