



The Demographic Impact of The 2004 Hurricane Season In Florida

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By most measures, the 2004 hurricane season was the worst in Florida's history. Four hurricanes blasted through the state between August 13 and September 25, with Charley making landfall on the southwest coast near Punta Gorda, Frances on the southeast coast near Stuart, Ivan in the panhandle near Pensacola, and Jeanne nearly retracing the route followed by Frances. This was the first time in recorded history that four hurricanes had struck Florida in a single year. Most parts of the state were hit by at least one of the hurricanes and some were hit by two or even three. Overall, the storms were blamed for at least 80 deaths in Florida and caused more than \$20 billion in damages.

In order to collect statewide information on the demographic impact of the hurricanes, the Bureau of Economic and Business Research (BEBR) at the University of Florida added a series of questions to its regular monthly survey of Florida households. These questions were included in surveys conducted between February and May, 2005, and were answered by more than 2,000 respondents, of whom 1,881 were permanent residents living in Florida when the first of the hurricanes struck last August. In this issue of *Florida Focus*, we discuss some of the major findings of these surveys. All findings have a margin of error of less than 3%.

Evacuations Prior to Hurricanes

With the advent of the Internet, talk radio, and 24/7 news channels, hurricanes can no longer sneak up on an unwary public. The likely path of a hurricane is known several days in advance of its arrival, giving people ample opportunity to evacuate potentially unsafe locations in search of safer ones. Approximately 11% of survey respondents evacuated from their homes prior to Hurricane Charley, 14% prior to Hurricane Frances, 10% prior to Hurricane Ivan, and 10% prior to Hurricane Jeanne. In all, just over one in four (25.5%) survey respondents evacuated prior to at least one hurricane. Almost 14% evacuated once, 6% evacuated twice, 2% evacuated three times, and 3% reported that they left their homes prior to all four hurricanes (Table 1).

Table 1. Number of Evacuations of Survey Respondents

Number of Evacuations	Number	Percentage
Zero	1,397	74.5
One	253	13.5
Two	117	6.2
Three	39	2.1
Four	61	3.2
Unsure of number	9	0.5
Total	1,876	100.0

Table 2. Type of Lodging During Hurricane Evacuation

Type of Lodging	Number	Percentage
Friends/relatives	550	65.2
Hotel/motel	129	15.3
Community shelter	48	5.7
Other	117	13.8
Total	844	100.0

Note: Data include each evacuation for people who evacuated more than once.

Given Florida’s estimated population of 17.6 million in August, 2004, this implies that almost 4.5 million Floridians evacuated their homes at least once. Counting all evacuations as separate events, 65% of evacuees stayed with family or friends, 15% stayed in a hotel or motel, 6% stayed in a community shelter, and 14% made some other type of lodging arrangement (Table 2).

Just over half of all evacuations were for one or two nights, 28% were for three or four nights, 17% were for five to ten nights, and 4% were for more than ten nights (Table 3).

Table 3. Nights Spent Away from Home During Evacuation

Nights	Number	Percentage
1	214	27.0
2	192	24.3
3	150	19.0
4	68	8.6
5-6	71	9.0
7-10	61	7.7
11-14	16	2.0
15+	19	2.4
Total	791	100.0

Note: Data include each evacuation for people who evacuated more than once.

Table 4. Number of Times Forced out of Home by Hurricanes

Number of Times	Number	Percentage
Zero	1,701	90.5
One	113	6.0
Two	32	1.7
Three	13	0.7
Four	14	0.8
Unsure of number	6	0.3
Total	1,879	100.0

Moves Caused by Hurricane Damages

The hurricanes wreaked havoc from one end of the state to the other. Almost one in ten survey respondents reported that they were forced to move out of their homes after at least one of the hurricanes (Table 4).

Six percent reported moving out after one hurricane, 1.7% after two, 0.7% after three, and 0.8% after all four. In terms of individual hurricanes, 3.6% of survey respondents were forced to leave by Hurricane Charley, 4.3% by Hurricane Frances, 3.0% by Hurricane Ivan, and 3.6% by Hurricane Jeanne (Table 5). Applied to the Florida population, these data imply that approximately 1.7 million people were forced out of their homes by at least one of the hurricanes.

Table 5. Survey Respondents Forced to Move out of Home, by Hurricane

Hurricane	Number	As Percentage of All Respondents
Charley	67	3.6
Frances	80	4.3
Ivan	57	3.0
Jeanne	68	3.6

Table 6. Primary Reason for Moving out of Home After Hurricanes

Reason for Move	Number	Percentage
Structural damage	37	13.7
Loss of utilities	196	72.3
Other	38	14.0
Total	271	100.0

Note: Data include reason for each move for people moving more than once.

Most people were forced out of their homes by loss of electricity, water, gas or telephone service rather than by structural damage to their housing unit (Table 6). Including multiple moves, more than 72% left because of a loss of utilities, 14% because of structural damages, and 14% for some other reason.

Of those leaving their homes, 73% moved in with family or friends, 14% went to a hotel or motel, 3% rented a house or apartment, 3% stayed on their own property in a tent, RV, or some other type of temporary housing, 3% went to a public shelter, and 5% made other types of lodging arrangements (Table 7). In their next move, 85% moved to their current home, 7% moved in with family or friends, 3% moved to a hotel or motel, and 5% made another type of arrangement.

Table 7. Type of Lodging Immediately After Moving out of Home After Hurricanes

Type of Lodging	Number	Percentage
Friends/relatives	197	72.7
Hotel/motel	38	14.0
Rented house/apartment	8	3.0
Stay on property	8	3.0
Community shelter	7	2.6
Other	13	4.8
Total	271	100.0

Note: Data include each move for people moving more than once.

Most movers were away from home for only a short period of time, but some were away for extended periods and some still have not returned. Of those forced to move, 88% had returned to their pre-hurricane housing unit by the time the surveys were conducted during the spring of 2005. (For purposes of comparison, it should be noted that only 94% of survey respondents who were *not* forced to move were still living in the same housing unit as last August; with or without hurricanes, Florida has a very mobile population). Of those who moved but have returned to their pre-hurricane housing unit, 61% were away for less than one week, 20% for one to two weeks, 7% for two to four weeks, 6% for one to three months, 2% for three to six months, and 3% for more than six months (Table 8).

As might be expected, the duration of the move was much greater for those who moved because of structural damages than for those who moved because of a loss of utilities. Of those moving because of structural damages, 69% were away from home for more than a week, 42% for more than a month, and 35% for more than three months (Table 9). Of those moving because of a loss of utilities, 64% were away for less than a week, 92% for less than a month, and

Table 8. Duration of Hurricane-induced Move for People Who Have Returned to Their Pre-hurricane Home

Duration	Number	Percentage
Less than 1 week	145	61.4
1-2 weeks	48	20.3
2-4 weeks	17	7.2
1-3 months	13	5.5
3-6 months	5	2.1
6+ months	8	3.4
Total	236	100.0

Note: Data include each move for people moving more than once.

Table 9. Duration of Hurricane-induced Move by Reason for Move

Duration	Reason for Move					
	Structural Damage		Loss of Utilities		Other	
	Number	%	Number	%	Number	%
Less than 1 week	8	30.8	118	63.8	19	76.0
1-2 weeks	3	11.5	42	22.7	3	12.0
2-4 weeks	4	15.4	11	6.0	2	8.0
1-3 months	2	7.7	10	5.4	1	4.0
3-6 months	4	15.4	1	0.5	0	---
6+ months	5	19.2	3	1.6	0	---
Total	26	100.0	185	100.0	25	100.0

Note: Data include each move for people moving more than once.

98% for less than three months. Most of those moving for “other reasons” were away from home for only a short time: 76% were away for less than a week; 96% for less than a month; and none for more than three months.

Damage Caused by Hurricanes

Almost one in three survey respondents (32%) reported hurricane damage to their homes (Table 10). Only 0.4% reported that their homes were completely destroyed, but 8% reported major damage and 24% reported minor damage. These proportions are based on households, or housing units occupied by permanent residents of Florida.

Assuming that the distribution of damages for all housing units is proportional

to that of households, we estimate that 2.6 million of Florida’s 8.1 million housing units were damaged by the storms, with 35,000 destroyed, 649,000 sustaining major damage, and 1,917,000 sustaining minor damage.

Of the four hurricanes, Jeanne and Frances produced the most widespread damage to housing units (Table 11). Almost 14% of survey respondents reported housing damage from Hurricane Jeanne, 12% from Hurricane Frances, 10% from Hurricane Charley, and 8% from Hurricane Ivan.

Almost 80% of survey respondents reported that they knew the dollar value of damage to their housing unit. Of these, 29% reported damage of less than \$1,000, 28% reported damage of \$1,000 to \$4,999, 31%

Table 10. Extent of Hurricane Damage to Housing Unit

Extent of Damage	Number	Percentage
Completely destroyed	8	0.4
Major	151	8.1
Minor	446	23.8
None	1,271	67.8
Total	1,876	100.0

Table 11. Survey Respondents with Hurricane Damage to Housing Unit by Hurricane

Hurricane	Number	As Percentage of All Respondents
Charley	196	10.4
Frances	231	12.3
Ivan	143	7.6
Jeanne	261	13.9

Table 12. Estimated Value of Hurricane Damage to Housing Unit

Estimated Value (\$)	Number	Percentage
< 1,000	139	29.4
1,000 – 4,999	133	28.1
5,000 – 9,999	69	14.6
10,000 – 24,999	79	16.7
25,000 – 49,999	31	6.6
50,000 – 99,999	13	2.7
100,000 +	9	1.9
Total	473	100.0

reported damage of \$5,000 to \$24,999, and 11% reported damage of \$25,000 or more (Table 12). The average estimate of housing damage was \$10,300.

The huge number of damaged units has made it difficult for many Floridians to carry out housing repairs. By May 2005, about 8% of survey respondents with hurricane damage were not planning to make any repairs, 13% were planning to make repairs but had not yet started, 27% had repairs underway, and 52% had completed all repairs (Table 13). These proportions imply that there were almost 348,000 housing units for which repairs had not begun and another 696,000 for which repairs had not been completed. Although a great deal remains to be done, the situation was better in May than February, when only 41% of survey respondents had completed their repairs and 28% had not yet begun.

Table 13. Status of Repairs to Housing Unit, May 2005

Status	Number	Percentage
None planned	11	7.7
Not started	19	13.4
Underway	38	26.8
Completed	74	52.1
Total	142	100.0

Table 14. Estimated Value of Hurricane Damage to Personal Property

Estimated Value (\$)	Number	Percentage
< 1,000	92	39.7
1,000 – 4,999	85	36.6
5,000 – 9,999	26	11.2
10,000 – 24,999	21	9.1
25,000 – 49,999	4	1.7
50,000+	4	1.7
Total	285	100.0

The hurricanes damaged not only housing units, but personal property as well (e.g., furniture, cars, boats and so forth). Only 15% of survey respondents reported damage to personal property, slightly less than half the proportion that reported damage to their housing unit. About 81% of survey respondents reported that they knew the dollar value of damage to personal property. Of these, 40% reported damage of less than \$1,000, 37% reported damage of \$1,000 to \$4,999, 20% reported damage of \$5,000 to \$24,999, and 3% reported damage of \$25,000 or more (Table 14). The average estimate of damage to personal property was \$4,400.

Compensation for Damages

In order to collect information regarding compensation for damages, we asked a series of questions regarding insurance coverage and insurance payments; these questions were included only in the surveys conducted in April and May. Of the 936 respondents living in Florida when the hurricanes struck, 87% of those sustaining damage reported that their home was insured prior to the hurricanes. Of the respondents who did not have insurance, over half (56%) lived in apartments or mobile homes, for which insurance is not required.

Given that many homes sustained only minor damage, not all respondents filed a claim with their insurance company. Of those with insurance coverage who sustained housing damage, only 53% filed a claim; this represents 14% of all respondents. Applying this proportion to all households implies that 976,000 Florida households filed a claim related to housing damages. Assuming that the distribution of claims for all housing units (including unoccupied units and those used seasonally or on an occasional basis) is proportional to that of households, we estimate that approximately 1,169,000 claims related to housing damages were filed in Florida. The Office of Insurance Regulation reported 1,667,000 insurance claims related to hurricane damage in Florida, of which 69% were for damage to housing units. This implies 1,146,000 claims for housing damage, very close to the estimate derived from the survey.

Of the 14% of survey respondents who filed housing damage claims with their insurance company, 88% received a payment and another 3% are still waiting for their claim to be settled. Respondents indicated that about 69% of the damage to their homes was covered by insurance payments. According to the survey, the average pay-out for housing damage was \$16,100.

Slightly less than 5% of survey respondents filed insurance claims for damage to personal property. Of those, 91% received a payment and 2% are still waiting for their claim to be settled. Respondents indicated that about 44% of the damage to their personal property was covered by insurance payments. According to the survey, the average pay-out for personal property damage was \$7,800.

Of all respondents filing insurance claims, 68% claimed housing damage only, 10% claimed personal property damage only, and 22% claimed both housing and personal property damage. Counting all types of pay-outs, the average insurance payment to Florida households was \$14,700, according to survey data. This is higher than the \$11,000 average payment reported by the Office of Insurance Regulation. The difference between these two estimates may be due to differences in accounting procedures, differences in the types of damage covered or a variety of other factors. Given sample size and sampling variability, the difference between the two estimates is not statistically significant.

Another resource that can be utilized following hurricanes or other natural disasters is federal government assistance from the Federal Emergency Management Agency (FEMA) and the Small Business Administration (SBA). FEMA provides assistance in a variety of ways. Many people are familiar with handouts of food and ice, but FEMA also provides assistance with temporary shelter, housing repairs, utility payments, debris removal, and even unemployment benefits. The survey included a number of questions regarding the use of FEMA resources following the 2004 hurricanes; these questions were included in the survey in all four months.

About 13% of survey respondents reported that they applied for some form of assistance from FEMA. Applied to Florida's 7 million households, this implies some 910,000 applications. Assuming that the distribution of claims for all housing units is proportional to that of households, we estimate that there were approximately 1,049,000 applications in Florida. This estimate is lower than the 1.2 million applications reported by FEMA. The higher

Table 15. Type of FEMA Assistance Received by Survey Respondents

Type of Assistance	Number	As a Percentage of Those Receiving Assistance
Temporary housing	28	20.0
Food/Water	28	20.0
Housing repairs or rebuilding	28	20.0
Replacement of personal property	19	13.6
Money for cleanup	17	12.1
Utility assistance	12	8.6
Unemployment benefits	5	3.6
Moving expenses	3	2.1
Other	59	42.1

number reported by FEMA is due in part to applications from businesses and government agencies; in addition, many households may have applied more than once, given the occurrence of multiple hurricanes.

Of the survey respondents who applied to FEMA, 58% reported that they received some type of assistance. Table 15 shows the distribution of respondents by the type of assistance they received. Temporary housing, assistance with home repairs, and the provision of food and water topped the list, with each received by 20% of those receiving assistance. In addition, 14% received money to replace personal property, 12% received money to defray cleanup expenses, 9% received assistance with utility payments, and 42% received some other type of assistance. It should be noted that many households received more than one type of assistance.

Another source of disaster-related assistance is the SBA, which provides loans covering damage to homes as well as to respondents applied for an SBA loan and only 26% of those applying received a

Table 16. Changes Made in Response to 2004 Hurricanes

Changes Made	Number	As a Percentage of All Respondents
Modifications to housing unit	184	9.8
Cut down, trimmed trees	150	8.0
Bought generator	76	4.1
Moved to safer housing unit	25	1.3
Other	58	3.1

favorable response. This very low application rate suggests that many Floridians may not have been aware of the SBA as an option for post-hurricane assistance.

Responses to the 2004 Hurricanes

People have responded to the 2004 hurricanes in a variety of ways. About 18% of survey respondents reported that they have made some type of change in their housing or living arrangements. Almost 10% made structural modifications to their housing unit, 8% cut down or trimmed trees, 4% bought a generator, 1% moved to a safer housing unit, and 3% made some other type of change (Table 16). These changes represent a substantial amount of economic activity, especially in particular sectors of the economy (e.g., the construction industry). Other businesses have also done well; for example, the data in Table 16 imply that almost 290,000 Florida households bought a generator during the six to eight months following the hurricanes.

Table 17. Changes Planned in Preparation for Future Hurricanes

Changes Planned	Number	As a Percentage of All Respondents
Cut down, trim trees	226	12.9
Modifications to housing unit	223	12.8
Buy generator	192	11.0
Move to safer housing unit	93	5.3
Leave Florida	41	2.3
Other	96	5.5

Many survey respondents intend to make further changes: 13% plan to make modifications to their housing unit; 13% plan to cut down or trim trees; 11% plan to buy a generator; 5% plan to move to a safer housing unit; and 5% plan to make other types of changes (Table 17). In fact, 2% say they intend to move away from Florida. Whether people actually carry out their plans, of course, remains to be seen. If they do, it will mean the sale of another 770,000 generators in Florida!

Comparison to Hurricane Andrew

Hurricane Andrew remains the single most devastating storm ever to strike Florida. Passing through the southern tip of Florida on August 24, 1992, with winds reaching 175 miles per hour, Hurricane Andrew claimed at least 25 lives and caused more than \$22 billion in damages. It was estimated to have destroyed approximately 23,000 housing units, caused major damage to 121,000 units, and minor damage to 285,000 units. The storm forced more than 353,000 people to leave their homes, at least temporarily. The vast majority of damages occurred in Miami-Dade County.

By most measures, the 2004 hurricane season was more destructive than Hurricane

Andrew. Taken as a whole, Hurricanes Charley, Frances, Ivan, and Jeanne caused far more deaths, damaged far more housing units and forced far more people from their homes than Hurricane Andrew. Their geographic coverage was vastly greater as well. Only in terms of the real dollar value of damages does it appear that the 2004 hurricane season may fall short of the destruction caused by Hurricane Andrew.

Implications for Future Population Growth

What will the 2004 hurricane season mean for future population growth in Florida? Will the hurricanes and the publicity that accompanied them cause a substantial number of people to leave Florida and prevent others from coming? We doubt that the 2004 hurricane season will have much impact on Florida's long-term population growth, for two reasons. First, hurricanes are not new to Florida. People have long been aware that Florida has hurricanes, just as California has earthquakes, Kansas has tornados and Colorado has wildfires. But, Florida also has warm winters, sandy beaches, low taxes and rapid job growth. As is true for all states, Florida has a variety of positive and negative attributes. People make their choices about where to live based on the entire bundle of attributes and how the attributes of one place compare to those of another. Despite its summertime heat, humidity, and hurricanes, Florida continues to have an attractive bundle of attributes.

Second, history does not show hurricanes to reduce long-term population growth in hurricane-prone areas. Many hurricanes in recent decades have struck coastal areas from Texas to Virginia, yet those coastal areas continue to grow rapidly. Hurricane Andrew had a substantial short-

term impact on population growth in Miami-Dade County, but no long-term impact; in spite of the hurricane, the county had a larger population increase during the 1990s than the 1980s. The 2004 hurricanes will most likely have a small short-term effect on Florida's population growth—and perhaps have lingering effects in some local areas—but are not likely to have any long-term effect on the state's future growth.

That could change, however, if there were several consecutive years of high hurricane activity. People expect an occasional bad year, but they don't expect a continuous series of bad years. If Florida were to experience several high-hurricane years in a row, a significant number of people might decide that Florida is no longer such a good place to live. This could cause larger numbers of people to leave the state and smaller numbers to move in, producing a slowdown in Florida's population growth. Although we do not believe this is likely to happen, it is a possibility that should not be overlooked.

A Caveat

It should be noted that this study was based on persons living in Florida during the spring of 2005. Since 300,000 to 350,000 people move out of the state each year, some

people affected by the 2004 hurricanes were not included in our sampling frame. If people moving out of the state experienced significantly different levels of hurricane-related events than those remaining in the state, the results reported here could be somewhat biased. Given the relatively small number of movers relative to non-movers and evidence collected from neighbors, however, we doubt that these omissions had much (if any) impact on the results.

It should also be emphasized that the sample analyzed in this study was proportionate to the distribution of households throughout the state. Since some areas of the state were much more profoundly impacted by the hurricanes than others, some areas suffered substantially greater damages than shown here. We have conducted additional surveys in the 13 counties most significantly affected by the hurricanes; results from these surveys will be available later this summer.

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