Behavioral Analysis for Alabama Hurricane Events
Final Report
April 2012

FEMA

Prepared by:

National Planning Center of Expertise
For Coastal Storm Damage Reduction
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BEHAVIORAL ANALYSIS
FOR
ALABAMA HURRICANE EVENTS

National Hurricane Program

FINAL REPORT

Prepared for:

Federal Emergency Management Agency
National Hurricane Program

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U.S. Army Corps of Engineers:
National Planning Center of Expertise for
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ALABAMA HURRICANE BEHAVIORAL ANALYSIS*
EXECUTIVE SUMMARY

Over 1100 telephone surveys were completed by a random sample of Baldwin and Mobile county resident during May 2011. Of those who answered the phone, 78% completed the survey. Most of the respondents were living in the area at the time of Hurricanes Ivan and Katrina. Many had evacuated for one or both hurricanes and expressed a high level of concern about hurricanes. For most variables the answers from Baldwin and Mobile counties were not significantly different and are thus discussed together.

Some of the most important findings are:

- 28% of those living in Zone 1 in Baldwin and 49% in Mobile either believe they do not live in an evacuation zone, or they don't know if they do.
- While 29% of the total sample says it is very or somewhat likely they will leave for Category 1 or 2 hurricanes, the rate jumps to 69% for higher category storms.
- While 57% say it is very or somewhat likely they will evacuate if voluntary, 85% say they will leave if a mandatory order is given.
- Only 33% of those living in mobile homes intend to leave for a Category 1 or 2 storms; 75% for major ones.

Separate from other factors, households with these characteristics were more likely to say they will evacuate:

- Renters,
- Households with children,
- Lower-income households.
- African American households,
- Those who have talked about what they will do,
- Those who have evacuated before.

A series of questions about what they would do IF they had to evacuate for a major storm yielded these results:

- 10% of the respondents from Mobile County and 5% from Baldwin County said they would need public transportation.
- 9% in Mobile County and 6% in Baldwin County will likely stay in a public shelter.
- Most will stay with family or friends.
- Most will travel at least 200 miles.
- On the average 2.7 persons will leave per household, taking 1.3 cars per household.
- Most pet owners will take them.

In summary the results call for major outreach campaigns to promote appropriate evacuation decisions. More specifically, to:

- **Publicize storm surge risk, including how it can differ among hurricanes of the same category on the Saffir-Simpson Scale;**
- **Inform coastal Alabamians of their evacuation and/or surge zone status;**
- **Promote evacuation, even for Category 1 or 2 storms, of those living in areas at risk for surge or flooding and those in mobile homes;**
- **Promote sheltering in place for those outside surge areas;**
- **Promote mitigation incentives, particularly for rental units.**

On the positive side there is a great deal of concern about hurricanes and this should translate to keen interest in learning more about their levels of risk. Findings from this behavioral study can provide guidance for campaigns that target those who should leave but don't intend to, as well as those who intend to leave who may be able to safely shelter at home or within their county. Mitigation incentives, particularly in rental units, could result in lower evacuation rates, as well as less need for shelter space and public transportation.

*This behavioral study was completed by SocResearch Miami under the direction of Drs. Betty Morrow and Hugh Gladwin and submitted through Dewberry to FEMA and the USACE in April 2012.

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I. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) (Mobile District) with support from the Federal Emergency Management Agency (FEMA) and the Alabama Emergency Management Agency (AEMA) contracted with Dewberry for a Vulnerability and Behavioral Analysis for the Alabama Hurricane Evacuation Study. SocResearch Miami was chosen by Dewberry to conduct a behavioral survey of the two counties in coastal Alabama under the direction of two social scientists with extensive experience in survey research related to citizen and household response to emergencies and disasters, Dr. Betty Hearn Morrow and Dr. Hugh Gladwin. (See Appendix A for summaries of their education and experience.)

The results will be compared to the results from the Alabama Hurricane Evacuation Project Critical Transportation Needs behavioral survey (2009) where appropriate. A total of 765 regular telephone interviews and 2,427 automated calls were completed in Baldwin and Mobile counties for that project.

II. METHODOLOGY

The goal was to gather relevant information about the past and potential evacuation behavior of the coastal Alabama population in response to a hurricane. The target population was located in Baldwin and Mobile counties. The random telephone sample included both landline and cell phones. An important feature of the research design is that responses are geo-coded, enabling analysis according to the location of the respondents' households.

A. THE QUESTIONS

The survey questions were developed by Morrow and Gladwin based on insights gained from past research and input from the agencies involved, as well as a critique by Dr. Susan Cutter at the University of South Carolina. A set of questions was submitted by the USACE to the Office of Management and Budget (OMB) for approval. It was approved with minor changes. A total of 47 questions solicited information about hurricane concern, past hurricane response and future intentions. Another 18 questions gathered demographic information for use in the analysis. A copy of the questionnaire used for the survey is provided in Appendix B.

B. THE SAMPLE

SocResearch Miami was contracted to complete interviews with a minimum of 1100 households distributed across the two coastal Alabama counties. Phone numbers were purchased from Scientific Telephone Samples according to location specified by Dr. Gladwin. Regardless of population differences, the target was 500 completed calls in Baldwin County and 600 in Mobile County. This reflected a minimum number necessary in order to allow for statistical analysis by county risk areas (surge and evacuation zones). The location of completed interviews was

carefully monitored throughout the interview process to assure that there were sufficient numbers in each risk area.

For persons interviewed using landline phones the Census block where their homes are located was known. With the cell phone sample, respondents were asked to provide their home location or at least the names of the closest intersection to their homes. Thus it is possible to consider respondents' answers within the context of where they are located. Table 1 shows the actual location of those who completed the interview. Since this survey was about hurricanes, an effort was made to over-sample the most vulnerable geographical areas.

TABLE 1. COMPLETED INTERVIEWS

COUNTY	TARGET	COMPLETED LAND LINE	COMPLETED CELL PHONE	TOTAL COMPLETED INTERVIEWS	MARGIN OF ERROR FOR TOTAL COMPLETED INTERVIEWS
BALDWIN	500	447	60	507	4.3
MOBILE	600	510	91	601	4.0
TOTAL	1100	957	151	1108	2.9

Margin of error is a statistic that expresses the amount of random error in a survey's results. The larger the margin of error, the less the confidence that the same results would occur if the same population was interviewed again. The margin of error for the total sample was about 3%. This is quite small and means that the values estimated for each variable are accurate +/- 3%. In other words when a finding is reported to be 43%, the actual rate for that variable in that general population would be somewhere between 40% and 46%. The margin of error is slightly higher, about 4%, for variables that are examined at the county level due to the smaller samples.

The following tables provide the number and percent of respondents in each of the evacuation and surge zones for each county. In order to be able to compare the counties the evacuation zones are grouped into two categories, High Risk and Lower Risk, as follows:

- In Baldwin County zones 1 and 2 are High Risk, while zones 3, 4, and 5 are Lower Risk.
- In Mobile County zones 1 and 2 are High Risk, while zones 3 and 4 are Lower Risk.

In all cases everything located within an evacuation zone but outside the designated surge zones is included in the No Zone surge category. The surge zones (based on SLOSH MOMs) for both counties are labeled 1-2 (Category 1 and 2) and 3-5 (Category 3, 4, and 5).

The following Tables 2 and 3 show the sample distributed by evacuation zones for each county. Table 4 provides it according to surge zones.

TABLE 2. SAMPLE DISTRIBUTION BY EVACUATION ZONE BALDWIN COUNTY*

	ZONE 1		ZONE 2		ZONE 3		ZONE 4		ZONE 5		TOTAL	
	#	%	#	%	#	%	#	%	#	%	#	%
HIGH RISK	61	12%	168	34%							229	46%
LOWER RISK					9	2%	230	46%	34	7%	264	55%
TOTAL	61	12%	168	34%	9	2%	230	46%	34	7%	493*	101%**

* Zone location could not be determined for several cases.
** Due to rounding errors.

TABLE 3. SAMPLE DISTRIBUTION BY EVACUATION ZONE – MOBILE COUNTY

	ZONE 1		ZONE 2		ZONE 3		ZONE 4		TOTAL	
	#	%	#	%	#	%	#	%	#	%
HIGH RISK	117	19%	313	52%					430	71%
LOWER RISK					132	22%	44	7%	176	29%
TOTAL	117	19%	313	52%	132	22%	44	7%	606	100%

TABLE 4. SAMPLE DISTRIBUTION BY SURGE ZONE

	CAT 1 & 2		CAT 3-5		NO ZONE		TOTAL
	#	%	#	%	#	%	#
BALDWIN	37	48%	63	28%	407	50%	507
MOBILE	40	52%	161	72%	400	50%	601
TOTAL	77	100%	224	100%	807	100%	1108

In spite of over-sampling in the higher risk zones, the numbers are smaller due to population differences. The population of Zones 1 and 2 in Baldwin was much smaller. However, these samples are large enough to allow statistical analysis by zones. The map in Figure 1 depicts the actual location of each respondent's household.

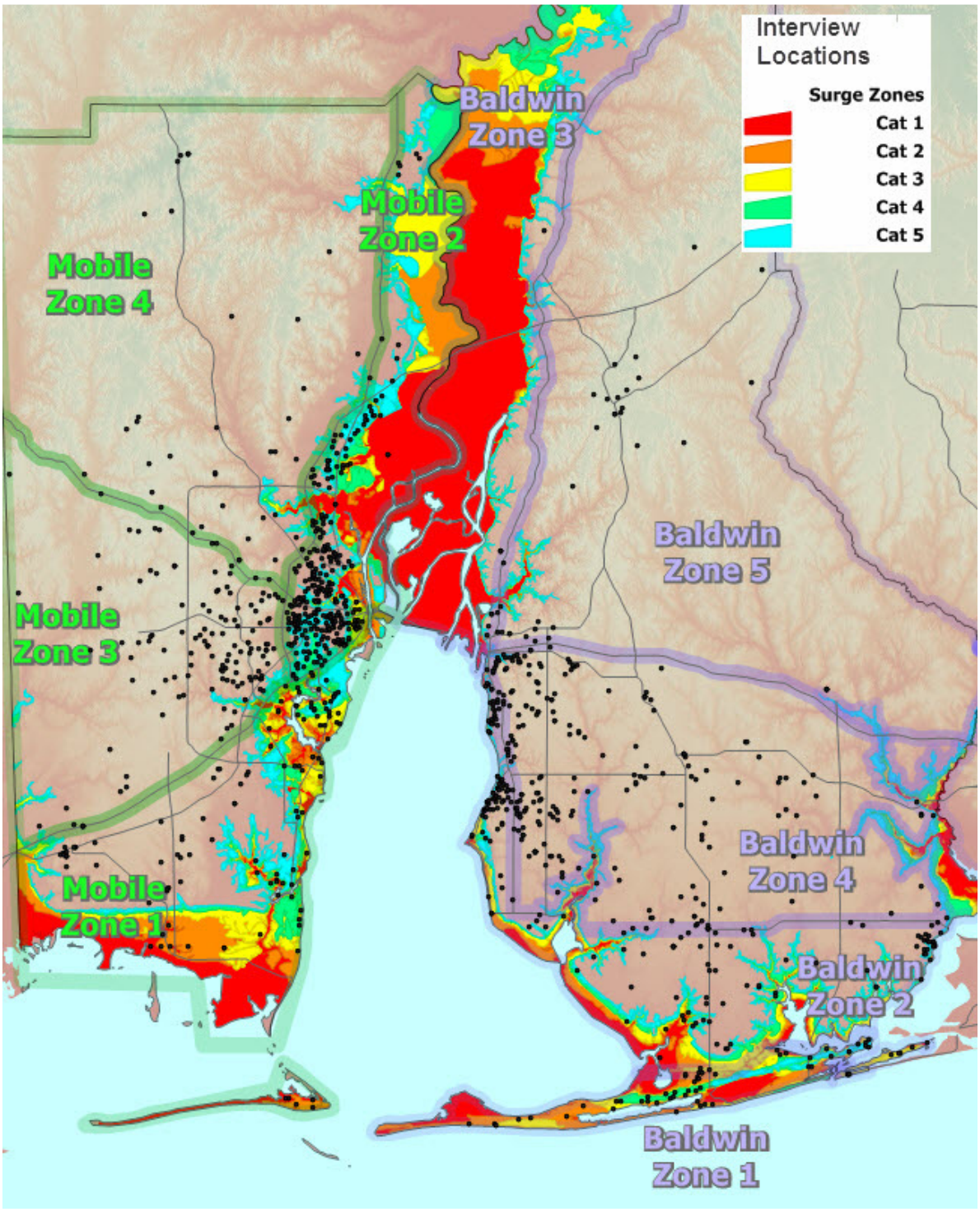

FIGURE 1. LOCATION OF COMPLETED INTERVIEWS

Table 5 compares the demographics of the sample with those reported for coastal Alabama by the U. S. Census 2010 American Community Survey. It is important to note that interviews were completed with persons at least 18 years of age who said they were qualified to speak for the household.

TABLE 5. COMPARISON OF DEMOGRAPHICS

DEMOGRAPHIC	CENSUS DATA	LANDLINE SAMPLE	CELL PHONE SAMPLE	TOTAL SAMPLE
EDUCATION				
GRADE SCHOOL	4%	1%	1%	1%
SOME HIGH SCHOOL	12%	8%	6%	6%
HIGH SCHOOL GRADUATE	33%	38%	29%	30%
SOME COLLEGE	30%	22%	23%	23%
COLLEGE GRADUATE	14%	21%	27%	27%
GRADUATE DEGREE	7%	10%	13%	13%
GENDER				
MALE	46%	42%	37%	37%
FEMALE	54%	58%	63%	63%
AGE				
18 - 30	18%	27%	2%	5%
31 - 45	24%	25%	11%	13%
46 - 60	29%	27%	31%	31%
OVER 60	28%	21%	55%	51%
INCOME				
$10,000 OR LESS	6%	12%	14%	14%
$10,001-$20,000	10%	19%	13%	14%
$20,001-$30,000	11%	11%	13%	13%
$30,001-$50,000	21%	16%	18%	18%
$50,001-$80,000	24%	21%	19%	19%
OVER $80,000	28%	20%	22%	21%
RACE				
WHITE	70%	70%	76%	75%
AFRICAN-AMERICAN	27%	27%	23%	23%
OTHER	3%	3%	2%	2%

Typical for telephone surveys, this sample is more educated and includes more women than found in the coastal Alabama population. The largest discrepancy occurs with age. Women and older adults are usually over-represented in telephone surveys since they are more likely to be at home and to agree to be interviewed, but in this survey the discrepancy is extreme. According to the Census, 28% of the population of coastal Alabama is made up of persons over 60, a fairly high rate. However, 51% of this sample is over 60 years of age. Unusual for survey samples, these respondents tended to have less household income than typical for the area. The rate for African Americans matches perfectly. In the sample 89% own their homes, compared to 80% reported by the Census. **In summary when examining the results of this survey, it is important to keep in mind that the answers represent people and households that are older, more educated, but have less income than found in the coastal Alabama population at large**. **There also are more women represented.** Since there are no statistically significant county differences on any of the housing and demographic variables much of the analysis that follows uses the total sample. **Only 56 respondents, or 5% of the total sample, live in mobile homes.**

The main purpose of including cell phone interviews in the sample is to see if the results are significantly different, given the extensive use of cell phones today, often in place of landlines. The results seen in the Table 5 are close enough to allow the landline and cell data to be combined for this analysis.

The bar graph in Figure 2 depicts the years respondents have lived in coastal Alabama. As shown, many respondents moved there in the last 20 years.

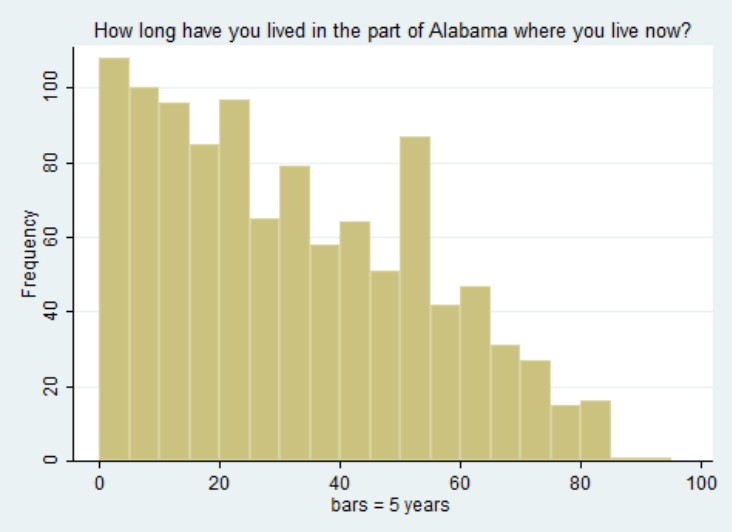

FIGURE 2. LENGTH OF TIME LIVING IN AREA

C. THE INTERVIEWS

Using the Computer-Assisted Telephone Interviewing (CATI) system at NORS Survey, Inc., experienced interviewers called each working number in the sample up to 10 times or until someone answered. The calls occurred mostly in the evenings and on weekends during May 2011 until quotas for each region and surge zone were reached. Most calls did not result in valid interviews for various reasons. Some were non-working or business numbers; others were located outside the target region; others were never answered, were answered by an answering machine, were answered by someone under 18, or were answered by a person who could not speak for the household.

For the landline interviews 1100 calls reached a person who potentially could do the interview, and 935 people who answered agreed to participate, resulting in an **cooperation rate of 78%.** The cooperation rate measures the amount of non-response that is most likely to bias results given that potential respondents know about the survey when they do not respond.[1] A total of 200 interviews were made to cell phones to check for bias in response resulting from a listed landline sample. **Cell phone calls had a cooperation rate of 76%** and were added to the overall sample and verified that survey results are valid for cell phone calls as well as landline. **The cooperation rate for the total sample was 78%.** These are excellent results for telephone interviewing, probably accounted for by hurricanes being a very salient topic in coastal Alabama.

D. THE ANALYSIS

In addition to simple frequencies, the results are analyzed according to other relevant variables, such as the household's location and demographics. The overall margin of error is plus or minus 3%. All cross-tabulations reported as showing a relationship between variables are tested for significance using an appropriate test.[2] Unless otherwise mentioned, all relationships between variables found in tables are significant at the .05 level (95% confidence), meaning that if the survey was redone with a new sample from the same population 95 times out of 100 the strength of the relationship between the variables would not be more than 5% different from that shown in this study. Some data are analyzed spatially and presented in the maps included in this report. A regression model is also presented to help explain the intent to evacuate.

As a result of doing a similar number of interviews for each county, interviews from Baldwin represent a smaller population. Some bias can occur as a result of some areas contributing more to the overall results. Oversampling of high-risk areas was also done to make sure that analysis by those would be statistically significant. To compensate for this, a weight was calculated so that each interview contributed equally to the overall results. This makes the percentages more

[1] "AAPOR Cooperation Rate 1 (COOP), or the minimum cooperation rate, is the number of complete interviews divided by the number of interviews (complete plus partial) plus the number of non-interviews that involve the identification of and contact with an eligible respondent." American Association for Public Opinion Research. 2009. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 6th edition. AAPOR, p. 37.

[2] When both variables were nominal, i.e. are categories, chi square was used as the significance test. If one or both were ordinal, i.e. are ranked in order, gamma was used.

accurate in the tables, but does not reduce the accuracy of results for each individual county since all the interviews done for that county go into calculating statistical significance. The weighting was done at the census block group level through a comparison of interviews in the block group with 2010 U.S. Census American Community Survey data. A lack of statistically significant differences between the counties supports a region-wide analysis on many of the survey variables.

III. FINDINGS

Most of the survey questions deal with attitudes, behaviors, and future intent related to hurricane evacuation. Results are reported and often illustrated in tables and/or figures. Particularly important findings are written in bold type for emphasis. These findings are discussed where appropriate and the major findings are summarized at the end.

A. HURRICANE EXPERIENCE

Past behavior is an important predictor of future actions. Research has shown that people who previously evacuated for a hurricane are more likely to evacuate in the future. In 2004 Hurricane Ivan made landfall in Baldwin County as a Category 3 hurricane with 120 mph winds and 14 feet of storm surge. A year later coastal Alabama, particularly Mobile County, was severely impacted by Hurricane Katrina. The 14-18 foot storm tide brought 2-6 feet of water into downtown Mobile. Wind and tornadoes resulted in damage to structures and infrastructure far inland.

Given this recent hurricane history, several questions were asked to determine the extent to which Ivan and Katrina were experienced by this sample.

Q42. *"Did you evacuate for Hurricane Ivan in 2004?"*

Q44. *"Did you evacuate for Hurricane Katrina?"*

If yes, *"How did your experience with Hurricane Ivan affect what you did for Katrina?"*

Q47. *"What happened to you and your home as a result of Katrina?"*

About 80% were living in the area for Hurricane Ivan and 82% were there for Hurricane Katrina. Table 6 provides sample evacuation rates for the two coastal Alabama counties.

TABLE 6.
EVACUATION RATES FOR HURRICANES IVAN AND KATRINA

	BALDWIN	MOBILE	TOTAL
Q42. Evacuated for Ivan	52%	36%	44%
Q44. Evacuated for Katrina	25%	32%	29%
Evacuated for Both	15%	17%	16%

The total evacuation rates for coastal Alabama are 44% for Hurricane Ivan and 29% for Hurricane Katrina, and 16% of these respondents evacuated for both hurricanes. There are significant county differences. Baldwin County had the highest rate for Hurricane Ivan and Mobile County for Hurricane Katrina. Both would be expected given their locations relative to landfall predictions. Most say their experience with Hurricane Ivan had nothing to do with their evacuation decision for Hurricane Katrina.

Respondents were asked the open-ended question, "*What happened to you and your home as a result of Katrina?*" About one-half of the Baldwin County respondents who were there for Hurricane Katrina reported no damage, most of the rest described minor damage to homes, trees and cars. A few had major damage to their homes. As expected given its location, Mobile County reported more damage; about 7% said their homes were either extensively damaged or destroyed and there were many reports of minor damage and flooding.

Interestingly, most felt their experience with Hurricane Ivan did not affect what they did for Hurricane Katrina. This implies that they evaluate each storm before making their decision. Yet, those who evacuated for Hurricane Ivan were significantly more likely to evacuate for Hurricane Katrina. Those who evacuated for Hurricane Katrina were more likely to say their home could be flooded by surge or rain and were more likely to say they would leave for future hurricanes, regardless of category. Of those who evacuated for both, 36% say they will leave for a Category 1 or 2 storm and 83% say they will leave for Category 3 or higher. This once more shows the effects of past hurricane behavior on future actions.

B. RISK FACTORS

Before deciding to take precautionary action against a hazard, people must believe they or their loved ones are at risk. If the action is as onerous as evacuation, they must believe the situation to be serious. Therefore, a major topic of this survey involved questions to measure the extent to which coastal Alabama residents understand their hurricane risk. Later in the report the relationship of these risk factors to respondents' evacuation zone location will be examined. The

first question (Q3) asked respondents, *"To what extent are you concerned about the threat of a hurricane? Are you very concerned, somewhat concerned, or not concerned?"* **As illustrated in the Figure 3, there is a lot of concern – 80% of the sample is either very concerned or somewhat concerned. This is not surprising. Given the area's recent hurricane history, the surprise is that 19% are not concerned.** County differences are statistically significant, with Baldwin County respondents being less concerned about the general threat of hurricanes. African Americans are significantly more likely to say they are concerned about hurricanes.

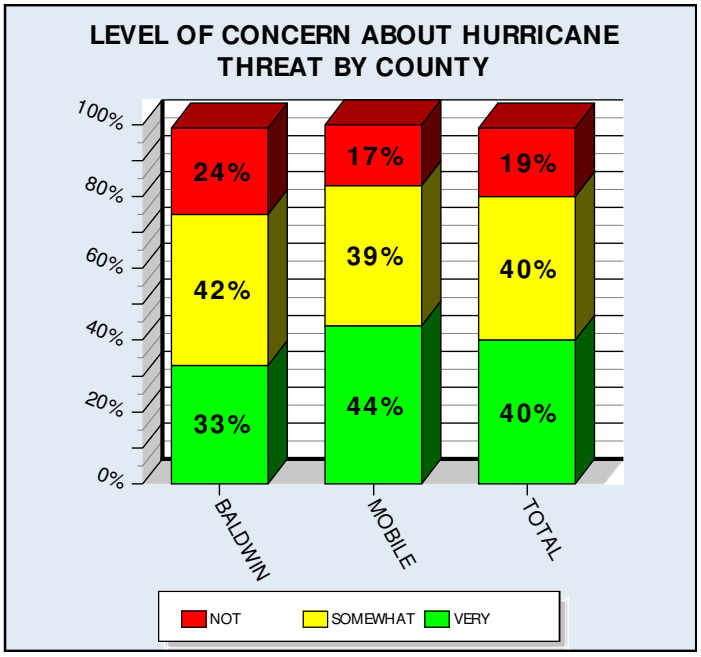

FIGURE 3.

The next series of questions are:

Q4. *"How likely is it that your home would ever be seriously damaged or destroyed by the winds of a hurricane or damaged by trees blown down by hurricane winds?"*

Q5. *"How likely do you think it is that your home would ever be flooded as a result of hurricane storm surge?"*

Q6. *"How likely do you think it is that your home would ever be flooded as a result of heavy rain from a hurricane?"*

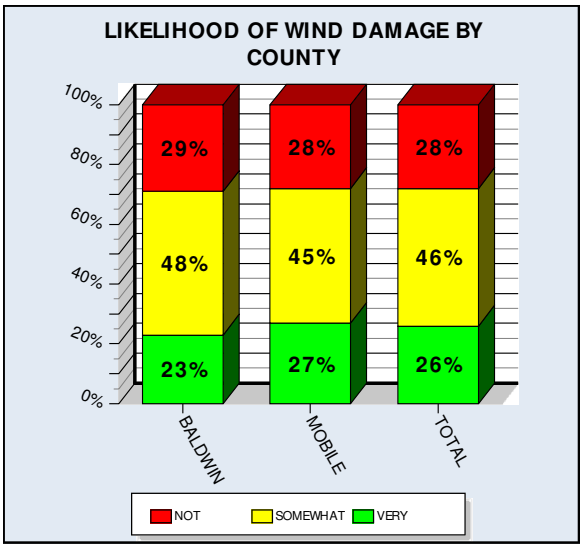

FIGURE 4.

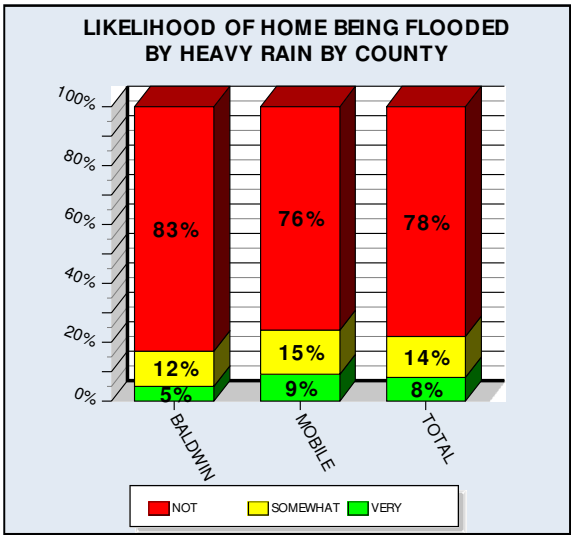

FIGURE 5.

As shown in Figure 4, **26% of the total sample thought it very likely and 46% thought it somewhat likely that their home will be seriously damaged or destroyed by hurricane winds.** While those in Mobile County are somewhat more apt to say it was very likely, there is relatively little difference between the counties. As would be expected, mobile home residents are significantly more likely to be concerned about wind damage. **However, 23% of mobile home residents said it was unlikely that their home would ever be seriously damaged or destroyed by the winds from a hurricane.**

As illustrated in Figure 5, **coastal Alabamians do not seem nearly as concerned about flooding from the rain accompanying a hurricane.** This is not surprising given the elevation of much of the area. There are no important county differences.

Figure 6 depicts the results from the question about hurricane surge.

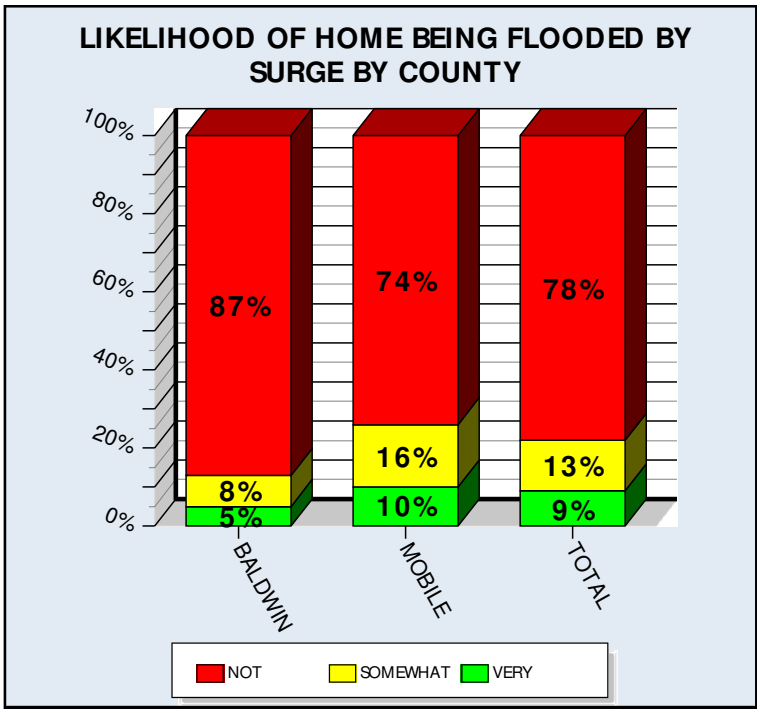

FIGURE 6.

While only 13% of Baldwin respondents think it is very or somewhat likely that their homes will be flooded by surge, the rate in Mobile is twice as high (26%). Later these variables will be examined in the context of respondent evacuation and surge zone location. Women, younger respondents, African Americans, renters and those with lower incomes are more likely to be concerned about all three hazards associated with hurricanes. No doubt some of these overlap and are associated with socioeconomic level. The results of multivariate analysis are provided later in the report.

C. EVACUATION DECISION MAKING

1. INFORMATION SOURCES

In today's world, weather forecasts, warnings, and evacuation-related messages are available through a variety of media. It is useful for officials to know where citizens are looking for information. Therefore, respondents were asked, *"If a hurricane was threatening your area, where would you get MOST of your information?*" Results are illustrated in Figure 7.

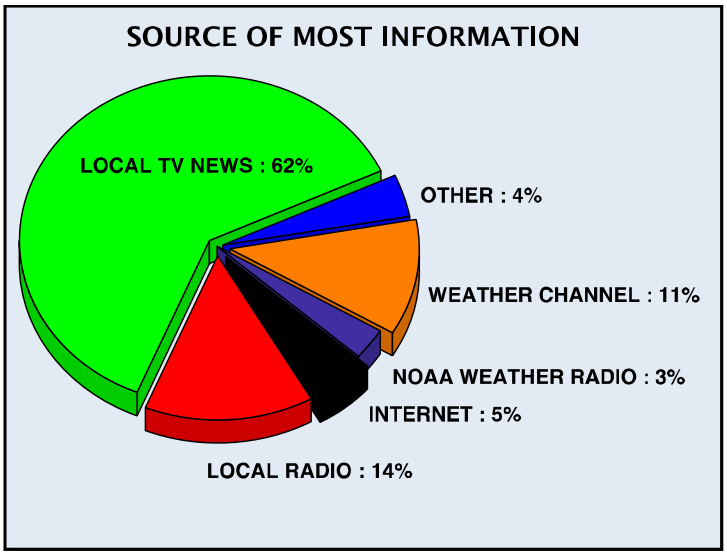

FIGURE 7.

As expected, the MOST common information source was local television, especially in Baldwin. A distant second was local radio, followed closely by the Weather Channel. It is important to note that **among the lowest educated group, 58% gave radio as their most important source.** The 5% who say the Internet is their main source, were then asked "*What Internet sites will you likely go to for hurricane information*". The most common answers were the websites of local TV stations, The Weather Channel and the National Hurricane Center.

Relevant to the warning communication process, they were asked:

Q39. *"Do you have access to the Internet from your home?"*

Q39A. *"Do you have access to the Internet from a mobile device such as your phone?"*

A surprising finding was that 82% of the Baldwin sample and 70% of the Mobile sample reported having access to the Internet in their home. As shown in the Table 7, this was negatively associated with age and positively associated with income. Nevertheless, **even among those reporting the lowest household income, nearly one-half have Internet, as do 64% of households with someone 60 or older. In addition 48% of the total sample report having access to the Internet through their cell phone.** Once again rates are highest among young adults and higher income households. Yet, **about one-third of older adults and and one-quarter of households with the lowest incomes have access to the Internet through a mobile device**. The rates for African-American households were 60% for Internet in their homes and 45% for access through a mobile device. Clearly, **the Internet is becoming a major source of information in coastal Alabama.**

TABLE 7. INTERNET AVAILABILITY BY AGE AND INCOME

	INTERNET IN HOME	INTERNET FROM MOBILE DEVICE
AGE		
18 - 30	88%	89%
31 - 45	91%	73%
46 - 60	83%	59%
Over 60	64%	30%
HOUSEHOLD INCOME		
<$10,000	47%	26%
$10,001 - $20,000	55%	28%
$20,001 - $30,000	64%	38%
$30,001 - $50,000	75%	51%
$50,001 - $80,000	95%	52%
Over $80,000	97%	76%
AFRICAN AMERICAN	60%	45%

While there may have been some confusion in the way the question was asked, **there is evidence that more than 95% of the respondents in the survey have access to a cell phone.** Of these, only 10% in Baldwin and 9% in Mobile have registered their cell phone to receive alerts or emergency notifications. This is a serious underuse of this important service.

2. ROLE OF SOCIAL NETWORKS

The effect of social networks in household evacuation decisions was illustrated in the case of Hurricane Katrina and New Orleans. Many people said that the advice of others influenced their decision to leave or stay. Thus, several questions are included in this survey regarding the possible role of people outside the household in evacuation decisions.

> Q12. *"Would you consult with anyone outside of your household before making your decisions about evacuation?"*
>
> Q13. *"Who would that be?"*
>
> Q14 *"Would assisting others outside your household affect how quickly you would be able to leave?"*

In answer to the first question in this series asking whether they would consult anyone outside their household before making their decision about evacuation, 59% from Mobile and 53% from Baldwin said they would. Women, African Americans, renters and those reporting lower household income are more likely to consult others before deciding whether to evacuate. Table 8 illustrates their choices for consultation.

TABLE 8.
WHO WOULD CONSULT WITH ON EVACUATION DECISION

PERSON	PERCENT*
Relative or Friend Inside the Area	68%
Relative or Friend Outside the Area	27%
Employer	3%
Local Authorities	12%
Other	5%

* Adds up to more than 100% because they could give more than one answer.

Past research has shown that people often have to assist others or be assisted by people outside of their household during evacuation. **In this sample 45% indicated that assisting others outside their household will affect how quickly they will be able to leave.** African American respondents were more likely to say they will need to assist others.

3. ROLE OF PETS

Post-evacuation research has shown that some people do not evacuate because they do not want to leave their pets. Many jurisdictions are making transportation and shelter plans for evacuees to bring their pets. In this survey 69% in Baldwin and 60% in Mobile indicate they have pets. **The vast majority (89% in Baldwin and 85% in Mobile) will take their pets with them if they evacuate.** Of the total sample about 9% will leave them at home, 4% will board them, and 1% will leave them with family or friends. It is interesting that among families with children under 12 only 3% would leave their pets at home. As revealed later in the regression analysis, pets alone do not seem a major factor explaining failure to evacuate.

4. EVACUATION PLANNING

Past research indicates that households that have discussed what they would do if they had to evacuate are more likely to do so when the time comes. Similarly, those who have a destination in mind are more likely to leave. This survey asked Q11: "*Has your household or family talked about where you would go if you had to evacuate for a hurricane?*" Most answered in the affirmative. There were county differences – 64% of the Baldwin sample reported they had discussed this, compared to 58% in Mobile County. Those with more education and higher

incomes, as well as homeowners, were more likely to say yes. **Further analysis showed the expected significant correlation between evacuation planning and evacuation intent.**

D. EVACUATION INTENT

This section gets to the core issue. The major purpose of this survey was to provide data to assist emergency managers and other officials in planning for hurricane evacuations. It is important to know how many people intend to leave, how they intend to leave, and where they intend to go. The relationship of intent to actual behavior will be discussed later.

1. BY HURRICANE CATEGORY

Respondents were asked:

> Q7. *"If a Category 3 or above hurricane, a major hurricane, was threatening your community, how likely is it that you would leave your home?"*
>
> Q8. *"What about for a Category 1 or 2, a lower category hurricane, how likely is it that you would leave your home?"*

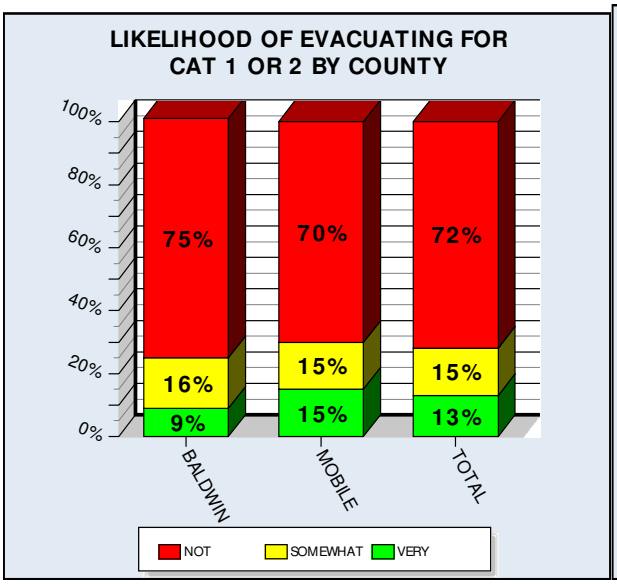

FIGURE 8.

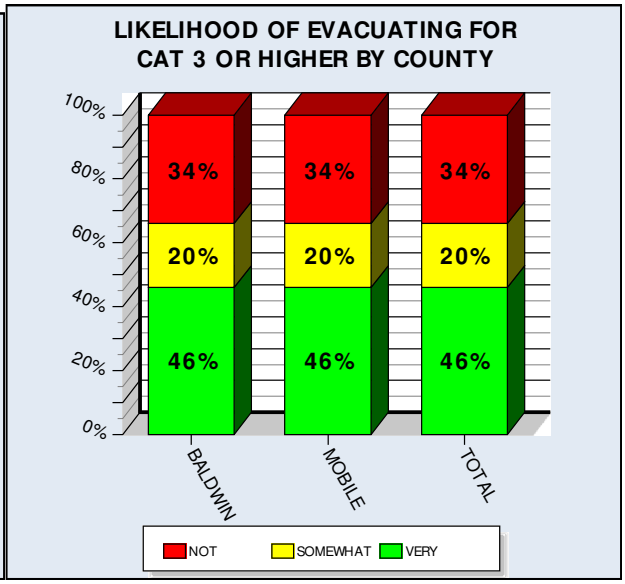

FIGURE 9.

As illustrated in Figures 8 and 9, the results differ dramatically**. A small minority (13%) of the total sample intend to leave for a Category 1 or 2 storm while nearly half say it is very likely they will evacuate for a Category 3 or above hurricane.** There are no significant county differences. In fact the county rates for a major storm are identical.

In both cases African Americans and lower-income households are more likely to say they will leave. The rate for African American households that intend to leave is 26% for Category 1 or 2

and 64% for more major storms. Households with children are more likely to say they will leave. As expected, those who evacuated for Hurricane Katrina are more likely to say they will evacuate again. In fact 74% said it is very likely they will evacuate again for a major storm.

On the 2009 Critical Transportation Needs telephone survey the question choices were different – a simple yes or no. At that time 23% of Baldwin County respondents said they would evacuate for a Category 1 or 2 storm and 68% for a Category 3 or higher one. The corresponding rates for Mobile County were 33% and 70%. If you combine "very likely" and "somewhat likely" on this survey, the results are similar.

2. RECOMMENDED VERSUS MANDATORY

The questions were:

> Q9. *"If government officials issue a mandatory evacuation for your area for a hurricane, how likely is it that you would leave your home?"*
>
> Q10. *"If an evacuation was voluntary, but not mandatory, for your specific area, how likely is it that you would leave your home?"*

Past studies have found that people are more likely to evacuate if ordered or mandated, as opposed to merely recommended or voluntary. As shown in Figures 10 and 11, the difference here is dramatic.

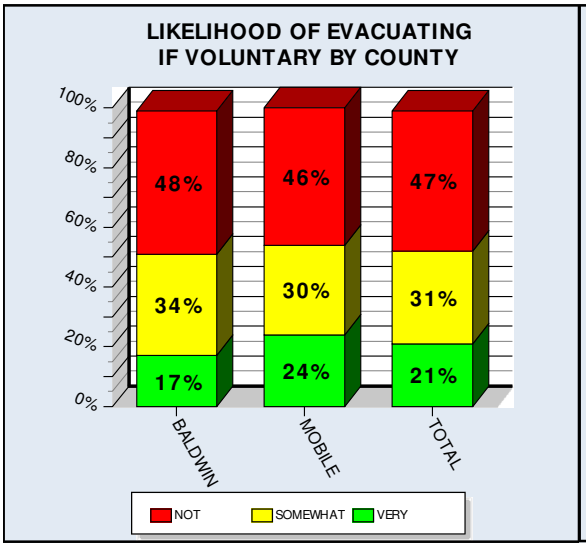

FIGURE 10.

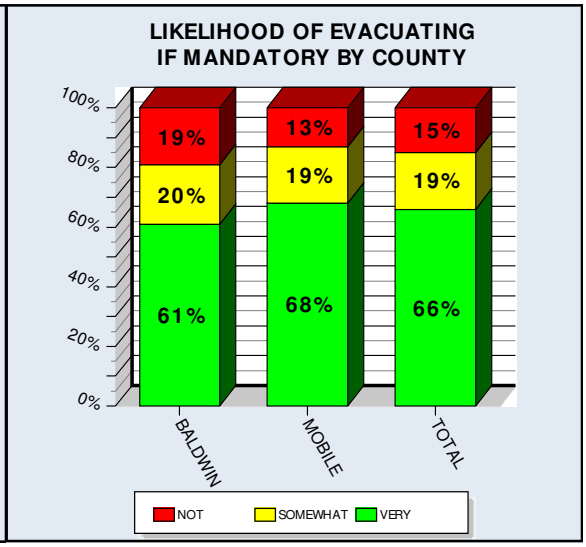

FIGURE 11.

While 21% of the total sample indicate they will very likely evacuate if voluntary, the rate jumps to 66% who say they will leave if a mandatory order is given. If you combine those who say "very likely" with "somewhat likely" the total is a staggering 85%. This pattern holds regardless of county, but the rates in both instances are higher for Mobile County.

There is a tendency for people to overstate their intention to leave, especially if the question includes the term "ordered" or "mandatory." Nevertheless, these are very high rates. Past experience has shown that there tends to be less disparity between stated intention and actual evacuation when the storm threatening the area is a major one, and when people have evacuated before. **This indicates that if a mandatory evacuation order is given for a major storm, compliance will be quite high.**

Among those households with someone 65 or older, only 15% say they will leave if voluntary and 48% if mandatory. Elderly households tend to be non-evacuators, but these very low rates should be of concern to authorities. Women respondents are more likely to say they will evacuate both when recommended and ordered.

3. EVACUATION INTENT AMONG RENTERS

From these data it is clear that **renters are more likely to evacuate for any hurricane**. Given the importance of home tenancy on evacuation factors, Table 9 provides relevant rates for the total sample according to whether they rent or own their homes.

TABLE 9. EFFECT OF HOME TENANCY ON EVACUATION FACTORS

RESPONSE	RENTERS	OWNERS
Very Likely Home Damaged by Winds	43%	24%
Very Likely Home Damaged by Rain Flooding	21%	7%
Very Like Home Damaged by Surge	26%	7%
Very Likely Evacuate for Category 1 or 2	19%	12%
Very Likely Evacuate for Category 3 or Higher e	65%	44%
Very Likely Evacuate if Voluntary	28%	21%
Very Likely Evacuate if Mandatory	80%	65%
Stay Inside County	48%	29%
Need Public Transportation	21%	7%
Access to Internet in Home	54%	76%

These data indicate that renters tend to be a more vulnerable population that will more likely require services during and after a hurricane event.

4. EVACUATION INTENT AMONG MOBILE HOME RESIDENTS

Given the hurricane vulnerability of mobile homes or manufactured housing it is important to consider their answers separately. Of the total sample, 56 lived in mobile homes. The rates were 5% for Baldwin and 6% for Mobile County. Their answers on pertinent questions are summarized in Table 10.

TABLE 10. EVACUATION INTENT OF MOBILE HOME RESIDENTS

RESPONSE	MOBILE HOME RESIDENTS
Very Concerned About Hurricanes	48%
Very Likely Home Damaged by Winds	59%
Very likely Evacuate for Category 1 or 2	33%
Very Likely Evacuate for Category 3 or Higher	75%
Very Likely Evacuate if Voluntary	43%
Very Likely Evacuate if Mandatory	75%

This means that 25% would stay in their mobile homes during a major storm. Given the extent to which mobile homes have been destroyed in past hurricanes, these rates regarding concern and evacuation are alarming. Even after considering the large margin or error for a sample this small, there remains cause for concern.

E. EXAMINING RISK FACTORS AND EVACUATION INTENT BY LOCATION

The lack of statistically significant differences among the counties on most of the important survey variables also supports a region-wide analysis. The following sections examine the answers given by respondents according to their evacuation zones.

1. KNOWLEDGE OF EVACUATION ZONE

Hurricane Evacuation zones are created to identify areas that should be evacuated for different types of storms, usually based on potential exposure to storm surge. Officials typically spend a great deal of time and effort educating citizens on their evacuation zone status. Table 11 compares respondents' opinions on whether they live in an evacuation zone with their actual evacuation zone status in each county.

TABLE 11. KNOWLEDGE OF EVACUATION ZONE BY EVACUATION ZONE

	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	TOTAL
BALDWIN						
Yes, Know They Are in a Zone	75%	43%	0%	29%	23%	35%
No, Know They Are Not In a Zone	3%	26%	63%	28%	38%	28%
Not Sure/ Don't Know	22%	32%	37%	42%	40%	37%
MOBILE						
Yes, Know They Are in a Zone	51%	29%	15%	18%		25%
No, Know They Are Not In a Zone	22%	44%	51%	54%		45%
Not Sure/ Don't Know	27%	27%	33%	27%		30%

When asked if their homes are located in official evacuation zones, 28% of those living in Baldwin and 45% in Mobile say they are not. In fact every location in both counties has an assigned zone. **Of serious concern is that 25% of those in Zone 1 in Baldwin and 49% in Mobile either say they are NOT in a zone or they do not know whether they are.**

Figures 12 and 13 map the location of respondents' homes relative to official evacuation zones in each county. The green dots said yes, they are in an evacuation zone, the blue dots said they are not in an evacuation zone and the red dots were not sure or did not know if their homes are located in an evacuation zones. Surge zones are also shown on these figures.

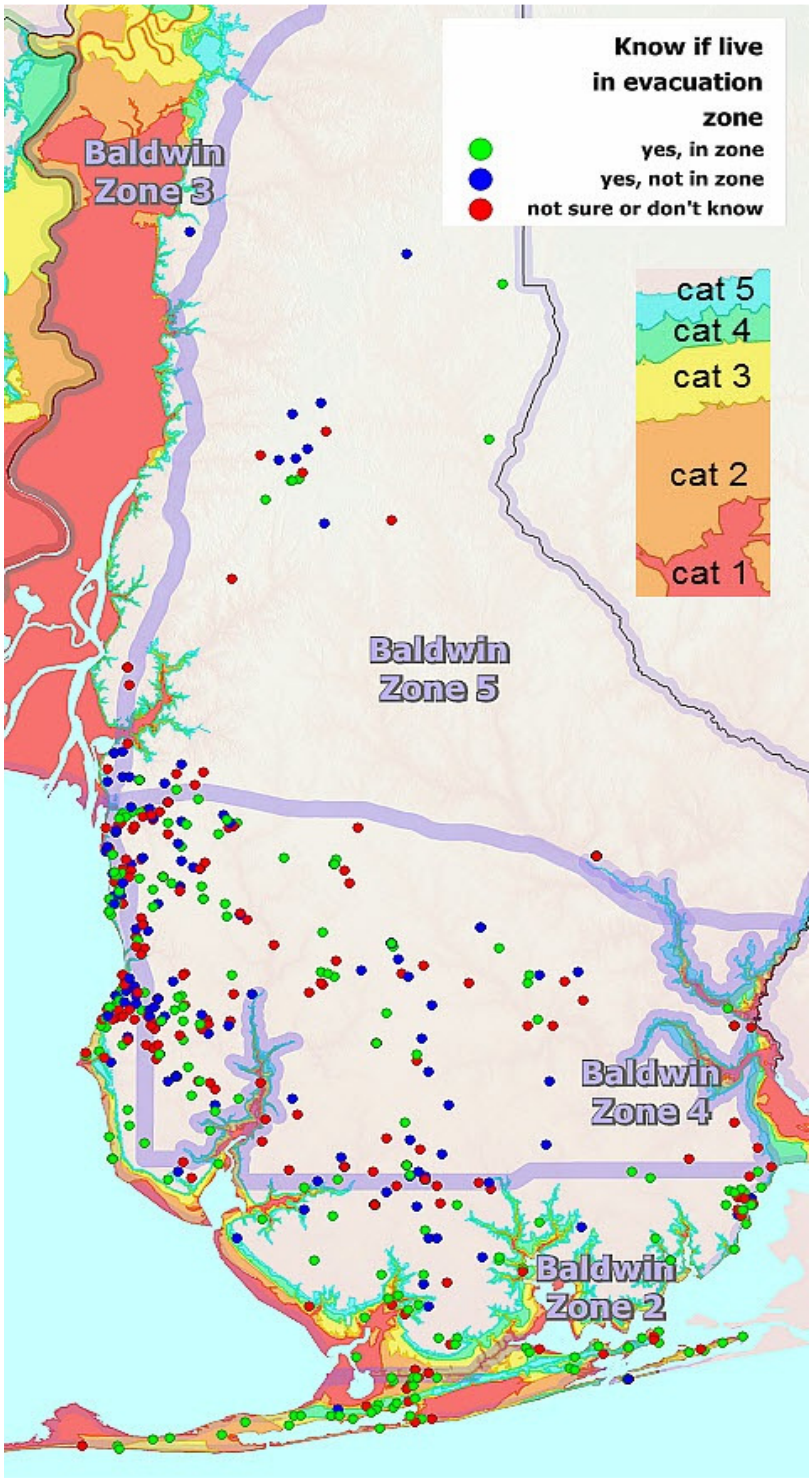

FIGURE 12.
KNOWLEDGE OF ZONE LOCATION BY ACTUAL LOCATION – BALDWIN

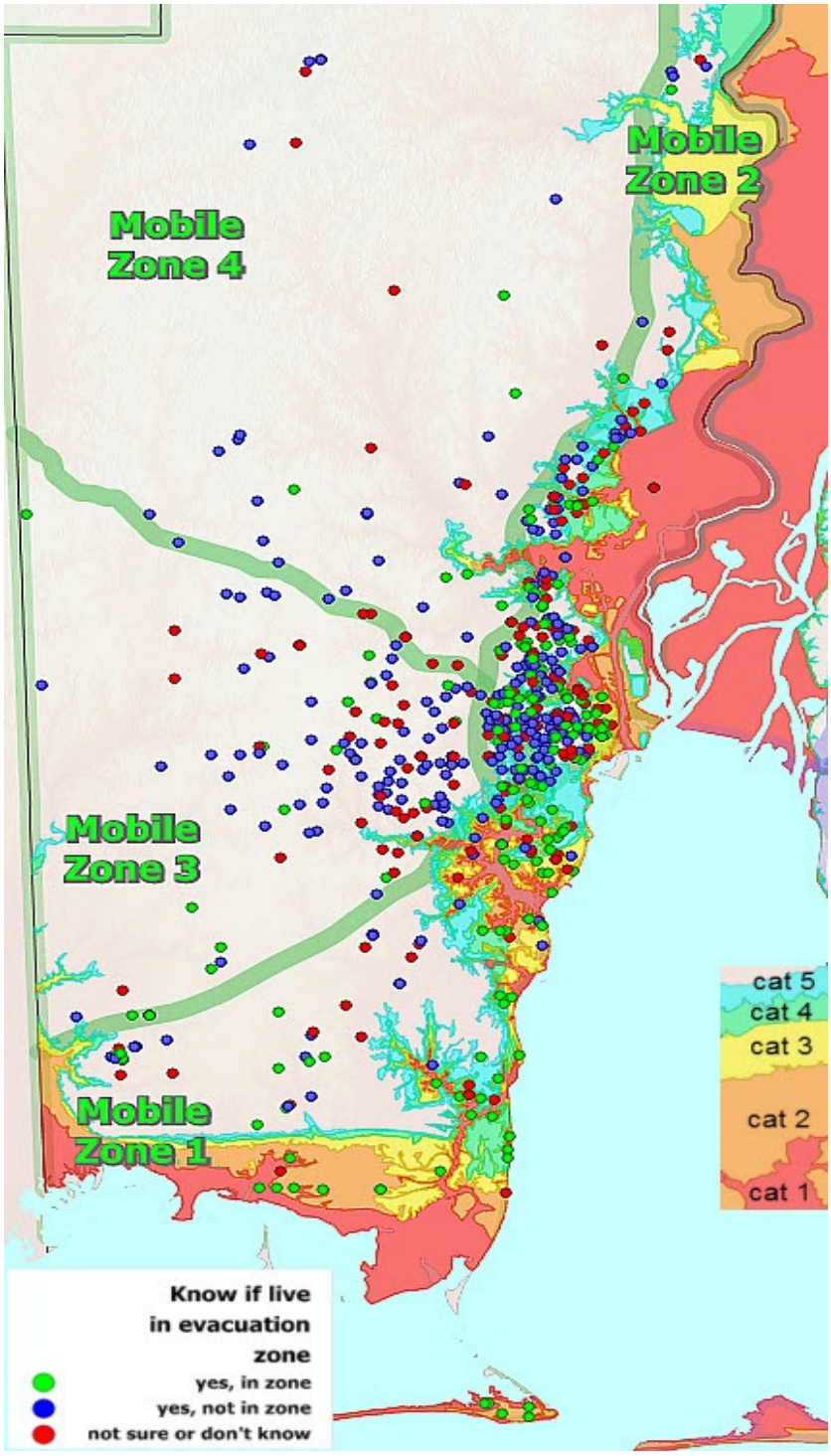

FIGURE 13.
KNOWLEDGE OF ZONE LOCATION BY ACTUAL LOCATION – MOBILE

Clearly, a great deal of confusion exists among coastal Alabamians about the location of their homes relative to official evacuation zones.

2. LEVEL OF CONCERN ABOUT HURRICANE THREAT BY ZONE

The next set of figures reexamines previously presented variables about general level of hurricane concern, as well as concern about various hazards associated with hurricanes, but this time according to the actual evacuation zone locations of respondents.

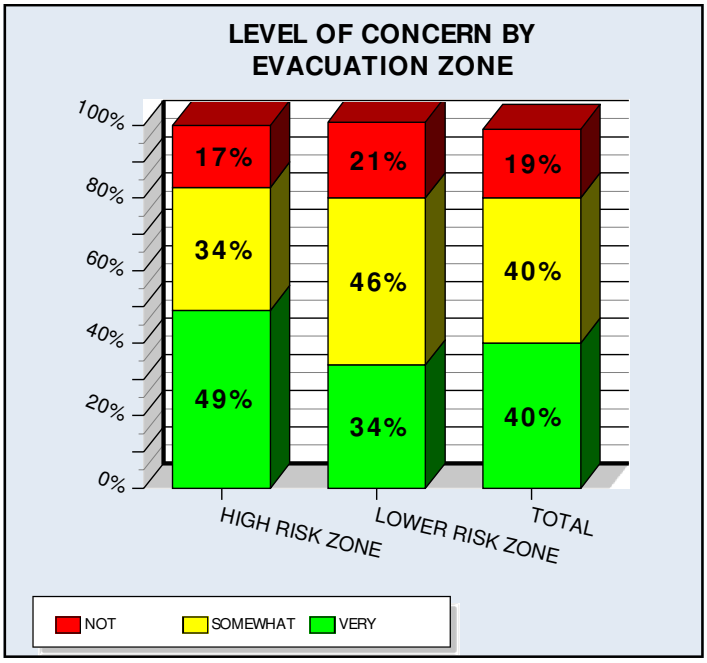

FIGURE 14.

As shown earlier in the report, about 40% of the total sample is very concerned about hurricanes and 19% is not concerned at all (in spite of the area's recent hurricane history). In Figure 14 **when the sample is divided according to their evacuation zones, there is only a 15% difference in concern between the two risk zones.**

Responses on the two questions asking how likely they think it is that their home will ever be seriously damaged or destroyed by the winds of a hurricane or damaged by trees blown down by a hurricane, or flooded as a result of the rainfall associated with a hurricane are now presented in Figures 15 and 16 according to the respondent's evacuation zone status.

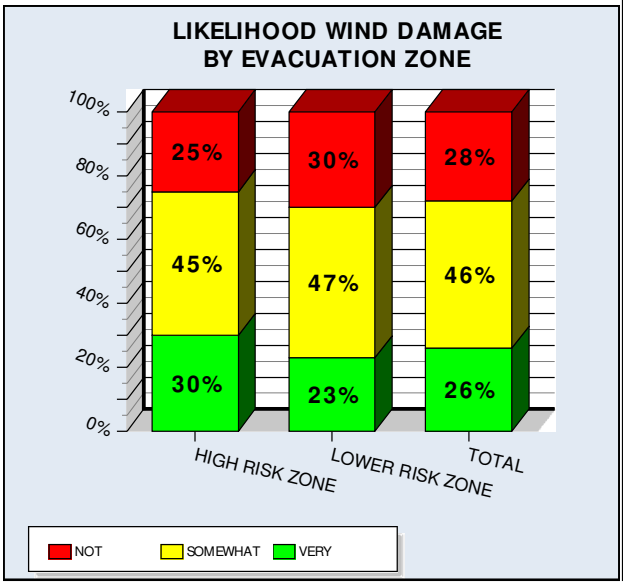

FIGURE 15.

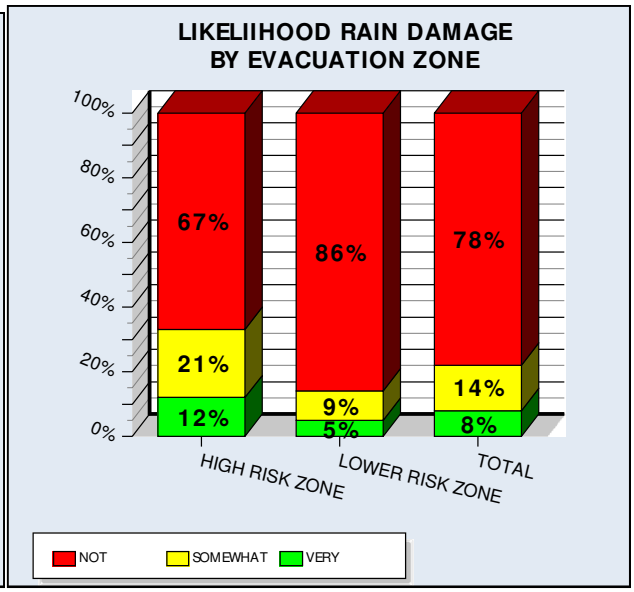

FIGURE 16.

As might be expected, opinions about the likelihood of wind damage and, to a lesser degree, flooding from rain are relatively the same across evacuation zones. Those in the High Risk zone are slightly more apt to say it is likely their homes could be impacted by wind and flooding.

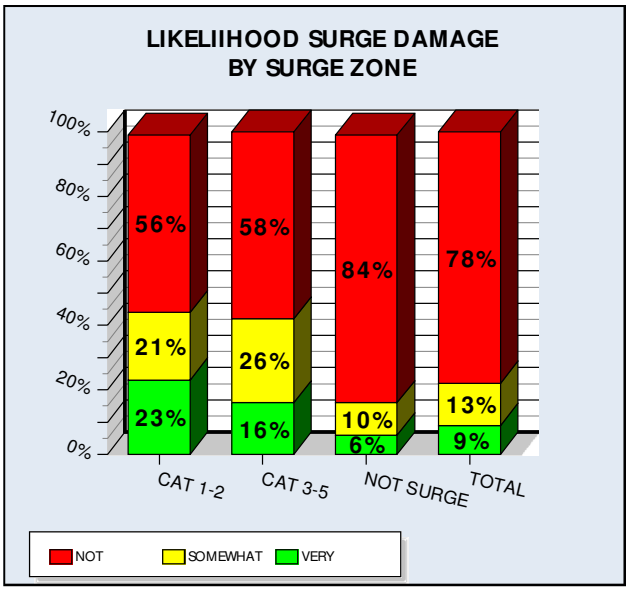

FIGURE 17.

The same information is provided in Figure 17 relative to how likely they are to have damage from surge. As expected, rates are higher in the Category 1-2 surge zone. Nevertheless, over half in that group say surge damage is not likely.

Figures 18 and 19 illustrate discrepancies between level of concern about surge and the locations of their homes relative to surge and evacuation zones. The red dots indicate those who do not think storm surge is very likely at their location.

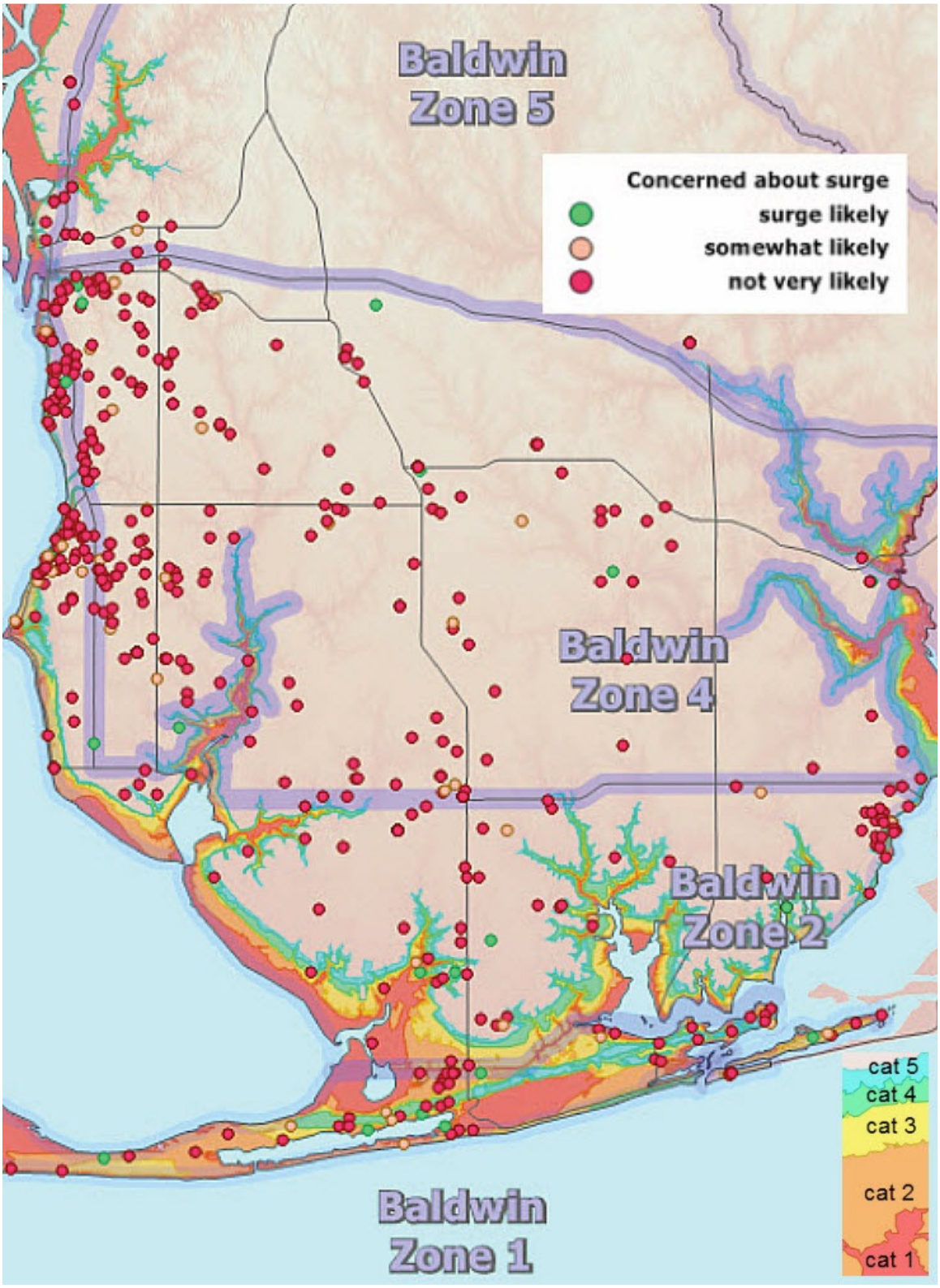

FIGURE 18. CONCERN ABOUT SURGE MAPPED BY ZONES – BALDWIN

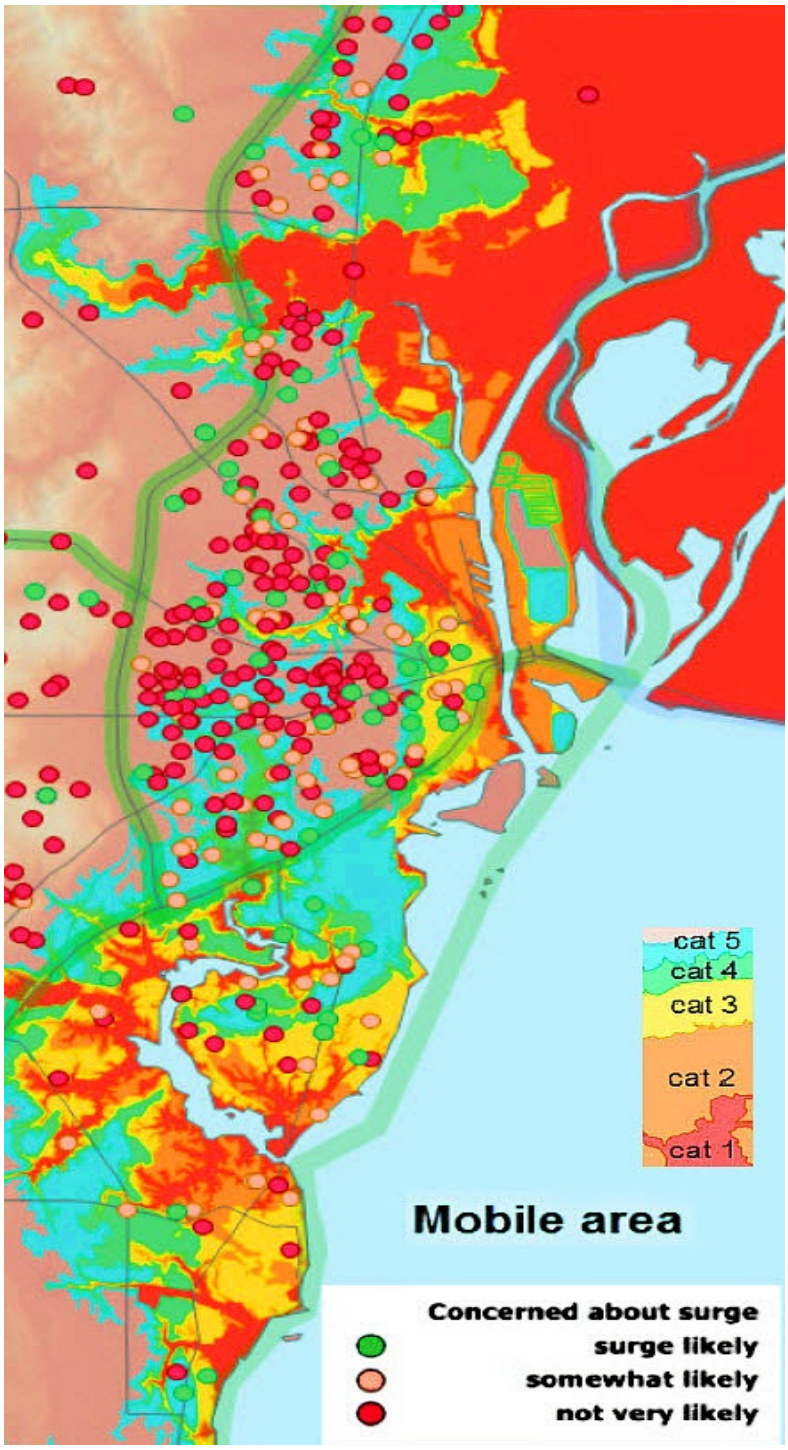

FIGURE 19. CONCERN ABOUT SURGE MAPPED BY ZONES – MOBILE
(Map shows storm surge areas)

The extent to which these coastal residents are not concerned is surprising considering the recent surge deaths and destruction from Hurricane Katrina in neighboring Mississippi. Referring to Figure 19 it is clear that many living in surge-threatened areas are not concerned about it.

3. EVACUATION INTENT BY EVACUATION ZONE

The most important findings are examined in this section. Figures 20 and 21 depict the evacuation intent of respondents for Category 1 or 2 hurricanes, and Category 3 or higher hurricanes, according to their evacuation zone location.

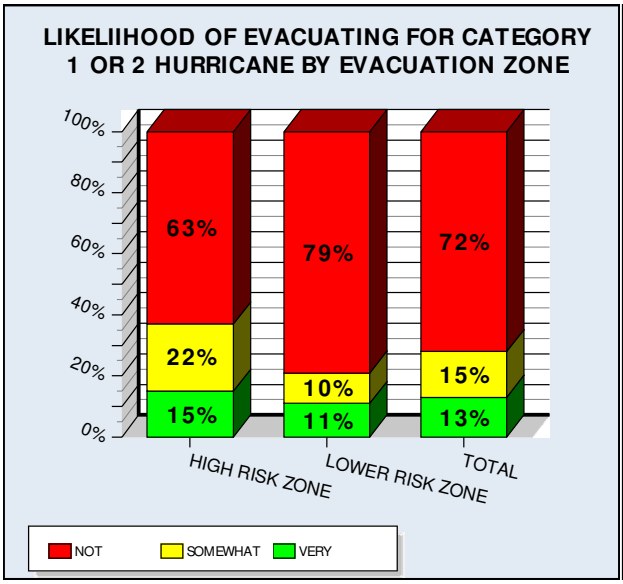

FIGURE 20

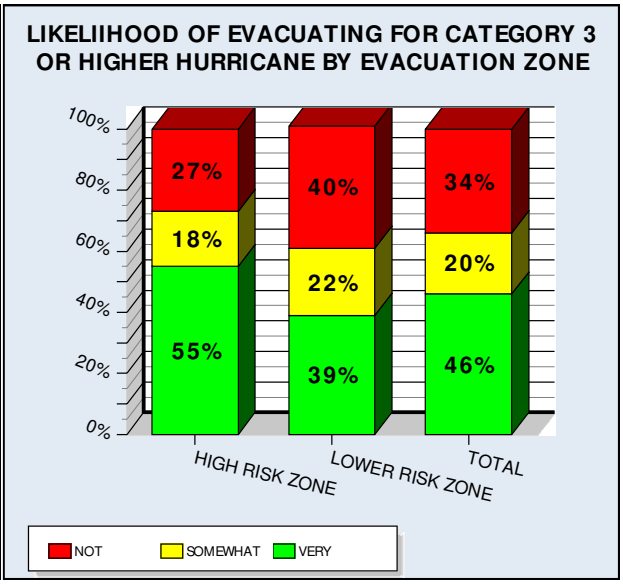

FIGURE 21.

It is clear that on other questions, such as general concern about hurricanes, people are only thinking of major storms. **The lack of evacuation intent for Category 1 or 2 storms by those expected to evacuate should be of concern.** This is especially true when Category 1 or 2 hurricanes poses significant surge threat. It highlights one National Weather Service argument for issuing surge warnings separate from the Saffir-Simpson Wind Scale. **People appear to have become so well-versed on the categories that they tend to use them as their only criteria when judging risk.**

On the other hand Figure 21 presents another problem to public officials. **About half in the Lower Risk zone say it is very or somewhat likely they will leave for a Category 3 or higher storm. This portends a very serious shadow evacuation problem with people who are likely to be safe staying either at home or in a refuge in the area will be clogging the roads, making it more difficult for those who should be leaving.**

Figures 22 and 23 map the actual locations of respondents in each county according to whether they say they will evacuate for a Category 3 or higher hurricane. Of special note are the red dots representing those who say they will not leave, but are located in evacuation zones.

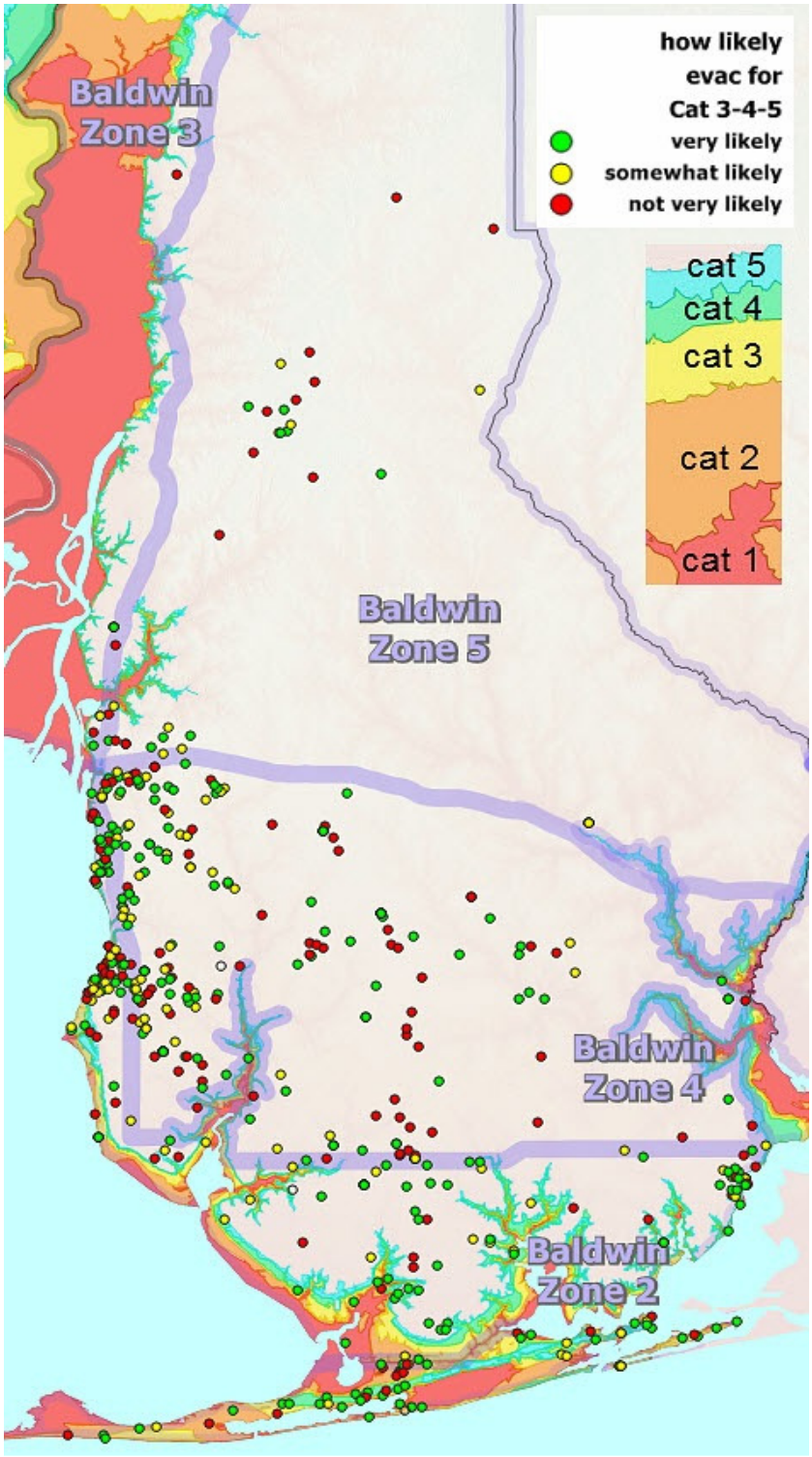

FIGURE 22.
EVACUATION INTENT BY SURGE AND EVACUATION ZONE LOCATION – BALDWIN

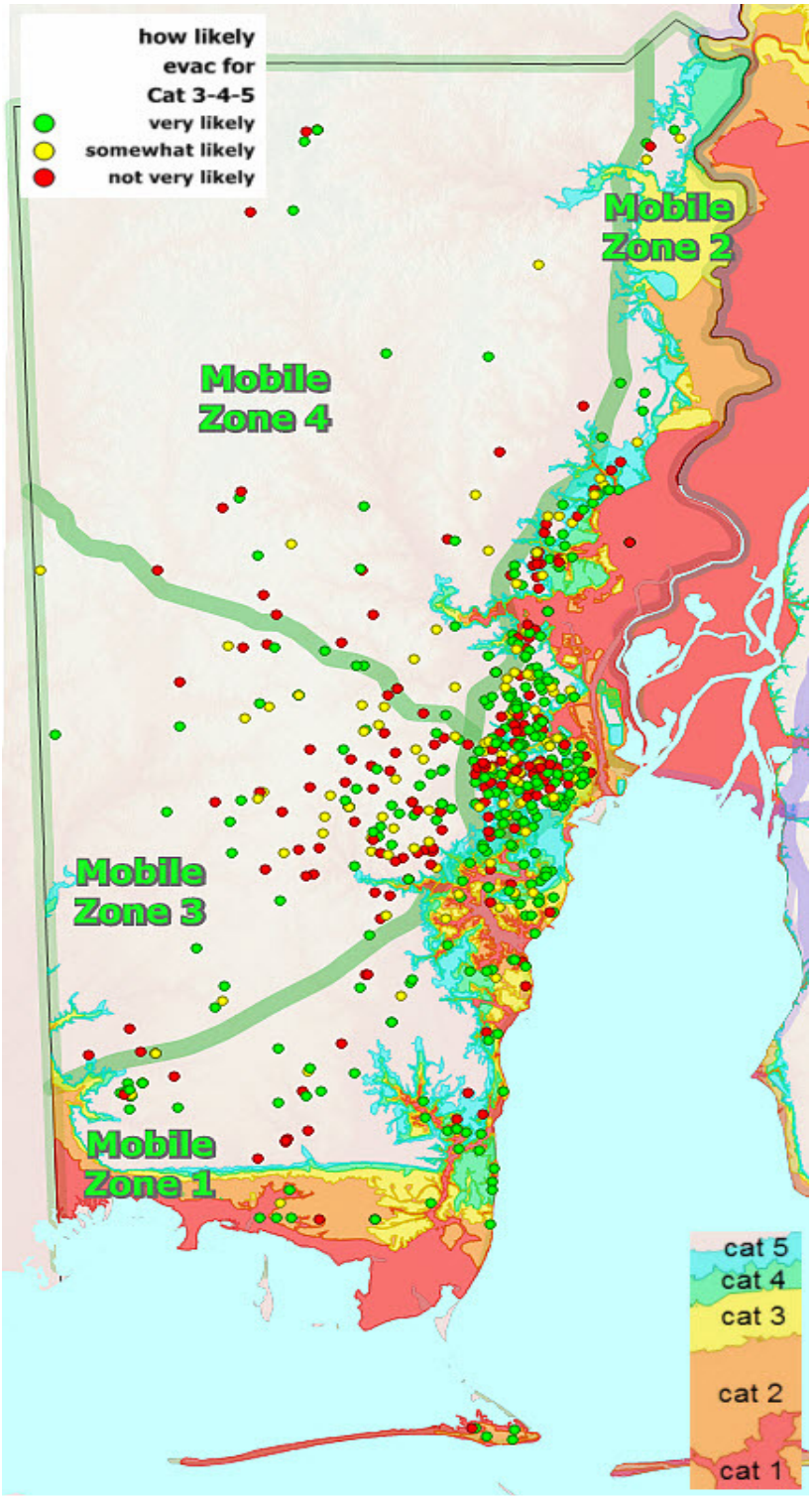

FIGURE 23.
EVACUATION INTENT BY SURGE AND EVACUATION ZONE LOCATION – MOBILE

As illustrated on these maps, **there seems to be no meaningful relationship between evacuation intent for a major hurricane and actual location relative to official zones.** This is true for both counties. **Clearly, many people who should evacuate do not plan to, and others who may not be safe where they are, plan to leave.**

Figures 24 and 25 depict the evacuation intent of respondents when the evacuation is voluntary and when a mandatory evacuation order has been given. Again the results are reported according to respondents' evacuation zone status.

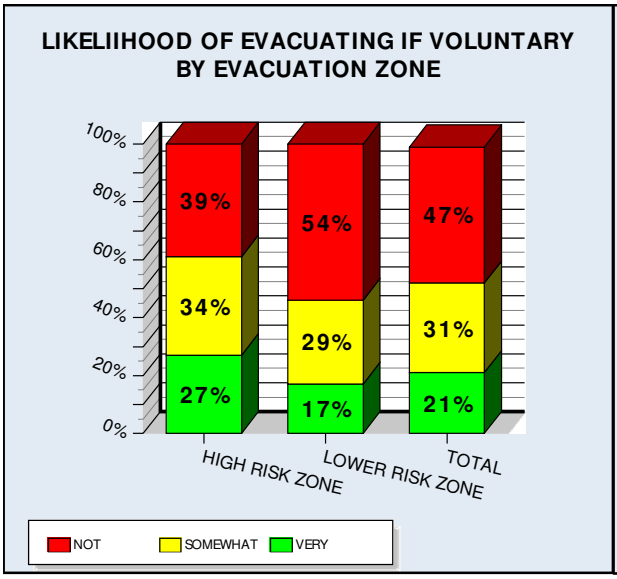

FIGURE 24.

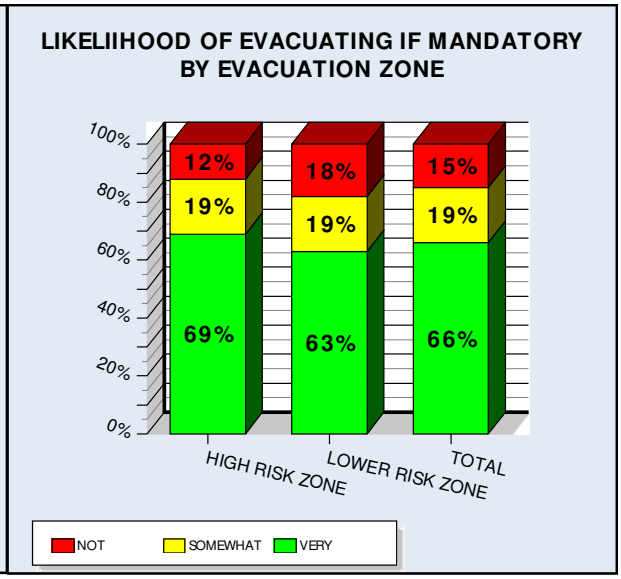

FIGURE 25.

The extreme effect of a mandatory or ordered evacuation over a recommended or voluntary one remains strong across all evacuation zones. In the High Risk Zone it lowers the rate for those who say it is very likely they will not leave from 39% to 12%. It appears that these coastal Alabama residents put a great deal of faith in the judgment of their State and local officials.

F. EXPLAINING THE EVACUATION DECISION

Respondents were asked:

> Q15. *"Please tell me the most important reasons that could make you feel you would have to evacuate your home for a hurricane."*
>
> If they answered that their home would not be safe, they were asked: *"Why would your home not be safe in a hurricane?"*
>
> If their answer to Q15 was that they had household members with health concerns, they were asked, *"What are the health concerns or medical needs of a person in your household that would be a reason to evacuate?"*
>
> Q18. *Please tell me the most important reasons that might make you think evacuating for a hurricane would NOT be a good idea?"*

The most common reason for evacuating was concern about the personal safety of household members, especially from major hurricanes. Special mention was often made about protecting children and the elderly. In a similar vein others say they plan to leave because their house or building will not be safe from wind or flooding in a hurricane. Other reasons include having household members with medical needs, such as oxygen, electrically powered devices, medicines and medical procedures, as well as physical disabilities. Many did not want to be in the area after the storm, particularly without electricity.

When those who say they will leave because their home is not safe were asked to be more specific, most were worried about wind damage, with 5% mentioning that they had no shutters or protection from the wind. A distant second was concern about flooding, either from surge or rain. Many are concerned about trees falling onto their homes.

The most common reason given for NOT intending to evacuate was the belief that their home was safe, closely followed by traffic concerns. About 7% said the storm always goes somewhere else and 8% are concerned about protecting their home from looting. About 3% mentioned pets as a reason for not leaving and 3% said they plan to stay because of their jobs.

To summarize, several factors were found to be associated with evacuation intent including beliefs related to home safety, hurricane experience, prior planning, income, household tenancy, gender, age and being African American. (Note: As shown in Table 5, other minorities made up 2% of the sample – not enough for further analysis.) Some of these factors are likely associated with each other. For example, African Americans are more likely to have lower measures on socioeconomic variables like income, home ownership, and years of school attended. Regression analysis builds a model to explain something, such as evacuation intent, by measuring the extent to which each variable makes a unique contribution to the model. For example, if it turned out that African Americans are more likely to leave regardless of socioeconomic status, there may be something unique about being African American that increases the tendency to evacuate.

The following regression model (Table 12) includes variables that are usually considered to be significant in explaining whether a household intends to evacuate. It shows the *unique* contribution each makes. The colors indicate the extent to which each variable by itself makes a significant contribution. If the number is negative the presence of this variable reduces the likelihood of evacuation; if positive, it increases it. For example, the variables, *Having evacuated for Hurricane Katrina*, *Being African American*, and *Having talked About evacuation,* all significantly increase the likelihood that the household will evacuate. In these regressions the dependent variable measuring evacuation intent is a combination of questions 7-10. These questions all measure evacuation intent, but they also measure other things like probability of different size storms and attitudes toward government authorities. In order to get a single common measure of evacuation intent, a factor analysis was done. One clear underlying factor resulted that can be then assumed to purely measure evacuation intent. A variable created from this factor was then used in the regressions.

Table 12 shows six different combinations of variables explaining evacuation intent. This makes it possible to see the contribution of a factor among similar variables, and then in the last column with all the variables. In most cases the effects persist in combination with all the variables, but in one case it does not. Having pets has a strong effect among other measures of household demographics in that it makes a household less likely to evacuate, but it has no effect when all variables except ones concerning hurricane experience or discussion are included. With all variables it has a weak effect.

TABLE 12. REGRESSION ANALYSIS OF EVACUATION INTENT

	EXPERIENCE	SOCIO-ECONOMIC CHARAC-TERISTICS	MINORITY STATUS	FAMILY AND HOUSEHOLD	ALL VARIABLES EXCEPT EXPERIENCE VARIABLES	ALL VARIABLES
How long have you lived in the part of Alabama where you live now?	-.0003					-0.002
Did you evacuate for Hurricane Katrina?	0.397					0.343
Has your household or family talked about where you will go if you had to evacuate your home for a hurricane?	0.316					0.383
Respondent's years of education		-0.009			-0.002	-0.011
Household income (by $10K)		-0.004			-0.001	-0.001
Owns single-family home		-0.270			-0.318	-0.253
Respondent is African-American			0.581		0.461	0.459
How many people living in your household are 65 or older?				0.017	0.027	0.055
How many of the people living in your household are 12 years old or younger?				0.208	0.167	0.098
Respondent is female				0.232	0.168	0.141
Household has pets or animals				-0.315	-0.169	-0.156
R^2 (approximate amount of variation explained)	*0.179*	*0.044*	*0.072*	*0.048*	*0.114*	*0.279*
Constant	*-0.061*	*0.530*	*-0.130*	*-0.003*	*0.159*	*0.188*

COLOR CODE:

Variable very significantly increases likelihood of not evacuating. p<=.01 Variable somewhat significantly increases likelihood of not evacuating. 05=>p>.01
Variable somewhat significantly increases likelihood of evacuating. .05=>p>.01
Variable very significantly increases likelihood of evacuating. p<=.01
No color = not significant. p>.05

* Dependent Variable = Factor score from questions 7, 8, 9, and 10.
Score goes from 0 = very unlikely to evacuate to 3 = very likely to evacuate.

** Numbers in table cells: Positive regression coefficient means this variable increases the likelihood of evacuating.
Negative regression coefficient means this variable reduces likelihood of evacuating.

When interpreting this table, a positive number means this variable, by itself (statistically controlling for the effects of other variables in that model), increases the chances that a household will evacuate. Therefore, **having evacuated for Katrina, having talked about where to evacuate, being African American, and being a woman all play a significant role in promoting evacuation, independent of the effects of other variables. In**

explaining the tendency not to evacuate the most important variable is living in an owner-occupied single family home. Having pets has a slight effect. An important finding is that neither income nor age by itself is a statistically significant explanatory variable. It does appear that there is something about being an African American household, regardless of income level, that makes it more likely to evacuate.

G. EVACUATION CONDITIONS

All respondents (regardless of evacuation intentions) were asked a series of questions about conditions should they HAVE to evacuate.

Q30. *"How many people in your household would leave?"*

Q31. *"Is there anyone living in your household who would probably stay in the area even if other people were leaving?"*

Q32. "*If so, what is the reason they would stay?"*

1. WHO WILL GO

Table 13 gives the number per household who will leave from each county.

TABLE 13. HOW MANY WILL LEAVE FROM HOUSEHOLD*

	BALDWIN	MOBILE	TOTAL
One	20%	23%	22%
Two	40%	33%	35%
Three	15%	16%	16%
Four	14%	15%	15%
Five or More	9%	12%	12%

* Columns do not add to 100% because some indicated no one would leave even though they were to assume they would HAVE to evacuate.

The number who would leave from each household by the percentage of those size households in the sample came to a total of 2962 persons. When divided by 1105, the size of the sample, **the average household size was about 2.7 persons. For Mobile County it was 2.7, but for the Baldwin County sample it was 2.5.**

About 12% in Baldwin and 9% in Mobile say someone will stay behind. The rate is slightly higher for younger households, those living in condominiums and higher-income households.

A number of reasons are given for someone staying behind when others in the household are leaving. The most often-mentioned reasons for staying include:

- Job responsibilities,
- Staying to protect the home,
- Just not being willing to evacuate.

Several mentioned staying to care for animals.

2. TIME NEEDED TO EVACUATE

The next series of questions dealt with conditions associated with respondents' evacuation, should they HAVE to evacuate. The following two are about the timing.

> Q24. *"If you had to evacuate, how long would it take for you and your household to get ready to leave?*
>
> Q25. "*If a hurricane is predicted to impact your area three days from now and you decided to evacuate, would you leave today, tomorrow or two days from now?"*

As illustrated in Figures 26 and 27, **68% of the sample say they can be ready in less than a day, with most of the rest being ready in one day**. There are no important differences at the county level.

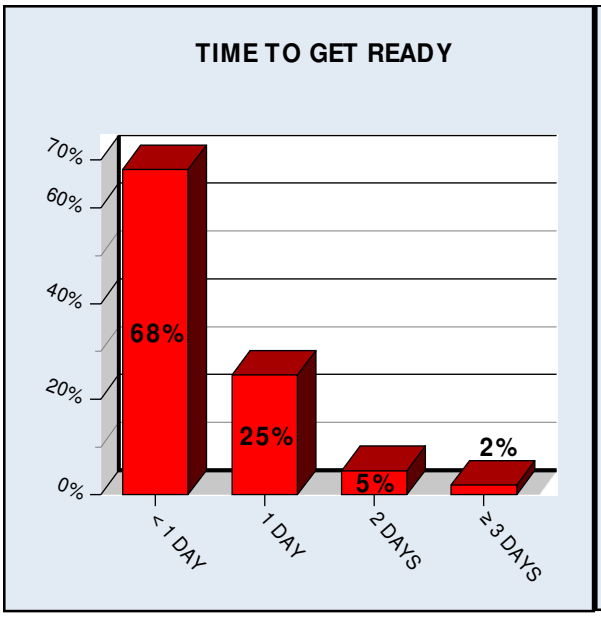

FIGURE 26.

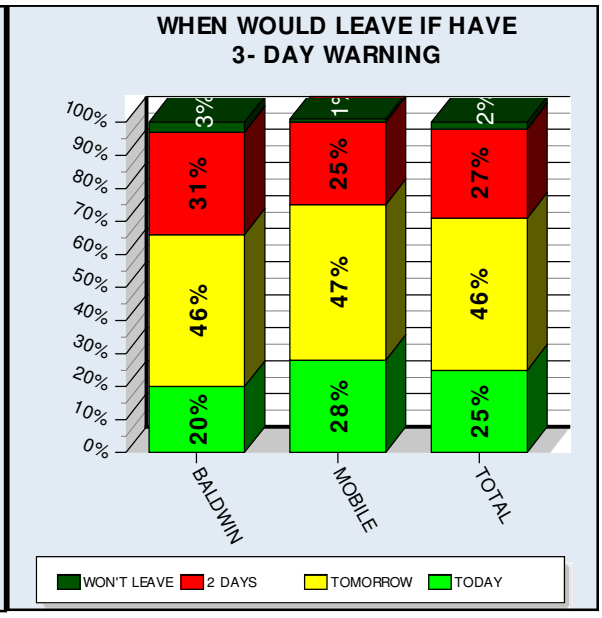

FIGURE 27.

Respondents were then asked when they would leave if a hurricane was predicted to arrive in three days. While about one-quarter will leave today and most of the rest will leave tomorrow, there are significant county differences. About one-third of Baldwin respondents said they will not leave for two days, compared to about one-quarter in Mobile County. As expected, home owners will take longer to leave. **This means most people plan to leave the day before scheduled landfall.**

3. TRANSPORTATION

The transportation questions included:

> Q22. *"If you HAD to evacuate for a hurricane, would you need public transportation or government assisted transportation?"*
>
> Q23. *"If yes, have you registered for government transportation assistance?"*
>
> Q33. *"How many cars would your household take in the evacuation?"*
>
> Q34. *"Are there any other kinds of vehicles you would likely take, such as recreational vehicles, trailers or other vehicles?"*

The county rates for those needing public transportation are quite different, 5% for Baldwin and 10% for Mobile County. These rates compare to 8% for Baldwin and 11% for Mobile on the 2009 CTN Hurricane Behavioral Study. It is important to remember that these rates are based on very small samples. As might be expected, the need for public transportation was higher in households having lower incomes and also with renters. **It was 26% for African American households and 12% for households with someone over 65.** Those needing

transportation in Mobile County were then asked if they have registered for transportation assistance, and 17% said yes.

4. VEHICLES THEY WILL TAKE

As shown in Figure 28, when asked how many cars they will take in an evacuation, 70% said only one, followed by 20% who will take two. Very few households will take more.

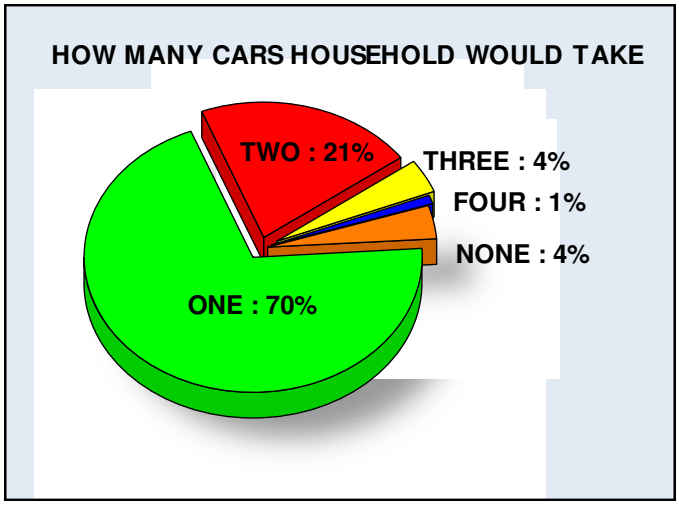

FIGURE 28.

The total number of cars mentioned was 1418 for the the 1090 households answering this question for an average of 1.3 cars per household. The rate was the same in both counties. This is somewhat lower than usually reported in evacuation studies. **Table 14 shows the average number of cars that will evacuate by zone within each county.**

Table 14 provides averages by surge and evacuation zones in each county.

TABLE 14. AVERAGE NUMBER OF CARS LEAVING PER HOUSEHOLD BY COUNTY SURGE AND EVACUATION ZONES

TYPE OF ZONE	BALDWIN	MOBILE
SURGE		
Cat 1	1.897	1.514
Cat 2	1.189	1.687
Cat 3	1.469	1.172
Cat 4	1.565	1.317
Cat 5	1.072	1.298
No Surge Zone	1.072	1.376
EVACUATION		
1	1.270	1.512
2	1.454	1.209
3	1.308	1.431
4	1.748	1.405
5	1.235	

As far as other vehicles, **only 9% say they will take some other kind of vehicle.** The rate was similar in both counties. When asked to be more specific, they mentioned trailers, recreational vehicles and boats, in that order.

5. ROUTE AND DESTINATION

Several questions asked about intended routes and destination.

> Q20. *"If you HAD to evacuate your home, would you likely seek shelter inside your county or would you go to another county?"*
>
> Q21: *"If you HAD to evacuate outside the county, where would you MOST likely go? Would you go the home of a relative or friend, another property you own, a public shelter, a hotel, or someplace else?*
>
> Q26. *"If you felt it necessary to evacuate for a hurricane, how far do you think you would probably go?"*
>
> Q27. *"What is the city or county and state where you would most likely go when you evacuate?"*
>
> Q28. *"If it became necessary for you to evacuate, what is the main road you would take leaving your neighborhood?"*

Q29. *"If you have to leave your city or county to evacuate, what is the main highway or highways your would take once you got out of your city or county?"*

A very important factor in community evacuation planning is the type of refuge people choose. Figures 29 and 30 report the findings separately for the two counties.

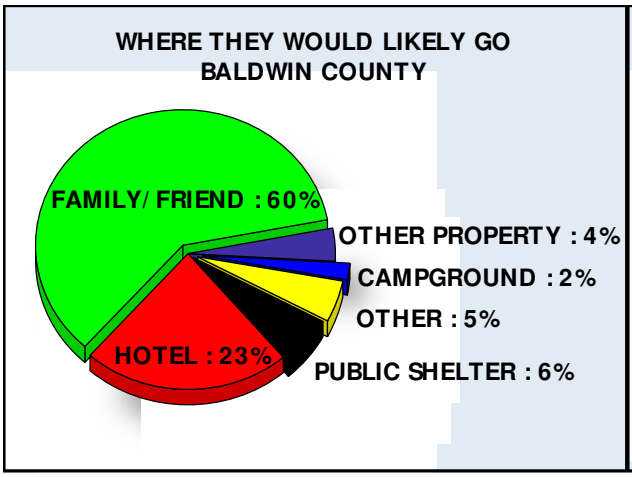

FIGURE 29.

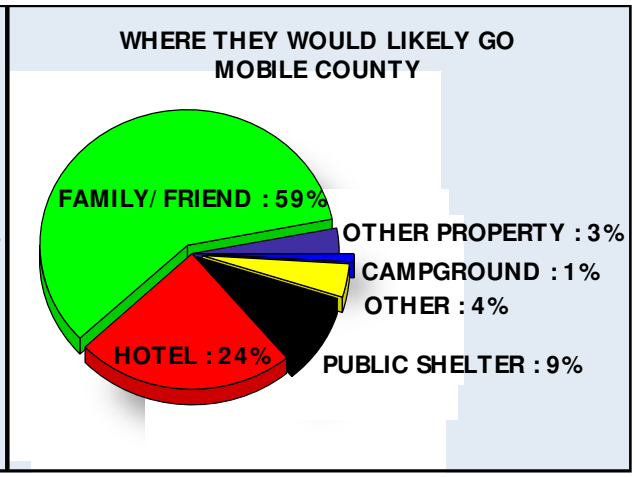

FIGURE 30.

Most intend to go to the home of family or friends, followed by a hotel. The county rates are a bit different in an important way for planning purposes. **In the Baldwin sample 6% say they will go to a public shelter, but for Mobile the rate is 9%.** While this rate is high, it is not unexpected given that Mobile has more low-income households, many without cars. **The intent to use public shelters was 40% for the lowest income group and 16% for the African American sample and 10% among older households**. On the 2009 survey 5% in Baldwin County and 9% in Mobile said they would stay in shelters—very similar results.

Once again it should be noted that these rates are based on small samples. Also past evacuations have shown that actual shelter use tends to be considerably less than intentions stated on behavioral surveys. Only 9 persons in Baldwin and 19 in Mobile indicate they have functional needs that will require extra assistance in a public shelter. No doubt this is an undercount given that persons with disabilities are less likely to have participated in the survey.

Hurricane Katrina evacuees were asked where they went. As seen in Figures 31 and 32, their responses are quite similar to those given for future refuge. Most went to the home of friends and/or family outside the area, followed by those going to a hotel. Once again there are no important differences between the counties. The reported rate for shelter use is 4% for Baldwin and 8% for Mobile. While this is more in line with shelter use in other areas, it does not lessen the possibility that for a major hurricane predicted to make landfall in the vicinity, shelter use could be substantially higher, especially in Mobile County.

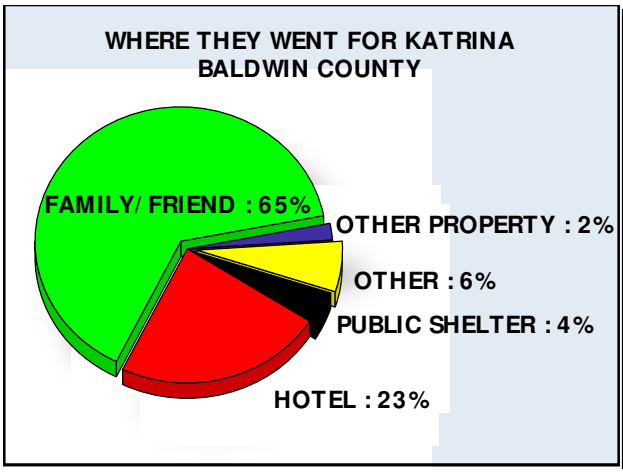

FIGURE 31.

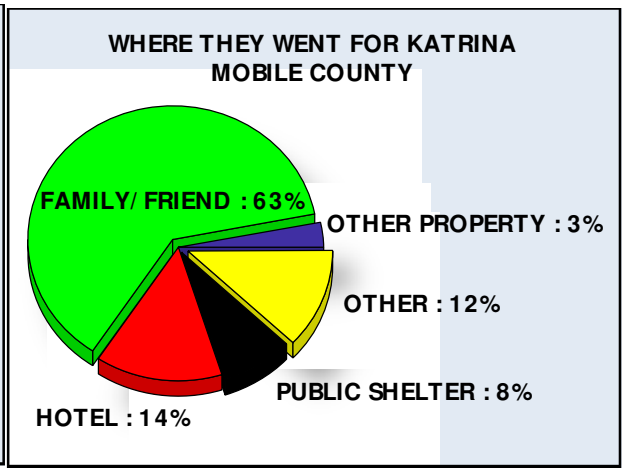

FIGURE 32.

When asked whether they will seek shelter inside or outside of their county should they HAVE to evacuate**, 69% in Baldwin and 59% in Mobile say they will leave the county.** The findings related to how far they would travel are presented in Figures 33 and 34.

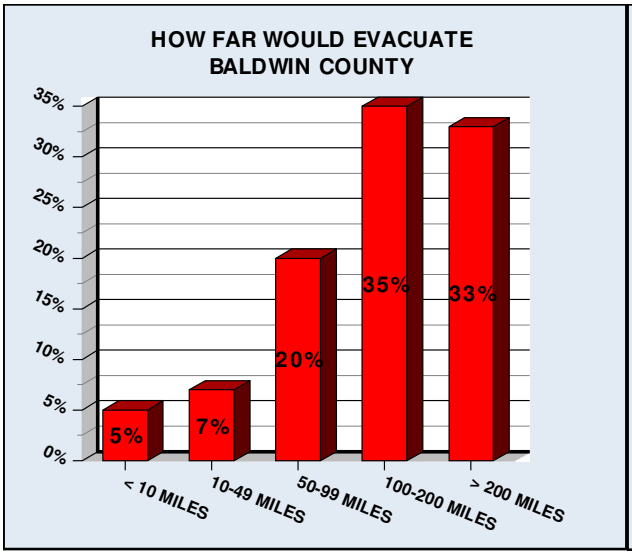

FIGURE 33.

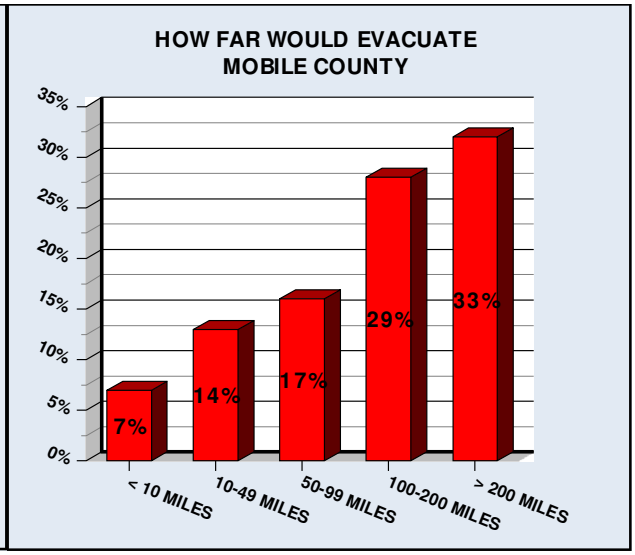

FIGURE 34.

When respondents were asked how far they will go if it was necessary to evacuate for a hurricane, the most common answer (31% for the total sample) was more than 200 miles, closely followed by 100 to 200 miles, and then 50 to 99 miles. Clearly, most of this hurricane-experienced population will leave the area. However, more Mobile evacuees expect to travel less than 50 miles – 21% compared to 12% for Baldwin.

When asked what county, city, or state they will likely go to when they evacuate, the most often-mentioned states in order of frequency are:

- Mississippi- 34%
- Alabama- 17%
- Georgia- 11%
- Tennessee- 4%
- Florida- 2%

From these the most often mentioned cities are:

- Vicksburg, MS -12%
- Hattiesburg, MS -12%
- Jackson, MS -10%
- Atlanta, GA -10%

About 17% said they didn't know, or gave answers that indicated it would depend on the storm.

The main highways they will take **once out of their cities or counties** are given in Tables 15 and 16. In the first one the percentages are computed by county. In other words 53% of the respondents from Baldwin and 51% from Mobile say, if they HAVE to evacuate, one of the main highways they will use will be MS 63 US 98, as will 52% of the total sample.

TABLE 15. MAIN HIGHWAYS FOR EVACUATION BY COUNTY*

HIGHWAY	BALDWIN		MOBILE		TOTAL	
	#	%	#	%	#	%
MS 63 US 98	268	53%	309	51%	577	52%
I-59	149	29%	128	21%	277	25%
US 49	12	2%	9	1%	21	2%
I-10 West	31	6%	3	1%	34	3%
I-10 East	22	4%	16	3%	38	3%
US 90 West	14	3%	52	9%	66	6%
US 90 East	9	2%	29	5%	38	3%
Other	77	15%	113	19%	190	17%
TOTAL	582	115%	659	110%	1241	112%

* Total exceeds100% because respondents could give more than one answer.

Table 16 provides the same data but the percentages are computed by road rather than by county. In other words of these coastal residents using MS 63 US98, if both counties were evacuating, about 46% will likely be from Baldwin County and 54% from Mobile County.

Table 16. Main Highways for Evacuation by Highway

HIGHWAY	BALDWIN		MOBILE		TOTAL	
	#	%	#	%	#	%
MS 63 US 98	268	46%	309	54%	577	100%
I-59	149	54%	128	46%	277	100%
US 49	12	57%	9	42%	21	100%
I-10 West	31	91%	3	98%	34	100%
I-10 East	22	58%	16	42%	38	100%
US 90 West	14	21%	52	79%	66	100%
US 90 East	9	24%	29	76%	38	100%
Other	77	41%	113	59%	190	100%
TOTAL	582	48%	659	52%	1241	100%

6. WHEN EXPECT TO RETURN

Respondents were asked Q37, *"After how many days would you expect to be able to return to your home?"* The results appear in Figure 35.

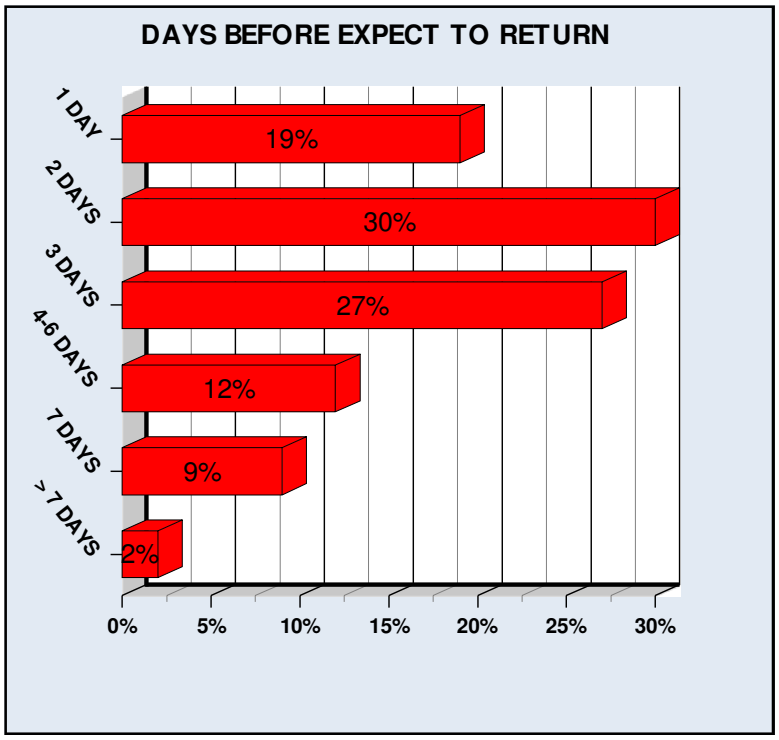

FIGURE 35.

Most expect to be able to return within three days. There are no significant county differences. If the area is impacted by a major hurricane, these are unrealistic return expectations.

IV. DISCUSSION OF RESULTS

This study captures the knowledge, attitudes, and intentions of a random sample of residents of coastal Alabama in response to the threat of a hurricane. The information it provides is intended to guide evacuation planning by emergency management and transportation officials. The random sample was chosen to represent households in the two coastal counties, Baldwin and Mobile. The survey was conducted via both landline and cellular telephones. A summary of some of the main findings and their implications follows. As there are only slight differences in the results from these two counties, most of the findings are reported for the entire sample.

A. CONCERN ABOUT HURRICANES AND HOME SAFETY

Coastal Alabama has been impacted by several hurricanes in recent years, including Hurricane Ivan and Hurricane Katrina. Most of the respondents in both counties have evacuated at least once. Since past evacuation has been found to be a good predictor of future evacuation, this is a positive finding (FEMA and USACE 2009; Dash and Gladwin 2007)[3]. It correlates with evacuation intent in this survey.

These coastal residents are concerned about hurricanes. The good news is that about four-fifths say they are either very concerned or somewhat concerned. On the flip side this means that about one-fifth is not concerned – rather surprising given the extent to which the area has been impacted in the past. The concern level does not appear to be closely associated with evacuation zone location.

As expected, more people are concerned about wind damage than about flooding. About 80% believe their home could be damaged by wind, but there is much less concern about damage from surge or rainfall flooding. About three-quarters of these respondents thought neither was likely to happen. Concern about wind damage is about the same for both counties, but people in Mobile County are somewhat more likely to think their homes might be flooded, both from surge and from rainfall. Women respondents are more likely to be concerned about all aspects of hurricanes. This is consistent with research findings that women tend to be more concerned about risk (e.g., Phillips and Morrow 2008).

Concern varies only a small amount according to evacuation zone status. Of those living in the High Risk zone where they are expected to evacuate for all hurricanes, the vast majority thinks it unlikely that their homes will be damaged by surge or flooded from rain. Given their location, this seems unrealistic. There is a major problem with inaccurate or non-existent knowledge of evacuation zone status.

[3] The cited references are not intended to cover the relevant literature, but rather to provide examples.

B. EVACUATION DECISIONS

Most respondents get their weather and evacuation forecast information from local television, with local radio being a distant second. However, it is a very important source of hurricane information for poorer residents. Growing numbers are using the Internet and cell phones to gather information, if not as a primary source, as a secondary one. While use of the Internet still varies with age and income, most of the households in this survey had access, either from a computer or smart phone This coincides with the findings of recent research related to the prevalence of these technologies even among poorer households (Kiefer et al. 2008). Nearly all had cell phones, buy only about 10% had registered them to receive emergency alerts.

The vast majority will consult with family and friends, either in the county or outside, before deciding whether to leave. Nearly half say they will assist others outside their household and this could affect when they can evacuate.

The most important part of this survey for planning purposes dealt with evacuation intent. The level of storm makes a very significant difference. People in coastal Alabama seem to pay close attention to where a particular storm ranks on the Saffir-Simpson scale. While only 12% are very likely to leave for a Category 1 or 2 storm, the rate nearly triples if it is a Category 3 or higher. They are very concerned about wind, but much less so about inundation. If the area is threatened by a lesser storm that is expected to bring high levels of surge and inland flooding, the risk could be seriously under-estimated.

These survey findings indicate that the most important factor in determining whether people will evacuate is how officials respond to the threat. There is a dramatic difference in intent based on whether it is a voluntary evacuation or mandatory, increasing from 23% who say they will very likely leave, to 67%! Clearly, the majority will leave for a major hurricane IF ordered. The situation for a less severe storm, or for a voluntary evacuation, is far different.

Certain households are more likely to leave. These include those who have evacuated before, those who have talked about it African American households and renters. This is consistent with findings on other surveys (e.g., FEMA and USACE 2005). While mobile home households are more likely to evacuate, about one-quarter intend to stay for a major storm and most for a lesser one. This is a high rate considering the level of risk.

Extreme levels of shadow evacuation could occur in a major storm. These data indicate that nearly half of those living in the Lowest Risk zone plan to leave for a Category 3 or higher storm.

It is significant that the main reason given by the evacuators for leaving is concern about the safety of family members. Similarly, the next most common answer was that they do not feel their home will be safe in a hurricane. Other studies report similar findings (e.g., Morrow and Gladwin 2009; Whitehead et al. 2000). As might be expected, the main reason given by those who say they will NOT leave is that they think their home is safe. A distant second reason for not planning to leave is traffic concerns.

There is a difference between evacuation intent and actual evacuation rates. One estimate is that stated intention rates are about 25% too high for a Category 1 hurricane, 20% for a Cat 2, 15% for a Cat 3, 10% for a Cat 4 and 5% for a Category 5 storm.[4] Making evacuation decisions at the individual or household level has been shown to be a complex process (Gladwin, Gladwin and Peacock 2001). Typically, fewer people evacuate when the time comes than say they will. This holds particularly true among those with limited hurricane experience and for minor storms (Dash and Gladwin 2007). With experience the decision gets well established. People in the Florida Keys, for example, often have to evacuate. They tend to be pretty well set as either evacuators or non-evacuators. Their behavior has become easier to predict. To a certain extent this is also happening in coastal Alabama.

C. EVACUATION CONDITIONS

An average of 2.7 persons per evacuating household is reported – a bit higher than normally reported. They will take an average of 1.3 cars per household. This is low compared to data taken after Hurricanes Lili, Katrina, and Rita when an average of 1.6 vehicles were taken per household (Lindell and Prater 2009), but is in keeping with the Census data for the area. A small minority will take other vehicles such as trailers, campers and boats. In Baldwin County about 5% indicate a need for public transportation in order to evacuate, but in Mobile County the rate jumps to 10%. This number contrasts with a recent Florida study where 6% say they will need assistance during evacuation (Baker 2009), but is probably a reflection of population differences. Of those households that plan to evacuate, about 9% in Mobile and 13% in Baldwin say someone will stay behind, usually to be there for a specific purpose such as protecting the structure or because of job demands. Nearly two-thirds of these households have pets, and most will take them if they evacuate. In the regression analysis pets did not appear to be an important reason for not planning to evacuate. However, they are an issue with some people, and these may be some of those at higher risk, such as the elderly living alone.

Most say they can be ready to go in less than a day, but if a storm is predicted to make landfall in three days, they will likely leave tomorrow. Assisting others outside the household will affect how quickly many can be ready to leave.

About 4% in Baldwin and 8% in Mobile County say they will go to a public shelter. This is comparable to the rates reported in the 2009 survey, 5% for Baldwin and 9% for Mobile. While the Mobile rate is high, it is in line with recent studies (FEMA and USACE 2009; Morrow and Gladwin 2009). Post-storm studies of actual shelter use typically fall somewhere between 3% and 5% (Lindell and Prater 2008; FEMA and USACE 2005). Probably the most important predictor in this case is that, of the respondents who evacuated for Hurricane Katrina, the reported shelter use was 4% for Baldwin and 8% for Mobile. This may be another case where recent hurricane experience results in better congruence between intent and behavior. The preferred place of refuge for about two-thirds is the home of friends and family members. Most

[4] Personal correspondence with Dr. Earl J. Baker from Florida State University, who has been researching evacuation behavior for decades.

plan to travel less than 200 miles and expect to be able to return within three days. These are unrealistic return expectations for a major storm.

V. IMPLICATIONS AND RECOMMENDATIONS

This survey provides considerable information about the attitudes and intended behavior of a sample of residents of coastal Alabama in response to the threat of a hurricane. The research methodology supports generalizing the results to the total population of each targeted county. The cell phone sample supplements the landline sample by providing responses from a slightly different, and younger, population. The spatial analysis provides valuable information not only about what respondents said but where they are located–making it especially useful for planning purposes.

Survey results support several actions:

- Outreach campaigns to educate citizens about their evacuation and/or surge zone status, including providing this information on county websites.

- Risk communication initiatives to better acquaint citizens about the dangers of surge and inland flooding from even minor hurricanes;

- Increased use of new technologies, such as the Internet and cell phones, in evacuation planning and warning communications;

- Risk communication initiatives to better acquaint citizens about the dangers of surge and inland flooding from even minor hurricanes;

- Extensive planning for public shelters and transportation, particularly in Mobile County;

- The promotion of targeted mitigation and preparation initiatives to increase safety and security and thus decrease unnecessary evacuation among African American households, lower income households and renters.

- Campaigns to urge citizens outside surge zones to shelter in place or in the area;

- Enlisting women and children as leaders in educational campaigns to promote appropriate response;

- Addressing citizen concerns about traffic problems during evacuation.

All of these efforts imply a multi-pronged approach combining the provision of relevant information to targeted groups with educational programs directed at helping the citizens of coastal Alabama make responsible evacuation decisions. While this study focused on hurricane response, it can be assumed that more effective household hurricane planning will have carryover benefits for citizen response to other catastrophic events.

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APPENDIX A: PRINCIPAL RESEARCHERS

Dr. Betty Hearn Morrow is Professor Emeritus at Florida International University and former Director of the Laboratory for Social and Behavioral Research at the International Hurricane Research Center. Her research focus on the effects of human and social factors on the ability of individuals, families, and communities to respond to hazards is reflected in her contribution to *Human Links to Coastal Disasters,* published by the Heinz Center for Science, Economics, and the Environment. She is co-editor of *The Gendered Terrain of Disaster* and, more recently, co-editor of *Women and Disasters.* She was part of a team of social scientists who analyzed the effects of Hurricane Andrew on South Florida funded by the National Science Foundation (NSF) and resulting in the co-authored book*, Hurricane Andrew: Ethnicity, Gender and the Sociology of Disaster*. She was the 2003 recipient of the Mary Fran Myers Award from the Gender and Disaster Network. Retired from academia, Morrow continues an active research agenda as a consulting sociologist, primarily focusing on issues related to warning messages, evacuation, social vulnerability and community resilience. Recent projects include *Examining the Hurricane Warning System* (NSF-funded through National Center for Atmospheric Research), *Providing Access to Resilience-Enhancing Technologies* (Oak Ridge Associated Universities), *Risk Behavior and Resilience Communication* (NOAA Coastal Services Center), *Alabama Hurricane Evacuation Project* (Dewberry & Davis), *Post Storm Assessment Hurricanes Gustav and Ike for Alabama and Alabama* (Dewberry & Davis), and *Building Resilience in Diverse Communities* (RTI International for Department of Homeland Security Center for Faith-Based and Community Initiatives).

Dr. Hugh Gladwin is an Associate Professor in the Department of Global & Sociocultural Studies (joint anthropology/geography/sociology) at Florida International University. His major area of research is the application of survey research and GIS tools to understand large urban settings of high cultural and demographic diversity. Within that framework, a particular interest is to better model the interactions between the human population and natural systems such as the South Florida ecosystem and natural events like hurricanes and climate change. For this latter area, integrating human decision models with GIS is a major focus. He is a co-editor (with Walter Gillis Peacock and Betty Hearn Morrow) and contributor to the book *Hurricane Andrew: Ethnicity, Gender, and the Sociology of Disaster* and author of numerous publications and presentations on disaster mitigation, public health, and public opinion. He is a research scientist in Florida Coastal Everglades Long-term Ecological Research project (FCE-LTER) and the Mexico/US LTER Hurricane Research network. In Miami-Dade County Gladwin serves as a member of the Steering Committee of the Local Mitigation Strategy and was appointed by the County Commission to be on the Climate Change Advisory Task Force. (http://www.miamidade.gov/derm/climatechange/taskforce.asp).

APPENDIX B: QUESTIONNAIRE

Behavioral Study Protocol. Coastal Alabama Hurricane Survey - May 2011
OMB Control #0710-0001

[Q1] Hello, I'm _____ and I'm calling on behalf of the Federal Emergency Management Agency. We have some questions that will help local, state and federal officials plan for your safety during hurricanes. It will take no more than a short time and your answers will be confidential. We are interviewing Alabama residents 18 years and older. Participation is completely voluntary. May I ask you these questions?
1 YES
2 NO

[Q2] Your personal answers will be kept completely confidential and will not be shared with anyone outside the study. This interview may be monitored for quality control purposes. If you have any questions please stop me and ask. Let's begin!
1 CONTINUE
2 STOP

[Q3] To what extent are you concerned about the threat of a hurricane? Are you very concerned, somewhat concerned, or not concerned?
1 VERY CONCERNED
2 SOMEWHAT CONCERNED
3 NOT CONCERNED
4 DON'T KNOW
5 NO RESPONSE

[Q4] How likely is it that your home would ever be seriously damaged or destroyed by the winds of a hurricane or damaged by trees blown down by hurricane winds? Is it very likely, somewhat likely, or not very likely?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY
4 DON'T KNOW
5 NO RESPONSE

[Q5] How likely do you think it is that your home would ever be flooded as a result of hurricane storm surge? Is it very likely, somewhat likely, or not very likely?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY
4 DON'T KNOW
5 NO RESPONSE

[Q6] How likely do you think it is that your home would ever be flooded as a result of heavy rain from a hurricane? Is it very likely, somewhat likely, or not very likely?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY
4 DON'T KNOW
5 NO RESPONSE

[Q7] If a Category 3 or above hurricane, a major hurricane, was threatening your community, how likely is it that you would leave your home? Is it very likely, somewhat likely, or not very likely that you would leave?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY

4 DON'T KNOW
5 NO RESPONSE

[Q8] What about for a Category 1 or 2, a lower category hurricane, how likely is it that you would leave your home? Is it very likely, somewhat likely, or not very likely that you would leave?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY
4 DON'T KNOW
5 NO RESPONSE

[Q9] If government officials issue a mandatory evacuation order for your area for a hurricane, how likely is it that you would leave your home? Is it very likely, somewhat likely, or not very likely?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY
4 DON'T KNOW
5 NO RESPONSE

[Q10] If an evacuation was voluntary but not mandatory, for your specific area, how likely is it that you would leave your home? Is it very likely, somewhat likely, or not very likely?
1 VERY LIKELY
2 SOMEWHAT LIKELY
3 NOT VERY LIKELY
4 DON'T KNOW
5 NO RESPONSE

[Q11] Has your household or family talked about where you would go if you had to evacuate your home for a hurricane?
1 YES
2 NO
3 DON'T KNOW
4 NO RESPONSE

[Q12] Would you consult with anyone outside of your household before making your decision about evacuation?
1 YES [ASK NEXT]
2 NO [SKIP TO Q14]
3 DON'T KNOW [SKIP TO Q14]
4 NO RESPONSE [SKIP TO Q14]

[Q13] Who would that be? [INTERVIEWER: IF THEY SAY FAMILY OR FRIENDS, ASK: "Would that person be located inside or outside the county?"]
[Open-End] [Multiple Response]
1 RELATIVES OR FRIENDS IN THE AREA
2 RELATIVES OR FRIENDS OUTSIDE THE AREA
3 EMPLOYER
4 LOCAL AUTHORITIES
5 OTHER,SPECIFY
6 DON'T KNOW/NO RESPONSE

[Q14] Would assisting others outside your household affect how quickly you would be able to leave?
1 YES
2 NO
3 DON'T KNOW
4 NO RESPONSE

[Q15] Please tell me the most important reasons that could make you feel you would have to evacuate your home for a hurricane. [INTERVIEWER: CHECK ALL THAT MATCH; IF YOU ARE NOT SURE WRITE ANSWER IN "OTHER, SPECIFY" CATEGORY]
[Open-End] [Multiple Response]
1 HOUSE OR BUILDING WOULD NOT BE SAFE FROM WIND OR FLOOD IN HURRICANE
2 PERSONAL SAFETY OF HOUSEHOLD MEMBERS
3 HAVE HOUSEHOLD MEMBERS WITH HEALTH CONCERNS OR MEDICAL NEEDS
4 HAVE CHILDREN OR ELDERLY TO PROTECT
5 WOULD NOT WANT TO BE HERE AFTER THE STORM
6 CARE FOR PETS OR ANIMALS
7 WOULD NEVER EVACUATE NO MATTER WHAT
8 OTHER, SPECIFY
9 DON'T KNOW/NO RESPONSE

[Q16] [ASK IF Q15=1] Why would your home not be safe in a hurricane? [INTERVIEWER: CHECK ALL THAT MATCH; IF YOU ARE NOT SURE WRITE ANSWER IN "OTHER, SPECIFY" CATEGORY]
[Open-End] [Multiple Response]
1 STORM SURGE/FLOODING
2 WIND DAMAGE, MOBILE HOME OR WEAK CONSTRUCTION
3 WIND DAMAGE, NO SHUTTERS OR OTHER PROTECTION
4 WIND DAMAGE, IN GENERAL
5 OTHER, SPECIFY
6 DON'T KNOW/NO RESPONSE

[Q17] [ASK IF Q15=3] What are the health concerns or medical needs of a person in your household that would be a reason to evacuate [INTERVIEWER: CHECK ALL THAT MATCH; IF YOU ARE NOT SURE WRITE ANSWER IN "OTHER, SPECIFY" CATEGORY]
[Open-End] [Multiple Response]
1 NEED OXYGEN
2 NEED MEDICINES OR MEDICAL PROCEDURES
3 NEED ELECTRICALY POWERED DEVICES
4 HAVE PHYSICAL HANDICAP
5 OTHER, SPECIFY
6 DON'T KNOW/NO RESPONSE

[Q18] Please tell me the most important reasons that might make you think evacuating for a hurricane would NOT be a good idea. [INTERVIEWER: CHECK ALL THAT MATCH; IF YOU ARE NOT SURE WRITE ANSWER IN "OTHER, SPECIFY" CATEGORY]
[Open-End] [Multiple Response]
1 HOME IS SAFE
2 HURRICANE USUALLY GOES SOMEWHERE ELSE
3 STAY TO PROTECT HOME FROM LOOTING
4 STAY TO PROTECT HOME FROM STORM EFFECTS
5 NO MONEY/RESOURCES TO LEAVE
6 NO PLACE TO GO
7 HEALTH OR AGE REASON
8 PETS OR ANIMALS
9 STAY WITH OTHER PERSON IN HOUSEHOLD NOT LEAVING
10 STAY WITH PERSON OUTSIDE HOUSEHOLD NOT LEAVING
11 TRAFFIC CONCERNS
12 HAVE JOB REQUIREMENT TO BE IN AREA DURING STORM
13 OTHER, SPECIFY
14 DON'T KNOW/NO RESPONSE

[Q19] Is your home located in an official evacuation zone?
1 YES

2 NO
3 NOT SURE
4 DO NOT KNOW
5 NO RESPONSE

[Q20] If you HAD to evacuate your home, would you likely seek shelter inside your county or would you go outside your county?
1. INSIDE THE COUNTY
2. OUTSIDE THE COUNTY
3. NOT SURE
4. NO RESPONSE

[Q21] If you HAD to evacuate outside of your county, where would you MOST likely go? Would you go to the home of a relative or friend, another property you own, a public shelter, a hotel, or someplace else?
[INTERVIEWER, IF RESPONDENT SAYS "WOULD NOT EVACUATE FOR A HURRICANE SAY: "this question is about a situation where for some serious reason you HAVE to evacuate"]
1 HOME OF A RELATIVE OR FRIEND
2 ANOTHER PROPERTY YOU OWN
3 CAMPGROUND
4 PUBLIC SHELTER [ASK 21A]
5 HOTEL
6 SOMEPLACE ELSE OR OTHER, SPECIFY
7 DON'T KNOW
8 NO RESPONSE

[Q21A] If PUBLIC SHELTER, would anyone in your household have functional needs, such as oxygen, or disabilities that might require extra assistance in a public shelter?
1 NO
2 YES. Describe _____

[Q22] If you HAD to evacuate for a hurricane, would you need public transportation or government transportation assistance?
1 YES
2 NO [SKIP TO Q24]
3 DON'T KNOW [SKIP TO Q24]
4 NO RESPONSE [SKIP TO Q24]

[Q23] If yes, have you registered for government transportation assistance?
1 YES
2 NO
3 DON'T KNOW
4 NO RESPONSE

[Q24] If you had to evacuate, how long would it take for you and your household to get ready to leave? Would it take less than one day, one day, two days or three days or more?
1 LESS THAN ONE DAY
2 ONE DAY
3 TWO DAYS
4 THREE DAYS OR MORE
5 DON'T KNOW
6 NO RESPONSE

[Q25] If a hurricane is predicted to impact your area three days from now and you decided to evacuate, would you leave today, tomorrow or two days from now?
1 TODAY

2 TOMORROW
3 TWO DAYS FROM NOW
4 DON'T KNOW
5. SAYS WILL NOT LEAVE
6 NO RESPONSE

[Q26] If you felt it necessary to evacuate for a hurricane, how far do you think you would probably go? Do you think you would need to go less than 10 miles, 10 to 50 miles, 50 to 100 miles, 100 to 200 miles or more than 200 miles?
1 LESS THAN 10 MILES
2 10-50
3 50-100
4 100-200
5 MORE THAN 200 MILES
6 OTHER, SPECIFY
7 DON'T KNOW
8 NO RESPONSE

[Q27] What is the city or county and state where you would most likely go when you evacuate? [INTERVIEWER, IF ANSWER DOES NOT SPECIFY A CITY OR COUNTY ASK: "Do you know what city or county that would be in or near?"]
[Open-End] [Multiple Response]

1. HATTIESBURG, MS
2. JACKSON, MS
3. MERIDIAN, MS
4. VICKSBURG, MS
5. MEMPHIS, TN
6. ATLANTA, GA
7. CHATTANOOOGA, TN
8. KNOXVILLE, TN
9. LITTLE ROCK, AR
10. DALLAS, TX
11. TALLAHASSEE, FL
12. OTHER, SPECIFY_____

[Q28] If it became necessary for you to evacuate, what is the main road you would take leaving your neighborhood? [Open-End]

1. 604/607 (SHUTTLE PARKWAY)
2. 43/603 (NICHOLSON AVENUE)
3. US 49 (25TH AVENUE)
4. I-110
5. 57
6. 611/613
7. OTHER. SPECIFY:

[Q29] If you have to leave your city or county to evacuate, what is the main highway or highways you would take once you got out of your city or county? [Multiple Response]
[Open-End]

1. I-59
2. US 49
3. MS 63/US 98
4. I-10 (W)
5. I-10 (E)
6. US 90 WEST
7. US 90 EAST
8. OTHER :SPECIFY_____

[Q30] How many people from your household would leave? [ENTER NUMBER, ENTER 88 FOR DON'T KNOW, 99 FOR NO RESPONSE]
[numeric, range: 0-99]

[Q31] Is there anyone living in your household who would probably stay in the area even if other people are leaving?
1 YES [ASK NEXT]
2 NO [SKIP TO Q33]
3 DON'T KNOW [SKIP TO Q33]
4 NO RESPONSE [SKIP TO Q33]

[Q32] What is the reason they would stay?
1 EMERGENCY OFFICIAL
2 MILITARY
3 HAVE OTHER JOB REQUIRING STAY DURING HURRICANE
4 STAY TO PROTECT HOME AFTER STORM
5 WOULD NEVER EVACUATE
6 OTHER, SPECIFY
7 DON'T KNOW
8 NO RESPONSE

[Q33] How many cars would your household take in the evacuation? [ENTER NUMBER, ENTER 88: DON'T KNOW; 99 FOR NO RESPONSE; PUT ZERO IF THEY DON'T HAVE A CAR]
[numeric, range: 0-99]

[Q34] Are there any other kinds of vehicles you would likely take, such as recreational vehicles, trailers or other vehicles?
1 YES [ASK NEXT]
2 NO [SKIP TO 35]
3 DON'T KNOW [SKIP TO 35]
4 NO RESPONSE [SKIP TO 35]

[Q35][Ask if Q34=1] What type and how many other vehicles? [MARK ALL THAT APPLY]
1 Boat. Give number.
2. Trailer. Give number
3. Recreational Vehicle. Give number
4. Other: Specify:

[Q36] If you have a family pet or pets what would you do with them if you had to evacuate? Would you leave them at home, take them to a boarding place, leave them with family or friends, take them with you, or don't you have any pets?
1 LEAVE THEM AT HOME
2 TAKE THEM TO A BOARDING PLACE
3 LEAVE THEM WITH FAMILY OR FRIENDS
4 TAKE THEM WITH YOU
5 DON'T HAVE ANY PETS
6 DON'T KNOW
7 NO RESPONSE

[Q37] After how many days from when you evacuated would you expect to be able to return to your home? [INTERVIEWER, IF RESPONDENT SAYS "as soon as possible", ASK: "Realistically, how many days do you think that would be? [88 = DON'T KNOW; 99 = NO RESPONSE]
[numeric, range: 0-99]

[Q38] If a hurricane was threatening your area, where would you get MOST of your information?
1 LOCAL TV NEWS
2 WEATHER CHANNEL
3. NATIONAL TV SUCH AS CNN OR FOX
4 INTERNET [IF YES, GO TO 38A]
5 LOCAL RADIO
6 NOAA WEATHER RADIO
7 FRIENDS OR FAMILY
8 OTHER, SPECIFY

9 DON'T KNOW
10 NO RESPONSE

[38A] [ASK ONLY IF ANSWERED 4 ON Q38]
What Internet sites would you likely go to for hurricane information? [MARK ALL THAT APPLY.]
1. LOCAL TV STATION WEBSITE
2. NATIONAL TV NEWS WEBSITE
3. NATIONAL HURRICANE CENTER WEBSITE
4. NATIONAL WEATHER SERVICE WEBSITE
5. WEATHER CHANNEL WEBSITE
6. OTHER WEATHER WEBSITE WEBSITE
6. LOCAL EMERGENCY MANAGEMENT WEBSITE
7. OTHER WEBSITE: SPECIFY
8. DON'T KNOW
9. NO RESPONSE

[Q39] Do you have access to the Internet from your home?
1 YES
2 NO
3 DON'T KNOW
4 NO RESPONSE

[39A] Do you have access to the Internet from a mobile device such as your phone?
1 YES
2 NO
3 DO NOT HAVE A CELL PHONE
4 DON'T KNOW
5 NO RESPONSE

[Q40If you have a cell phone, have you registered it with any government alert or notification service such as Reverse 911?
1 YES
2 NO
3 DO NOT HAVE A CELL PHONE
4 DON'T KNOW
5 NO RESPONSE

[Q41] Were you living in the area where you are now for Hurricane Ivan?
1 YES
2 NO [SKIP TO Q43]
3 DON'T KNOW [SKIP TO Q43]
4 NO RESPONSE [SKIP TO Q43]

[Q42] [IF Q41=1] Did you evacuate for Hurricane Ivan in 2004?
1 YES
2 NO
3 DON'T KNOW
4 NO RESPONSE

[Q43] Were you living in the area where you are now for Hurricane Katrina in 2005?
1 YES [ASK Q44-Q47]
2 NO [SKIP TO Q48]
3 DON'T KNOW [SKIP TO Q45]
4 NO RESPONSE [SKIP TO Q45]

[Q44] [If Q43=1]. Did you evacuate for Hurricane Katrina?
1 YES
2 NO [SKIP to Q47]
3 DON'T KNOW
4 NO RESPONSE

[Q45] [If Q43=1] How did you experience with Hurricane Ivan affect what you did for Katrina?
[Open-End][INTERVIEWER DOES NOT READ RESPONSES]
1. HAD NO EFFECT
2. TRAFFIC PROBLEMS FOR IVAN MADE ME DECIDE NOT TO EVACUATE FOR KATRINA
3. TRAFFIC PROBLEMS DURING IVAN MADE ME EVACUATE EARLIER FOR KATRINA
4. DID NOT EVACUATE FOR IVAN; REALIZED IT WAS A MISTAKE SO EVACUATED FOR KATRINA
5. DID EVACUATE FOR IVAN, REALIZED IT WAS NOT NECESSARY, SO DID NOT EVACUATE FOR KATRINA
6. OTHER, SPECIFY:
7. NO RESPONSE

[Q46] Where did you go when you evacuated for Katrina? Did you go to the home of a relative or friend, another property you own, a public shelter, a hotel, or someplace else?
1 HOME OF A RELATIVE OR FRIEND
2 ANOTHER PROPERTY YOU OWN
3 PUBLIC SHELTER
4 HOTEL
5 SOMEPLACE ELSE OR OTHER, SPECIFY
6 DON'T KNOW
7 NO RESPONSE

[Q47] What happened to you and your home as a result of Katrina?
[Open-End]

[Q48] We're almost done! I just have a few general background questions and we will be finished! Do you live in a single family home, a duplex, a condominium, an apartment, a mobile home, or someplace else?
1 SINGLE FAMILY HOME
2 DUPLEX
3 CONDOMINIUM
4 APARTMENT
5 MOBILE HOME
6 OTHER, SPECIFY
7 DON'T KNOW
8 NO RESPONSE

[Q49] Do you -- or your family -- own your home or apartment or do you rent?
1 OWN
2 RENT
3 OTHER, SPECIFY
4 DON'T KNOW
5 NO RESPONSE

[Q50] May I ask how old you are? [INTERVIEWER ENTER THE ACTUAL AGE, DON'T KNOW/REFUSED = 999]
[numeric, range: 0-999]

[Q51] How long have you lived in the part of Alabama where you live now? [INTERVIEWER TYPE NUMBER OF YEARS; 1 = ONE YEAR OR LESS, 999 = NO RESPONSE]

[numeric, range: 0-999]

[Q52] Including yourself, how many people live in your household? [INTERVIEWER ENTER THE ACTUAL NUMBER, DON'T KNOW/REFUSED = 99, IF ONLY ONE PERSON LIVING IN HOUSEHOLD = 1] [PROGRAMMER USE STANDARD SKIP CODING FOR Q49-Q53]
[numeric, range: 0-99]

[Q53] How many of the people living in your household are under 12 years old? [INTERVIEWER ENTER THE ACTUAL NUMBER, DON'T KNOW/REFUSED = 99]
[numeric, range: 0-99]

[Q54] How many people living in your household are 12 to 18 years old? [INTERVIEWER ENTER THE ACTUAL NUMBER, DON'T KNOW/REFUSED = 99] [INTERVIEWER IF ONLY ONE PERSON LIVING IN HOUSEHOLD & AGE = 18 PLEASE ENTER 1]
[numeric, range: 0-99]

[Q55] How many people living in your household are 19 to 64 years old? [INTERVIEWER ENTER THE ACTUAL NUMBER, DON'T KNOW/REFUSED = 99] [INTERVIEWER IF ONLY ONE PERSON LIVING IN HOUSEHOLD & AGE BETWEEN 19 TO 64 PLEASE ENTER 1]
[numeric, range: 0-99]

[Q56] And how many people living in your household are 65 OR OLDER? [INTERVIEWER ENTER THE ACTUAL NUMBER, DON'T KNOW/REFUSED = 99] [INTERVIEWER IF ONLY ONE PERSON LIVING IN HOUSEHOLD & AGE >= 65 PLEASE ENTER 1]
[numeric, range: 0-99]

[Q57] What is your marital status?
1 SINGLE
2 MARRIED
3 OTHER, SPECIFY
4 DON'T KNOW
5 NO RESPONSE

[Q58] What is your zip code? [INTERVIEWER ENTER THE ACTUAL NUMBER, DON'T KNOW/REFUSED = 99999]
[numeric, range: 99999]
[Q59] What is the highest level of education you've completed?
1 GRADE SCHOOL
2 SOME HIGH SCHOOL
3 HIGH SCHOOL GRAD
4.VOCATIONAL OR TECHNICAL SCHOOL
5.COMMUNITY COLLEGE OR SOME COLLEGE
6. COLLEGE GRADUATE
7. GRADUATE DEGREE
8. DON'T KNOW
9. NO RESPONSE

[Q60] Do you consider your ethnicity to be:
1 HISPANIC
2 NON-HISPANIC
3 DON'T KNOW
4 NO RESPONSE

[Q61] What is your race? You may give multiple answers.
1 WHITE

2 BLACK OR AFRICAN AMERICAN
3 NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER
4 OTHER
5 DON'T KNOW
6 NO RESPONSE

[Q62] Approximately, what is your annual household income -- is it...?
1 $10,000 or less
2 $10,001 - $20,000
3 $20,001 - $30,000
4 $30,001 - $50,000
5 $50,001 - $80,000
6 OVER $80,000
7 DON'T KNOW/NO RESPONSE

[Q63] Well, that concludes the interview. I'd like to thank you for taking the time to complete it. Do you have any comments that you would like me to write down on what we have discussed in this survey?
1 YES
2 NO
3 DON'T KNOW/NO RESPONSE

[Q64] WRITE COMMENTS IF ANY
[Q65] [INTERVIEWER PLEASE ENTER THE GENDER OF THE RESPONDENT, ASK ONLY IF SEEMS NECESSARY]
1 MALE
2 FEMALE