

Florida's 2004 Hurricane Season: Local Effects

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Florida was struck by four devastating hurricanes in 2004 (see Figure 1). In a previous issue of *Florida Focus*, we presented the results of a survey designed to assess the impact of those hurricanes at the state level. Those results provided a useful statewide overview, but provided no information on the impact of the hurricanes on local areas in Florida. Since some of the most populous parts of the state were largely unaffected by the hurricanes, state-level results understate the impact of the hurricanes on many local areas. In this report, we describe the results of surveys conducted in the areas most strongly affected by the hurricanes. These surveys, funded by the Florida Legislature, provide a wealth of information on evacuations, housing damage, population displacement, and reconstruction. The results of these surveys deepen our understanding of the full impact of Florida's 2004 hurricane season.

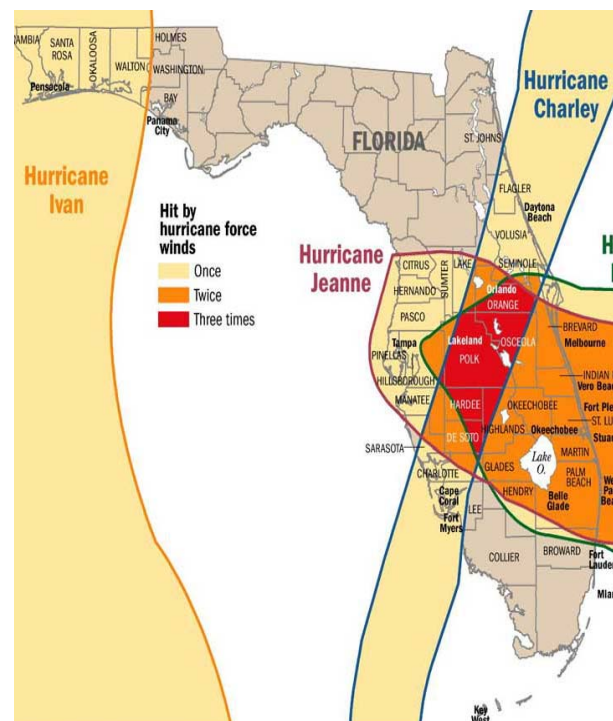
The Sample

The Bureau of Economic and Business Research (BEBR) conducted 11,559 surveys in 13 Florida counties between March and June, 2005. These counties were chosen based on the number of housing units sustaining major damage from the 2004 hurricanes (according to estimates from FEMA, the Federal Emergency Management Agency), calculated as a proportion of the total number of housing units in the county. The counties with the highest proportions of damaged units were included in the sample. In the ten

counties with the heaviest damage, we also surveyed several of the largest cities or towns and the remainder of the county. This approach led to surveys at the county level for three counties and at the sub-county level for 16 cities and 10 other (mostly unincorporated) areas.

A mixed sampling method was used, drawing listed numbers from a telephone directory database and unlisted numbers through the use of random digit dialing techniques. We

Figure 1. Paths Followed by the 2004 Florida Hurricanes



Source: National Weather Service/National Hurricane Center

Table 1. Areas Included in the Survey

Area	Number of Respondents
Brevard County	375
Punta Gorda	393
Charlotte - remainder	397
Arcadia	331
DeSoto - remainder	500
Pensacola	488
Escambia - remainder	343
Bowling Green	226
Wachula	459
Zolfo Springs	116
Hardee - remainder	793
Avon Park	354
Sebring	368
Highlands - remainder	476
Sebastian	369
Vero Beach	396
Indian River - remainder	427
Stuart	319
Martin - remainder	486
Okeechobee	333
Okeechobee - remainder	441
Osceola County	377
Polk County	391
Ft. Pierce	359
Port St. Lucie	395
St. Lucie - remainder	459
Gulf Breeze	364
Milton	355
Santa Rosa - remainder	469
TOTAL	11,559

targeted 350-400 completed interviews in each area, but obtaining that number was sometimes difficult because of small population sizes and the geographic misidentification of listed numbers. Consequently, some areas had more completed interviews than others. The number of completed interviews for each area is shown in [Table 1](#).

In this report, we show survey results at the county level and for the entire 13-county area. The analysis is based on data collected from respondents who were permanent residents living in Florida when the first of the hurricanes struck last August. All findings have a margin of error of less than 5% for counties and less than 1% for the 13-county area.

Who Evacuates, Who Doesn't, and Why?

In the aftermath of recent hurricanes, a critical question on the minds of public safety officials is who evacuates prior to a hurricane, who does not evacuate, and why. [Table 2](#) shows the proportion of respondents who evacuated prior to at least one hurricane for each county in the sample. For the entire 13-county area, nearly half of the respondents (48%) evacuated at least once. However, there was a great deal of variation among counties. Polk (27%) and Highlands (28%) had the lowest proportions evacuating, and Indian River (65%) and Brevard (62%) had the highest.

Table 2. Percent of Respondents Evacuating Prior to at Least One Hurricane

County	Evacuated	Did not evacuate
Brevard	62.0	38.0
Charlotte	36.1	63.9
DeSoto	40.9	59.1
Escambia	38.9	61.1
Hardee	42.8	57.2
Highlands	28.4	71.6
Indian River	65.5	34.5
Martin	48.6	51.4
Okeechobee	55.4	44.6
Osceola	36.7	63.3
Polk	27.0	73.0
St. Lucie	49.8	50.2
Santa Rosa	56.0	44.0
TOTAL	48.3	51.7

Some of these results can be explained by geographic location. Polk and Highlands are inland counties and many residents may have considered their locations to be less vulnerable than coastal counties. Brevard and Indian River are coastal counties that lay directly in the path of two hurricanes (Francis and Jeanne), which raised the probability that respondents would evacuate at least once. Santa Rosa and Okeechobee also had high proportions evacuating. Santa Rosa is a coastal county that lay directly in the path of Hurricane Ivan. Okeechobee, although inland, has a high proportion of mobile homes. As we show later, residents of mobile homes are more likely to evacuate than residents of other types of housing.

Other results are more difficult to understand. Charlotte, which took a direct hit and suffered heavy damage from Hurricane Charley, had a relatively low proportion of residents evacuating (36%). Escambia and Santa Rosa are contiguous counties and experienced similar damages, but had very different evacuation rates.

In an attempt to understand some of these differences, we did a follow-up survey of all residents of Charlotte and Escambia counties who reported in the original survey that they did not evacuate before any of the hurricanes. In this follow-up survey, we asked respondents the main reason they did not evacuate. The results are shown in Table 3. Over half of the non-evacuees in Escambia reported that they thought they could ride out the hurricane without compromising their safety. Others did not evacuate because they were concerned about leaving their pets behind (8%) or their house unattended (8%). Almost 7% cited job responsibilities and 4% cited medical conditions as reasons for not evacuating.

In Charlotte, 27% did not evacuate because they thought they could ride out the hurricane. The second most common reason was that many residents thought the storm would hit elsewhere

Table 3. Primary Reason for Failing to Evacuate: Escambia and Charlotte Counties (Percent Distribution)

Reason	Escambia	Charlotte
Thought I could ride it out	53.6	27.2
Storm was predicted to hit elsewhere	1.8	25.6
Was not aware hurricane was coming	0.0	4.1
Concerned about leaving pets	8.3	6.1
Concerned about leaving house unattended	8.3	5.7
Had no place to go	1.8	2.0
Had no transportation	1.2	1.2
Medical condition prevented evacuation	4.2	3.7
Job did not permit leaving	6.8	2.9
Did not have enough time	0.0	4.9
Other	14.0	16.6

(26%). This most likely occurred because the storm had been forecasted to make landfall near Tampa, well to the north. Residents were perhaps lulled into a false sense of security by the media focus on Tampa. The sudden shift in the path of the storm helps explain why 4% did not know the hurricane was coming and 5% did not feel they had enough time to evacuate. About 6% each cited concerns about leaving pets or houses unattended, 4% cited medical conditions, and 3% cited job responsibilities.

There was surprisingly little variation across counties regarding the primary place people stayed when they evacuated (see Table 4). On average, 58% of those evacuating stayed with family or friends; proportions ranged from 53% in Osceola to 67% in Highlands. There was more variation in other types of lodging. Three inland counties (Hardee, DeSoto, and Okeechobee) had the highest proportions staying

Table 4. Type of Lodging during Evacuation
(Percent Distribution)

County	Family/ Friends	Public Shelter	Hotel/ Motel	Other
Brevard	59.1	3.8	29.1	8.0
Charlotte	54.0	4.8	25.2	16.0
DeSoto	58.8	13.3	6.4	21.5
Escambia	58.3	9.6	20.7	11.4
Hardee	61.6	14.5	6.6	17.3
Highlands	66.7	5.3	9.9	18.1
Ind. River	56.7	5.1	22.2	16.0
Martin	58.8	7.8	15.4	18.0
Okeechobee	55.5	10.5	20.3	13.7
Osceola	53.2	5.6	34.1	7.1
Polk	64.1	5.4	9.8	20.7
St. Lucie	60.9	6.5	21.2	11.4
Santa Rosa	58.4	3.9	22.2	15.5
TOTAL	58.2	6.5	22.4	13.1

in public shelters. This may have been caused by the absence of nearby hotel and motel facilities or by a lack of personal financial resources.

Given the high proportion of evacuees staying with family or friends, we speculated that some respondents may have failed to evacuate because they had no one to stay with. This hypothesis was not borne out in the follow-up survey. Very few non-evacuees in Charlotte and Escambia said they failed to evacuate because they had no place to go (see Table 3). When asked where they would stay if they were to evacuate, 52% said they would stay with family or friends (57% in Escambia and 45% in Charlotte). When asked if there was a family member or friend at least 50 miles away they could have stayed with (that is, far enough away to improve safety), 66% in Escambia and 55% in Charlotte said yes.

Overall, most evacuees were away from home for only a short time: 47% for three nights or less and 75% for less than a week (see Table 5). However, there was a substantial amount of variation among counties. More than 15% of

Table 5. Number of Nights Away from Home during Evacuation (Percent Distribution)

County	1-3 Nights	4-6 Nights	7-13 Nights	14+ Nights
Brevard	48.3	37.3	10.5	3.9
Charlotte	57.8	14.5	8.0	19.7
DeSoto	56.3	11.5	6.5	25.7
Escambia	35.0	27.8	15.9	21.3
Hardee	64.8	10.6	9.4	15.2
Highlands	74.4	10.3	9.0	6.3
Ind. River	26.2	40.4	25.7	7.7
Martin	46.1	33.8	15.8	4.3
Okeechobee	59.8	18.0	15.7	6.5
Osceola	53.3	31.1	12.3	3.3
Polk	77.0	10.3	8.1	4.6
St. Lucie	36.3	34.5	18.5	10.7
Santa Rosa	43.4	27.5	16.7	12.4
TOTAL	46.7	28.1	14.7	10.5

respondents evacuated for more than two weeks in Charlotte, DeSoto, Escambia, and Hardee, compared to less than 5% in Brevard, Martin, Osceola, and Polk. We believe this variation is related to the extent of damages caused by the hurricanes. As we show later, the counties with the highest proportions evacuating for more than two weeks were also the counties with the highest proportions reporting major damage. It is likely that many of the respondents evacuating for more than two weeks were unable to return to their homes because of hurricane damage.

Damages

Table 6 shows the distribution of hurricane damage by county. For the entire area, almost three-quarters of respondents reported housing damage. Just over 2% reported that their homes were completely destroyed, 33% reported major damage, and 39% reported minor damage. Again, there was a substantial amount of variation among counties. The proportion reporting complete destruction ranged from less than 1% in

Table 6. Extent of Hurricane Damage to Housing Unit (Percent Distribution)

County	Damage			
	Completely Destroyed	Major	Minor	None
Brevard	0.6	21.4	38.3	39.7
Charlotte	6.0	43.0	32.6	18.4
DeSoto	6.5	45.2	37.8	10.5
Escambia	1.7	40.7	39.1	18.5
Hardee	8.1	40.3	38.7	12.9
Highlands	1.4	24.5	44.3	29.8
Indian River	2.8	38.4	43.1	15.7
Martin	0.6	23.4	43.8	32.2
Okeechobee	5.1	33.1	39.5	22.3
Osceola	0.6	28.0	43.4	28.0
Polk	1.2	22.1	40.1	36.6
St. Lucie	1.8	36.4	40.4	21.4
Santa Rosa	2.6	34.1	38.4	24.9
TOTAL	2.2	32.7	39.0	26.1

Brevard, Martin, and Osceola to 8% in Hardee. The proportion reporting major damage ranged from 21% in Brevard to 45% in DeSoto and 43% in Charlotte. The proportion reporting no damage ranged from 10% in DeSoto to 40% in Brevard.

Nearly 35% of respondents in the entire sample suffered either major damage or the complete destruction of their homes. When viewed this way, DeSoto sustained the most damage of any county (52%), followed by Charlotte (49%) and Hardee (48%). Least damaged were Brevard (22%), Polk (23%), Martin (24%), and Highlands (26%). By this measure, it appears that Charley—which passed directly through Charlotte, DeSoto, and Hardee—was responsible for more damage than any of the other three hurricanes. The high level of damage in Charlotte was most likely caused by its coastal location and the strength of the storm. Contributing to the damages in DeSoto and Hardee was the large proportion of mobile homes in those two counties, since mobile homes generally suffer greater storm damage than other types of housing.

Table 7. Estimated Median Value of Housing Damage

County	Median Value (\$)
Brevard	6,000
Charlotte	30,000
DeSoto	20,000
Escambia	13,000
Hardee	14,000
Highlands	5,000
Indian River	18,000
Martin	10,000
Okeechobee	9,000
Osceola	7,000
Polk	5,000
St. Lucie	10,000
Santa Rosa	15,000
TOTAL	11,000

Table 7 shows the median estimate of housing damage by county. For the sample as a whole, the median estimate was \$11,000. The counties with the highest estimates were Charlotte (\$30,000) and DeSoto (\$20,000), the counties hardest hit by Hurricane Charley. Other counties where hurricanes made landfall reported lower median damages. Hurricane Ivan made landfall in Escambia (\$13,000) and Santa Rosa (\$15,000), while Hurricanes Jeanne and Frances made landfall in St. Lucie (\$10,000) and Indian River (\$18,000). Charley was a Category 4 storm when it made landfall, Frances was Category 2, and Ivan and Jeanne were Category 3.

Table 8 shows the status of repairs to damaged housing units at the time the surveys were conducted. It is noteworthy that, for the sample as a whole, repairs had been completed for only 35% of damaged units. Shortages of labor and building materials, perhaps accompanied by delays in collecting insurance payments, have slowed the rebuilding process. Almost one in six respondents had not even begun making repairs by spring, 2005. Nearly

Table 8. Status of Repairs to Housing Unit, Spring 2005 (Percent Distribution)

County	None Planned	Not Started	Under-way	Completed
Brevard	12.5	20.7	30.4	36.4
Charlotte	6.5	10.5	58.5	24.5
Desoto	6.8	12.4	51.3	29.5
Escambia	4.9	15.8	47.2	32.1
Hardee	7.6	10.7	41.7	40.0
Highlands	4.7	20.1	29.9	45.3
Indian River	2.8	14.8	50.5	31.9
Martin	4.8	20.3	37.9	37.0
Okeechobee	7.2	19.0	39.1	34.7
Osceola	8.2	11.5	38.9	41.4
Polk	13.9	16.7	36.1	33.3
St. Lucie	3.7	14.8	44.8	36.7
Santa Rosa	4.3	15.0	50.0	30.7
TOTAL	5.5	15.8	43.9	34.8

44% of the respondents for the entire sample reported having some type of repair underway. This proportion varied from 30% in Brevard to 59% in Charlotte. Respondents in Highlands reported the highest proportion of completed repairs (45%). No repairs were planned for 12 to 14% of the respondents in Brevard and Polk, reflecting the relatively low proportions suffering major damages in those two counties.

Moves Caused by Hurricanes

Not only did many residents evacuate prior to the arrival of at least one hurricane, many were forced to move out of their homes after a hurricane passed through their area. Table 9 shows the proportion of respondents that were forced to move out because of hurricane damage, loss of utilities, or some other reason. Overall, 21% reported that they were forced to move. For individual counties, the proportion moving ranged from 16% in Brevard to 33% in DeSoto.

For the sample as a whole, 50% left their homes because of a loss of utilities (electricity,

Table 9. Percent of Respondents Forced to Move Out of Home by at Least One Hurricane

County	Forced to Move	Not Forced to Move
Brevard	16.5	83.5
Charlotte	32.2	67.8
Desoto	32.9	67.1
Escambia	25.3	74.7
Hardee	32.3	67.7
Highlands	22.4	77.6
Indian River	24.6	75.4
Martin	17.5	82.5
Okeechobee	25.8	74.2
Osceola	20.8	79.2
Polk	17.0	83.0
St. Lucie	22.2	77.8
Santa Rosa	23.5	76.5
TOTAL	21.2	78.8

gas, water, or telephone), 37% left because of structural damage to their housing unit, and 13% left for some other reason (see Table 10). There were substantial variations in these proportions

Table 10. Primary Reason for Moving out of Home after Hurricanes (Percent Distribution)

County	Structural Damage	Loss of Utilities	Other
Brevard	19.3	63.2	17.5
Charlotte	43.0	43.8	13.2
Desoto	42.9	45.1	12.0
Escambia	45.9	41.6	12.5
Hardee	48.5	38.6	12.9
Highlands	22.4	70.9	6.7
Indian River	33.1	52.0	14.9
Martin	23.7	58.5	17.8
Okeechobee	27.5	65.6	6.9
Osceola	23.6	68.1	8.3
Polk	20.7	67.2	12.1
St. Lucie	36.3	53.4	10.3
Santa Rosa	44.3	37.6	18.1
TOTAL	37.2	50.2	12.6

Table 11. Type of Lodging Immediately after Moving Out of Home because of Hurricanes
(Percent Distribution)

County	Family/ Friends	Hotel/ Motel	Rental	Same Property	Public Shelter	Other
Brevard	60.7	25.0	1.8	3.6	0.0	8.9
Charlotte	55.4	12.5	12.1	3.5	0.9	15.6
Desoto	61.6	6.7	3.6	11.1	0.5	16.5
Escambia	57.0	8.8	7.5	11.4	1.8	13.5
Hardee	59.8	7.6	2.5	11.4	2.3	16.4
Highlands	68.0	10.3	6.9	4.3	1.2	9.3
Indian River	48.5	20.0	7.3	4.7	0.9	18.6
Martin	60.8	8.7	5.5	4.0	2.9	18.1
Okeechobee	53.1	15.7	4.5	8.6	0.9	17.2
Osceola	47.2	33.3	8.4	1.4	2.8	6.9
Polk	63.8	17.2	0.0	6.9	1.7	10.4
St. Lucie	57.7	12.8	9.9	3.8	2.9	12.9
Santa Rosa	54.2	4.7	11.3	16.5	0.8	12.5
TOTAL	56.3	12.1	8.0	7.0	1.6	15.0

from county to county. More than 40% of movers left their homes because of structural damage in Charlotte, DeSoto, Escambia, Hardee, and Santa Rosa. As shown in Table 6, these counties also sustained high proportions of housing destruction and major damage. Less than 25% of movers left their homes because of structural damage in Brevard, Highlands, Martin, Osceola, and Polk; these counties experienced relatively low proportions of housing destruction and major damage.

Most people forced from their homes stayed with family or friends (see Table 11). In their initial moves, 56% moved in with family or friends, 12% stayed in hotels and motels, 8% rented a house or apartment, and 7% stayed in temporary quarters on their pre-hurricane property. Less than 2% stayed in a public shelter. These proportions varied considerably from one county to another. The proportion staying with family or friends varied from 47% in Osceola to 68% in Highlands, the proportion going to a hotel or motel varied from 5% in Santa Rosa to 33% in

Osceola, the proportion renting a house or apartment varied from zero in Polk to 12% in Charlotte, and the proportion staying on their pre-hurricane property varied from 1% in Osceola to 17% in Santa Rosa.

For the sample as a whole, 82% of those forced to move had returned to their pre-hurricane homes by the time the surveys were conducted (see Table 12). Among counties, proportions varied from less than 80% in Charlotte, DeSoto, and Hardee to around 90% in Martin, Polk, Brevard, and Highlands. The proportions returning to their pre-hurricane homes were generally highest in counties with the least severe damages and lowest in the counties with the most severe damages (see Tables 6 and 7).

Most movers were away from home for only a short period of time (see Table 13). Overall, of those who had returned to their pre-hurricane homes by the time the surveys were conducted, 59% were away for less than two weeks and

Table 12. Percent of Respondents Who Have Returned to Their Pre-hurricane Homes

County	Returned	Have Not Returned
Brevard	87.7	12.3
Charlotte	76.2	23.8
Desoto	76.7	23.3
Escambia	83.4	16.6
Hardee	76.5	23.5
Highlands	87.8	12.2
Indian River	86.6	13.4
Martin	93.0	7.0
Okeechobee	87.9	12.1
Osceola	86.1	13.9
Polk	89.7	10.3
St. Lucie	81.0	19.0
Santa Rosa	82.5	17.5
TOTAL	82.0	18.0

75% were away for less than a month. These proportions varied considerably among counties. More than 80% of movers were away from home for less than two weeks in Highlands, Osceola, and Polk, compared to less than half of movers in Charlotte, DeSoto, Hardee, and Santa Rosa. More than 20% of movers were away for more than three months in Charlotte, Escambia, Hardee, and Santa Rosa, compared to less than 10% in Brevard, Highlands, Osceola, and Polk. The length of time away from home was generally greatest in counties with the most severe damages and lowest in counties with the least severe damages.

More Detailed Analyses

The relatively small number of survey respondents in each county limits the number of analyses that can be carried out at the county level. By aggregating all respondents into a single sample, we are able to conduct more detailed analyses regarding a number of issues. The

Table 13. Duration of Hurricane-induced Move for People Who have Returned to their Pre-Hurricane Homes (Percent Distribution)

County	Weeks		Months		
	<2	2-4	1-3	3-6	>6
Brevard	69.6	19.0	7.6	1.3	2.5
Charlotte	29.3	26.1	12.6	21.4	10.6
Desoto	42.0	24.2	15.7	8.5	9.6
Escambia	51.6	18.3	7.6	11.9	10.6
Hardee	47.7	15.3	14.6	10.6	11.8
Highlands	81.6	5.1	4.8	3.0	5.5
Indian River	65.4	17.1	3.1	5.2	9.2
Martin	77.9	8.4	1.4	8.2	4.1
Okeechobee	62.9	19.4	6.0	3.0	8.7
Osceola	88.0	5.4	1.1	4.4	1.1
Polk	82.2	6.7	4.4	2.2	4.5
St. Lucie	59.8	15.1	8.0	11.7	5.4
Santa Rosa	44.0	17.6	8.9	10.4	19.1
TOTAL	59.2	16.0	8.1	9.0	7.7

following tables are based on these aggregated data. Individual responses have been weighted to provide a representative sample of the full 13-county area.

One important issue is where displaced residents go following a hurricane and how long they stay. Table 11 showed that most displaced residents initially moved in with family or friends and Tables 12 and 13 showed that most have returned to their pre-hurricane homes and were away for only a few days or weeks. Table 14 shows the length of stay by the type of lodging

Table 14. Length of Stay by Type of Lodging (Percent Distribution)

Type of Lodging	Weeks		Months		
	<2	2-4	1-3	3-6	>6
Same property	30.1	8.6	11.9	17.5	31.9
Family/friend	59.0	19.2	10.4	8.6	2.8
Hotel/motel	80.3	9.3	7.2	1.7	1.5
Public shelter	75.7	1.4	6.4	16.5	0.0
Other	26.0	11.0	12.8	18.8	31.4

Table 15. Type of Lodging in First Move by Type of Lodging in Second Move.

Lodging in First Move	Lodging in Second Move				
	Current House	Family/Friend	Trailer on Current Property	Trailer Not on Current Property	Other
Temporary quarters, same property	50.4	2.6	26.8	0.0	20.2
Family/friend	79.5	7.4	2.0	1.0	10.1
Hotel/motel	80.0	7.9	1.6	0.2	10.3
Public shelter	38.7	30.0	0.0	14.9	12.1
Other	56.1	6.7	6.3	2.6	28.3

people found immediately after leaving their homes. Substantial differences are apparent. Fifty-nine percent of those moving in with family or friends stayed for less than two weeks and 78% stayed for less than a month; only 3% stayed for more than six months. Those moving to hotels or motels spent even less time away from home. Three-quarters of those moving into public shelters stayed for less than two weeks, but one in six stayed for more than three months. People establishing temporary quarters on their pre-hurricane property tended to be there for longer periods of time: almost half spent more than three months in this type of lodging and almost one-third spent more than six months.

Where did people go when they left their immediate post-hurricane lodging? Table 15 shows that second moves varied considerably, depending on where people went for their first move. Of those who initially moved in with family or friends, about 80% moved into their current home in their second move. The same was

true for those initially going to hotels or motels. For all other groups, this proportion was substantially lower. Of those who initially stayed in temporary quarters on their pre-hurricane property, 27% moved into some type of trailer on the same property. Of those who initially went to a public shelter, 30% moved in with family or friends and 15% moved into a trailer that was not on the same property. We speculate that many of these trailers were provided by FEMA.

Another issue is the impact of housing type on hurricane damage. Housing units can be broken down into three basic types: Single-family, multifamily, and mobile home. As shown in Table 16, mobile homes are far more vulnerable to hurricane damage than other types of housing. More than 10% of mobile home residents reported that their homes were completely destroyed by the hurricanes and 38%

Table 16. Extent of Damage by Housing Type

Housing Type	Damage			
	Completely Destroyed	Major	Minor	None
Single-family	1.2	33.4	39.8	25.6
Multifamily	0.8	21.8	34.2	43.2
Mobile Home	10.3	37.8	35.5	16.4
TOTAL	2.2	32.7	39.0	26.1

Table 17. Percent of Respondents Forced to Move Out of Home, by Housing Type

Housing Type	Forced to Moved	Not Forced to Moved
Single-family	19.2	80.8
Multifamily	20.8	79.2
Mobile Home	36.5	63.5
TOTAL	21.2	78.8

Table 18. Evacuation Status by Type of Housing Unit (Percent Distribution)

Housing Type	Evacuated	Did Not Evacuate
Single-family	44.0	56.0
Multifamily	48.4	51.6
Mobile Home	80.5	19.5
TOTAL	48.3	51.7

reported major damage. Only one in six reported no damage. In comparison, only 1% of residents of single-family and multifamily units reported the total destruction of their homes. It is noteworthy that a higher proportion of single-family residents than multifamily residents reported major damage (33% compared to 22%) and that 43% of multifamily residents reported no damage at all, compared to only 26% of single-family residents. It appears that single-family units are more susceptible to hurricane damage than multifamily units.

Mobile home residents are much more likely to be forced to move out of their homes than residents of other types of housing (see Table 17). More than 36% of mobile home residents left their homes following at least one of the hurricanes, compared to 19% of the residents of single family units and 21% of residents of multi-family units. Mobile home residents are also much more likely to evacuate prior to a hurricane (see Table 18). More than 80% of mobile home residents evacuated before at least one hurricane, compared to 44% of single family residents and 48% of multi-family residents. It is obvious that most mobile home residents in Florida recognize the threat posed by hurricanes.

Finally, we consider the issue of insurance coverage. Overall, 92% of owners and 64% of renters had some type of housing insurance at the time the hurricanes struck. Not surprisingly, coverage varied considerably by housing type

Table 19. Percent of Homes Insured, by Housing Type

Housing Type	Insured	Not Insured
Single-family	92.6	7.4
Multifamily	58.2	41.8
Mobile Home	73.1	26.9
TOTAL	88.7	11.3

(see Table 19). Almost 93% of the residents of single-family units reported they had insurance coverage, compared to 73% of mobile home residents and 58% of multifamily residents.

Given the impact of deductibles and other factors, insurance payments do not cover the full value of hurricane losses. As shown in Table 20, residents of mobile homes and single family units estimated that insurance payments covered approximately 70% of the value of their losses; residents of multi-family units estimated that insurance payments covered only 47% of their losses. In addition to their heavy personal costs, the 2004 hurricanes extracted a heavy financial cost from many Floridians.

Summary and Conclusions

Evacuations:

- Almost half the survey respondents evacuated prior to at least one of the 2004 hurricanes. Evacuation rates were much

Table 20. Percent of Damages Covered by Insurance Payments, by Housing Type

Housing Type	Damages Covered
Single-family	70.0
Multifamily	47.4
Mobile Home	71.9
TOTAL	70.1

higher for residents of mobile homes than for residents of other types of housing.

- More than half of all evacuees stayed with family or friends. Relatively few went to public shelters.
- Most of those who did not evacuate thought the storm was going to hit elsewhere or they could safely ride it out. Significant proportions failed to evacuate because they could not accommodate their pets or were concerned about the security of their homes. Lack of transportation or a place to go were not important reasons for failing to evacuate.
- Many people use the news media as their primary source of information about hurricanes. We believe it is imperative that the news media emphasize the lack of precision of hurricane forecasts and focus on the wide area that may be affected. Focusing on precise landfall locations may lull residents of nearby areas into a false sense of security.

Damages and Reconstruction:

- Homes near the coast were far more susceptible to hurricane damage than homes further inland. However, mobile homes in both coastal and inland counties were highly susceptible to hurricane damage. Single-family units generally sustained more damage than multifamily units.
- Hurricane strength had an enormous impact on the level of damage. The Category 4 hurricane (Charley) caused substantially more damage than the Category 2 and 3 hurricanes (Frances, Jeanne, and Ivan).
- Repairs following a major hurricane can take a long time to complete. It is not unusual for repairs to remain incomplete even a year after a hurricane has hit.

Population Movements:

- Many people were forced from their homes by the 2004 hurricanes, but the moves were often

caused by loss of utilities rather than by structural damage. Although some people were away from home for many months, most were away for only a few days or weeks.

- Most people displaced by the hurricanes moved in with family or friends. These moves led to significant short-term increases in average household size, but those increases faded away over time.
- The vast majority of people displaced by the 2004 hurricanes eventually returned to their pre-hurricane homes.
- Historically, hurricanes have led to significant short-term population declines for some places in Florida, but have had no impact on long-term population growth for most places or for the state as a whole. We believe the same will be true for the 2004 hurricanes.

Caveat

The data analyzed in this study were collected from people living in the study area during the spring of 2005. Consequently, people who moved out of the area after the hurricanes struck and have not returned were not included in our sample. If people moving out and not returning experienced significantly different levels of hurricane-related damage and dislocation than those living in the area during the spring of 2005, the results reported here could be somewhat biased. Based on our 2005 population estimates and evidence collected from neighbors, however, we doubt that these omissions had a significant impact on the results reported here.

Postscript: Comparisons to Katrina

In light of the recent devastation caused by Hurricane Katrina in Louisiana, Mississippi, and Alabama, it may be useful to compare the effects of that hurricane with the effects of the four hurricanes hitting Florida in 2004. There

are similarities, of course, but the differences are more dramatic:

1) Katrina was much more destructive. Preliminary estimates indicate that it made more than 600,000 housing units uninhabitable and caused damages of at least \$50 billion and perhaps as much as \$100 billion. It is estimated that last year's hurricanes in Florida made around 105,000 housing units uninhabitable and caused \$20-30 billion in damages. Katrina took some 1,200 lives, whereas the 2004 Florida hurricanes took around 80 lives.

2) People forced out of their homes by Katrina moved further away and will be away longer. Although the 2004 hurricanes caused 1.7 million Floridians to leave their homes at least temporarily, most left due to the loss of utilities rather than because of structural damage. They typically moved into nearby places and were away from home for only a few days or weeks. Preliminary estimates indicate that Katrina displaced approximately 1.4 million people. Many were sent hundreds or thousands of miles away and will not be able to return for many months. It is likely that many will never return.

3) In New Orleans, most of the damage was caused by flooding rather than by wind or storm surge. Flooding is not covered by private insurance policies and most people do not purchase supplemental flood insurance; consequently, many of Katrina's victims will suffer significant uninsured damages. Florida did not experience major flooding in 2004 and 89% of those with damages were insured. Although many suffered financial losses, their losses were not as great as those suffered by many of Katrina's victims.

4) The 2004 hurricanes did not destroy many jobs in Florida. Even if people lost their homes, they still had jobs to go to and paychecks coming in. Katrina, on the other hand, destroyed jobs as well as homes. Preliminary estimates put Katrina-related job losses at more than 400,000. This adds

to the economic misery of many of the hurricane's victims. Also, the Florida hurricanes had little impact on the national economy, whereas Katrina had a substantial impact.

5) The 2004 Florida hurricanes received a great deal of national publicity, but they were viewed basically as natural disasters. Those storms and Hurricane Andrew in 1992 led to some changes in building codes and increases in insurance rates, but did not lead to a national discussion of broader issues. Katrina, on the other hand, put the spotlight squarely on several of the nation's most serious social, economic, political, and environmental problems. The political fallout began almost immediately and Katrina is likely to lead to a national dialogue on issues of race, inequality, wetlands restoration, building codes, coastal development, property insurance, urban design, and the proper role of government in disaster preparation and mitigation, including the payment of government subsidies for flood protection and insurance. The rebuilding of New Orleans is likely to be particularly contentious.

What impact will Katrina have on future population growth in the Gulf Coast region? Some hurricanes have had substantial short-term effects on population growth in Florida, but—to date—they have had no long-term effects. Will the same be true for Katrina? Before answering this question, it is important to note that there were two Katrinas:

► Katrina 1: the storm that blasted coastal areas from Louisiana to Florida with winds and a tremendous storm surge.

► Katrina 2: the storm that devastated New Orleans through floods and the ensuing social and political breakdown.

These two storms differed from each other substantially regarding the nature of their

damages and we believe they will differ in terms of their impact on future population growth as well. The coastal area battered by Katrina 1 will most likely follow the Florida model. The short-term population loss will be substantial in many areas, but areas that had been growing will soon begin growing again. It may take a number of years, but the populations of those areas will eventually reach and exceed their pre-hurricane levels. Some residents displaced by the storm will never return, but they will be replaced by new residents. Places with stable or declining populations, however, will probably not experience much growth.

Katrina 2 is a different story. We doubt that New Orleans will follow the Florida model. Much of the city lies below sea level and relies on a system of levees and pumps for its survival. It will take many months before the levees are rebuilt and the essential infrastructure is restored. Tens of thousands of homes will have been so badly damaged that they will have to be destroyed. Some areas probably will be declared off-limits for reconstruction and others will see substantial changes in building codes and environmental regulations.

Prior to Katrina, many residents of New Orleans were unemployed or underemployed, had very low incomes, and were renters rather than

homeowners. Many have since lost their jobs and their homes and have few economic resources left; they may be priced out of the future housing market. Orleans Parish is among the poorest counties in the nation with a poverty rate of 26.9% in 2002.

Family and cultural ties to New Orleans are very strong and will bring many people back to the city. In addition, New Orleans' unique history and culture, its tourism industry, and its strategic importance as a port will continue to attract newcomers. However, many people displaced by the hurricane will find new jobs, put their children into new schools, and start putting down roots in their new locations. Many are likely to remain where they are. The metropolitan area has grown very slowly in recent decades and the city's population has been declining since 1960. We believe New Orleans' recovery will be much slower than the rest of the Gulf Coast, and it may never again reach its pre-hurricane population size.

Acknowledgement

The authors would like to thank the Florida Legislature for funding these surveys and Alicia Turner and Scott Richards for their assistance in collecting and compiling the data.