6.0 EXISTING TRANSPORTATION SYSTEM

Planning for the future transportation system begins with an evaluation of existing facilities and services. This chapter identifies the conditions and characteristics of the existing transportation system, including roadways and bridges, bicycle and pedestrian facilities, public transit, freight transportation, aviation safety and security.

6.1 ROADWAYS AND BRIDGES

Major Roadways

The region's roadways and bridges are used by almost everyone: Drivers and passengers in (or on) personal motor vehicles, public and private transportation providers, local and long-distance freight movers and bicyclists. The importance of a region's roadways and bridges can hardly be overestimated.

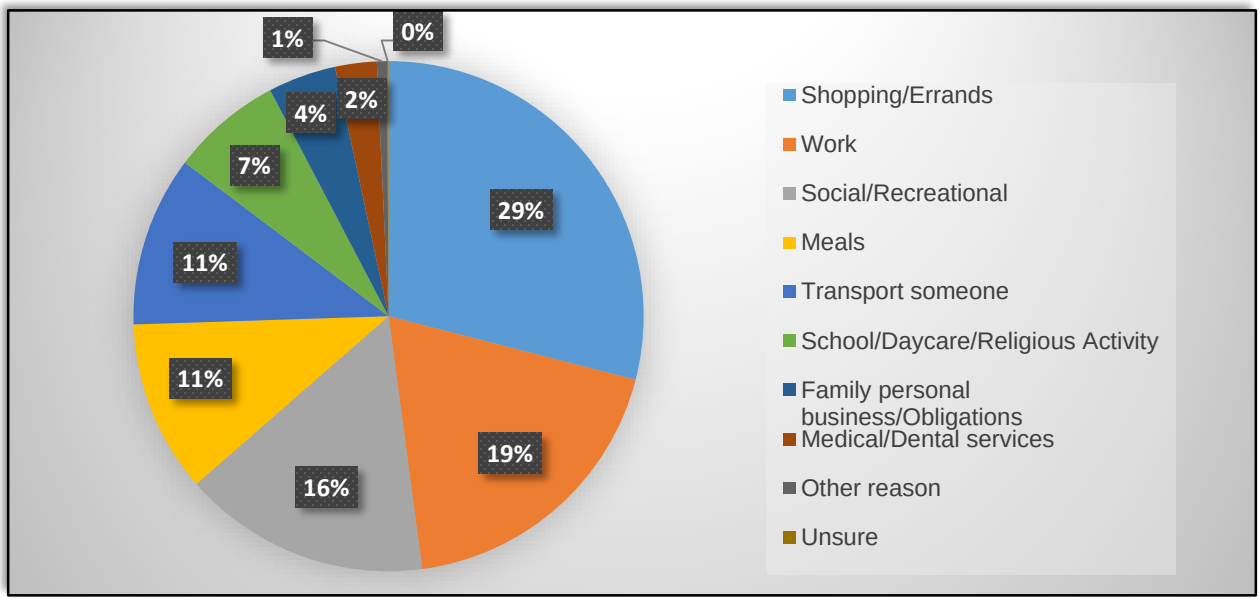
Travel by motor vehicle is the primary means of transportation. According to the 2009 National Household Travel Survey (NHTS), approximately 83.4 percent of all person-trips were made in a private vehicle. While that represented an overwhelming majority of all person-trips, the personal-vehicle share of total travel was down from an NHTS estimated high of 89.3 percent in 1995. While transit was up slightly—from 1.8 percent in 1995 to 1.9 percent in 2009--the combined shares of the *walk* and *other* categories increased significantly, from 8.6 to 14.6 percent, during the same period. Nevertheless, the condition of roadways and bridges in the metropolitan area remains the most important factor affecting travel in the region.

While long-range planning typically focuses on the work trip, because of its central role in creating peak-period traffic congestion, work-related trips actually account for only about 19 percent of all household travel made by personal motor vehicle (see Figure 6-1). The NHTS data indicated shopping and running errands accounted for 29 percent of all household trips, the largest share registered for any trip purpose. The majority of trips--about 52 percent of the total--were distributed among seven other survey responses (including *unsure*). More than half of these (27 percent) were related to either social or recreational activities or eating out.

The functional classification of roadways adopted by the Mississippi Department of Transportation (MDOT) recognizes six urban and six rural classes:

Urban	Rural
Interstate	Interstate
Expressway	—
Principal Arterial	Principal Arterial
Minor Arterial	Minor Arterial
Collector	Major Collector
--	Minor Collector
Local	Local

Figure 6-1: Distribution of Household Travel by Trip Purpose



Note: Personal motor vehicles include the following: Car, Van, SUV, Pickup Truck and Motorcycle.
Source: 2009 National Household Travel Survey.

Each type of roadway serves a distinct function in the overall roadway network. Roadways are divided into functional classes based on their intended balance of mobility (speed) and access to adjacent land. Their designs vary in accordance with this division of functionality.

Freeways are divided highways, such as interstates, with full control of access and grade separation at all intersections. The controlled-access character of freeways results in high vehicular lane capacities--typically three times greater than the individual lane capacities of urban arterial streets.

Expressways provide for the movement of large volumes of traffic at relatively high speed and are primarily intended to serve long trips. Expressways have some grade-separated intersections while the majority of the intersections are widely spaced and signalized.

Arterials are important components of the overall transportation system. They serve both as feeders to freeways and expressways and as principal travel ways between major land use concentrations within the study area. Arterials are typically divided facilities (but may be undivided where right-of-way limitations exist) that carry relatively high traffic volumes. Intersections with other major streets are generally signalized. The primary function of arterials is to move traffic; they are the main means of local travel. A secondary function of arterials is to provide access to land, especially where intensive development has already taken place or is likely to occur.

Collectors provide both access and mobility, serving as intermediate feeders between arterials and local streets, but primarily accommodating short-distance trips. Since collector streets are not intended to accommodate long through trips, they are generally not continuous for any great distance.

Local Streets have the sole function of providing access to immediately adjacent land. Within the local street classification, three subclasses indicate the type of area served: residential, industrial, and commercial. These streets are not included in networks developed for the regional travel demand forecasting model. Instead a limited number of *centroid connectors* are used to link the major streets represented in the network to *centroids* that serve as points of origin or destination for trips between *traffic analysis zones*.

The base-year network, constructed for use in calibrating the regional travel demand model for the Mississippi Gulf Coast, is a georeferenced representation of the 2,666 miles of major roads which were in service in 2013 (see Figure 6-2). The network includes interstate highways, major and minor arterials, collectors and a limited number of local streets needed to provide continuity or maintain the integrity of the network.

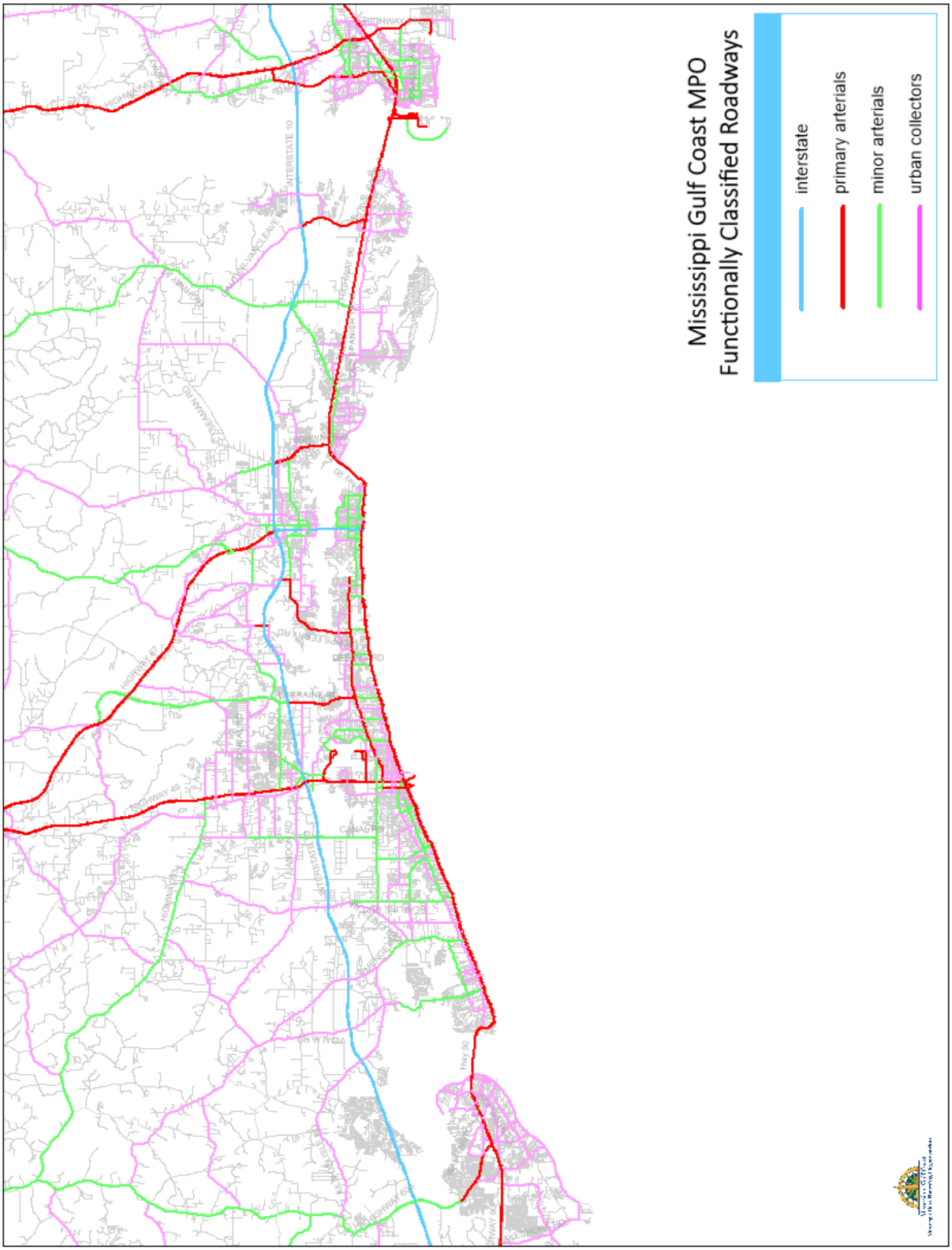
Interstate highways in the area include Interstate 10 (I-10) and Interstate 110 (I-110). I-10 is a major transcontinental route running east and west across the southern tier of states between California and Florida. It traverses the Mississippi Gulf Coast area between the Louisiana state line (Pearl River) on the west and the Alabama state line on the east. I-110 is a north-south spur connecting I-10 to U. S. Highway 90 (Beach Boulevard) in downtown Biloxi. The route includes a high-rise bridge spanning the Back Bay of Biloxi between D'Iberville on the north side of the bay and Biloxi on the south. The total length of the interstate system within the study area is 81.62 miles (see Table 6-1). Some sections include four lanes (two each way), others six or eight, yielding total lane-mileage in the base year (2013) of 377.73. While carrying the heaviest volume of traffic, the interstate system represents only a little more than three percent of total major roadway mileage in the Mississippi Gulf Coast Area.

Principal arterials carry the highest volumes, and typically the longest trips, after the interstates. They extend approximately 211 miles in total length, accounting for slightly less than eight percent of all major roadway mileage in the area. This class includes important travel routes like US Highway 90 (US 90) and US Highway 49 (US 49). The former traverses the study area along an east-west axis in the southerly portions of all three counties, hugging the Mississippi Sound shoreline from one end of Harrison County to the other. Beyond Hancock County to the west, the highway leads to New Orleans; beyond Jackson County to the east, it leads to Mobile. Highway 49 connects to US 90 in downtown Gulfport and goes north from there to Saucier, just south of the Stone County line, and then on to Hattiesburg and Jackson. As there is no north-south interstate highway in the study area, US 49 is the principal transportation link between the Mississippi Gulf Coast and the state capital, as well as other destinations further north of Jackson.

Other important principal arterials include Mississippi Highway 43 (MS 43) and State Route 607 (SR 607) in Hancock County; MS 67, Pass Road, Airport Road, Popp's Ferry Road and Lorraine Road (SR 605) in Harrison County; and MS 63, SR 609, SR 611, SR 613, Telephone Road and Gautier-Vancleave Road in Jackson County.

Minor arterials collectively account for about 246 route-miles or just over nine percent of total mileage in the major roadway network which encompasses all arterials, collectors and interstate system highways.

Figure 6-2: Functional Classification of Mississippi Gulf Coast Roadways



Source: Gulf Regional Planning Commission

Table 6-1:
MISSISSIPPI GULF COAST MAJOR ROAD MILEAGE BY FUNCTIONAL CLASS AND COUNTY

CLASSIFICATION	COUNTY	LENGTH (MILES)	PERCENT OF TOTAL
Interstate	Hancock	19.0	0.7
(Urban and Rural)	Harrison	32.9	1.2
	Jackson	29.7	1.1
	Interstate Total	*81.6*	*3.1*
Principal Arterial	Hancock	31.8	1.2
(Urban and Rural)	Harrison	102.8	3.9
	Jackson	76.5	2.9
	Principal Arterial Total	*211.1*	*7.9*
Minor Arterial	Hancock	47.1	1.8
(Urban and Rural)	Harrison	129.6	4.9
	Jackson	70.0	2.6
	Minor Arterial Total	*246.6*	*9.2*
Collector	Hancock	708.1	26.6
(Urban and Rural,	Harrison	707.8	26.5
Major and Minor)	Jackson	711.3	26.7
	Collector Total	*2127.2*	*79.8*
GRAND TOTAL		2666.5	100.0

Source: Mississippi Gulf Coast Regional Travel Demand Forecasting Model (2015).

The numerous routes classified as minor arterials include portions of US 90 and MS 43, along with MS 53 and SR 603, in Hancock County; MS 15, MS 53, SR 605 and a sizable number of city and county streets in Harrison County; and MS 57, a portion of SR 613 and numerous city and county streets in Jackson County.

Collectors carry the lowest volumes of traffic among the functionally classified major streets. Their primary purpose is to provide a connection between local streets and the arterial network, facilitating access to one or the other, depending on the direction of travel. There are more than 700 miles of collector roads in each of the three Mississippi Gulf Coast area counties. Collectively they account for 2,127 route-miles or very nearly 80 percent of the overall total. In all, there are 2,666.5 miles of major roads in the study area.

A majority of roadway mileage in the study area (about 55 percent) is actually to be found in local streets that provide direct access to homes, places of work or recreation, grocery stores, small shops and many other places of origin or destination. There are more than 3,300 miles of local streets in the study area (see Table 6-2). Adding those to the major roadway total of 2,666 yields an overall total for all streets and highways of 5,968.8 miles and reduces the interstate system to 1.4 percent of the systemwide total. The recalculated principal arterial share is 3.5 percent; the minor arterial share 4.1; and the collector share 35.6 percent.

As all local streets, the vast majority of collectors, and a significant number of arterial routes fall under the jurisdiction of local government, city and county authorities have maintenance responsibility for well over 90 percent of all street and highway mileage in the region. Nevertheless, the State of Mississippi bears responsibility for maintaining most of the more heavily traveled routes, such as I-10, I-110, US 90, US 49 and all of the roadways on the state highway system: MS 43, MS 53, MS 57, MS 67 and the other numbered state routes. In a 2013 report on *Mississippi's Transportation Infrastructure*, MDOT assessed the anticipated maintenance needs for roads and bridges over the next 20 years on a county-by-county basis. The assessment projected the amount of funding that would be required to maintain state highways, bridges under MDOT jurisdiction and *State-Aid* bridges built by counties with assistance from the Office of State-Aid Road Construction (OSARC).

Table 6-2:
MISSISSIPPI GULF COAST TOTAL ROAD MILEAGE BY FUNCTIONAL CLASS AND COUNTY

CLASSIFICATION	COUNTY	LENGTH (MILES)	PERCENT OF TOTAL
Interstate	Hancock	19.0	0.3
(Urban and Rural)	Harrison	32.9	0.6
	Jackson	29.7	0.5
	Interstate Total	*81.6*	*1.4*
Principal Arterial	Hancock	31.8	0.5
(Urban and Rural)	Harrison	102.8	1.7
	Jackson	76.5	1.3
	Principal Arterial Total	*211.1*	*3.5*
Minor Arterial	Hancock	47.1	0.8
(Urban and Rural)	Harrison	129.6	2.2
	Jackson	70.0	1.2
	Minor Arterial Total	*246.6*	*4.1*
Collector	Hancock	708.1	11.9
(Urban and Rural,	Harrison	707.8	11.9
Major and Minor)	Jackson	711.3	11.9
	Collector Total	*2127.2*	*35.6*
Local	Hancock	621.8	10.4
(Estimated)	Harrison	1577.5	26.4
	Jackson	1103.0	18.5
	Local Total	*3302.3*	*55.3*
GRAND TOTAL		5968.8	100.0

Source: Mississippi Gulf Coast Regional Travel Demand Forecasting Model (2015).

The report identified a total of $53,382,798 in maintenance needs in Hancock County. Roadway inspection yielded unsatisfactory pavement ratings for SR 607 between I-10 and US 90, and for US 90 in Waveland and Bay Saint Louis. Projected rehabilitation costs for Harrison County roads and bridges were double those for Hancock County: $107,327,540. Unsatisfactory pavement ratings were recorded for I-10 in the vicinity of US 49, for US 49 between Airport Road and 28th Street, for I-10 from the Woolmarket interchange to the Jackson County line, and for all of I-110. The projected total cost for maintenance in Jackson County fell between the figures for the other two counties: $88,340,062. Pavement inspection resulted in unsatisfactory ratings for I-10 from SR 609 to SR 613, MS 57 between I-10 and US 90, US 90 between Gautier and Pascagoula and a portion of the same route in Pascagoula, MS 63 between I-10 and US 90, and US 90 from Old Stage Road to the Alabama state line.

Daily Traffic and Roadway Congestion

The total number of trips made daily within the Mississippi Gulf coast area was estimated by the regional travel demand model to be 1,560,537 (see Table 6-3). The base-year model assignment indicated 60 percent of all trips had one end (or both) at the place of residence. Approximately 22 percent had both origin and destination somewhere other than the place of residence. An estimated 8.3 percent of all trips were made by trucks or other commercial vehicles. And nine percent of all trips were estimated to have either origin or destination (or both) outside the metropolitan area.

While the interstate system accounts for only 3.1 percent of all centerline route-miles on the major street and highway network, it carries nearly 37 percent of all traffic, registering 4.54 million vehicle-miles daily of the 12.34 million traveled in the study area (see Table 6-4). Principal arterials account for another 4.14 million or more than 33 percent. Of the remaining 30 percent, about 13 percent of vehicle-miles are travelled on minor arterials and 17 percent on collectors.

Vehicle delay is the difference between the actual time required to make a trip and the time that would be required if one were able to travel at free-flow speed. Model output indicated 55,657 hours of delay daily due to suppressed operating speeds resulting from traffic congestion. That means that approximately 18 percent of all time spent travelling is attributable to non-optimal traffic conditions.

Table 6-3:
2013 MISSISSIPPI GULF COAST ESTIMATED DAILY TRIPS BY TRAVEL PURPOSE

PURPOSE	NUMBER	PERCENT OF TOTAL
Home-Based Work	281,119	18.0
Home-Based Other	664,928	42.6
Non-Home-Based	341,447	21.9
Gaming	3,717	0.2
Commercial Motor Vehicle	114,766	7.4
Truck	14,099	0.9
External Auto	105,004	6.7
External Truck	35,457	2.3
TOTAL	1,560,537	100.0

Source: Mississippi Gulf Coast Regional Travel Demand Forecasting Model (2015).

Table 6-4:

2013 MISSISSIPPI GULF COAST ESTIMATED DAILY VEHICLE-MILES TRAVELED, VEHICLE-HOURS TRAVELED AND VEHICLE-HOURS OF DELAY BY FUNCTIONAL CLASS

FUNCTIONAL CLASS	DAILY VEHICLE-MILES TRAVELED (VMT)		DAILY VEHICLE-HOURS TRAVELED (VHT)		DAILY VEHICLE-HOURS OF DELAY (VHD)	
	NUMBER	PCT OF TOTAL	NUMBER	PCT OF TOTAL	NUMBER	PCT OF TOTAL
Interstate	4,544,997	36.8	97,006	31.6	24,891	44.7
Principal Arterial	4,144,750	33.6	102,175	33.3	17,407	31.3
Minor Arterial	1,573,663	12.8	43,799	14.3	6,164	11.1
Collector	2,077,122	16.8	63,694	20.8	7,195	12.9
TOTAL	12,340,532	100.0	306,674	100.0	55,657	100.0
Average Speed (VMT/VHT)		40.2		Percent Delay (VHD/VHT)		18.1

Source: Mississippi Gulf Coast Regional Travel Demand Forecasting Model (2015).

Nearly 45 percent of delay was associated with interstate highway congestion (including congested conditions on off-ramps).

One common measure of congestion is the ratio of traffic volume to roadway capacity. The actual capacity of a given roadway depends on a number of factors, including the number of travel lanes, type of access, operating speed, lane width and so forth. The model assumes a range of vehicular lane capacities associated with the functional classification of a road and whether it is undivided or divided. Put simplistically, bigger, faster roads have higher capacities. The volume-over-capacity ratio indicates congestion when it exceeds 1.00, since the higher numerator suggests that the daily volume of traffic has surpassed the theoretical capacity of the roadway.

The regional travel demand model generates a statistic representing the *maximum VOC* for each link in the network. MAX VOC is the higher V/C when directional values are compared for a two-way street or highway. A limited number of links had MAX VOC in excess of 1.0 for the base-year network. The most significant instances reflected congested traffic conditions in the immediate vicinity of major retail shopping outlets. V/C ratios as high as 1.20 were recorded on US 49 between Crossroads Parkway and Creosote Road, streets providing direct access to Crossroads Mall in the northeast quadrant of the I-10 interchange and Prime Outlets in the southwest quadrant. However, the highest V/C ratios were registered for Promenade Parkway (1.26) and Indian River Road (1.25), two short routes which connect to MS 15 at the northern terminus of I-110 immediately north of its interchange with I-10. Promenade Parkway provides direct access to the Promenade mall; Indian River Road provides direct access to Sangani Boulevard and the Lakeview Village shopping district.

6.2 BICYCLE AND PEDESTRIAN

The availability of quality bicycle and pedestrian facilities is an important indicator of how well an area provides for the mobility of residents and visitors. People who live or work in the metropolitan area may be more likely to walk to a bus stop, or walk to work, or ride a bicycle home or to the store, if the facilities

that make non-motorized travel safe and convenient are there for them to use. The health benefits of walking or riding a bicycle for the individual do not need to be emphasized. The environmental benefits for the area as a whole—reduced vehicular emissions, less time lost due to delays resulting from traffic congestion, fewer vehicular collisions--may be less apparent, but they are also worth noting and promoting by planning for needed improvements.

Within the Mississippi Gulf Coast Metropolitan Planning Area (MPA) there are approximately 48 miles of designated shared-use roadways (i.e., signed bike routes), four times the number of signed miles (12) in 2010. There are 20 miles of shared-use (multiuse) pathways, more than doubling the number (8.5) available in 2010. There are 36 miles of bike lanes, up slightly from the 2010 total (33). The local communities around the region are embracing opportunities to expand their bicycle networks. The MPO actively works with jurisdictions by providing funding to plan for projects and to support the construction when funding is available.

The Mississippi Gulf Coast MPO has demonstrated a consistent effort to improve and expand non-motorized travel options across the region. Ideally every roadway in the urban planning area would be made suitable for biking and walking. In an effort to progress toward this goal, GRPC has set two long-range bicycle and pedestrian priorities:

- The first priority is to ensure that every new and improved roadway constructed on the Mississippi Gulf Coast will accommodate non-motorized traffic in an appropriate way. The MPO hopes to accomplish this through the implementation of its Complete Streets Policy. Adopted in August of 2015, the policy requires that all federally funded projects in the urban planning area be made suitable for bicycles and pedestrians unless there are unavoidable and insurmountable impediments to doing so. The policy requires the local planning agency (LPA) to consider a variety of factors including traffic volume, speed and surrounding land use, in order to identify the best way in which bicyclists and pedestrians can be accommodated. (The Complete Streets Policy may be found in Appendix B or viewed at www.grpc.com.)

- The second priority relates to how the MPO allocates available transportation improvement funds across the region. The MPO sets aside 10 percent of the region's annual Surface Transportation Program (STP) funding allocation to support continued improvement and expansion of the bicycle and pedestrian travel network. With this in mind, the focus is on filling gaps in the existing bicycle and pedestrian network by identifying independent projects for implementation. These projects are not associated with planned roadway improvements but simply seek to add sidewalks or bicycle facilities to existing roads.

GRPC staff will participate in educational activities necessary to maintain professional awareness of best practices, funding opportunities and other relevant information in support of system development, evaluating the effectiveness and comprehensiveness of the Complete Streets Policy on a periodic basis and monitoring the MPO's bicycle and pedestrian performance measures. The Complete Streets Policy will serve to promote the development of adequate bicycle facilities by affording preferential

consideration to proposed projects that include bicycle lanes, dedicated bike paths or multiuse pathways suitable for use by both pedestrians and bicyclists. The *John Paul Frerer Bicycle Safety Act*, adopted by the Mississippi Legislature in 2010, put the state on record in favor of safe bicycle facilities by guaranteeing the equal rights of bicyclists with regard to the use of transportation facilities. Bicycle and pedestrian accommodations have become standard on new facilities built by the state: MS 67 and SR 605 include dedicated bike lanes, and the new bridges built across the Bay of Saint Louis and Bay of Biloxi feature separated pathways that have proven to be immensely popular with walkers and bicycle riders. At the east end of the bridge spanning the Bay of Biloxi, the City of Ocean Springs connected the bridge path to the city's beachfront and downtown with a shared-use path and sidewalks. Another encouraging sign is the growing presence of bicycle racks in downtown areas and other commercial activity centers.

CTA has also done its part to make cycling a realistic travel option through the transit operator's highly successful Bike 'n Bus Program. The installation of front-mounted bicycle racks on CTA vehicles enables an individual to make a trip by both modes, racking his bike when he boards a bus, taking it down when he disembarks. The ability to transfer easily from one mode to another benefits both by enhancing the accessibility of each for the individual traveler.

The Transportation Assessment prepared in 2013 for *The Plan for Opportunity*, a collaborative planning project funded by a grant from the U. S. Department of Housing and Urban Development, indicated there are 149 miles of roadways in the Mississippi Gulf Coast area that "may be considered suitable for some form of bicycle access. . . ." According to the report, there were at the time seven miles of bike lanes and 11 miles of multiuse paths in the urbanized area. Adapting the suitable roadways for use by bicyclists would create an extensive and well-connected regional network that would both facilitate and encourage expanded bicycle travel in the area.

Sidewalks are currently not prevalent outside the downtown districts and older residential neighborhoods in the incorporated municipalities, although they are increasingly included in newer developments. Nevertheless, efforts to upgrade bicycle and pedestrian facilities in the area are steadily gaining momentum. The MPO Complete Streets Policy will encourage local jurisdictions to include sidewalks in their plans for new streets or roadway improvements. The City of Pascagoula has had a similar policy in place for several years. The City of Long Beach has a sidewalk ordinance requiring that new projects, whether public or private, include pedestrian pathways. Other cities located along the coastline committed to improved pedestrian facilities in rebuilding after Hurricane Katrina. Today the reconstructed central business districts in Bay Saint Louis, Pass Christian, Gulfport, Biloxi, Ocean Springs, Gautier and Moss Point feature wide sidewalks and pedestrian amenities such as benches, crosswalks and signals enabling those on foot to cross streets safely. The beachfront boardwalk in Harrison County was also rebuilt following the storm. The new MPO Complete Streets Policy establishes a formal preference, in the project evaluation process leading to adoption of the Transportation Improvement Program, for proposed improvements that include sidewalks. This is an important inducement that should help make sidewalks and other pedestrian facilities more widely available as new streets are built and old ones are widened.

6.3 PUBLIC TRANSIT

Existing Transit Service and Operating Characteristics

The Mississippi Coast Transportation Authority has been providing public transit service in the study area since 1974, operating under the name *Coast Transit Authority* (CTA) since 1992. CTA currently operates buses on nine regularly scheduled routes and provides demand-response paratransit service for qualified individuals who live in the area. The CTA offices, bus storage and maintenance facilities are centrally located on DeBuys Road in Gulfport immediately west of the Biloxi city limit. Transit centers in Gulfport and Biloxi provide parking and passenger accommodations and serve as the principal transfer points for routes radiating outward from those centrally located facilities. A third transit center built in D'Iberville opened for business early in 2015, and Edgewater Mall in Biloxi continues to operate as a major transfer point. CTA scheduled operations extend into all three Mississippi Gulf Coast counties and five different cities: Gulfport, Biloxi and D'Iberville in Harrison County; Ocean Springs in Jackson County; and Bay Saint Louis in Hancock County.

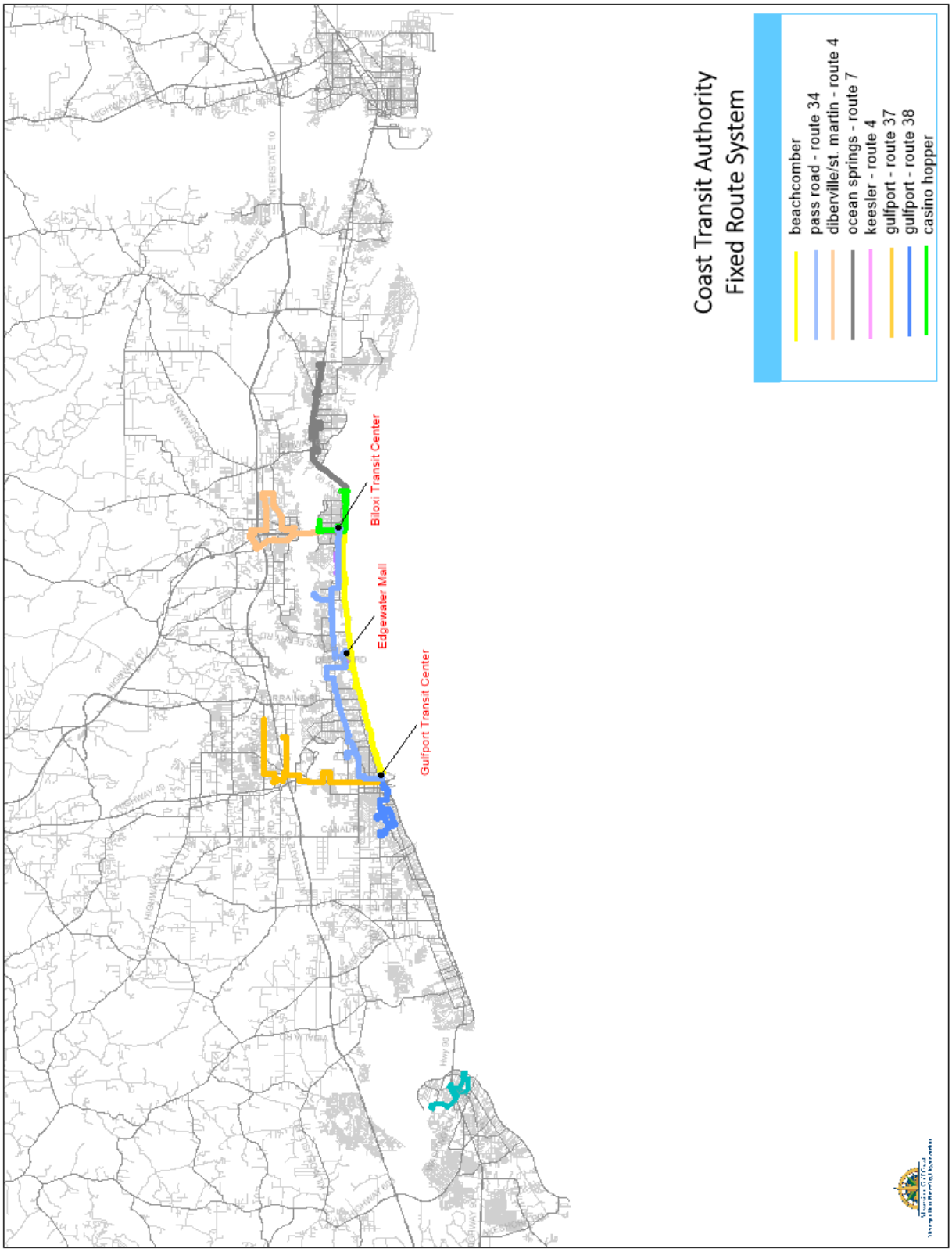
Biloxi Transit Center on Dr. M. L. King Jr. Boulevard

The regular adult fare for a single ride is $1.50. An individual with a Medicare card pays half-fare, as do senior citizens (60 years of age or older) and disabled individuals with identification cards provided by CTA at a cost of $2.00 each. Anyone over 90 with a CTA identification card can ride free of charge; the same applies to children five or under. Discounts are also available for older children and public school students. Discounted monthly passes are available for senior citizens and disabled individuals for $32.00; others can purchase a 31-day pass, allowing an unlimited number of rides, for $50.00.

Daily passes, good for an unrestricted number of rides, can be purchased for $6.00; and three-day passes cost $14.00. The ADA Paratransit fare is $2.00. CTA operates on a zone fare system: No free or reduced-fare transfers are allowed. Customers pay the appropriate fare when boarding and must pay an additional fare when crossing a zone boundary. Zone boundaries are located at the eastern ends of the Ocean Springs (Route 7) and Gulfport (Route 37) lines; at the Gulfport and Biloxi transit centers, and at Edgewater Mall. CTA fixed-route bus lines (shown in Figure 6-3) include the following:

The Beachcomber is a beachfront bus line that attracts ridership among both visitors to the area and residents who live or work near the waterfront. Replica vintage trolleys travel on Beach Boulevard (Highway 90) between the Gulfport Transit Center on 15th Street at 21st Avenue and the Biloxi Transit Center on Dr. Martin Luther King Jr. Boulevard at Reynoir Street. The distance between transit centers is just over 12 miles, but the Beachcomber route also includes an intervening loop in the vicinity of the Edgewater Mall, approximately midway between the start and end-points.

Figure 6-3: Coast Transit Authority Fixed-Route Bus Lines



Source: Gulf Regional Planning Commission.

Edgewater is a principal hub of the CTA system. Passengers can transfer from The Beachcomber to any one of six other CTA routes linked to one of the transit centers or the hub at Edgewater Mall. The Beachcomber operates on a 45-minute headway six days a week (Monday-Saturday) between the hours of 5:30 a.m. and 8:49 p.m.

D'Iberville Transit Center on Central Avenue

The Casino Hopper is a two-way loop route located at the east end of peninsular Biloxi between I-110 and the Bay of Biloxi. As its name implies, the line primarily serves visitors to the area and Mississippi Gulf Coast residents patronizing casinos located along the route. Buses circulate around the periphery of the peninsula, beginning at the Biloxi Transit Center and proceeding in both clockwise and counter-clockwise directions along opposing six-mile paths that bring them back to where they began. The principal streets traveled by the Casino Hopper are Caillavet Street, Bayview Avenue, Back Bay Boulevard, Oak Street and Beach Boulevard. Stop locations include casinos located on the Mississippi Sound, Bay of Biloxi and Back Bay; Point Cadet Senior Village near the east end of the route; the Maritime and Seafood Museum; and the Ohr-O'Keefe Museum. Passengers have the opportunity to transfer from The Casino Hopper to any one of the other four routes connecting to the Biloxi Transit Center. Buses run on 45-minute headways six days a week (Monday-Saturday) between the hours of 5:30 a.m. and 9:10 p.m.

D'Iberville Route 4 operates between the Biloxi Transit Center and the Promenade shopping center at the north end of D'Iberville. The route is somewhat circuitous north of the Back Bay of Biloxi, including two looping extensions, one within the limits of D'Iberville and the other diverging into the unincorporated St. Martin area in neighboring Jackson County. The principal north-south roadways traveled by Route 4 buses include Caillavet Street in Biloxi; I-110 crossing the Back Bay to D'Iberville; Central Avenue, Lamey Bridge Road and Auto Mall Parkway in D'Iberville; and McCann Road in St. Martin. The principal east-west streets are LeMoyne Boulevard and Big Ridge Road in D'Iberville and St. Martin; and Sangani Boulevard, Promenade Parkway and Rodriquez Street in D'Iberville. Passengers can transfer at the Biloxi Transit Center to any one of the four other bus routes linked to the same facility. Route 4 buses operate six days a week (Monday-Saturday) between 5:30 a.m. and 6:50 p.m. and on Sundays between 7:00 a.m. and 5:20 p.m. The lengthy route requires a 90-minute headway between scheduled bus departures.

Ocean Springs Route 7 buses travel between the Biloxi Transit Center and the WalMart on Bienville Boulevard (US 90) in Ocean Springs, a distance of approximately nine miles. The eastbound route is predominantly located along Highway 90 but diverges at Washington Avenue in Ocean Springs to make a loop around the central business district. Proceeding in an easterly direction along Government Street, the route returns to Bienville Boulevard at Bechtel Boulevard. Westbound buses diverge from Bienville Boulevard at Vermont Avenue, turning west again at Government Street and reversing the loop around downtown Ocean Springs before continuing to Biloxi. Passengers can transfer at the west end of the route

to any one of the four other bus lines terminating at the Biloxi Transit Center. Route 7 buses operate six days a week, providing service between 5:30 a.m. and 8:20 p.m. on weekdays and between 8:30 a.m. and 8:20 p.m. on Saturdays. Buses do not run on Sunday. The headway between scheduled departures at each end of the route is 90 minutes.

Keesler Route 24 provides targeted service between Keesler Air Force Base (KAFB) and Edgewater Mall six days a week, not including Saturday. The route is located primarily on Beach Boulevard. Buses operate on two different schedules: On Fridays the first trip leaves Keesler at 5:30 p.m., and the last arrives at the base at 9:25 p.m. On the other five days buses run from 10:30 a.m. until 9:25 p.m., departing from Keesler every hour on the half-hour, and from Edgewater every hour on the hour.

Gulfport-Biloxi Pass Road Route 34 buses operate between the Gulfport and Biloxi transit centers, traveling primarily on Pass Road, with diversions to Mississippi Gulf Coast Community College, Edgewater Mall and the Veterans Administration Hospital in Biloxi. At the east end of Pass Road, the route circumvents Keesler AFB by jogging to the south (for eastbound tips, north for westbound) on Rodenberg Avenue, continuing along Irish Hill Drive and Howard Avenue into downtown Biloxi. As the total length of the route is about 16 miles, and a trip from one end to the other takes an hour and 20 minutes, four buses are required to provide service on 45-minute headways from Monday through Saturday. On those days service begins at 4:45 a.m. and continues until 8:20 p.m. Reduced service on Sundays operates on a split route with two buses running between the Edgewater Mall and the Gulfport Transit Center on 45-minute headways and one bus running between the mall and the Biloxi Transit Center every 90 minutes. Operating hours on the Gulfport leg run from 6:15 a.m. until 6:50 p.m. Service on the Biloxi leg is available from 6:15 a.m. until 6:05 p.m. On weekdays passenger can transfer to the Beachcomber or either one of two Gulfport lines (described below) at the transit center in that city. At the Biloxi end of the line they can transfer to either the Beachcomber or any one of the other three lines terminating at the transit center in that city (described above). On Sunday transfer opportunities are limited to two other routes operating on that day: Gulfport Route 37 on one end and D'Iberville Route 4 on the other.

Gulfport Route 37 runs between the Gulfport Transit Center and the Orange Grove area north of I-10, operating primarily on US 49 south of the interstate. At Creosote Road the route diverges from the main north-south axis and travels north on Three Rivers Road, then east on Seaway Road as far as Larkin Smith Drive. Returning to Three Rivers Road, the route passes under I-10 and turns onto Crossroads Parkway, proceeding from the shopping center to Community Road and via Klein Road to Dedeaux Road, continuing eastward on that well-traveled route for some distance. The total distance traveled is about 14 miles. Service is provided six days a week, on 90-minute headways, between the hours of 5:30 a.m. and 6:50 p.m. Connecting routes include The Beachcomber and two other routes (34 and 38).

Gulfport Route 38 features two distinct legs served by a single bus, in alternating fashion, six days a week (Monday-Saturday). Both legs have one end at the Gulfport Transit Center and the other at a point on the western periphery of the city. The northern (Red Line) leg operates mainly on 33rd Avenue and 28th Street, terminating at the Ladnier Homes located immediately north of the Naval Construction Battalion Center (NCBC) and just west of Canal Road. The southern (Blue Line) leg follows a more complicated path ending at the William Bell Apartments on Commission Road south of the NCBC. Intervening streets include 15th Street, Old Pass Road, Lewis Avenue and West Railroad Street, among others. Each leg

operates on a 90-minute headway. Service begins on the Blue Line at 5:30 a.m. and terminates on the Red Line at 6:55 p.m. Passengers can transfer to The Beachcomber, Route 34 or Route 37 at the transit center.

The Bay Trolley Line, the newest CTA route, was initiated on a free-trial basis on July 4, 2015. A single replica trolley bus circulates between Beach Boulevard in downtown Bay Saint Louis and the Hollywood Casino on the north side of the city. Buses run on Blue Meadow Road and Hollywood Boulevard north of US 90 and on Main Street, Dunbar Avenue, Bookter Street and others in the area south of the highway. Service is provided four days a week (Thursday-Sunday), between 11:00 a.m. and 10:10 p.m., with each trip on the loop route commencing 45 minutes after the one preceding it.

Paratransit service is also provided by CTA in compliance with the *Americans with Disabilities Act* (Public Law 101-336, 104 Stat. 327) (ADA). ADA Paratransit offers qualified individuals demand-response curb-to-curb service within three-quarters of a mile of any established fixed-route transit line. The target population includes disabled individuals unable to use the regular handicapped-accessible fixed-route service. ADA Paratransit-Plus provides demand-response curb-to-curb service outside the three-quarter-mile buffer, throughout all three counties in the study area. Service was extended to Hancock County shortly before the initiation of regular fixed-route operations on the Bay Trolley line. The Hancock County Handy Ride transportation service is available on Tuesdays and Thursdays for senior citizens and disabled individuals alike. Pick-ups for all paratransit operations are scheduled by appointment on a space-available basis. Customers must be certified for the regular ADA program. As already noted, the standard fare for paratransit service is $2.00, with an additional charge of $2.00 imposed upon crossing from one zone into another.

Vanpool service is provided by CTA on a *purchased transportation* basis. The *Coast Commuter* program offers commuter carpool and vanpool services to all interested employers located in the study area. The service has been of particular benefit in areas of very high employment concentration such as Ingalls Shipyards in Jackson County and the Stennis Space Center in Hancock County. There are now more than 40 vanpools, serving workers from four different states travelling to work sites on the Mississippi Gulf Coast.

Recent Historical Ridership by Type of Service and Route

CTA ridership declined drastically in the aftermath of Hurricane Katrina which devastated not only homes and businesses but transportation infrastructure as well. The center of the storm made landfall at the west end of the study area on August 29, 2005, one month prior to the end of the 2005 operating year. The ensuing interruption of service resulted in an immediate and lasting loss of ridership and operating revenue. In the preceding operating year (2004) CTA had carried more than 51,000 passengers per month for a year-end total of 615,255 (see Table 6-5). The lost month at the end of Fiscal Year (FY) 2005 caused an immediate decline of 51,593 in total ridership for the operating year. In the following fiscal year (2006) ridership fell off another 159,000—an additional 28.2 percent—as the Mississippi Gulf Coast struggled to regain some semblance of normality. CTA leaped to the forefront of relief efforts, getting buses back out on the streets as fast as they could be rebuilt or repaired, and providing free transportation to all in the

time of need. A year after the hurricane recovery efforts were well underway; and CTA ridership recovered rapidly, rebounding by more than 26 percent in FY 2007. New service in Biloxi (the Casino Hopper) and Gulfport (Route 38), along with the initiation of Coast Commuter vanpool operations, pushed the total number of unlinked passenger-trips back over the half-million mark.

CTA experienced phenomenal growth in ridership (over 41 percent) in the 2008 operating year as the nation sank into recession. Major infrastructure repairs were completed, including the construction of new US 90 bridges across the Bay of Biloxi and Bay of Saint Louis; and in 2009 service on the beachfront highway finally resumed. Despite service cutbacks necessitated by strained finances the following year, the number of riders on CTA buses, complementary paratransit vehicles and commuter service vans continued to climb steadily, exceeding one million in 2011 and each of the succeeding three years. However, ridership began to decline in FY 2014 and then fell off drastically in FY 2015 as the price of gasoline collapsed. Analysis has shown there is a strong correlation between transit ridership and the price of gasoline on the Mississippi Gulf Coast, and CTA ridership is likely to remain depressed until the price private vehicle drivers pay at the pump recovers somewhat.

Table 6-5:
COAST TRANSIT AUTHORITY TOTAL RIDERSHIP BY TYPE OF SERVICE: 2004-2015

	OPERATING YEAR					
TYPE OF SERVICE	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Bus Transit	533,522	490,705	363,010	451,630	617,741	690,886
Demand-Response	81,733	72,957	41,636	42,780	43,319	47,222
Vanpool	--	--	--	17,010	61,447	105,574
TOTAL	**615,255**	**563,662**	**404,646**	**511,420**	**722,507**	**843,682**
Year-to-Year Change	--	-51,593	-159,016	106,774	211,087	121,175
Percent Change	--	-8.4	-28.2	26.4	41.3	16.8

	OPERATING YEAR					
TYPE OF SERVICE	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Bus Transit	759,456	781,364	843,678	914,782	819,734	662,756
Demand-Response	53,862	54,575	63,132	52,029	51,262	NA
Vanpool	133,017	177,080	174,907	172,491	156,440	NA
TOTAL	**946,335**	**1,013,019**	**1,081,717**	**1,139,302**	**1,029,450**	**874,893**
Year-to-Year Change	102,653	66,684	68,698	57,585	-109,852	-154,557
Percent Change	12.2	7.0	6.8	5.3	-9.6	-15.0

Source: National Transit Database (2015).

Over the past two years the loss in total ridership exceeded 260,000 passengers, falling more than 23 percent from a little less than 1,140,000 to fewer than 875,000 riders. Regular bus service was hit hardest, accounting for more than 250,000 of the lost passengers or 95 percent of the overall loss. Demand-response patronage topped 60,000 customers in 2012, and vanpool ridership was more than 177,000 in 2011; but both have suffered only moderate losses since then. It is reasonable to infer that the demand

for paratransit and vanpool service is less elastic than demand for fixed-route transit for various reasons: Many paratransit users are likely not to have the option of operating a private vehicle due to their disabilities; others may simply prefer not to drive because of age. Vanpool riders typically travel longer distances commuting to work and already pay less than they would driving their own vehicles. Generally speaking vanpool commuters have made a commitment to ridesharing because they prefer to let someone else do the driving and appreciate the advantages of simply being a passenger. In addition to the benefits associated with the ride itself, vanpoolers do not have to worry about parking. Not having to find a good place to park every day can be a significant factor for someone choosing to rideshare who would otherwise have to compete with hundreds or even thousands of other workers for coveted space on a daily basis.

Monthly data for the eight regularly scheduled bus lines that have been operating continuously since 2010 indicate that, at the end of FY 2015, almost all had been steadily declining in ridership for nearly two years (see Table 6-6). The system's strongest line, Pass Road Route 34, attracted fewer riders in each of the last 15 months (and 21 of the last 22) than were carried in the same month one year before. Annual ridership peaked at over 280,000 passengers in 2013 but has since fallen off to less than 245,000, the lowest total since 2010.

The second-most productive route, the Casino Hopper, has experienced year-to-year monthly declines in each of the last 20 months. Service cutbacks in March of 2014, necessary due to reduced public funding, were certainly a contributing factor. Annual patronage was nearly halved from 260,000 in 2013 to 137,000 in 2015. The Beachcomber, also affected by service cuts in 2014, has registered year-to-year monthly losses in 22 of the last 23 months. Annual ridership exceeded 140,000 in 2013, but in 2015 dropped off—less drastically than in the case of the Casino Hopper--to less than 110,000 passengers. The other route included in the March 2014 service reductions, Keesler Route 24, was already in decline but lost the lion's share of its patronage in the month following the cuts. Annual ridership, which had already fallen from 33,000 in 2012 to 24,000 in 2013, fell by half in 2014 and was halved again in 2015.

Two routes connecting Biloxi to other nearby cities have not fared as badly as those in Biloxi proper. D'Iberville Route 4 has suffered year-to-year monthly losses in 19 of the last 21 months, but they have mostly been fairly modest in size. FY 2015 ridership was nearly 12,000 below the peak annual figure of 44,000-plus in 2013. Ocean Springs Route 7 actually showed gains in six of the last eight months in 2015, but annual ridership continued to fall, from not quite 39,000 in 2013 to 32,000-plus two years later.

Bucking the downward trend, the Gulfport lines fared surprisingly well in the 24 months from October 1, 2013 through September 30, 2015. Gulfport Route 37 actually showed increases over the previous year in 15 of the last 16 months during that period. Moreover, annual ridership hit a new peak in 2015, topping 45,000 passengers compared to less than 38,000 the previous year and 39,000-plus the year before that.

Gulfport (Red/Blue) Route 38 recorded increases in six of the 12 months in FY 2015, and for seven of the 12 months in FY 2014. Annual ridership, which passed 40,000 in 2013, was slightly higher in 2014 but only slightly lower in 2015.

Table 6-6:
COAST TRANSIT AUTHORITY FIXED-ROUTE RIDERSHIP BY ROUTE AND MONTH FOR FY 2010 THROUGH 2015

FISCAL YEAR	MONTH (UNLINKED PASSENGER-TRIPS)												TOTAL
	October	November	December	January	February	March	April	May	June	July	August	September	
Beachcomber												*Note: CTA reduced service on March 9, 2014.*	
2010	9,615	8,897	7,960	8,300	8,318	10,750	11,300	10,556	11,061	11,944	12,206	11,760	122,667
2011	11,246	10,344	9,267	9,238	8,044	7,413	8,542	9,367	10,093	9,662	10,478	9,345	113,039
2012	8,827	8,775	8,850	9,078	9,523	10,361	10,909	11,321	11,246	10,773	10,222	11,017	120,902
2013	11,919	11,429	11,354	11,542	11,674	12,681	12,314	12,589	11,870	12,591	12,064	11,183	143,210
2014	11,941	10,742	10,536	10,451	10,890	10,059	9,713	9,454	9,277	10,342	10,194	9,341	122,940
2015	9,522	8,821	8,664	8,546	7,688	8,192	9,147	9,385	10,419	9,836	9,476	8,305	108,001
Casino Hopper												*Note: CTA reduced service on March 9, 2014.*	
2010	20,692	17,975	13,433	14,380	15,373	19,722	20,689	19,000	19,208	21,333	20,231	19,536	221,572
2011	20,856	16,481	11,760	14,272	17,038	20,486	19,499	22,192	19,750	21,443	22,618	20,500	226,895
2012	21,654	18,459	16,078	17,985	18,712	22,796	22,134	22,560	23,894	23,532	18,908	20,746	247,458
2013	23,625	19,058	17,475	17,300	20,576	23,969	23,812	24,675	21,764	22,650	22,358	23,249	260,511
2014	26,840	20,240	16,103	17,353	19,705	21,376	19,027	19,514	18,316	14,866	17,693	18,270	229,303
2015	18,096	14,235	12,828	12,117	8,435	11,440	10,328	9,941	9,791	10,119	10,002	9,972	137,304
D'Iberville Route 4													
2010	2,946	2,615	2,704	2,666	2,484	2,728	2,631	2,478	2,694	2,716	2,961	2,975	32,598
2011	3,107	3,052	2,999	2,554	2,958	3,068	3,210	3,528	3,521	3,165	3,307	2,996	37,465
2012	3,418	3,326	3,612	3,345	3,279	2,868	3,190	3,250	3,111	2,980	3,079	3,184	38,642
2013	3,455	3,577	3,973	4,699	3,458	4,086	3,372	3,365	3,996	3,428	3,645	3,349	44,403
2014	3,611	3,630	4,072	4,186	3,281	3,096	3,083	2,573	2,308	2,561	2,811	2,517	37,729
2015	2,558	2,601	2,719	3,417	3,085	2,572	2,484	2,778	2,697	2,509	2,710	2,431	32,561
Ocean Springs Route 7													
2010	2,691	2,647	2,381	2,021	2,129	2,546	2,610	2,367	2,986	2,673	2,901	2,829	30,781
2011	2,780	2,445	2,483	2,462	2,453	2,859	3,065	2,965	3,135	2,794	3,156	2,905	33,502
2012	2,854	2,903	3,054	2,863	2,688	3,177	2,797	2,870	3,193	3,081	3,343	3,165	35,988
2013	3,840	3,361	3,211	3,310	3,072	3,469	3,403	3,203	3,181	2,897	3,173	2,756	38,876
2014	3,097	5,013	2,656	2,574	2,512	2,372	2,575	2,540	2,639	2,872	3,106	2,730	34,686
2015	2,857	2,343	2,471	2,378	2,584	2,650	2,691	2,848	2,902	2,822	2,859	2,753	32,158
Keesler Route 24												*Note: CTA reduced service on March 9, 2014.*	
2010	3,913	2,851	1,080	1,438	3,302	3,521	3,708	2,887	2,647	3,278	2,651	2,820	34,096
2011	2,237	1,931	1,281	1,071	2,608	5,897	3,341	3,024	2,992	3,186	2,876	3,375	33,819
2012	2,769	2,652	2,362	1,758	2,840	4,292	3,216	3,373	2,471	1,723	2,561	3,362	33,379
2013	2,593	2,775	1,948	1,599	2,279	2,778	1,934	1,501	1,759	1,579	2,002	1,414	24,161
2014	1,191	1,954	1,279	1,279	1,512	1,165	748	540	608	393	879	521	12,069
2015	763	819	386	325	469	300	434	659	499	428	679	420	6,181

Table 6-6 (*Continued*):
COAST TRANSIT AUTHORITY FIXED-ROUTE RIDERSHIP BY ROUTE AND MONTH FOR FY 2010 THROUGH 2015

FISCAL YEAR	MONTH (UNLINKED PASSENGER-TRIPS)												TOTAL
	October	November	December	January	February	March	April	May	June	July	August	September	
Pass Road Route 34													
2010	22,742	20,021	19,014	19,141	17,351	19,315	18,049	17,895	17,999	17,383	18,096	18,981	225,987
2011	19,542	18,490	19,269	19,519	18,604	21,882	22,009	21,669	21,691	20,053	22,903	21,402	247,033
2012	22,280	20,832	21,339	22,314	21,106	22,238	20,212	20,914	21,809	21,819	21,245	21,668	257,776
2013	24,527	23,266	21,883	24,594	22,507	23,449	22,425	23,187	22,115	23,325	25,284	23,637	280,199
2014	25,547	23,817	22,215	22,171	22,152	22,359	21,556	20,793	22,531	22,453	22,709	21,728	270,031
2015	23,857	20,362	20,693	20,605	19,031	19,082	19,759	20,235	20,135	20,569	19,959	20,369	244,656
Gulfport Route 37													
2010	2,689	2,178	2,366	2,826	2,403	2,608	2,598	2,570	2,900	2,976	2,884	3,115	32,113
2011	2,884	2,581	2,585	2,358	2,489	2,922	3,054	2,808	3,050	2,629	3,454	2,985	33,799
2012	2,791	2,927	3,047	2,863	2,973	2,862	2,779	2,879	3,265	2,781	2,939	3,196	35,302
2013	3,363	3,255	3,201	3,426	2,934	3,285	3,296	3,564	3,081	3,179	3,680	3,120	39,384
2014	3,604	2,956	2,753	2,891	3,091	3,030	2,926	2,853	3,114	3,529	3,837	3,389	37,973
2015	3,510	2,959	3,197	3,522	3,682	3,622	3,964	4,207	4,162	4,392	4,169	3,987	45,373
Gulfport (Red/Blue) Route 38													
2010	1,530	1,320	1,307	1,277	1,321	1,356	1,195	1,236	1,488	1,370	1,341	1,352	16,093
2011	1,474	1,466	1,472	1,327	1,587	1,928	2,142	2,937	2,655	2,555	2,985	2,699	25,227
2012	2,728	2,491	2,619	2,506	2,357	2,477	2,555	2,596	2,865	2,659	3,072	2,982	31,907
2013	3,363	3,338	2,929	3,341	3,042	3,070	3,278	3,548	3,187	3,737	3,907	3,505	40,245
2014	3,833	3,286	3,135	3,309	3,231	3,310	3,448	3,301	3,189	3,485	3,617	3,576	40,720
2015	3,847	2,804	2,950	3,452	2,854	2,819	2,893	3,149	3,642	3,672	3,700	3,669	39,451
Totals for Existing Routes													
2010	66,818	58,504	50,245	52,049	52,681	62,546	62,780	58,989	60,983	63,673	63,271	63,368	715,907
2011	64,126	56,790	51,116	52,801	55,781	66,455	64,862	68,490	66,887	65,487	71,777	66,207	750,779
2012	67,321	62,365	60,961	62,712	63,478	71,071	67,792	69,763	71,854	69,348	65,369	69,320	801,354
2013	76,685	70,059	65,974	69,811	69,542	76,787	73,834	75,632	70,953	73,386	76,113	72,213	870,989
2014	79,664	71,638	62,749	64,214	66,374	66,767	63,076	61,568	61,982	60,501	64,846	62,072	785,451
2015	65,010	54,944	53,908	54,362	47,828	50,677	51,700	53,202	54,247	54,347	53,554	51,906	645,685
Percent Change from Preceding Year													
2010	--	--	--	--	--	--	--	--	--	--	--	--	--
2011	-4.0	-2.9	1.7	1.4	5.9	6.2	3.3	16.1	9.7	2.8	13.4	4.5	4.9
2012	5.0	9.8	19.3	18.8	13.8	6.9	4.5	1.9	7.4	5.9	-8.9	4.7	6.7
2013	13.9	12.3	8.2	11.3	9.6	8.0	8.9	8.4	-1.3	5.8	16.4	4.2	8.7
2014	3.9	2.3	-4.9	-8.0	-4.6	-13.0	-14.6	-18.6	-12.6	-17.6	-14.8	-14.0	-9.8
2015	-18.4	-23.3	-14.1	-15.3	-27.9	-24.1	-18.0	-13.6	-12.5	-10.2	-17.4	-16.4	-17.8

Source: Coast Transit Authority for monthly route ridership; calculations by Neel-Schaffer.

Overall ridership for the eight routes totaled almost 871,000 in 2013, fell off to 785,000 in 2014, then dropped even more precipitously to 645,000 in 2015. Aggregate fixed-route ridership was down from year to year in each of the 22 months from December of 2013 through September of 2015. The number of passengers carried on regularly scheduled buses fell by roughly 10 percent in 2014 and by approximately 18 percent in 2015. Data for the operating years from 2010 through 2013 show that during this growth period, as ridership was increasing steadily and fare revenues were rising, operating expenses remained relatively unchanged (see Table 6-7). The operating cost in 2012 was actually lower than in 2010 and 2011, and operating expenses in 2013 exceeded those in 2010 by only one-half of one percent. This was directly attributable to judicious paring of the system itself as well as daily operations: Route-miles were reduced by 13.3 percent, revenue-miles by 12.9 percent, and revenue-hours by 9.2 percent.

Table 6-7:
CTA BUS TRANSIT OPERATING DATA FOR FISCAL YEARS 2010 THROUGH 2013

DATA ITEM/STATISTIC	2010	2011	2012	2013
Passenger-Trips	759,456	781,364	843,678	914,782
Passenger-Miles	5,445,300	5,602,380	6,049,171	6,648,720
Fare Revenue	$656,415	$672,503	$705,517	$765,203
Operating Expenses	$4,060,350	$4,061,917	$3,989,879	$4,082,184
Directional Route Miles	205.4	174.5	178.0	178.0
Average Trip Length (Miles)	7.17	7.17	7.17	7.27
Fare Revenue per Trip	$0.86	$0.86	$0.84	$0.84
Operating Cost per Trip	$5.35	$5.20	$4.73	$4.46
Revenue/Cost (Percent)	16.2	16.6	17.7	18.7
Revenue/Route-Mile	$3,195.79	$3,853.89	$3,963.58	$4,298.89
Vehicle Revenue Miles	1,177,622	1,042,940	1,035,742	1,025,716
Vehicle Revenue Hours	81,094	68,677	74,105	73,603
Peak Vehicles in Service	18	15	17	17
Passengers/Vehicle Mile	0.64	0.75	0.81	0.89
Passengers/Vehicle Hour	9.37	11.38	11.38	12.43
Fare Revenue/Vehicle Mile	$0.56	$0.64	$0.68	$0.75
Fare Revenue/Vehicle Hour	$8.09	$9.79	$9.52	$10.40
Operating Cost/Vehicle Mile	$3.45	$3.89	$3.85	$3.98
Operating Cost/Vehicle Hour	$50.07	$59.15	$53.84	$55.46
Revenue Vehicle Miles/Hour	14.52	15.19	13.98	13.94

Source: National Transit Database (2015) for data; calculations by Neel-Schaffer, Inc.

Significantly, while fare revenue per passenger-trip actually declined slightly (two cents), the operating cost per trip went down every year--89 cents in all from 2010 to 2013—and the farebox recovery of cost increased from 16.2 percent to 18.7 percent. No doubt these numbers have been adversely affected by the decline in ridership since 2013, but data for 2014 and 2015 are not yet available from the National Transit Database.

Table 6-8:
CTA DEMAND-RESPONSE TRANSIT OPERATING DATA FOR FISCAL YEARS 2010 THROUGH 2013

DATA ITEM/STATISTIC	2010	2011	2012	2013
Passenger-Trips	61,222	67,138	63,763	52,029
Passenger-Miles	1,276,529	1,763,864	2,040,426	1,681,577
Fare Revenue	$84,500	$83,676	$78,226	$42,470
Operating Expenses	$1,176,298	$1,347,592	$1,257,494	$1,145,046
Average Trip Length (Miles)	20.85	26.27	32.00	32.32
Fare Revenue per Trip	$1.38	$1.25	$1.23	$0.82
Operating Cost per Trip	$19.21	$20.07	$19.72	$22.01
Fare Revenue/Cost (Percent)	7.2	6.2	6.2	3.7
Vehicle Revenue Miles	316,711	336,101	266,373	270,527
Vehicle Revenue Hours	27,900	30,125	26,175	24,739
Peak Vehicles in Service	14	15	13	14
Passengers/Vehicle Mile	0.19	0.20	0.24	0.19
Passengers/Vehicle Hour	2.19	2.23	2.44	2.10
Fare Revenue/Vehicle Mile	$0.27	$0.25	$0.29	$0.16
Fare Revenue/Vehicle Hour	$3.03	$2.78	$2.99	$1.72
Operating Cost/Vehicle Mile	$3.71	$4.01	$4.72	$4.23
Operating Cost/Vehicle Hour	$42.16	$44.73	$48.04	$46.29
Revenue Vehicle Miles/Hour	11.35	11.16	10.18	10.94

Source: National Transit Database (2015) for data; calculations by Neel-Schaffer, Inc.

As one might expect, operating data for the CTA paratransit service vary considerably from year to year. For example, while the average trip-length for regularly scheduled bus service remained essentially unchanged from FY 2010 to FY 2013, the average trip by a paratransit passenger increased from 20 miles in 2010 to 32 miles in 2013 (see Table 6-8). Operating revenues and expenses varied similarly. The demand-response service generates about 50 percent more in fare revenue per passenger-trip than does the regularly scheduled fixed-route bus service. However, the operating cost per passenger-trip is typically several times higher. The operating cost per mile for paratransit vehicles is a little higher than

the corresponding cost for buses running scheduled routes, but the cost per vehicle-hour is significantly lower. Presumably this is because paratransit vehicles spend less time actually underway (i.e., burning fuel) and more time boarding and disembarking passengers than do regular transit service coaches. Although the average fare collected from paratransit passengers was as much as 50 percent higher during the period studied, the annual farebox recovery-of-cost rate was more than 50 percent lower every year.

Both fare revenues and operating expenses associated with the Coast Commuter vanpool service fluctuated considerably in the operating years from 2010 through 2013. While average trip length varied only about 15 percent between the low in 2010 (43.73 miles) and the high in 2012 (50.53 miles), the average fare was less than $1.00 in 2010 and more than $4.00 in 2012 (see Table 4-9). Similarly, the operating cost per passenger-trip was $3.05 in 2010 and $5.68 in 2012. Fare revenues and operating expenses per vehicle-mile and vehicle-hour also varied widely from year to year. Vehicle revenue miles and hours peaked in 2011 when 48 vehicles were in service daily. Average ridership increased from a little less than eight passengers per vehicle-hour in 2010 to nearly nine in 2013.

Table 6-9:
COAST COMMUTER OPERATING DATA FOR FISCAL YEARS 2010 THROUGH 2013

DATA ITEM/STATISTIC	2010	2011	2012	2013
Passenger-Trips	135,846	178,085	174,935	172,491
Passenger-Miles	5,940,483	7,857,440	8,840,108	7,902,991
Fare Revenue	$127,747	$383,984	$774,676	$473,951
Operating Expenses	$414,423	$576,881	$994,307	$780,198
Average Trip Length (Miles)	43.73	44.12	50.53	45.82
Fare Revenue per Trip	$0.94	$2.16	$4.43	$2.75
Operating Cost per Trip	$3.05	$3.24	$5.68	$4.52
Fare Revenue/Cost (Percent)	30.8	66.6	77.9	60.7
Vehicle Revenue Miles	1,095,268	1,117,859	1,034,590	983,463
Vehicle Revenue Hours	17,337	20,613	20,377	19,582
Peak Vehicles in Service	42	48	47	46
Passengers/Vehicle Mile	0.12	0.16	0.17	0.18
Passengers/Vehicle Hour	7.84	8.64	8.58	8.81
Fare Revenue/Vehicle Mile	0.12	0.34	0.75	0.48
Fare Revenue/Vehicle Hour	7.37	18.63	38.02	24.20
Operating Cost/Vehicle Mile	0.38	0.52	0.96	0.79
Operating Cost/Vehicle Hour	23.90	27.99	48.80	39.84
Vehicle Revenue Miles/Hour	63.18	54.23	50.77	50.22

Source: National Transit Database (2015) for data; calculations by Neel-Schaffer, Inc.

6.5 AVIATION

Commercial Airports and General Aviation Facilities

The region's aviation facilities play a vital role in the overall transportation system, offering services that efficiently move both people and goods into and out of the area. Airports also make significant contributions to corporate recruitment and economic development; provide military support; offer assistance to first-responders during emergencies; and provide recreational and tourism opportunities.

There are three publicly owned commercial and general aviation airports in the Mississippi Gulf Coast MPA, one in each of the three counties. The principal location for commercial airline service is Gulfport-Biloxi International Airport in Harrison County. Stennis International Airport in Hancock County provides general aviation facilities and services in proximity to the National Aeronautics and Space Administration's Stennis Space Center. Trent Lott International Airport provides the same services in Jackson County for the benefit of the general public and corporations engaged in heavy industry in and around Pascagoula.

Centrally located just east of US 49 and south of I-10, approximately three miles north of downtown Gulfport, Gulfport-Biloxi International Airport (GPT) is a joint civil-military public-use airport owned and operated by the Gulfport-Biloxi Regional Airport Authority. GPT offers regularly scheduled passenger air service provided by four commercial airlines: American Airlines, Delta Airlines, United Airlines and Sun Country Airlines. American offers service to Charlotte and Dallas-Fort Worth; Delta flights travel between GPT and Atlanta; United flies to Houston-Intercontinental; and Sun Country provides seasonal flights to and from Minneapolis-St. Paul. GPT is classified in the National Plan of Integrated Airport Systems (NPIAS) as a *primary commercial service airport*. According to Federal Aviation Administration (FAA) records, nearly half a million passengers (487,907) boarded flights at the airport in 2008. The figure for 2014 was a somewhat less imposing 325,437.

Originally constructed by the U. S. Army Air Forces as a training base during World War II, it remains a joint-use airport and Air National Guard base. There are no military aircraft permanently housed at the airport, but it continues to serve as headquarters of the Gulfport Combat Readiness Training Center. GPT encompasses 1,400 acres and features two runways, one 9,002 feet long by 150 feet wide and a second 4,935 feet long by 150 feet wide. During the 12-month reporting period that ended January 31, 2012, there were 63,052 aircraft operations for an average of 172 per day: 43 percent were military, 31 percent were general aviation, 20 percent were air taxi takeoffs or landings, and six percent were scheduled commercial flights. There were 34 aircraft based at the airport: 17 single-engine planes, seven jets, six multi-engine planes, two helicopters and two military aircraft. GPT also offers a 40,000-square-foot cargo facility that includes 20,000 square feet of chiller space and 20,000 square feet of cargo sorting and distribution space, as well as 6,000 square-feet of office space. General aviation services at GPT are provided by Million Air and Apollo Aviation.

Owned and operated by the Hancock County Port and Harbor Commission, Stennis International Airport is located just north of I-10 and west of MS 43 (SR 603) between Bay Saint Louis and Kiln. The airport is

also located just east of the noise buffer zone for the NASA rocket testing facility at John C. Stennis Space Center. Stennis International is a public use airport listed in the NPIAS as a general aviation facility. Originally established as an auxiliary military training airfield during World War II, it was eventually opened for civil use in 1970, following the location of the NASA space center in Hancock County.

The airport itself encompasses 591 acres and has a single runway 8,497 feet long and 150 feet wide. During the 12-month period ended January 31, 2012, the airport recorded 63,600 aircraft operations, averaging 174 per day. Of that total, 90 percent were general aviation takeoffs or landings and 10 percent were military operations. At that time there were 34 aircraft based at the airport: 25 single-engine planes, five multi-engine aircraft, two jets and two ultralight aircraft. Million Air serves as the fixed-base operator (FBO) for Stennis International Airport, providing aircraft fueling, air charter, hangar space and aircraft tie-down service. Adjoining the airport, the 1,800-acre Stennis International Airpark houses a variety of local and international businesses, including Lazy Magnolia Brewery and Optech, a leading developer and manufacturer of advanced lidar and photographic survey instruments for airborne mobile and terrestrial mapping.

Trent Lott International Airport is a public-use airport owned by Jackson County located immediately north of I-10 and east of MS 63 in the vicinity of Moss Point. Trent Lott international provides charter service, flight training and testing facilities for both manned and unmanned airplanes and helicopters. Corporate clients include Northrop Grumman, Chevron, Omega Protein and ERA Helicopters. The airport encompasses 906 acres and features a 6,500-foot runway 100 feet wide. A 500-acre industrial/business park adjoins the airport property. During a 12-month period in 2006-2007, the airport recorded 50,205 aircraft operations, averaging 137 per day. Of that total, 87 percent were general aviation, 10 percent were air taxi and four percent were military operations. At that time there were 53 aircraft based at the airport: 35 single-engine, eight multi-engine, seven jets and three helicopters.

6.6 SAFETY

Disclaimer: *This document and the information contained herein is prepared solely for the purpose of identifying, evaluating and planning safety improvements on public roads which may be implemented utilizing federal aid highway funds; and is therefore exempt from discovery or admission into evidence pursuant to 23 U.S.C. 409.*

In recent years, on average, 35,600 fatalities occur on roadways in the United States each year. Every crash, regardless of its severity, entails a cost that must be borne by the public. It may be only the expense incurred in dispatching a police officer to write up an accident report; there may be damage to public property such as light standards, fences, curbs or median barriers; or there may be more significant costs associated with emergency services, traffic congestion and travel delay resulting from lane closures, removal of damaged vehicles and other debris, including potentially toxic material. Despite the downward trend in the incidence of fatal accidents, there remains a need to address the frequency of vehicular collisions and the continuing quest for enhanced roadway safety. One purpose of this plan is to advance that quest and contribute in some small way to the greater safety of motorists, bicyclists and pedestrians on the streets and highways of the Mississippi Gulf Coast.

Safety Management System (SMS)

Traffic safety programs are relatively uniform from state to state in their approach to making the highway system safer for their users. The typical traffic safety program combines several different features from an SMS, which all states were mandated to have following enactment of the *Intermodal Surface Transportation Efficiency Act* of 1991 (Public Law 102-240). Commonly known as ISTEA, the act required the SMS to address the following:

- Coordinating and integrating safety features for the various modes of travel;
- Identifying hazardous locations, investigating them, and establishing countermeasures to increase safety;
- Early consideration for safety in all highway projects and programs;
- Identifying safety needs of special user groups (handicapped, elderly, etc.);
- Routinely maintaining and upgrading the safety features on the roadways;
- Marketing safety programs to encourage community involvement.

The SMS mandate was later withdrawn due to the 1995 *National Highway System Designation Act* (Public Law 104-59, 109 Stat. 568). However, Section 1203 of the *Moving Ahead for Progress in the 21st Century Act* (Public Law 112-141), adopted in 2012, required that each state and MPO have a planning process that addresses the safety performance measure to "achieve a significant reduction in traffic fatalities and serious injuries on all public roads." Commonly known as MAP-21, the act also retains the requirement previously imposed by the *Safe, Accountable, Flexible, Transportation Equity Act: A Legacy for Users* (Public Law 109-59) that the planning process address the need to "increase the safety of the transportation system for motorized and non-motorized users." A traffic safety program involves several steps, and programs are relatively uniform throughout the United States. The typical traffic safety program includes the following elements:

- A crash record system;
- Identification of hazardous locations;
- Engineering studies;
- Selection of countermeasures;
- Prioritization of improvement projects;
- Planning and implementation of improvement projects;
- Evaluation of the implemented projects.

The crash record system should contain data on individual crashes that occur in the area. The crash data should include the following information: Time, date, weather, pavement condition, driver and roadway. The primary source for this data is usually police reports from local jurisdictions. In order for this record system to be useful, the data has to be processed and available on a timely basis so that it can be analyzed.

The identification of hazardous locations is based on actual crashes that have occurred and/or the perceived potential of an area to have a high number of crashes. The severity of these crashes must also be considered in order to prioritize the locations and develop solutions for problems associated with each. Once the hazardous locations are identified, engineering studies can be conducted using the crash record system data. An analyst can make use of crash frequency data, Equivalent Property Damage Only (EPDO) rates and other statistical approaches. Supplemental data from police comments and citizen complaints can also be used in the analytical process in attempting to identify the causes of crashes.

Once cause has been determined, countermeasures can be proposed and evaluated. Improvement projects can then be selected on the basis of benefits they would provide compared to the cost required to implement them. Sometimes, enforcement and education may be all that is necessary in order to reduce the number of crashes. In other cases multiple projects may be needed to mitigate conditions at a particular problem area.

Once projects have been selected, they need to be prioritized based on previously identified benefits and costs. Funding limitations may rule out any possibility of implementing certain projects. Once those that are considered feasible have been prioritized, a plan should be developed for their implementation. An implementation plan will help ensure that the necessary financial and other are available to complete the selected projects in a timely manner. Implementation of the projects should occur as soon as possible to avoid cost increases and prevent potential crashes that may occur without the project in place.

Projects must be evaluated to determine whether they are effective or can be used to address similar problems in the future. This is typically done in a before-and-after analysis by observing the frequency and severity of the crashes several years before the implementation of the project, and then for several years after the project has been completed. Two issues can arise in this method of analysis. First, if enforcement and/or education change from *before* to *after* conditions, it can affect the number of crashes at that location. Second, *regression to the mean*, a statistical phenomenon that can make natural variation in repeated data look like real change, must be taken into account to ensure that a change in crash patterns and/or frequency is actually attributable to the improvements made. In order to correct for these two issues, the methodology employed for the analysis should include the establishment of control sites similar to the study locations that have not had any changes made to them.

The safety element of the Mississippi Gulf Coast 2040 MTP focuses on gathering and analyzing available crash data and then identifying hazardous locations. Due to the limited scope of this study, it does not identify location-specific recommendations for the identified hazardous locations. However, potential countermeasures which could be used to mitigate various crash types have been included in Section 8.1.

Study Area Crash Data Analysis

Safety Analysis Management System (SAMS) data, provided by the Mississippi Department of Transportation (MDOT), were used to georeference crash locations by linking latitude and longitude coordinates to the reports. Crash reports from Hancock, Harrison and Jackson counties, for the period from 2011 through 2013, were used to conduct a safety analysis of the study area. The crash records included the time and location of the accident, its severity, and the crash location conditions. A total of 27,592 crashes occurred within the study area (see Table 6-10). There were in excess of 9,000 crashes in each of the three years, and in each year more than half of all crashes occurred in Harrison County.

Table 6-10:
CRASHES BY YEAR BY COUNTY (2011 - 2013)

CRASH YEAR	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER
2011	697	4,603	3,812	9,112
2012	730	4,640	3,640	9,010
2013	845	4,839	3,786	9,470
TOTAL	2,272	14,082	11,238	27,592

Source: Mississippi Department of Transportation Safety Analysis Management System *(SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.*

Crash Trends

The first step in improving travel safety is determining the causes of crashes. This study analyzed time, surface condition, lighting, severity, collision type, bicycle or heavy vehicle involvement, and whether or not alcohol was a factor. The first factor on which the study focused was the time at which the crash under investigation occurred (see Table 6-11). Approximately 75 percent of all crashes occurred between 8 a.m. and 8 p.m., hours in which people were traveling to work, school, shopping and other activities. The largest number of crashes occurred between 3 p.m. and 6 p.m., when traffic tends to be the heaviest.

Another factor to consider is the condition of the roadway surface at the time of the crash. While most crashes occurred on dry roads, a significant number--4,685 or 17.0 percent of the total--occurred on wet roads (see Table 6-12). Wet roadway surface conditions might have been a factor in some instances, but the overwhelming majority of crashes happened when rain was not falling and wet conditions did not exist.

Lighting conditions at the time of a crash may or may not have been a factor. Over 73 percent of all crashes occurred during daylight (see Table 6-13). About 14 percent of crashes occurred when it was dark outside but there were street lights in the area; another 10 percent occurred at night but in areas that were not illuminated by street lights.

Table 6-11:
CRASHES BY TIME OF DAY BY COUNTY (2011-2013)

HOUR BEGINNING	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Midnight	31	182	150	363	1.32%
1:00 AM	26	138	126	290	1.05%
2:00 AM	29	134	110	273	0.99%
3:00 AM	23	133	101	257	0.93%
4:00 AM	32	138	149	319	1.16%
5:00 AM	49	145	302	496	1.80%
6:00 AM	59	308	318	685	2.48%
7:00 AM	136	729	551	1,416	5.13%
8:00 AM	81	517	462	1,060	3.84%
9:00 AM	75	544	384	1,003	3.64%
10:00 AM	90	653	488	1,231	4.46%
11:00 AM	130	894	614	1,638	5.94%
12:00 PM	126	1,033	665	1,824	6.61%
1:00 PM	174	982	692	1,848	6.70%
2:00 PM	135	1,095	854	2,084	7.55%
3:00 PM	183	1,252	1,057	2,492	9.03%
4:00 PM	216	1,175	991	2,382	8.63%
5:00 PM	196	1,296	1,059	2,551	9.25%
6:00 PM	144	769	629	1,542	5.59%
7:00 PM	96	588	430	1,114	4.04%
8:00 PM	83	464	376	923	3.35%
9:00 PM	62	359	317	738	2.67%
10:00 PM	61	318	221	600	2.17%
11:00 PM	35	236	192	463	1.68%
Unlisted	0	0	0	0	0.00%
TOTAL	2,272	14,082	11,238	27,592	100.00%

Source: Mississippi Department of Transportation Safety Analysis Management System *(SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.*

The type of collision is also an important factor in determining the cause of crashes. Rear-end collisions were far and away the most frequently recorded type of crash during the study period (see Table 6-14). Nearly as many rear-end crashes occurred (10,266) as were recorded for the next two most frequent categories combined. The system recognizes 21 different types of crashes, but the four most commonly occurring—Rear-end (37.2 percent), Angle (19.9 percent), Run off road (18.3 percent) and Sideswipe (10.1 percent)—collectively accounted for 85.5 percent of all accidents. Rear-end crashes are typically concentrated at or near signalized intersections.

Table 6-12:
CRASHES BY ROADWAY SURFACE CONDITION BY COUNTY (2011-2013)

ROADWAY SURFACE CONDITION	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Dry	1,783	11,576	9,322	22,681	82.2%
Wet	459	2,380	1,846	4,685	17.0%
Water	10	66	29	105	0.4%
Ice	0	1	0	1	0.0%
Sand/Mud/Dirt/Oil/Gravel	7	35	10	52	0.2%
Unlisted	13	24	31	68	0.2%
TOTAL	2,272	14,082	11,238	27,592	100.0%

Source: Mississippi Department of Transportation Safety Analysis Management System *(SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.*

Unlike roadway surface or lighting conditions, or the type of collision, crash severity is not a cause or contributing factor but a way to measure the outcome of the accident. Of the 27,592 crashes that occurred in the Mississippi Gulf Coast area during the three-year period from 2011 through 2013, 154 resulted in fatalities and 8,475 involved injuries (see Table 6-15). Only 1.2 percent of the total were crashes that resulted in either a fatality or severe injury; about 69 percent had no injuries reported.

Between 2011 and 2013, pedestrians were involved in 246 traffic accidents in the study area (see Table 6-16). That represented less than one percent of all vehicular crashes. However, 22 of those accidents involving pedestrians resulted in fatalities, accounting for 14.3 percent of all fatal crashes in the study area. Bicyclists were involved in 98 crashes--less than one-half of one percent of the study area total--including two fatal accidents (see Table 6-17). Heavy vehicles were involved in 445 accidents or 1.6 percent of all crashes in the study area between 2011 and 2013 (see Table 6-18). Four resulted in fatalities.

The last characteristic examined in this analysis was the possible involvement of alcohol in a vehicular mishap. The data indicated that in 5.8 percent of all crashes the accident report noted the consumption of alcohol as a factor (see Table 6-19). Moreover, alcohol as a factor in fatal crashes was twice as prevalent. Of the 154 fatal crashes that occurred in the three-county metropolitan area over the three-year period studied, 18 were alcohol-related. That represents a disproportionately high 11.7-percent share of all fatal crashes in the area.

Crash Locations

There were 10,148 intersection crashes in the study area in the three years from 2011 through 2013. The total number of crashes at each intersection was computed by summing accidents located on one road within 100 feet of the road intersecting it, then doing the same for crashes on the other road and combining the results.

Table 6-13:
CRASHES BY ROADWAY LIGHTING BY COUNTY (2011-2013)

LIGHTING CONDITION	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Daylight	1,637	10,478	8,089	20,204	73.2%
Dark – Lit	280	2,157	1,436	3,873	14.0%
Dark – Unlit	306	1,162	1,382	2,850	10.3%
Dawn	26	92	143	261	0.9%
Dusk	23	193	188	404	1.5%
TOTAL	2,272	14,082	11,238	27,592	100.0%

Source: Mississippi Department of Transportation Safety Analysis Management System *(SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.*

Table 6-14:
CRASHES BY TYPE OF COLLISION BY COUNTY (2011-2013)

TYPE OF COLLISION	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Run off road	624	2,345	2,080	5,049	18.3%
Vehicle overturn	5	21	17	43	0.2%
Object fell from vehicle	12	52	54	118	0.4%
Other object in road	14	44	50	108	0.4%
Roadside Object	2	133	57	192	0.7%
Pedestrian	6	160	80	246	0.9%
Bicycle	9	67	22	98	0.4%
Parked vehicle	37	308	407	752	2.7%
Train	3	16	13	32	0.1%
Rear End	706	5,350	4,210	10,266	37.2%
Left turn same roadway	127	996	611	1,734	6.3%
Left turn cross traffic	0	9	8	17	0.1%
Right turn cross traffic	0	2	1	3	0.0%
Head on	19	123	83	225	0.8%
Sideswipe	232	1,419	1,131	2,782	10.1%
Angle	419	2,866	2,204	5,489	19.9%
Hit and Run	2	40	28	70	0.3%
Jackknife	0	1	5	6	0.0%
Animal	52	121	159	332	1.2%
Other	3	8	16	27	0.1%
Unknown	0	1	2	3	0.0%
Total	2,272	14,082	11,238	27,592	100.0%

Source: Mississippi Department of Transportation Safety Analysis Management System *(SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.*

Table 6-15:
CRASHES BY SEVERITY BY COUNTY (2011-2013)

SEVERITY	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Fatal	25	79	50	154	0.6%
Severe	33	67	74	174	0.6%
Moderate	215	840	666	1,721	6.2%
Complaint	491	3,755	2,334	6,580	23.8%
No Injury	1,508	9,341	8,114	18,963	68.7%
Unlisted	0	0	0	0	0.0%
Total	2,272	14,082	11,238	27,592	100.0%

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.

The intersection with the highest incidence of accidents in each county was located on one of the two high-volume U. S. highways in the region: US 49 in Harrison County and US 90 in Hancock and Jackson counties (see Table 6-20). Not surprisingly, US 49 at Creosote Road in Gulfport, the most heavily traveled intersection in the region with a composite daily approach volume of approximately 72,000 vehicles, experienced the greatest number of accidents—289. The only other intersection that came close, Pass Road at Cowan Road in Gulfport, had 277 crashes and posted a close second in spite of the fact that there are at least 20,000 fewer vehicles approaching the intersection daily than there are at the first intersection. The most notable difference between the two is that traffic is distributed more evenly at the second with heavy volumes on three of the four approaches compared to only two at the top-ranked intersection. There is a greater preponderance of turning movements and hence greater potential for conflict. Other differences relate to intersection geometry and signalization. The Highway 49 intersection has dedicated left-turn lanes for all approaches plus a left-or-through lane for the eastbound approach from Creosote Road to US 49. At the intersection of Pass Road and Cowan Road there are dual dedicated left-turn lanes for all four approaches. Perhaps more significantly, while left turns from or to US 49 are permitted only on the green arrow, left turns from Pass Road to Cowan Road are protected on the green arrow and allowed on the green.

Table 6-16:
CRASHES INVOLVING PEDESTRIANS BY COUNTY (2011-2013)

PEDESTRIAN INVOLVED/NOT INVOLVED	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Pedestrian involved	6	160	80	246	0.89%
Pedestrian not involved	2,266	13,922	11,158	27,346	99.11%
Total	2,272	14,082	11,238	27,592	100.00%

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011- 2013 Crash Records for Hancock, Harrison, and Jackson counties.

Table 6-17:
CRASHES INVOLVING BICYCLES BY COUNTY (2011-2013)

BICYCLE INVOLVED/ NOT INVOLVED	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Bicycle involved	9	67	22	98	0.36%
Bicycle not involved	2,263	14,015	11,216	27,494	99.64%
Total	2,272	14,082	11,238	27,592	100.00%

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011- 2013 Crash Records for Hancock, Harrison, and Jackson counties.

Table 6-18:
CRASHES INVOLVING HEAVY VEHICLES BY COUNTY (2011-2013)

HEAVY VEHICLE INVOLVED/NOT INVOLVED	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Heavy vehicle involved	73	177	195	445	1.61%
Heavy vehicle not involved	2,199	13,905	11,043	27,147	98.39%
Total	2,272	14,082	11,238	27,592	100.00%

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011- 2013 Crash Records for Hancock, Harrison, and Jackson counties.

Table 6-19:
CRASHES INVOLVING ALCOHOL CONSUMPTION BY COUNTY (2011-2013)

ALCOHOL CONSUMPTION INVOLVED/NOT INVOLVED	HANCOCK COUNTY	HARRISON COUNTY	JACKSON COUNTY	TOTAL NUMBER	PERCENT OF TOTAL
Alcohol consumption involved	141	851	614	1,606	5.82%
Alcohol consumption not involved	2,131	13,231	10,624	25,986	94.18%
Total	2,272	14,082	11,238	27,592	100.00%

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011- 2013 Crash Records for Hancock, Harrison, and Jackson counties.

The top five intersection accident locations in Hancock County are all on US 90. Of the top 10 seven are on US 90 and the other three are on MS 43. Four of the top five--and seven of the top 10--intersection crash locations in Harrison County are on US 49. Two of the other three are on Highway 605 (Cowan Road and Lorraine Road). In Jackson County the top five intersection accident locations are on US 90: Two on Denny Avenue in Pascagoula and three on Bienville Boulevard in Ocean Springs. The top 10 include three on Denny Avenue and five on Bienville Boulevard.

Table 6-20:
TOP 10 INTERSECTIONS WITH HIGH INCIDENCE OF CRASHES BY COUNTY (2011-2013)

HANCOCK COUNTY		HARRISON COUNTY		JACKSON COUNTY	
Intersection	Crashes	Intersection	Crashes	Intersection	Crashes
US 90 @ MS 43/603 (Nicholson Ave)	76	US 49 @ Creosote Rd	289	Denny Ave (US 90) @ Hospital Rd	175
US 90 @ Waveland Ave	50	Cowan Rd (Hwy 605) @ E Pass Rd	277	Denny Ave (US 90) @ Chicot St	173
US 90 @ Blue Meadow Rd/Main St	38	US 49 @ Dedeaux Rd	221	Bienville Blvd (US 90) @ Washington Ave (Hwy 609)	113
US 90 @ McLaurin Rd	38	US 49 @ Crossroads Pkwy/Landon Rd	215	Bienville Blvd (US 90) @ Hanshaw Rd	99
US 90 @ Washington St	31	US 49 @ Community Rd	126	Bienville Blvd (US 90) @ Ocean Springs Rd	90
MS 43/603 @ I-10 EB Off Ramp	28	Lorraine Rd (Hwy 605) @ Seaway Rd	110	Hwy 609 @ Old Fort Bayou Rd	90
US 90 @ Drinkwater Blvd	26	US 49 @ Airport Rd/Poole St	106	Bienville Blvd (US 90) @ Hanley Rd	85
US 90 @ Lower Bay Rd	24	US 49 @ Pass Rd	105	Bienville Blvd (US 90) @ Martin Luther King Jr Ave/Vermont Ave	85
MS 43/603 @ Kiln-DeLisle Rd	24	Dedeaux Rd @ Three Rivers Rd	98	Denny Ave (US 90) @ Market St	81
MS 43/603 @ I-10 WB Off Ramp	23	US 49 @ 28th St	90	MS 63 @ Amoco Rd	71

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011- 2013 Crash Records for Hancock, Harrison, and Jackson counties.

Very few of the crashes occurring at the intersections with a high frequency of accidents resulted in fatalities or serious injuries. Data for the 20 intersections with the most accidents show that only four of 2,721 crashes involved death (three) or severe injury (one) (see Table 6-21). Moderate injuries were associated with 60 crashes; another 616 involved complaints. That leaves 2,041, or 75 percent, that were recorded as no-injury accidents.

Safety Analysis Conclusions

Within the study area a total of 27,592 crashes occurred between 2011 and 2013. The majority of these crashes took place between the hours of 8 a.m. and 8 p.m., with most occurring from 3 p.m. to 6 p.m. These peak-hour crashes are likely the result of intersections and/or roadways not being designed to operate efficiently when presented with large traffic volumes. Safety can probably be improved and collisions reduced by adjusting signal timing, making intersection improvements and/or adding lane(s).

Table 6-21
TOP 20 INTERSECTIONS WITH HIGH CRASH FREQUENCY BY SEVERITY (2011-2013)

RANK	INTERSECTION LOCATION	TOTAL	FATAL	SEVERE	MODERATE	COMPLAINT	NO INJURY
1	US 49 @ Creosote Rd	289	0	0	4	64	221
2	Cowan Rd (Hwy 605) @ E Pass Rd	277	0	0	4	64	209
3	US 49 @ Dedeaux Rd	221	0	0	2	33	186
4	US 49 @ Crossroads Pkwy/Landon Rd	215	0	0	1	40	174
5	Denny Ave (US 90) @ Chicot St	175	1	0	3	53	118
6	Bienville Blvd (US 90) @ Washington Ave (Hwy 609)	173	0	0	4	33	136
7	US 49 @ Community Rd	126	0	0	1	31	94
8	Denny Ave (US 90) @ Hospital Rd	113	0	0	4	28	81
9	Lorraine Rd (HWY 605) @ Seaway Rd	110	0	0	0	27	83
10	US 49 @ Airport Rd/Poole St	106	0	0	1	23	82
11	US 49 @ Pass Rd	105	0	1	5	24	75
12	Bienville Blvd (US 90) @ Hanshaw Rd	99	0	0	8	33	58
13	Dedeaux Rd @ Three Rivers Rd	98	0	0	1	21	76
14	Bienville Blvd (US 90) @ Ocean Springs Rd	90	0	0	3	19	68
15	Washington Ave (Hwy 609) @ Old Fort Bayou Rd	90	1	0	0	15	74
16	US 49 @ 28th St	90	0	0	2	21	67
17	US 49 @ MS 53/N Swan Rd	88	1	0	5	27	55
18	Lorraine Rd (Hwy 605) @ I-10 WB Off Ramp	86	0	0	4	20	62
19	Bienville Blvd (US 90) @ Hanley	85	0	0	2	21	62
20	Bienville Blvd (US 90) @ M L King Jr/Vermont Ave	85	0	0	6	19	60
TOTAL		2,721	3	1	60	616	2,041

Source: Mississippi Department of Transportation Safety Analysis Management System (SAMS), 2011-2013 Crash Records for Hancock, Harrison, and Jackson counties.

Approximately 82 percent of crashes in the study area occurred during dry roadway surface conditions; therefore, roadway surface conditions do not play a significant role in the majority of crashes. About 73 percent of crashes occurred during the daylight, with 24.5 percent of crashes occurring near a traffic signal or at locations with no street lights when it was dark. The crashes that occurred under these conditions are likely the result of poor lighting and can be reduced by providing proper lighting at intersections.

Within the study area there were 154 fatal crashes and 8,475 injury crashes during the period analyzed. About five percent of all crashes involved alcohol, but 11.6 percent of fatal accidents were alcohol-related.

The four most prevalent types of collisions, collectively making up nearly 86 percent of all crashes in the study area, were the following:

- Rear-end collisions;
- Angle collisions;
- Run off road collisions; and
- Side-swipe collisions.

Recommendations for reducing these types of crashes are outlined in Chapter 8.0: Future Transportation Needs.