

Hurricane Katrina's effects on industry employment and wages

Rapid development of alternative methods in two BLS programs resulted in a clearer view of the economic impact of this storm than would have been possible otherwise; the number of jobs in many affected areas and industries is still down

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The Bureau of Labor Statistics (BLS) has two programs that measure employment and wages by industry: The Current Employment Statistics (CES) program and the Quarterly Census of Employment and Wages (QCEW) program. Both operate as Federal-State cooperative programs in which BLS partners with workforce agencies in each State.

The CES program surveys approximately 400,000 business establishments nationwide and publishes estimates of employment, hours, and earnings for the Nation, States, and metropolitan areas. Estimates are released 1 month after the reference month; for example, March estimates are published in April.

The QCEW provides a virtual census (97 percent) of monthly employment and quarterly total wages, derived from Unemployment Insurance tax records that almost all employers are required to file quarterly. QCEW series for the Nation, States, metropolitan areas, and counties are published 7 months after the end of the reference quarter. For example, first quarter (January through March) employment and wage counts are published in October.

Thus, the CES estimates are timelier, but the QCEW series are more comprehensive, publishing far more industry and geographic detail. The CES employment estimates are benchmarked annually to the QCEW employment counts. The benchmarking process is intended to correct for sampling error and nonsampling error in the CES estimates.

Both the CES and the QCEW programs faced major operational and analytical challenges collecting data following Hurricane Katrina. At the same time, there was great demand for these data as policymakers tried to assess the immediate and long-term effects of the storm. This article describes the CES and QCEW responses to the difficulties posed by the hurricane and its aftermath and presents some of the employment and wage trends measured by the programs both before and after the storm.

Scope of damage

Hurricane Katrina made landfall on August 29, 2005, near Buras, Louisiana. Although it had weakened to a strong Category 3 hurricane by then, with sustained winds of 115 to 130 miles per hour, the massive cyclone generated a storm surge as high as 27 feet along the gulf coast from New Orleans to Mobile, Alabama. Significant failures in the levees of New Orleans caused flooding in approximately 80 percent of the city.

The storm unleashed widespread devastation across the region. Katrina affected 138 counties and parishes covering 93,000 square miles—roughly the same land area as Great Britain. It became the costliest hurricane on record, with an estimated \$96 billion in damage.¹ Some 300,000 homes were either destroyed or rendered uninhabitable, displacing over 770,000

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Table 1. Employment and wages in heavily affected areas of Louisiana and Mississippi, by State and area, annual averages 2004

State/area	Annual average employment, 2004	Total annual wages, 2004
Louisiana	1,865,164	\$59,460,916,210
Affected parishes, by MSA	595,156	20,525,241,005
New Orleans-Metairie-Kenner MSA:		
Jefferson Parish	213,301	6,942,626,388
Orleans Parish	247,260	9,118,298,381
Plaquemines Parish	15,260	622,076,257
St. Bernard Parish	17,386	499,183,111
St. Charles Parish	22,643	1,014,399,343
St. John the Baptist Parish	12,698	426,249,127
St. Tammany Parish	66,608	1,902,408,398
Mississippi	1,105,915	31,557,062,544
Affected counties, by MSA:	153,907	4,640,440,535
Gulfport-Biloxi MSA		
Hancock County	13,470	476,140,734
Harrison County	89,631	2,512,013,761
Stone County	3,811	97,007,856
Pascagoula MSA		
Jackson County	46,995	1,555,278,184
Combined affected area, Louisiana and Mississippi	749,063	25,165,681,540

NOTE: MSA=metropolitan statistical area

people. This is over three times the number of homes lost in 2004 to Hurricanes Charley, Frances, Ivan, and Jeanne combined.

The economic ramifications of the hurricane are immense for the gulf coast region. In addition, storm damage produced short-term reverberations across the country in the form of higher gasoline prices, crippled communications, and displaced individuals crossing State lines seeking shelter and jobs.

Hurricanes strike the United States every year, and the effect of an “average” hurricane on a local economy is fairly predictable: after some temporary disruption caused by evacuation, property damage, and power outages, employment recovers and may even surge for a short time in industries such as construction as residents return to their homes and businesses and repair the storm damage.

Katrina, however, was clearly no average hurricane. The massive scale of destruction to property, infrastructure, communications, and the environment, as well as the scale of human displacement, challenged BLS conventions for measuring the impact of a natural disaster on a local economy.

Identifying affected areas, establishments

Immediately following the hurricane, BLS assembled data from the CES survey and the QCEW as well as from other BLS programs into a pre-hurricane profile of the affected areas in Alabama, Louisiana, and Mississippi. BLS posted the information on its Web site. Many key elements of the pre-hurricane profile of the area are included below.

Defining heavily affected areas. Although many areas were

affected to varying degrees by Katrina, this article focuses on gulf coast counties and associated metropolitan areas in zones designated by Federal Emergency Management Agency (FEMA) as flooded or having extensive or catastrophic damage, herein referred to as “heavily affected areas.” These included portions of several Louisiana parishes in and around New Orleans and portions of several Mississippi counties in and around Gulfport and Biloxi.

There are 11 such areas. (See table 1.) Seven are in Louisiana and make up the New Orleans-Metairie-Kenner metropolitan area. In Mississippi, there are four counties designated as heavily affected, three of which are in the Gulfport-Biloxi metropolitan area; the fourth is located in the Pascagoula metropolitan area.

For calendar year 2004, these 11 areas employed a combined 749,063 workers. In Louisiana, the number of jobs reported in 2004 in the seven Katrina-affected parishes represented nearly one-third of the State’s workforce.² In contrast, the four affected counties in Mississippi accounted for 14 percent of that State’s employment in 2004.

Tourism is a vital part of the local economies in these gulf coast communities. Before the storm, 43 percent of private industry jobs in these 11 areas were found in two broad industry groupings: Trade, transportation, and utilities (24 percent) and leisure and hospitality (19 percent). This is a higher concentration of employment than is found nationwide in these industries (35 percent). These industries accounted for 263,400 jobs and 35 percent of the business establishments in the area.

Among the 11 areas, Harrison County, which encompasses

Gulfport and Biloxi, had the greatest share of its workers employed in these 2 industries (60 percent). Breaking it out further, 37 percent of private industry workers (26,600) in Harrison County were employed in the leisure and hospitality industry. Half of this employment was concentrated in the accommodation industry, with the largest number of jobs (12,300) located in casino hotels.

Using geocoding to locate establishments. BLS began geocoding QCEW establishment-level files in 2003. The basic procedure involves the assignment of longitude and latitude codes, based on physical addresses. This geocoding allowed BLS to create maps and data tabulations that more precisely pinpoint establishments, employment, and wages in Katrina-affected areas.

Detailed geographic damage assessments were developed by FEMA using aerial photography. FEMA identified six damage categories: Flooded, saturated, limited damage, moderate damage, extensive damage, and catastrophic damage. For a map of these areas, see the FEMA Web site: www.gismaps.fema.gov/2005graphics/storms/Katrina/rs_Damage_overview_090605_1800.pdf.

Working with BLS, the California Employment Development Department matched damage areas defined through the aerial photography (as of September 6, 2005) and FEMA maps to geocoded QCEW establishment data to estimate the expected level of damage for each. Files containing this detailed information were provided to BLS and used by both the CES and the QCEW programs in their response to the hurricane.

Adapting the CES survey following Katrina

Katrina's unique combination of intense destruction and widespread geographic impact affected nearly every aspect of CES program operation. The QCEW-based pre-hurricane profiling described above provided a basis for the CES program to plan its post-hurricane response. The program faced three immediate concerns:

- Would BLS be able to contact sampled businesses in the heavily affected areas and collect employment and earnings information?
- Would the CES standard estimation procedures produce useful employment estimates in this extraordinary situation?
- Would BLS be able to approximate the impact of Katrina on employment trends in the first months following the hurricane?

Data collection. Data collection for the CES survey began roughly 2 weeks after Katrina hit the gulf coast, while the

region was still reeling from the storm. Large portions of the area remained under evacuation order; many also still had phone and power outages. Despite these circumstances, BLS and its State partners attempted to collect September reports from all the businesses in the CES sample. Response rates were lower than normal in Louisiana and Mississippi, particularly in the heavily affected areas in and around New Orleans and the Mississippi gulf coast, where many businesses were temporarily or permanently closed. Although the gulf coast of Alabama was also hit by the storm, survey response rates were normal in that area. For preliminary September estimates, BLS received responses from 57 percent of the sample in Louisiana (50 percent in the heavily affected parishes), and 62 percent in Mississippi (53 percent in the heavily affected counties). This compares with responses from 67 percent of the sample received across all States. The 67-percent national response rate for September was in a normal range for the payroll survey for the preliminary estimates.

More than one-third of the sample reports covering hurricane-affected areas in these States actually originated from outside the local areas. Large national and regional companies with many locations across the country often report data for all of their locations from a single, central site. BLS uses several data collection techniques in the payroll survey, including several forms of respondent-initiated self-response, mostly touchtone data entry, fax, and mail. BLS attempted telephone followup with all respondents who did not initiate a self-response during the September collection cycle; for subsequent months, the Bureau contacted as many such respondents as resources permitted. This effort helped increase response rates in the Katrina-affected areas. Since the storm, response rates have rebounded in these areas; however, these rates are still substantially below the response rates in unaffected areas of Mississippi and Louisiana.

Estimation methods. BLS staff reviewed their estimation methods, including their underlying assumptions, and concluded that several facets of the estimation procedures should be modified to reflect the effects of Hurricane Katrina on employment estimates for the months immediately following the storm. Because of the high visibility of the CES employment estimates and the sensitivity of U.S. financial markets to them, the Bureau also determined that changes in estimation methods needed to be announced ahead of the October 7 release of national CES estimates. BLS decided on its course of action and announced its plans in a posting to its public Web site nearly 2 weeks before the national data release.

BLS made two changes to compensate for higher-than-usual survey nonresponse. For sample establishments that BLS was unable to contact in the most heavily affected areas,

BLS assumed the business was not operating and therefore had an employment level of zero—except when research indicated that the business was paying its employees for the pay period including the 12th of the month. (Employees on paid leave are counted as employed in the survey.) September employment was set to zero for 82 sample units that were in the heavily affected areas and that normally respond to BLS for its preliminary estimates. If CES had followed its usual imputation procedure for nonrespondents, all nonresponding units in these areas would have been assigned the over-the-month trend of all responding sample units in that industry with similar characteristics. This assumption, given the circumstances in the heavily affected areas, was unlikely to be accurate, and, therefore, following standard imputation procedure carried a strong risk of understating employment loss. This was particularly true for national estimates, for which “similar” units are defined almost exclusively by industry, not segmented by geography.

In addition to imputing zero employment for nonrespondents in the heavily affected areas, BLS also decided to reweight the sample. Because the September survey response rates in Mississippi and Louisiana disaster areas were substantially lower than usual, the sample units reporting data were reweighted to reflect sample units that did not respond. This procedure resulted in a more accurate representation of the disaster areas in the CES estimates; if there were large differentials in response rates and sample units were not reweighted, disaster areas would be underrepresented in the estimates. Reweighting adjustments were made for 1,260 sample units, whose weights were increased by about 30 percent on average.

Finally, BLS made temporary changes to the CES procedure for estimating the effect of business births (openings) and deaths (closures) on employment. First, under standard CES estimation procedures, sample units reporting zero employment are excluded from the calculation of estimates. This is done to offset new business employment, which the survey is unable to capture in real time. This technique is used because research has shown that, in most months, the employment gain from business births and the employment loss from business deaths largely offset one another. However, for the disaster areas, this assumption of reported business deaths in September accurately imputing for unsampled births was unlikely to hold. Therefore, any sample units from the heavily affected areas in Louisiana and Mississippi reporting zero employment were used in the calculation of September estimates. There were 111 sample units reporting zero employment for September 2005 that were used in the CES estimates.

Second, under standard procedures, the CES program adds a net birth-death employment adjustment, derived from a time series model, to account for the residual net of birth-death

employment not captured by the technique described above. This model-based component was omitted from the September and October employment estimates for New Orleans, Gulfport-Biloxi, and Pascagoula. The change affected the employment estimates slightly for these metropolitan areas and minimally for the Louisiana and Mississippi statewide estimates. This modification did not affect national estimates because the residual net birth-death adjustment originating from these areas is negligible at the national level.

These modified estimation procedures were used for September and October estimates. Beginning with the November reference month, the CES returned to its standard estimation procedures because the number of sample units reporting zero employment had dropped, and the differential between overall national response rates and rates for the heavily affected areas had shrunk somewhat.

CES national estimates

Until Hurricane Katrina hit, BLS had never tried to quantify the effect of this type of shock on national employment estimates. However, given the magnitude of the event, and because the CES State and metropolitan area estimates are not published until 2 weeks following national estimates, BLS believed it was important to attempt to isolate a likely Katrina effect on the national estimates when those estimates for September 2005 were first published in October. Because of improved analytical capabilities that now exist in BLS, it was also feasible. The deputy commissioner’s “Statement on the Employment Situation” from October 7, 2005, roughly quantified Katrina’s impact on national employment:

Turning to the data from our payroll survey, one way to roughly gauge the impact of the hurricane on job growth in September is to compare the over-the-month employment change with the monthly average for the prior year. The change reported for September—a loss of 35,000 jobs—is about 230,000 less than the average monthly gain over the previous 12 months. Using this simple approach to gauge the hurricane impact assumes that, in the absence of the storm, employment growth would have followed its recent trend. To test that assumption, we constructed a rough estimate of the change in payroll employment from August to September excluding all of the sample units in the disaster areas. This exercise showed that total nonfarm employment would have increased by an amount in line with the prior year’s average. We will know more about the hurricane’s impact when local employment estimates become available later this month.

CES State and metropolitan area estimates

September 2005 CES State employment estimates for Louisiana show a decrease in total employment for the State of 216,000 (as revised).³ While employment losses were widespread across all private industries, the hardest hit supersectors were leisure and hospitality; education and health services; and trade, transportation, and utilities. Substantial losses in eating and drinking places, hospitals, and general merchandise stores were at the heart of these precipitous declines.

The overwhelming majority of employment losses in Louisiana were concentrated in the New Orleans-Metairie-Kenner metropolitan area. CES calculated that nonfarm payroll employment in New Orleans fell by 204,700 or 34 percent from August to September 2005. Some 60 percent of the industries in New Orleans-Metairie-Kenner had estimated over-the-month employment losses of one-third or greater (not including industries that are aggregates of component estimates, such as total nonfarm, total private, and the like). The most affected supersectors in the metropolitan area mirrored those affected statewide: Trade, transportation, and utilities; leisure and hospitality; and education and health services.

Because Hurricane Katrina did not strike Mississippi's major population and industrial centers as it had Louisiana's, the storm's impact on employment in Mississippi was less severe. For September 2005, CES estimates show an employment decline of 16,700 or 1.2 percent in Mississippi (as revised). Also, the employment losses in Mississippi, unlike those in Louisiana, were largely in industries concentrated on the gulf coast: Ship building; amusement, gambling, and recreation; accommodation; and general merchandise stores. Nearly two-thirds of the jobs lost in Gulfport-Biloxi belonged to the leisure and hospitality and to the trade, transportation, and utilities industries. More than half the jobs lost in Pascagoula were in manufacturing.

In contrast, employment in Alabama posted an increase of 1,300 or 0.1 percent in September 2005. Accommodation and food services, as well as retail trade, experienced small over-the-month losses. Although Mobile County qualified for disaster assistance from FEMA, employment in the Mobile metropolitan area remained relatively unscathed by Hurricane Katrina. Mobile reported an employment increase of 800 or 0.5 percent. Small losses in industries such as manufacturing and trade, transportation, and utilities were offset by gains in local government and financial activities.

Employment recovery measured by CES

Most areas have posted increases in total nonfarm employment since their post-Katrina lows. In general, employment in construction has increased in the aftermath of the hurricane as heavily affected areas have begun

rebuilding; however, this growth has not returned construction employment to pre-storm levels in all areas. In both Mississippi and Louisiana, the trade, transportation, and utilities supersector has experienced the largest share of employment growth since the hurricane. Gains in professional and business services have also accounted for large portions of employment growth in both States since September 2005. In Louisiana, employment in the leisure and hospitality supersector has remained depressed but stable, while in Mississippi employment in this supersector continues to decline. Pascagoula and New Orleans have both increased total nonfarm employment since the immediate aftermath of the storm, while Gulfport-Biloxi has continued to shed jobs. Construction employment in New Orleans has rebounded in the months following Katrina, although the over-the-year change as of May 2006 continued to be negative. Employment in the trade, transportation, and utilities supersector has recovered to different degrees in each of the three heavily affected areas: in New Orleans, trade, transportation, and utilities employment has rebounded slightly since the initial decrease after the storm, while in Pascagoula, employment in this supersector has surpassed the pre-Katrina levels, and in Gulfport-Biloxi, it has remained depressed. Tables 2 through 6 contain over-the-year changes in not seasonally adjusted employment data for September 2004 to September 2005 and May 2005 to May 2006 for Mississippi, Louisiana, Gulfport-Biloxi, Pascagoula, and New Orleans-Metairie-Kenner; data for May 2006 are preliminary.⁴

The decrease in employment in Mississippi from September 2004 to September 2005 was 14,200 jobs or 1.3 percent of payroll employment. (See table 2.) By May 2006, the over-the-year decrease in employment had shrunk to 1,000 jobs or 0.1 percent of payroll employment. From September 2004 to September 2005 in Mississippi, only the construction and the professional and business services supersectors posted increases in payroll employment. Joining them in posting over-the-year employment increases in May 2006 were the following: Natural resources and mining; trade, transportation, and utilities; education and health services; and government. From September 2004 to September 2005, Mississippi payroll employment in trade, transportation, and utilities decreased 3,200 jobs or 1.5 percent; by May 2006, this supersector posted an over-the-year increase of 5,400 jobs, with payroll employment 2.4 percent higher than pre-storm levels. The education and health services supersector has also posted job gains since Hurricane Katrina, adding 2,300 jobs that expanded its workforce 1.9 percent from May 2005 to May 2006. The leisure and hospitality supersector in Mississippi continued to shed a substantial number of jobs after the storm's initial impact. The over-the-year loss in this supersector was 6,100 jobs or 4.8 percent of employment in September 2005; by May 2006, the 8.8-percent drop in total

Table 2. Employment and over-the-year changes in employment in Mississippi, by industry, not seasonally adjusted, September 2004–May 2006

[Numbers in thousands]

Industry	Employment level				Change in employment			
	September 2004	September 2005	May 2005	May 2006 ¹	September 2004–September 2005		May 2005–May 2006	
					Number	Percent	Number	Percent
Total nonfarm	1,132.1	1,117.9	1,139.3	1,138.3	-14.2	-1.3	-1.0	-0.1
Natural resources and mining	8.8	8.7	8.8	9.1	-.1	-1.1	.3	3.4
Construction	50.6	53.7	51.4	56.0	3.1	6.1	4.6	8.9
Manufacturing	179.5	172.6	180.0	175.8	-6.9	-3.8	-4.2	-2.3
Trade, transportation, and utilities	220.1	216.9	221.0	226.4	-3.2	-1.5	5.4	2.4
Information	14.4	14.0	14.4	14.0	-.4	-2.8	-.4	-2.8
Financial activities	46.1	45.9	46.4	45.7	-.2	-.4	-.7	-1.5
Professional and business services	83.3	87.0	85.8	88.6	3.7	4.4	2.8	3.3
Education and health services	120.8	120.7	121.4	123.7	-.1	-.1	2.3	1.9
Leisure and hospitality	126.6	120.5	128.8	117.5	-6.1	-4.8	-11.3	-8.8
Other services	37.4	36.4	37.8	37.4	-1.0	-2.7	-.4	-1.1
Government	244.5	241.5	243.5	244.1	-3.0	-1.2	.6	.2

¹ Preliminary data

employment amounted to 11,300 jobs. Employment in Mississippi's remaining supersectors did not decline substantially as a result of Hurricane Katrina.

Total nonfarm employment in Louisiana decreased by 184,600 jobs or 9.6 percent from September 2004 to September 2005 because of Hurricane Katrina. (See table 3.) In May 2006, the year-to-year loss was slightly less: 177,600 jobs or 9.1 percent. Natural resources and mining was the only supersector to produce growth in employment over the year in either September 2005 or May 2006; all other supersectors posted at least modest over-the-year losses for both months. The education and health services and the leisure and hospitality supersectors posted the largest year-to-year job losses in September 2005: 44,700 (17.7 percent) and 39,600 (19.3 percent), respectively. Employment in these supersectors remained depressed in May 2006 with over-the-year decreases of 44,900 jobs (17.4 percent) and 40,600 jobs (18.8 percent), respectively. Employment in the information and government supersectors has continued to decline since the storm. The over-the-year decline in September 2005 in these supersectors was 600 jobs (1.9 percent) and 5,200 jobs (1.4 percent) respectively. By May 2006 the over-the-year declines in employment had increased to 1,800 (6.1 percent) jobs in information and 10,900 jobs (2.9 percent) in government. The construction; trade, transportation, and utilities; and financial activities super-sectors substantially decreased their initial over-the-year losses by May 2006.

Total nonfarm payroll employment in Gulfport-Biloxi has continued to decline since Hurricane Katrina. (See table 4.) The CES sample supports publication of only a limited number of supersectors in Gulfport-Biloxi. Of these published supersectors, only the combined natural resources mining

and construction supersector has posted employment increases since the storm. In May 2006 employment in manufacturing had largely rebounded from its immediate post-storm low, but was still slightly below its May 2005 level. Employment in the trade, transportation, and utilities and the government supersectors has remained depressed since the hurricane, while employment in the leisure and hospitality supersector has continued to decline even after the initial job loss in September 2005.

Total nonfarm payroll employment in Pascagoula has recovered from its initial post-Katrina low; however, the employment level in May 2006 was still slightly below the previous year's level. (See table 5.) Employment in natural resources, mining, and construction actually improved slightly in September 2005 and continued to be higher than the prior year in May 2006. The manufacturing supersector has replaced about half the jobs lost after the storm's initial impact, while employment in government has not recovered. After a loss in September 2005, employment in trade, transportation, and utilities rebounded, posting an over-the-year gain in May 2006.

New Orleans-Metairie-Kenner was the hardest hit MSA in terms of employment loss following Hurricane Katrina. By May 2006, total nonfarm payroll employment continued to be nearly one-third lower than it had been before the storm. (See table 6.) All supersectors in this MSA posted large over-the-year decreases in employment in September 2005, and employment in all supersectors continued to be below pre-storm levels in May 2006. A few industries—leisure and hospitality, and construction, in particular—have added jobs after the storm's initial impact, while employment in information and government has continued to decline.

Table 3. Employment and over-the-year changes in employment in Louisiana, by industry, not seasonally adjusted, September 2004–May 2006

(Numbers in thousands)

Industry	Employment level				Change in employment			
	September 2004	September 2005	May 2005	May 2006 ¹	September 2004–September 2005		May 2005–May 2006	
					Number	Percent	Number	Percent
Total nonfarm	1,913.3	1,728.7	1,952.4	1,774.8	-184.6	-9.6	-177.6	-9.1
Natural resources and mining	43.9	46.5	45.8	47.7	2.6	5.9	1.9	4.1
Construction	114.1	95.5	121.6	107.7	-18.6	-16.3	-13.9	-11.4
Manufacturing	154.3	144.6	154.7	144.0	-9.7	-6.3	-10.7	-6.9
Trade, transportation, and utilities ..	376.0	347.9	382.9	363.9	-28.1	-7.5	-19.0	-5.0
Information	31.1	30.5	29.3	27.5	-6	-1.9	-1.8	-6.1
Financial activities	100.1	92.2	99.0	94.5	-7.9	-7.9	-4.5	-4.5
Professional and business services	182.9	163.9	191.7	171.6	-19.0	-10.4	-20.1	-10.5
Education and health services	252.7	208.0	257.4	212.5	-44.7	-17.7	-44.9	-17.4
Leisure and hospitality	205.2	165.6	215.7	175.1	-39.6	-19.3	-40.6	-18.8
Other services	71.2	58.5	71.9	58.8	-12.7	-17.8	-13.1	-18.2
Government	383.0	377.8	382.4	371.5	-5.2	-1.4	-10.9	-2.9

¹ Preliminary data

Table 4. Employment and over-the-year changes in employment in Gulfport-Biloxi MSA, by industry, not seasonally adjusted, September 2004–May 2006

(Numbers in thousands)

Industry	Employment level				Change in employment			
	September 2004	September 2005	May 2005	May 2006 ¹	September 2004–September 2005		May 2005–May 2006	
					Number	Percent	Number	Percent
Total nonfarm	114.6	99.4	116.3	94.3	-15.2	-13.3	-22.0	-18.9
Natural resources, mining, and construction	5.2	5.7	5.7	6.1	.5	9.6	.4	7.0
Manufacturing	5.9	4.7	6.0	5.9	-1.2	-20.3	-.1	-1.7
Trade, transportation, and utilities	20.5	16.2	20.8	16.4	-4.3	-21	-4.4	-21.2
Leisure and hospitality	29.8	24.5	30.1	15.6	-5.3	-17.8	-14.5	-48.2
Government	24.7	23.6	24.8	23.7	-1.1	-4.5	-1.1	-4.4

¹ Preliminary data

NOTE: MSA=metropolitan statistical area

Table 5. Employment and over-the-year changes in employment in Pascagoula MSA, by industry, not seasonally adjusted, September 2004–May 2006

(Numbers in thousands)

Industry	Employment level				Change in employment			
	September 2004	September 2005	May 2005	May 2006 ¹	September 2004–September 2005		May 2005–May 2006	
					Number	Percent	Number	Percent
Total nonfarm	54.1	49.6	56.0	55.8	-4.5	-8.3	-0.2	-0.4
Natural resources, mining, and construction	2.1	2.9	2.5	2.9	.8	38.1	.4	16.0
Manufacturing	16.3	12.8	16.4	14.7	-3.5	-21.5	-1.7	-10.4
Trade, transportation, and utilities	8.2	7.5	8.5	9.1	-.7	-8.5	.6	7.1
Government	11.1	10.8	11.2	10.9	-.3	-2.7	-.3	-2.7

¹ Preliminary data

NOTE: MSA=metropolitan statistical area

Table 6. Employment and over-the-year changes in employment in New Orleans-Metairie-Kenner MSA, by industry, not seasonally adjusted, September 2004–May 2006

[Numbers in thousands]

Industry	Employment level				Change in employment			
					September 2004–September 2005		May 2005–May 2006	
	September 2004	September 2005	May 2005	May 2006 ¹	Number	Percent	Number	Percent
Total nonfarm	610.1	405.5	614.7	429.7	-204.6	-33.5	-185.0	-30.1
Natural resources and mining	38.1	21.6	38.4	29.8	-16.5	-43.3	-8.6	-22.4
Construction	29.8	12.7	30.0	19.5	-17.1	-57.4	-10.5	-35.0
Manufacturing	38.8	27.2	38.4	28.6	-11.6	-29.9	-9.8	-25.5
Trade, transportation, and utilities	121.1	83.0	123.5	90.2	-38.1	-31.5	-33.3	-27.0
Information	10.1	8.3	9.6	7.3	-1.8	-17.8	-2.3	-24.0
Financial activities	34.3	25.2	32.9	24.5	-9.1	-26.2	-8.4	-25.5
Professional and business services ..	71.0	43.7	75.6	45.3	-27.3	-38.5	-30.3	-40.1
Education and health services	84.3	41.5	81.7	45.7	-42.8	-50.8	-36.0	-44.1
Leisure and hospitality	84.2	46.5	87.4	57.8	-37.7	-44.8	-29.6	-33.9
Other services	22.4	8.5	22.6	9.8	-13.9	-62.1	-12.8	-56.6
Government	105.8	100.0	104.6	90.7	-5.8	-5.5	-13.9	-13.3

¹ Preliminary data

NOTE: MSA=metropolitan statistical area

Adapting QCEW following Katrina

Unlike the CES employment data, which come from a voluntary survey of employers, the QCEW employment and wage data come from mandatory Unemployment Insurance tax records. However, many of the same collection and methodology issues that CES experienced also affected QCEW.

The percentage of missing reports—that is, nonrespondents—in the QCEW in the heavily affected areas of Louisiana and Mississippi was greater than normal, especially in the New Orleans area. There, 27.4 percent of units had imputed employment for the third quarter of 2005, compared with 12.9 percent a year earlier. When a report is not received, QCEW allows for employment in that firm to be imputed for up to two consecutive quarters, unless the firm is confirmed to be out of business. Table 7 shows the imputation rates for the two quarters following Hurricane Katrina as compared with imputation rates a year earlier.

Nonresponse followup. Most employers in the heavily affected areas continued to report data to the Unemployment Insurance program for the third quarter of 2005. Employers were required to report employment and wages for July and August and explain any changes in September according to the normal time schedule.

The QCEW data collection and processing schedule includes time and resources to collect as much detailed data as possible before relying on imputations for nonrespondents. State and BLS staff made numerous attempts to contact virtually all nonrespondents. Doing so was difficult, particularly because mail and telephone service were curtailed or limited in many areas for several weeks, and some em-

ployers did not receive quarterly collection forms.

Traditional and nontraditional information sources were used to follow up with nonrespondents to determine whether they were still open for business and employing workers. Traditional sources included employers, whom staff contacted and visited personally. Nontraditional sources included the following:

- The United States Postal Service, to identify five-digit zip codes with no or limited mail access in which collection forms were not mailed in a timely manner or could not be mailed at all
- Telephone companies, to identify areas with limited, sporadic, or no service
- State and city Web sites, such as the site for the city of New Orleans, which posted reports on business, school, and road openings and closings and on disruptions to services such as sewer, gas, electric, trash, and fire prevention. This information not only identified when schools, hospitals, and other critical businesses were reopened, but also identified areas where lack of access to services made it unlikely that normal businesses could function.
- News media
- Professional and business organizations
- Unions
- Universities and other organizations that did special surveys
- Local field offices of State agencies

The State partners in Louisiana and Mississippi made hundreds of phone calls and some personal visits to obtain

Table 7. Response and imputation rates for QCEW business establishments in Louisiana and Mississippi, third and fourth quarters 2004 and 2005

[Rates in percent]

Area	Third quarter 2004	Fourth quarter 2004	Third quarter 2005	Fourth quarter 2005
Louisiana				
Responded	88.9	90.7	83.5	84.2
Imputed	11.1	9.3	16.5	15.8
Katrina-affected areas:				
Responded	87.1	88.8	72.6	74.2
Imputed	12.9	11.2	27.4	25.8
Standard methods	12.9	11.2	15.1	15.6
Hand-adjusted	0	.1	.7	1.9
Special system-adjusted	0	0	11.6	8.3
Mississippi				
Responded	93.3	93.4	93.7	92.2
Imputed	6.7	6.6	6.3	7.8
Katrina-affected areas:				
Responded	92.9	93.2	90.8	89.8
Imputed	7.1	6.8	9.2	10.3
Standard methods	6.8	6.3	4.9	3.1
Hand-adjusted3	.5	.9	1.1
Special system-adjusted	0	0	3.4	6.1

detailed information from employers who did not initially respond or gave unexpected responses. This information helped determine whether the business was operating, whether it was operating at full strength or partial capacity or rebuilding, and whether it had relocated in the State.

All detailed data on monthly employment or quarterly wages that were obtained directly from the employer were treated as reported data. When other useful information was available to modify a computer-generated imputation or to replace missing or imputed data, it was collected, and changes based on it were identified as hand-entered imputations. This enabled BLS to distinguish reported data, standard and special system-imputed data, and manually modified data based on reliable information.

Standard imputation methodology. For most businesses that do not report employment or total wages, missing data are imputed by assigning over-the-month and over-the-quarter percentage changes for the current time period identical to the changes for the same months 1 year ago.

For example, if Company X's September 2005 employment was not reported, it was derived by obtaining the ratio of employment for September 2004 (if the business were operating a year ago) to employment for August 2004 and multiplying that ratio by the August 2005 employment level. Using a numerical example, if September 2004 = 110, August 2004 = 100, and August 2005 = 130, September 2005 would be imputed as $(110 \div 100) \times 130 = 1.1 \times 130 = 143$.

If the business was not in business a year ago or there is insufficient data to use the standard methodology, other methods are used.

In cases of multiestablishment accounts, the aggregate totals are prorated, or distributed, among the individual worksites based on the prior quarter's third-month distribution.

The standard methodology, which relies heavily on historical trends, would have been inappropriate in the post-Katrina environment, likely overstating both employment and total wages. Without confirmation of whether a business was actually operating in September 2005, wages would have been imputed at levels associated with 3 months of employment, including wages assumed to have been earned in September. Employment growth or decline for July through September would be imputed so as to be comparable with second quarter employment adjusted to reflect third-quarter 2004 employment trends.

BLS and its partners in the Mississippi and Louisiana State Workforce Agencies therefore agreed on modified imputation procedures. Imputed employment and wage totals generated from these procedures were edited and screened by QCEW systems using standardized quality control procedures, and large-firm imputations were manually reviewed by State and BLS analysts. Where possible, employers were contacted to verify levels or to obtain improved information.

For the most affected areas in Mississippi and Louisiana, the following adjustments were made to the methodology:

- Wages were adjusted to only two-thirds of what would normally have been imputed for the period.
- July and August were imputed using standard methodology; September employment was set to zero.
- For multiestablishment accounts, September

employment for the worksites located in the heavily affected areas was set to zero, and wages were reduced to two-thirds their normal levels; the remaining employment and wages were distributed to the remaining worksites.

Fourth-quarter 2005 adjustments. While fourth-quarter collection reports were due to the States by the end of January 2006, the actual data were not due to BLS until the end of April 2006. From February to early April, reported data were analyzed periodically to determine if patterns in reported data differed by location and might warrant additional changes to nonstandard imputation procedures. Preliminary data from the 74-percent response in Louisiana and almost 90-percent response in Mississippi were examined in each of the major damage areas to determine if areas had response rates below normal or demonstrated unusual employment change patterns. Using information on the extent of response, the types of response (for example, steady employment reported, zeros reported, or very volatile employment reported), the direction of the response (continued to be zero, employment decreased, employment increased), and previously provided employer plans and information, BLS made some additional modifications to the imputation procedures.

Employment totals for all 3 months (October, November, and December) for nonrespondents in Orleans, St. Bernard, and Plaquemines parishes—areas that continue to experience response problems—were set to zero. Total quarterly wages were also set to zero.

Records with missing employment in Jefferson and St. Tammany, Louisiana, and in all three affected counties in Mississippi— areas that are beginning to show more normal response—were imputed by using the trends of responding units in their industry that were of roughly the same size. For example, if all responding units in Industry X of size class Y reported total employment of 3,000 in September 2005 and 3,200 in December 2005, and a nonrespondent in Industry X of size class Y had September employment of 100, the October value for the nonrespondent would be imputed as $(3,200 \div 3,000) \times 100 = 1.067 \times 100 = 107$ employees.

The main reason for choosing this imputation method was to eliminate the potential bias from using the standard year-ago-trend method, which was unlikely to be accurate for this unusual event.

For other areas in Louisiana and Mississippi, employment and wages for nonrespondents were imputed using standard methods.

All imputations were reviewed through computer-generated editing and screening, and those with an employment level of more than 25 were also manually reviewed. When available, additional employer information was used to update or adjust these imputations.

QCEW measures of economic impact

The first published QCEW data to reflect post-hurricane conditions was for the third quarter of 2005 (July through September) and was published by BLS in April 2006. It reflected less employment loss than that measured by the CES sample-based estimates.

Mobile. Compared with that in neighboring counties, damage to Mobile was moderate, having little overall impact on the labor market. Only 76 establishments in Mobile were located in the FEMA-designated damage zone. Before the hurricane struck, Mobile was experiencing steady employment growth. In August 2005, employment had grown 3.1 percent over the year. Hurricane Katrina did not interrupt this employment growth. In fact, Mobile experienced a slightly higher over-the-year growth rate (3.5 percent) in September, which exceeded the 2.0 percent national growth rate by 75 percent. Mobile experienced some storm-related job growth in the fourth quarter. Employment growth occurred in the insurance and specialty trade contractors industries. Twelve-month changes in employment in Mobile, shown as percentages, are shown below for the third and fourth quarters of 2005:

	<i>Percent change</i>		<i>Percent change</i>
Third quarter:		Fourth quarter:	
July	2.4	October	4.1
August	3.1	November	3.6
September	3.5	December	3.4

Heavily affected areas. The macroeconomic effects of this disaster were evident almost immediately in local job markets in the third quarter of 2005. Substantial employment declines were recorded in the combined affected area for the month of September. The QCEW also registered a significant storm-related impact on third-quarter wages: the average weekly wages of workers climbed in the third quarter of 2005 in the hardest hit areas, primarily due to the elimination of many thousands of relatively low-paying jobs.

Overall, 158,346 jobs were eliminated in the combined heavily affected area between August and September 2005. Some of this loss, however, is the result of seasonal variation. QCEW employment change is generally reported on an over-the-year basis to remove large seasonal movements. For heavily affected areas, year-to-year job losses as of September 2005 totaled 151,195. The number of job losses would have been greater, but some employers continued to pay their employees in September despite the fact that the employees could not work. Because these employees remained on the payroll, they were included in the September employment count. September job losses were distributed as follows:

	<i>Number</i>	<i>Percent</i>
Louisiana parishes (7).....	-134,718	-22.9
Mississippi counties (4).....	-16,477	-10.7
Combined area (11).....	-151,195	-20.3

In July and August, before the hurricane, the 11 areas combined experienced modest over-the-year employment growth, 0.4 percent and 0.6 percent, respectively. The rate plummeted to -20.3 percent in September for the combined area. The sharpest drop occurred in the combined Louisiana parishes.

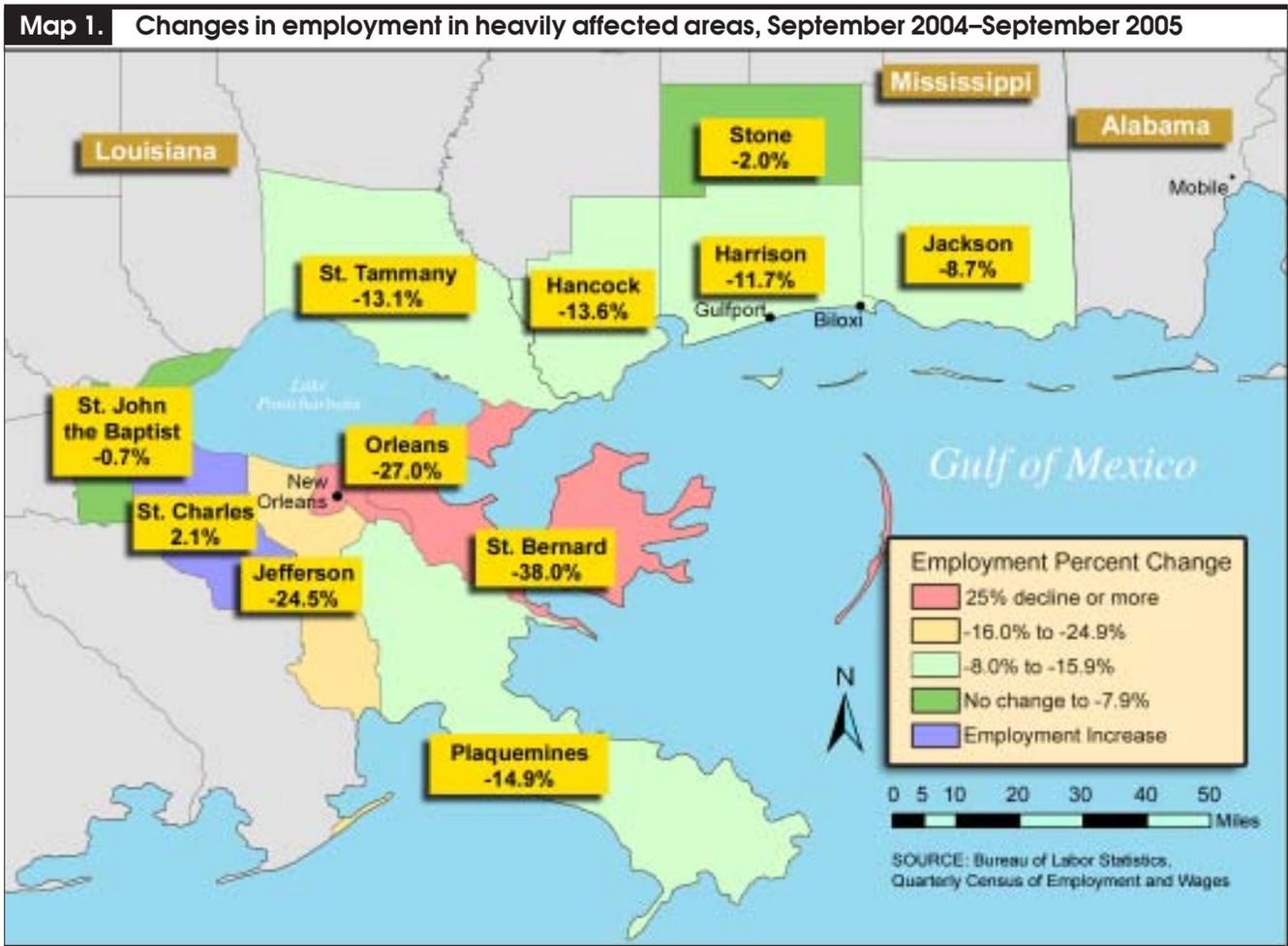
Ten of the 11 areas posted over-the-year employment declines in September. St. Charles, a relatively small parish west of New Orleans, was the only exception, adding 479 jobs (2.1 percent) during this period. (See map 1.)

Nearly 90 percent of the overall September employment decline occurred in the Louisiana parishes—134,718 jobs; 5 of the 7 parishes experienced more than a 10-percent decrease in employment over the year. All four of the Mississippi

counties registered job losses in September, and the percentage decline over the year reached above 10 percent in two of these counties. Overall, job losses in these affected Mississippi counties totaled 16,477 over the year.

Orleans Parish suffered the largest over-the-year employment loss in September among the 11 affected areas. Approximately 65,800 jobs disappeared almost immediately, representing a 27-percent reduction in the number of payroll jobs. The employment situation in Jefferson Parish was similar: job losses reached 51,713 or 24.5 percent of total employment during this period. More than 10,000 jobs were eliminated in nearby Harrison County, which saw an 11.7-percent reduction in its workforce, and in St. Tammany Parish 8,714 jobs were lost, leading to a 13.1-percent employment decline in September.

From September 2004 to September 2005, St. Bernard Parish lost the greatest share of its workforce, 38 percent, a decline of 6,614 jobs. Plaquemines, also a small parish, saw a 14.9-percent reduction in its workforce, as 2,248 jobs disappeared. Among



the affected Mississippi counties, Hancock, 40 miles east of New Orleans, had the largest percentage decline in employment, 13.6 percent, with an over-the-year loss of 1,814 jobs.

QCEW measures of industry impact

Employment losses in the affected areas occurred in every major industry group in September, reflecting the widespread destruction caused by the storm. Nearly half of the job loss occurred in leisure and hospitality (37,461) and in trade, transportation, and utilities (34,899). (See table 8.) These industry supersectors are integral parts of tourism, which has been a driving force in many of the local economies in this region. Job losses in leisure and hospitality represent 25.6 percent of all the jobs in private industry that disappeared in September, and these losses are concentrated in three areas: Orleans Parish, Jefferson Parish, and Harrison County.

Leisure and hospitality employment fell 32.3 percent over the year in September 2005. This loss was especially severe in Orleans Parish, where, before the storm, the concentration of workers in leisure and hospitality (22 percent in 2004) was twice that for the Nation as a whole. The parish, which encompasses the city of New Orleans, took the biggest hit in this industry of all 11 heavily affected areas, losing 17,030 jobs, representing 39.7 percent of its workforce. Jefferson Parish, adjacent to Orleans, experienced the loss of a comparable share of its workforce, 37.7 percent, or 9,869 jobs. In Harrison County, jobs in leisure and hospitality fell by 5,396 (20.3 percent). Significant industry losses also occurred in St. Tammany (2,643 jobs, 30.3 percent of the workforce) and St. Bernard (1,222 jobs, 60.4 percent of the workforce). The leisure and hospitality industry in the affected Louisiana parishes fell 38 percent over the year in September (31,281 jobs), while the Katrina-affected counties in Mississippi lost about 19 percent of their workers in this industry (6,180 jobs).

Job losses in the trade, transportation, and utilities sector (34,899) were nearly as high as in leisure and hospitality, but the percentage of employment loss was not quite as high (24 percent). Almost 90 percent of losses in trade, transportation, and utilities occurred in the Louisiana parishes (30,739 jobs). The magnitude of job losses was greatest in retail trade, where more than 25,200 jobs were eliminated, representing about 70 percent of employment decreases in this sector. Jefferson and Orleans parishes had the largest reduction of retail jobs, 9,600 and 9,100, respectively. Food and beverage stores accounted for nearly 36 percent of the loss of retail jobs. Approximately 9,000 jobs in these stores were destroyed, representing an over-the-year reduction of about 60 percent. Orleans Parish posted the greatest loss, with almost 80 percent of workers in these stores no longer employed (3,814). Jefferson Parish had the next largest employment decline in food and beverage stores, 2,945 jobs, representing a loss of 58 percent of its workforce. Gasoline

Table 8. Employment change in private industry in heavily affected areas, September 2004–September 2005, by industry

Industry	Number	Percent	Percent of total private industry job loss
Leisure and hospitality	-37,461	-32.3	25.6
Trade, transportation, and utilities	-34,899	-24.0	23.9
Education and health services	-20,538	-24.3	14.0
Professional and business services	-16,242	-19.5	11.1
Manufacturing	-13,350	-21.9	9.1
Other services ¹	-8,096	-40.0	5.5
Construction	-7,350	-20.0	5.0
Financial activities	-7,307	-18.7	5.0
Information ¹	-761	-6.4	.5
Natural resources and mining	-195	-2.2	.1
Unclassified	76	11.9	-1
Total private industry	-146,267	-24.1	100.0

¹ Changes were based on data that exclude information for Plaquemines Parish, as some of the data for that area were found not to be disclosable. Corresponding data for other industries, and the all-industry totals, include

stations also suffered significant losses—a 52-percent drop in workforce and a loss of 2,748 jobs—as did motor vehicle and parts dealers, whose workforce dropped by 25.4 percent or 2,497 jobs. Clothing stores lost approximately 27 percent of their workforce, or about 2,300 jobs. Employment in wholesale trade was reduced by 4,574 jobs or 16 percent of the workforce over the year in September, following a pre-hurricane job loss of 0.2 percent over the year in August.

Transportation and warehousing activities were severely disrupted in the affected areas following the hurricane, leading to a 17.6-percent over-the-year employment decline in September. Approximately 4,700 jobs were destroyed, with the greatest share of the loss occurring in two industries: Support activities for transportation, which dropped nearly 2,300 jobs, and truck transportation, which lost 1,013 jobs. Both of these industries saw over-the-year declines exceeding 20 percent. Most of the jobs eliminated in these two industries were in Orleans Parish, which lost more than 1,630 workers.

QCEW measures of third-quarter wages

There was a notable effect on average wages resulting from the immense damage inflicted on gulf coast businesses. At a time when there was so much job loss, the average weekly wages of workers in the heavily affected areas spiked upward because there was a disproportionate loss in employment and pay in low-paying industries.

In the third quarter of 2005, the U.S. average weekly wage grew by 6.1 percent. During the same period, 9 of the 11 heavily affected areas saw relatively higher average pay gains, 30 percent or more above the national growth rate. The

Table 9. Average monthly employment, total quarterly wages, and average weekly wages in heavily affected areas, third quarter 2004–third quarter 2005

Heavily affected area	Changes in average monthly employment		Changes in total quarterly wages		Average weekly wages	
	Number	Percent	Amount	Percent	Amount, third quarter 2005	Over-the-year percent change
Louisiana parishes	-44,754	-7.6	\$59,474,212	1.2	\$701	9.5
Jefferson	-16,526	-7.8	-6,450,720	-.4	660	8.0
Orleans	-24,548	-10.0	-18,993,898	-.9	746	10.2
Plaquemines	-655	-4.3	6,419,698	4.3	836	9.0
St. Bernard	-2,126	-12.2	1,942,609	1.6	620	15.9
St. Charles	362	1.6	23,259,563	9.9	883	8.1
St. John the Baptist	7	.1	12,979,444	12.8	678	12.8
St. Tammany	-1,268	-1.9	40,317,516	8.7	601	10.7
Mississippi counties	-3,154	-2.0	79,543,880	7.0	622	9.2
Hancock	-121	-.9	14,204,055	12.4	745	13.4
Harrison	-3,056	-3.4	53,833,666	8.8	586	12.5
Jackson	-97	-.2	10,088,275	2.6	664	2.8
Stone	120	3.2	1,417,884	6.1	486	3.0
Combined affected area ¹	-47,908	-6.4	139,018,092	2.3	684	9.4

¹ Using rounded data

average weekly wages of workers in the combined affected Louisiana parishes increased sharply—by 9.5 percent—in the third quarter of 2005, and the average weekly wages of workers in the combined affected Mississippi counties advanced by 9.2 percent. (See table 9.) Among the three largest areas, Harrison County posted the strongest over-the-year growth in average weekly wages (12.5 percent), followed by Orleans Parish (10.2 percent) and Jefferson Parish (8.0 percent).

In contrast, total quarterly wages grew in Harrison County by 8.8 percent (\$53.8 million), while average monthly employment dropped by 3.4 percent in the third quarter. Most of the growth in total wages was in the private sector (\$37 million): Leisure and hospitality and construction wages grew by \$9.4 million each, and professional and business services gained by \$8.3 million.

In Orleans Parish, which of the three largest areas had the largest drop in average monthly employment, almost half of the employment decreases occurred in three industries that were paying workers average weekly wages below \$677, the previous year's average for the parish. (See table 10.) Average weekly wages of workers in leisure and hospitality in Orleans Parish rose 10.5 percent in the third quarter, as the average number of these jobs dropped 12.5 percent. In Jefferson Parish, over 60 percent of the jobs eliminated over the year were in industries with average weekly wages below \$611, the previous year's average for the parish. The average weekly wages of workers employed in leisure and hospitality in Jefferson climbed by nearly 21 percent over the year in the third quarter.

QCEW measures of fourth-quarter job recovery

In the aftermath of this disaster, the local business communities struggled to deal with the destruction of their

establishments, a large number of displaced workers, and critical infrastructure deficiencies. In some industries work stoppages were short lived, while in other industries operations ceased, and employment losses continued to climb. In the fourth quarter of 2005, employment in some of the heavily affected areas showed signs of improvement. (See table 11.) Although 8 of the 11 counties registered over-the-year employment declines in December, the number of job losses in some of these areas was less than in the preceding months, evidence of some recovery.

Eighty-five percent of the job loss in the entire reference area was concentrated in the three largest areas—Jefferson Parish, Orleans Parish, and Harrison County—where the combined workforce dropped by 128,040 jobs or 23.5 percent over the year in September. Chart 1 shows monthly employment for these three large areas from January 2004 to December 2005.

In heavily affected Louisiana parishes, the net over-the-year job loss of 150,945 in December was 12 percent greater than the September loss of 134,718. (See table 12.) While Jefferson Parish did show significant job recovery, as did St. Tammany, Orleans Parish's employment levels continued to plummet, down by more than 98,000 over the year in December. From September to December, over 32,000 more jobs were eliminated in Orleans, and the workforce reduction amounted to 39.7 percent over the year in December, compared with a 27-percent decline as of September. Although the net job loss in Orleans was higher in December than in September, there was some good news: job losses over the year peaked at 105,298 in November, and fewer jobs (98,283) were eliminated in the following month, indicating some recovery might be taking place. Over-the-year employment losses in the combined Louisiana parishes

Table 10. Average monthly employment, total quarterly wages, and average weekly wages in Harrison County, Mississippi, and Orleans and Jefferson parishes, Louisiana, by industry, third quarter 2004–third quarter 2005

Area	Over-the-year change						Level	
	Average monthly employment		Total quarterly wages		Average weekly wages		Average weekly wages	
	Number	Percent	Amount	Percent	Amount	Percent	Third quarter 2004	Third quarter 2005
Harrison County:								
All Industries	-3,056	-3.4	\$53,833,666	8.8	\$65	12.5	\$521	\$586
Leisure and hospitality	-2,416	-9.0	9,449,032	7.2	67	18.0	372	439
Trade, transportation, and utilities ...	-909	-5.5	5,661,456	5.5	56	11.6	482	538
Manufacturing	-543	-12.7	264,145	.7	102	15.4	664	766
Orleans Parish:								
All industries	-24,548	-10.0	-18,993,898	-9	69	10.2	677	746
Leisure and hospitality	-5,339	-12.5	-6,294,337	-3.2	37	10.5	352	389
Trade, transportation, and utilities ...	-4,193	-11.6	-10,329,773	-3.5	58	9.1	635	693
Other services	-1,239	-16.7	-4,483,178	-11.0	30	7.1	424	454
Jefferson Parish:								
All industries	-16,526	-7.8	-6,450,720	-4	49	8.0	611	660
Trade, transportation, and utilities ...	-4,676	-8.8	-11,298,998	-2.7	39	6.5	597	636
Leisure and hospitality	-2,956	-11.1	7,650,990	7.1	64	20.5	312	376
Professional and business services	-2,084	-7.4	2,149,176	1.0	55	9.1	603	658

peaked a month earlier, with 173,197 jobs eliminated largely because of substantial increases that month in the number of jobs destroyed in Orleans and St. Bernard. The overall employment situation in the Louisiana parishes began to improve in November in three parishes: Jefferson, St. Tammany, and Plaquemines. Recovery was evident as early as October in St. Tammany and Plaquemines, and by November in Jefferson. Fewer job losses in these parishes helped reduce the overall job losses in the affected Louisiana parishes in November (165,484) and December (150,945).

Over-the-year job losses in the combined Mississippi counties were higher in December than in any of the previous 3 months. Net job losses in December exceeded 20,000 and were 25 percent higher than they had been in September. Jackson rebounded quickly from the 8.7 percent September losses, and by December experienced 1.8 percent over-the-year job growth (858 jobs). Stone County posted the highest employment growth in December, 8.1 percent, albeit with modest job gains (317). In contrast and offsetting this gain were deeper employment losses in Hancock and Harrison Counties. In Harrison County, employment fell by 17,969 over the year in December, which exceeded the year-to-year September losses by approximately 7,500. The nearly 3,600 jobs that were eliminated in Hancock in December were about double the September job losses.

QCEW measures of fourth-quarter wages

Increases in average weekly wages in the affected counties were more pronounced in the fourth quarter than in the third

quarter primarily because fourth quarter employment losses were far greater. The over-the-year increase in the average weekly wage of workers in the combined affected area was 18 percent, almost twice the 9.4-percent increase in the prior quarter. (See chart 2.) The average weekly wage went from \$696 in December 2004 to \$821 in December 2005 in the heavily affected areas.

Employment losses occurred in only 1 month of the third quarter because of the timing of the storm. Nevertheless, as discussed above, the very large September employment losses resulted in large declines in third-quarter average monthly employment in many areas, contributing to large increases in the average weekly wages. In the fourth quarter,

Table 11. Percent changes in employment in heavily affected areas, September 2004–September 2005 and December 2004–December 2005

Heavily affected area	September 2004–September 2005	December 2004–December 2005
Louisiana parishes		
Jefferson	-24.5	-16.6
Orleans	-27.0	-39.7
Plaquemines	-14.9	-7.6
St. Bernard	-38.0	-65.2
St. Charles	2.1	-3.7
St. John the Baptist	-7	3.3
St. Tammany	-13.1	-5.8
Mississippi counties		
Hancock	-13.6	-26.4
Harrison	-11.7	-19.9
Jackson	-8.7	1.8
Stone	-2.0	8.1

Chart 1. Monthly employment in Jefferson Parish, Louisiana; Orleans Parish, Louisiana; and Harrison County, Mississippi, January 2004–December 2005

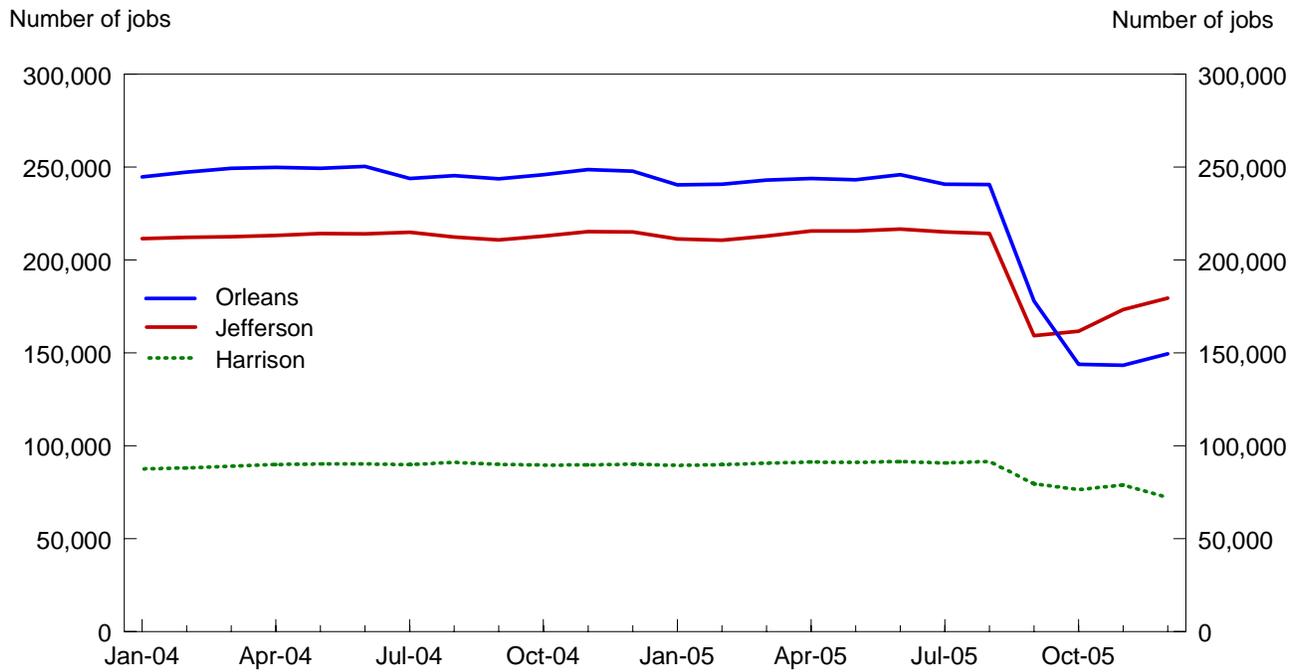


Table 12. Over-the-year change in total employment in heavily affected areas, third and fourth quarters 2005, by month

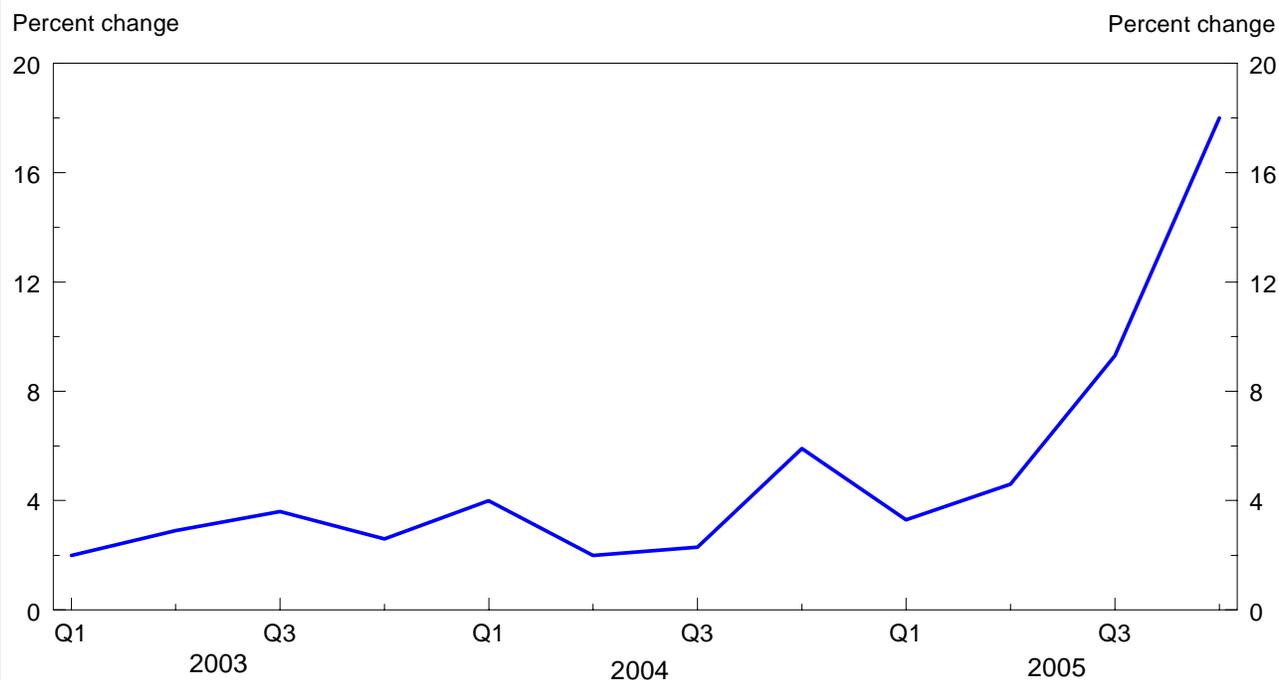
Heavily affected area	August 2005	September 2005	October 2005	November 2005	December 2005	Difference in over-the-year change: August to December	Difference in over-the-year change: September to December
Louisiana parishes	460	-134,718	-173,197	-165,484	-150,945	-151,405	-16,227
Jefferson	1,945	-51,713	-51,250	-41,957	-35,619	-37,564	16,094
Orleans	-4,733	-65,824	-102,234	-105,298	-98,283	-93,550	-32,459
Plaquemines	219	-2,248	-1,661	-1,399	-1,167	-1,386	1,081
St. Bernard	155	-6,614	-11,409	-11,694	-11,498	-11,653	-4,884
St. Charles	293	479	241	-569	-849	-1,142	-1,328
St. John the Baptist	21	-84	103	475	429	408	513
St. Tammany	2,560	-8,714	-6,987	-5,042	-3,958	-6,518	4,756
Mississippi counties ...	3,712	-16,477	-16,940	-13,057	-20,392	-24,104	-3,915
Hancock	749	-1,814	-2,922	-2,648	-3,598	-4,347	-1,784
Harrison	524	-10,503	-13,191	-10,881	-17,969	-18,493	-7,466
Jackson	2,221	-4,085	-1,007	191	858	-1,363	4,943
Stone	218	-75	180	281	317	99	392
Combined affected area	4,172	-151,195	-190,137	-178,541	-171,337	-175,509	-20,142

significantly larger declines in average monthly employment were observed in several counties. Average weekly wage growth rates in all 11 areas exceeded the 1.5-percent national growth rate in the fourth quarter, with gains ranging between 3 and 39 times the national average.

In the third quarter, 5 of the 11 heavily affected areas—Orleans, Jefferson, Harrison, St. Bernard, and St. Tammany—

had average monthly employment losses that exceeded 1,000. (See table 13.) Orleans experienced the greatest average monthly employment loss, 24,548 jobs. Average weekly wages in these five areas grew by between 8 and 15.9 percent over the year in the third quarter. St. Bernard Parish had the highest wage growth in the third quarter, 15.9 percent. This parish also had the largest percentage drop in its workforce: 12.2 percent.

Chart 2. Over-the-year percent changes in average weekly wages in heavily affected areas, first quarter 2003–fourth quarter 2005



QCEW data on establishments

Another way to examine the hurricane's effects is by reviewing the number of businesses operating in the storm-damaged areas before and after Katrina. QCEW data show that the number of business establishments operating in the heavily affected reference area in 2004 totaled 44,091—36,149 establishments in Louisiana and 7,942 in Mississippi. (See table 14.) Based on FEMA-designated damage areas, BLS was able to determine the number of QCEW establishments in the damage zones by damage category.

Of all establishments in the seven heavily affected Louisiana parishes, 46.5 percent were in the FEMA-designated flooding and storm damage areas. These 16,793 establishments posted an over-the-year loss of 112,621 jobs in December 2005, accounting for more than 99 percent of all establishments in designated damage areas of Louisiana and almost all of their December employment loss. More than 75 percent of the business establishments in FEMA-designated damage areas in Louisiana and Mississippi were in Orleans and Jefferson parishes. Not surprisingly, Orleans and Jefferson had substantial percentages of their businesses located in the damage areas, 65.2 percent and 48.6 percent, respectively, but it was St. Bernard Parish that had the largest percentage of its establishments in the damage zones—83.1 percent.

Reconciling CES and QCEW results

As noted, the CES program benchmarks its sample-based employment estimates to the QCEW employment counts. Although both programs experienced collection difficulties following Katrina, CES and QCEW post-Katrina employment trends will eventually be reconciled through the benchmarking process. However, the relatively low response rates in both programs and use of special imputation procedures in CES confound the normally straightforward process and interpretation of the CES benchmark revisions.

Publication of the next CES benchmark revision for State and area series is scheduled for March 2007; that revision will incorporate QCEW data through the third quarter of 2006. At that point both programs will have completed nonresponse followup and analysis of the effects of special procedures, and the picture of Katrina job loss and recovery will be more complete and more consistent between the two programs.

Future disaster response procedures

Both the CES and the QCEW programs made extraordinary efforts to continue their normal data collection and publication schedules immediately after Hurricane Katrina. Both programs made adjustments to their normal estimation

Table 13. Average monthly employment and average weekly wages in heavily affected areas, third and fourth quarters, 2004-05

Heavily affected area	Third quarter 2005				Fourth quarter 2005			
	Over-the-year change in average monthly employment		Average weekly wages		Over-the-year change in average monthly employment		Average weekly wages	
	Number	Percent	Amount	Over-the-year percent change	Number	Percent	Amount	Over-the-year percent change
Louisiana parishes:								
Jefferson	-16,526	-7.8	\$660	8.0	-42,942	-20.0	\$812	17.5
Orleans	-24,548	-10.0	746	10.2	-101,938	-41.2	968	27.7
Plaquemines	-655	-4.3	836	9.0	-1,409	-9.2	928	11.0
St. Bernard	-2,126	-12.2	620	15.9	-11,534	-65.8	934	58.6
St. Charles	362	1.6	883	8.1	-392	-1.7	948	5.2
St. John The Baptist ...	7	.1	678	12.8	336	2.6	741	10.4
St. Tammany	-1,268	-1.9	601	10.7	-5,329	-7.9	680	12.8
Mississippi counties:								
Hancock	-121	-.9	745	13.4	-3,056	-22.4	912	26.7
Harrison	-3,056	-3.4	586	12.5	-14,014	-15.6	680	18.9
Jackson	-97	-.2	664	2.8	14	0	731	9.9
Stone	120	3.2	486	3.0	259	6.6	542	5.0
Combined affected area ¹	-47,908	-6.4	684	9.4	-180,005	-23.9	821	18.0

¹ Using rounded data

Table 14. Employment in FEMA-designated damage areas and employment change in those establishments, December 2004-December 2005

State/area	Total establishments (annual average 2004)	Establishments in damage areas (flooded and storm) December 2004		Establishments in flooded damage areas, December 2004		Establishments in storm damage areas, December 2004		Employment change, December 2004-December 2005
		Number	Percent	Number	Percent	Number	Percent	
Louisiana								
All FEMA damage areas	104,668	16,920	16.2	16,101	15.4	819	0.8	-113,106
Heavily affected parishes	36,149	16,793	46.5	16,008	44.3	785	2.2	-112,621
Jefferson	13,910	6,766	48.6	6,536	47.0	230	1.7	-26,204
Orleans	12,496	8,150	65.2	8,053	64.4	97	.8	-73,776
Plaquemines	851	241	28.3	165	19.4	76	8.9	-1,061
St. Bernard	1,268	1,054	83.1	1,049	82.7	5	.4	-10,265
St. Charles	1,034	135	13.1	131	12.7	4	.4	-202
St. John the Baptist	775	0	0	0	0	0	0	226
St. Tammany	5,815	447	7.7	74	1.3	373	6.4	-1,339
Mississippi								
All FEMA damage areas	23,642	2,678	11.3	57	.2	2,621	11.1	-20,551
Heavily affected counties	7,942	2,663	33.5	57	.7	2,606	32.8	-20,593
Hancock	823	555	67.4	52	6.3	503	61.1	-3,502
Harrison	4,537	1,609	35.5	2	0	1,607	35.4	-16,836
Jackson	2,299	498	21.7	3	.1	495	21.5	-257
Stone	283	1	.4	0	0	1	.4	2

and imputation procedures to reflect the extraordinary situation that existed, but, owing to the relatively high levels of nonresponse in both programs, some uncertainty remains regarding the employment trends measured. BLS continues

to review its disaster preparedness and the results of the special procedures developed in response to Katrina. In the event of another major disaster, many of the same special procedures will likely be followed. □

Notes

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¹ *The Federal Response to Hurricane Katrina: Lessons Learned*, Washington, The White House, February 2006.

² The term “jobs” refers to the number of workers counted as employed for the pay period that includes the 12th of the month. “Workforce” refers to the count of all workers employed in a defined geographic area.

³ Estimates are not seasonally adjusted. For further information on CES State and metropolitan area estimates for September 2005, see www.bls.gov/sae/home.htm#data.

⁴ For more information on CES employment estimate revisions, see www.bls.gov/sae/790faq2.htm#1q12.