

Appendix C

The Economic Profile of the Lower Mississippi River: An Update 2014

Demand for Nature Based Tourism in the Lower Mississippi River Region 2013



The Economic Profile of the
Lower Mississippi River:

An Update

Final Report | February 2014



prepared for:

Lower Mississippi River Conservation Committee

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

CHAPTER 1 INTRODUCTION

- Purpose *1-1*
- LMR Study Area *1-1*
- Methodology and Data Sources *1-7*
- Report Structure *1-9*

CHAPTER 2 COMMERCIAL HARVEST OF NATURAL RESOURCES

- Forestry *2-1*
 - Timber Harvest *2-4*
 - Non-Timber Forest Products *2-7*
- Marine Commercial Fishing *2-8*
- Freshwater Commercial Fishing *2-12*
- Alligator Hunting *2-12*
- Trapping *2-13*
- Data Sources and Methodology *2-13*

CHAPTER 3 OUTDOOR RECREATION

- Protected Lands in the LMR Corridor *3-1*
- Outdoor Recreation Activities in the LMR *3-4*
- Outdoor Recreation Expenditures and Employment in the LMR *3-10*
- Data Sources and Methodology *3-15*

CHAPTER 4 TOURISM

- Expenditures and Employment *4-1*
- Tourist Destinations *4-4*
 - New Orleans, Louisiana *4-4*
- The Deepwater Horizon Oil Spill Impact on Tourism in the LMR *4-6*
 - Memphis, Tennessee *4-7*
- Gaming Industry in the LMR *4-7*
- Riverboat Cruises and Tours *4-8*
- National Historic Landmarks in the LMR *4-9*
- Data Sources and Methodology *4-9*

CHAPTER 5 WATER SUPPLY

- Overview of Water Supply and Water Users *5-1*
 - Public Surface Water Supply Systems *5-5*
 - Self-Supplied Surface Water *5-5*
- Revenues and Employment in the Water Supply Sector *5-6*
- Data Sources and Methodology *5-8*

CHAPTER 6 AGRICULTURE

- LMR Farmland, Employment and Revenues *6-1*
- Agricultural Crops *6-5*
 - Corn *6-6*
 - Soybean *6-11*
 - Rice *6-11*
 - Agricultural Livestock Production *6-12*
 - Aquaculture *6-14*
 - Oysters *6-16*
- Data Sources and Methodology *6-17*

CHAPTER 7 MINERAL RESOURCES

- Oil and Gas Extraction *7-1*
- Non-Fuel Mineral Resources *7-5*
 - Salt *7-5*
 - Clay *7-5*
 - Crushed Stone *7-5*
 - Sand and Gravel *7-6*
- Data Sources and Methodology *7-7*

CHAPTER 8 ENERGY GENERATION AND PRODUCTION

- Energy Generation *8-1*
- Power Consumption in the LMR *8-5*
- Employment and Revenues in the LMR *8-6*
- Data Sources and Methodology *8-9*

CHAPTER 9 COMMERCIAL NAVIGATION

- Navigation System in the LMR *9-1*
 - Current State of Navigation on the LMR *9-2*
- Cargo Shipments on the LMR *9-4*
- Ports in the LMR *9-6*
- Panama Canal Extension and the LMR *9-8*
- Data Sources and Methodology *9-9*

CHAPTER 10 MANUFACTURING

- Manufacturing Revenues and Employment *10-1*
- Major Manufacturing Activities in the LMR Corridor *10-7*
 - Chemicals and Allied Products *10-7*
 - Food Manufacturing *10-7*
 - Machinery Manufacturing *10-8*
 - Fabricated Metal Product Manufacturing *10-8*
 - Other Significant Manufacturers *10-9*
- Manufacturers Use of the LMR *10-9*
 - National Pollutant Discharge Elimination System *10-10*
- Data Sources and Methodology *10-12*

CHAPTER 11 NATURAL RESOURCE SERVICES NOT DIRECTLY REFLECTED IN THE MARKET ECONOMY

- Ecosystem Services in the LMR Corridor *11-1*
 - Climate Change Mitigation *11-1*
 - Services Provided by LMR Wetlands *11-6*
- Habitat Services of the LMR Corridor *11-8*
- Wastewater Treatment, Water Pollution, and Hypoxia *11-9*

REFERENCES**APPENDIX A ADDITIONAL TABLES**

EXECUTIVE SUMMARY

The purpose of this study is to develop a profile of the regional economic activity dependent upon the Lower Mississippi River (LMR), the portion of the Mississippi flowing from southern Illinois to the Gulf of Mexico. This report is an updated analysis of a corresponding work produced in 2004.¹ The profile provides an overview of economic activity in the LMR region today, and discusses recent trends. Recent years have been particularly turbulent for the LMR region, with notable events including the major hurricanes Katrina and Rita in 2005, the economic crises in 2008 and 2009, the *Deepwater Horizon* oil spill in the Gulf of Mexico in 2010, and extreme flooding in 2011 followed by an extreme drought in 2012.

The ultimate objective of this report is to enhance understanding among government agencies, legislative bodies, private organizations, and individual citizens of the relative significance of key economic sectors in the LMR region, providing an information source for future river management decisions.

LMR CORRIDOR

The report focuses on economic activities in the LMR region, which encompasses more than 71,000 square miles and includes 113 counties in seven states: Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana. For simplicity, the study area is referred to in the report as the ‘LMR Corridor’ or ‘LMR Region.’ Louisiana has the most counties (41), the largest percent of state land area included (59 percent), and the largest population (3.4 million) in the LMR Corridor.

RIVER-RELATED ECONOMIC SECTORS

The study evaluates the economic significance of ten key “river-related” economic sectors. These sectors use the river ecosystem in a number of ways. Many of the sectors directly utilize the waters of the river for purposes that include water supply, cooling, transport, harvest, recreation, and/or waste disposal. In addition, the natural beauty of the river and its surrounding habitats support other economic sectors, including tourism and recreation.

Considered together, the river-related LMR sectors produced \$151.7 billion in annual revenues in 2011, and employed just over 585,000 people, as shown in Exhibit ES-1. The total revenues are dominated by the manufacturing sector, which generated over 70 percent of total revenues (\$106 billion) in river-related sectors within the LMR Corridor in 2011. Tourism contributed 10 percent of river-related values, followed by agriculture, energy production, and mineral resources extraction.

¹ IEc, 2004, *Economic Profile of the Lower Mississippi River*.

EXHIBIT ES-1. REVENUES (\$MILLIONS) AND EMPLOYMENT IN THE LMR CORRIDOR, 2011

SECTOR	REVENUES*		EMPLOYMENT	
	\$ MILLION	PERCENTAGE	# PEOPLE	PERCENTAGE
Harvest of Natural Resources	559	0.4%	13,726	2.3%
Outdoor Recreation	1,335**	0.9%	54,476	9.3%
Tourism	15,501	10.2%	190,395	32.5%
Water Supply	385	0.3%	601	0.1%
Agriculture and Aquaculture	8,737	5.8%	56,102	9.6%
Mineral Resources	7,816	5.2%	41,443	7.1%
Energy	6,758	4.5%	2,730	0.5%
Navigation	4,219	2.8%	18,764	3.2%
Manufacturing	106,394	70.1%	207,186	35.4%
Ecosystem Services (non-market)	Unquantified		Unquantified	
Total LMR:	151,703***	100%	585,423***	100%
Notes:				
* Economic values generated by Tourism and Outdoor Recreation sectors are measured as expenditures.				
** The Outdoor Industry Association (OIA) produced a report that estimated the economic contribution of outdoor recreation, including estimates for motorized and non-motorized activities at the state level. The OIA survey suggests that trip-related expenditures for motorized and non-motorized visits would have been \$7.5 billion in the LMR Corridor. However, it is unclear whether these numbers may double count some of the estimates provided in the well-recognized FWS survey used in this report. Thus, we have conservatively not included OIA estimates in our measure of the total recreational expenditures in the LMR. To the extent that these estimates do not overlap, our estimates of recreational values in the LMR Corridor could be understated.				
*** Totals may not sum due to rounding.				
Sources: IEc analysis. For detailed source information, please refer to individual chapters.				

Employment is more equally distributed across the ten sectors. Manufacturing employs the largest number of workers, but its contribution of 35 percent is more moderate (relative to its contribution to revenues) and is just slightly higher than employment in the tourism sector. Tourism is a major contributor to the labor market in the LMR, providing 33 percent of the employment in all ten sectors. The third largest source for the LMR's total river-related employment is agriculture, with the outdoor recreation sector contributing almost as many workers.

Geographically, the highest total revenues and employment occurred in Louisiana's portion of the LMR Corridor, which includes contributions from manufacturing as well as the tourism sector in New Orleans and Baton Rouge, Louisiana. Other areas reporting high revenues include Arkansas LMR Corridor areas, which have a strong agricultural sector and manufacturing concentrated in Little Rock, Arkansas. A robust source of

revenues for the LMR Corridor comes also from Tennessee's LMR counties, which are driven by tourism and manufacturing in Memphis, Tennessee.

Key findings for individual economic sectors include the following:

- **Commercial Harvest of Natural Resources:** Annually, LMR natural resources provide over 375 million cubic feet of timber products, almost 20 million pounds of freshwater fish, over 1 billion pounds of seafood, and between 28,000 and 35,000 alligator skins. This diverse sector produces in the LMR corridor annual revenues of \$559 million and employs over 13,000 people.
- **Outdoor Recreation:** The LMR corridor offers a variety of recreational opportunities for anglers, hunters, and outdoor enthusiasts interested in wildlife watching. These opportunities attract 38 million trips that generate \$1.3 billion in expenditures and provide jobs for over 54,000 people.
- **Tourism:** The tourist sector in the LMR corridor generates \$15.5 billion in annual expenditures, making it the second largest sector after manufacturing in the region. Tourism is estimated to provide employment to 190,000 workers. This sector has survived numerous natural and manmade disasters during the last decade. For example, the city of New Orleans lost \$2 billion in expenditures during the first 12 months after Hurricane Katrina. The sector shows long term resilience and is expected to make meaningful future economic contributions to the LMR region.
- **Water Supply:** Overall, over 11.8 billion gallons of surface water are withdrawn each day by water users in the LMR corridor, which represents approximately four percent of all U.S. fresh surface-water withdrawals. The water supply and sewerage sector in the LMR corridor employs roughly 600 people and generates an estimated \$385 million in annual revenue.
- **Agriculture:** The agricultural sector is the third largest contributor to the regional economy for the LMR corridor. It is dominated by crop production, followed by livestock, and aquaculture. LMR farmland covers 22.5 million acres, with a value of \$51 billion. The land produces \$7.2 billion in crop revenues annually, which represents 5 percent of U.S. production.² The agricultural sector as a whole in the LMR Corridor generates \$8.7 billion, and provides employment to at least 56,000 workers. During the flood of 2011, the agricultural sector lost an estimated \$660 million in revenue.
- **Mineral Resources:** This sector encompasses both fuel (natural gas and oil) and non-fuel minerals: salt, clay, crushed stone, and sand and gravel. The LMR counties that produce crude oil and natural gas are located within the states of Louisiana and Mississippi. The total annual LMR production in 2004 was 398 billion cubic feet of natural gas (representing approximately 1.6 percent of total

² Total U.S. annual crop revenues in 2007 were almost \$136 billion. (Sources: Census Bureau,

U.S. production)³ and almost 56 million barrels of oil (representing approximately 2.8 percent of total U.S. production).⁴ Overall, the mineral sector generates \$7.8 billion in annual revenues and provides employment to 41,443 workers receiving \$3.6 billion in wages.

- **Energy Production:** The LMR energy sector includes 108 power plants that generated more than 100 million megawatt-hours in 2012 for the LMR corridor. Coal, natural gas, and nuclear energy generation are the dominant energy sources. The LMR corridor also has several non-renewable power plants supported by bio and hydro power. The sector produces \$6.8 billion in annual revenues and provides employment to at least 2,700 workers.
- **Commercial Navigation:** The commercial navigation sector in the LMR corridor is inseparable from the function and maintenance of the river. Over 470 million short tons of cargo are shipped through the LMR annually. The sector generates \$4.2 billion in revenue and employs 18,764 workers annually.
- **Manufacturing:** The LMR corridor's manufacturing sector encompasses operations ranging from food processing to chemical manufacturing. In 2007, manufacturers generated \$106.4 billion in revenue (2011 dollars) and employed roughly 207,000 people, with most of the activity concentrated in Louisiana, Tennessee, and Arkansas.
- **Natural Resource Services Not Reflected in the Commercial Economy:** The ecosystems in the LMR Corridor provide numerous biological and ecological services that are not captured by the previously described nine economic sectors. For example, coastal marshes of Louisiana serve as nurseries for numerous marine organisms, including many commercially important seafood species, such as shrimp. The coastal marshes and barrier islands also provide a physical barrier against strong winds and hurricanes. Both coastal as well as inland wetlands provide flood control. The water of the LMR itself dilutes and treats waste. The LMR supports a rich diversity of fish and invertebrate fauna that includes several threatened and endangered species, such as the pallid sturgeon and several rare species of mussels. LMR wetlands are also home to unique flora, including species such as cattails, swamp rose, spider lilies, and cypress trees. The LMR Corridor provides habitat for numerous terrestrial endangered or threatened species, including the Louisiana black bear, piping plover, and green sea turtle.

There are 11 million acres of forested land in the LMR corridor that store over 400 million tons of carbon above and below ground in living trees. Over 50,000

"Statistical Abstract of the United States. Section 17: Agriculture" 2007. Accessed at: <https://www.census.gov/prod/2011pubs/12statab/agricult.pdf>

³ National production of natural gas in 2011 was 24,036,352 MMcf. (Sources: EIA, "Natural Gas Production Data" Accessed at: <http://www.eia.gov/dnav/ng/hist/n9050us2A.htm>)

⁴ National production of crude oil in 2004 was 1.9 billion barrels. (Sources: EIA, "Crude Oil Production." Accessed at: http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbb1_m.htm)

acres of land in the Mississippi Delta are currently under a privately managed carbon reforestation program that offers private landowners revenues from carbon credits equal to \$600 to \$1,200 per acre in 15 years. In the future, there may be potential to obtain additional income from implementation of conservation strategies in agricultural production to reduce hypoxia in the Gulf of Mexico. The extra income from sale of nitrogen and phosphorus credits may range from \$12.00 to \$33.00 per acre. In 2012 and 2013, the Lower Mississippi River Conservation Committee (LMRCC), the Mississippi River Trust and the Natural Resources Conservation Service signed up 10,000 acres of batture, an area of active floodplain, to be placed under easement and reforested to provide the unique services of contiguous forested wetlands. The Wetlands Reserve Program in the LMR Corridor (not including the Kentucky-LMR counties) has successfully enrolled 873,000 acres in a similar program.

EXHIBIT ES-2. REVENUES (\$MILLIONS) FROM ALL RIVER-RELATED SECTORS IN THE LMR CORRIDOR, 2011

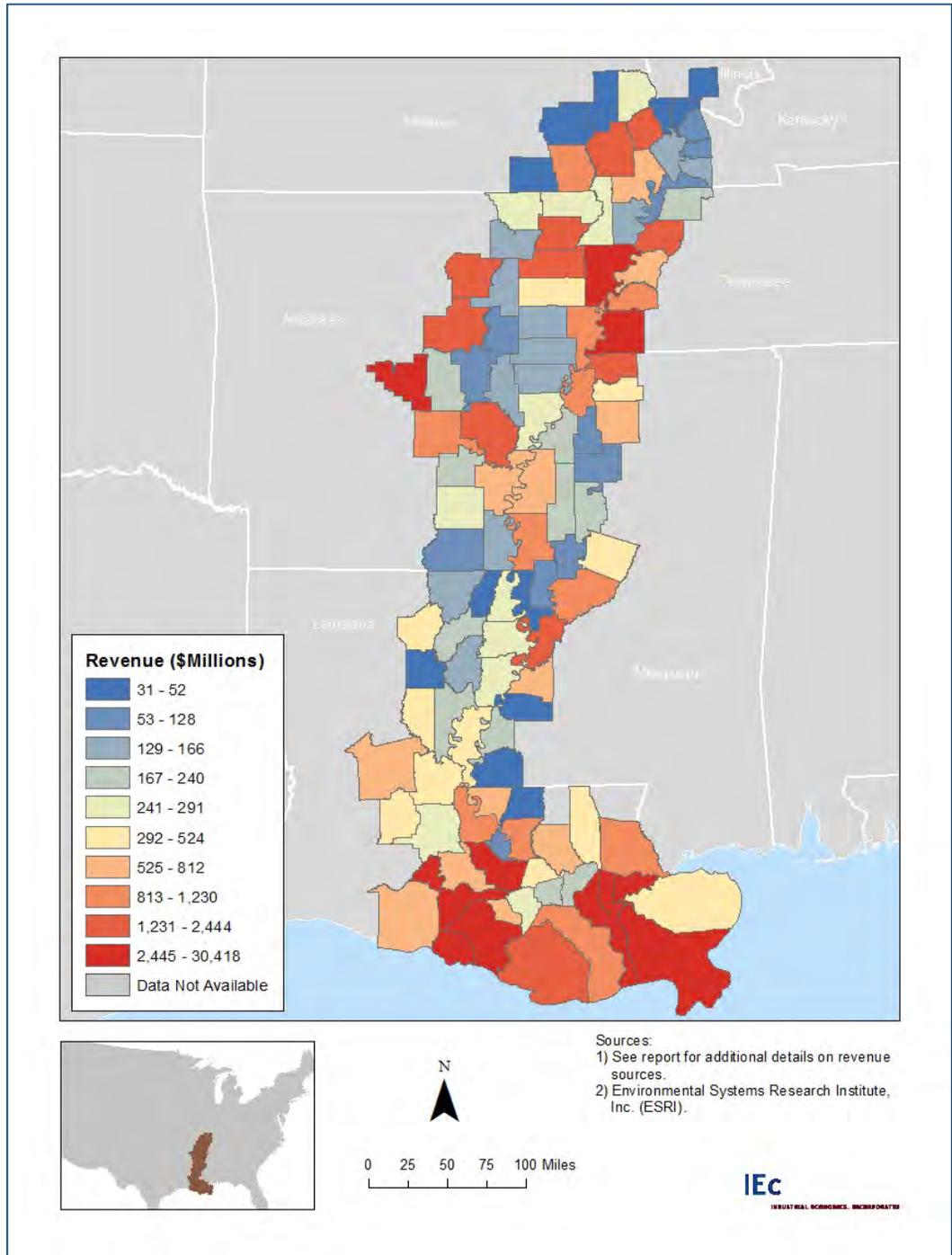
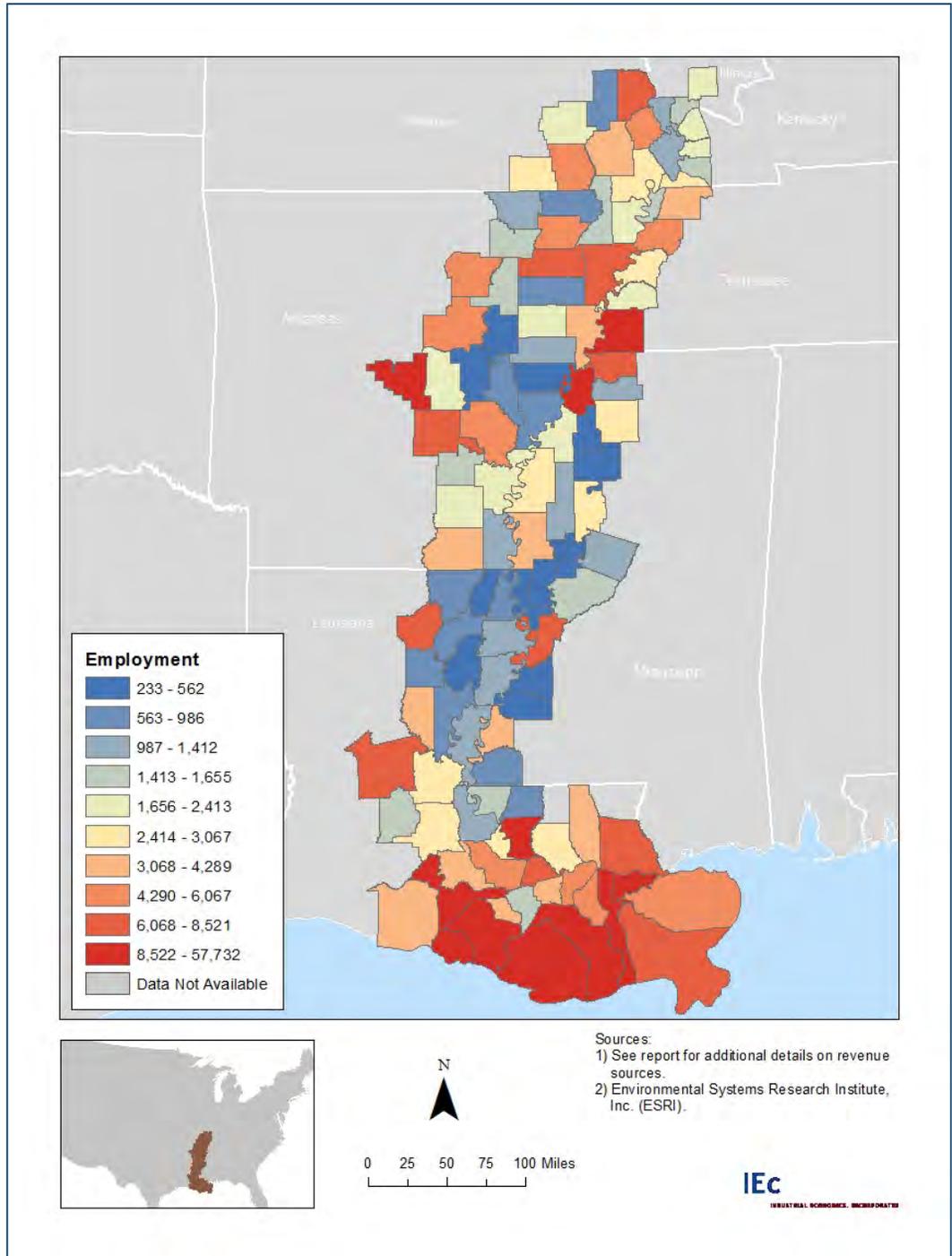


EXHIBIT ES-3. EMPLOYMENT IN ALL RIVER-RELATED SECTORS IN THE LMR CORRIDOR, 2011



CHAPTER 1 | INTRODUCTION

PURPOSE

Throughout U.S. history, the Mississippi River has occupied a central place in commerce. In the 18th and 19th centuries, agriculture flourished in the Mississippi Alluvial Plain and New Orleans was established as a hub of international trade. Today, the river continues to serve as a pillar in the U.S. economy. Individuals and businesses rely on the Mississippi for transportation, water, food, recreation, and a variety of other goods and services. As a result, the regional economies surrounding the river, as well as the national economy, benefit from careful conservation and management of the Mississippi.

The purpose of this study is to develop a profile of the regional economic activity dependent upon the Lower Mississippi River (LMR), the portion of the Mississippi flowing from southern Illinois to the Gulf of Mexico. This report is an updated analysis of a corresponding work produced in 2004.⁵ The profile provides an overview of economic activity in the LMR region today, and discusses recent trends. Recent years have been particularly turbulent for the LMR corridor, with notable events including the major hurricanes Katrina and Rita in 2005, the economic crises in 2008 and 2009, the *Deepwater Horizon* oil spill in the Gulf of Mexico in 2010, and extreme flooding in 2011 followed by an extreme drought in 2012.

The ultimate objective of this report is to enhance understanding among government agencies, legislative bodies, private organizations, and individual citizens of the relative significance of key economic sectors in the LMR corridor, providing an information source for future river management decisions.

LMR STUDY AREA

For the purposes of this study, the LMR is defined as the main stem of the Mississippi River from Cairo, Illinois (at the Upper Mississippi River confluence with the Ohio River) to the Gulf of Mexico. The hydrology of the LMR area is shown in Exhibit 1-2. The LMR, extending for 954 miles, constitutes 41 percent of the entire Mississippi River's length. It crosses Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana. The study area spans 113 counties and parishes in these states and includes the territory of the current and historic LMR riverbed as well as the Atchafalaya River tributary (see Exhibit 1-3). Appendix A, Exhibit 1A-1 provides a complete list of LMR counties included in the study area. The study area also intersects 21 congressional districts (see Exhibit 1-4).

⁵ IEc, 2004, *Economic Profile of the Lower Mississippi River*.

For simplicity, the study area is referred to in the report as the ‘LMR Corridor’ or ‘LMR Region.’ As shown in Exhibit 1-1, Louisiana has the most counties (42), largest percent of state land area included (59 percent), and largest population (3.4 million) in the LMR Corridor.

The LMR Corridor encompasses more than 71,000 square miles. The total population of LMR Corridor counties was over 6.5 million in 2011, with 85 percent of the population residing in urban areas in Louisiana, Arkansas, or Tennessee. The land cover within the region, as demonstrated in Exhibit 1-5, is primarily a mix of farmland, forest, and wetland. Except for the southern tip of the corridor where wetland areas dominate, the majority of the region is farmland with forested areas occurring on the edges.

EXHIBIT 1-1. CHARACTERISTICS OF THE LMR CORRIDOR

STATE	NUMBER OF COUNTIES	PERCENT OF STATE AREA IN LMR CORRIDOR	POPULATION IN THE LMR CORRIDOR (2007-2011)
Arkansas	26	37.6%	1,167,472
Illinois	3	1.4%	27,164
Kentucky	4	2.4%	25,070
Louisiana	42	59.1%	3,359,710
Mississippi	21	26.3%	603,859
Missouri	10	9.7%	310,349
Tennessee	7	7.2%	1,091,809
Total LMR Corridor	113	20%	6,585,433
Source: U.S. Census Bureau, American Community Survey, 2011 5-Year Average Data.			

EXHIBIT 1-2. HYDROLOGY OF THE LMR CORRIDOR

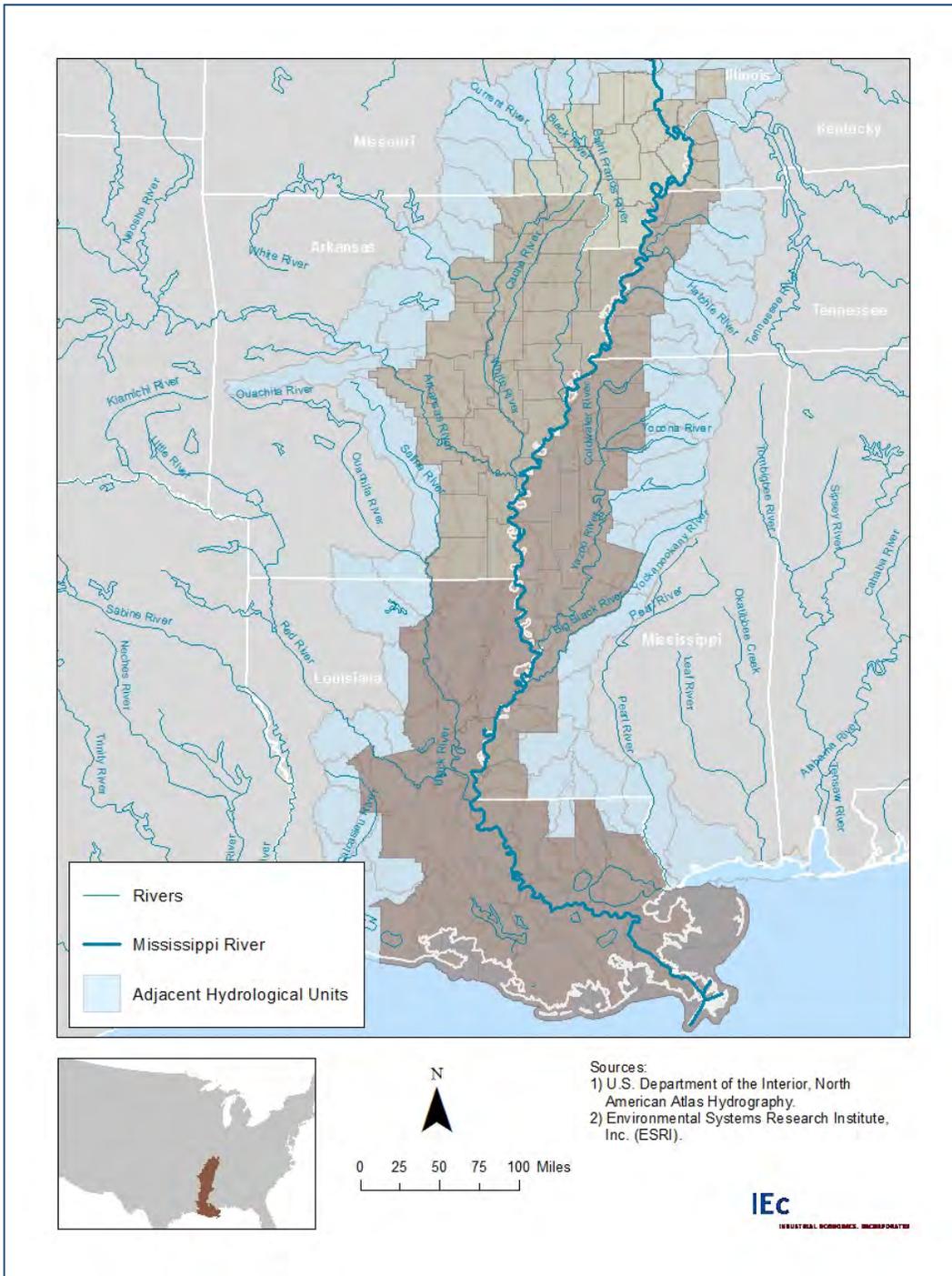


EXHIBIT 1-3. LMR CORRIDOR STUDY AREA

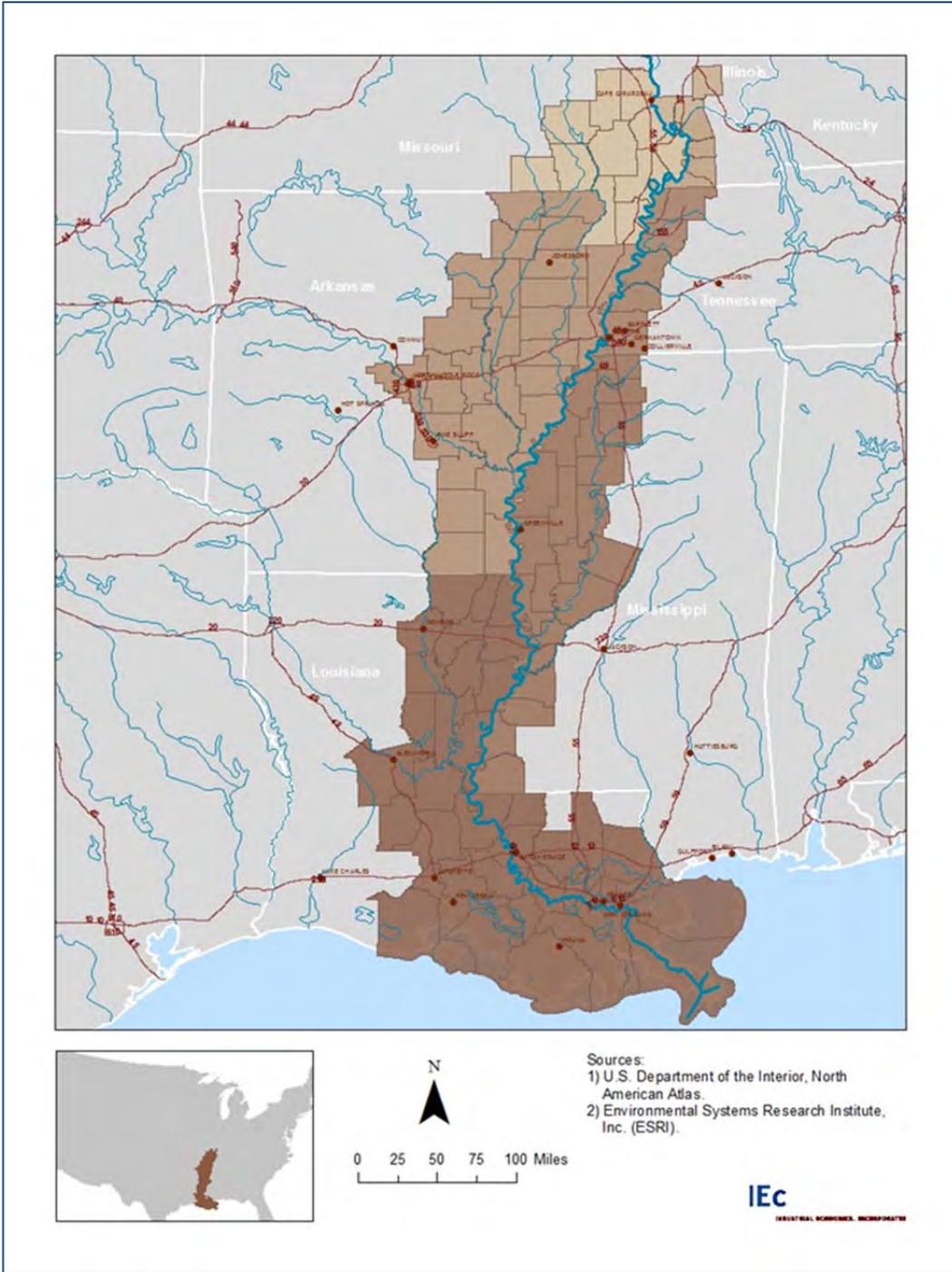
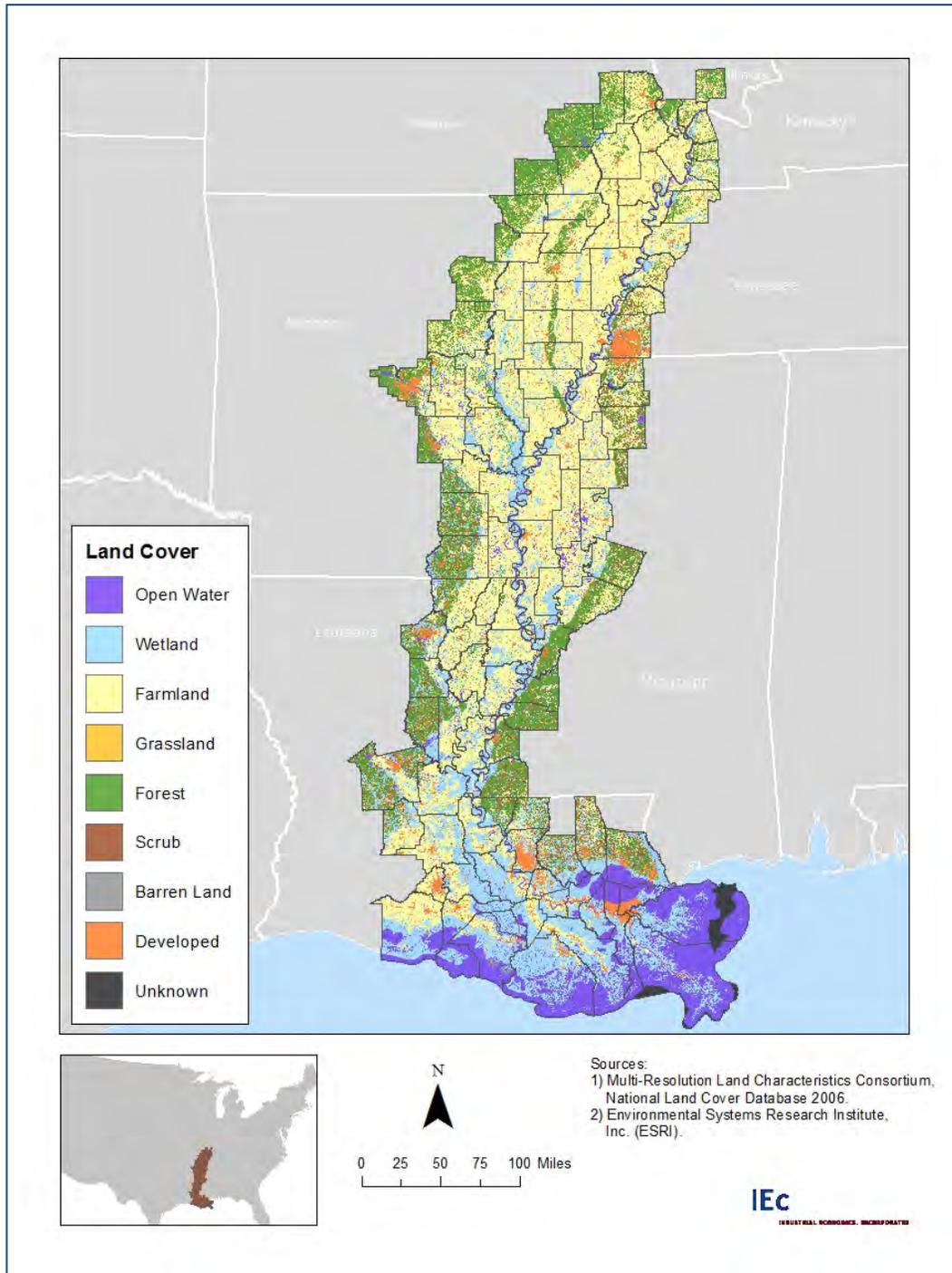


EXHIBIT 1-5. LAND COVER OF THE LMR CORRIDOR



METHODOLOGY AND DATA SOURCES

The study evaluates the economic significance of the LMR Corridor by identifying and measuring economic activities in each of ten selected sectors, followed by calculating revenues⁶ and employment figures produced by these activities. The considered sectors have been selected based on their direct or indirect dependence on the LMR. The analyzed sectors include:

- **Sector 1: Commercial Harvest of Natural Resources.** This sector addresses the extensive resources harvested for commercial purposes in the LMR. Both forest and non-forested terrestrial ecosystems depend on rich alluvial soil created by the river. The river itself and its tributaries host an abundance of commercially fished species. Off shore marine fisheries also depend on the LMR, because all commercially harvested species off the LMR coast need the estuaries and wetlands during some parts of their lifecycle. The LMR dependent wetlands in the corridor also provide habitat for alligators hunted for commercial purposes.
- **Sector 2: Outdoor Recreation.** The LMR Corridor offers an abundance of freshwater fishing opportunities along the river and its tributaries as well as marine fishing off the coast in Louisiana. The river also supports numerous diverse habitats that offer options for wildlife watching and hunting both small and large game. Additionally, the LMR Corridor attracts waterfowl hunters, with the unique opportunity to hunt migrating ducks and geese along the Mississippi Flyway.
- **Sector 3: Tourism.** The tourism sector in the LMR Corridor relies on numerous attractions related to the presence of the river. These attractions range from direct use of the river for river cruises and festivals to a more indirect impact of providing a desirable location for the initial settlement and creation of small river towns and major cities along the LMR. The LMR Corridor hosts numerous music, art, film and cultural festivals; including blues, rock and jazz events. It also is home to a number of historic landmarks related to Native American and Civil War history, and also provides unique culinary culture.
- **Sector 4: Water Supply.** The LMR is a source of surface water for industrial and agricultural production. To a lesser extent, residents of the Corridor also depend on LMR surface water for domestic use.
- **Sector 5: Agriculture.** The success of agricultural production in the LMR Corridor is in several ways directly linked to the Mississippi River. The river provides the means of transportation for inputs of agricultural production as well as distribution of agricultural products. This low cost transportation option contributes to competitiveness for LMR agricultural production. The river also supplies water necessary both for conventional and irrigated agriculture. However, arguably the most important factor contributing to the success of

⁶ In this report, the term revenues refer to gross revenues, calculated as the quantity of a good times its price at the first point of sale. For example, the revenues from shrimp production is calculated as the amount caught times the price shrimp sold for after catching but before processing.

agriculture in the LMR corridor, and crop production in particular, is soil properties. Sediments deposited by the river created alluvial soil that is particularly fertile. The alluvial soil along with the warm and humid climate in the region makes the LMR corridor one of the most productive agricultural areas in the world.

- **Sector 6: Mineral Resources.** The LMR provides both the means of transportation for the mineral sector products and a source of water necessary for many mineral resource activities. Surface water from the LMR is used for drilling, stimulating and hydraulic fracturing of oil and gas wells, as well as in enhanced recovery processes. Water is also crucial in salt mining, known as injection mining. Sand and gravel mining in the LMR often depends on the River as well. Mining sand and gravel can involve dredging the river bottom, followed by processing these minerals with water to segregate by particle size.
- **Sector 7: Energy Production.** In the energy sector, the LMR provides a means of transportation for inputs to energy production. Another crucial use of the river is from the water it provides for cooling processes in thermoelectric power plants. Both fossil fuel and nuclear power plants in the LMR are thermoelectric.
- **Sector 8: Commercial Navigation.** This sector is the most directly dependent on the river. Its waterways provide cost-effective means for transporting large volume cargo. The LMR is the main inland waterway for the country, facilitating movement of commodities, goods, and products across the U.S and sending them towards international destinations. Water transportation is of crucial importance to national and international trade.
- **Sector 9: Manufacturing.** The LMR serves the manufacturing sector in three main ways. The river provides a means of transporting raw materials to processing facilities. Manufacturers also draw water directly from the river for use in production processing, washing, and cooling. Finally, several manufacturers discharge wastewater from production processes into the LMR. Properly treated effluent can be assimilated and treated by the river more safely and at a lower cost than if it were disposed of by other means.
- **Sector 10: Natural Resource Services.** All services provided by LMR ecosystems directly depend on the river. For example, the LMR provides wastewater treatment services and supports a variety of habitats for aquatic and terrestrial species. The LMR also sustains a large inland and coastal wetlands system in the corridor. Wetlands provide numerous unique services that include flood control, water purification and supply, habitats for many species, and breeding and nursery grounds.

The study relies exclusively on existing reports and databases as well as published literature and personal communication with industry experts. There are three general categories of data used in this analysis, including: 1) physical measurements of output produced by each sector; 2) revenues (or expenditures) derived from production; and, 3)

employment in each sector. Employment estimates are based on data from the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages in 2011, except for marine fishing, where employment numbers were obtained from the National Oceanic and Atmospheric Administration (NOAA), outdoor recreation, where the employment numbers were estimated based on labor to expenditure ratios obtained from literature, and agriculture, where the employment numbers were obtained from the Agricultural Census of 2007. The output and revenues data were collected from a large variety of sources, listed separately for each sector in the methodology section of each chapter. Most data were obtained at a county level. In certain cases, county level data were not available. State level numbers were allocated to counties using methods described in individual chapters. We assumed 2011 as a base year. In cases where 2011 data were not available, we used the latest available year. All revenue figures from earlier years were adjusted for inflation and presented in real terms, as 2011 dollars (\$2011).

REPORT STRUCTURE

The report devotes an individual chapter to each sector under consideration. Each chapter begins with an explanation of the relationship between the sector and the LMR. The analysis presents measurements of output produced in each sector as well as revenues and employment generated. We also discuss how individual sectors were impacted and reacted to major events that affected the LMR over last ten years. We specifically discuss Hurricanes Katrina and Rita in 2005, the housing market collapse in 2008 and recession that followed, the *Deepwater Horizon* oil spill of the Louisiana shore in 2010, the record breaking floods in 2011, and the severe droughts in 2012. Finally, we describe specific data sources used in the analysis.

We present the sectors in the following order:

- Chapter 2: Commercial Harvest of Natural Resources
- Chapter 3: Outdoor Recreation
- Chapter 4: Tourism
- Chapter 5: Water Supply
- Chapter 6: Agriculture
- Chapter 7: Mineral Resources
- Chapter 8: Energy Generation and Production
- Chapter 9: Commercial Navigation
- Chapter 10: Manufacturing
- Chapter 11: Natural Resource Services not Directly Reflected in the Market Economy

CHAPTER 2 | COMMERCIAL HARVEST OF NATURAL RESOURCES

The LMR Corridor offers a wide-range of resources that are commercially harvested, providing almost \$560 million in revenues and employing almost 14,000 people. Forested land in the LMR Corridor provides both timber and non-timber forest products (NTFPs). LMR's forested and non-forested lands provide habitat for numerous furbearing species that are trapped for commercial purposes. The river itself and its tributaries host an abundance of commercially targeted species. Offshore marine fisheries also depend on the LMR -- nearly all commercially harvested species off the LMR coast depend on the estuaries and wetlands of the LMR during some part of their lifecycle. The LMR Corridor also provides habitat for alligators that are hunted for commercial purposes. Appendix A, Exhibit 2A-1 presents estimates of the volume of harvest and associated revenues from sales of alligators.

This chapter describes LMR natural resources available for commercial harvest, including the size of the annual harvest these resources support, and the contribution of these resources to the local economy through employment and revenues.

FORESTRY

Almost 16 million acres (or 35 percent) of land in the LMR Corridor is covered by forest. Appendix A, Exhibit 2A-2, provides estimates of the number of acres of forested land and major tree species harvested by state. The market value of forested lands are estimated between \$16 and \$32 billion, depending on assumed per acre price.⁷ Forest types range from upland deciduous and coniferous to bottomland hardwood forests.⁸ Land in the Mississippi River Alluvial Valley is exceptionally productive, and provides both timber and non-timber forest products (NTFPs). In fact, the LMR forestry sector employed 1,345 people and generated almost \$50 million in annual wages in 2011.⁹

⁷ This value was calculated assuming \$1,000 to \$2,000 per acre for both private and public forests. The per acre value was estimated based on Land Watch prices of large parcels (over 50 acres) of forested land for sale in the LMR counties. Land Watch. "Land for Sale." Accessed at: <http://www.landwatch.com/>

⁸ National Park Service, *Draft Heritage Study and Environmental Assessment - Lower Mississippi Delta Region*, no date (<http://www.cr.nps.gov/delta/volume2/natural.htm>)

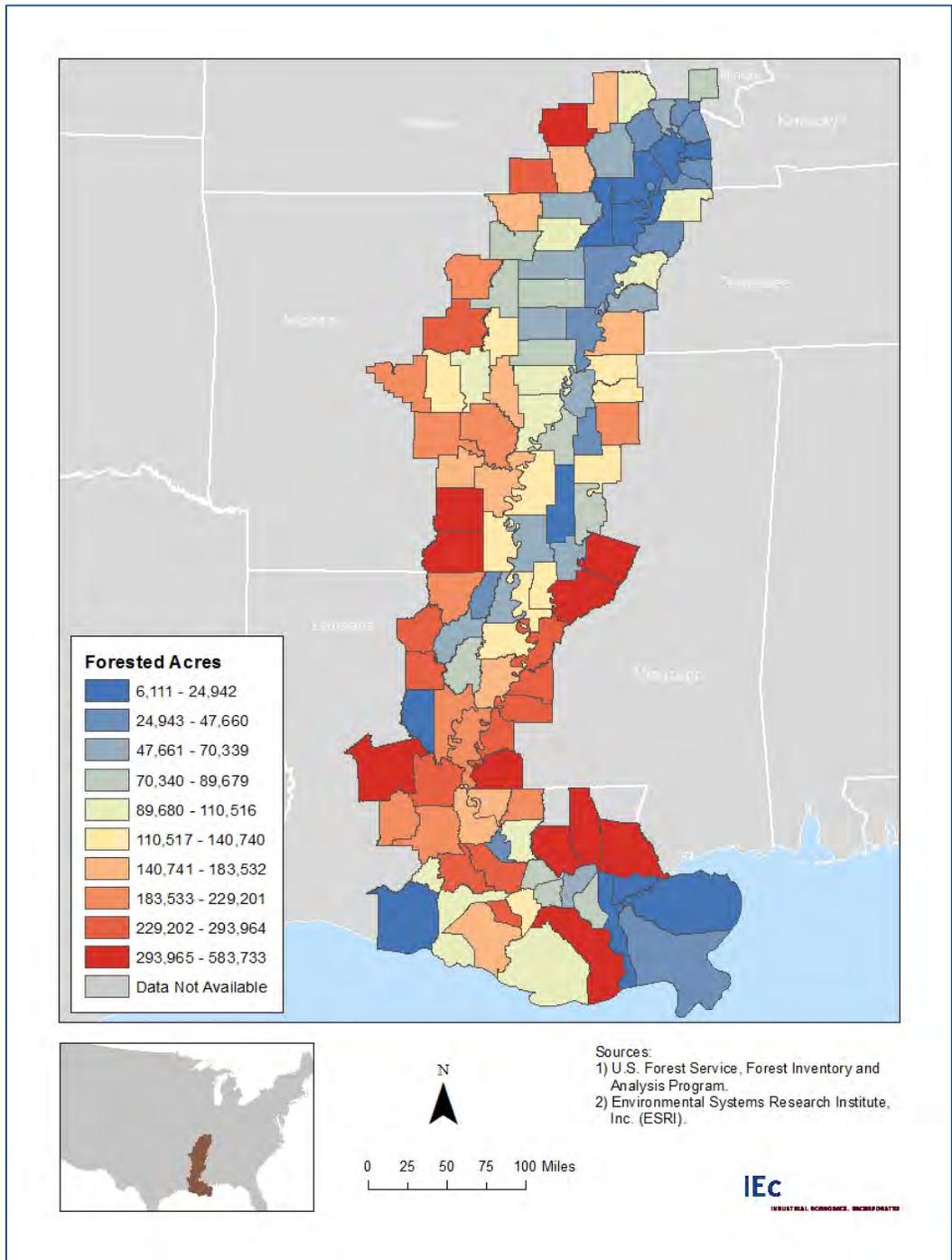
⁹ The reported employment in the Forestry Sector was calculated based on 113 and 1153 NAICS codes. The BLS Quarterly Census of Employment and Wages (<http://www.bls.gov/cew/home.htm>) was used. The resulting estimates may be heavily underestimated. For example, the forestry sector employs a large number of independent contractors, often not captured in the employment counts. Hodges et al. 2012. *Recession Effects on the Forests and Forest Products Industries of the South*. Accessed at: http://www.forestprod.org/assets/FPJ_articles_62_1/fpro-61-08-pg614-624.pdf

Most of the forested lands in the LMR Corridor (84 percent) are privately owned.¹⁰ Because private land owners tend to follow land management practices intended to maximize profits, large portions of the private forests are intensely managed for timber production.¹¹ Ownership of the remaining 16 percent of the forested lands are evenly split between federal agencies (8 percent) and state and local entities (8 percent). Exhibit 2-1 shows the relative forested acres per county in the LMR Corridor. As shown, counties in Louisiana, Arkansas, and Mississippi have greater forested acres relative to other counties in the corridor.

¹⁰ Source: U.S. Forest Service, Forest Inventory and Analysis National Program, Forest Inventory Data Online (FIDO). TOPs Reports from Southern and Northern Region Research Center.

¹¹ Smith et al. 2007. *Forest Resources of the United States, 2007. A Technical Document Supporting the Forest Service 2010 RPA Assessment*. Accessed at: http://www.fs.fed.us/nrs/pubs/qtr/qtr_wo78.pdf

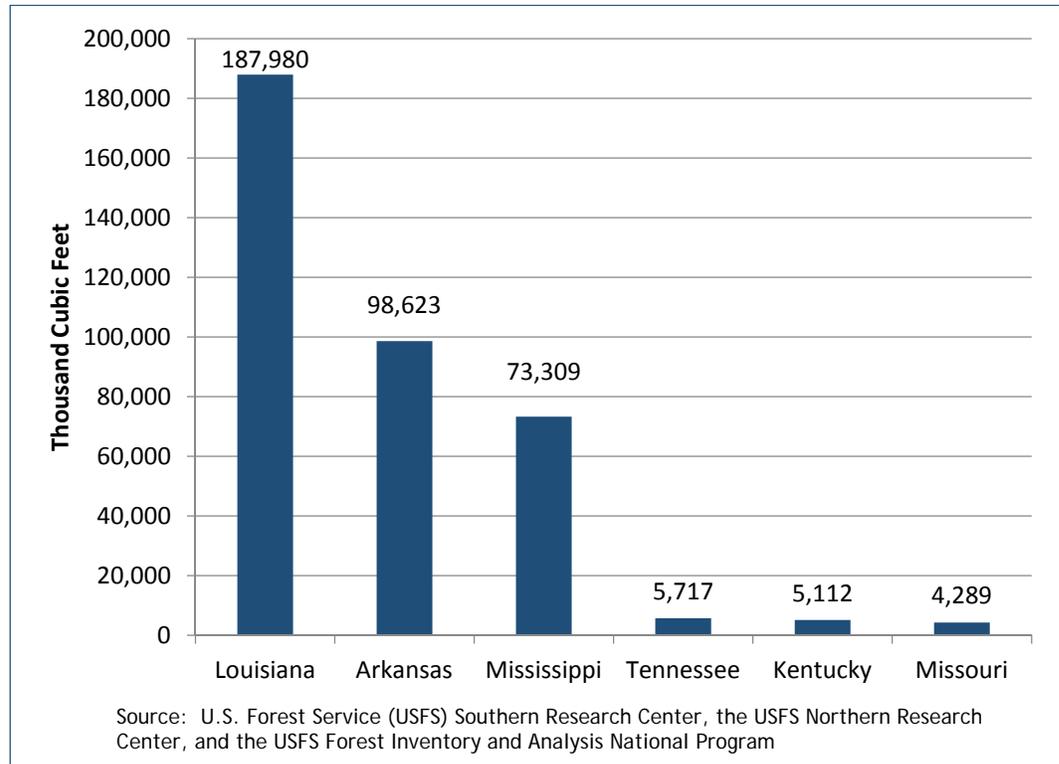
EXHIBIT 2-1. FORESTED LANDS IN THE LMR CORRIDOR, 2011



TIMBER HARVEST

The forests of the LMR corridor produced over 375 million cubic feet of timber each year, valued at \$290 million in annual revenues (\$2011).¹² As shown in Exhibit 2-2, the major timber producers are located in counties along Louisiana's LMR Corridor, contributing 50 percent (or 188 million cubic feet) of this total volume, followed by Arkansas producing 26 percent (or 99 million cubic feet) and Mississippi 19 percent (or 73 million cubic feet).

EXHIBIT 2-2. TIMBER HARVEST (THOUSAND CUBIC FEET) IN THE LMR CORRIDOR, 2011

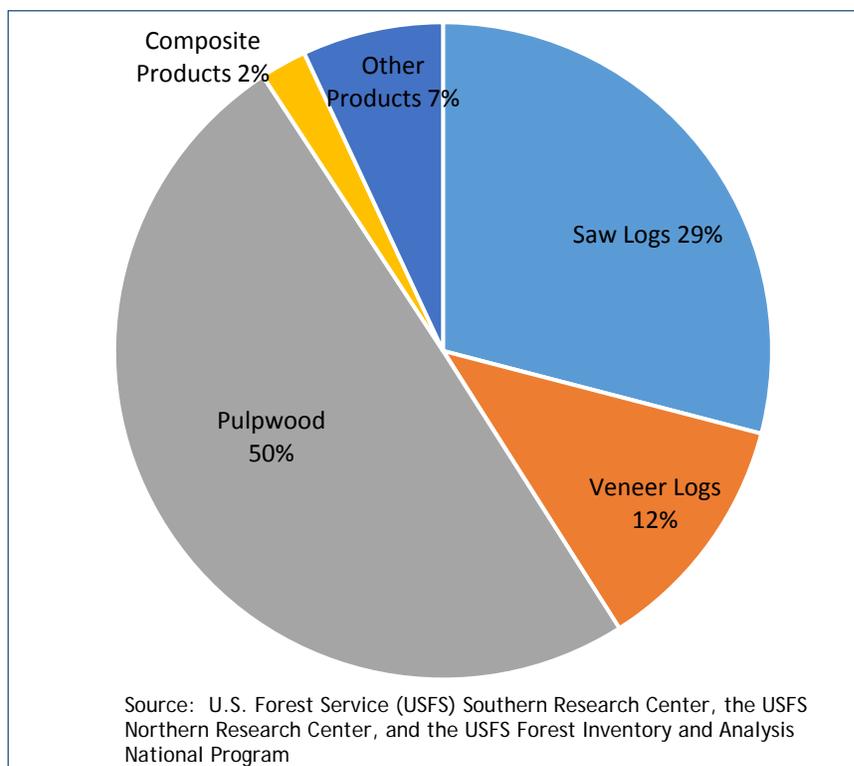


Softwood species made up approximately 60 percent of the LMR harvest in 2011 and hardwood species (in particular, white and red oaks, hickory, ash, elm, gum, cypress and cottonwood) made up the remaining 40 percent. Exhibit 2A-3 provides detailed estimates of the volume of timber harvested by state and type in 2011. As shown in Exhibit 2-3, about 50 percent of both of these varieties were used for pulpwood production. Pulpwood was traditionally consumed domestically for paper and paper-product production. In recent years, domestic demand for these products has declined along with the shift away from newsprint and writing paper and toward paperless communication. In contrast to this trend, the global demand for paper and paper products increased, driven primarily by demand from Asia. Additionally, in recent years

¹² We present numbers for 2009, since it is the most recent year with available county level data. Our estimates are based on 110 LMR counties. Timber harvest data for three counties in Illinois are not available. The revenues are calculated using 2011 stumpage prices and expressed in 2011 dollars.

pulpwood became a source for bioenergy production, further stabilizing or even increasing demand for domestic pulpwood production. Pulpwood from LMR forests is particularly well-suited for bioenergy. The most desired species for biofuel production is loblolly pine, abundant in the LMR forests. Other species available in the LMR Corridor and suited for bioenergy production include other pines, and several hardwoods (oaks, yellow poplars, sweetgum and cottonwood).¹³

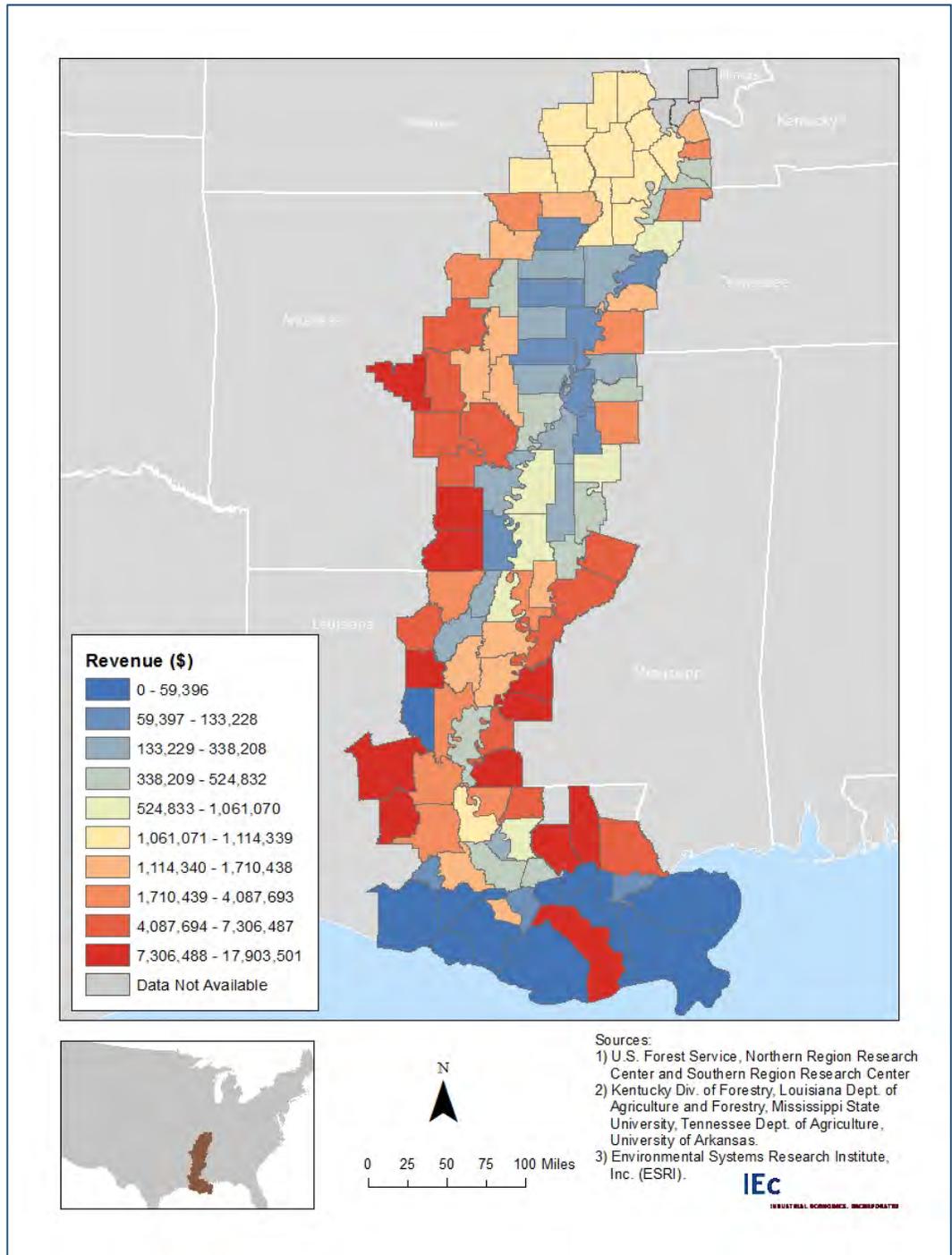
EXHIBIT 2-3. COMPOSITION OF TIMBER HARVEST PRODUCTS IN THE LMR CORRIDOR, 2011



Prices of forest products vary significantly across regions and states, and prices of different timber products follow varying seasonal and long-term patterns. For example, average annual prices of pulpwood in the LMR Corridor have been stable over the last several years, despite the housing and economic crisis that affected prices of other timber products. The 187 million tons of pulpwood produced in the LMR Corridor in 2009 contributed 16 percent (or \$48 million) of total timber revenues within the region. This relatively small contribution to total revenues (from the large production volume) is related to the fact that pulpwood is derived from low grade timber and sold at much lower prices than higher grade outputs (e.g., sawlogs or veneer logs). Exhibit 2-4 shows the revenues by county for timber harvest revenues in 2011. As shown, counties in Louisiana, Arkansas, and Mississippi generated the greatest revenues.

¹³ Biofuel Center of North Carolina. 2013. "Woody Biomass." Accessed at <http://www.biofuelscenter.org/feedstocks/woody-biomass?showall=&start=3>

EXHIBIT 2-4. TIMBER HARVEST REVENUES IN THE LMR CORRIDOR, 2011



Demand for sawlogs, and hence sawlog prices, has fluctuated greatly over the last few years, mostly in response to changes in the housing market. New housing starts in 2009 were the lowest on record. Because sawtimber is primarily used in new house construction, when the housing market collapsed in 2008, sawtimber demand and prices dropped. The volume of lumber demanded by the market both in the South and throughout the country was in severe decline. Therefore, the sawtimber production of 109 million cubic feet estimated for the LMR Corridor in 2009 is a conservative estimate of typical annual sawtimber production. Sawtimber contributed 29 percent to the total harvest, and produced nearly \$190 million, or 68 percent of revenues (see Exhibit 2-3). The prices of sawtimber began to rise in the last quarter of 2009 (along with improvements in the housing market) encouraging landowners to sell previously withheld timber. In recent years, the US economy has been slowly recovering, as shown by a 1.7 percent increase in GDP in 2011, followed by a 2.2 percent increase in 2012, and 2.4 percent in the first quarter of 2013. The housing market has also been showing signs of recovery both in 2012 and in the first quarter of 2013, as shown by reported growth in real estate and construction industries. Following these trends, the LMR states' timber volume harvested and revenues continued to slowly increase in 2012 and the first quarter of 2013.

NON-TIMBER FOREST PRODUCTS (NTFPS)

In addition to timber, forests also provide a variety of non-timber forest products, or NTFPs. NTFPs are plant-based products collected from the forest floor, canopy and (in the case of roots) underground. They include a wide range of products that can be categorized as:¹⁴

- culinary (e.g. sap, mushrooms, fruits, nuts, ferns, greens, roots);
- wood-based crafts (tree parts that are not cut for timber);
- floral and decorative (foliage, wild flowers, etc. for production of fresh or dry floral arrangements, aromatic oils, wreaths and more); and,
- medicinal and dietary supplements (e.g. herbs, roots such as ginseng)

For millennia NTFPs have been collected for personal and subsistence use; only recently have NTFPs gained significance as commercial products. The scale of these harvests is still small relative to timber values, and data are limited for many regions. Recently, the U.S. Forest Service's Southern Research Station and Virginia Polytechnic Institute developed a Web site (<http://www.sfp.forprod.vt.edu>) designed as a clearinghouse for harvesters, growers, marketers, processors, and end-users of NTFPs.¹⁵ However, at present, there are no available data to estimate the volume or value of NTFPs harvested in the LMR Corridor.

¹⁴ After Chamberlain and Predny, 2003 and Chamberlain, Winn and Hammett, 2009.

¹⁵ Chamberlain, Winn and Hammett, 2009.

Available value estimates show the potential importance of NTFPs to the regional economy. For example, sales of floral greens collected in the Pacific Northwest were reported at \$81 million, providing employment for 10,300 people, and producing wages of \$50 million.¹⁶ Wild mushrooms collected and sold in Oregon, Idaho, and Washington states provided employment to 11,000 people.¹⁷ A nationwide estimate of maple syrup revenues are \$25 million, while ginseng brings between \$29 and \$58 million in total revenue.¹⁸

MARINE COMMERCIAL FISHING

Marine landings are indirectly affected by the LMR, and therefore included as a part of the economic contribution that the LMR has to the regional economy. It is estimated that 97 percent of fish and shellfish species commercially harvested off Louisiana's coast depend on estuaries and wetlands during some parts of their lifecycle.¹⁹ Louisiana is one of the leaders in commercial fishing nationally, and is the single largest shrimp producer in the country. Commercial fishing in this state employs at least 12,381 fishermen.²⁰ This is most likely an underestimate relative to actual employment in commercial fishing, because seasonal employees and family members working in commercial fishing operations tend to be underreported. In addition to shrimp, Louisiana's marine landing consists of several other major species harvested in the Gulf of Mexico, including crab and finfish.²¹ The LMR counties produced ex-vessel value²² of \$245 million in 2011. Appendix A, Exhibit 2A-4, provides estimates of the total volume and value of finfish, shrimp, and crabs landed in LMR-Corridor ports in 2011.

Finfish account for 88 percent (or almost 890 million pounds) of the region's landings (Exhibit 2-5), which brought \$86 million (or 35 percent) in revenues to the fishery. The largest single source of marine revenues in 2011, following a historic trend, was shrimp, producing 51 percent (or \$124.5 million) of revenues, from only eight percent of the regional catch (85 million pounds) (Exhibit 2-6). This disproportion between the size of landing and the size of revenues produced is due to the relatively high prices received for shrimp. Historically, shrimp prices have been high relative to most finfish. Since 2009, the prices were further increasing, compensating for the smaller catch that followed the closing of fisheries after the *Deepwater Horizon* oil spill (see Exhibit 2-7).

The large volume and low revenue from finfish are driven in part by menhaden landings. LMR county level data for menhaden catch is not available, but from state-wide figures,

¹⁶ Schlosser et al. 1991.

¹⁷ Alexander et al. 1999.

¹⁸ Vaughan et al. 2013.

¹⁹ Upton, 2011.

²⁰ Form the CueGroup, 2012 citing: National Marine Fisheries Service. 2010. Fisheries Economics of the United States, 2009. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS- F/SPO-118, available at: <https://www.st.nmfs.noaa.gov/st5/publication/index.html>.

²¹ Oysters' harvest and revenues are discussed in Chapter 6, as part of aquaculture production.

²² Ex-vessel value is value of fish catch after it leaves the boat (first point of sale), before processing.

it is apparent that menhaden dominates the volume of the overall finfish landing in the region, and that the menhaden catch off the Louisiana coast increased after the *Deepwater Horizon* oil spill. The larger menhaden landing was a result of catch substitution away from species that became less available due to the closing of many fishing grounds. Menhaden is a low quality and low revenue producing fish that historically has been used as fertilizer for crops, feed for animals, and bait for fishing.

EXHIBIT 2-5. COMPOSITION OF MARINE LANDINGS (POUNDS) IN THE LMR CORRIDOR, 2011

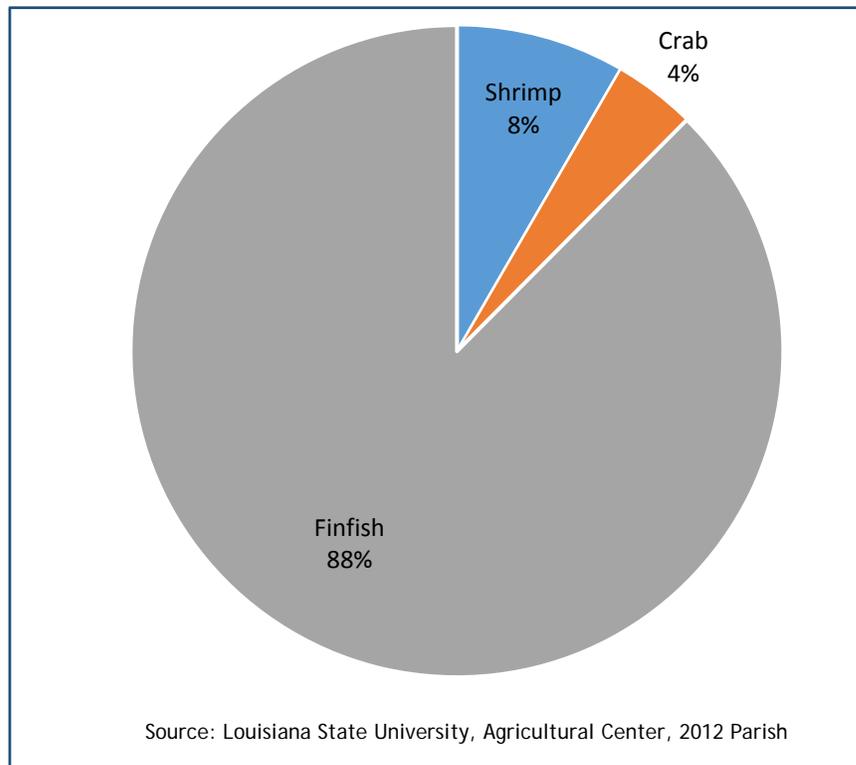


EXHIBIT 2-6. COMPOSITION OF REVENUES FROM MARINE LANDINGS (POUNDS) IN THE LMR CORRIDOR, 2011

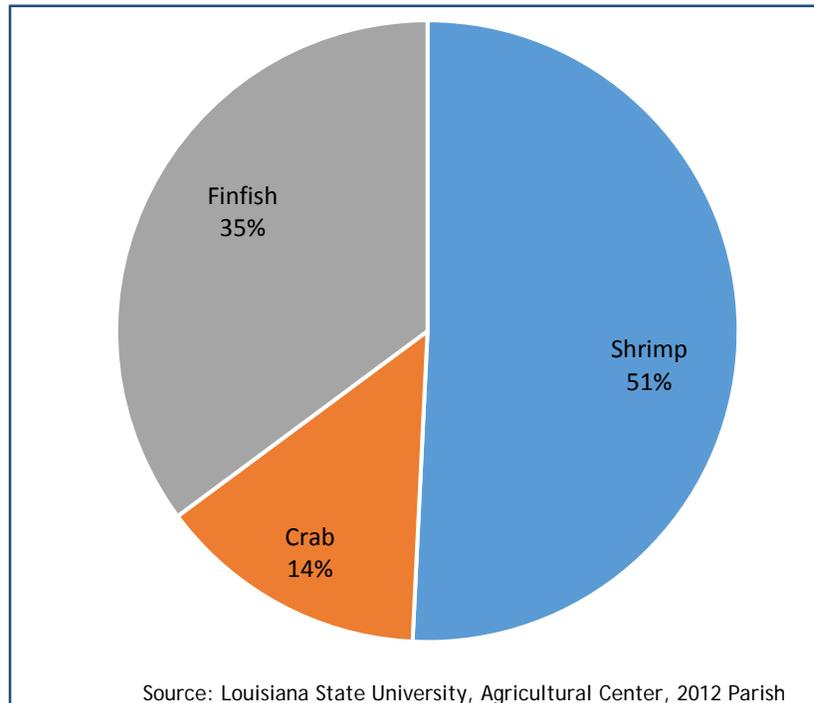
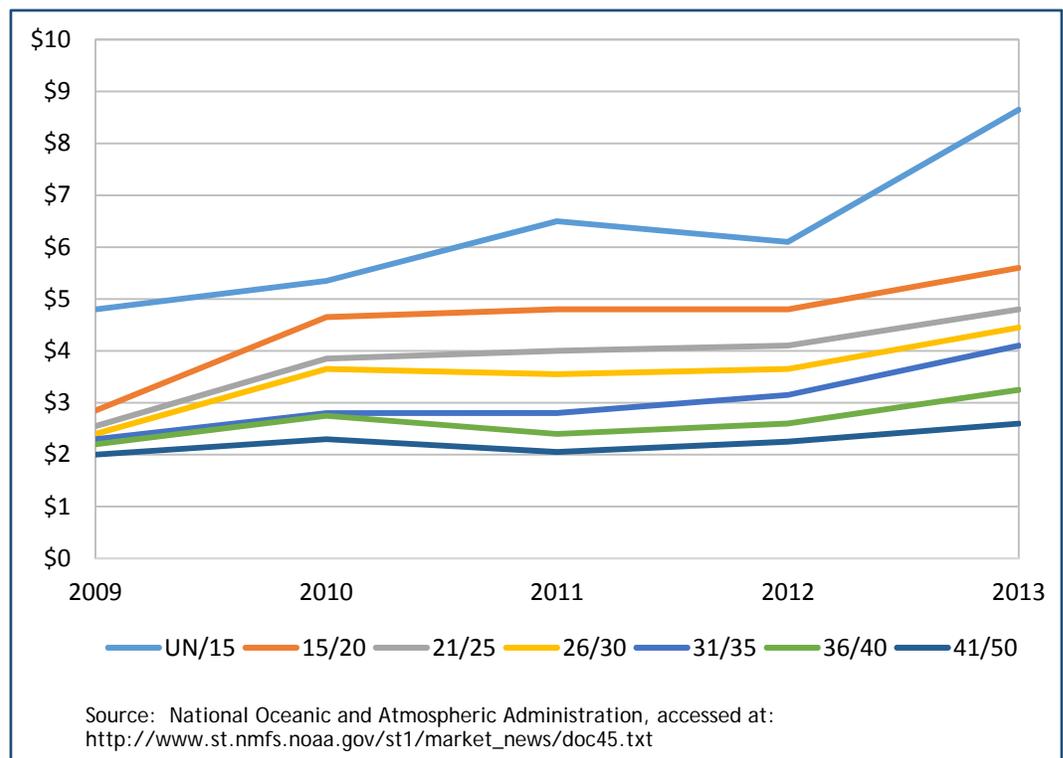


EXHIBIT 2-7. SHRIMP PRICES (DOLLARS PER POUND) BY COUNT PER POUND GROUPINGS IN LOUISIANA



On April, 20, 2010, the *Deepwater Horizon* oil drilling rig exploded, releasing over 200 million gallons (4.9 million barrels) of crude oil over 87 days directly into the waters of the Gulf of Mexico. In an effort to control the spill and minimize the damages, 1.8 million gallons of surface and subsurface chemical dispersants were used. Both the oil and the dispersant directly affected the marine fishing industry in the Gulf of Mexico, in general, and in the LMR in particular. The National Oceanic and Atmospheric Administration (NOAA) ordered closure of the majority of federal and state fishing waters (initially, approximately 6,800 square miles in the Gulf of Mexico) in July and August 2010.²³ It was both a precautionary measure to ensure that potentially contaminated seafood did not enter the market and was a requirement to facilitate clean-up efforts. Federal Food and Drug Administration (FDA) and NOAA developed a protocol for assessing the quality of the fisheries and the standards that had to be met for reopening. Seafood samples were tested using both sensory (oil and dispersant odor and taste) and chemical analysis. The chemical analysis was designed to detect polycyclic aromatic hydrocarbons (PAHs), a carcinogenic substance.²⁴ At the peak of the closure, 55 percent of Louisiana state waters were closed to commercial fishing.²⁵ Consequently, 2010 landings were significantly lower relative to previous years.²⁶ Shrimp landings were 34 percent, oysters 54 percent, crab 43 percent and other finfish 30 percent lower than 2009 landings, resulting in \$49 million reduction in revenues.²⁷ In addition to a lower supply of seafood, the oil spill also affected demand. Despite NOAA's and FDA's declarations that catch from the re-opened fisheries was free of oil and dispersant contamination and safe to eat, the public remained skeptical. Low consumer confidence was reported in numerous surveys. For example, according to a national survey of restaurant owners, 33 percent of customers asked about the origins of the served seafood in 2006. In 2010, following the oil spill, this percentage rose to 69 percent. Additionally, 73 percent of customers surveyed held favorable opinions about seafood from Louisiana in 2006, but only 50 percent after the oil spill.²⁸ A survey commissioned by the Louisiana Seafood Promotion Board reported that 23 percent of consumers reduced their consumption of seafood as a result of safety concerns.²⁹

²³ NOAA, 2010. *Closes Commercial and Recreational Fishing in Oil-Affected Portion of Gulf of Mexico*. Accessed at: http://www.noaanews.noaa.gov/stories2010/20100502_fisheries.html

²⁴ Upton, 2011.

²⁵ Upton, 2011.

²⁶ The estimates that follow are based on data from NOAA, National Marine Fisheries Service: http://www.st.nmfs.noaa.gov/pls/webpls/mf_lndngs_grp_data_in

²⁷ These are numbers for the whole state of Louisiana. The LMR Louisiana counties contributed 73% of the total state landing and followed the same pattern over the last years.

²⁸ Greater New Orleans Regional Economic Alliance. 2011. A Study of the Economic Impact of the *Deepwater Horizon* Oil Spill. Part Three - Public Perception. March 25, 2011. Accessed at: http://qnoinc.org/wp-content/uploads/Economic_Impact_Study_Part_III_-_Public_Perception_FINAL.pdf

²⁹ McGill, Kevin. 2011. "Survey measures post-spill seafood attitudes," Bloomberg Businessweek, January 31, 2011. Accessed at: <http://www.businessweek.com/ap/financialnews/D9L3IP000.htm>.

The state of Louisiana asked the British Petroleum (BP) for \$173 million in financial assistance for a long-term seafood testing and marketing campaign. BP refused to provide the funding. However, it agreed to sponsor a \$13 million three year study to monitor long term effects of the oil spill on Louisiana fisheries.³⁰

The direct revenue losses from a lower catch in Louisiana were partially recovered in 2011 when the total marine revenues in Louisiana were \$37 million higher than in 2009, due to higher prices and a larger than 2009 catch of menhaden. Landings of other species in 2011 remained below 2009 levels.

FRESHWATER COMMERCIAL FISHING

The freshwater commercial industry in the LMR Corridor naturally depends on the river. However, most of the freshwater catch takes place away from the main stem of the Mississippi. The strong and fast moving current of the river, along with heavy commercial navigation traffic, puts fishing vessels and fishing equipment at high risk.³¹ Consequently, most freshwater commercial fishing takes place on LMR tributaries.

Except for Louisiana, the LMR states do not report freshwater fishing data at county/parish level. Louisiana's landing from the LMR parishes in 2011 was 8.8 million pounds of crawfish and almost 11 million pounds of finfish, producing \$13.2 million total in revenues. State level data reported in Mississippi confirms that fresh water landing consists of catfish, buffalo, common and Asian carp, gar and freshwater drum.³² There are also no data on freshwater landings from Tennessee, Illinois, Kentucky, or Arkansas.

ALLIGATOR HUNTING

American alligators were once abundant in the Southeast, but became nearly extinct in 1960 due to overhunting. In 1967, the U.S. Fish and Wildlife Service placed American alligators on an endangered species list (precursor law to the Endangered Species Act of 1973).³³ Their population quickly recovered and in 1987 it was removed from the endangered species list. Currently, the American alligator is again abundant, and it is legally hunted in Louisiana³⁴, where it is managed by Louisiana Department of Wildlife and Fisheries as a commercial, renewable natural resource. The alligator's habitat in Louisiana is made up of coastal wetlands. Over 80 percent of this species' habitat is

³⁰ Upton, 2011.

³¹ IEc, 2004.

³² Mississippi Wildlife, Fisheries and Parks, 2010. 'Mississippi Freshwater Commercial Fishery and Paddlefish Commercial Fishery Report for Fiscal Year 2010.' Report for Project 109: Freshwater Commercial Fishery Coordination Freshwater Fisheries Report No. 269

³³ Mississippi Wildlife, Fisheries, & Parks. Wildlife and Hunting. The Recovery of the American Alligator in Mississippi. Accessed at: <https://www.mdwfp.com/wildlife-hunting/alligator-program/the-recovery-of-the-american-alligator-in-mississippi.aspx>

³⁴ Alligator hunting is also currently legal in Mississippi. The size of the alligator population is too small for commercial harvest. In 2012, 590 alligator hunting permits were distributed, and 513 skins harvested. (Mississippi Wildlife, Fisheries, & Parks. 2012 Public Waters Alligator Harvest Summary. Accessed at: https://www.mdwfp.com/media/185593/alligator_harvest_summary2012.pdf)

privately owned land. Landowners receive revenues from the production of alligator skins.³⁵ The revenues provide incentives to manage the wetlands in a sustainable way to ensure a steady population for harvest. The annual harvest ranges from 28,000 to 35,000 skins during the 30-day hunting season in September.³⁶ In 2011, the revenues from the LMR counties in Louisiana were almost \$9.6 million. In addition to these market captured benefits, alligator hunting provides external, non-market benefits. For example, maintaining healthy habitats for alligators means maintaining healthy wetland ecosystems, which provide various valuable ecosystem services (discussed in Chapter 11).

TRAPPING

Numerous furbearing species are harvested in the LMR Corridor for the subsequent sale of pelts, meat (for commercial dog food production), and other products, such as perfume ingredients. Species harvested in the LMR Corridor include beavers, bobcats, coyote, gray and red foxes, minks, muskrats, nutrias, opossums, otters, raccoons, and skunks. The prices of pelts vary greatly across species, from as little as \$2.00 for a stripped skunk to as much as over \$40.00 for a bobcat or an otter. The total revenues from pelt sales in the LMR Corridor in 2011 are approximately \$667,000.

These revenues capture only a part of benefits provided by controlling populations of the furbearing species. Some of these species are capable of causing serious damages to both wildlife habitats and commercial production. For example, beavers, abundant in the LMR Corridor, can cause serious economic losses when building dams on canals and drainages that then lead to flooding agricultural and forested lands. When beaver populations are properly controlled, this species provides numerous valuable ecosystem services (discussed in Chapter 11). Similarly, nutria has few natural enemies; when not controlled this species can damage drainage canals, irrigation systems and levees, primarily through burrow building.

DATA SOURCES AND METHODOLOGY

This analysis of commercially harvested natural resources is based on several existing sources of data.

- **Employment data** for timber harvesting activities (NAICS: 113 and 1153), and hunting and trapping (NAICS: 1142) were provided by the 2011 Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages. Since the employment estimates for commercial fishing (NAICS 1141) provided by BLS appear to be underestimated, employment numbers for the fishing sub-sector were obtained from National Oceanic and Atmospheric Administration (NOAA).

³⁵ State of Louisiana, Department of Wildlife and Fisheries. Alligator Program. Accessed at: <http://www.wlf.louisiana.gov/wildlife/alligator-program>

³⁶ Louisiana Wildlife & Fisheries. Louisiana Alligator Advisory Council. 2008. *Alligator mississippiensis*. Accessed at: <http://www.alligatorfur.com/alligator/alligator.htm>

- **Timber volume data** were obtained from the U.S. Forest Service (USFS) Southern Research Center, the USFS Northern Research Center, and the USFS Forest Inventory and Analysis National Program.
- **Timber prices** on the state level were provided by state agencies and universities. Specifically, average state-wide stumpage prices for Mississippi, Louisiana, Missouri, and Arkansas were supplied by Mississippi State University, Louisiana Department of Agriculture and Forestry, Missouri Department of Conservation, and the University of Arkansas, Department of Agriculture, respectively. Because stumpage prices from Kentucky and Tennessee were not available we estimated these using the average stumpage prices from nearby states.
- **Commercial landings, hunting and trapping data** on harvest size and revenues were obtained for the state of Louisiana from a parish-level agriculture report by Louisiana State University's Agricultural Center. For the other states in the study area we calculated hunting and trapping harvest values for the LMR region using data from harvest reports published by state agencies. We obtained county-level harvest data as well as statewide average pelt prices from 'The Arkansas Game and Fish Commission's 2011 Furbearing Animal Report'. Data for Illinois, Kentucky, and Tennessee were provided by the Association of Fish and Wildlife Agencies, 'US Fur Harvest Report 1970-Present' report. We also obtained statewide harvest data for Mississippi and Missouri from the 'Mississippi Department of Wildlife Trapper Harvest Estimate Report' and the 'Missouri Department of Conservation's 2011 Furbearer Program Annual Report', respectively. Finally, we obtained bobcat and otter harvest data on the county level for Kentucky and Missouri from the Kentucky Department of Fish and Wildlife Service's online reporting tool for 2011 and the 'Missouri Department of Conservation's 2011 Furbearer Program Annual Report', respectively. Where county-level harvest data were not available, state-level harvest data were allocated to LMR counties based on the total land area of the LMR region. State-wide average pelt prices were available for Arkansas and Missouri and the average pelt price in these two states was used to estimate pelt prices in the rest of the LMR region.

CHAPTER 3 | OUTDOOR RECREATION

The Lower Mississippi River (LMR) corridor provides numerous opportunities for outdoor recreation. The natural beauty of the river and surrounding ecosystems attracts millions of outdoor recreation enthusiasts both from the LMR region and from the rest of the country. The corridor offers an abundance of freshwater fishing opportunities along the river and its tributaries and in more than 200 lakes, as well as marine fishing off the coast in Louisiana. The river also supports numerous diverse habitats that offer options to hunt both small and large game. Additionally, the LMR Corridor attracts waterfowl hunters, with the unique opportunity to hunt migrating ducks and geese along the Mississippi Flyway. There are also a variety of hunting opportunities in the batture, an area of active floodplain, which includes private hunting clubs, some covering more than 10,000 acres. There are also abundant options for wildlife watching, including many rare and endangered species. These opportunities resulted in 38 million recreational trips, generated \$1.3 billion in expenditures in 2011, and provided more than 54,000 jobs.

PROTECTED LANDS IN THE LMR CORRIDOR

Currently, the LMR Corridor has at least 3.3 million acres of lands that are protected from development. Exhibit 3-1 presents the ownership breakdown of protected lands in the LMR region. Appendix A, Exhibit 11A-1, provides estimates of protected areas in acres by ownership type and state. As shown in Exhibit 3-2, over half of the protected lands are State-owned, while 43 percent are federally owned, including lands of the U.S. Forest Service (USFS), which control National Forests, the U.S. Fish and Wildlife Service (USFWS), which controls National Wildlife Refuges, and the National Park Service (NPS), which operates National Parks. Six percent of protected lands are in private hands, which include not-for-profit conservation organizations, as well as private hunting clubs.

State-owned land in the LMR Corridor primarily occurs in Louisiana and Arkansas. Exhibit 3-3 presents ownership of protected lands by state in the LMR region.

EXHIBIT 3-1. PROTECTED AREAS IN THE LMR CORRIDOR, BY LAND OWNERSHIP TYPE

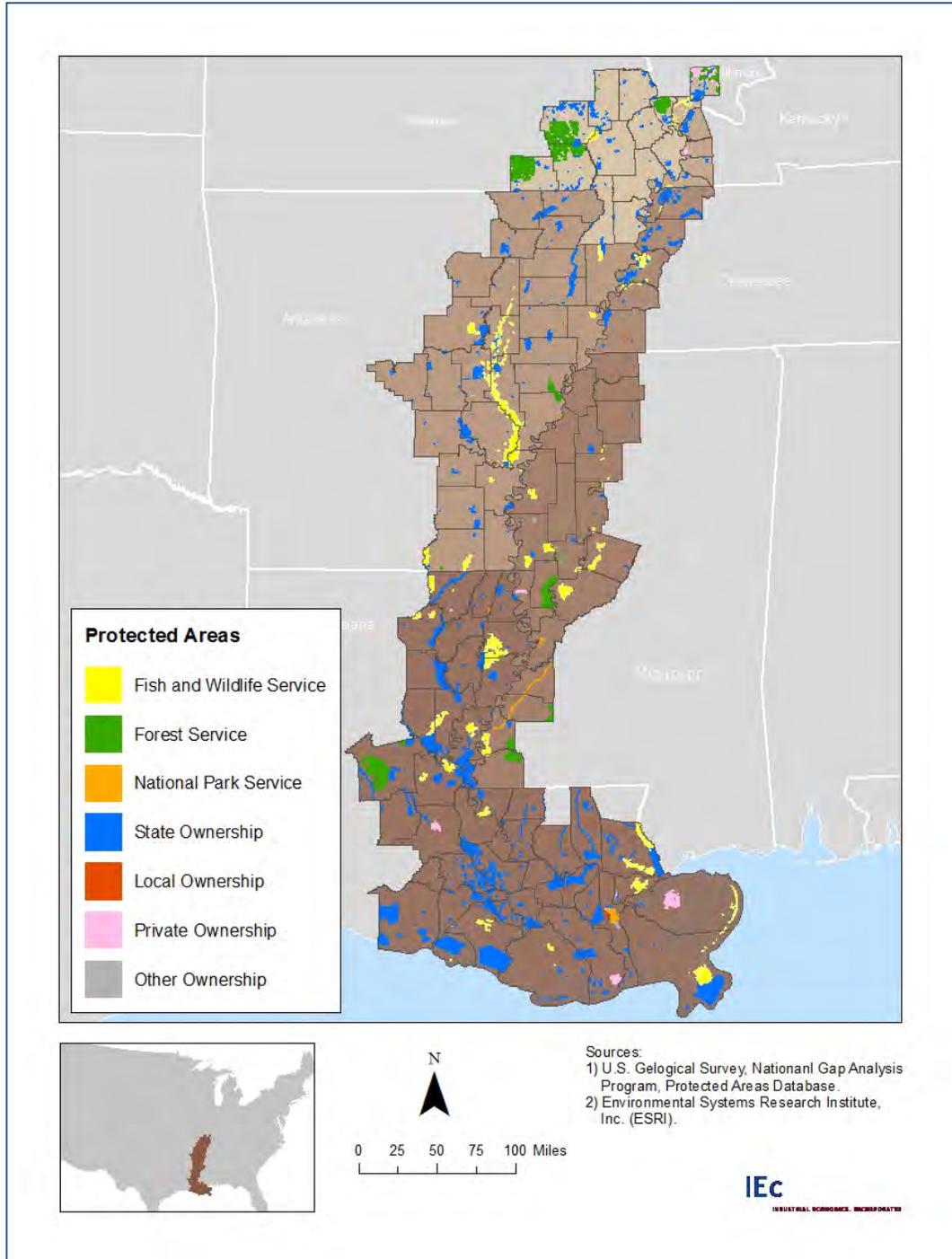
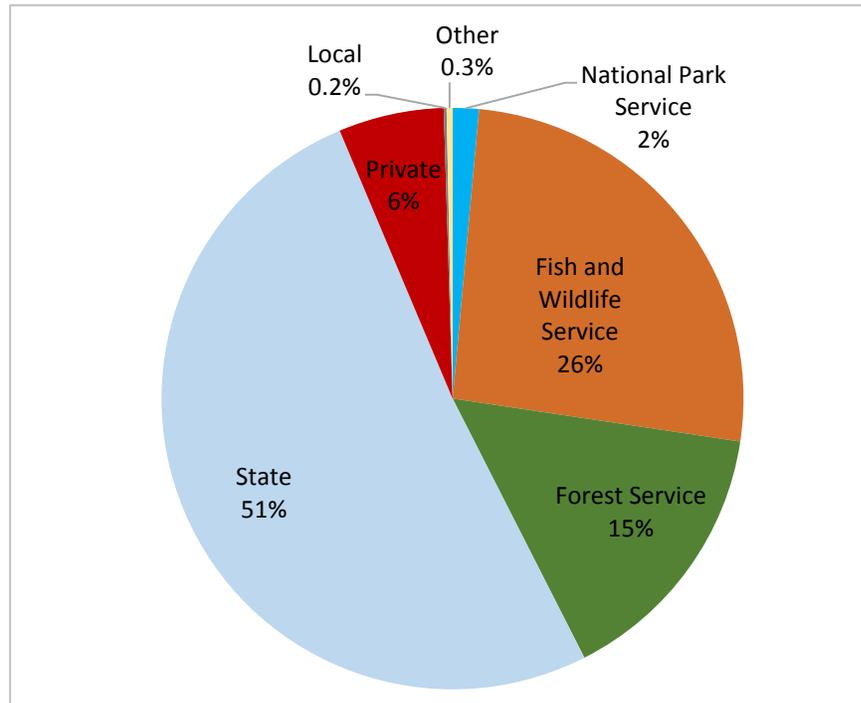
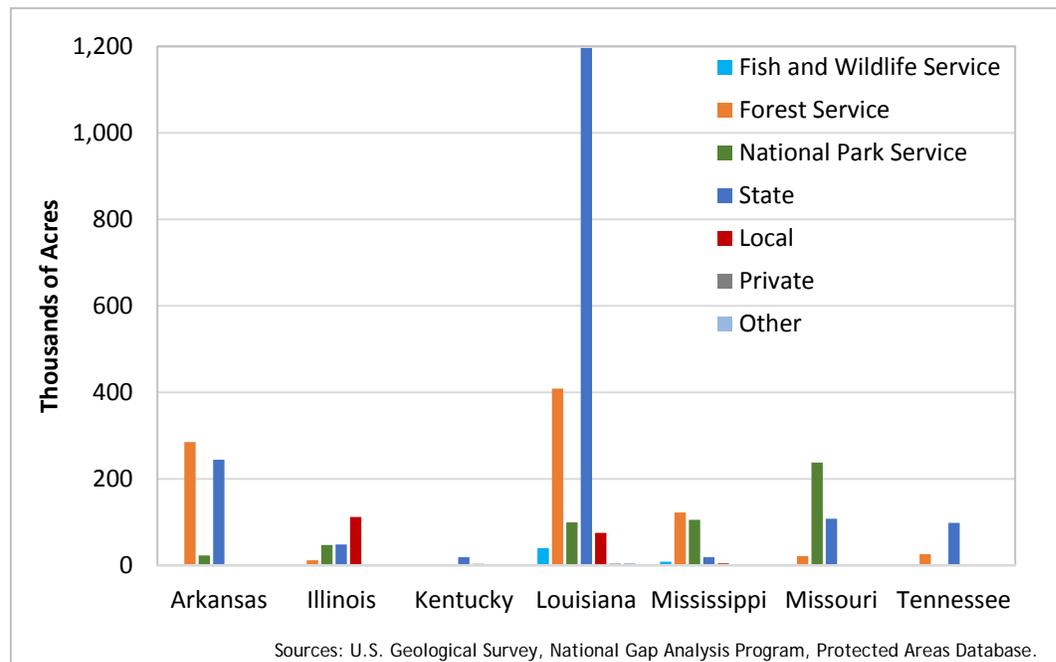


EXHIBIT 3-2. OWNERSHIP OF PROTECTED LANDS IN LMR



Source: U.S. Geological Survey, National Gap Analysis Program, Protected Areas Database

EXHIBIT 3-3. DISTRIBUTION OF PROTECTED LANDS IN LMR BY STATE



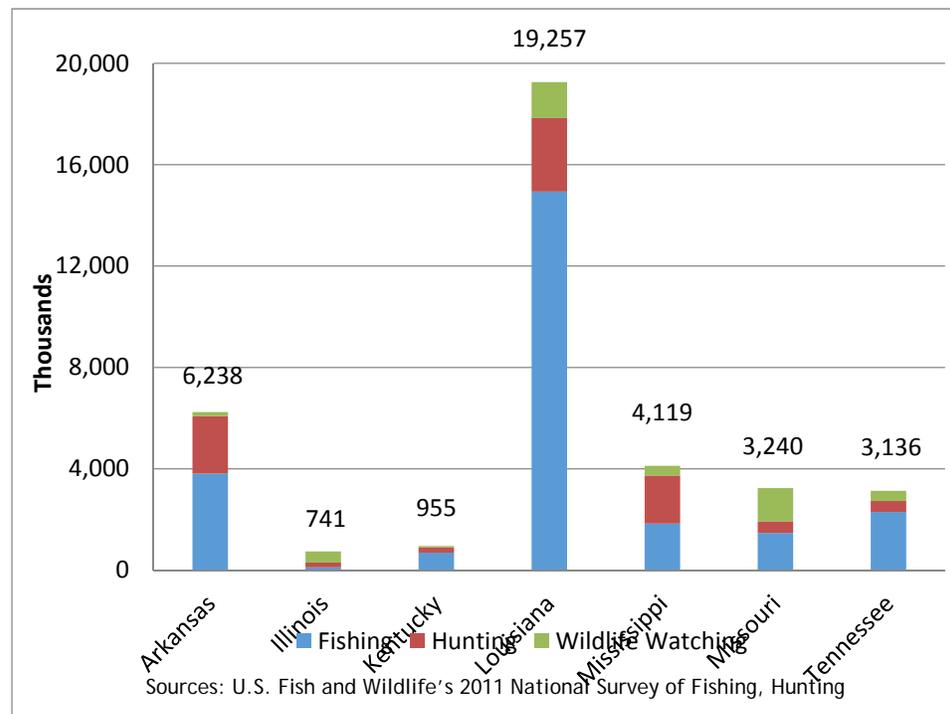
The protected lands in the Mississippi portion of the LMR, are primarily federally owned, with over 90 percent of all the protected areas in USFWS, USFS, or NPS ownership. Private ownership of protected lands is relatively rare among the LMR states, with the exception of Illinois, where 50 percent are in private hands.

OUTDOOR RECREATION ACTIVITIES IN THE LMR

Using FWS data, we estimate that almost 38 million outdoor recreational trips were taken in the LMR Corridor in 2011 (see Exhibit 3-4). Appendix A, Exhibit 3A-1, provides estimates of the number of fishing, hunting, and wildlife-watching trips made to the LMR Corridor in 2011 by state. A trip is broadly defined as “an outing involving fishing, hunting, or wildlife watching.” A trip may begin from an individual’s principal residence or from another place, such as a vacation home or the home of a relative. A trip may last an hour, a day, or many days.³⁷

Visitors to the Louisiana portion of the LMR Corridor accounted for 51 percent (over 19 million) of total trips to the Corridor. The second most popular destination in the LMR Corridor was Arkansas, which attracted 17 percent (or 6.2 million) trips, followed by Mississippi 11 percent (or 4.1 million trips), Missouri nine percent (or 3.2 million trips), and Tennessee eight percent (or 3.1 million trips). The few LMR counties in Illinois and Kentucky together attracted five percent (or 1.7 million outdoor recreation trips) to the LMR Corridor.

EXHIBIT 3-4. FISHING, HUNTING, AND WILDLIFE WATCHING TRIPS (THOUSANDS) IN THE LMR CORRIDOR, 2011

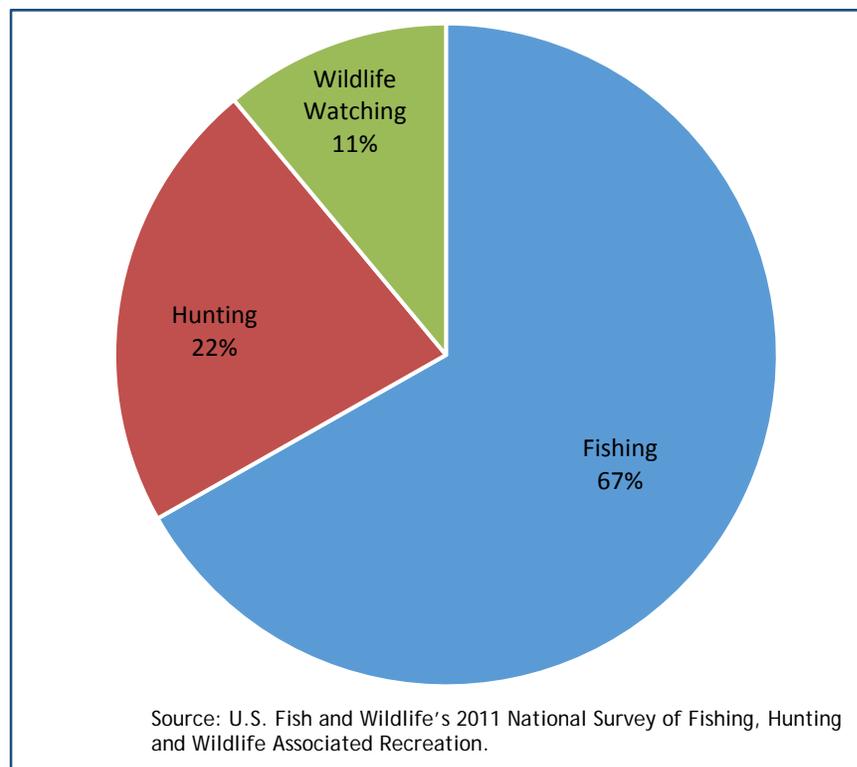


³⁷ U.S. Fish and Wildlife Service, 2011. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

As shown in Exhibit 3-4, fishing was the most common reason for outdoor recreation in the LMR Corridor, comprising 67 percent of outdoor recreational visits.³⁸ Again, Louisiana's portion of the LMR Corridor attracted the most recreational anglers (15 million, or 60 percent of all fishing trips), which includes both fresh and saltwater anglers. While Louisiana's extensive coastline is likely to represent a substantial portion of Louisiana-based fishermen, we are unable to estimate how many of the fishing trips were for saltwater fishing with available data.³⁹

Fishing is also popular in the Arkansas and Tennessee LMR counties, attracting 15 percent (or 3.8 million trips) and nine percent (or 2.3 million) of total fishing trips, respectively.

EXHIBIT 3-5. PRIMARY PURPOSE OF OUTDOOR RECREATIONAL TRIPS IN THE LMR CORRIDOR, 2011



The main species of fish in the LMR Corridor include: bass, freshwater drum, sunfish, crappie, bluegill, and, of course, catfish. Catfish is probably the most popular fish among

³⁸ A specific guide for fishing in LMR, "Fishing the Lower Mississippi River," has been recently published by the LMRCC, available at: <http://www.lmrcc.org/>

³⁹ The 2011 Louisiana, F&W, 2011 survey reports that only 1 million of the 14.9 million fishing trips are saltwater ones. This very low number is estimated from a very small sample size (10-29 respondents). Consequently, the estimates may be unreliable.

anglers on the LMR and includes blue catfish, channel catfish, and flathead catfish.⁴⁰ Fishing on the main LMR channel with its deep waters, fast current and commercial navigation traffic is challenging. However, there are numerous options for LMR anglers to fish in tributaries, secondary channels, oxbows, backwaters, and along sandbars.

The second most popular location for anglers is the Arkansas portion of LMR counties, which account for 15 percent of fishing trips (3.8 million).

Twenty-two percent (or 8.3 million) of all outdoor recreation trips to the LMR were for hunting (see Exhibit 3-5). The corridor provides diverse hunting opportunities including an abundance of deer, wild turkey, quail, and doves, as well as small game such as squirrels and rabbits. Arkansas' LMR counties also offer limited opportunities for bear hunting.⁴¹ However, the LMR is most known for its unique location along the Mississippi Flyway (see text box). In the LMR Corridor, the Mississippi Flyway is relatively narrow, which leads to a high bird concentration. This phenomenon has provided a unique waterfowl opportunity that has attracted millions of hunters to the area for generations. It is known to be one of the best waterfowl hunting areas in the country.⁴²

The Mississippi Flyway

The LMR Corridor is a part of the Mississippi Flyway, a major bird migratory route. The Mississippi Flyway leads across the US from the Gulf of Mexico to Canada following the general path of the Mississippi River. It is estimated that about 40 percent of all waterfowl migration in the US takes place along this Flyway.⁴³

The LMR Corridor provides suitable winter habitats for a variety of waterfowl from the Prairie Pothole and Great Lakes. The naturally flooded forests of the Delta region offer desirable conditions for millions of mallards, wood ducks, and other waterfowl. The coastal marshes of Louisiana provide winter habitats for pintails, gadwalls, wigeon and green-winged teal, also to name a few. Missouri attracts water birds with the deltaic bottomland hardwoods, natural wetlands, and flooded agricultural fields. Arkansas offers wetlands and rice fields, which attract in the winter more mallards than any other place in the US.⁴⁴ Illinois is also a part of the Mississippi Flyway inviting wood ducks, mallards, canvasbacks and Canada geese.

⁴⁰ A specific guide for fishing in LMR, "Fishing the Lower Mississippi River," has been recently published by the LMRCC, available at: <http://www.lmrcc.org/>

⁴¹ Arkansas Game & Fish Commission. 2011. Bear Hunting Zones. Accessed at: <http://www.agfc.com/hunting/Pages/HuntingBearZones.aspx>

⁴² Brantley, 2011. Dream Destinations. 10 Spots to Hunt Ducks and Geese in North America. Accessible at: <http://www.deltawaterfowl.org/media/magazine/archive/2011-03/destinations.php>

⁴³ National Audubon Society, Inc. 2013. Mississippi Flyway. Audubon Magazine. Accessed at: <http://conservation.audubon.org/mississippi-flyway>

⁴⁴ Ducks Unlimited. DU Projects: Mississippi Flyway. Accessed at: <http://www.ducks.org/conservation/where-we-work/flyways/du-projects-mississippi-flyway>

According to a FWS survey, 20 percent of Mississippians over 16-years old participate in hunting, which is the second highest level of participation in the country.⁴⁵ Approximately 16 percent of the adult population in Arkansas participates in hunting, compared with the national average of six percent.⁴⁶ In addition to LMR residents, many out of state visitors enjoy the corridor's outdoor places for the purpose of hunting. This may account for the high number of hunting trips in Louisiana-LMR parishes. These parishes attract the largest number of trips (2.9 million), which is 35 percent of all LMR hunting trips. The second most popular location among hunters is Arkansas-LMR counties with 27 percent (or 2.3 million) trips, followed by Mississippi with 23 percent (or 1.9 million) hunting trips.

Wildlife watching is another outdoor activity enjoyed by many visitors and residents of the LMR. There are 4.1 million trips taken annually across the LMR corridor for the sole purpose of observing nature.⁴⁷ The LMR Corridor has an abundance of complex ecosystems providing habitats for numerous species. Several endangered species can be observed, including the Louisiana black bear and red-cockaded woodpecker. Large numbers of American white pelicans congregate along the river, and brown pelicans breed on the Louisiana coast. Large numbers of wood storks, herons, egrets and other birds can be found as well, and dozens of species of forest-dwelling songbirds migrate along the river and breed there.

Exhibit 3-6 shows the estimated number of recreational trips per county in 2011. We note that the county level visitation numbers are estimates calculated from state level data using proxy variables, which are variables chosen to best approximate the relative intensity of a particular recreational activity. In Exhibit 3-6, we assume that because wildlife watching frequently occurs on protected lands such as state or federal parks or refuges, there is a relationship between the amount of protected land and the level of visitation by county. Thus, we approximate the distribution of wildlife-watching activity from the State-level data using the number of protected acres in each LMR county. This means that counties with a large amount of protected areas are shown to attract a high number of wildlife watching visitors, while counties with a small amount of protected land appear to be visited by a small number of wildlife watchers. County level hunting data (in all states but Mississippi) are estimated from state-level data using the number of deer harvested in each county as a proxy. For Mississippi, where deer hunting data are not available, we allocate state-level hunting trips based on the size of each county. Finally, we allocate fishing data to LMR counties based on U.S. Census-estimated acres

⁴⁵ U.S. Department of Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

⁴⁶ U.S. Department of Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*; Arkansas Economy Benefits from Hunting Season. Accessed at: http://www.arkansas.gov/senate/newsroom/index.php?do:newsDetail=1&news_id=374

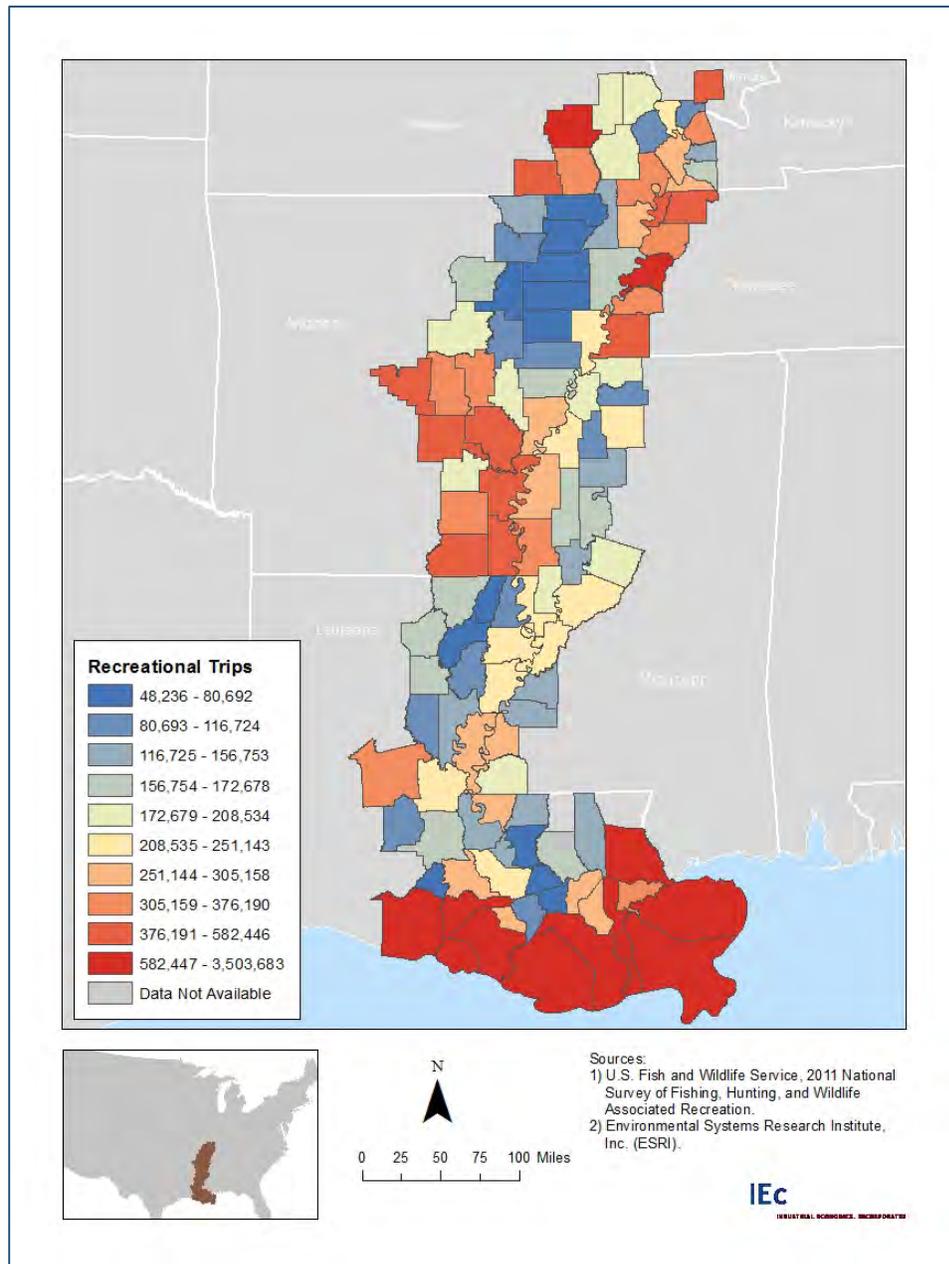
⁴⁷ The Fish and Wildlife Survey identifies two categories of wildlife watching: 1) around-the-home and 2) away-from-home activities. These calculations are based on away-from-home category only. U.S. Department of Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

of water features in each county. The data contain coastal shorelines as well as lentic and lotic water bodies. This means that a large number of fishing trips is assigned to a county with a large number of water bodies, regardless of their suitability for fishing. Due to these approximations, we recommend that adoption of county-level recreational visit data be used with caution.

Using the above methodology, we estimate that within the LMR Corridor, the most visited counties are in Louisiana, with 34 percent (or 1.4 million) of the wildlife watching trips, followed by Missouri. Missouri's LMR counties are estimated to attract 31 percent (or 1.3 million) of the wildlife watching trips in the LMR, surpassing Arkansas, which hosts less than one percent (or 160,000) trips. Arkansas-LMR counties are dominated by agricultural lands, which may explain lower estimated visitation rates.⁴⁸

⁴⁸ For information on Arkansas LMR wildlife watching opportunities refer to Sutton, K at al. *Arkansas, Watchable Wildlife Guide*. Accessed. Report for the Arkansas Game & Fish Commission. (no date) at: http://www.agfc.com/resources/publications/watchable_wildlife_guide.pdf

EXHIBIT 3-6. ESTIMATES OF COUNTY LEVEL OUTDOOR RECREATIONAL TRIPS IN THE LMR CORRIDOR, 2011



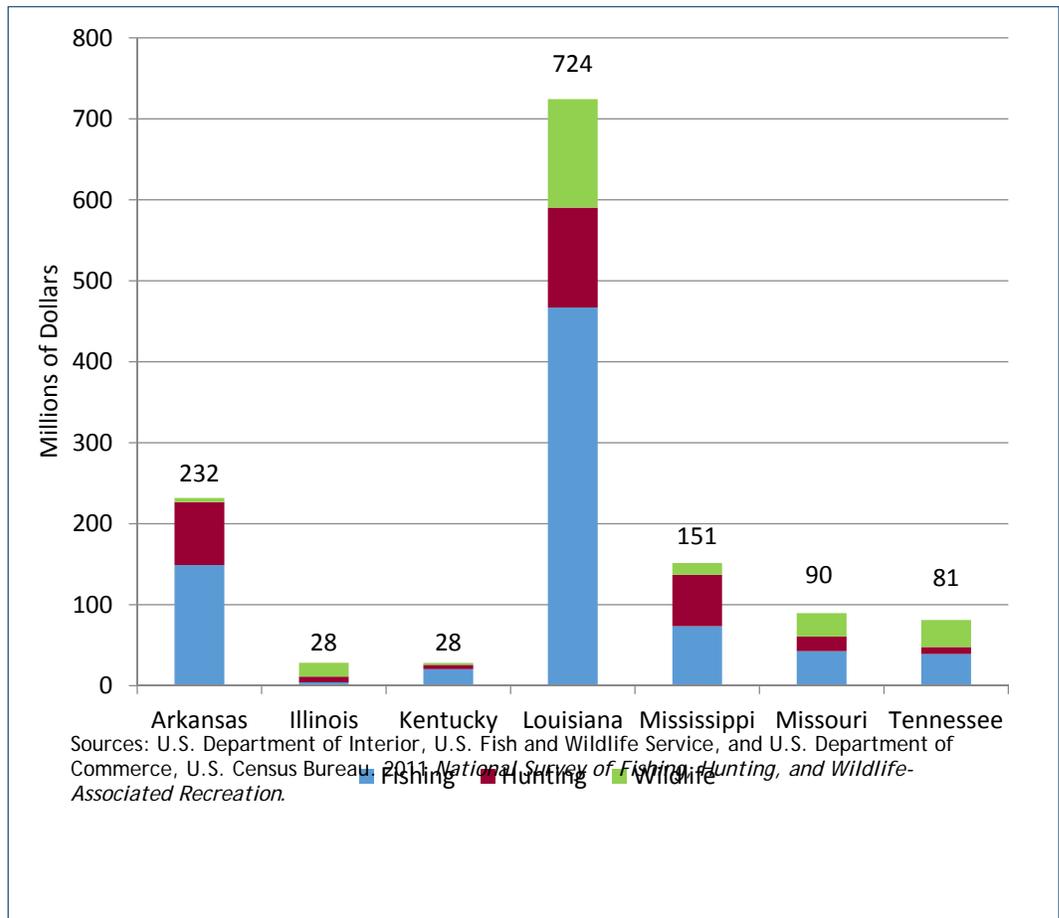
OUTDOOR RECREATION EXPENDITURES AND EMPLOYMENT IN THE LMR

Trip-related expenditures cover several categories: food, lodging, transportation, and more (such as guide and land use fees, equipment rentals, etc.). Per trip expenditures are estimated to be \$30 per day for fishing, \$32 per day for hunting, and \$48 per day for wildlife watching. Appendix A, Exhibit 3A-2, provides average per-trip estimates for fishing, hunting, and wildlife-watching by state. Using these expenditure estimates and the level of visitation estimated from the FWS survey, as allocated to the LMR Corridor using our proxy metrics, we estimate the total outdoor recreation trip expenditures in 2011 (Exhibit 3-7). Appendix A, Exhibit 3A-3 provides estimates of these trip expenditures by state. As shown, Louisiana has the greatest estimated expenditures, followed by Arkansas and Mississippi. In total, outdoor recreation in the LMR Corridor is estimated to have generated \$1.3 billion in trip-related expenditures and provided employment for approximately 54,000 people in 2011.⁴⁹ Appendix A, Exhibit 3A-4 provides estimated employment and total trip and non-trip expenditure estimates by state.

As shown in Exhibit 3-7, the greatest expenditures are generated by the most frequently visited Louisiana-LMR parishes. This portion of the corridor produces 56 percent (or \$724 million) of annual outdoor recreational revenue. The next most popular area among LMR's outdoor enthusiasts are Arkansas-LMR counties that generate 17 percent (\$232 million) of trip related expenditures, followed by 11 percent produced in Mississippi, seven percent in Missouri and six percent in Tennessee. Kentucky and Illinois LMR counties account for the remaining one percent of outdoor recreation trip related expenditures.

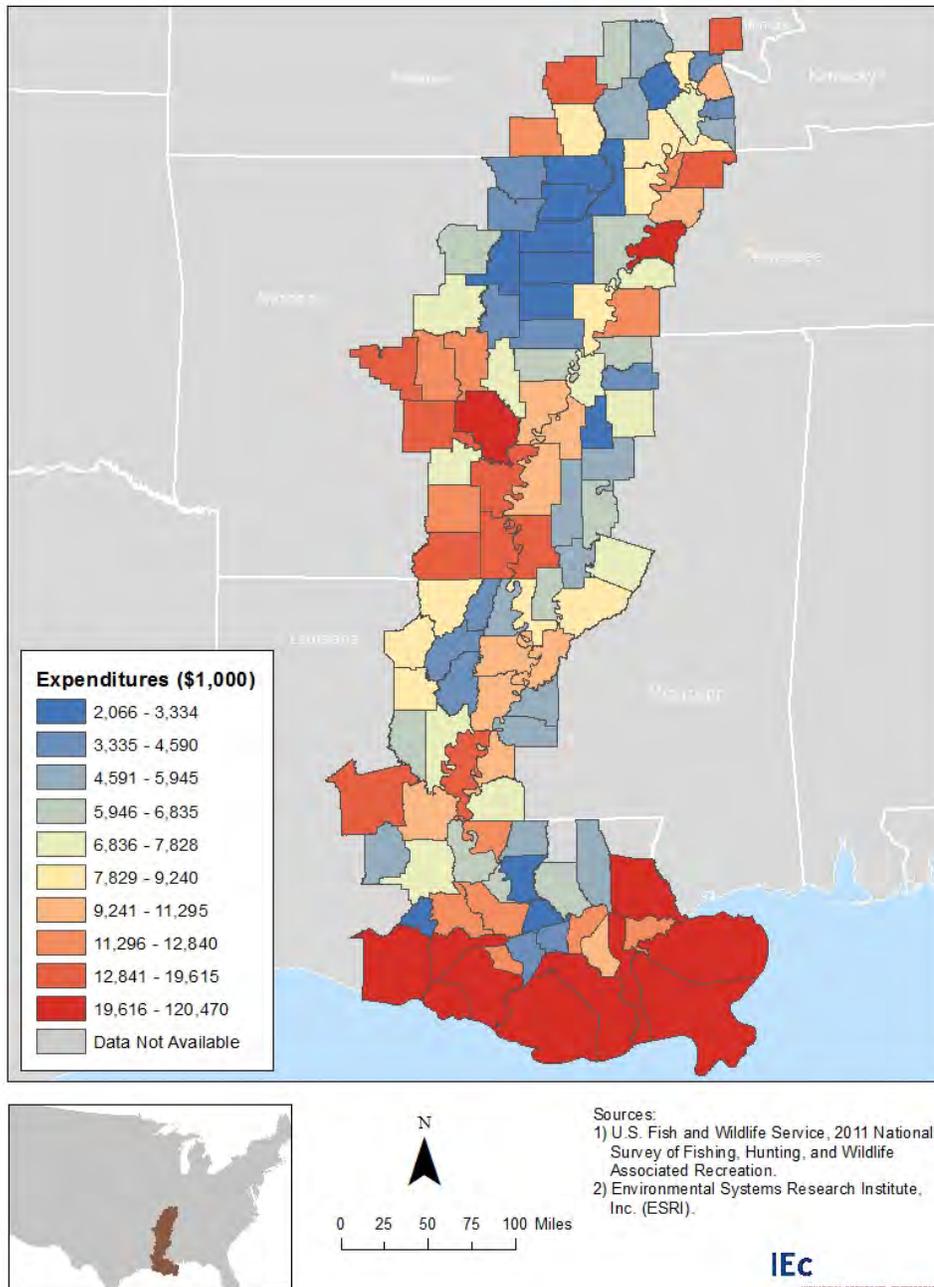
⁴⁹ Note that the estimated outdoor recreational expenditures and employment may partially overlap with revenues and employment in the tourism sector. The tourism numbers for lodging and dining expenditures and employment are provided without sufficient details to select which trips were taken for outdoor recreational purposes. U.S. Department of Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

EXHIBIT 3-7. TOTAL ESTIMATED OUTDOOR RECREATIONAL TRIP EXPENDITURES (\$MILLIONS) IN THE LMR CORRIDOR, 2011



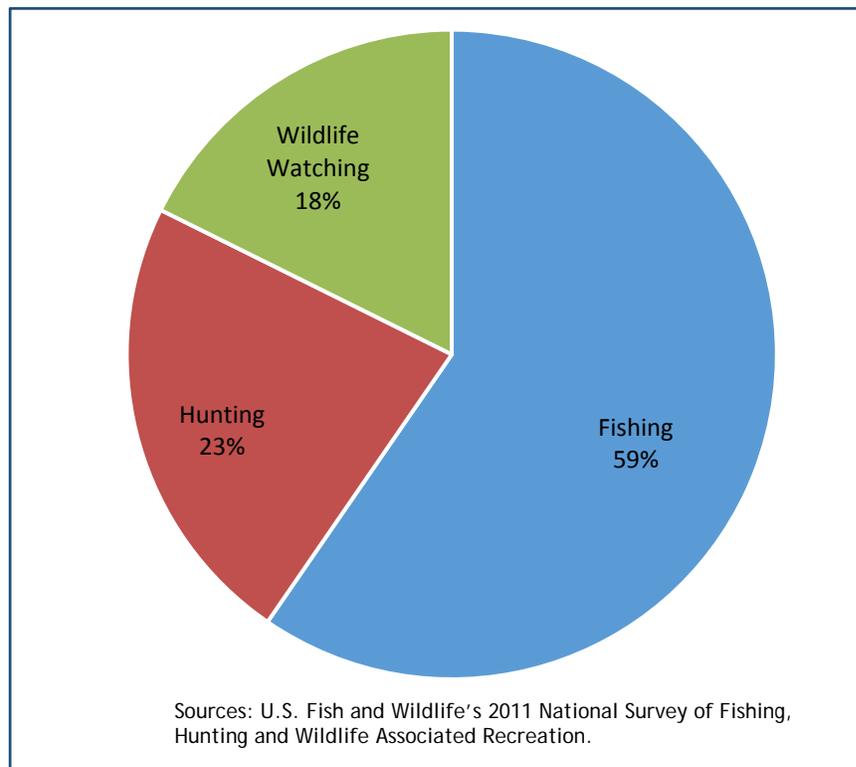
The trip expenditures are mostly associated with fishing trips (see Exhibit 3-8). They account for almost 60 percent (\$795 million) of all trip-related expenditures. Twenty-three percent (or \$303 million) of expenditures are spent on hunting, followed by wildlife-watching trips that generate the remaining 18 percent (or \$236 million).

EXHIBIT 3-7. ESTIMATED OUTDOOR RECREATIONAL TRIP EXPENDITURES (\$1,000S) IN THE LMR CORRIDOR BY CORRIDOR, 2011⁵⁰



⁵⁰ Please use caution when interpreting the county level expenditure data. Estimates of recreational expenditures is based on statewide visitation data.

EXHIBIT 3-8. COMPOSITION OF ESTIMATED OUTDOOR RECREATIONAL EXPENDITURES IN THE LMR CORRIDOR, 2011



In addition to trip related expenditures, the FWS survey also collected information on equipment expenditures. These account for an additional \$1.7 billion in the LMR's outdoor expenditures. This category of expenses is directly related to outdoor enjoyment in the LMR Corridor, but it is unclear how much of the expenses directly affect the LMR economy. In most cases, equipment for fishing, hunting and wildlife watching is purchased in the place of residence. Purchases at the trip destination usually involve replacement of broken parts or individual elements of equipment. Since some of the LMR trips are taken by local residents, it is reasonable to assume that their equipment expenditures may partially contribute to the LMR economy. They contribute only partially, because in the age of internet purchasing, many transactions made at the place of residency bring expenditures to a retail location in a different state or country. Based on the available data, it is not possible to identify which equipment purchases have actually been made in the LMR. They may be considered, though, as an economic contribution from the LMR recreational sector to the national economy. Adding the equipment expenditures provided by the FWS survey to the trip expenditures potentially overestimates the total outdoor recreation expenditures attributable to the LMR. This upper-bound value is \$3 billion. However, for the purpose of this analysis the more conservative estimate of trip related expenditures only will be added to the total value derived from recreation.

Outdoor Industry Association Survey

In addition to hunting, fishing and wildlife watching there are also numerous other outdoor activities that contribute to local economies in the LMR Corridor. Some of these activities include hiking, biking, camping, and non-motorized water-based sports (such as sailing, kayaking or swimming). There is also a large category of outdoor activities that involve motorized equipment such as boating, motorized water-based sports, recreational vehicle use, and off-road vehicle use. The Outdoor Industry Association's (OIA) 2010 report provides state-level estimates of the economic contribution of outdoor recreation, including estimates for motorized (recreational vehicle, off-road vehicle, and boating) and non-motorized activities (water-based sports, trail-based sports, bicycling, and camping).

We analyzed the survey data to estimate the expenditures from these additional activities by applying the same methodology we used in analysis of the Fish and Wildlife survey. We allocated state-level expenditures from water based sports to individual counties in the LMR Corridor based on the acres of water features in each county.⁵¹ We allocated off-road vehicle use, biking, camping, recreational vehicle use, and trail-based sports data to counties based on the number of protected areas within each county.⁵² We assigned state-level boating data to counties using the number of boat ramps and marinas in each county.⁵³

Using this method, the LMR Corridor attracted a total of 132 million motorized and non-motorized trips in 2010, not including wildlife-based recreation, fishing, or hunting. Of these trips, 74 percent were for the purpose of non-motorized activities and 26 percent were for motorized activities. This estimate is 3.5 times larger than the estimated number of wildlife trips from the FWS survey in 2011. The OIA survey also suggests that trip-related expenditures for motorized (\$2.5 billion) and non-motorized visits (\$5 billion) would have been \$7.5 billion in the LMR Corridor.

Based on the limited information about the OIA survey methodology, it is unclear whether the numbers estimated may double count some of the estimates provided in the FWS survey. Because the estimates provided therein are substantially larger than estimates from FWS, and overlap may exist, we have conservatively not included them in our estimates of the total value associated with the LMR.

⁵¹ Data on acres of water features were obtained from the US Census and contain coastal shorelines as well as lentic and lotic water bodies.

⁵² Protected area data was obtained from the U.S. Geological Society's Protected Areas Database. We included areas accessible to the public only.

⁵³ Data were obtained from the Louisiana Department of Wildlife and Fisheries, Illinois Department of Natural Resources, Mississippi Department of Wildlife, Fisheries and Parks, Tennessee Wildlife Resources Agency, Missouri Department of Conservation, Arkansas Game and Fish Commission, and Kentucky Department of Fish and Wildlife Resources.

DATA SOURCES AND METHODOLOGY

The economic analysis of the outdoor recreation sector is a challenge. It is a non-standardized sector, for which economic data is rarely collected systematically. The sector generates non-trivial expenditures and provides employment to many people, yet the financial and labor figures are reported as parts of other economic sectors and are often hard to trace. Outdoor recreation activities generate expenditures and employment in manufacturing where equipment and gear are produced, in retail where these goods are sold, in the hospitality sector which provides lodging and dining, and in numerous others industries. This makes it difficult to avoid double counting.

In this study, we rely on the results of the U.S. Fish and Wildlife's 2011 National Survey of Fishing, Hunting and Wildlife Associated Recreation. The survey provides statewide figures for the intensity of outdoor recreational activities and expenditures associated with them. Activities are categorized in three major groups: fishing, hunting, and wildlife watching. These outdoor activities are measured by the number of trips. A trip is broadly defined as "an outing involving fishing, hunting, or wildlife watching." A trip may begin from an individual's principal residence or from another place, such as a vacation home or the home of a relative. A trip may last an hour, a day, or many days."⁵⁴

We allocate state-level estimates of trips and expenditures to the county level in order to estimate total number of trips and total expenditures in the LMR Corridor. The county-level allocation is based on variables chosen to best approximate the relative intensity of a particular recreational activity. Specifically, we assume that wildlife watching frequently occurs on protected lands such as state or federal parks or refuges. We then approximate the distribution of wildlife-watching activity using the number of protected acres in each LMR county. We allocated hunting estimates to the LMR Corridor based on the number of deer harvested in each county. We obtained deer-hunting data from State Fish and Game offices for the study area other than Mississippi, where deer hunting data was not available. For Mississippi, we allocate state-level hunting data based on the size of each county. We allocate fishing data to LMR counties based on Census-estimated acres of water features in each county. The data contain coastal shorelines as well as lentic and lotic water bodies.

Employment data for outdoor recreation as an industry does not exist (Bureau of Labor Statistics Quarterly Census of Employment and Wages). We therefore estimate county-level employment in support of outdoor recreation activities based on assumed relationships between expenditures on outdoor recreation and the demand for jobs in the sector. The relationship was developed based on data from other studies on recreation conducted in the LMR states.⁵⁵ Using this data, we assume that for every \$1 million spent on recreation, 16 jobs are created.

⁵⁴ U.S. Department of Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

⁵⁵ Sources: IEc, 2004 and Fly et al. 2012.

CHAPTER 4 | TOURISM

This chapter presents information on the tourism sector in the Lower Mississippi River (LMR) Corridor. The LMR offers a great number of historic, cultural, and natural attractions enjoyed by millions of tourists and travelers. Outdoor recreation in the corridor is presented as a separate sector in Chapter 3 due to its importance and scale. Here, we are focusing more specifically on activities associated with the river, ranging from its direct use for river cruises and festivals to a more indirect impact of providing a desirable location for the initial settlement and creation of small towns and major cities along the LMR. The rich cultural and historic heritage of the LMR region makes the tourist sector the second most profitable sector after manufacturing in the region, generating \$15.5 billion in annual expenditures, and employing 190,000 workers.

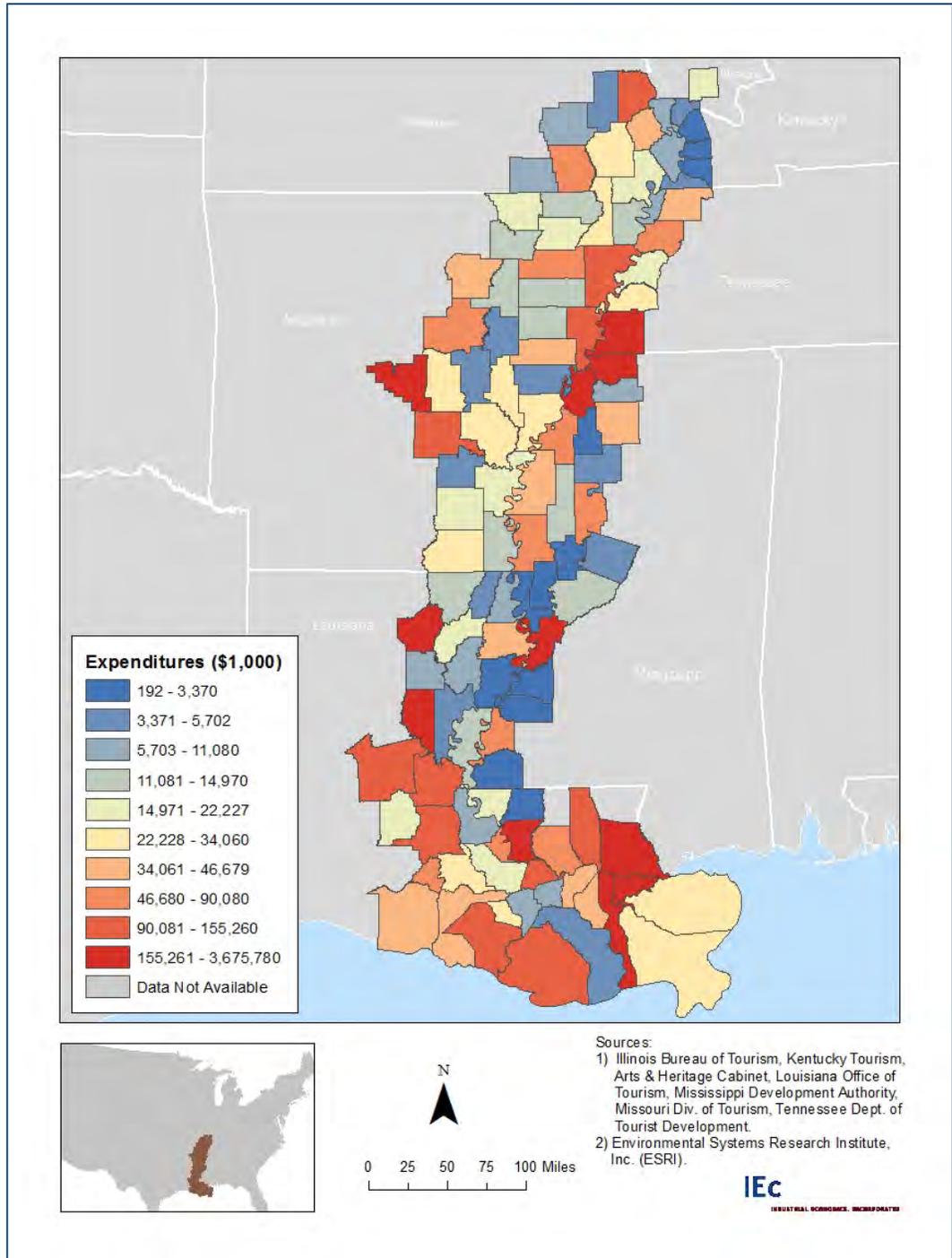
EXPENDITURES AND EMPLOYMENT

In 2011, the travel and tourism sector in the LMR Corridor provided employment for over 190,000 people, bringing \$15.5 billion in annual expenditures. Over half of the expenditures (\$7.8 billion) are produced in Louisiana LMR parishes (see Exhibits 4-1 and 4-2). The Louisiana parishes also provide major employment opportunities, offering 43 percent (or 81,150 jobs) of the sector's employment in the LMR (see Exhibit 4-1). The second largest expenditure contributors are Tennessee counties that produce 21 percent (or \$3.2 billion) of expenditures and 25 percent (or 48,490 jobs) of employment in the tourist sector. In both cases the size of the economic impact is not related to the land area, as often observed in land dependent sectors such as agriculture or forestry. The high expenditures and employment are produced by tourist attractions concentrated primarily in the two major cities in the region: New Orleans, Louisiana, and Memphis, Tennessee.

EXHIBIT 4-1. TOURISM AND TRAVEL EXPENDITURES (\$1,000S) AND EMPLOYMENT IN THE LMR CORRIDOR, 2011

STATE	EXPENDITURES		EMPLOYMENT	
	\$1,000	PERCENTAGE	# OF PEOPLE	PERCENTAGE
Kentucky	\$8,669	>1%	3,964	2%
Illinois	\$27,594	>1%	130	>1%
Missouri	\$377,642	2%	10,026	5%
Mississippi	\$1,604,326	10%	23,759	12%
Arkansas	\$2,436,842	16%	22,876	12%
Tennessee	\$3,205,080	21%	48,490	25%
Louisiana	\$7,840,440	51%	81,150	43%
LMR Corridor	\$15,500,593		190,395	
Sources: Arkansas Department of Parks and Tourism, Illinois Bureau of Tourism, Kentucky Tourism, Arts & Heritage Cabinet, Louisiana Office of Tourism, Mississippi Development Authority, and Missouri Division of Tourism.				

EXHIBIT 4-2. TOURISM EXPENDITURES (\$1,000S) IN THE LMR CORRIDOR, 2011



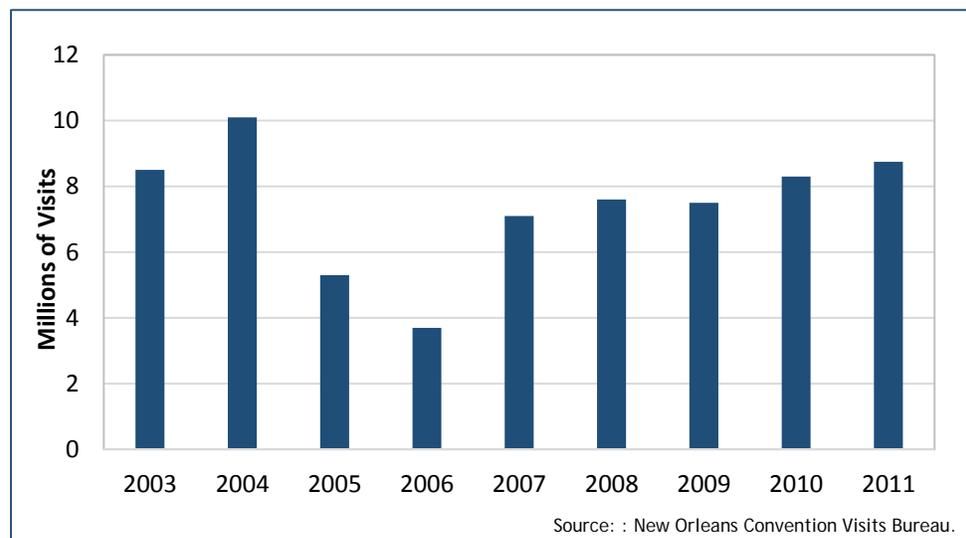
TOURIST DESTINATIONS

There are numerous tourist destinations in the LMR Corridor. The sites and places presented below highlight the highest revenue contributors as well as selected points of interest.

NEW ORLEANS, LOUISIANA

According to a study commissioned by Louisiana's Office of Tourism, New Orleans is the primary Louisiana destination for tourism. Seventy-two percent of Louisiana's visitors come to the state to stay in New Orleans.⁵⁶ The city has also been one of the most frequently visited cities in the country. The city's tourism industry typically attracts 8.5 to 10 million visitors annually (see Exhibit 4-3), producing \$5 billion in annual expenditures (Exhibit 4-4), and employing 70,000 people. New Orleans is one of the top 20 hotel markets in the country, producing \$1 billion in annual expenditures. It is one of the top destinations for organizing conventions as well as for leisure visitations. New Orleans offers a unique tourist destination with its French Quarter, internationally renowned restaurants, and vibrant night life. The main attractions of the city include music, cultural, culinary, art, film and theatre festivals. New Orleans also hosts the largest annual festival in the country, and a well-known carnival celebration, Mardi Gras. This single event generates every year approximately \$1 billion in expenditures.⁵⁷ The city organizes also numerous other events, such as the New Orleans Jazz and Heritage Festival, which draw thousands of tourists to the city annually.

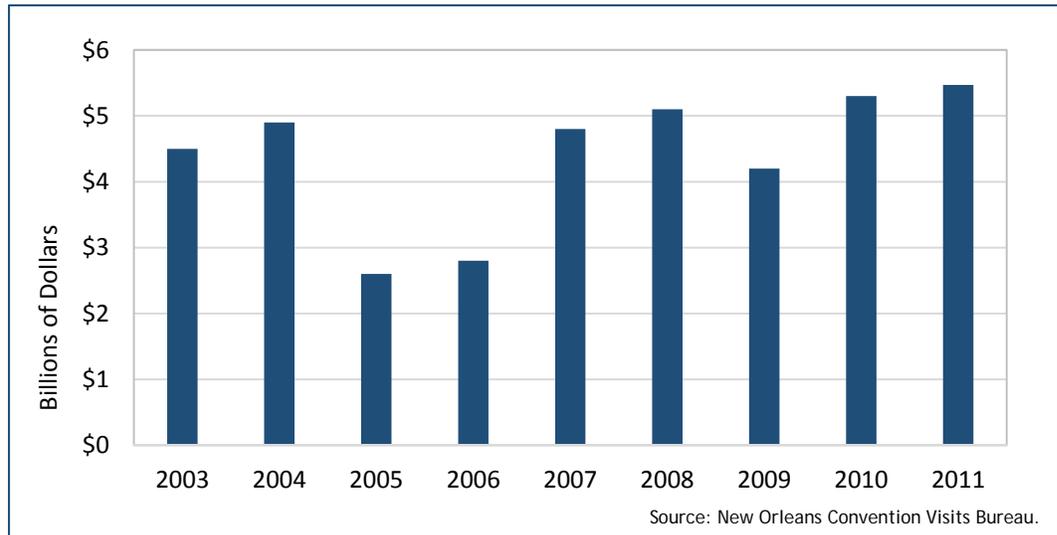
EXHIBIT 4-3. ANNUAL NUMBER OF TOURIST VISITS (MILLIONS) TO NEW ORLEANS, 2003-2011⁵⁸



⁵⁶ Q2 Insights, 2013. Louisiana Culinary Web Survey Detailed Report, May 15, 2013. Accessed at: <http://www.crt.state.la.us/tourism/research/Documents/2013-14/CulinaryTourismSurveyReport2013.pdf>

⁵⁷ New Orleans Tourism Marketing Corporation. Press Release: "New Orleans Tourism, Mardi Gras statistics." Accessed at: http://www.neworleansonline.com/pr/releases/releases/pr_MGstats_1.pdf

⁵⁸ Source: New Orleans Convention Visits Bureau, 2011. New Orleans Tourism Industry Fact Sheet. Accessed at: <http://www.neworleansonline.com/pr/releases/releases/Sixth%20Anniversary%20Katrina%20tourism%20fact%20sheet.pdf>

EXHIBIT 4-4. ANNUAL VISITOR SPENDING (\$BILLIONS) IN NEW ORLEANS, 2003-2011⁵⁹

Recent years have brought a series of catastrophic events that critically affected the city of New Orleans. The first in a series of disasters was hurricane Katrina, which hit the city in 2005 claiming 1,833 lives. The devastating impact of this storm on infrastructure was estimated at \$85 billion in property damages.⁶⁰ Hurricane winds and flood surges extensively damaged roads and buildings. Eighty percent of the city was submerged and in many places the flood water stayed for weeks, devastating New Orleans infrastructure. Ninety-five percent of hotel rooms were closed in September, 2005, and this problem persisted in October of that year when 67 percent remained closed.⁶¹

The New Orleans Convention and Visitors Bureau (CVB) estimated direct revenue losses of greater than \$2 billion during the 12 months that followed the hurricane. Annual tourism expenditures dropped from \$4.9 billion in 2004 to \$2.5 billion in 2005. The number of visitors went down from 10.1 million in 2004 to 5.3 million in 2005. In addition to direct losses from cancellation of already planned events, Hurricane Katrina caused what the CVB refers to as ‘unprecedented brand impairment.’⁶² In 2006, the number of visitors dropped to 3.7 million, which is only 37 percent of pre-Katrina, 2004

⁵⁹ Source: New Orleans Convention Visits Bureau, *New Orleans Achieves 7.75 Million Visitors in 2011*. Press Release. Accessed at: <http://www.neworleanscvb.com/articles/index.cfm?action=view&articleID=6792&menuID=1602>

⁶⁰ University of New Orleans, Hospitality Research Center, 2013. Louisiana Tourism Forecast 2013-2014. Report prepared for Louisiana Department of Culture, Recreation and Tourism. Accessed at: http://www.crt.state.la.us/tourism/research/Documents/2012-13/Louisiana_Tourism_Forecast_Report_2013-2016.pdf

⁶¹ RERC, 2005. Real Estate Report: Hurricane Katrina’s Impact on the Regional Hotel Market. Accessed at: <http://research.rerc.com/media/BAhbBlshOgZmSSi5MjAxMi8wNC8wNS8wMC8zNS80My80NzVSHVycmljYW5lX0thdHJpbmFFSW1wYWw0LnBkZgY6BkVU/hurricane-katrina-impact.pdf>

⁶² New Orleans Convention Visits Bureau, 2011. Accessed at: <http://www.neworleansonline.com/pr/releases/releases/Sixth%20Anniversary%20Katrina%20tourism%20fact%20sheet.pdf>

visitation numbers. There were six parades canceled in the Orleans Parish alone and the parades that did take place were smaller.⁶³

Tourism is a perception driven industry and, therefore, marketing campaigns have been employed to inform the public about the rebuilding and recovery of New Orleans. In 2007 and 2008, both the number of visitors and associated expenditures started recovering. In 2008, the expenditures even exceeded the 2004 numbers. This trend did not continue, as 2009 saw a nationwide economic recession that again decreased both visitation and tourism revenue. In 2010, the numbers began to increase again, with three major festivals (Mardi Gras, the Essence, and the Jazz Festivals) reaching record attendances.

However, in 2010 another catastrophe hit Louisiana's shore. The *Deepwater Horizon* oil spill in April of that year occurred about 150 miles southeast of New Orleans, threatening the city's tourism industry. The city's visitation numbers and tourism expenditures in 2010, though, were higher than expected. Over 5 billion people visited the city contributing \$8.3 billion in expenditures. This effect is often attributed to an aggressive marketing campaign conducted to clear a possible misconception that the city of New Orleans was directly affected by oil. The campaign was partially financed from an initial payment of \$15 million from BP to the state of Louisiana in June, 2010.⁶⁴

THE DEEPWATER HORIZON OIL SPILL IMPACT ON TOURISM IN THE LMR

The *Deepwater Horizon* oil spill threatened tourism not only for the city of New Orleans, but for all coastal LMR parishes (which are exclusively located in Louisiana). The state wide losses to leisure visitor spending in 2010 was estimated to be \$247 million. A substantial part of these losses was offset by an increase in business spending (\$216 million), attributed to the oil spill cleanup efforts and damage assessments. This resulted in a net loss of \$32 million.⁶⁵ The oil spill impact on visitation and expenditures in 2011 is not available, but statewide numbers for the Louisiana travel industry increased, which may be attributed to the effect of a TV and newspaper promotional campaign advertising Louisiana as a tourist destination. The campaign was financed by the BP retribution payments.⁶⁶ In 2011, domestic travelers directly spent \$9.6 billion in Louisiana, up 6.5 percent from 2010. The employment in the travel industry in 2011 increased by 0.9 percent from 2010.

⁶³ University of New Orleans, Hospitality Research Center, 2013. Louisiana Tourism Forecast 2013-2014. Report prepared for Louisiana Department of Culture, Recreation and Tourism. Accessed at: http://www.crt.state.la.us/tourism/research/Documents/2012-13/Louisiana_Tourism_Forecast_Report_2013-2016.pdf

⁶⁴ Finn, Kathy. Reuters. May 27, 2012. "Two years after BP oil spill, tourists back in U.S. Gulf." Accessed at: <http://www.reuters.com/article/2012/05/27/usa-bpspill-tourism-idUSL1E8GP15X20120527>

⁶⁵ Tourism Economics. 2011 (June). The Impact of the BP Oil Spill on Visitor Spending in Louisiana: Revised estimates based on data through 2010 Q4. Report prepared for Louisiana Office of Tourism. Accessed at: http://www.crt.state.la.us/tourism/research/Documents/2011-12/Oil_Spill_Impacts_201106.pdf

⁶⁶ Comment by Mark Romig, president of the New Orleans Tourism Marketing Corp. http://www.nola.com/business/index.ssf/2012/03/new_orleans_tourism_breaks_rec.html

On Sunday, February 3, 2013, New Orleans hosted Super Bowl XLVII. It was the tenth time the Super Bowl took place in the city of New Orleans creating a tie with Miami for the most frequently hosting city. These highly profitable events contribute greatly to the tourist sector expenditures producing additional expenditures and employment. The estimated impact of Super Bowl XLVII and its numerous supporting events (for example, live concerts and the NFL Experience, a pro football interactive theme park) generated \$480 million in expenditures from both direct and secondary spending. The National Football League and associated entity visitors spent on average \$718 a day, followed by regular day-trip visitors, whose daily expenditures were on average \$680. It is estimated that an additional 5,672 full- and part-time jobs were created producing \$154 million in additional earnings.⁶⁷

MEMPHIS, TENNESSEE

It is estimated that the tourism industry in Memphis produces \$3.1 billion annually and employs 25,000 people.⁶⁸ The city offers a variety of attractions. One of the most popular is Graceland, a museum and the former home of Elvis Presley. It is listed as a National Historic Landmark, and the second most visited house (with an average of 500,000 visitors annually) after the White House.⁶⁹ Another major attraction is Beale Street, the entertainment district in Memphis that used to be a trade center for merchants moving their products along the Mississippi River. Then, in the mid-1800's, Beale began attracting traveling musicians. Currently, Beale Street is known for its live jazz, delta blues, rock 'n' roll, R&B and gospel concerts, as well as night clubs and restaurants.

GAMING INDUSTRY IN THE LMR

The LMR Corridor also attracts tourists through its large gaming industry. Out of the seven LMR states, three host casinos. There are 23 casinos in the LMR Corridor. Their annual expenditures were \$2.4 billion in 2011 (see Exhibit 4-5).

Out of 30 casinos in the state of Mississippi, 17 are located in the LMR Corridor. They contributed 48 percent (or \$1.1 billion) of the LMR's gaming industry revenue in 2011.⁷⁰ Six of the 18 Louisiana casinos are in LMR parishes, and they generate 38 percent (or \$915 million) of this revenue. There is also one casino in the LMR for Missouri that contributes 14 percent (or \$325 million) of 2011 LMR gaming expenditures. In October

⁶⁷ Prepared based on: The New Orleans Super Bowl Host Committee and The University of New Orleans. "2013 Super Bowl Visitor Study & Economic Impact." Accessible at: http://media.nola.com/business_impact/other/Super%20Bowl%20XLVII%20Economic%20Impact%20Study%20UNO.PDF

⁶⁸ City of Memphis. Memphis Convention & Visitors Bureau History. Accessed at: <http://www.memphistravel.com/mcgv-history>

⁶⁹ List of threatened historic sites in the United States. Accessed at: http://en.wikipedia.org/wiki/List_of_threatened_historic_sites_in_the_United_States

⁷⁰ Louisiana Gaming Control Board, 2011-2012 Report to the Louisiana State Legislature; Missouri Gaming Commission, 2011 Annual Report; Article in the Southeast Missourian newspaper accessed at: <http://www.semissourian.com/story/1958157.html>; Mississippi Department of Revenue, Miscellaneous Tax Division. 2013. Casino Gross Gaming Revenues. Accessed at: http://www.dor.ms.gov/docs/game_gaminggrossrevenuesprevious.pdf

2012, a second casino in Missouri's part of the LMR Corridor (in Cape Girardeau, MO) opened.

EXHIBIT 4-5. CASINOS AND GAMING EXPENDITURES (\$1,000S) IN THE LMR CORRIDOR, 2011

STATE	COUNTY	CASINOS	EXPENDITURES (\$1,000)
Mississippi	Warren	<ul style="list-style-type: none"> • Ameristar Casino Hotel • Horizon Casino Hotel • Isle of Capri Casino • Rainbow Hotel Casino • Riverwalk Casino 	\$1,142,398
	Tunica	<ul style="list-style-type: none"> • Bally's Saloon • Fitzgerald's Casino • Gold Strike Casino Resort • Harrah's • Hollywood • Horseshoe Resorts • Sam's town • Tunica's Roadhouse 	
	Washington	<ul style="list-style-type: none"> • Harlow's Casino Resort • Trop Casino 	
	Adams	<ul style="list-style-type: none"> • Isle of Capri Hotel & Casino • Magnolia Bluffs Casino 	
Louisiana	East Baton Rouge	<ul style="list-style-type: none"> • Belle of Baton Rouge • Hollywood Casino 	\$192,120
	Jefferson	<ul style="list-style-type: none"> • Treasure chest • Boomtown 	\$372,047
	St. Mary	<ul style="list-style-type: none"> • Amelia Belle 	
	New Orleans	<ul style="list-style-type: none"> • Harrah Casino 	\$350,882
Missouri	Pemiscot	<ul style="list-style-type: none"> • Lady Luck of Caruthersville 	\$325,000
LMR Corridor			\$2,382,447
Sources: Louisiana Gaming Control Board, 2011-2012 Report to the Louisiana State Legislature; Missouri Gaming Commission, 2011 Annual Report; Article in the <i>Southeast Missourian</i> newspaper accessed at: http://www.semissourian.com/story/1958157.html .			

RIVERBOAT CRUISES AND TOURS

Many riverboats are used for scenic tours and cruises on the LMR allowing tourists to directly enjoy the river's beauty. There are numerous boats offering day or overnight trips along the LMR. One of the longest (seven day) cruises can be taken onboard a newly built (in 2012) paddlewheel-steamboat, Queen of the Mississippi. It boards 150 passengers and recreates the grand experience of the river.⁷¹ The Queen of the Mississippi replaced the historic Mississippi Queen, the second largest paddle wheel-steamboat ever built. It had 206 rooms for 412 guests and employed a crew of 157 people.

⁷¹ American Cruise Lines. Queen of the Mississippi. Accessed at: <http://www.americancruiselines.com/small-riverboat-cruise-ships/Queen-of-the-Mississippi>

The largest steamboat ever built is the American Queen. It cruises both the LMR and UMR, as well as the Ohio and Tennessee rivers. The LMR cruises depart from New Orleans or Memphis. The American Queen accommodates 436 passengers.⁷² It is also the only authentic overnight paddlewheel steamboat in America.⁷³

Some of the steamboats formerly cruising the LMR are landmarks converted into hotels. For example, the Delta Queen sternwheeler steamboat became a U.S. National Historic Landmark. It retired to Chattanooga, Tennessee, where it is permanently docked as a floating hotel.

NATIONAL HISTORIC LANDMARKS IN THE LMR

The LMR corridor has a rich history and culture reflected in the number of national historic landmarks located along the river. Out of 2,500 national landmarks in the country, 89 are located in the LMR Corridor.⁷⁴ These include a variety of historic and cultural sites, structures, and objects that attract tourists to the region. Appendix A, Exhibit 4A-1 presents a list of these 89 landmarks. Few of the LMR national historic landmarks suffered varying degrees of damage in recent years. For example, Hurricanes Katrina and Rita badly damaged Fort Jackson in Louisiana. It was constructed in 1822 to defend the city of New Orleans from a coastal attack. During the American Civil War, in 1862, it was a site of the Battle of Forts Jackson and St. Philip. During Hurricanes Katrina and Rita the fort was flooded for almost six weeks, causing structural damages to the buildings and destroying many historic exhibits. The damages were severe enough to classify Fort Jackson's condition as threatened.⁷⁵ In 2006, it was also listed as one of the Top 10 Endangered Civil War Battlefields.⁷⁶ The Fort was also involved in environmental restoration after the *Deepwater Horizon* oil spill, as a site for treating birds affected by the oil.

DATA SOURCES AND METHODOLOGY

We obtained expenditure and employment data in the tourism sector from reports published by state tourism departments. These reports provide estimates of travel and tourism related expenditures by county. We used data from the following agencies: Mississippi Development Authority Tourism Division, Arkansas Department of Parks and Tourism, Illinois Bureau of Tourism, Louisiana Office of Tourism, Tennessee Department of Tourist Development, Missouri Division of Tourism, and the Kentucky Tourism, Arts & Heritage Cabinet. Except for Missouri and Illinois, all tourism data are from the year 2011. Tourism data for Illinois and Missouri were obtained for the years

⁷² Cruise Critic, The American Queen Review. Accessed at: <http://www.cruise critic.com/reviews/review.cfm?ShipID=649&gclid=CPzCt7OT6rsCFcZ77Aod8X4ARg>

⁷³ American Queen Steamboat Company. The American Queen Steamboat. Accessed at: http://www.americanqueensteamboatcompany.com/american_queen/

⁷⁴ National Park Service, U.S. Department of the Interior, National Historic Landmarks. List of Sites. Accessed at: <http://www.nps.gov/nhl/designations/listsofnhls.htm>

⁷⁵ Wikipedia. 2013. Fort Jackson, Louisiana. Accessed at: http://en.wikipedia.org/wiki/Fort_Jackson,_Louisiana

⁷⁶ Wikipedia. 2013. List of threatened historic sites in the United States. Accessed at: http://en.wikipedia.org/wiki/List_of_threatened_historic_sites_in_the_United_States

2008 and 2010 respectively. Additionally, we obtained information on historic and cultural attractions and National Natural Landmarks from the U.S. National Park Service.

CHAPTER 5 | WATER SUPPLY

Water from the Lower Mississippi River is an essential input to industrial and agricultural production. To a lesser extent, residents of the corridor also depend on LMR surface water for domestic use. Overall, over 11.8 billion gallons of surface water are withdrawn each day by water users in the LMR Corridor, which represents approximately four percent of all U.S. fresh surface-water withdrawals (USGS, 2005). The majority of the surface water withdrawals (approximately 82 percent) are for industrial and thermoelectric power plant use. Overall, 97 percent of all surface water in the LMR Region is self-supplied (i.e., water is withdrawn directly by a user rather than being obtained from a public supply).

Public water supply systems drawing on surface water comprise approximately three percent of total regional surface water withdrawals. Domestic customers (i.e., households) in the LMR Corridor region use less than one percent of total surface water withdrawals, relying instead upon groundwater to meet their needs.

The discussion below is divided into several sections. First, we provide an overview of the water supply sector in the region, summarizing total quantities supplied and major users. We then discuss revenue and employment estimates. Finally, we review the data sources and methods used to estimate key figures.

OVERVIEW OF WATER SUPPLY AND WATER USERS

Water users in the LMR region draw water from ground and surface water sources. In total, approximately half of total water withdrawals are from surface water sources, or approximately 11,802 MGD (million gallons per day) in 2005. As shown in Exhibit 5-1, the relative importance of surface water withdrawals varies by state. Each of the major categories of surface water withdrawal is reported as either self-supplied or publicly supplied. This analysis focuses on estimated surface water withdrawals, both public and self-supplied, because surface water is tied most directly to the LMR and its tributaries. Exhibit 5-2 highlights those locations within the LMR Corridor most reliant on surface water withdrawals.

As shown in Exhibit 5-3 and Exhibit 5-4, the majority of surface water withdrawals occur in the thermoelectric power, industrial, and farming and irrigation (i.e., agriculture, aquaculture, and other irrigation) sectors.⁷⁷ Nearly 95 percent of all surface water withdrawals occur in these sectors, with thermoelectric power comprising nearly 60

⁷⁷ See Appendix A: Exhibit 5A-1 and Exhibit 5A-2 for additional detail.

percent of all surface water withdrawals in the LMR. Below we discuss the various water supply systems and water users.

EXHIBIT 5-1. WATER WITHDRAWALS IN THE LMR CORRIDOR (MILLION GALLONS PER DAY), 2005

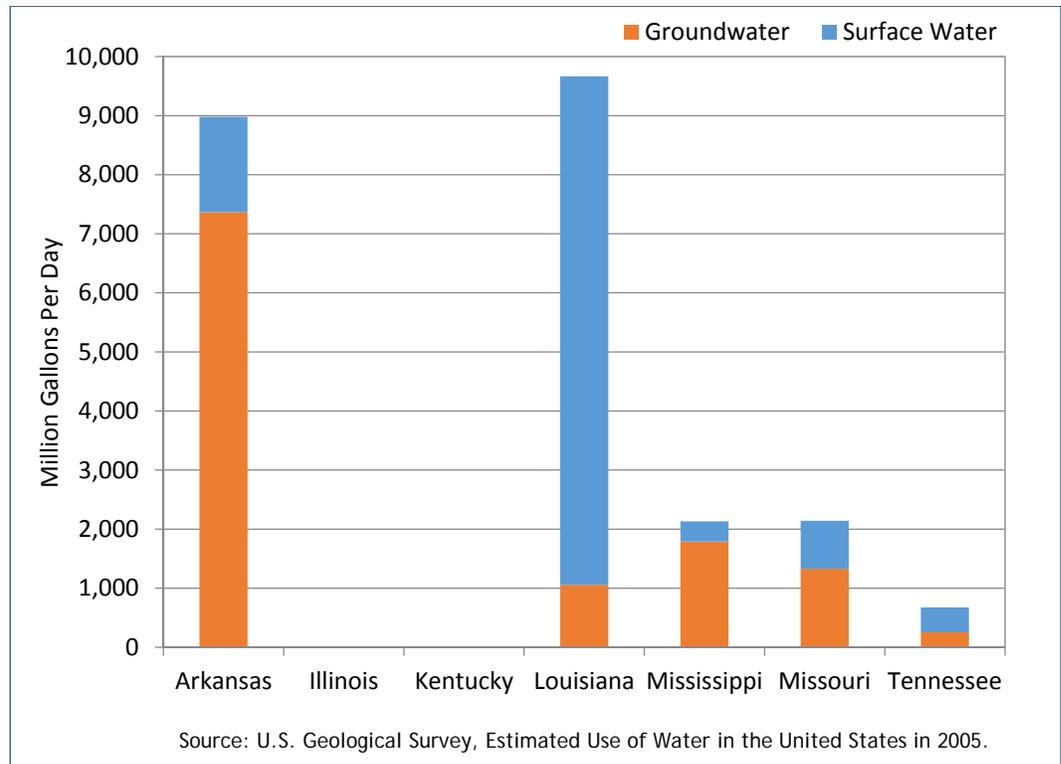


EXHIBIT 5-2. SURFACE WATER WITHDRAWALS (MILLION GALLONS PER DAY) IN THE LMR CORRIDOR, 2005

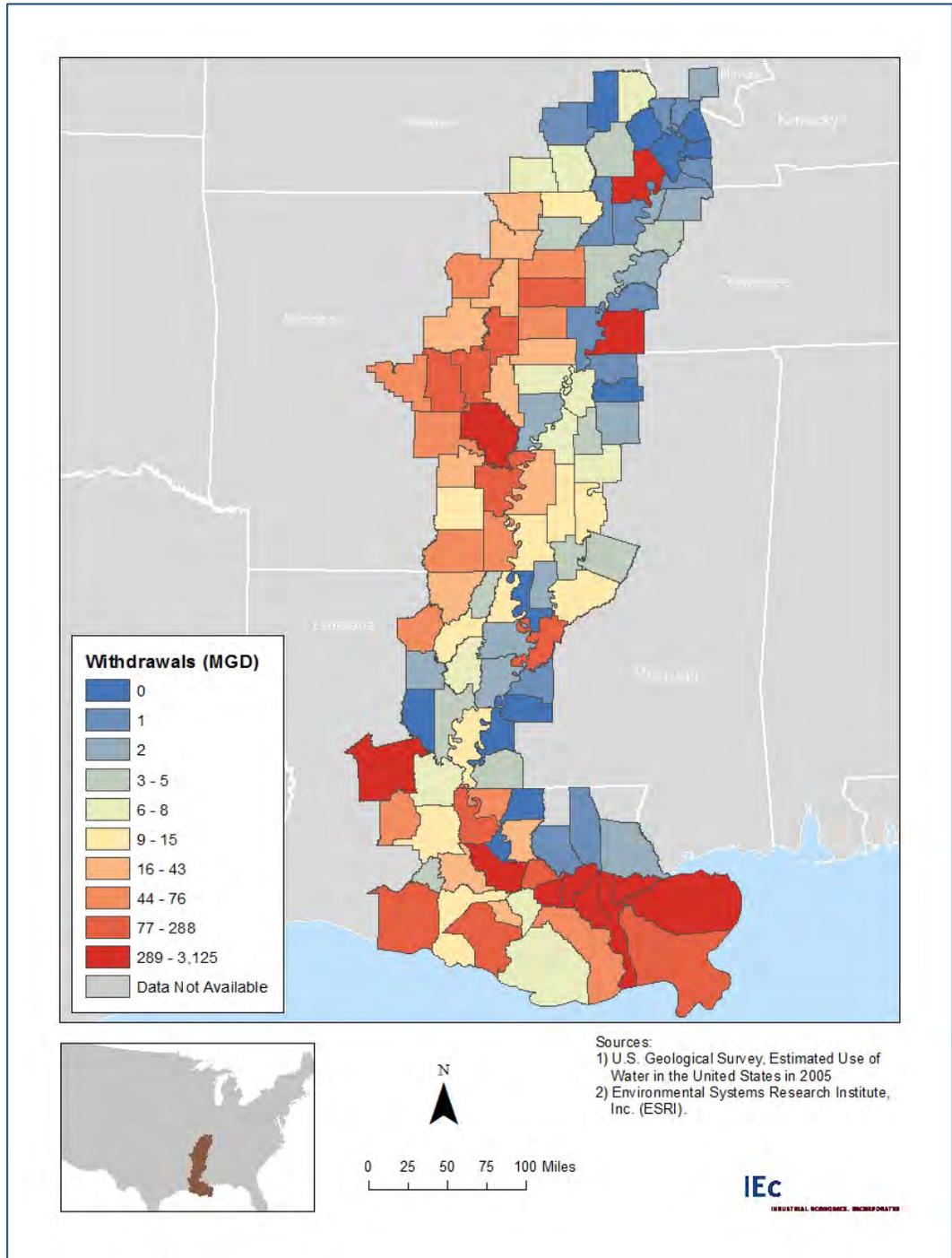


EXHIBIT 5-3. SURFACE WATER WITHDRAWALS (MILLION GALLONS PER DAY) BY SECTOR IN THE LMR CORRIDOR, 2005

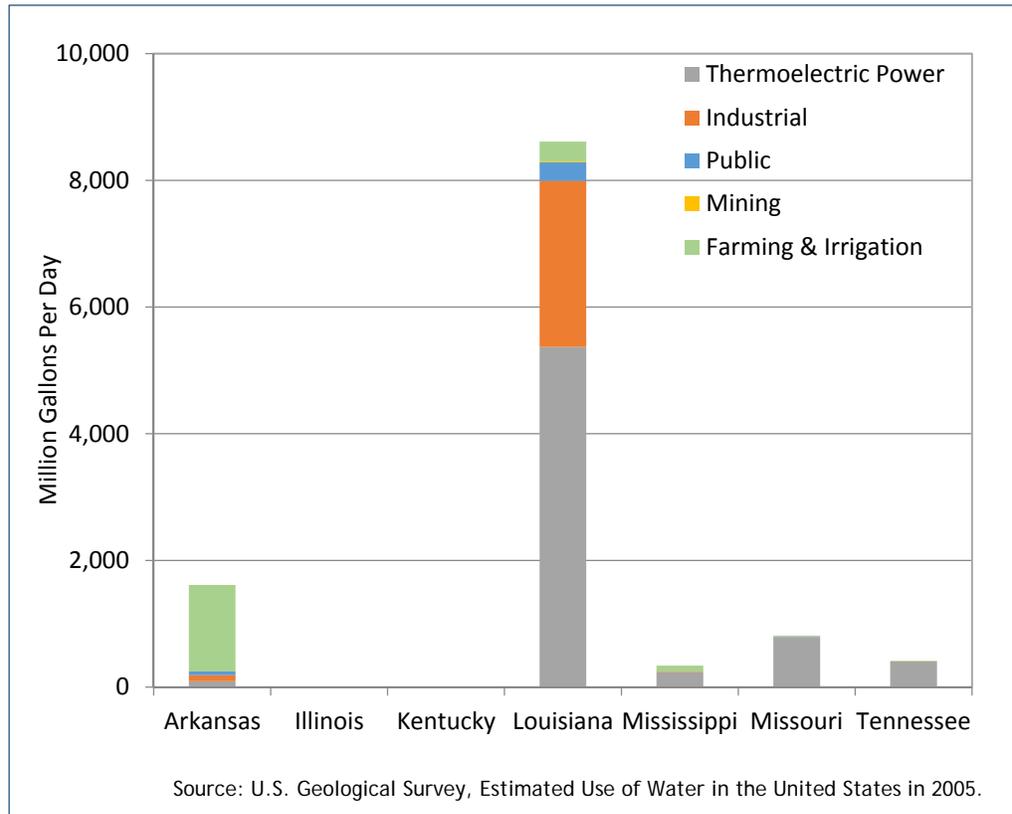
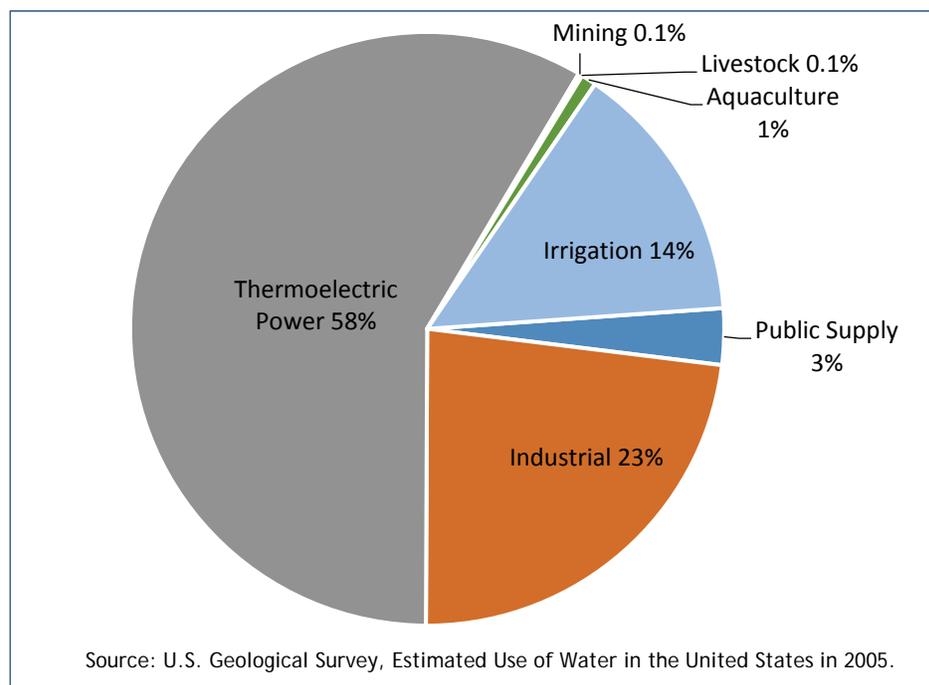


EXHIBIT 5-4. SURFACE WATER WITHDRAWALS BY SECTOR IN THE LMR CORRIDOR, 2005



PUBLIC SURFACE WATER SUPPLY SYSTEMS

Public water supply systems furnish 362 million gallons of water per day in the 113-county LMR Corridor. This quantity represents only three percent of the total surface water used in the region. Of all states in the region, Louisiana uses about 81 percent of the publicly supplied surface water; users in Missouri and Arkansas consume the remainder.

Surface water is subjected to a rigorous treatment process. After water is withdrawn, it is generally transported to publicly owned treatment facilities, which filter, disinfect, and remove organic and inorganic contaminants from the water. To ensure that a water supply meets regulations, water is tested at various stages of the treatment process for contaminants. After treatment, the water is delivered to domestic, commercial, and industrial water users through transmission pipes.

Domestic, Commercial, and Public Use of Surface Water

Public supply of surface water withdrawals are used in domestic, commercial, and public markets. Domestic water use includes water for normal household purposes such as drinking, food preparation, bathing, flushing toilets, washing clothes and dishes, and watering lawns and gardens. Commercial water use includes water for hotels, motels, restaurants, office buildings and civilian and military institutions. Public water use includes water used for firefighting, street washing, municipal office buildings, parks and swimming pools, and water used to flush out filters at water treatment facilities. This category also includes water that is lost in the distribution system. However, these markets do not solely rely on public supply to meet needs. A significant portion of these markets in the LMR corridor use self-supplied groundwater to supplement water needs.

SELF-SUPPLIED SURFACE WATER

In addition to deliveries from the public supply, many sectors also use self-supplied surface water. During 2005, the total amount of self-supplied surface water withdrawals in the LMR Corridor was 11.5 billion gallons per day. Generally, self-supplied surface water is more common in industrial sectors that use the water for cooling or other purposes that require little or no purification of the water. Three sectors are most significant:

- **Thermoelectric Power:** As shown in Exhibit 5-4, thermoelectric power generators used roughly 58 percent of self-supplied surface water in 2005. The thermoelectric power category includes the generation of power with fossil fuel and nuclear energy. In total, there are 108 power plants in the LMR Corridor. The majority (92) of these plants are fossil fuel plants, of which more than half are located in Louisiana. This state accounts for 5.4 billion of the 6.9 billion gallons of surface water withdrawn per day by power plants in the LMR.
- **Industrial Users:** Industrial facilities used an additional 23 percent of total self-supplied surface water. Industrial water use includes processing, washing, and cooling water used in facilities that manufacture products. Industrial facilities used about 2.7 billion gallons per day of self-supplied surface water in 2005. Louisiana

is the largest industrial consumer of surface water, accounting for 96 percent of the total.

- **Farming and Irrigation Users:** Self-supplied surface water is also used to irrigate cropland, raise livestock, and conduct aquaculture activities in the LMR corridor. Arkansas uses 76 percent of the 1.8 billion gallons withdrawn per day for irrigation. Rice production requires particularly large amounts of water, driving Arkansas' demand for irrigation water.

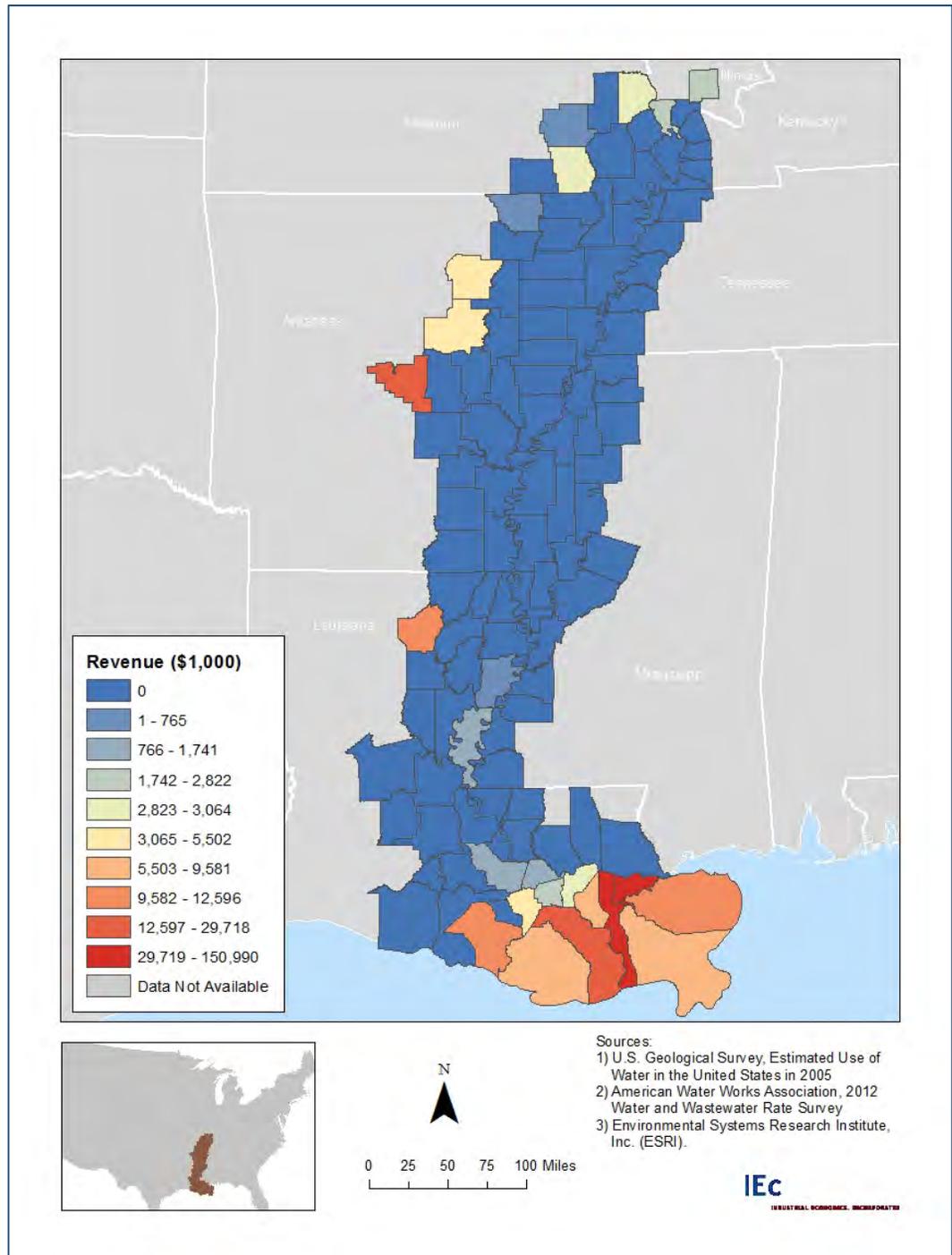
REVENUES AND EMPLOYMENT IN THE WATER SUPPLY SECTOR

The water supply and sewerage sector in the LMR Corridor employs roughly 600 people and generates an estimated \$385 million in revenues according to the U.S. Bureau of Labor Statistics, as shown in Exhibit 5-5. Louisiana is the largest revenue generator in this sector, reflecting its relatively heavy use of the publicly supplied water in the corridor. Arkansas employs the largest number of people in the water supply sector within the LMR region. Exhibit 5-6 provides more detail on the geographical distribution of revenues within the LMR Corridor.

EXHIBIT 5-5. WATER SUPPLY EMPLOYMENT AND ESTIMATED REVENUES (\$1,000S) IN THE LMR CORRIDOR, 2011

STATE	EMPLOYMENT	REVENUES (\$1,000)
Arkansas	361	\$39,657
Illinois	0	\$3,92
Kentucky	0	\$0
Louisiana	185	\$334,465
Mississippi	55	\$0
Missouri	0	\$6,489
Tennessee	0	\$0
LMR Corridor	601	\$384,533
Sources: U.S. Geological Survey, Estimated Use of Water in the United States in 2005. American Water Works Association, 2012 Water and Wastewater Rate Survey. U.S. Bureau of Labor Statistics, 2011 Quarterly Census of Employment and Wages.		

EXHIBIT 5-6. ESTIMATED SURFACE WATER SUPPLY REVENUES FOR PUBLIC SUPPLIERS (\$1,000S) IN THE LMR CORRIDOR, 2011



DATA SOURCES AND METHODOLOGY

Water supply data provided in this chapter are based on the U.S. Geological Survey's (USGS) *Estimated Use of Water in the United States in 2005*;⁷⁸ the American Water Works Association *2012 Water and Wastewater Rate Survey*; and employment data from the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages, using the NAICS codes: 22131- Water Supply and Irrigation Systems, and 22132 – Sewage Treatment Facilities. In this chapter, we report all surface water withdrawals in the 113-county study area.

For water use in the public supply system, USGS estimates deliveries to specific sectors by gathering information from water supply authorities and through per-capita estimates (in the case of domestic users) at the county level. For industrial and commercial businesses, USGS obtains its data on self-supplied withdrawals from state agencies that permit withdrawals or require permits to operate drinking water supplies. For example, self-supplied water use estimates for the industrial sector are generated using state permit programs that require industrial users to report withdrawals and returns. In some cases, USGS bases the total amount of self-supplied withdrawals on the population of facilities (i.e., workers in an office building, average occupancy of a hotel, or the number of students at a university).

Water revenues are calculated by multiplying the average water price per state, as reported by the American Water Works Association (2012) by the total volume of publically supplied surface water reported by USGS. Employment and revenue figures are presented in the revenues and employment section of this chapter.

⁷⁸ The 2005 data are the most recent data available from the USGS.

CHAPTER 6 | AGRICULTURE

Agriculture is the third largest revenue producing sector in the LMR Corridor, generating \$8.7 billion in annual revenues and employing at least 56,000 workers. LMR farmland covers 22.5 million acres, valued at \$51 billion. The success of agricultural production in the region is in several ways directly linked to the Mississippi River. The river provides the means of transportation for inputs of agricultural production as well as deliveries of agricultural products to markets. As discussed in Chapter 9, 30 percent of the overall shipping volume on the Lower Mississippi River is food and farm products. The availability of low cost transportation contributes to competitiveness for LMR agricultural production. The Lower Mississippi River and its tributaries also supply water necessary both for conventional and irrigated agriculture. In addition to the large volume of groundwater used for farming and irrigation in the LMR Corridor (10.7 billion gallons per day), an additional 1.8 billion gallons of surface water is also withdrawn for farming and irrigation daily, representing approximately 15 percent of total surface water withdrawals in the Corridor (see Exhibits 5A-1 and 5A-2 in the Appendix).

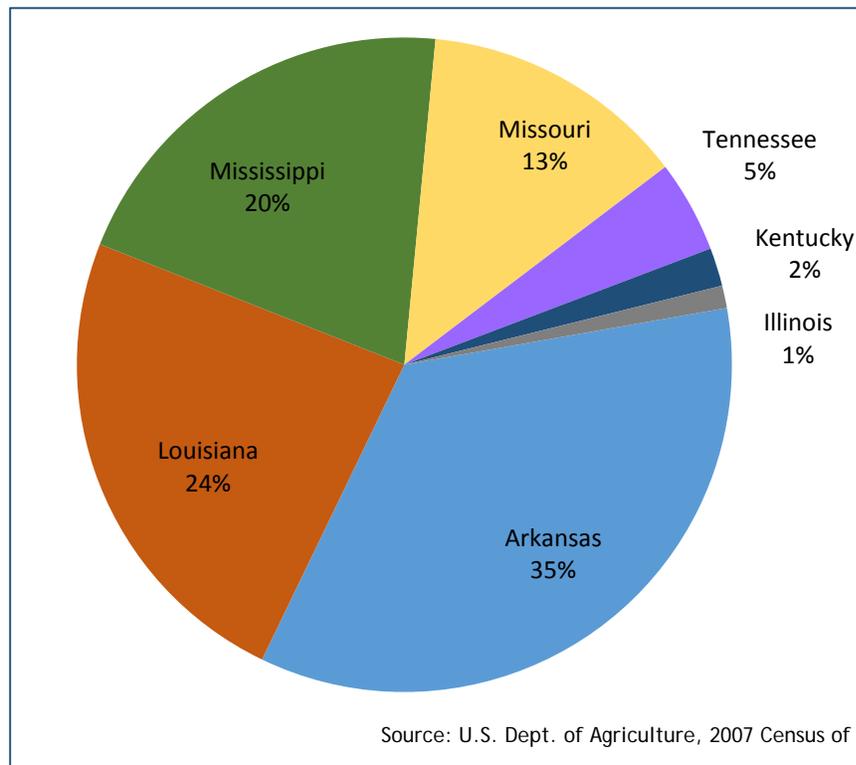
Arguably the most important factor contributing to the success of agriculture in the LMR corridor, in general, and crop production in particular, are the properties of soil. Sediments deposited by the river have created alluvial soils that are particularly fertile. The alluvial soil along with the warm and humid climate in the region makes the LMR Corridor one of the most productive agricultural areas in the world.

LMR FARMLAND, EMPLOYMENT AND REVENUES

Lately, along with increasing mechanization of farming operations, national agriculture has followed a trend of consolidation, particularly in the South.⁷⁹ The same pattern has not been observed in the LMR Corridor over the past 10 years. According to the US Agricultural Census, an average LMR farm in 1997 had 484 acres, while in 2007, the number dropped to 422. The number of farms rose from 45,677 in 1997 to 53,525 in 2007.

⁷⁹ Upton, 2012.

EXHIBIT 6-1. SHARE OF FARMLAND IN THE LMR CORRIDOR BY STATE, 2007



In 2007, the LMR agricultural land covered over 22.5 million acres, which represents 5.5 percent of farmland in the U.S.⁸⁰ The value of this farmland is estimated at \$51 billion. The farms provide employment to at least 56,000 people.⁸¹ This may be a lower-bound estimate, because employment figures provided by the U.S. Census Bureau may underestimate employment in the agricultural sector. Many people working in the sector are migrant and seasonal workers whose employment tends to be under-reported.

Arkansas has 35 percent of the LMR farmland, followed by 24 percent in Louisiana and 20 percent in Mississippi (see Exhibit 6-1). The more Northern states of Missouri, Tennessee, Kentucky and Illinois contribute 13 percent, five percent, two percent and one percent, respectively.

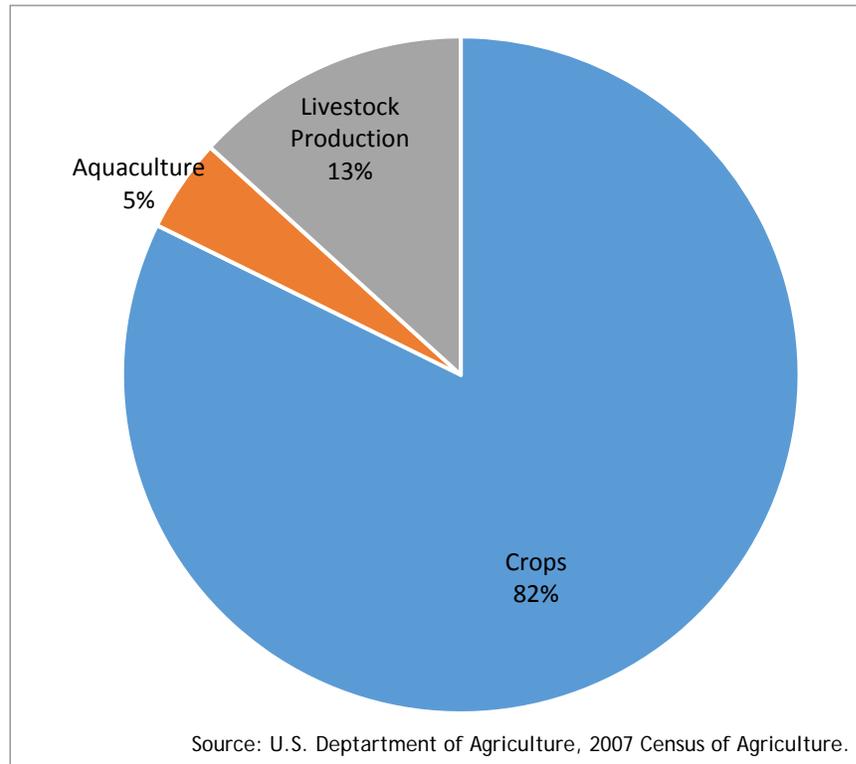
The annual revenues from total agricultural production in the LMR Corridor are \$8.7 billion. Agricultural crops contribute 82 percent to these revenues, while livestock and aquaculture add an additional 13 and five percent, respectively (see Exhibit 6-2).⁸²

⁸⁰ Based on the 2007 Agricultural Census, the total farmland in the US is 406,424,909 acres.

⁸¹ For the number of farms, employment, acres of farmland, and farmland value by state, see Appendix A: Exhibit 6A-1.

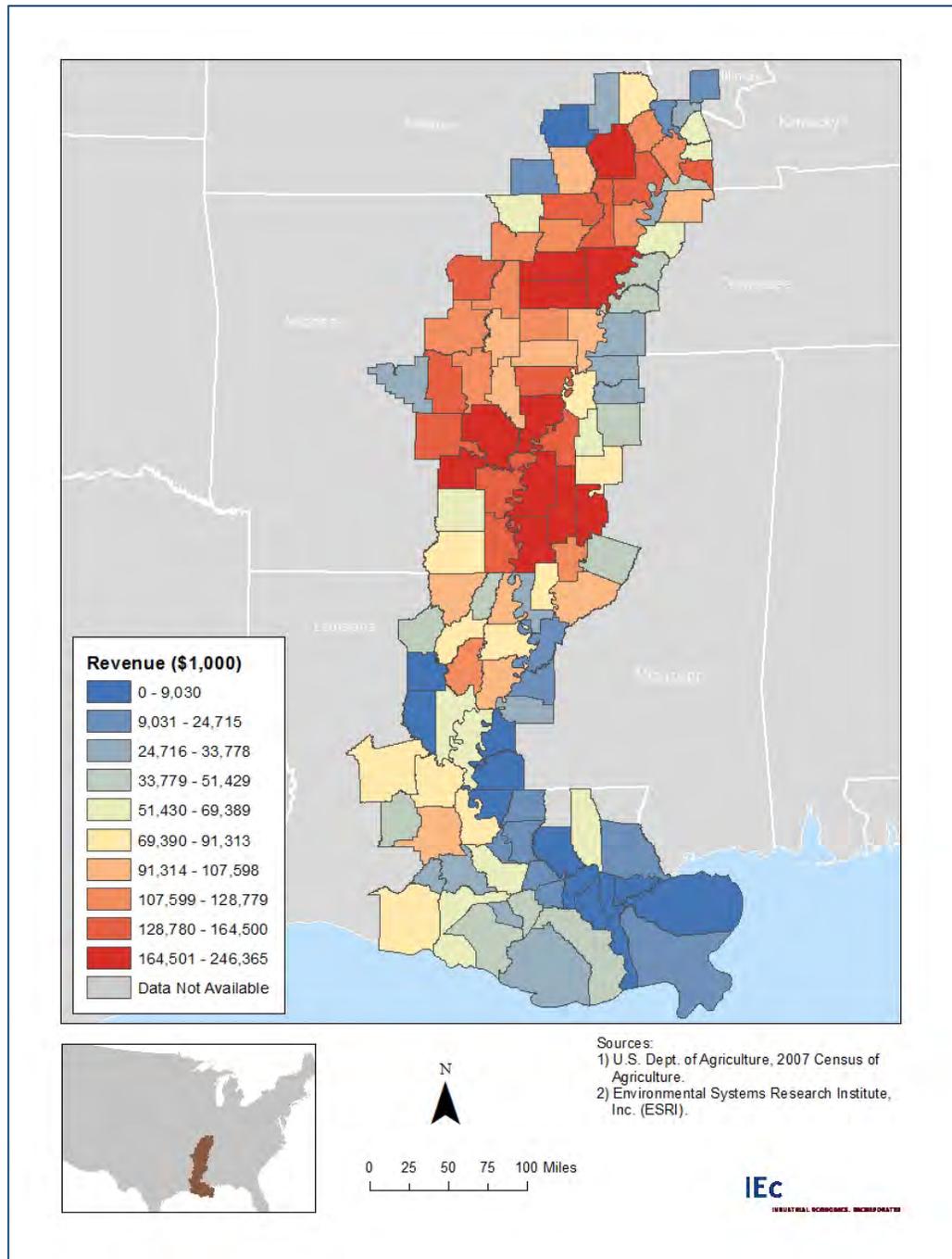
⁸² For additional detail on agricultural revenues see Appendix A: Exhibit 6A-2.

EXHIBIT 6-2. COMPOSITION OF AGRICULTURAL REVENUES IN THE LMR CORRIDOR, 2007



The largest agricultural revenue producers in the LMR Corridor are Arkansas LMR counties that generate \$3.5 billion (or 40 percent) annually. Arkansas's contribution to the agricultural sector is almost equal to contributions from Mississippi and Louisiana together. The Arkansas farmlands are 35 percent of the total LMR agricultural land. The distribution of agricultural revenues by county is presented in Exhibit 6-3.

EXHIBIT 6-3. AGRICULTURAL REVENUES (\$1,000 IN 2011) IN THE LMR CORRIDOR

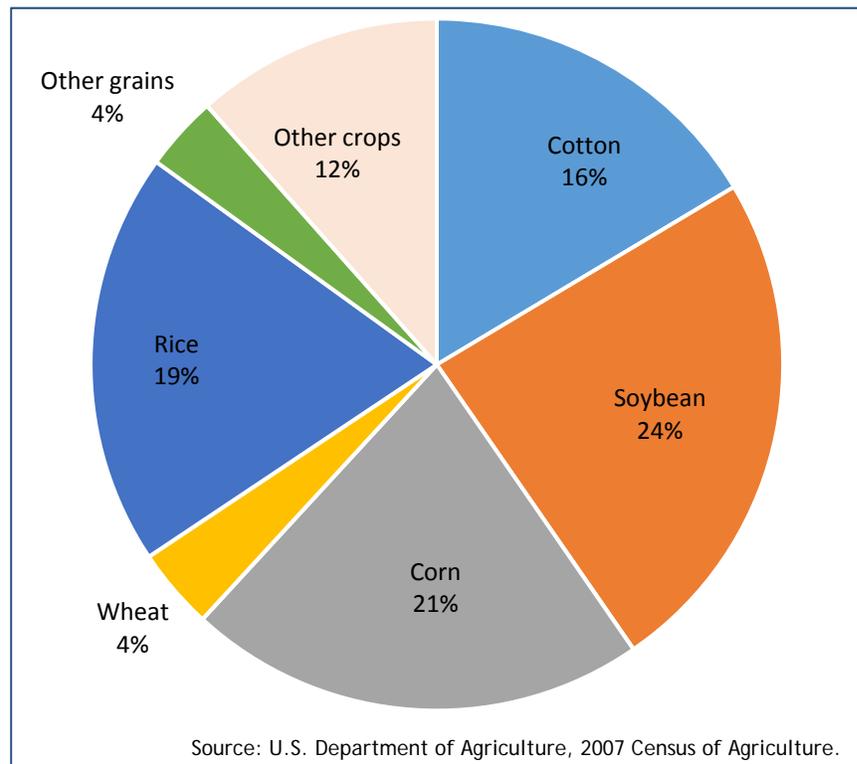


AGRICULTURAL CROPS

The LMR Corridor is a major producer of soybeans, corn, rice and cotton. The southern part of the corridor with its subtropical climate and long growing season makes it one of the most productive croplands in the world.⁸³ Arkansas's corn yield in 2007 was 185 bushels per acre, the third highest yield, in terms of production per acre (after Washington State and Oregon), in the nation.⁸⁴ Within the LMR corridor, counties located in Arkansas lead crop production, including leading the Corridor in cotton, rice and soybean production.

Soybean farming contributes 24 percent (or \$1.7 billion) to the total agricultural LMR Corridor crop production (see Exhibit 6-4). Soybeans have been the major crop in the region over the last 15 years. The next largest revenue contributor in the LMR Corridor is corn, comprising 21 percent (or \$1.5 billion) of crop revenues, followed by rice at 19 percent (or \$1.4 billion) and cotton at 16 percent (or \$1.2 billion).

EXHIBIT 6-4. COMPOSITION OF AGRICULTURAL CROP REVENUES IN THE LMR CORRIDOR

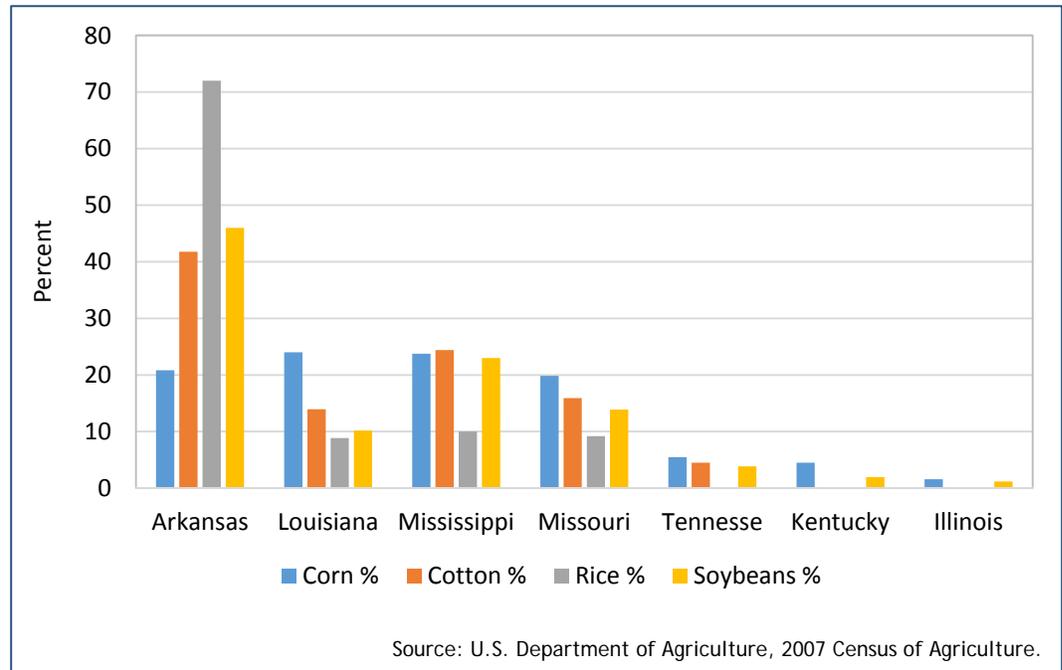


⁸³ Foley et al. 2011.

⁸⁴ Source: U.S. Department of Agriculture, 2010 Agricultural Statistics, Table 1-37, http://www.nass.usda.gov/Publications/Ag_Statistics/index.asp

Since crop revenues dominate the total agricultural revenues, the contribution of individual states to the total crop value follows the same pattern.⁸⁵ Arkansas LMR counties contribute the most (41 percent), followed by Mississippi and Louisiana producing about 20 percent of crop revenues each (see Exhibit 6-5).

EXHIBIT 6-5. STATE PROPORTIONS OF TOTAL LMR CORRIDOR REVENUES BY CROP, 2007



CORN

Corn is the largest crop in the US, and the second largest in the LMR Corridor. The 2007 production was 440 million bushels (see Exhibit 6-7), which is 3.4 percent of the total national corn production (13 billion bushels in 2007).

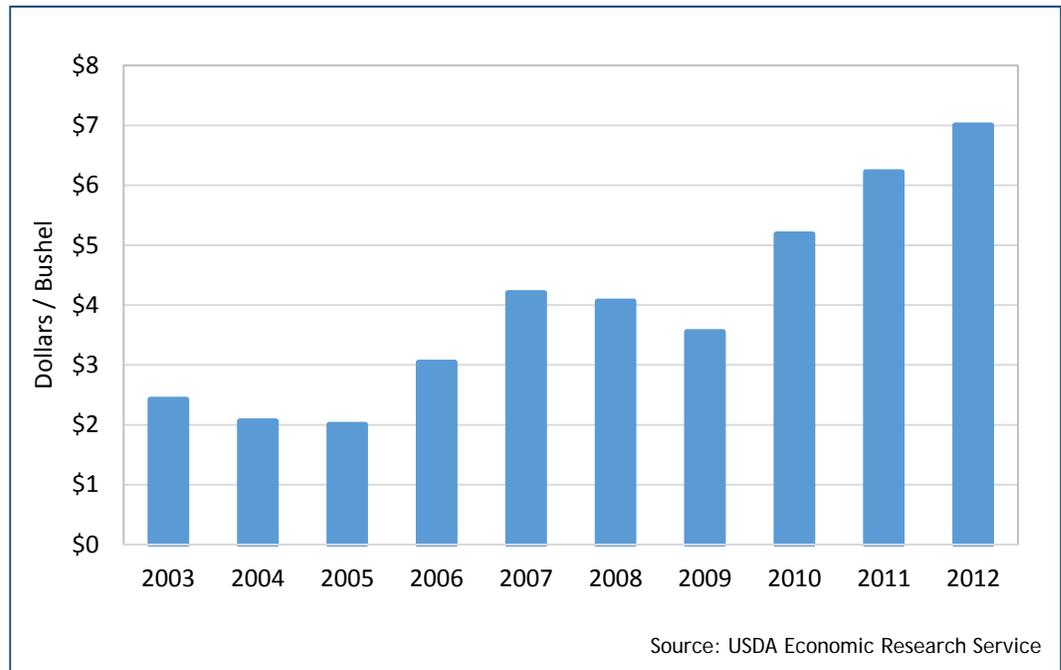
Corn is processed into a large variety of food and industrial products such as oil, sweeteners, starch, and industrial alcohol. It is also used as a main ingredient of livestock feed. Corn is also increasingly used for ethanol production. Ethanol, an alternative to fossil based fuels, is mandated by the EPA for use in gasoline blends (to replace Methyl Tertiary Butyl Ether, suspected to be carcinogenic⁸⁶). Additionally, the Renewable Fuels Standards, part of the Energy Policy Act from 2005, requires ethanol to be produced annually in a predetermined amount. The required ethanol production levels have been

⁸⁵ For crop revenues, by LMR state and type of crop see Appendix A: Exhibit 6A-3.

⁸⁶ American Cancer Society, *What is MBTE?* Accessed at: <http://www.cancer.org/cancer/cancercauses/othercarcinogens/pollution/mtbe>

increasing since 2005, which led to increase in demand and prices of corn. In 2011, 40 percent of corn production was used for ethanol production (compared to 14 percent in 2005).⁸⁷ As seen in Exhibit 6-6, corn prices more than tripled between 2005 and 2011.

EXHIBIT 6-6. AVERAGE CORN PRICES (DOLLARS PER BUSHEL) IN THE U.S.⁸⁸



The corn contribution to the LMR economy increased substantially within the last few years. According to the 1997 Agricultural census, corn contributed seven percent to the overall LMR agricultural revenues, while 10 years later, in 2007, the contribution tripled, rising to 21 percent. The volume of 2011 corn production in bushels by county in the LMR Corridor is presented in Exhibit 6-7.

⁸⁷ Brester, 2012. *Corn*. Accessible at: http://www.agmrc.org/commodities_products/grains_oilseeds/corn_grain/ and Carter, Rausser and Smith, 2012.

⁸⁸ The prices are the U.S. weighted averages of monthly price received by farmers weighted by monthly marketing. The 2012 price is based on January-September data only. Data are from the U.S. Department of Agriculture Research Service, accessed at: <http://www.ers.usda.gov/data-products/feed-grains-database/feed-grains-yearbook-tables.aspx#.Ud2RkPnrygg>

EXHIBIT 6-7. CORN PRODUCTION (BUSHEL) IN THE LMR CORRIDOR, 2007

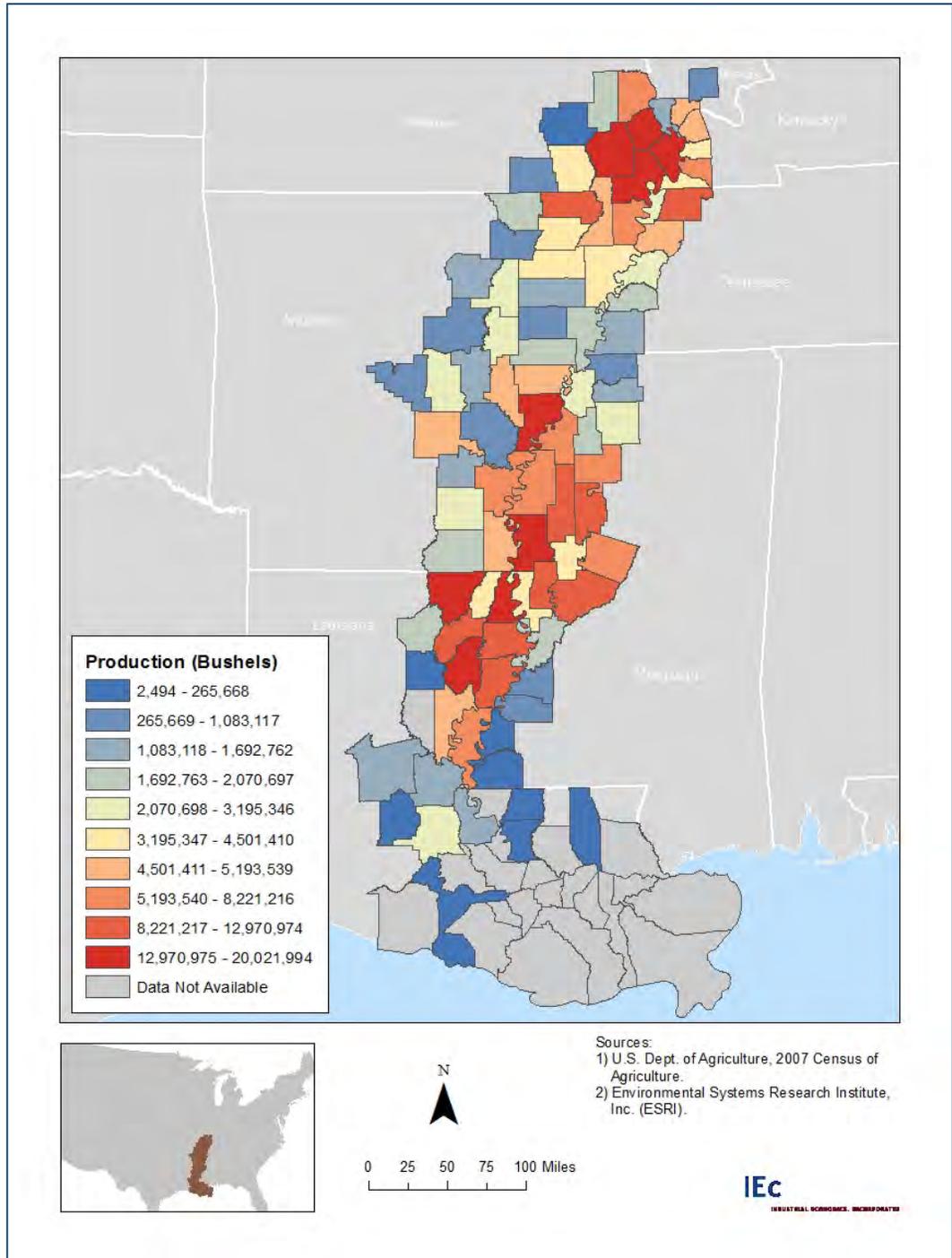


EXHIBIT 6-8. SOYBEAN PRODUCTION (BUSHELS) IN THE LMR CORRIDOR, 2007

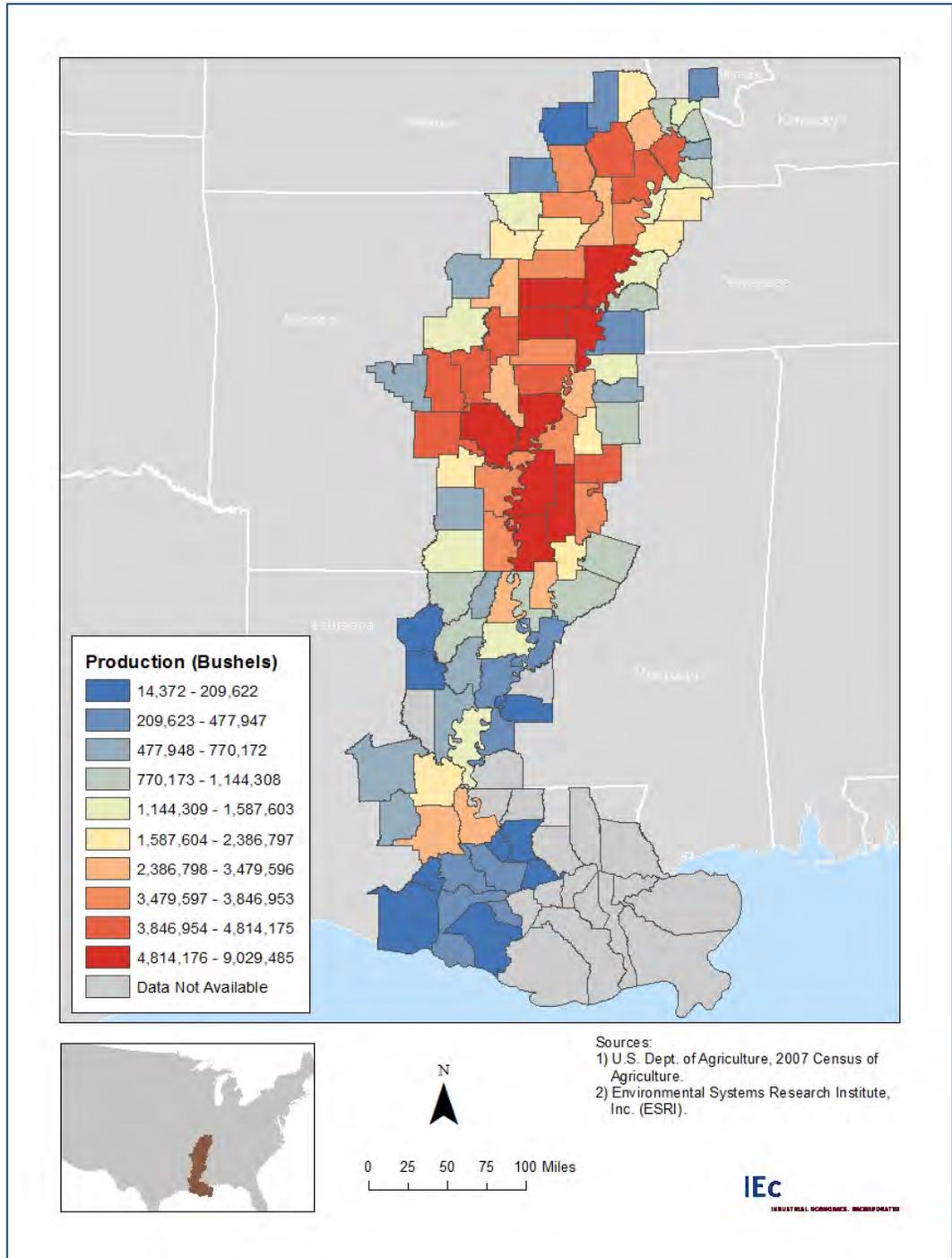
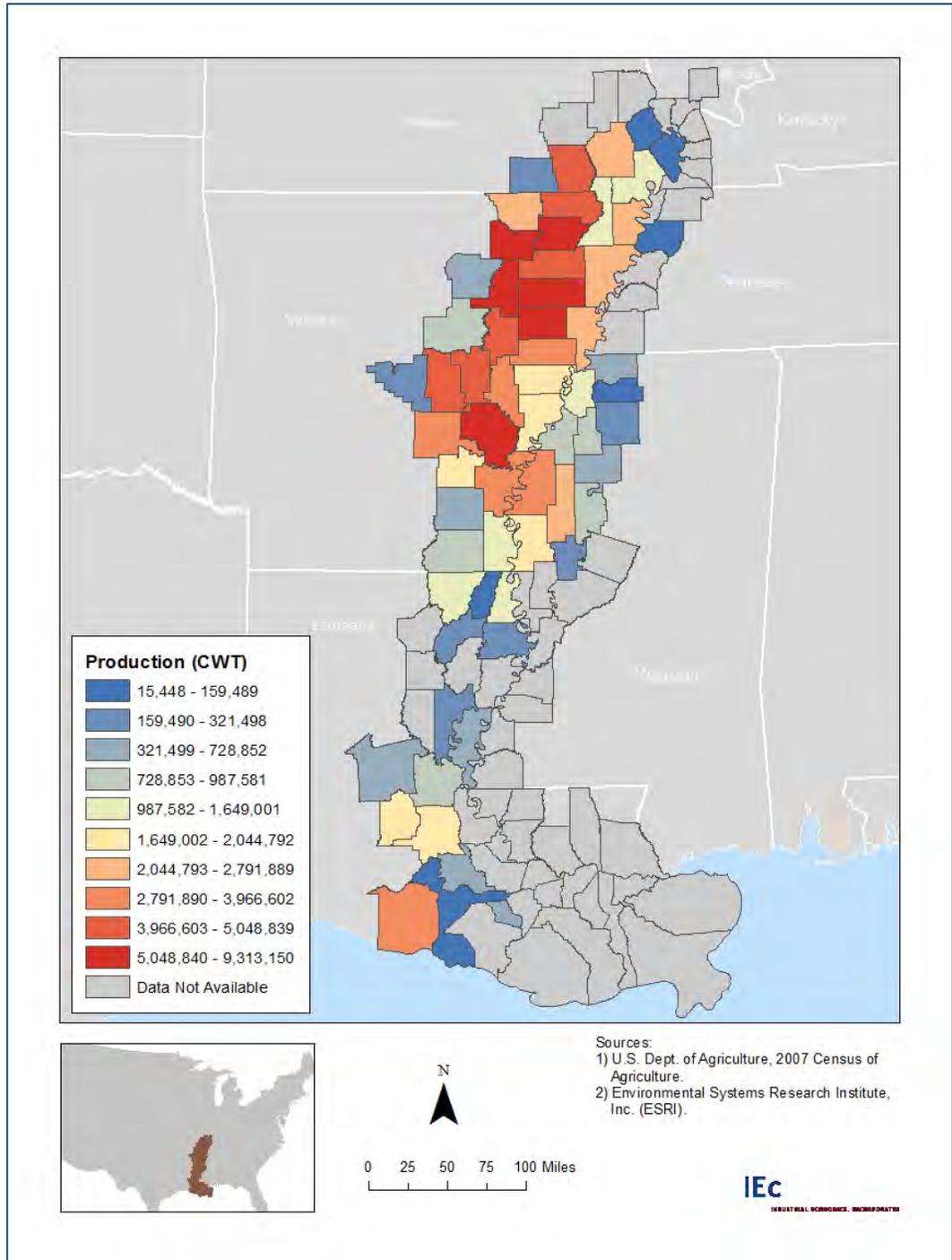


EXHIBIT 6-9. RICE PRODUCTION (CWT) IN THE LMR CORRIDOR, 2007



SOYBEAN

Soybeans are primarily used for oil and meal (base for animal feed) production. They can be also processed into flour, infant formula and a variety of meat and dairy substitutes. The soybean accounts for 90 percent of oilseed production. The U.S. soybean harvest in 2007 was 3.36 billion bushels, out of which 208 million bushels (or six percent) was produced in the LMR corridor. The soybean production in the LMR Corridor went down over the last 10 years. According to the 1997 and 2007 Agricultural Census, the amount of soybeans decreased by 35 million bushels. The lower production may be associated with increased demand for corn, and subsequent crop substitution. The volume of 2011 soybean production in bushels by county in the LMR Corridor is presented in Exhibit 6-8.

RICE

Rice is one of the top three crops in the LMR Corridor, both in terms of crop production and revenues they produce. Arkansas, Mississippi, Missouri and Louisiana are major rice producing states in the nation (rivaling California and Texas).⁸⁹ The vast majority (72 percent) of rice production in the LMR Corridor comes from Arkansas LMR counties, followed by 10 percent produced in Mississippi and nine percent in Louisiana and Missouri each. Overall, the LMR rice production of 133 million bushels is about 67 percent of the total U.S. rice production. The volume of 2011 rice production in hundredweight (100 pounds, or cwt) by county in the LMR Corridor is presented in Exhibit 6-9.

Rice production profitability is highly variable, and depends on fluctuating input costs. Rice yield is also particularly sensitivity to weather. Rice grows best under cloud-free conditions, in temperatures with highs in the low 90s and lows in the 60s. The part of the LMR Corridor within a sub-tropical climate provided good, but not ideal rice growing conditions. Numerous cloudy days and summer lows above 60F often substantially reduce yields.

Over the last 15 years, Arkansas and Missouri increased their share of rice production, which can be attributed to lower production costs. For example, the dominant seeding technique in the LMR corridor involves drilling seeds into the soils. This procedure is cheaper, because it requires fewer seeds per acre than seeding from an airplane, a common procedure in Texas and California. The LMR states also provide a hydrological advantage. Most LMR rice producers either do not have to purchase irrigation water or do so at a relatively low cost, because either surface water is used, or the water table (of the ground water) is high.⁹⁰ Additionally, the cost of drying is low, because most producers have on-farm drying facilities.

⁸⁹ A small amount of transgenic pharmaceutical rice is also grown in North Carolina and Kansas, Source: LSU AgCenter, 2007. *Climate, Economics Crucial for Rice Industry*. Accessed at: http://www.lsuagcenter.com/en/our_offices/research_stations/Rice/Features/Publications/Climate+Economics+Crucial+for+Rice+Industry.htm

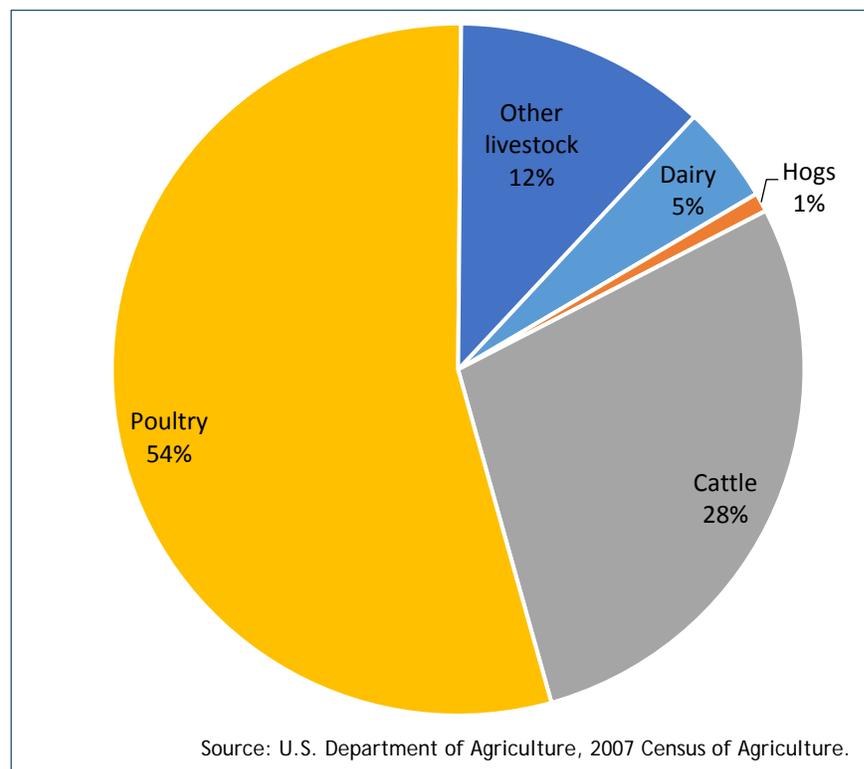
⁹⁰ LSU AgCenter, 2007. *Climate, Economics Crucial for Rice Industry*. Accessed at: http://www.lsuagcenter.com/en/our_offices/research_stations/Rice/Features/Publications/Climate+Economics+Crucial+for+Rice+Industry.htm

Since 2007, rice yield in all LMR states fluctuated with production, steady or increasing until 2010, and then falling in 2011, the year of the flood. Rice grows in water, which in the LMR corridor is provided through irrigation systems. Some rainfall helps in reducing costs of irrigation, yet excessive rainfall creates an environment suitable for development of diseases that can severely affect rice yield.⁹¹ Following the 2011 flood, state wide rice production dropped almost 50 percent in Mississippi and Missouri, 38 percent in Arkansas and 20 percent in Louisiana. In 2012, the numbers rebounded to 2007 levels in Arkansas, Louisiana and Missouri. Mississippi even exceeded 2011 production.⁹²

AGRICULTURAL LIVESTOCK PRODUCTION

Livestock production annually contributes approximately \$1.2 billion in revenues, which is 13 percent of all agricultural revenues in the LMR Corridor. The production is primarily located in Arkansas's LMR counties, which provide 41 percent of the overall livestock production revenues. Louisiana produces 18 percent, followed by Kentucky (16 percent), Missouri (15 percent), and Mississippi (seven percent). Tennessee and Kentucky account for the remaining five percent of livestock production revenues in the LMR Corridor.⁹³

EXHIBIT 6-10. COMPOSITION OF LIVESTOCK REVENUES IN THE LMR CORRIDOR, 2007



⁹¹ LSU AgCenter, 2007. *Climate, Economics Crucial for Rice Industry*. Accessed at: http://www.lsuagcenter.com/en/our_offices/research_stations/Rice/Features/Publications/Climate+Economics+Crucial+for+Rice+Industry.htm

⁹² Source: USDA, National Agricultural Statistics Service, Crop Production 2012 Summary, January 2013.

⁹³ For the livestock revenues by LMR state and type of production see Appendix A: Exhibit 6A-4.

Poultry and cattle production together bring \$1 billion, which is 83 percent of the total livestock revenues. Dairy contributes an additional 5 percent of livestock revenues, producing \$53 million. Hog production along with other types of livestock provide the remaining \$147 million or 13 percent of revenues (see Exhibit 6-10 and Exhibit 6A-4 in the Appendix).

In this analysis, we are focusing on the economic impact that the LMR has on the local economy. The impact addresses economic contributions to the wellbeing of the region. However, in rare instances, the presence of the river may lead to economic losses. One such instance was the massive flood in 2011. In April and May 2011, the LMR and surrounding counties were inundated with flood waters. These floods were one of the largest on record along the LMR, comparable to a record breaking flood of 1927.⁹⁴ The Lower Mississippi River overflowed its banks leading to extensive damages in areas between the levees and up the tributaries. The geographical extent of the damages exceeded the corridor spanned by the LMR counties, including an additional 14 counties in Louisiana (Acadia, Allen, Grant, Lincoln, Union, Winn), Missouri (Perry), Arkansas (Bradley, Calhoun, Chicot, Ouachita, Union), and Mississippi (Carroll, Grenada). The damages affected farmland, houses, businesses, local infrastructure of roads and bridges, as well as private properties. The flood impacted an estimated 43,358 people in the region. Many were left without either shelter or utilities. Many lives were interrupted leading to income losses and inconveniences. The two major areas damaged by the flood included urban structures and agricultural properties. There were 21,203 residential, commercial, industrial and public structures damaged. The area of flooded agricultural land was estimated to be 1,233,100 acres. The US Army Corps of Engineers reported flood damages to crops and non-crops (non-crop farm property, such as farm supplies, farm roads, and drainage ditches). The analysis of crop damages included: corn, soybean, cotton, rice, as well as winter wheat, grain sorghum and sugarcane. The overall agricultural damages in 2011 have been quantified by the US Army Corps of Engineers (USACE) and estimated at \$660 million. The majority of the damages (\$2.2 billion) were in urban settings. The extent of overall flood damages was quantified at \$2.8 billion.⁹⁵ These damages occurred in the presence of a flood damage prevention system developed and operated by the USACE. The system involves levees, cutoffs, floodways and reservoirs. In the absence of the flood control system, the damages could have been far more severe. According to the U.S. Army Corps of Engineers, this flood control system prevented approximately \$234 billion in damages that could have affected 1.5 million residential and commercial structures.⁹⁶

⁹⁴ USACE, 2012. Accessible at: <http://www.fas.org/sqp/crs/misc/R41640.pdf>

⁹⁵ USACE, 2012. Accessible at: <http://www.fas.org/sqp/crs/misc/R41640.pdf>

⁹⁶ USACE, 2012. Accessible at: <http://www.fas.org/sqp/crs/misc/R41640.pdf>

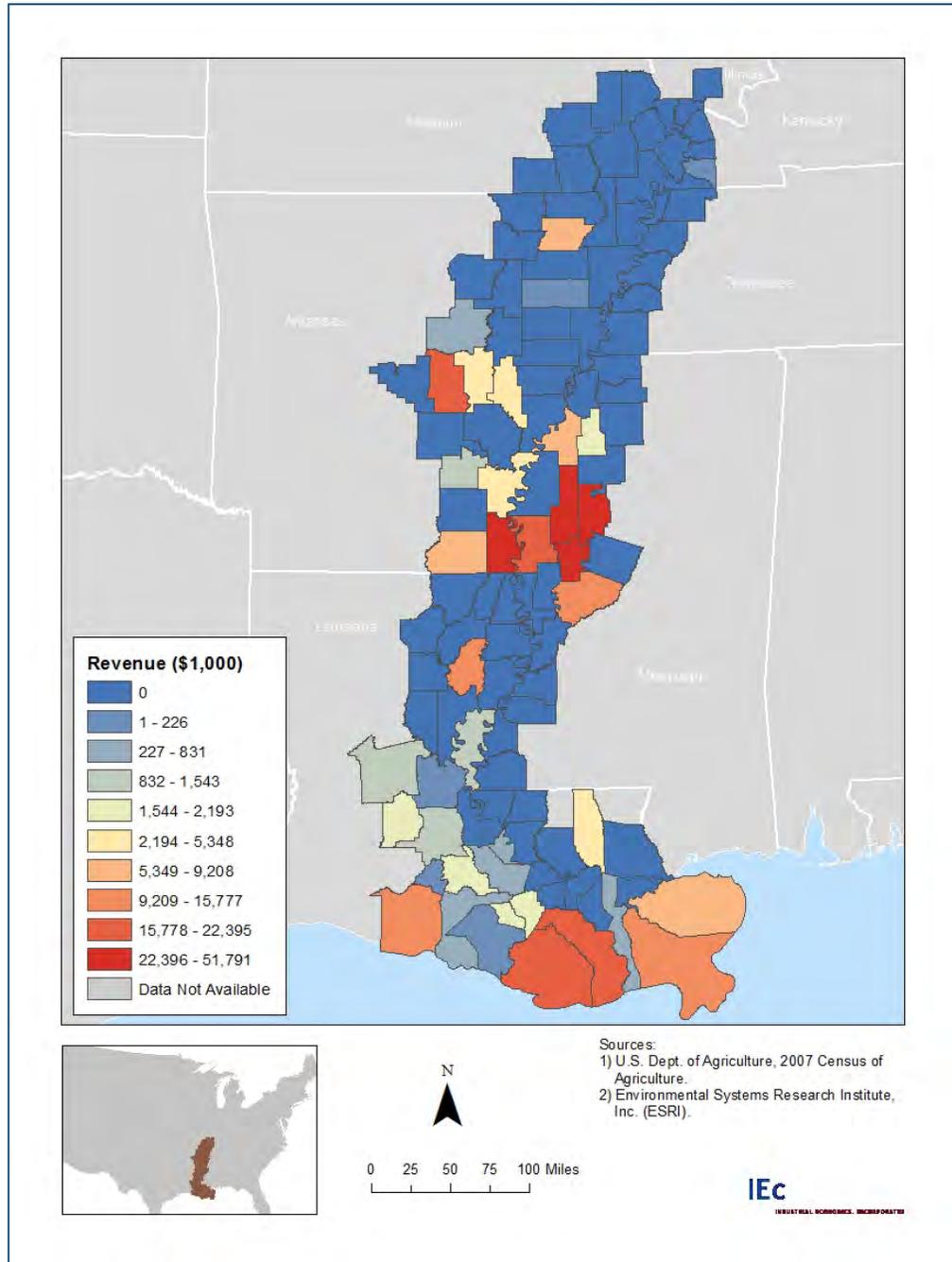
AQUACULTURE

The aquaculture in the LMR Corridor is contained within Mississippi, Arkansas and Louisiana. In 2007, the LMR counties of the three states produced almost \$388 million in aquaculture revenues.⁹⁷ Mississippi is the largest LMR aquaculture producer, contributing 52 percent of revenues, followed by 26 percent from Arkansas and 21 percent from Louisiana. Aquaculture revenues in the LMR Corridor are presented in Exhibit 6-11.

The aquaculture production in the region is dominated by catfish farming, which produces 300 million pounds of fish, worth \$263 million, or 75 percent of revenues, primarily in Mississippi. The remaining 25 percent of revenues are primarily generated from oyster farms in Louisiana (11.5 percent), baitfish farmed mostly in Arkansas (6.5 percent), and what is classified as ‘other products’ (6 percent). The ‘other products’ include alligator farms and pet turtle production in Louisiana.

⁹⁷ See Appendix A: Exhibit 6A-5 for additional detail on aquaculture revenues by species and state.

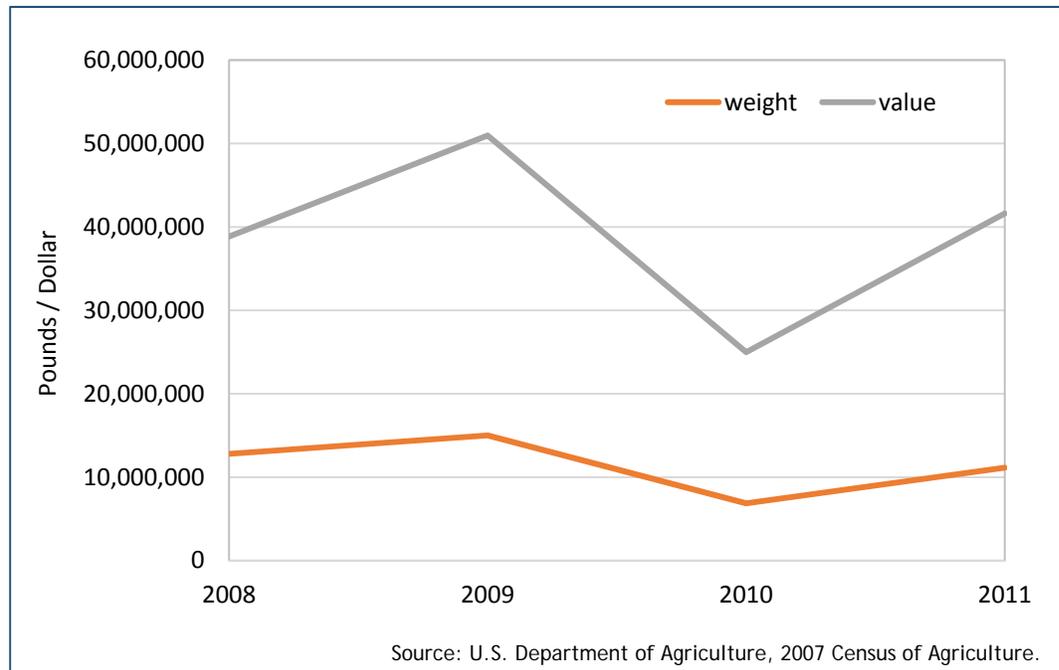
EXHIBIT 6-11. AQUACULTURE REVENUES (\$1,000S IN 2011) IN THE LMR CORRIDOR



OYSTERS

Oyster production in the LMR Corridor is located exclusively in the Louisiana counties. The Marine Fisheries Division of the Louisiana Department of Wildlife and Fisheries has developed successful oyster management plans over the last century for both sack and seed oysters production on public grounds. Private oystermen can lease state water bottoms (up to a maximum of 1,000 acres) to cultivate oysters.⁹⁸

EXHIBIT 6-11. EASTERN OYSTER LANDINGS (POUNDS PER DOLLAR) IN LOUISIANA



In 2009 oysters beds were still recovering from damages incurred during the series of hurricanes (Katrina and Rita in 2005 and Hurricanes Gustav and Ike in 2008), when the *Deepwater Horizon* oil spill led to additional severe damages. The majority of federal and state fishing waters in Louisiana were closed in July and August to allow clean-up efforts and to test for safety of the harvest. The low numbers of oyster landings in 2010 were not only due to closing of the fisheries and effects of oil contamination. It is estimated that 50 percent of oyster mortality was caused by increased amounts of fresh water diverted from the Mississippi River toward the coastal waters in an attempt to flush the oil away from the coast.⁹⁹ The massive infusion of fresh water diluted salinity below a threshold level (below five parts per thousand), which combined with high temperatures (above 23C) created unsuitable conditions for oysters' survival.

The same effect of dissolved oxygen and salinity level below a threshold occurred in 2011, when flood waters entered coastal oysters' beds. According to the USACE, the

⁹⁸ Lutz, 2012. Accessible at: http://www.agmrc.org/commodities_products/aquaculture/oyster-profile/

⁹⁹ Upton, 2011. Accessible at: <http://www.fas.org/sqp/crs/misc/R41640.pdf>

flood waters caused 85 percent oysters' mortality in the whole Gulf of Mexico, leading to total losses of approximately \$60 million.¹⁰⁰

DATA SOURCES AND METHODOLOGY

We define the agricultural sector using classifications provided by the U.S. Agricultural Census. The major categories include: crop production, livestock production and aquaculture. Crop production includes data on: cotton, soybeans, corn, wheat, rice, other grains and other crops. Livestock production is defined as: dairy, hogs, cattle, poultry and other livestock products. Aquaculture includes production of: baitfish, catfish, crustaceans, mollusks, ornamental fish, sport or game fish, other products and other food fish. The data for volume of agriculture production, revenues, employment, acreage of farmland, and total value were obtained from the latest available Agricultural Census of 2007. Supplemental data on historic trends was supplied from the U.S. Agricultural Census of 1997.

¹⁰⁰ Upton, 2011. Accessible at: <http://www.fas.org/sqp/crs/misc/R41640.pdf>

CHAPTER 7 | MINERAL RESOURCES

This chapter addresses the LMR mineral resources sector that encompasses both fossil fuel (natural gas and oil) and non-fuel mineral extraction. The LMR non-fuel minerals include salt, clay, crushed stone, and sand and gravel. The LMR provides both means of transportation for mineral sector's products and a source of water necessary for many mineral extraction activities. Specifically, 142 million tons of petroleum and petroleum products, and 24 million tons of non-metallic minerals are shipped annually along the LMR. Surface water from the LMR is used for drilling, stimulating, and hydraulic fracturing of oil and gas wells, as well as in enhanced recovery processes. Water is also crucial in injection mining, one of the technologies used to extract salt. The process involves injecting water into underground salt domes, where the salts are dissolved, then salt water is flushed to the surface and evaporated to recover salt products. Sand and gravel mining in the LMR often depends on the river as well. Mining sand and gravel can involve dredging the river bottom, and then processing these minerals with water to segregate by particle size.

This chapter presents the scale of the mineral resources sector in the LMR Corridor, the size of annual revenues it produces and the employment opportunities it provides.

OIL AND GAS EXTRACTION

The LMR natural gas and crude oil production is generated in Louisiana and Mississippi. Based on the latest available county level data (from 2004), the total LMR production is 398 billion cubic feet of natural gas and almost 56 million barrels of oil. Both oil and gas production in the LMR Corridor is dominated by Louisiana's counties, which generate 99 percent (or 394 billion cubic feet) of the Corridor's natural gas and 92 percent (or 51 million barrels) of LMR oil. Appendix A, Exhibit 7A-1, provides estimates of oil and gas production by county in the LMR Corridor.

The primary oil-producing parishes are located in the southern part of Louisiana, while natural gas extraction tends to be higher in the northern parishes. The single highest oil and gas producing county/parish in LMR is Plaquemines, Louisiana. It provides almost 71 billion cubic feet (18 percent) of the Corridor's natural gas production and almost 16 million barrels (29 percent) of the Corridor's annual oil production. Louisiana is a leader in oil and gas production not only in the LMR, but also in the nation. The state ranked sixth in oil and third in gas production in 2012.¹⁰¹

¹⁰¹ Kaiser, M.J. and Y. Yu. 2012. Louisiana Drilling and Production Activity Review. Oil & Gas Journal. Accessed at: <http://www.oj.com/articles/print/vol-110/issue-10/exploration-development/louisiana-drilling-and-production-activity.html>

Mississippi's contribution to overall oil and gas production in the LMR Corridor is small. The six natural gas producing LMR counties located in Mississippi contribute a modest one percent (or 4.4 billion cubic feet) of gas and eight percent (or 4.5 million barrels) of the LMR Corridor's crude oil production (in 2004).

Based on the 2004 production levels and 2011 prices, we estimated that LMR oil and gas production brought \$7.6 billion in revenues.¹⁰² Twenty-two percent of this amount (or \$1.7 billion) was generated from natural gas extraction,¹⁰³ while 78 percent (\$5.9 billion) was generated from oil production (see Exhibit 7-1).

This is likely an overestimate of the actual 2011 oil and gas revenues in the Corridor. Crude oil production has been decreasing since 2004. The total crude oil production in the whole state of Louisiana in 2011 was 83 percent of the 2004 production. As active fields diminish their reserves and cease production, new sources are not being discovered fast enough to offset declining production.

Natural gas prices and production, both nationally and in the LMR Corridor have followed a different pattern. After a sharp price increase between 2002 and 2005 (including a tripling of prices received in Louisiana), prices decreased in 2006 and 2007, only to pick up again in 2008 (see Exhibit 7-2). Since then gas prices have followed a downward trend.

¹⁰² We decided to use 2011 prices (instead of inflation adjusted 2004 prices), because recent years have brought a steady, sharp increase in crude oil prices both nationally and in the LMR corridor, reflecting increasing scarcity of oil reserves and increased worldwide demand for petroleum products. Louisiana wellhead oil prices have followed this national trend. Since 2002, oil prices have been rising and, after peaking in 2008 at \$100 per barrel, fell by 40 percent in 2009. This temporary drop was related to the housing market collapse and subsequent recession that lowered demand. Since then, oil prices have climbed back to over \$100 per barrel. Sources: Louisiana Department of Natural Resources and the U.S. Energy Information Administration.

¹⁰³ Data on wellhead gas prices in Mississippi are available only through 2010. Therefore, revenue from gas extraction in Mississippi in 2011 was estimated using adjusted Louisiana prices. Louisiana prices historically have been highly correlated with Mississippi prices, and have been consistently slightly higher over the last 10 years. The average ratio of Louisiana to Mississippi prices during this time was 1.08. Thus, we adjusted the average 2011 Louisiana gas price of \$4.23 [per thousand cubic feet] by this historical ratio and inferred Mississippi gas prices in 2011 of \$3.92 [per thousand cubic feet].

EXHIBIT 7-1. ESTIMATED OIL AND GAS REVENUES (\$1,000S) IN THE LMR CORRIDOR, 2011

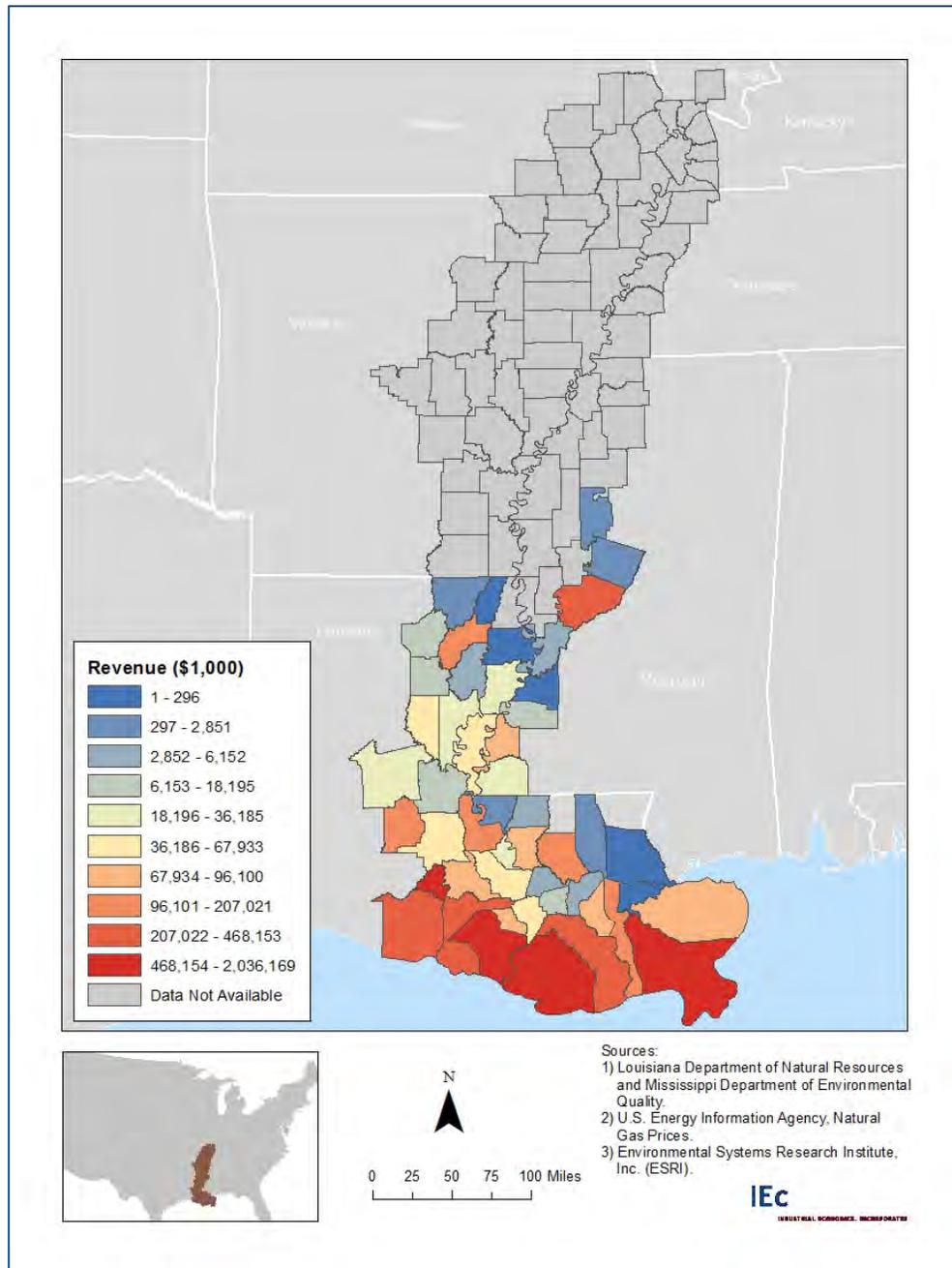
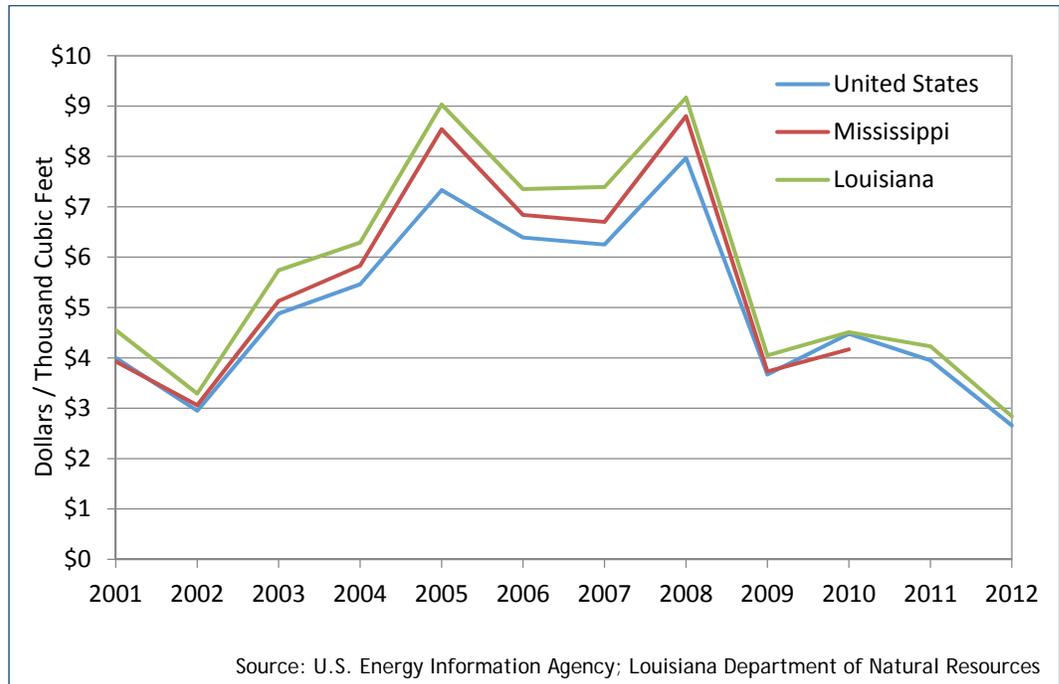


EXHIBIT 7-2. WELLHEAD NATURAL GAS PRICES (DOLLARS PER THOUSAND CUBIC FEET) IN THE US, MISSISSIPPI AND LOUISIANA



The initial drop in 2009 was the result of the recession, while subsequent decreasing prices have been related to an increase in available natural gas supplies from shale sources.¹⁰⁴ According to the U.S. Energy Information Administration's forecast, domestic shale gas production is expected to result in continued low gas prices. Consequently, natural gas revenues in the LMR Corridor may decrease as a result of the downward sloping price trend.¹⁰⁵ Although LMR counties may have shale gas resources, these

¹⁰⁴ The initial sharp increase in prices created opportunities to explore shale gas (and oil) reserves. Some shale formations (fine grained rocks) are rich sources of natural gas and oil. Although they had been previously identified, there was little, if any, production due to technological limitations and high costs of extraction. However, sharp price increases and technological advances (horizontal drilling and hydraulic fracturing) have made these sources very competitive, introducing large quantities of natural gas to the national markets. In fact, in 2011, 95 percent of natural gas consumed in the US was produced domestically. Source: U.S. Energy Information Administration. 2012. Energy in Brief. What is shale gas and why is it important? Accessed at: http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm. In 2006, a shale gas source was discovered in Louisiana leading to doubling of the natural gas production in the state over the first three years of extraction. The new source, located in Haynesville LA, supplied 62 percent of Louisiana natural gas production in 2011. This change, however, has not influenced the LMR production trends, because the new gas shale is located west of the LMR corridor.

¹⁰⁵ A potential reversal in this trend could occur if the highly local natural gas market expands globally, mimicking the crude oil market. Natural gas, in contrast to crude oil, is expensive to transport. However, if new transport technology is developed or the cost decreases for existing means (liquefied natural gas carriers), the U.S. may become a natural gas exporter, increasing domestic gas prices in the long run. Such a scenario could produce steady or even increasing revenues from gas production in the LMR.

resources have not yet undergone exploration, and thus are not expected to be brought into production in the near future.¹⁰⁶

NON-FUEL MINERAL RESOURCES

The major non-fuel mineral resources in the LMR Corridor include salt, crushed stone, clay, and sand and gravel (see Exhibit 7-3). Data on the volume of minerals extracted is not available at the county level. Estimates of the LMR revenues from non-fuel mineral extraction is based on state level revenues and the number of active mines in the LMR counties. Approximate annual revenues from non-fuel mineral resource extraction was over \$219 million in 2011.

SALT

Salt mines in the LMR Corridor are all located in the Louisiana counties. Louisiana is a leading salt producing state, contributing about 30 percent of national salt production. The LMR Corridor hosts 10 out of 11 active salt mines in Louisiana.¹⁰⁷ Salt production feeds a number of markets; ranging from food flavoring, road deicing, water softening, and use in industrial production.

CLAY

The LMR Corridor has six active mines extracting common and ball clay. Two mines are located in LMR counties of Missouri, two in Arkansas, one in Louisiana, and one in Kentucky. Clay is used as raw material for brick and cement production, floor and wall tiles, pipes, and sanitary ware.

CRUSHED STONE

Crushed stone is produced in five of the LMR states: Missouri, Tennessee, Illinois, Kentucky and Arkansas. Missouri, Illinois and Kentucky are leading states in crushed stone production. A relatively small proportion of this production is located in the LMR corridor. Of the 24 mines (of 480 in the five states) actively extracting stone for crushed stone in LMR counties, 13 are in Arkansas, nine in Missouri and two in Illinois.

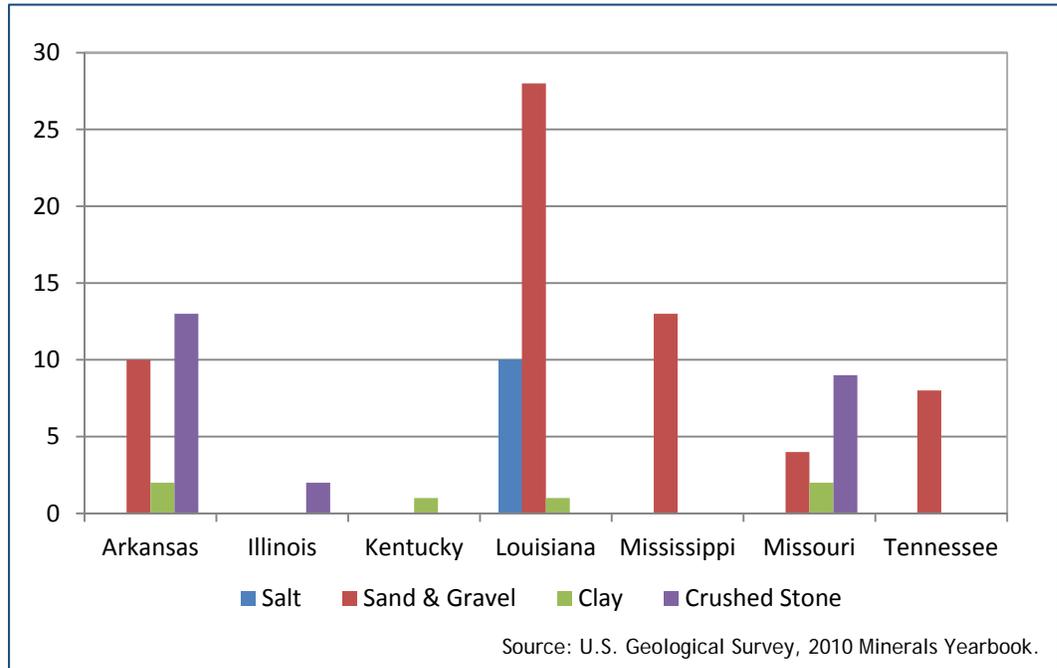
Crushed stone is used as aggregate in the construction industry, especially in concrete for roads, foundation, and building construction. It is also supplied for non-binding uses as railroad track ballast, river bank fortification, and water filtration. The fine particles created as a byproduct of the stone crushing are also used for production of plastic fillers,

¹⁰⁶ Several LMR counties in Louisiana and Mississippi are located above a prospective play, which is a part of the TX-LA-MS Salt Basin (see the Lower 48 Shale Plays Map provided by EIA at: http://www.eia.gov/oil_gas/rpd/shale_gas.pdf). A prospective play is a part of a shale basin that may be explored in the future and, if this exploration is successful, production may result. (Source: personal communication on January 8th, 2014, with John R. Parry, PhD, retired Executive Vice President, Exploration, WMC Resources Ltd.).

¹⁰⁷ Find The Data. Compare Active Mines. Accessed at: <http://active-mines.findthedata.org>

ceramic, and brick frits.¹⁰⁸ Crushed stone is used in chemical and metallurgical processes for agricultural and other industrial production.¹⁰⁹

EXHIBIT 7-3. NUMBER OF NON-FUEL MINERAL EXTRACTION MINES IN THE LMR CORRIDOR BY MINE TYPE, 2010



SAND AND GRAVEL

Sand and gravel are naturally created from weathering of rock and stone. These granular deposits are found throughout the country. In the northern US, glacial deposits are a significant source of sand and gravel, while in the LMR Corridor, they are primarily concentrated as alluvial deposits along the river shore and bed. All sand and gravel mining is surface mining (open pit excavation or dredging). In the LMR Corridor, there are 63 active sand and gravel mining operations. The largest number (28) are located in Louisiana, followed by Mississippi (13), Arkansas (10), Tennessee (8) and Missouri (4).

There are two major categories of sand and gravel use: construction and industrial. In construction, sand and gravel can be used directly, such as for construction fill, railroad ballast, or water filtration. It can also be used as a component with asphalt or concrete for road construction or for producing construction materials such as concrete blocks,

¹⁰⁸ The Encyclopedia of Arkansas History and Culture. "Crushed Stone Mining." Accessed at: <http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=5955>

¹⁰⁹ Willett, 2013.

pipes and roofing shingles. Industrial use of sand is often for glass production (nearly 40 percent) as well as foundry and abrasive sand.¹¹⁰

DATA SOURCES AND METHODOLOGY

We obtained employment information on the mineral resources sector (NAICS 21) from the 2011 Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages. We calculated oil and natural gas revenues for the petroleum producing states of Mississippi and Louisiana using available production and price data. Data on oil and gas production, including the number of wells and monthly county production, were obtained from the Louisiana Department of Natural Resources' online database "SONRIS" and the Mississippi Department of Environmental Quality Oil and Gas Board. The latest available county-level natural gas and oil production data were from 2004. The 2011 Louisiana first purchase prices (prices of domestic crude oil at the first point of sale¹¹¹) and wellhead prices (the price of natural gas obtained at the mouth of the well¹¹²) were provided by the Louisiana Department of Natural Resources and the U.S. Energy Information Administration. 2011 natural gas prices for Mississippi were not available. They were estimated by adjusting the 2011 Louisiana natural gas wellhead price by the 10-year average price ratio between Mississippi and Louisiana.

Data on non-fuel mineral production were estimated based on statewide production levels and revenue figures obtained from the U.S. Geological Survey 2010 Minerals Yearbook for Salt, Sand, Gravel, Clay, Shale, and Crushed Stone. County level data were created based on the county level proportion of active mines in LMR counties in 2011 (for each type of non-fuel mineral) from the website <http://active-mines.findthedata.org>.

¹¹⁰ Minerals Education Coalition. 2013. "Sand and Gravel." Accessed at: <http://www.mineraleducationcoalition.org/minerals/sand-and-gravel>

¹¹¹ Source: Dictionary of Energy. Accessible at: <http://www.photius.com/energy/glossaryf.html>

¹¹² Source: Dictionary of Energy. Accessible at: <http://www.photius.com/energy/glossaryf.html>

CHAPTER 8 | ENERGY GENERATION AND PRODUCTION

As of 2013, the 108 power plants in the LMR Corridor generated nearly 15 percent of the total power generated in the seven states in the region. Energy production in the LMR Corridor depends on the Mississippi River in several ways. First, the river provides waterway transportation, an important means of shipping coal and other materials to power plants (the Navigation industry is discussed further in Chapter 9). Second, the river provides a source of cooling water for fossil fuel and nuclear power plants. It is estimated that the daily intake of surface water to condense steam in all LMR's thermoelectric power plants is 6.9 billion gallons.¹¹³

The remainder of this chapter provides an overview of the different types of power plants along the LMR, presents facility generation and capacity data, examines revenue and employment associated with power generation, and discusses potential trends for the industry.

ENERGY GENERATION

In 2012, the LMR Corridor power plants generated more than 100 million megawatt hours (MWh).¹¹⁴ This accounted for approximately 15 percent of total energy produced in the seven LMR states (see Exhibit 8-1 and Exhibit 8-2).

Five out of the seven LMR states generate electricity in the LMR corridor (see Exhibit 8-1). The largest volume of electricity within the LMR region is produced in Louisiana-LMR counties, which generated approximately 46 million MWh in 2012. This is approximately half (45 percent) of the electricity produced in Louisiana, as shown in Exhibit 8-2. Arkansas counties in the LMR Corridor generated over 27 million MWh in 2012, which represented 42 percent of the electricity produced in the state. The Corridor counties of Mississippi, Missouri, and Tennessee produced approximately 23, 11, and 5 percent of electricity production in their respective states in 2012.

¹¹³ U.S. Geological Survey, 2005. Estimated Use of Water in the United States in 2005. Accessed at: <http://water.usgs.gov/watuse/data/2005/index.html>.

¹¹⁴ EIA. 2013.

EXHIBIT 8-1. POWER GENERATION (THOUSAND MWH) IN THE LMR STATES AND CORRIDOR, 2012

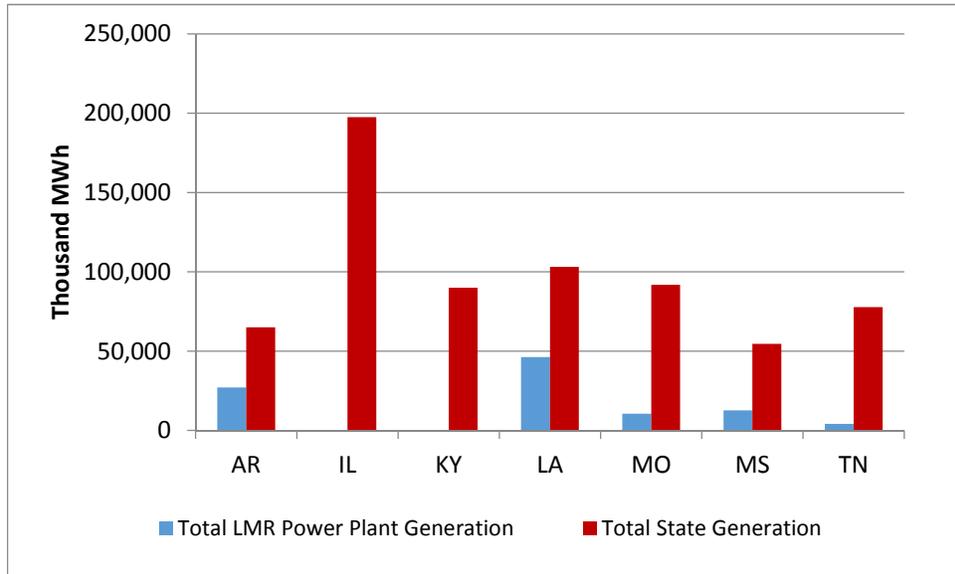


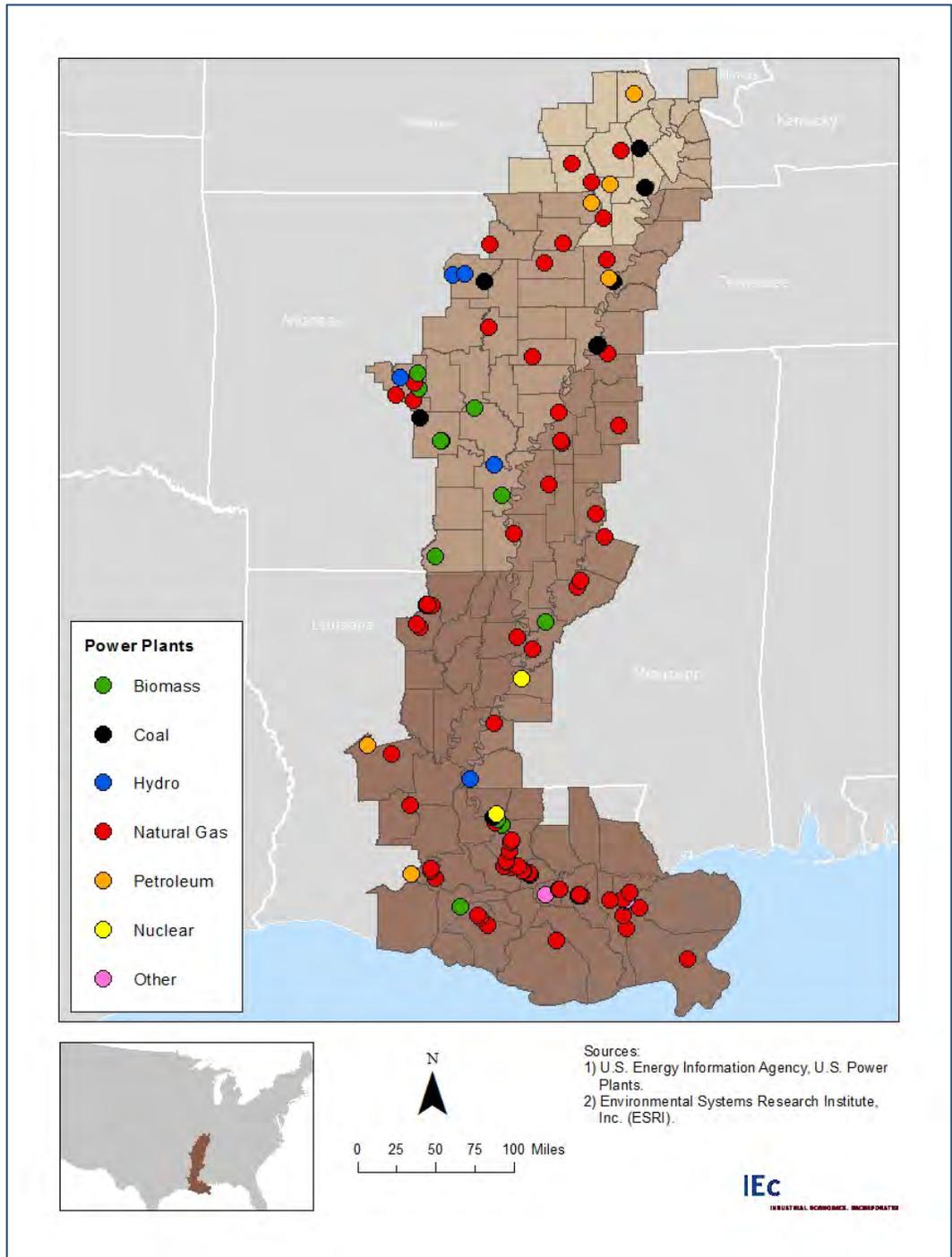
EXHIBIT 8-2. POWER GENERATION (THOUSAND MWH) IN THE LMR STATES AND CORRIDOR, 2012

STATE	STATEWIDE GENERATION (1,000 MWH)	LMR CORRIDOR GENERATION (1,000 MWH)	PROPORTION LMR CORRIDOR GENERATION
Arkansas	65,006	27,136	42%
Illinois	197,565	0	0%
Kentucky	89,950	0	0%
Louisiana	103,184	46,283	45%
Mississippi	91,809	10,525	11%
Missouri	54,591	12,633	23%
Tennessee	77,722	4,082	5%
Total LMR Corridor	679,827	100,659	15%

Source: U.S. Energy Information Agency, Form EIA-923: Monthly Generation and Fuel Consumption Time Series File, 2012 Early Release.

As of 2011, there were 108 working power plants or independent energy providers in the LMR Corridor (see Exhibit 8-3). There are currently 72 gas-fired power plants, eight coal-fired power plants, eight oil, five hydroelectric, 10 biomass, three nuclear, and two other power plants.

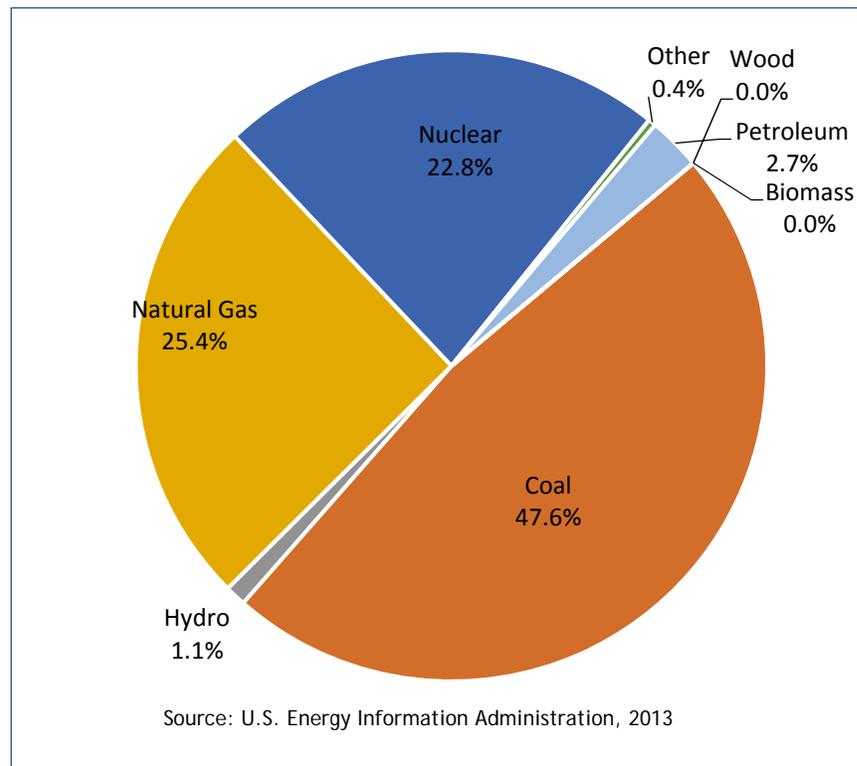
EXHIBIT 8-3. POWER GENERATING STATIONS BY FUEL TYPE IN THE LMR CORRIDOR, 2013



As shown in Exhibit 8-4, coal was the single largest energy source, producing 48 percent of electricity, followed by gas, which contributed 25 percent, in 2012.¹¹⁵ Based on market conditions in a given year, coal and gas contributions to the total power generation in the LMR region vary. However, recent low gas prices have resulted in development of large gas facilities. In fact, the largest power plant operating in the LMR, Louisiana's Willow Glen, is gas-fired, with generation capacity of 2,178 megawatts (MW).

The relative contribution of coal-fired energy production to total energy production is expected to slowly diminish over the next 20 years. According to the Energy Information Administration (EIA), the total contribution of coal to national energy production in the U.S. will decline between 2011 and 2040 from nearly 50 percent to 30 percent. EIA also estimates that energy production from natural gas will increase from 25 percent to 30 percent over that time frame.¹¹⁶

EXHIBIT 8-4. POWER GENERATION IN THE LMR CORRIDOR BY FUEL SOURCE, 2012



¹¹⁵ See Appendix 8A: Exhibit 8A-1 for additional detail on generation by fuel category.

¹¹⁶ U.S. Energy Information Administration. 2012. AEO2013 Early Release Overview. Electricity Generation. Accessed at: http://www.eia.gov/forecasts/aeo/er/early_elecqen.cfm

In 2012, 23 percent of power production in the LMR Corridor was produced by three large nuclear power plants with capacity of 3,600 MW.¹¹⁷

Remaining production was made up of a combination of petroleum, hydropower and other renewable sources. In 2012, petroleum and the renewable energy sources contributed 2.7 and 1.5 percent of overall power generation in the LMR Corridor, respectively.¹¹⁸ There are five hydroelectric power plants in the LMR, four in Arkansas, and one in Louisiana.

The other source of renewable energy in the LMR Corridor is biomass. As of 2012, there were 10 biomass-based power plants: six in Arkansas, three in Louisiana, and one in Mississippi. These currently contribute less than one percent of energy production in the LMR Corridor. Nonetheless, the LMR region is particularly suitable for bioenergy production, because of its extensive agriculture and corn production (see Chapter 6), as well as extensive forested lands (see Chapter 2). Currently, the most economical sources of biomass are mill and urban wood residues. Residues from mill production, in the form of wood scraps and sawdust, are frequently used by biomass plants. As a result, many biofuel power plants are located near pulp and paper mills. In fact, most of the bioenergy produced from woody biomass is used for on-site energy production at the pulp and paper mills. While the current contribution of bioenergy production from wood residue is small, some forecasts estimate that biomass production could contribute as much as nine to eleven percent of primary energy use nationwide by 2040.¹¹⁹

The LMR Corridor has the potential to be a leader in producing bioenergy from agricultural crops, such as corn. Corn production has been increasing in the LMR in recent years (see Chapter 6). For example, in 2008, Mississippi was ranked by Forbes as the fifth highest state for potential crop-based bioenergy production in the U.S.¹²⁰ One of the leading research centers on biofuels is the Sustainable Energy Research Center at Mississippi State University in Starkville, Mississippi.

POWER CONSUMPTION IN THE LMR

In 2012, the seven LMR states consumed 1,182 million MWh. As shown in Exhibit 8-5, residential users consumed 36 percent (or 426 million MWh), the largest portion of energy. These are private households purchasing energy for cooling, heating, lighting and household appliances.

The next largest consumers are industrial entities that require energy to cool, heat, and light commercial buildings. They accounted for 34 percent (or 400 million MWh) of the total LMR Corridor's energy use in 2012. The third largest energy consumer was the commercial sector, which requires electricity to power industrial processes and

¹¹⁷ EIA, 2013.

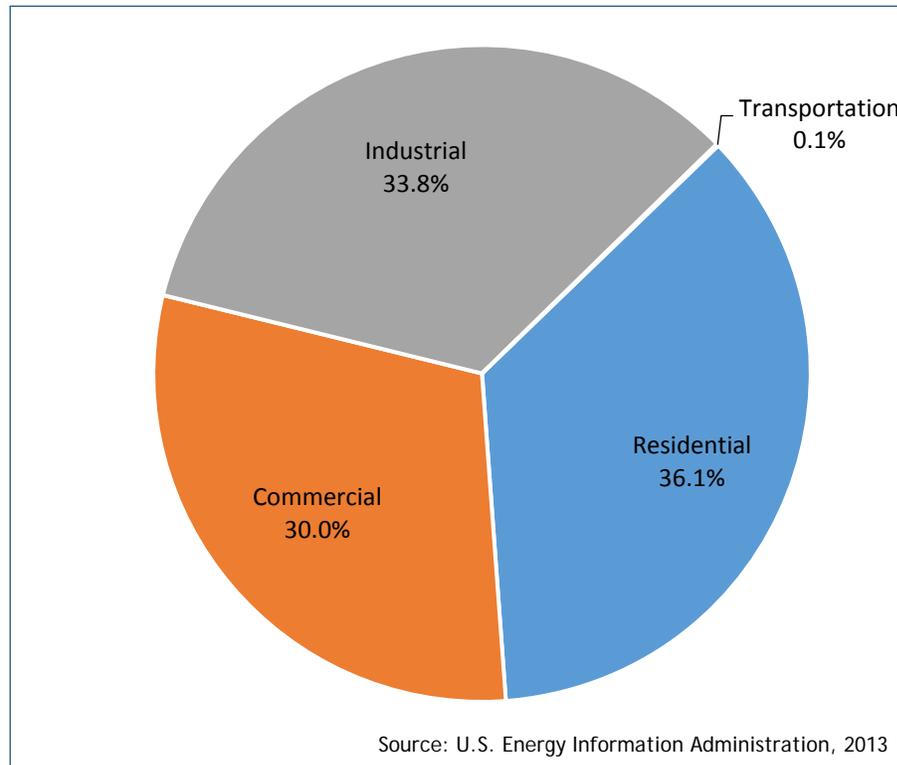
¹¹⁸ EIA, 2013.

¹¹⁹ U.S. Energy Information Administration, 2013. Annual Energy Outlook, 2013. Accessed at: [http://www.eia.gov/forecasts/aeo/pdf/0383\(2013\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf) on October 2, 2013.

¹²⁰ Tap, Inc. "Biofuel." Accessed at: <http://www.tapintoindustry.com/target-industries/biofuel/> on October 2, 2013.

production. Industry used 30 percent (or 354.5 million MWh) of the total energy consumed in the region in 2012.

EXHIBIT 8-5. ENERGY CONSUMPTION BY SECTOR IN LMR STATES, 2012



EMPLOYMENT AND REVENUES IN THE LMR

Power facilities in the LMR corridor employ approximately 2,700 workers and generate approximately \$6.8 billion in revenues (see Exhibit 8-6).¹²¹ Revenues and employment from the generation, transmission, and distribution of electricity tend to be higher in populous areas, such as Memphis, New Orleans, and Baton Rouge, which helps to explain why the bulk of the energy sector revenue and employment in the corridor is concentrated in Louisiana, and to a lesser extent the rest of the LMR Corridor (see Exhibit 8-7).

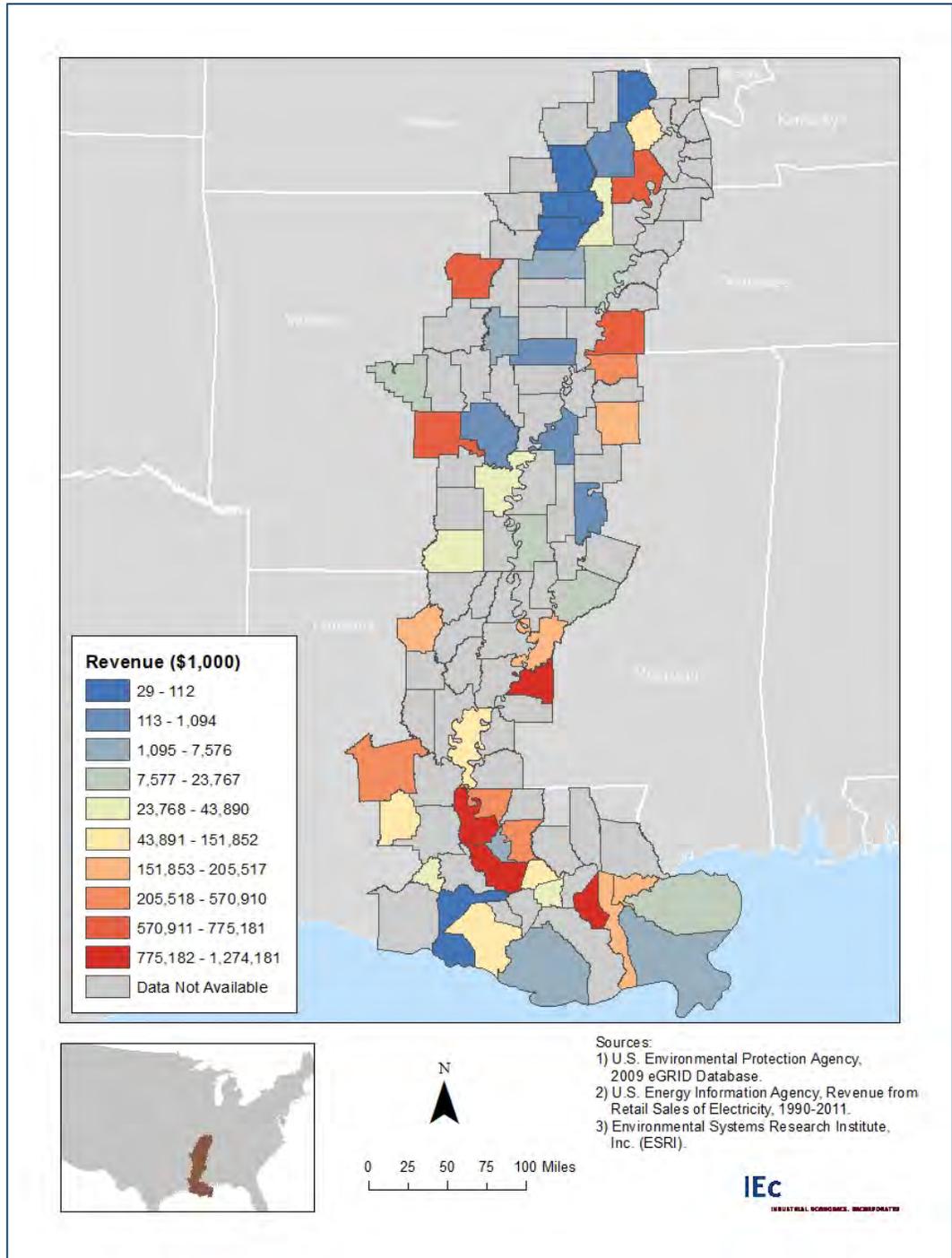
¹²¹ U.S. Bureau of Labor Statistics, 2011. BLS Quarterly Census of Employment and Wages. Accessed at <http://www.bls.gov/cew/home.htm>; EIA, 2013.

EXHIBIT 8-6. ANNUAL GENERATION (THOUSAND MWH) AND REVENUES (\$MILLIONS) IN THE LMR CORRIDOR, 2013

STATE	ANNUAL POWER GENERATION (1,000 MWH)	REVENUES (\$MILLIONS) ¹
Arkansas	27,136	1,487
Illinois	0	0
Kentucky	0	0
Louisiana	46,283	2,975
Mississippi	10,525	1,002
Missouri	12,633	803
Tennessee	4,082	491
LMR Corridor	100,659	6,758

Note: 1-Revenues are in \$2011.
Sources U.S. Energy Information Agency. Form EIA-923: Monthly Generation and Fuel Consumption Time Series File, 2012 Early Release and Revenue from Retail Sales of Electricity by State by Provider, 1990-2011.

EXHIBIT 8-7. ENERGY SECTOR REVENUES IN THE LMR CORRIDOR, 2011



DATA SOURCES AND METHODOLOGY

We obtained data on energy generation of existing power plants from the U.S. Energy Information Agency.¹²² All data are from 2012. Additionally, we obtained data from the 2011 Bureau of Labor Statistics Quarterly Census of Employment and Wages for the NAICS codes 221111 – Hydroelectric Power Generation, NAICS 221112 – Fossil Fuel Electric Power Generation, NAICS 221113 – Nuclear Electric Power Generation, 221116 – Geothermal Electric Power Generation, 221121 – Electric Bulk Power Transmission, NAICS 221122 – Electric Power Distribution, NAICS 221210 – Natural Gas Distribution.

¹²² U.S. Energy Information Administration (EIA), 2013. "Electricity." Form EIA-923 and Form EIA-861. Accessed at: <http://www.eia.gov/electricity/data.cfm#sales>. Data for form EIA-923 are early release data for 2012.

CHAPTER 9 | COMMERCIAL NAVIGATION

This chapter describes the economic impact of commercial navigation on the LMR. The LMR's waterway transportation industry provides an outlet for and an inlet to a wide range of economic sectors operating in the nation's interior, including agriculture, energy, mining, and manufacturing. These sectors depend on LMR commercial navigation as a means of shipping and receiving millions of tons of farm products, coal, minerals, and other commodities. Overall, the waterway transportation industry shipped close to 474 million tons of commodities on the LMR in 2011.

In addition to providing bulk cargo transport, the waterway transportation industry supports a network of businesses and more than 20 ports that store, load, unload, and transport cargo to land-based modes of transportation such as rail and trucking. In 2011, waterway transportation generated approximately \$4.2 billion in revenues and employed roughly 18,764 people in the LMR Corridor. Appendix A, Exhibit 9A-1 provides estimates of navigation sector employment by state.

This chapter describes commercial navigation in the LMR and its contribution to domestic and international trade, including annual revenues and the employment opportunities provided.

NAVIGATION SYSTEM IN THE LMR¹²³

The navigation industry on the LMR has been important since the earliest days of America. According to historians, one of the primary reasons for the Louisiana Purchase in 1803 was to secure the Port of New Orleans and free access to the whole length of the Mississippi River. Continued efforts to maintain the waterway as navigable have been ongoing ever since. The extensive trade occurring along the banks of the LMR changed the region's economic landscape, ushering in an era of prosperity. In 1824, under the General Survey Act, the USACE received \$75,000 to improve navigation on both the Ohio and Mississippi rivers. In 1879, a new institution, the Mississippi River Commission (MRC) was created as a civilian partner to the USACE to oversee navigation. Since then, both institutions have been working to improve the reliability of navigation along the Mississippi River, and the LMR in particular. During that time, over 1,000 miles of concrete revetment and fifteen artificial cutoffs were installed to stabilize riverbanks. Additionally, extensive dredging activities occur annually to maintain the LMR's navigability.

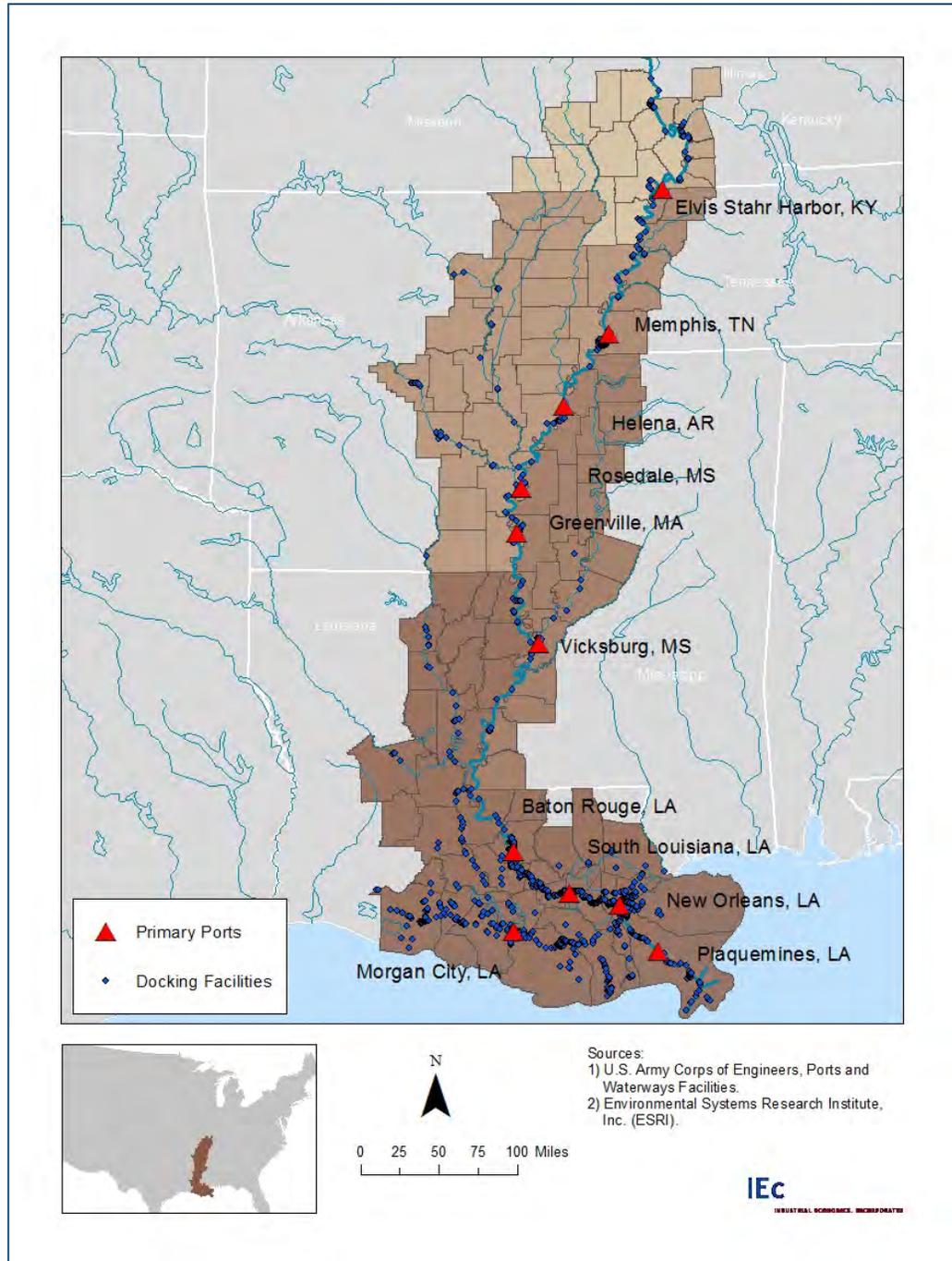
¹²³ Niebling, et al., 2012

CURRENT STATE OF NAVIGATION ON THE LMR

Today, vast quantities of goods travel along the Mississippi River, carried aboard large barges pushed by towboats from port to port. Eleven of the top 150 ports by shipping volume occur in the LMR, including the ports of New Orleans, Baton Rouge, and Memphis. These ports, as well as supporting docking facilities, are presented in Exhibit 9-1. Individual barges, carrying up to 1,500 tons, are considered to be far more efficient than trains or trucks for transporting commodities. It would require roughly 15 large train cars and 50 trucks to ship the volume of cargo carried by one barge.

River navigation facilitates a wide array of economic activity. Agricultural, mining, and processing facilities along the Mississippi rely on the shipping industry to provide an economical means of transporting products domestically and internationally. Barges pay fees at their ports of call for the use of port facilities, fleeting (parking), and the loading and unloading of cargo. In addition, ports offer services such as barge cleaning, repairing, boat refueling, and security services.

EXHIBIT 9-1. PRIMARY PORTS AND DOCKING FACILITIES IN THE LMR CORRIDOR, 2013

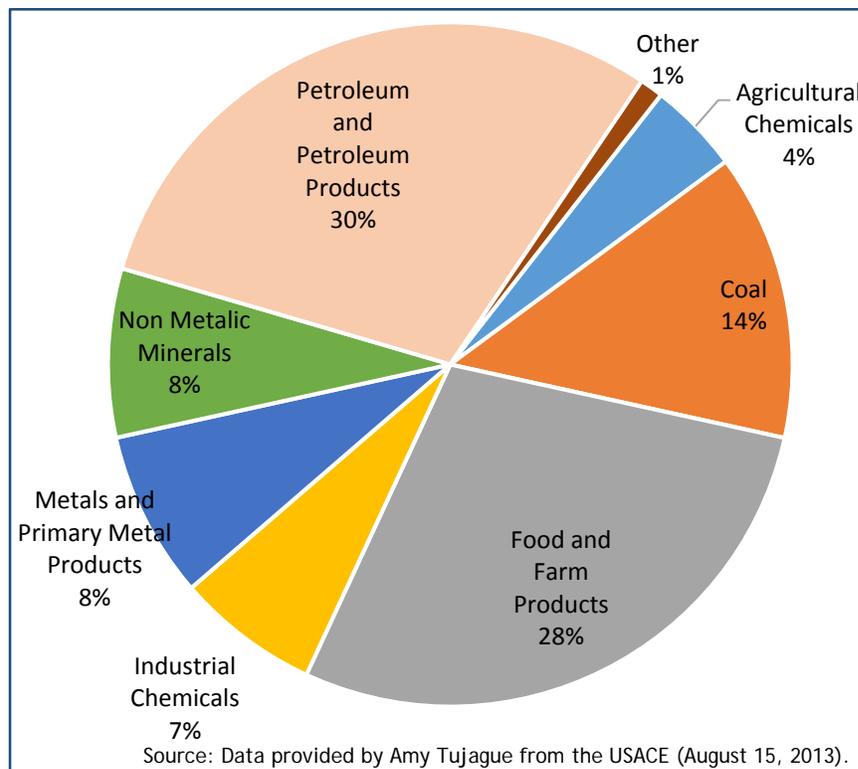


CARGO SHIPMENTS ON THE LMR

In 2011, the commercial navigation sector in the LMR Corridor generated \$4.2 billion in revenues and employed 18,764 people, according to the Bureau of Labor Statistics (BLS). In 2011, approximately 474 million short tons of cargo were shipped on the LMR.¹²⁴

In 2011, the top ranked commodities (by tonnage) shipped on the LMR were petroleum and petroleum products, which accounted for 30 percent (or 142 million short tons) of all shipped goods, as shown in Exhibit 9-2. The second largest category was food and farm products, which comprised 28 percent (or 135 million short tons) of cargo. The total cargo tonnage shipped on the LMR are presented by product type in Exhibit 9-2.

EXHIBIT 9-2. COMPOSITION OF CARGO VOLUME TRANSPORTED ON WATERWAYS IN THE LMR CORRIDOR, 2011



The third largest cargo category was coal, which accounted for 14 percent (64.3 million short tons) of LMR shipping volume in 2011. In 2011, 20 percent of U.S. coal and petroleum products were moved through the LMR.¹²⁵

¹²⁴ Shipping data for the LMR portion of the River in 2011 was provided by Amy Tujague from the U.S. Army Corps of Engineers (August 15, 2013). See Appendix A: Exhibit 9A-1 for additional detail on the employment, establishments, and revenues in the navigation sector in the LMR Corridor by state.

¹²⁵ The New Orleans Board of Trade Limited. The Importance of the Mississippi River. Accessed at: http://midamericafreight.org/wp-content/uploads/Bourgeois_ImportanceMississippi.pdf

In 2011, non-metallic minerals comprised eight percent (or 38 million short tons) of cargo, along with minerals and primary metal products (37.5 million short tons), followed by industrial chemicals (32 million short tons) and agricultural chemicals (20.5 million short tons).

Forty-eight percent (or 228 million short tons) of all the goods travelling on the LMR are shipped domestically: of these, 40 percent were commodities shipped and received in LMR ports, while eight percent were either shipped to or from the Upper Mississippi River (UMR). Twenty-six percent of commodities traveling on the LMR were exports and 16 percent were imports. Appendix A, Exhibit 9A-2, provides additional details on the tonnage and cargo transported on waterways in the LMR corridor. Only a minimal amount of cargo (less than 0.1 percent) shipped along the LMR was imported or exported from the UMR.

The LMR ports are very important for international trade. More than 60 percent of all agricultural products exported from the U.S. pass through LMR ports. However, the contribution of agricultural products to the total cargo shipped abroad through the LMR substantially decreased over the last 10 years. In 2001, food and farm products were 80 percent of LMR shipped exports.¹²⁶ In 2011, this number dropped to 55 percent (or 69 million short tons). One reason for this difference is a recent shift in the composition of nationwide agricultural exports. Due to an increasing world population with greater income, there is increased demand for a more diversified diet.¹²⁷ Consequently, high value products (HVP) (such as meats, poultry, live animals, oilseed meals, vegetable oils, fruits and vegetables) as a percent of exported agricultural goods has increased. In contrast, the contribution of bulk products has fluctuated.¹²⁸ Nonetheless, bulk products (such as wheat, rice, coarse grains, oilseeds, cotton, and tobacco) continue to be a major category of food and farm product shipped along the LMR. For example, the LMR ports ship 60 percent of the grain exported from the United States.¹²⁹

Additionally, the recent discovery of natural gas in the Haynesville Shale region (northwest Louisiana) increased the demand for imported frac sand.¹³⁰ Therefore, an increase in volume shipment both along the LMR and its inland tributaries may be expected.¹³¹

¹²⁶ IEC., 2004.

¹²⁷ Source: USDA, Exports. Accessible at: <http://www.ers.usda.gov/topics/international-markets-trade/us-agricultural-trade/exports.aspx#.Uj37Soasim5>

¹²⁸ Source: USDA, Exports. Accessible at: <http://www.ers.usda.gov/topics/international-markets-trade/us-agricultural-trade/exports.aspx#.Uj37Soasim5>

¹²⁹ The New Orleans Board of Trade Limited. The Importance of the Mississippi River. Accessed at: http://midamericafreight.org/wp-content/uploads/Bourgeois_ImportanceMississippi.pdf

¹³⁰ Frac sand is high-purity, crush-resistant quartz sand used in the extraction process associated with horizontal drilling (see chapter 7 for more details). Sources: Geoscience News and Information, *What is frac sand?* Accessible at: <http://geology.com/articles/frac-sand/>

¹³¹ Richardson, 2012.

PORTS IN THE LMR

There are several types of ports operating in the LMR Corridor. The major types include: inland ports, coastal ports, and deep draft ports. Coastal and inland ports are supporting regional industries by facilitating cargo movement within the corridor. The major economic impact, however, comes from deep draft ports. These ports serve a large number of high volume vessels and support international exchange producing substantial revenues.

Currently, there are four deep draft ports on the LMR: New Orleans, Baton Rouge, Plaquemine, and South Louisiana. According to a 2011 tonnage based ranking of US ports, the port of South Louisiana is the largest in the nation (and in the western hemisphere) based on the tonnage of 246.5 million short tons, which is 52 percent of total LMR cargo.¹³² This South Louisiana Port is also No. 1 in domestic trade, accounting for 125.6 million of short tons shipped domestically, and second (to Houston, TX) in foreign trade (120.8 short tons).¹³³

The second largest LMR port is the Port of New Orleans, visited every year by more than 5,000 oceangoing vessels. It is also the fifth largest port in terms of total tonnage (77 million short tons) and domestic cargo (39 million short tons). Baton Rouge is listed as No. 10 and the Plaquemine Port is number No. 14 in the nation.¹³⁴

The Port of South Louisiana and the Port of New Orleans have been severely affected by Hurricane Katrina. During the 10-month period following Katrina's landfall in August 2005, the ports lost 3,500 jobs associated with a loss of \$136.1 million in wages.¹³⁵ However, overall during the last 10 years, ports in Louisiana (which dominate the economic impact of all LMR ports) have been growing in terms of net assets and net income.¹³⁶ In spite of Katrina, the total net assets of Louisiana ports increased by almost

¹³² The tonnage of 246.5 million short tons of cargo is reported by the American Association of Port Authorities (accessed at: <http://www.aapa-ports.org/Industry/content.cfm?ItemNumber=900>), as well as USACE, 2011. 'U.S. Port Ranking by Cargo Volume 2011.' Accessed at: http://www.portofpascagoula.com/Port%20Ranking%20Poster_8.5x11.pdf

An alternative number of about 274 million short tons of cargo is provided by the Ports of South Louisiana (accessed at: <http://www.portsl.com/newsinfo/statistics.htm>), as well as The Times-Picayune Greater New Orleans (from February 10, 2012. The 274 million short tons of cargo serviced by the Port of South Louisiana in 2011 is record breaking high. According to The Times-Picayune Greater New Orleans ('Record cargo passes through Port of South Louisiana in 2011.' Accessed at: http://www.nola.com/business/index.ssf/2012/02/record_cargo_passes_through_po.html), it is most likely related to increasing amounts of petrochemicals and fertilizers passing through the Port. In the first three quarters of 2011, six million more tons of oil passed through the port than in 2010. Additionally, coal, lignite and petroleum coke shipments increased as well. The amount of this cargo increased from six million tons in 2010 to 23 million tons in 2011. Chemicals and fertilizer shipping in the South Louisiana Port also increased, rising from 19 million in 2010 to more than 35 million tons in 2011.

¹³³ USACE, 2011. 'U.S. Port Ranking by Cargo Volume 2011.' Accessed at: http://www.portofpascagoula.com/Port%20Ranking%20Poster_8.5x11.pdf

¹³⁴ The New Orleans Board of Trade Limited. *The Importance of the Mississippi River*. Accessed at: http://midamericafreight.org/wp-content/uploads/Bourgeois_ImportanceMississippi.pdf

¹³⁵ Dolfman, M.L., S. Fortier Wasser, and B. Bergman, 2007. The effects of Hurricane Katrina on the New Orleans economy. Monthly Labor Review June:3-18. Accessed at: <http://www.bls.gov/opub/mlr/2007/06/art1full.pdf>

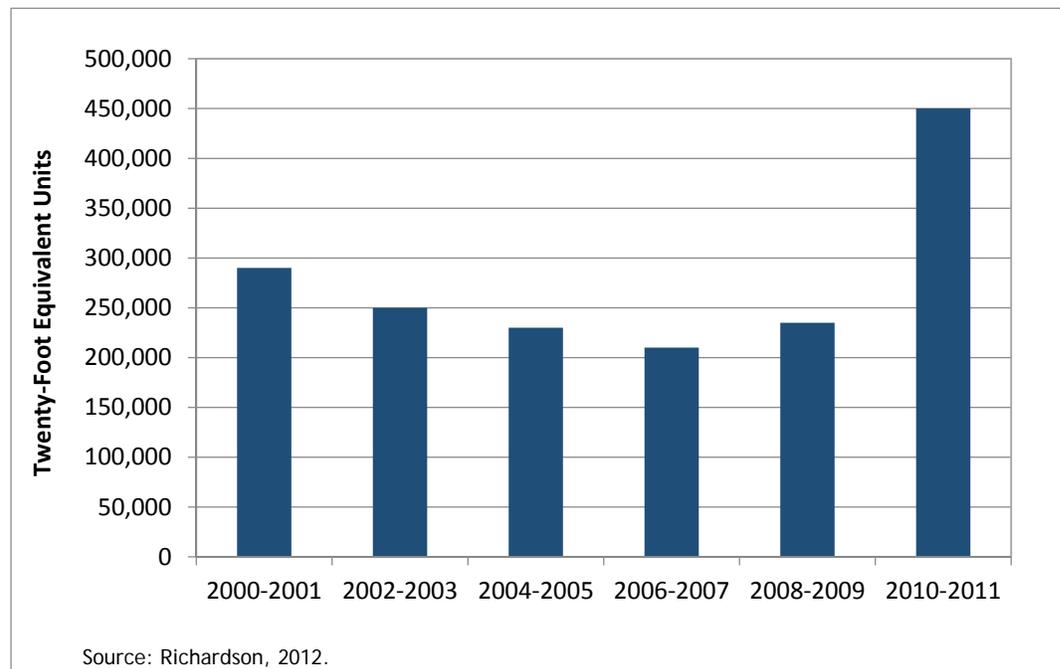
¹³⁶ Net income is operating and non-operating revenues minus operating expenses.

\$600 million between 2000 and 2011.^{137,138} The largest growth occurred among coastal ports, which grew 190 percent. The deep draft ports' net assets increased 40 percent. Growth in the net assets of the ports is a particularly optimistic indicator, because it represents an increase in the ports' capacity to handle greater amounts of cargo (which usually generate increasing revenues).

Net income of the ports grew as well. Net income for deep draft ports increased on average \$2.9 million annually, relative to \$1.3 million growth for the coastal ports and \$0.3 million for inland ports.¹³⁹ These average annual increases account for the natural disasters and economic recession that affected the ports, but the effect was only temporary and compensated by growth during the uneventful years.

In the 2000-2005 period, the cargo shipment in the South Louisiana Port was on average 250 million tons, rising in 2005 and 2007 to 260 million tons.¹⁴⁰ In 2008 and 2009, as a result of the economic slowdown, the numbers went down, but rebounded in 2010 and 2011.

EXHIBIT 9-2. CONTAINER CARGO VOLUME (TEUS) IN THE PORT OF NEW ORLEANS, 2000-2011



¹³⁷ Richardson, 2012.

¹³⁸ This is a state level figure, which includes some ports located beyond the LMR counties. However, it is a reasonable LMR approximation, because non LMR ports are inland ones with a small economic impact.

¹³⁹ Richardson, 2012.

¹⁴⁰ Data cited in the following two paragraphs is based on Richardson, 2012.

As shown in Exhibit 9-2, the Port of New Orleans experienced a major increase in containerized cargo shipment in 2010-2011. At the beginning of the decade, in 2000 and 2001, the average volume of container cargo handled at the Port of New Orleans was 300,000 twenty-foot equivalent units (TEU).¹⁴¹ The volume of container shipments decreased during Hurricanes Katrina and Rita and in their aftermath in 2005 through 2007. Since then, volume has increased, leading to a record breaking annual average of 450,000 TEU in 2010 and 2011.

In 2012, the general cargo tonnage at the Port of New Orleans increased to 7.55 million tons, which was an 8.6 percent increase since 2011, and a third year of tonnage gains.¹⁴² This increase included a 38 percent growth in imported steel (steel import was 1.39 million tons in 2011 and 1.92 in 2012). Additionally, between 2011 and 2012, chemical exports increased by 5.4 percent (to 1.75 million tons), followed by poultry and other agriculture exports, which rose by 22.8 percent to 496,000 tons.¹⁴³

PANAMA CANAL EXTENSION AND THE LMR

The Panama Canal extension project is designed to double the Canal's capacity by installing a third set of locks that will be larger than the two existing sets. The extension is expected to be completed in 2015. Maximum size vessels that can currently traverse the Panama Canal are called "Panamax," but the improved locks will allow larger size vessels to travel through the Canal. These post-Panamax ships will provide economies of scale. Individual ports may benefit from increased cargo volume moving through them. The net impact though will depend on a variety of elements. The most important determinant will be the cost of preparing a port to be post-Panamax ready and the cost of maintaining that status.

The post-Panamax vessels will require ports with an appropriate channel's depth, width and turning basin size, sufficient height for bridges and supporting port structures (e.g., cranes and docks to load and unload shipments). For example, post-Panamax vessels will have a 50 feet draft, which is 3 to 5 feet more than the current depth of the channel in New Orleans.

There are already several ports on the West and East Coasts that are in the process of getting post-Panamax ready.¹⁴⁴ None of the Gulf of Mexico and South Atlantic ports, though, are post-Panamax ready. There is a competition among these ports for funding to support the necessary investments in waterways and port modernization. One of these competing ports is the LMR's Port of New Orleans.

¹⁴¹ TEU is a metric measure of containerized cargo.

¹⁴² Journal of Commerce. 2013. Port of New Orleans' General Cargo Increases. April 9, 2013. Accessed at: http://www.joc.com/port-news/us-ports/port-new-orleans/port-new-orleans-general-cargo-increases_20130409.html

¹⁴³ Journal of Commerce. 2013. Port of New Orleans' General Cargo Increases. April 9, 2013. Accessed at: http://www.joc.com/port-news/us-ports/port-new-orleans/port-new-orleans-general-cargo-increases_20130409.html

¹⁴⁴ Institute for Water Resources and USACE, 2012.

There are numerous studies commissioned to estimate profitability of investment in post-Panamax deep draft ports.¹⁴⁵ One study, released in August, 2013, argues that the potential financial benefits of dredging the LMR to 50-foot depths, required for the Port of New Orleans to be post-Panamax ready, are very substantial. According to the study, the initial investment will be about \$300 million, followed by \$90 million in annual maintenance costs. However, each dollar in costs will result in \$89.4 in benefits. The study claims also that the nation-wide effect of getting the LMR post-Panamax ready will be \$11.5 billion, resulting from lowering costs of export and lower cost of importing oil. Additionally, the investment will create almost 17,000 jobs and almost \$850 million in wages nationwide.¹⁴⁶

This study was commissioned by the Big River Coalition, an advocacy group of Mississippi River navigation industry. In order to form conclusions about economic returns from investment in the Port of New Orleans to make it post-Panamax ready, results from currently ongoing studies need to be considered as well.

DATA SOURCES AND METHODOLOGY

Estimates of commodity shipments on the LMR are based on data developed by the USACE. The data are published in segments in the USACE Waterborne Commerce Report, with data reflecting shipments from the Ohio River to Baton Rouge and from Baton Rouge to the Head of Passes. However, it is not possible to add the segments to calculate total cargo on the LMR because shipments traveling the full stretch or on any portion of both stretches would be counted twice. Therefore, the USACE compiled and provided us with unpublished data that reflect shipments on the LMR (the Ohio River to the Head of Passes) as a unit. These data identified the tonnage transported in the LMR Corridor for the year 2011. Additionally we obtained employment data from the 2011 Bureau of Labor Statistics Quarterly Census of Employment and Wages for the NAICS codes 483 – Water Transportation and 4883 – Support Activities for Water Transportation.

¹⁴⁵ The U.S. Army Corps of Engineers commissioned 17 studies to assess economic viability of investing in post-Panamax ready ports. Source: Institute for Water Resources and USACE, 2012.

¹⁴⁶ Ryan, 2013.

CHAPTER 10 | MANUFACTURING

The LMR Corridor's manufacturing sector encompasses operations ranging from food processing to chemical manufacturing. In 2007, manufacturers generated \$106.4 billion in revenues and employed roughly 207,000 people, with most of the activity concentrated in Louisiana, Tennessee, and Arkansas.

The LMR serves the manufacturing sector in three primary ways. First, the river provides a means of transporting raw materials to processing facilities. In turn, these manufacturers ship primary and finished products from production sites to distributors. Second, manufacturers draw water directly from the river for use in production processing, washing, and cooling. Corridor manufacturers withdraw more than 2.7 billion gallons of surface water per day (see Exhibit 5A-1).¹⁴⁷ Some water-intensive industries along the LMR include food production, chemical and allied products, machinery, and fabricated metal production. Finally, several manufacturers discharge wastewater from production processes into the LMR. Properly treated effluent can be assimilated and treated by the river more safely and at a lower cost than if it were disposed of by other means.

This chapter presents an overview of the LMR Corridor's major manufacturing activities, and provides revenue and employment estimates.

MANUFACTURING REVENUES AND EMPLOYMENT

As shown in Exhibits 10-1 and 10-2, a variety of manufacturers contribute to the LMR Corridor's economy. As a whole, the manufacturing sector employed about 207,000 people and generated \$106.4 billion in revenues in 2007. Employment is highest in the following four industrial categories: (1) food manufacturing; (2) fabricated metal product manufacturing; (3) machinery manufacturing; and, (4) chemical manufacturing. LMR Corridor manufacturing is centered in the Louisiana, Tennessee, and Arkansas areas, with these areas accounting for about 91 percent of the corridor's total manufacturing output (\$97.3 billion).

Exhibits 10-3 and 10-4 show county-level manufacturing industry employment and revenues, respectively. As shown, levels of employment vary throughout the region, with high concentrations in the southern portion of Louisiana, near Memphis, Tennessee, and

¹⁴⁷ U.S. Geological Survey, *Water Use in the United States*, 2005, obtained from <http://water.usgs.gov/watuse/data/2005/index.html> on September 25, 2013.

portions of Arkansas. Many of the counties do not report manufacturing revenues to protect small business information, and thus county-level estimates are understated.

While we rely on 2007 Economic Census data (the latest data available at the writing of this report), we recognize that after 2007, the manufacturing sector contracted substantially across the entire United States as a result of an economic recession. According to the U.S. Bureau of Labor Statistics, all manufacturing jobs in Louisiana (includes other occupations not included under the NAICS Codes 31-33) decreased nine percent, from 157,000 individuals in December 2007 to 142,100 in December 2012. Comparable estimates for revenues at the regional level were not readily available. However, according to the Board of Governors of the Federal Reserve System, the manufacturing industry output across the entire nation, when compared to 2007, decreased by more than four percent.¹⁴⁸

¹⁴⁸ The Board of Governors of the Federal Reserve System. "Industrial Production and Capacity Utilization - G. 17. Manufacturing." Released September 16, 2013. Accessed at <http://www.federalreserve.gov/releases/q17/current/>.

EXHIBIT 10-1. REVENUE (\$1,000S IN 2011), EMPLOYMENT AND NUMBER OF ESTABLISHMENTS IN THE LMR CORRIDOR BY MANUFACTURING SUB-SECTOR

NAICS CODE	INDUSTRIAL CATEGORY	REVENUES (\$1,000)	EMPLOYMENT	ESTAB.
311	Food manufacturing	3,294,497	23,256	559
312	Beverage and tobacco product manufacturing	Not Available	1,607	87
313	Textile Mills	Not Available	157	16
314	Textile Product Mills	Not Available	712	142
315	Apparel Manufacturing	Not Available	233	64
316	Leather and Allied Product Manufacturing	Not Available	Not Available	18
321	Wood product manufacturing	290,780	5,723	348
322	Paper manufacturing	Not Available	7,854	121
323	Printing and related support activities	Not Available	6,354	543
324	Petroleum and coal products manufacturing	Not Available	4,168	111
325	Chemical manufacturing	8,671,613	22,523	460
326	Plastics and rubber products manufacturing	693,750	6,673	220
327	Nonmetallic mineral product manufacturing	137,768	5,070	374
331	Primary metal manufacturing	Not Available	4,499	115
332	Fabricated metal product manufacturing	3,276,945	23,046	1,105
333	Machinery manufacturing	199,630	22,548	600
334	Computer and electronic product manufacturing	Not Available	3,478	149
335	Electrical equipment, appliance, and component manufacturing	Not Available	1,948	108
336	Transportation equipment manufacturing	Not Available	16,476	327
337	Furniture and related product manufacturing	Not Available	1,598	291
339	Miscellaneous manufacturing	Not Available	10,723	500
31-33	All Manufacturing	106,394,419	207,186	6,220

Note: Totals do not sum as the Census excludes some data at the three-digit NAICS level for privacy reasons, but includes it on the two-digit level.
Sources: U.S. Census Bureau, 2007 Economic Census; U.S. Bureau of Labor Statistics, 2011 Quarterly Census of Employment and Wages.

EXHIBIT 10-2. MANUFACTURING REVENUES (\$1,000S IN 2011) AND EMPLOYMENT IN THE LMR CORRIDOR

STATE	REVENUES (\$1,000)	EMPLOYMENT
Arkansas	21,302,582	58,799
Illinois	0	279
Kentucky	*	1,025
Louisiana	53,525,451	105,238
Mississippi	6,444,135	16,998
Missouri	2,697,342	15,808
Tennessee	22,424,908	9,039
LMR Corridor	106,394,419	207,186
Notes: *Data not reported by Census Bureau to protect respondent privacy. Sources: U.S. Census Bureau, 2007 Economic Census; U.S. Bureau of Labor Statistics, 2011 Quarterly Census of Employment and Wages.		

EXHIBIT 10-3. MANUFACTURING EMPLOYMENT IN THE LMR CORRIDOR, 2011

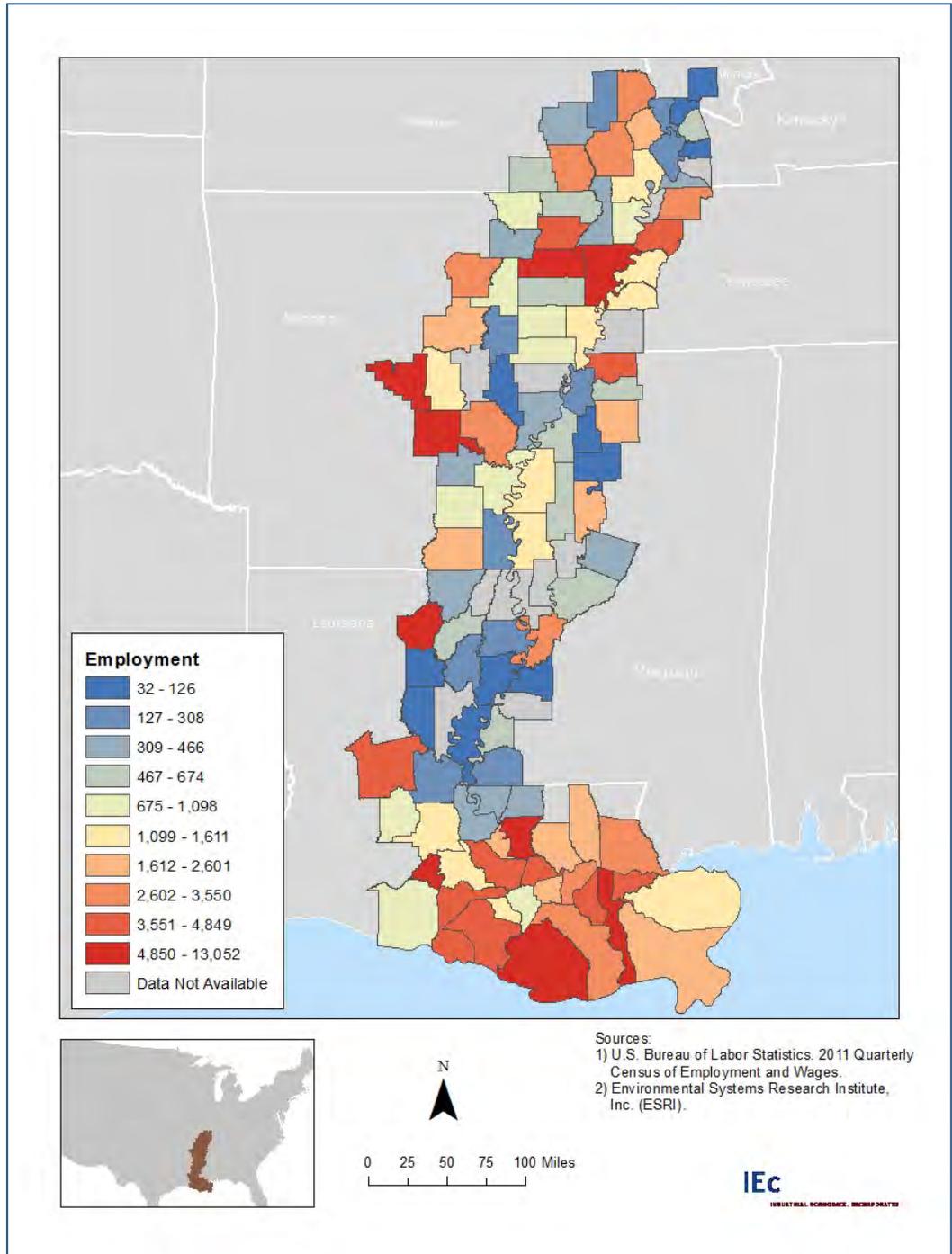
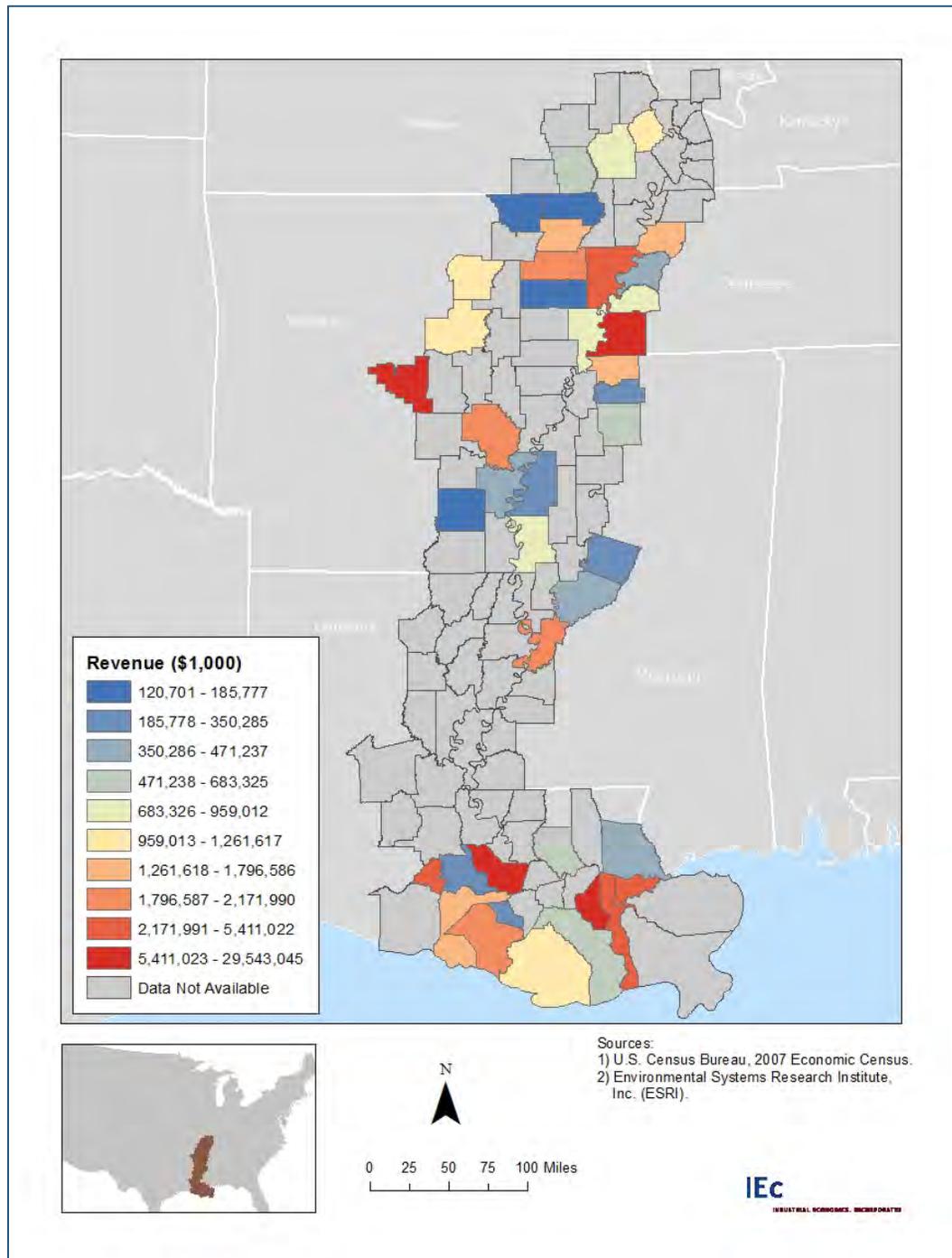


EXHIBIT 10-4. MANUFACTURING REVENUES (\$1,000S IN 2011) IN THE LMR CORRIDOR (2007 DATA)



*Counties where data is reported as "not available" was suppressed by the U.S. Census to avoid disclosure of confidential information.

MAJOR MANUFACTURING ACTIVITIES IN THE LMR CORRIDOR

Below, we describe the LMR Corridor's major manufacturing categories (i.e., chemicals, petroleum refining, and food processing) in more detail and discuss their specific role in the LMR Corridor. For each category, we examine significant subsectors and provide examples of firms operating in the corridor. Appendix A, Exhibit 10A-1, provides additional detail on the number of manufacturing establishments in each subsector.

CHEMICALS AND ALLIED PRODUCTS

Chemical manufacturers in the corridor primarily produce finished chemical products, ranging from organic dyes to fertilizers. These products are used by numerous other industries, helping to fuel the Corridor's economy. Approximately 460 of these establishments exist in the region. Key subsectors include:

- *Basic Chemical Manufacturing*: This includes both manufacture of *Cyclic Crudes, Intermediate & Industrial Organic Chemicals*: Concentrated around Baton Rouge and New Orleans, this sector manufactures cyclic organic crudes and intermediates, and organic dyes and pigments. Some of the industry's products include: (1) aromatic chemicals, such as benzene, toluene, mixed xylenes naphthalene; (2) synthetic organic dyes; and (3) synthetic organic pigments. And, *Plastics Materials and Resins*: This industry, primarily located in Louisiana, produces synthetic resins, plastics materials, and nonvulcanizable elastomers, such as cellulose plastic materials and petroleum polymer resins.
- *Soap, cleaning compounds, and toilet preparation manufacture (inorganic chemicals)*: Companies in this sector manufacture aluminum compounds, potassium, and sodium compounds from earth materials such as minerals and the atmosphere. Key end markets for the sector include the water treatment, pulp and paper, fertilizer, and soap and detergent industries.
- *Pesticide, fertilizer, and other agricultural chemical manufacturing (e.g., nitrogenous and phosphatic fertilizers)*: This industry, concentrated primarily around Baton Rouge, manufactures fertilizer compounds, nitrogen solutions, and natural organic fertilizers (except compost) and mixtures.

FOOD MANUFACTURING

Manufacturers of food and kindred products process food and beverages for human and animal consumption. Food manufacturers in the corridor take advantage of the region's vibrant agriculture and aquaculture industries. In the region, approximately 560 establishments exist. Key subsectors include:

- *Bakeries and Tortilla Manufacturing*: This industry spans the entire region with concentrations in and near metropolitan areas such as Memphis and Baton Rouge. These facilities create and distribute baked goods.

- *Animal Slaughtering and Processing:* The animal slaughter industry is located in multiple locations around the study area. These facilities prepare livestock for human consumption as well as for other uses (e.g., animal feed).
- *Seafood Product Preparation and Packaging:* Concentrated in Mississippi and Louisiana, this industry processes commercially-landed fish and shellfish as well as farm-raised catfish and other seafood, producing frozen and fresh seafood for consumption within the corridor and for export.

MACHINERY MANUFACTURING

Manufacturers of machinery in the LMR Corridor assemble various products from automobiles to other durable industrial appliances and goods. In the region, more than 600 establishments exist. Key subsectors include:

- *Agriculture, Construction, and Mining Machinery Manufacture:* This sector manufactures farm and construction machinery, such as tractors and other farm equipment, heavy construction equipment, and specialty equipment used in mining operations.
- *Metalworking Machinery Manufacture:* This sector manufactures machinery used to alter metals primarily in the construction, industrial, and utility sectors.
- *Industrial Machinery Manufacture:* This sector manufactures machine and tools used in various industries, such as heavy industrial equipment used in food production to paper manufacture.

FABRICATED METAL PRODUCT MANUFACTURING

Manufacturers of fabricated metal products in the LMR Corridor alter metals primarily in the construction, industrial, domestic, and utility sectors. This sector includes establishments engaged in fabricating ferrous and nonferrous metal products, such as metal cans, tinware, handtools, cutlery, general hardware, non-electric heating apparatus, fabricated structural metal products, metal forgings, metal stampings, ordnance (except vehicles and guided missiles), and a variety of metal and wire products not elsewhere classified. In the region, more than 1,100 establishments exist. Key subsectors include:

- *Machine shops, turned products, and screw, nut and bolt manufacturing:* This sector machines metal goods and also produces various fastening and assembly items. This also includes the manufacture of various hardware used in construction and industrial applications.
- *Coating, engraving, heat treating, and allied activities:* This sector treats and manipulates various processed metallic goods. Additional activities include engraving metals and metal products.
- *Architectural and Structural Metals Manufacturing:* This sector prefabricates metal building and components used in construction and other industrial applications. Other work is related to plating and sheet metal manufacturing.

OTHER SIGNIFICANT MANUFACTURERS

In addition to the four largest manufacturing sectors, several other manufacturing sectors play a significant role in the LMR Corridor's economy. The following industries each employ at least 7,000 workers and have 300 establishments within the region.

- *Paper and Allied Products*: Concentrated around Memphis and Baton Rouge, this industry manufactures paperboard from wood pulp and other fiber pulp. Some of the by-products of the manufacturing process are used for energy in biomass plants.
- *Transportation Equipment*: Establishments in this sector manufacture equipment for the transportation of passengers and cargo by land, air, and water. Shipbuilding, concentrated primarily in Louisiana, and motor vehicle assembly, concentrated primarily in Mississippi, are the two largest sub-sectors in the corridor.

MANUFACTURERS USE OF THE LMR

Manufacturing enterprises rely on the LMR for a variety of services. Specifically, manufacturers use water from the LMR in production processing, for transportation of goods, and as a sink for discharge of wastewater.

- **Processing**: A variety of industries use river water as a key part of the manufacturing process. Collectively, LMR manufacturers used more than 2.7 billion gallons of surface water per day in 2005 (see Exhibit 5A-1).¹⁴⁹
- **Transportation**: Many manufacturers ship their products to distribution points along the river. For instance, Bunge North America uses the river to transport soybeans to its processing facility near Memphis and then ships finished soy products on the river to end-customers.
- **Discharge**: The LMR also receives discharges from manufacturers located along the river. Approximately 1,128 industrial facilities are permitted to discharge wastewater to rivers in the LMR Corridor (See Exhibit 10-5).

In addition, manufacturers have an interest in the quality of LMR water. Water that is too turbid can impair the efficiency of industrial processes such as heat exchange and filtration. Poor water quality may force manufacturers to perform expensive treatment on water before it can be used. Degraded water quality limits the river's ability to absorb and treat additional wastewater discharged from factories. As a result, business interruptions and increased costs can result from unreliable water supplies or degraded water quality.

¹⁴⁹ U.S. Geological Survey, *Water Use in the United States*, 2005, obtained from <http://water.usgs.gov/watuse/data/2005/index.html> on September 25, 2013.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

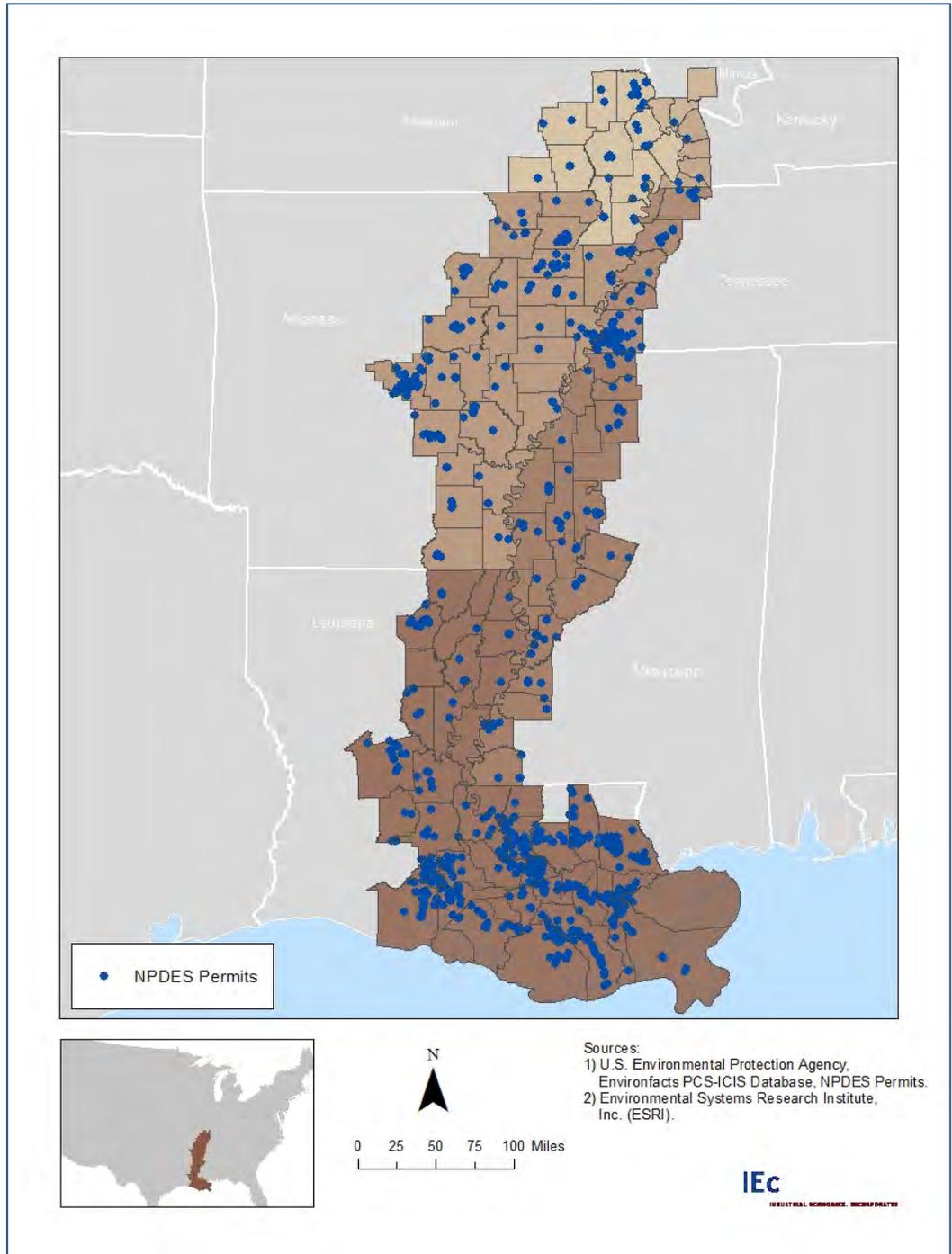
Under the National Pollutant Discharge Elimination System (NPDES) program, EPA sets pollutant-specific limits on the point source discharges for major industries and provides permits to individual point sources that apply to these limits. In total across the entire LMR Corridor, there are more than 18,000 active NPDES permits. Of these, approximately 1,100 are manufacturing facilities (see Exhibit 10-5).

Exhibit 10-5 presents the numbers of NPDES permits in the LMR Corridor in 2013. Exhibit 10-6 presents a map that shows the locations of each of these permits. NPDES Permit Areas are areas holding permits to discharge municipal and industrial wastes to surface water.

EXHIBIT 10-5. NUMBER OF MANUFACTURING NPDES PERMITS IN THE LMR CORRIDOR, 2013

STATE	NUMBER OF PERMITS
Arkansas	194
Illinois	1
Kentucky	4
Louisiana	734
Mississippi	37
Missouri	79
Tennessee	79
TOTAL LMR Region	1,128
Source: U.S. EPA ICIS National Pollution Discharge Elimination System Permit Database, 2013.	

EXHIBIT 10-6. NPDES MANUFACTURING PERMITS IN THE LMR CORRIDOR, 2013



DATA SOURCES AND METHODOLOGY

We define the manufacturing sector as those operations that fall within the North American Industry Classification System (NAICS) codes 31 through 33. Generically, manufacturing refers to the transformation of materials into new products. This process can occur at a variety of levels, from turning raw materials into intermediate products, to creating finished products. As a result, we include activities in the manufacturing sector that span from primary processing, such as mixing fertilizer, to high technology manufacturing, such as building computers. However, certain assembly activities are classified outside of the manufacturing code and under other sectors (e.g., the assembly and fabrication operations performed on site at construction facilities are classified under NAICS Code 23, construction).¹⁵⁰

We rely on a variety of information sources to characterize manufacturing in the LMR Corridor, including, primarily, the 2007 U.S. Economic Census report. To develop revenue and employment estimates, we use: (1) U.S. Economic Census Report, 2007; and (2) U.S. Department of Labor, Bureau of Labor Statistics employment reports.

¹⁵⁰ U.S. Census Bureau, North American Industry Classification System (NAICS) Definition, Sector 31-33 - Manufacturing, 2012.

CHAPTER 11 | NATURAL RESOURCE SERVICES NOT DIRECTLY REFLECTED IN THE MARKET ECONOMY

Ecosystems, including those of the LMR, provide an array of goods and services of value to people. For example, the LMR riparian vegetation filters nutrients and contaminants from stormwater runoff, thereby improving water quality. The LMR also sustains a large inland and coastal wetlands system. The Mississippi River batture, 2.8 million acres of active floodplain, is considered by the USGS “one of the most important, longest extent and least impacted wetland ecosystems in the southern United States.”¹⁵¹ Wetlands provide numerous ecosystem services ranging from flood control, by buffering storm waters, to climate stabilization, via carbon sequestration in soils and biomass. We refer to these goods and services collectively as “ecosystem services.” For many of these services, markets do not exist to provide measures of economic values. This chapter discusses the ecosystem services provided by the LMR that are not captured by the previously described nine economic sectors.

In this chapter, we describe some of the ecosystem services that the LMR produces and provide estimates of services that can be quantified. We also present the emerging opportunities for including ecosystem services into the market system.

ECOSYSTEM SERVICES IN THE LMR CORRIDOR

The LMR Corridor hosts a large variety of diverse ecosystems. Each of these ecosystems provides numerous services to humans. Despite scientific advances over the last decade, quantifying ecosystem services is still challenging and often impossible. Placement of economic value on these non-market services is also challenging. Here, we are focusing on selected categories of services provided by LMR ecosystems, chosen based on the availability of quantifiable information.

CLIMATE CHANGE MITIGATION

A major service provided by terrestrial ecosystems is their ability to mitigate climate change. Forests, grasslands, and wetlands play a major role in the carbon cycle by sequestering large amounts of carbon through photosynthesis and emitting it back to the atmosphere through respiration and decomposition. Carbon can be stored above ground in living biomass that includes grasses, trees, understory, and forest floor, as well as in dead biomass through coarse wood materials.

Research shows that soils also have great capacity to store carbon. In fact, the carbon pool in soil is 3.3 times larger than the atmospheric pool, and 4.5 times larger than all

¹⁵¹ USGS, Mississippi River Wetlands: Mapping the Batture Habitats. Accessed at:

<http://www.mvm.usace.army.mil/Portals/51/docs/missions/projects/LMRR/Reconnaissance%20Study/Appendix%20H.pdf>

terrestrial biotic pools.¹⁵² Plants are capable of transforming atmospheric carbon into organic carbon through the process of photosynthesis creating forms useful for plant growth. Organic carbon travels from the plant to the soil becoming a source of energy for the soil processes. Soil organic carbon (SOC) increases soil surface area which in turn increases its capacity to retain water and nutrients.¹⁵³ Therefore, there is an important feedback loop between soil sequestration and flood control.

There are 11 million acres of forested land in the LMR Corridor, both commercially harvested and managed for conservation (see Chapter 2).¹⁵⁴ The LMR forests store over 400 million tons of carbon above and below ground in living trees. Exhibit 11-1 shows the breakdown by state in the LMR region. This is an equivalent to one of the following:¹⁵⁵

- Annual greenhouse gas emissions from over 278 million passenger vehicles;
- CO₂ emissions from nearly 150 billion gallons of gasoline consumed; and
- CO₂ emissions from the electricity use of over 200 million homes for one year.

The amount of carbon held in forest land in the LMR is not static. For example, the harvest of trees can result in a change in carbon sequestration rate for a given forest. Similarly, planting of trees and the forest management techniques can be used to optimize the sequestration of carbon over a given area.

Carbon markets have been developed for purposes of managing carbon released into the atmosphere. These markets exist for some countries and economic sectors to comply with mandatory carbon regulations (e.g., the European Union's Emissions Trading Scheme); for example, businesses may trade carbon credits to minimize costs in meeting their emissions limits. In other cases, the markets support voluntary carbon reduction projects. For example, sellers, such as forest managers, may offer carbon sequestration services (e.g., reforestation land) by selling carbon offsets that businesses may purchase to mitigate emissions. Forest managers may also receive payments for ecosystem services from government incentive programs (e.g., the Conservation Reserve Program) and non-governmental organizations that reward carbon sequestration services achieved through afforestation or other forest management practices.

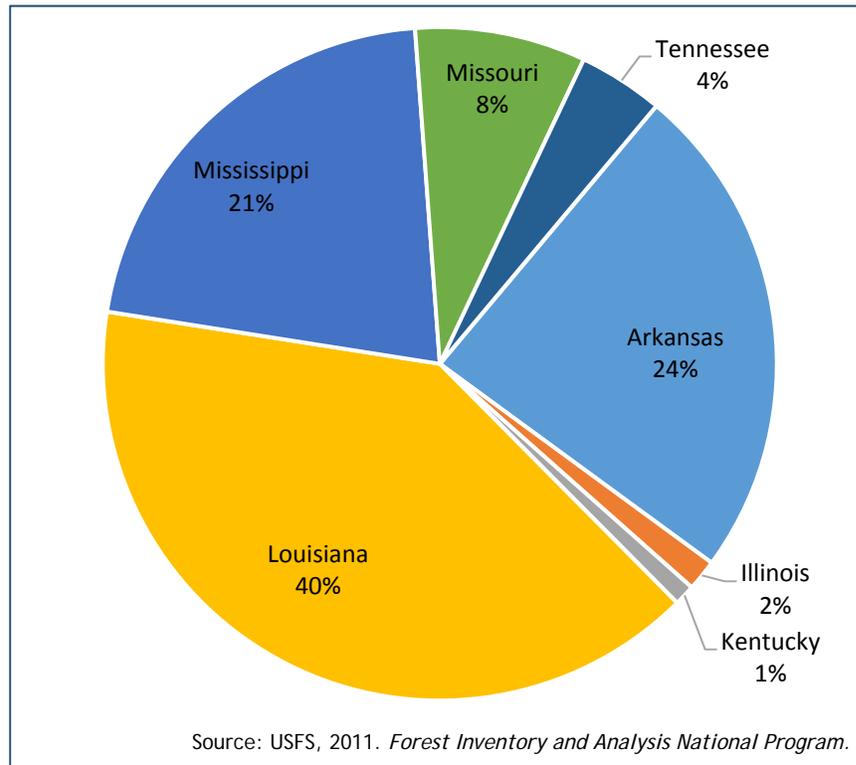
¹⁵² Formara and Tilman, 2008.

¹⁵³ Source: Fynn et al. 2010.

¹⁵⁴ Sources: USFS, 2011. *Forest Inventory and Analysis National Program*

¹⁵⁵ Source: USEPA Greenhouse Gas Equivalencies Calculator: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>

EXHIBIT 11-1. CARBON STORED IN LMR'S FORESTS



From an economic perspective, the value of carbon sequestration is the avoided social cost of carbon in the atmosphere (i.e., the value of a metric ton of carbon sequestered is equivalent to the avoided damage generated by that carbon if it were released into the atmosphere). Significant uncertainty surrounds the estimate of the social cost of carbon, however. In considering how the LMR may benefit from carbon sequestration services, one may reference the prices of carbon credits or offsets via the types of markets described above. These markets may take place through various exchange platforms, such as the European Climate Exchange and Regional Greenhouse Gas Initiative (RGGI). In 2012, the price per metric ton of carbon dioxide equivalent fluctuated around \$4.00 to \$8.00.¹⁵⁶

Carbon markets are still in their early development, however. Carbon credits cannot be considered uniform assets as currently no Federal regulations exist in the United States defining what constitutes an acceptable quality credit or offset. As a result, credit and offset providers require different management strategies for forests to generate carbon credits. Given this market fragmentation, it is not feasible to estimate how much of the LMR forested land may actually qualify for carbon credits, and at what value. Carbon

¹⁵⁶ The world-wide prices vary substantially. The range can be as low as \$0.1/tCO₂e (credits from the now-defunct Chicago Climate Exchange (CCX)) to more than \$120/tCO₂e for Japan-Verified Emissions Reduction (J-VER) credits.

Source: Ecosystem Marketplace: Forest Trends, 2013. "Maneuvering the Mosaic: State of the Voluntary Carbon Markets 2013."

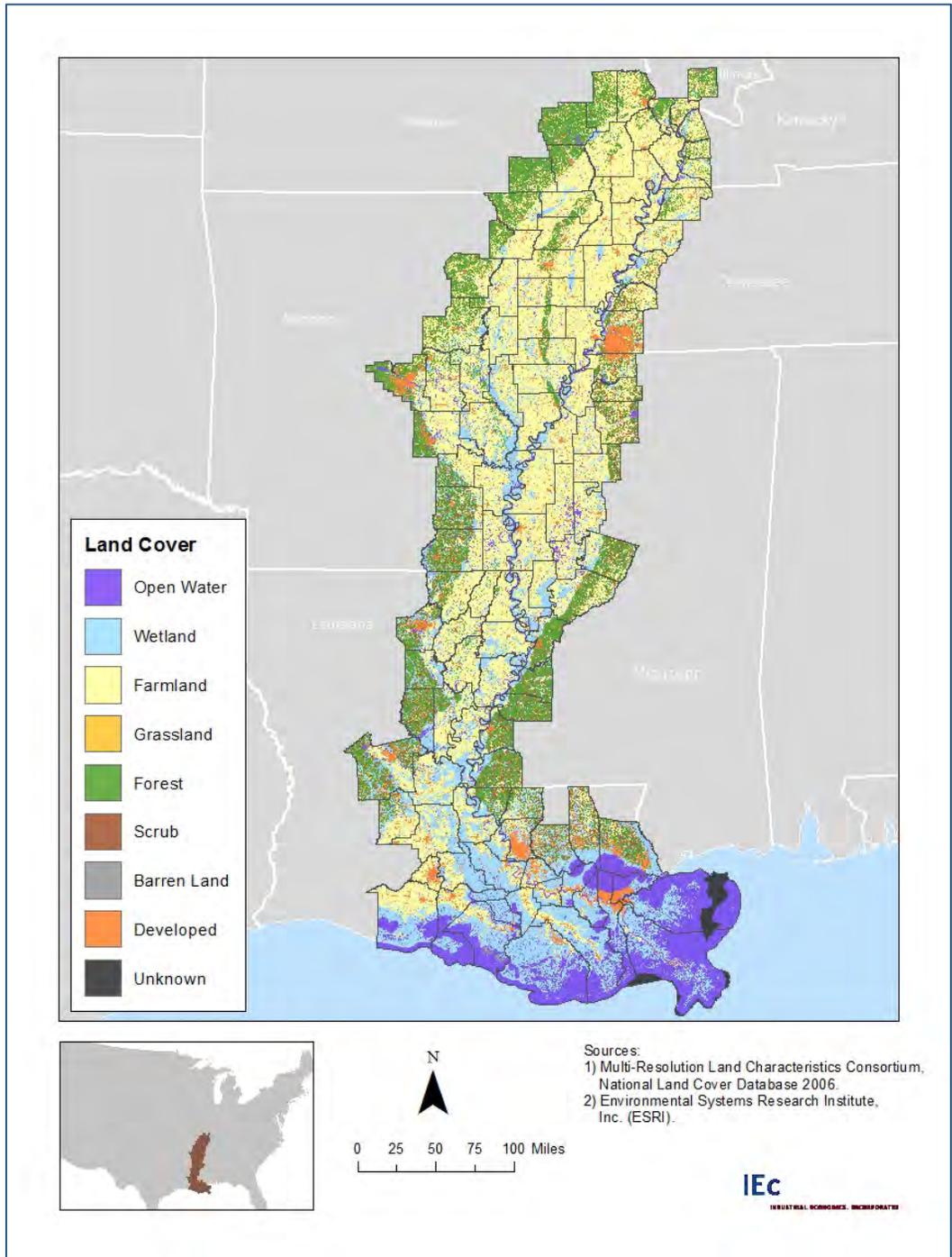
markets have experienced rapid growth and development over the last several years, however, and we expect the market will continue to develop allowing carbon sequestration and storage services to become part of total potential revenue calculations for the region.

www.green-trees.com

Over 60,000 acres of land in the Mississippi Alluvial Valley is currently under the management of Green Trees, a privately managed carbon reforestation company. These lands are comprised of both their cottonwood-hardwood interplanting land as well as hardwood only. Green Trees offers assistance to landowners who are interested in managing their land for carbon sequestration. Currently, they have two million tons of carbon credits under contract in Arkansas, Louisiana, and Mississippi. Their interplanting program involves planting 604 trees per acre: 302 fast growing native cottonwood trees along with 302 mixed hardwoods that tolerate high stem density and store more carbon. The cottonwood can be harvested three times within 25 years. The slower growing hardwoods require a longer rotation. Landowners can thin down to a specific basal area at years 35,45 and 55. This type of mixed forest with its species and structural (age) complexity produces numerous conservation benefits. For example, in addition to carbon sequestration, mixed forest provide resilient habitats for a variety of wildlife species. Landowners can derive income from a combination of timber harvest revenues and carbon credit revenues. Additionally, as trees grow, the landowners can expect a modest annual income of \$15.00 an acre from recreational uses of hunting. Gross carbon revenues from the cottonwood – hardwood interplanting varies from \$600-\$1,200 per acre in the first 15 years, depending on yield and market price.

Sources: Personal communication with Chandler Van Voorhis, co-founder of GreenTrees.

EXHIBIT 11-2. LAND COVER IN LMR



SERVICES PROVIDED BY LMR WETLANDS

The term wetlands encompasses a wide variety of ecosystems that share a dominant characteristic -- soil that is saturated or inundated with water. This water is supplied from either surface or groundwater aquifers in amounts that are sufficient to support vegetation adapted to grow in saturated soils.

The LMR has an extensive system of wetlands (see Exhibit 11-2) that vary from bottomland hardwood forests and oxbow lakes to cypress swamps and coastal marshes. The system includes some of most unique and threatened ecosystems in the nation.

The floodplain of the LMR was historically covered by much larger wetland areas. However, the highly productive alluvial soils led to large scale clearing of seasonally flooded forested wetlands in order to convert them into crop land. Between 1950 and 1976 one third of the wetland area was converted. Today, only 20 percent (or 4.9 million acres) of the forested wetlands remain in the Mississippi River Alluvial Plain.¹⁵⁷ These highly fragmented areas are located mostly in Arkansas, Louisiana, and Mississippi.

The Louisiana wetlands are particularly threatened. Between 1930 and 2010, Louisiana lost 1,883 square miles of coastal wetlands. In recent years, Louisiana accounts for 90 percent of the coastal wetlands loss in the continental United States. The rate of coastal land loss in Louisiana between 1985 and 2010 averaged 16.6 square miles per year, or a football field every hour.¹⁵⁸ The remaining marshes in coastal Louisiana represent 37 percent of all estuarine herbaceous marshes left in the continental U.S., making these areas some of the most threatened ecosystems in the country.¹⁵⁹ The causes of the observed losses are a combination of natural process and human induced impact. The natural process of the Mississippi River delta shifting its location among overlapping delta lobes causes deterioration of wetlands created around an abandoned delta and creation of new ones along the newly formed delta. The balance between losses and wetland building processes was disturbed when the LMR became confined by the levee system to control flooding and to allow safe navigation. The system of levees and regular dredging prevented the river from carrying its usual sediment load. Currently, the river carries about half of the sediment it used to transport during delta building conditions. The limited sediment meant less nourishment for the wetlands. Additionally, creating straight canals in support of navigation and mineral exploration led to higher speeds of tidal movements resulting in saltwater intrusion.¹⁶⁰ Finally, in recent years, episodic events, such as hurricanes and extreme storms, additionally contributed to coastal land loss.

¹⁵⁷ The Nature Conservancy. *The Mississippi Alluvial Plain. Fact Sheet*. Accessed at :

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/mississippi/placesweprotect/ms-delta-1.pdf>

¹⁵⁸ Couvillion et al. 2011.

¹⁵⁹ Couvillion et al. 2011.

¹⁶⁰ Coastal Wetlands Conservation and Restoration Task Force, "The 1997 Evaluation Report to the U.S. Congress on the Effectiveness of Louisiana Coastal Wetland Restoration Projects." 1997. Accessed at:

<http://lacoast.gov/reports/rtc/1997/5.htm>

The wetlands provide many critical services for the region. The coastal marshes serve as nurseries for numerous marine organisms, including many commercially important seafood species, such as shrimp (most valuable catch for commercial fishery: see Chapter 2).¹⁶¹ Continuous losses of the coastal wetlands will eventually impact revenues and employment in commercial fishing. According to some estimates, by 2040, the commercial and recreational catch may decline by 30 percent and affect 50,000 jobs in fishing, processing and wholesaling.¹⁶²

The coastal marshes and barrier islands also provide a physical barrier against strong winds and hurricanes. It is estimated that on average 2.7 miles of wetlands absorb one foot of storm surge. Between 60 and 70 percent of Louisiana's population lives within 50 miles of the shore. This means that the continuing decline of wetland areas puts 2 million people at an increased risk from storms and hurricanes.¹⁶³ Reduction on the coastal barrier provided by wetlands may also affect offshore oil and gas production, as the over 20,000 miles of pipelines buried on federal offshore lands may be periodically exposed as a result of storm surges.

Both coastal as well as inland wetlands also provide flood control. The scale of that protection depends on the size of the wetland area, type of vegetation and soil saturation before flooding, but on average one acre of wetlands is capable of storing three acre feet of water, which is equivalent to three million gallons.¹⁶⁴ Additionally, forested wetlands provide a natural barrier to flood waters slowing down their surge.

Wetlands also contribute to water quality by acting as 'sinks' that filter out pollutants. Sediments, nutrients, and propagules of plants and animals transported in watersheds accumulate in wetlands that absorb and process them. The LMR wetlands are particularly crucial in the LMR Corridor by providing denitrification and phosphorus removal services. This service of capturing a portion of the runoff fertilizer nutrients before they reach open water helps reduce hypoxia in the Gulf of Mexico.

Wetlands also have great carbon sequestration capacity. It is estimated that wetlands cover about six percent of the earth's surface, but their soil contributes 12 percent of the global carbon stock.¹⁶⁵

The importance of the ecosystem services provided by LMR wetlands led to numerous restoration initiatives in recent decades. The majority of wetlands remaining in the

¹⁶¹ Audubon Louisiana. "Mississippi River Delta Restoration." Accessed at: <http://la.audubon.org/mississippi-river-delta-restoration>

¹⁶² Restore or Retreat, "Coastal Erosion: Facts and Figures." Accessed at: http://www.restoreorretreat.org/la_erosion_facts.php

¹⁶³ Restore or Retreat, "Coastal Erosion: Facts and Figures." Accessed at: http://www.restoreorretreat.org/la_erosion_facts.php

¹⁶⁴ EPA, "Wetlands: Protecting Life and Property from Flooding" Fact Sheet. Accessed at: <http://water.epa.gov/type/wetlands/upload/flooding.pdf>

¹⁶⁵ Bridgham et al. 2006; IPCC, 2001; Ferrati, et al. 2005. This relationship may overestimate the LMR's wetlands potentials as carbon sinks, because the estimate includes carbon stored in peatlands. There are no peat-wetlands in the LMR corridor.

United States and in the LMR are privately owned. Therefore, providing appropriate incentives for private land owners to restore or maintain wetlands is essential to any major conservation efforts. For example, the Lower Mississippi River Conservation Committee (LMRCC) partnering with the Mississippi River Trust and the Natural Resources Conservation Service leads a major reforestation project in the batture that has about one million acres of contiguous forested wetlands.¹⁶⁶ The initial goal of the project is to reforest 40,000 acres of batture. In the first two years (2012 and 2013), there have been 10,000 acres signed up to be placed under easement and reforested.¹⁶⁷ Ducks Unlimited provides wetland mitigation credits where carbon credits can be obtained by private land owners for establishing and maintaining appropriate hydrological conditions.¹⁶⁸ In Arkansas, the Wetlands Reserve Program (ranked second in the U.S. based on enrollment) restored 215,000 acres of private land, including approximately 60,000 acres of shallow water habitat and about 140,000 acres of reforested lands.¹⁶⁹ The overall impact of the Wetlands Reserve Program in the LMR Corridor (not including the Kentucky-LMR counties) is a successful enrolment of 873,000 acres.

HABITAT SERVICES OF THE LMR CORRIDOR

The diverse set of LMR ecosystems, ranging from uplands to the waters of the Gulf of Mexico provide habitats for a large variety of species. The LMR itself supports a rich fish and invertebrate fauna that includes several threatened and endangered species. For example, LMR waters are home to the pallid sturgeon and several rare species of mussels. Estuaries and wetlands are nurseries for many young fish and shellfish, as well as habitat for the American alligator. LMR wetlands are also home to unique flora, including species such as cattails, swamp rose, spider lilies, and cypress trees. The LMR Corridor provides habitat to numerous terrestrial rare species, such as the Louisiana black bear. The LMR Corridor also provides habitat for the core of the world's breeding population of the interior least tern. The tern, listed as endangered by the U.S. Fish and Wildlife Service, requires specialized conditions for its breeding grounds that include open beaches, free of vegetation – the very conditions offered along the LMR.¹⁷⁰

Finally, the LMR Corridor is located along the Mississippi Flyway that provides places for numerous neotropical migratory songbirds to rest and feed. It is estimated that LMR

¹⁶⁶ LMRCC, Lower Mississippi River Batture Reforestation. Accessed at: <http://www.lmrcc.org/programs/lower-mississippi-river-batture-reforestation/>

¹⁶⁷ Sources: personal communication with Bruce Reid, LMRCC on January 11, 2014.

¹⁶⁸ Ducks Unlimited, "DU wetland mitigation." Accessed at: <http://www.ducks.org/conservation/du-wetland-mitigation>

¹⁶⁹ USDA, Natural Resources Conservation Service, Arkansas, "Wetlands Reserve Program," <http://www.nrcs.usda.gov/wps/portal/nrcs/main/ar/programs/easements/wetlands/>

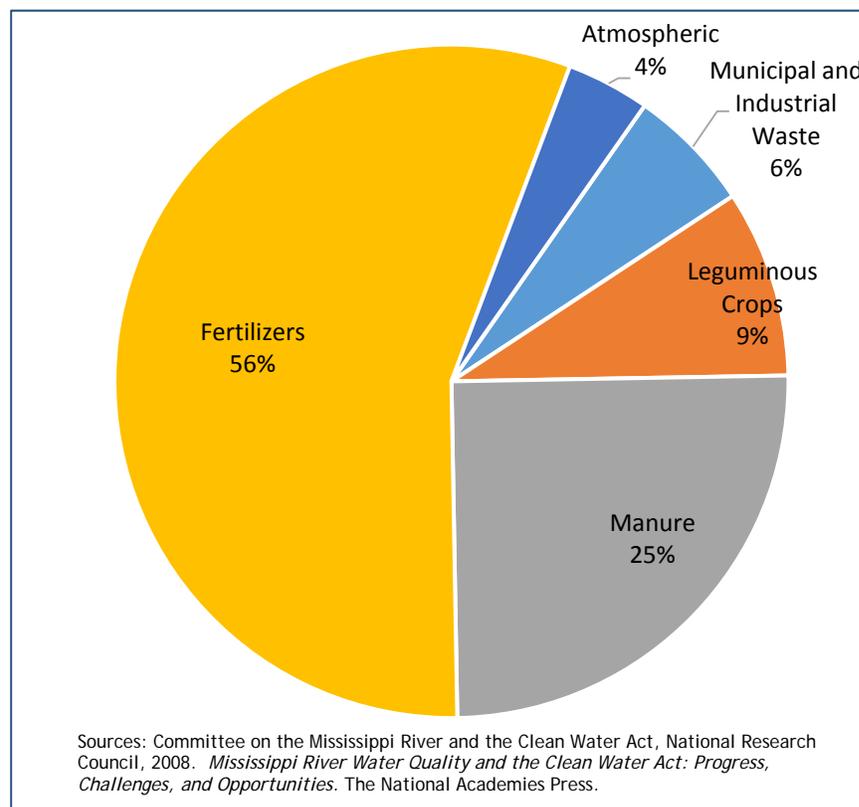
¹⁷⁰ American Bird Conservancy. "Interior Least Tern." Accessed at: http://www.abcbirds.org/abcp/programs/domestic/Interior_LeastTern.html

ecosystems in Louisiana alone supports 100 million migratory, nesting and wintering birds, including gadwall, green-winged teal, northern shoveler, and snow geese¹⁷¹

WASTEWATER TREATMENT, WATER POLLUTION AND HYPOXIA

One of the longest recognized ecosystem services provided by rivers is their ability to dilute and treat waste. However, the assimilative capacity of even the largest water bodies is limited. The Clean Water Act places limits on pollution from point sources, including municipalities and industrial facilities (see Chapter 5). Nonpoint source pollution is difficult to regulate due to its dispersed nature. Nonpoint sources include runoff from agricultural lands, as well as stormwater from roads, construction, and surface mines.

EXHIBIT 11-3. SOURCES OF NITROGEN IN MISSISSIPPI RIVER



The LMR Corridor has a large agricultural sector (see Chapter 6), where widespread use of herbicides and fertilizers lead to runoff. In fact, 81 percent of nitrogen in the river is from agricultural runoff, while municipal and industrial waste accounts for six percent. High levels of nitrogen and phosphorus leads to increased seasonal algae growth. The algae absorb oxygen when decomposing. When the levels of dissolved oxygen

¹⁷¹ Audubon Louisiana. "Mississippi River Delta Restoration." Accessed at: <http://la.audubon.org/mississippi-river-delta-restoration>

concentration in water fall below two parts per million, aquatic life cannot be sustained and hypoxic, or ‘dead’ zones, can be created. The largest hypoxic zone in the U.S. and second largest in the world is in the Gulf of Mexico along the Louisiana and Texas shore.¹⁷² In 2013, the hypoxic zone covered 5,850 square miles, which is an area comparable to the state of Connecticut.¹⁷³ Estimating the economic impacts of hypoxia on the Gulf of Mexico is difficult. A number of researchers are attempting to link hypoxia to changes in commercial fish catch.¹⁷⁴ To address issues of environmental and economic impacts of hypoxia in the Gulf, a large research project was established in September 2013 with Florida State University, Duke University and the National Marine Fisheries Service.¹⁷⁵

There are several other efforts underway to study the impacts of hypoxia. For example, one study assessed the technical and economic feasibility of large-scale interstate nutrient trading in the Mississippi River Basin (MRB) to address hypoxia in the Gulf of Mexico.¹⁷⁶ The proposed nutrient trading scheme is based on the same principles as described earlier for carbon markets. The study examines the cost-effectiveness of using trading of total nitrogen and phosphorus credits to reach nutrient load reduction targets to limit the Gulf’s hypoxia. The study concludes that such a trading scheme has potential to be cost effective, with the exact scale of profitability depending on details of the trading scenario. Potential for profit making from implementation of conservation strategies in agricultural production and from sale of credits ranges from \$12.00 to \$33.00 per acre. The study also shows potential for cost savings on the part of utilities involved in trading. The estimated numbers depend heavily on numerous assumptions made in the analyzed scenarios, yet they provide encouraging results for further work on nutrient trading schemes.

¹⁷² Louisiana Universities Marine Consortium, “Hypoxia in the Northern Gulf of Mexico.” Accessed at: <http://www.gulfhypoxia.net/>

¹⁷³ USGS, 2013. “Nitrate Levels Continue to Increase in Mississippi River; Signs of Progress in the Illinois River” Accessed at: <http://www.usgs.gov/newsroom/article.asp?ID=3715&from=rss#.UoPmefmsim4>

¹⁷⁴ For example, O’Connor, Thomas and David Whitehall. “Linking hypoxia to shrimp catch in the northern Gulf of Mexico.” *Marine Pollution Bulletin*, Volume 54, April 2007, page 460-463.

¹⁷⁵ Florida State 24/7. *FSU, Duke Partner to Study Impact of Gulf’s “Dead Zone” on Shrimp Fishery*. October 20, 2009. Accessed at: <http://news.fsu.edu/More-FSU-News/News-Archive/2009/October/FSU-Duke-Partner-to-Study-Impact-of-Gulf-s-Dead-Zone-on-Shrimp-Fishery>

¹⁷⁶ Perez, Walker and Jones, 2012. Accessed at: http://pdf.wri.org/nutrient_trading_in_mrb_feasibility_study.pdf

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APPENDIX A - ADDITIONAL TABLES

EXHIBIT 1A-1. LIST OF COUNTIES IN THE LMR CORRIDOR

STATE	COUNTY			
Arkansas	Arkansas	Desha	Lee	Prairie
	Ashley	Drew	Lincoln	Pulaski
	Chicot	Greene	Lonoke	Randolph
	Clay	Independence	Mississippi	St. Francis
	Craighead	Jackson	Monroe	White
	Crittenden	Jefferson	Phillips	Woodruff
	Cross	Lawrence	Poinsett	
Illinois	Alexander	Johnson	Pulaski	
Kentucky	Ballard	Carlisle	Fulton	Hickman
Louisiana	Ascension	Iberia	Plaquemines	Mary St.
	Assumption	Iberville	Pointe	Tammany
	Avoyelles	Jefferson	Coupee	Tangipahoa
	Caldwell	La Salle	Rapides	Tensas
	Catahoula	Lafayette	Richland	Terrebonne
	Concordia	Lafourche	St. Bernard	Vermilion
	East Baton Rouge	Livingston	St. Charles	West Baton Rouge
	East Carroll	Madison	St. James	West Carroll
	East Feliciana	Morehouse	St. John the Baptist	West Feliciana
	Evangeline	Orleans	St. Landry	
	Franklin	Ouachita	St. Martin St.	
Mississippi	Adams	Humphreys	Sharkey	Washington
	Bolivar	Issaquena	Sunflower	Wilkinson
	Claiborne	Jefferson	Tallahatchie	Yazoo
	Coahoma	Leflore	Tate	
	DeSoto	Panola	Tunica	
	Holmes	Quitman	Warren	
Missouri	Bollinger	Dunklin	Pemiscot	Stoddard
	Butler	Mississippi	Ripley	Wayne
	Cape Girardeau	New Madrid	Scott	
Tennessee	Dyer	Lauderdale	Shelby	
	Lake	Obion	Tipton	

EXHIBIT 2A-1. NATURAL RESOURCE HARVEST SIZE, REVENUES (\$1,000S) AND EMPLOYMENT IN THE LMR CORRIDOR, 2011

NATURAL RESOURCE	HARVEST	REVENUES (\$1,000)	EMPLOYMENT ¹
Timber (ft ³)	375,030,000	\$290,263	1,345
Fresh water fishing (lbs.)	19,594,226	\$13,254	N/A
Marine fishing (lbs.)	1,015,560,575	\$245,347	12,381
Alligator hunting (skins)	28,000 to 35,000	\$9,582	N/A
Trapping	N/A	\$667	N/A
Total	N/A	\$559,113	13,726

Note: 1-Marine fishing employment data are from 2009.

Sources: Timber Harvest and Revenues Data - U.S. Forest Service, Forest Inventory and Analysis National Program, Harvest Volumes (TOPs reports) and prices from Southern and Northern Region Research Center. Additional prices from: Mississippi State University, Extension Service; Louisiana Department of Agriculture and Forestry; Kentucky Division of Forestry, Growing Gold Publication; Tennessee Department of Agriculture, Forest Products Bulletin; and University of Arkansas, Department of Agriculture, Arkansas Timber Reports. Fishing Harvest and Revenues Data - Louisiana State University, Agricultural Center, 2012 Parish Totals. Trapping Revenues Data - Arkansas Game and Fish Commission, 2011 Furbearing Animal Report; Association of Fish and Wildlife Agencies, US Fur Harvest Report; Mississippi Dept. of Wildlife Trapper Harvest Estimates; Missouri Department of Conservation, 2011 Furbearer Program Annual Report; Kentucky Department of Fish and Wildlife Resources, Telecheck Results. Timber Employment - BLS 2011 Quarterly Census of Employment and Wages. Fishing Employment - NOAA National Marine Fisheries Service, 2009 Economic Impacts of the Louisiana Seafood Industry.

EXHIBIT 2A-2. FORESTED LAND (ACRES) AND MAJOR TREE SPECIES IN THE LMR CORRIDOR, 2011

STATE	FORESTED LAND (ACRES)	PERCENT OF STATE FORESTED LAND IN LMR	MAJOR TREE SPECIES
Arkansas	3,864,578	31	loblolly/shortleaf pine oak/pine oak/hickory oak/gum/cypress elm/ash/cottonwood
Illinois	199,354	40	oaks/hickory elm/ash/cottonwood oak/pine
Kentucky	129,340	23	oaks/hickory elm/ash/cottonwood
Louisiana	6,506,252	42	oak/hickory oak/gum/cypress elm/ash/cottonwood loblolly/shortleaf pine
Mississippi	3,347,766	43	oaks/hickory elm/ash/cottonwood oak/pine
Missouri	1,278,801	30	oak/hickory elm/ash/cottonwood oak/pine loblolly/shortleaf pine oak/gum/cypress
Tennessee	467,311	25	oak/hickory oak/gum/cypress elm/ash/cottonwood
Total LMR Corridor	15,793,402	47	

Source: U.S. Forest Service, Forest Inventory and Analysis National Program, Forest Inventory Data Online (FIDO). TOPs Reports from Southern and Northern Region Research Center.

EXHIBIT 2A-3. TIMBER HARVEST QUANTITY (THOUSAND CUBIC FEET) AND REVENUES (\$1,000S) IN THE LMR CORRIDOR, 2011

STATE	TIMBER HARVEST (1,000 CUBIC FEET)			REVENUES ¹ (\$1,000)
	ALL	SOFTWOOD	HARDWOOD	
Arkansas	98,623	59,866	38,757	\$81,375
Illinois	Not Available	Not Available	Not Available	Not Available
Kentucky	5,112	95	5,017	\$4,204
Louisiana	187,980	136,372	51,608	\$122,921
Mississippi	73,309	31,343	41,966	\$61,681
Missouri	4,289	206	4,083	\$12,078
Tennessee	5,717	1,375	4,342	\$8,003
Total LMR Corridor	375,030	229,257	145,773	\$290,263

Note: 1-Revenues were calculated using "stumpage" prices.
Sources: U.S. Forest Service, Forest Inventory and Analysis National Program, Harvest Volumes (TOPs reports) and prices from Southern and Northern Region Research Center. Additional prices from: Mississippi State University, Extension Service; Louisiana Department of Agriculture and Forestry; Kentucky Division of Forestry, Growing Gold Publication; Tennessee Department of Agriculture, Forest Products Bulletin; and University of Arkansas, Department of Agriculture, Arkansas Timber Reports.

EXHIBIT 2A-4. MARINE FINFISH, SHRIMP, AND CRAB LANDINGS (POUNDS) AND EX-VESSEL VALUES (REVENUES, \$1,000S) IN THE LMR CORRIDOR, 2011

SPECIES	LANDING (POUNDS)	EX-VESSEL VALUE (REVENUES) (\$1,000)
Shrimp	84,818,594	\$124,550
Crabs	41,554,876	\$34,548
Finfish	889,187,105	\$86,249
Total	1,015,560,575	\$245,346,735

Source: Louisiana State University, Agricultural Center, 2012 Parish Totals report.

EXHIBIT 3A-1. WILDLIFE-BASED OUTDOOR RECREATIONAL TRIPS (THOUSAND) IN THE LMR CORRIDOR BY RECREATIONAL CATEGORY, 2011

STATE	WILDLIFE BASED RECREATIONAL TRIPS (1,000)			
	FISHING	HUNTING	WILDLIFE WATCHING	TOTAL
Arkansas	3,811	2,267	160	6,238
Illinois	117	187	437	741
Kentucky	694	210	51	955
Louisiana	14,937	2,904	1,416	19,257
Mississippi	1,838	1,900	381	4,119
Missouri	1,472	457	1,311	3,240
Tennessee	2,297	434	405	3,136
Total LMR Corridor	25,167	8,358	4,161	37,686

Source: U.S. Fish and Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

EXHIBIT 3A-2. AVERAGE PER-TRIP EXPENDITURES IN THE LMR CORRIDOR BY RECREATIONAL CATEGORY, 2011

STATE	AVERAGE PER TRIP EXPENDITURES		
	FISHING	HUNTING	WILDLIFE WATCHING
Arkansas	\$39	\$34	\$33
Illinois	\$35	\$38	\$39
Kentucky	\$29	\$25	\$48
Louisiana	\$31	\$42	\$95
Mississippi	\$40	\$33	\$38
Missouri	\$29	\$40	\$22
Tennessee	\$17	\$20	\$83
Total LMR Corridor	\$30	\$32	\$48

Source: U.S. Fish and Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

EXHIBIT 3A-3. OUTDOOR RECREATIONAL TRIP EXPENDITURES (\$1,000S) IN THE LMR CORRIDOR BY RECREATIONAL CATEGORY, 2011

STATE	TRIP EXPENDITURES (\$1,000)			
	FISHING	HUNTING	WILDLIFE WATCHING	TOTAL
Arkansas	\$148,976	\$77,620	\$5,205	\$231,801
Illinois	\$4,059	\$7,021	\$17,099	\$28,179
Kentucky	\$20,393	\$5,219	\$2,458	\$28,071
Louisiana	\$467,015	\$123,309	\$134,065	\$724,388
Mississippi	\$73,390	\$63,466	\$14,630	\$151,486
Missouri	\$42,606	\$18,119	\$28,786	\$89,510
Tennessee	\$39,035	\$8,634	\$33,485	\$81,155
Total LMR Corridor	\$795,242	\$303,387	\$235,728	\$1,334,589

Source: U.S. Fish and Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

EXHIBIT 3A-4. ESTIMATED OUTDOOR RECREATIONAL EXPENDITURES (\$1,000S) AND EMPLOYMENT IN THE LMR CORRIDOR, 2011

STATE	EMPLOYMENT	RECREATIONAL EXPENDITURES (\$1,000)		
		TRIP	NON-TRIP	TOTAL
Arkansas	8,156	\$231,801	\$267,496	\$499,297
Illinois	2,923	\$28,179	\$148,068	\$176,247
Kentucky	1,726	\$28,071	\$67,858	\$95,929
Louisiana	23,535	\$724,388	\$593,229	\$1,317,617
Mississippi	9,847	\$151,486	\$264,363	\$415,849
Missouri	4,264	\$89,510	\$166,911	\$256,421
Tennessee	4,024	\$81,155	\$159,308	\$240,463
Total LMR Corridor	54,476	\$1,334,589	\$1,667,231	\$3,001,823

Notes: 1 - Totals will not sum as some expenditures were not classified as trip or non-trip expenditures.
Source: U.S. Fish and Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

EXHIBIT 4A-1. NATIONAL HISTORIC LANDMARKS IN THE LMR CORRIDOR

STATE	COUNTY	NATIONAL HISTORIC LANDMARKS
Arkansas	Arkansas	Menard-Hodges Site
	Cross	Arkansas Post
	Cross	Parkin Indian Mound
	Desha	Rohwer Relocation Center Memorial Cemetery
	Lonoke	Toltec Mounds Site
	Mississippi	Eaker Site
	Mississippi	Nodena Site
	Monroe	Beginning Point Of The Louisiana Purchase Land Survey
	Phillips	Beginning Point Of The Louisiana Purchase Land Survey
	Phillips	Centennial Baptist Church
	Pulaski	Bates, Daisy House
	Pulaski	Camden Expedition Sites
	Pulaski	Little Rock Central High School
	Pulaski	Old State House
Pulaski	Robinson, Joseph Taylor, House	
Louisiana	Assumption	Madewood Plantation House
	Avoyelles	Marksville Prehistoric Indian Site
	East Baton Rouge	Kidd (Uss)
	East Baton Rouge	Louisiana State Capitol
	East Baton Rouge	Old Louisiana State Capitol
	East Feliciana	Courthouse, The, And Lawyers' Row
	East Feliciana	Port Hudson
	Iberia	Shadows-On-The-Teche
	Lafourche	White, Edward Douglass, House
	Orleans	Cabildo, The
	Orleans	Cable, George Washington, House
	Orleans	Cabot (Uss) Relocated To Texas
	Orleans	Delta Queen (River Steamboat) Relocated To Tennessee
	Orleans	Deluge (Fire Fighting Tug)
	Orleans	Dillard, James H., Home
	Orleans	Gallier Hall
	Orleans	Gallier House
	Orleans	Garden District
	Orleans	Hermann-Grima House
	Orleans	Jackson Square
	Orleans	Lafitte's Blacksmith Shop
	Orleans	Longue Vue House And Gardens
	Orleans	Louisiana State Bank Building
	Orleans	Madame John's Legacy
	Orleans	Mayor Girod House
	Orleans	New Orleans Cotton Exchange Building
	Orleans	Pontalba Buildings
	Orleans	Presbytere, The
	Orleans	St. Alphonsus Church
	Orleans	St. Mary's Assumption Church
Orleans	St. Patrick's Church	

STATE	COUNTY	NATIONAL HISTORIC LANDMARKS
	Orleans	United States Customhouse
	Orleans	United States Mint, New Orleans Branch
	Orleans	Ursuline Convent
	Orleans	Vieux Carre Historic District
	Plaquemines	Fort De La Boulaye
	Plaquemines	Fort Jackson
	Plaquemines	Fort St. Philip
	Pointe Coupee	Parlange Plantation House
	St. Charles	Homeplace Plantation House
	St. James	Oak Alley Plantation
	St. John The Baptist	Evergreen Plantation
	St. John The Baptist	San Francisco Plantation House
	St. Martin	Acadian House
	West Carroll	Poverty Point
	West Feliciana	Rosedown Plantation
Mississippi	Adams	Anna Site
	Adams	Arlington
	Adams	Auburn
	Adams	Commercial Bank And Banker's House
	Adams	Dunleith
	Adams	Emerald Mound Site
	Adams	Grand Village Of The Natchez
	Adams	House On Ellicott's Hill
	Adams	Longwood
	Adams	Melrose
	Adams	Monmouth
	Adams	Rosalie
	Adams	Stanton Hall
	Alcorn	Siege And Battle Of Corinth Sites
	Bolivar	Montgomery, I. T., House
	Claiborne	Oakland Memorial Chapel
	Claiborne	Port Gibson Battle Site
	Humphreys	Jaketown Site
	Monroe	Hester Site
	Warren	Fort St. Pierre Site
Washington	Winterville Site	
Yazoo	Holly Bluff Site	
Tennessee	Lauderdale	Fort Pillow
	Shelby	Beale Street Historic District
	Shelby	Chucalissa Site
	Shelby	Graceland (Home Of Elvis Presley)
	Shelby	Sun Record Company

Source: National Park Service, List of National Historic Landmarks, Last Updated: June 2013.

EXHIBIT 5A-1. SURFACE WATER WITHDRAWALS (MILLION GALLONS PER DAY) IN THE LMR CORRIDOR BY SECTOR, 2005

STATE	SURFACE WATER WITHDRAWALS (MGD)					
	PUBLIC SUPPLY	INDUSTRIAL	ELECTRIC POWER	MINING	FARMING & IRRIGATION	TOTAL
Arkansas	60	95	94	1	1,363	1,613
Illinois	2	0	0	1	0	3
Kentucky	0	0	0	0	2	2
Louisiana	294	2,622	5,370	14	311	8,612
Mississippi	0	8	239	0	92	340
Missouri	7	3	789	1	16	815
Tennessee	0	0	406	1	11	418
Total LMR Corridor	362	2,728	6,899	17	1,796	11,802
Percent of Total	3.1%	23.1%	58.5%	0.1%	15.2%	100.0%

Source: U.S. Geological Survey, Estimated Use of Water in the United States in 2005.

EXHIBIT 5A-2. GROUND WATER WITHDRAWALS (MILLION GALLONS PER DAY) IN THE LMR CORRIDOR BY SECTOR, 2005

STATE	GROUND WATER WITHDRAWALS (MGD)						
	PUBLIC SUPPLY	DOMESTIC	INDUSTRIAL	ELECTRIC POWER	MINING	FARMING & IRRIGATION	TOTAL
Arkansas	99	4	55	0	0	7,208	7,367
Illinois	1	1	0	0	0	4	7
Kentucky	2	0	7	0	0	0	10
Louisiana	256	29	168	12	100	492	1,057
Mississippi	78	10	16	28	3	1,658	1,792
Missouri	29	5	8	7	2	1,276	1,328
Tennessee	207	1	34	0	0	13	254
Total LMR Corridor	672	49	287	48	106	10,651	11,814
Percent of Total	5.7%	0.4%	2.4%	0.4%	0.9%	90.2%	100.0%

Source: U.S. Geological Survey, Estimated Use of Water in the United States in 2005.

EXHIBIT 6A-1. FARMLAND (ACRES) AND FARMS IN THE LMR CORRIDOR, 2007

STATE	NUMBER OF FARMS	EMPLOYMENT	LAND IN FARMS (ACRES)	FARMLAND VALUE (\$1,000)
Mississippi	14,862	15,738	7,886,839	\$18,013,450
Louisiana	987	314	249,314	\$736,660
Tennessee	1,385	1,039	427,078	\$1,142,616
Arkansas	18,980	20,837	5,383,824	\$11,806,339
Kentucky	7,524	10,303	4,631,211	\$8,747,182
Missouri	6,639	5,584	2,968,814	\$7,383,216
Illinois	3,148	2,287	1,029,271	\$3,002,857
Total LMR Corridor	53,525	56,102	22,576,351	\$50,832,320

Source: U.S. Department of Agriculture, 2007 Census of Agriculture.

EXHIBIT 6A-2. AGRICULTURAL REVENUES (\$1,000S IN 2011) IN THE LMR CORRIDOR

STATE	REVENUES (\$1,000)			
	CROPS	LIVESTOCK	AQUACULTURE	ALL PRODUCTS
Mississippi	\$1,372,080	\$77,458	\$187,332	\$1,668,803
Louisiana	\$1,479,540	\$212,841	\$99,211	\$1,786,883
Tennessee	\$259,447	\$40,594	\$0	\$300,042
Arkansas	\$2,940,913	\$469,072	\$101,276	\$3,511,259
Kentucky	\$122,794	\$180,011	\$42	\$302,847
Missouri	\$949,668	\$167,767	\$0	\$1,107,362
Illinois	\$50,779	\$8,747	\$0	\$59,525
Total LMR Corridor	\$7,175,221	\$1,156,490	\$387,861	\$8,736,722

Note: Revenues are reported in \$2011.
Source: U.S. Department of Agriculture, 2007 Census of Agriculture.

EXHIBIT 6A-3. AGRICULTURAL CROP REVENUES (\$1,000S IN 2011) IN THE LMR CORRIDOR

STATE	REVENUES (\$1,000)							
	COTTON	SOYBEANS	CORN	WHEAT	RICE	OTHER GRAINS	OTHER CROPS	ALL CROPS
Mississippi	\$300,046	\$377,834	\$381,529	\$66,943	\$143,284	\$52,233	\$50,211	\$1,372,080
Louisiana	\$168,633	\$165,079	\$332,963	\$31,968	\$119,132	\$82,261	\$579,503	\$1,479,540
Tennessee	\$39,649	\$72,177	\$85,580	\$12,236	\$0	\$7,143	\$42,661	\$259,447
Arkansas	\$492,746	\$812,850	\$353,030	\$110,202	\$1,002,188	\$85,553	\$84,344	\$2,940,913
Kentucky	\$0	\$38,967	\$70,195	\$2,662	\$0	\$6,516	\$4,454	\$122,794
Missouri	\$176,709	\$231,872	\$292,246	\$45,804	\$123,029	\$14,547	\$65,462	\$949,668
Illinois	\$0	\$20,964	\$23,746	\$2,337	\$0	\$1,733	\$1,999	\$50,779
Total LMR Corridor	\$1,177,782	\$1,719,743	\$1,539,289	\$272,152	\$1,387,633	\$249,987	\$828,634	\$7,175,221

Note: Revenues are reported in \$2011.
Source: U.S. Department of Agriculture, 2007 Census of Agriculture.

EXHIBIT 6A-4. AGRICULTURAL LIVESTOCK REVENUES (\$1,000S IN 2011) IN THE LMR CORRIDOR

STATE	REVENUES (\$1,000)					
	DAIRY	HOGS	CATTLE	POULTRY	OTHER LIVESTOCK	ALL LIVESTOCK
Mississippi	\$97	\$43	\$43,209	\$17,390	\$16,718	\$77,458
Louisiana	\$39,002	\$495	\$120,784	\$13,025	\$39,536	\$212,841
Tennessee	\$0	\$150	\$14,332	\$21,799	\$4,314	\$40,594
Arkansas	\$4,712	\$443	\$97,584	\$323,891	\$42,442	\$469,072
Kentucky	\$2,033	\$6,048	\$4,807	\$164,777	\$2,347	\$180,011
Missouri	\$6,794	\$1,567	\$44,164	\$89,217	\$26,025	\$167,767
Illinois	\$329	\$1,557	\$1,679	\$13	\$5,168	\$8,747
Total LMR Corridor	\$52,968	\$10,303	\$326,560	\$630,111	\$136,549	\$1,156,490

Note: Revenues are reported in \$2011.
Source: U.S. Department of Agriculture, 2007 Census of Agriculture.

EXHIBIT 6A-5. AQUACULTURE REVENUES (\$1,000S IN 2011) IN THE LMR CORRIDOR

STATE	REVENUES (\$1,000)					
	BAITFISH	CATFISH	CRUSTACEANS	MOLLUSKS	OTHER PRODUCTS	AQUACULTURE TOTAL
Mississippi	\$0	\$185,323	\$85	\$0	\$0	\$187,332
Louisiana	\$12	\$10,539	\$8,692	\$40,090	\$20,900	\$99,211
Tennessee	\$0	\$0	\$0	\$0	\$0	\$0
Arkansas	\$22,989	\$67,337	\$52	\$0	\$1,641	\$101,276
Kentucky	\$0	\$42	\$0	\$0	\$0	\$42
Missouri	\$0	\$0	\$0	\$0	\$0	\$0
Illinois	\$0	\$0	\$0	\$0	\$0	\$0
Total LMR Corridor	\$23,001	\$263,240	\$8,829	\$40,090	\$21,581	\$387,861

Note: Revenues are reported in \$2011.

Source: U.S. Department of Agriculture, 2007 Census of Agriculture.

EXHIBIT 7A-1. OIL AND GAS PRODUCTION (BARRELS, THOUSAND CUBIC FEET) AND ESTIMATED REVENUES (\$1,000S) IN THE LMR CORRIDOR, 2011

STATE	COUNTY	NUMBER OF WELLS	CRUDE OIL (BARRELS)	NATURAL GAS (MCF)	REVENUES (\$1,000)	
Louisiana	Ascension	778	46,954	120,579	\$5,484	
	Assumption	1,214	350,624	6,327,491	\$64,011	
	Avoyelles	1,199	169,259	50,113	\$18,195	
	Caldwell	1,817	52	1,740,130	\$7,291	
	Catahoula	3,637	234,694	32,082	\$25,068	
	Concordia	5,674	385,300	257,984	\$42,211	
	East Baton Rouge	769	528,228	3,928,024	\$72,538	
	East Carroll	158	Not Available	Not Available	Not Available	
	East Feliciana	175	21,887	241,116	\$3,385	
	Evangeline	1,534	1,632,974	7,825,620	\$207,021	
	Franklin	946	30,373	4,216	\$3,262	
	Iberia	3,998	2,687,542	43,511,720	\$468,153	
	Iberville	2,777	591,824	1,252,852	\$67,933	
	Jefferson	3,027	1,457,307	10,047,871	\$197,572	
	Lafayette	947	359,240	4,853,597	\$58,700	
	Lafourche	9,531	6,821,748	37,742,414	\$886,551	
	La Salle	10,211	2,551,173	8,475,221	\$307,197	
	Livingston	443	996,398	490,339	\$107,894	
	Madison	306	166	0	\$18	
	Morehouse	2,865	250	665,609	\$2,851	
	Orleans	134	0	17,773	\$77	
	Ouachita	4,013	24,995	3,298,257	\$16,683	
	Plaquemines	17,624	16,309,452	70,706,253	\$2,036,169	
	Pointe Coupee	1,130	588,880	21,856,543	\$155,256	
	Rapides	1,344	217,760	724,976	\$26,291	
	Richland	2,480	1,322,986	67,499	\$142,049	
	St. Bernard	1,763	586,330	5,762,830	\$87,242	
	St. Charles	1,719	592,666	4,318,384	\$81,434	
	St. James	662	66,366	939,077	\$11,028	
	St. John the Baptist	298	30,318	52,455	\$3,460	
	St. Landry	2,715	437,389	1,470,146	\$52,770	
	St. Martin	3,976	814,500	2,265,730	\$96,100	
	St. Mary	5,890	3,062,359	51,397,902	\$542,614	
	St. Tammany	121	14	0	\$1	
	Tangipahoa	96	3,527	0	\$377	
	Tensas	1,656	233,659	518,916	\$27,065	
	Terrebonne	10,077	5,728,500	59,262,477	\$862,173	
	Vermillion	4,938	2,192,517	41,284,741	\$407,638	
	West Baton Rouge	359	252,760	2,204,795	\$36,185	
	West Carroll	227	51	0	\$5	
	West Feliciana	168	5,485	41,661	\$750	
		Total	113,396	51,336,507	393,757,393	\$7,130,703
	Mississippi	Adams	258	760,359	7,740	\$76,207
		Bolivar	0	0	0	\$0

STATE	COUNTY	NUMBER OF WELLS	CRUDE OIL (BARRELS)	NATURAL GAS (MCF)	REVENUES (\$1,000)
	Claiborne	1	0	75,631	\$297
	Coahoma	0	0	0	\$0
	DeSoto	0	0	0	\$0
	Holmes	2	17,444	0	\$1,753
	Humphreys	0	0	0	\$0
	Issaquena	0	0	0	\$0
	Jefferson	59	81,786	1,959	\$8,238
	Leflore	2	17,251	0	\$1,722
	Panola	0	0	0	\$0
	Quitman	0	0	0	\$0
	Sharkey	0	0	0	\$0
	Sunflower	0	0	0	\$0
	Tallahatchie	0	0	0	\$0
	Tate	0	0	0	\$0
	Tunica	0	0	0	\$0
	Warren	13	40,972	517,740	\$6,152
	Washington	0	0	0	\$0
	Wilkinson	130	181,910	127,797	\$18,715
	Yazoo	255	3,364,314	3,717,320	\$352,534
	Total	720	4,464,036	4,448,187	\$465,616
	Total LMR Corridor	114,116	55,800,543	398,205,580	\$7,596,319

Sources: Louisiana Department of Natural Resources, Mississippi Department of Environmental Quality, U.S. Energy Information Agency.

EXHIBIT 8A-1. POWER GENERATION (THOUSAND MWH) IN THE LMR CORRIDOR BY FUEL SOURCE, 2012

STATE	ANNUAL POWER GENERATION (1,000 MWH)							
	COAL	HYDRO	NATURAL GAS	PETROLEUM	NUCLEAR	BIOMASS	OTHER	TOTAL
Arkansas	24,265	395	2,359	0	0	117	0	27,136
Illinois	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0
Louisiana	10,258	680	16,827	2,741	15,659	100	18	46,283
Mississippi	9,289	0	1,236	0	0	0	0	10,525
Missouri	0	0	5,177	0	7,296	160	0	12,633
Tennessee	4,082	0	0	0	0	0	0	4,082
Total LMR Corridor	47,894	1,075	25,599	2,741	22,955	377	18	100,659

Source: U.S. Energy Information Agency, Form EIA-923: Monthly Generation and Fuel Consumption Time Series File, 2012 Early Release.

EXHIBIT 9A-1. NAVIGATION SECTOR EMPLOYMENT, ESTABLISHMENTS AND REVENUES (\$1,000S) IN THE LMR CORRIDOR, 2011

STATE	EMPLOYMENT	ESTABLISHMENTS	REVENUES ¹ (\$1,000)
Arkansas	43	20	Not Available
Illinois	0	1	Not Available
Kentucky	0	3	Not Available
Louisiana	17,682	631	\$3,789,571
Mississippi	409	16	Not Available
Missouri	0	8	Not Available
Tennessee	630	15	\$429,059
Total LMR Corridor	18,764	694	\$4,218,630

Note: Revenues are reported in \$2011.
Source: U.S. Census Bureau, 2007 Economic Census. U.S. Bureau of Labor Statistics, 2011 Quarterly Census of Employment and Wages.

EXHIBIT 9A-2. CARGO (THOUSAND SHORT TONS) TRANSPORTED ON WATERWAYS IN THE LMR CORRIDOR, 2011

PRODUCT	TRANSPORTED CARGO (1,000 SHORT TONS)							
	INBOUND		OUTBOUND		THROUGH		INTRA	TOTAL
	DOMESTIC	FOREIGN	DOMESTIC	FOREIGN	DOMESTIC	FOREIGN		
Agricultural Chemicals	1,409	6,772	10,003	181	599	0	1,599	20,563
Coal	30,823	605	5,993	21,377	3,426	0	2,061	64,285
Food And Farm Products	50,383	1,719	1,629	68,617	1,354	224	11,025	134,950
Industrial Chemicals	5,025	5,277	7,614	3,429	5,453	0	5,233	32,031
Metals And Primary Metal Products	5,387	13,690	10,181	3,125	3,094	0	1,971	37,447
Non Metallic Minerals	8,610	7,627	2,676	62	16,501	0	2,334	37,811
Petroleum And Petroleum Products	18,228	38,893	30,190	26,018	7,947	0	20,616	141,891
Other	131	1,235	328	2,491	927	1	108	5,220
Total LMR Corridor	119,996	75,818	68,614	125,298	39,301	225	44,946	474,197

Source: Unpublished data provided by Amy Tujague at the U.S. Army Corps of Engineers.

**EXHIBIT 10A-1. NUMBER OF ESTABLISHMENTS IN MAJOR MANUFACTURING ACTIVITIES BY
MANUFACTURING SECTOR, 2007**

MANUFACTURING SECTOR	NAICS CODE	SIGNIFICANT MANUFACTURING ACTIVITIES	ESTAB.
Food and Kindred Products	3118	Bakeries and Tortilla Manufacturing	128
	3116	Animal Slaughtering and Processing	78
	3117	Seafood Product Preparation and Packaging	75
	Other	Other	280
Chemicals and Allied Products	3251	Basic Chemical Manufacturing	157
	3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	61
	3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	51
	Other	Other	193
Fabricated Metal Products	3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	408
	3323	Architectural and Structural Metals Manufacturing	350
	3328	Coating, Engraving, Heat Treating, and Allied Activities	77
	Other	Other	275
Machinery	3331	Agriculture, Construction, and Mining Machinery Manufacturing	235
	3335	Metalworking Machinery Manufacturing	63
	3332	Industrial Machinery Manufacturing	48
	Other	Other	257

Source: U.S. Census Bureau, 2007 Economic Census.

EXHIBIT 11A-1. PROTECTED AREAS (ACRES) IN THE LMR CORRIDOR BY OWNERSHIP TYPE

STATE	FEDERAL			STATE	LOCAL	PRIVATE	OTHER	ALL TYPES
	NATIONAL PARK SERVICE	FISH AND WILDLIFE SERVICE	FOREST SERVICE					
Arkansas	428	285,244	22,995	244,615	76	360	30	553,319
Illinois	0	11,974	47,522	48,584	0	112,205	3,051	223,336
Kentucky	0	2,026	0	19,107	0	3,631	0	24,764
Louisiana	40,027	408,736	99,686	1,196,140	4,528	75,386	5,075	1,789,550
Mississippi	8,835	122,267	105,503	19,144	0	4,557	2,461	253,931
Missouri	65	21,662	237,845	107,893	28	2,149	478	370,055
Tennessee	0	26,129	0	98,384	841	0	0	125,354
Total LMR Corridor	49,354	878,037	513,551	1,733,866	5,473	198,288	11,095	3,340,309

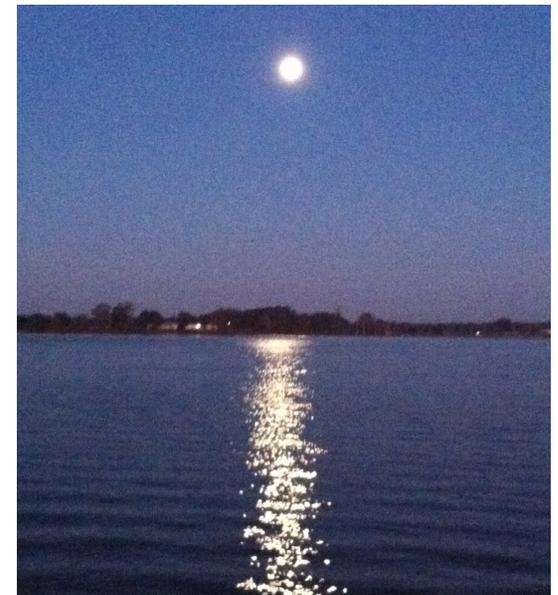
Sources: U.S. Geological Survey, National Gap Analysis Program, Protected Areas Database.

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Demand for Nature Based Tourism in the Lower Mississippi River Region

July 2013



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Table of Contents

- Table of Contents..... 1
- Tables and Figures 4
- Executive Summary 5
- Introduction..... 8
 - Methodology.....12
- Tourism in the Region 13
- Tourism-Related Activities 13
 - Overview of the Active Outdoor Recreation Economy14
 - Obstacles to Success 15
 - Economic Impact of the Mississippi River Fishing and Boating Trail: Buck Island Case Study 16
 - Paddling17
 - National Trends..... 17
 - Economics of paddling 17
 - Paddling-related Experience and Opportunities in the Lower Mississippi Region 18
 - Infrastructure and Service Gaps and Resources to Create and Meet Additional Demand for Paddling..... 20
 - Models 22
 - Economic Potential of Paddling for the Target Region 24
 - Cultural/Historical25
 - National Trends..... 25
 - Economics 27
 - Regional Trends and Activities Related to Cultural and Heritage Tourism 27
 - Gaps 30
 - Recommendations and Resources..... 31
 - Models 32
 - The Potential 33
 - Non-consumptive Watchable Wildlife34
 - National Trends..... 34
 - Birding 34
 - Economics 35
 - Economics of Birding..... 36
 - Regional Trends and Activities Related to Non-Consumptive Wildlife Watching 36
 - Gaps 38
 - Models and Resources 38

The Potential.....	39
Hunting and Fishing.....	40
National Trends.....	40
Economics.....	40
Regional Trends.....	41
Consumptive Tourism Gaps.....	42
Recommendations and Resources.....	42
The Potential.....	43
Recommendations for Strengthening Tourism related to Paddling, Culture and Heritage, Non-consumptive and Consumptive Wildlife Activities in the Lower Mississippi River Region.....	44
Potential Aggregators.....	44
Potential Learning Journeys.....	45
Filling Common Gaps.....	45
Hard Infrastructure.....	46
Soft Infrastructure.....	46
<i>Public Education and Hospitality Training.....</i>	47
Bringing the Region Together.....	48
Networking Opportunities.....	48
Lower Mississippi Resource Conservation Committee.....	48
Miss Lou Rural Tourism Association.....	48
Mississippi River Trail.....	49
Natural Resource Enterprises Program, Mississippi State University.....	49
Mississippi River Institute.....	49
National Trust for Historic Preservation, Rural Heritage Development Initiative.....	50
American Society of Ecotourism.....	51
Mississippi River Water Trail.....	52
Next Steps.....	53
Appendices.....	54
Appendix A: Lower Mississippi River Resource Assessment Area.....	55
Counties & Parishes in the Lower Mississippi River Resource Assessment Area (As defined by the Army Corps of Engineers).....	55
Appendix B: State Specific Tourism Data.....	56
Arkansas.....	57
Louisiana.....	61
Mississippi.....	65
Tennessee.....	67
Appendix C: State Outdoor Recreation Data.....	71

Appendix D: Case Studies72

- Northern Forest Canoe Trail: Case Study..... 73
- Mississippi River Water Trail: Case Study 74
- Southern Foodways Alliance: Case Study 75
- Birmingham Civil Rights Heritage Trail: Case Study 76
- The Alabama Coastal Birding Trail: Case Study..... 77
- Kentucky Trail Town Program: Case Study 78

Appendix E: Contact Information for Potential Resources and Network Participants79

Appendix F: State Maps Showing Counties Included in Report.....81

Tables and Figures

Tables

Table 1: National and Regional Economic Impacts of Active Outdoor Recreation on Economies, Employment, Sales and Taxes (2006 and 2012)	14
Table 2: Active Outdoor Recreation: U.S. Participation (2006)	15
Table 3: Recreational Use of the Lower MS River Fishing & Boating Trail: 2006 Usage in the 31 County Area.....	16
Table 4: Increased Recreational Use since 2006 as a Result of the Lower Mississippi River Fishing and Boating Trail	16
Table 5: Economic Impacts of Buck Island Investments Since 2006.....	16
Table 6: Economic Impact of Tourism in the Selected Counties of Grantees in this Region (see list in Appendix A)	56
Table 7: Impact of Travel on Arkansas Tourism Regions, 2010	58
Table 8: Activities Participated In by Arkansas Tourists, 2009 and 2010	59
Table 9: 2010 Impact of Travel on Louisiana	63
Table 10: Estimated County Travel and Tourism Expenditures, Employment, Taxes, TCI, FY 2011	66
Table 11: 2010 Impact of Travel on Tennessee	68
Table 12: Tennessee Outdoor Recreation, 2006	71
Table 13: Louisiana Outdoor Recreation, 2006:	71

Figures

Figure 1: Counties Included in the Lower Mississippi River Economic Profile.....	9
Figure 2: Arkansas Counties Included in Report	11
Figure 3: Tennessee Counties Included in Report.	11
Figure 4: Louisiana Parishes Included in Report	12
Figure 5: Mississippi Counties Included in Report	12
Figure 6: Arkansas Heritage Trails, from http://www.arkansasheritagetrails.com/	30
Figure 7: Wildlife Watchers and Wildlife Watcher Expenditures, 2001-2011	35
Figure 8: Arkansas - Total Travel Expenditures by Tourism Region, 2010	60
Figure 9: Louisiana Visitors by Purpose of Trip and Source of Visitor, from TNS TravelsAmerica.....	64
Figure 10: Mud Island River Park, TN.....	70

Executive Summary

The Walton Family Foundation is interested in supporting regional economic development opportunities in the Lower Mississippi River region that will lead to natural resource conservation and preservation. Toward this end, they have supported four pilot projects with grantee organizations that are interested in developing nature-based tourism opportunities. Each grantee organization is working in a different sub-region, including western Mississippi, eastern Louisiana, and western Tennessee, or in the region as a whole. While each grantee organization is interested in many types of nature-based tourism, there is overlap across them in the areas of paddling, historical/cultural tourism and non-consumptive wildlife watching. Two pilots are also interested in the consumptive activities of hunting and fishing.

Our research has shown that there is significant potential in these specific tourism areas, nationally and in the Lower Mississippi River region. **Paddling** is increasing each year, according to the American Canoe Association and the Outdoor Industry Foundation's 2009 *Special Report on Paddlesports*. Over 17 million Americans ages 6 and older (6.4%) participated in kayaking, canoeing, and rafting in 2008 as compared with 6.3% in 2007 and 4.7% in 2006. Regarding specific paddling activities, 9.9 million Americans participated in canoeing in 2008, 7.8 million Americans participated in kayaking and 4.7 million in rafting. Paddling participants made 174 million outings in 2008, averaging 10 days per participant.¹

A 2009 study of U.S. Cultural and Heritage Travel² reveals that 78% of all U.S. leisure travelers participate in **cultural and/or heritage** activities while traveling, translating to 118.3 million adults each year.

There were 71.8 million **wildlife-watching** participants in 2011 (up from 71.1 million in 2006), nearly 23% of the US population.³ Birding is the most common form of wildlife watching.⁴ In 2011, there were 46.7 million birdwatchers or birders, 16 years of age and older, in the United States – about 15 percent of the U.S. population.

In 2011, 13.7 million people, 6% of the U.S. population 16 years old and older, went **hunting**. Overall hunting participation increased 9% from 2006 to 2011.⁵ As one of the most popular outdoor recreational activities in the United States, **fishing** attracted 33.1 million individuals 16 years old and older in 2011.⁶ Comparing results from the 2011 Fishing, Hunting, and Wildlife-Associated Recreation Survey with those of the 2006 Survey reveals the number of anglers increased 11%.

¹ Outdoor Industry Association and Outdoor Foundation. 2009. A Special Report on Paddlesports. <http://www.outdoorfoundation.org/pdf/ResearchPaddlesports.pdf>

² Mandela, Laura. 2009. New Study Reveals Popularity of U.S. Cultural and Heritage Travel. http://mandalaresearch.com/images/stories/pressreleases/CHT_release_Oct_20.pdf

³ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. <http://www.census.gov/prod/2012pubs/fhw11-nat.pdf>

⁴ Birding in the United States: A Demographic and Economic Analysis. U.S. Department of the Interior, Fish and Wildlife Service. 2006. <http://digitalmedia.fws.gov/cdm/ref/collection/document/id/176>

⁵ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

⁶ Ibid.

The economic potential of these nature-based tourism subsectors is significant. Average expenditures per party and per excursion range from \$144 for local paddlers to \$503 for non-local paddlers⁷, about \$1,000 per cultural/historical tourist⁸, and \$766 per wildlife watcher.⁹ Hunters spend an annual average of \$2,484 per hunter and anglers spent an annual average of \$1,261 per angler¹⁰. If we assume that gaps and obstacles to these forms of tourism can be filled and overcome, there is significant economic potential to be realized. For example, extrapolating average expense figures, there is potential for up to \$500,000 in direct spending for adding 1,000 paddlers, \$1 million for adding 1,000 historical/cultural tourists, \$766,000 for adding 1,000 wildlife watchers, \$1.2 million for adding 1,000 anglers or \$2.5 million for adding 1,000 hunters. This does not include the impact of economic multipliers or tax revenues, meaning the actual economic impact would likely be much greater.

There is also significant crossover between these different forms of nature-based tourism. Based on conversations with historical/cultural tourism representatives in the region, there is significant crossover between cultural /heritage tourism and nature-based tourism. We have learned that the families of those who are hunting and fishing are seeking non-consumptive activities like paddling, wildlife watching and historical/cultural tourism opportunities. Through key informant interviews in the region, we have found that there is a real understanding that this area needs more cross-marketing between different types of tourism and specific tourism destinations. This suggests that, with solid coordination, developments in each of these nature-based tourism subsectors can benefit the other.

What needs to be done to realize this potential? First, there are several gaps that need to be filled in each of these subsectors of nature-based tourism. For example, in the areas of paddling and wildlife watching, there is a real need for more outfitters and guides, access points to the river, itineraries, maps, and other amenities.

There are also overall gaps and obstacles to strengthening tourism in general and nature based tourism in particular in this region. Some of these include:

1. A lack of lodging options.
2. A lack of dining options.
3. The need for more of a regional online marketing and presence.
4. The need for itineraries that combine different kinds of attractions.

Finally, in order to scale up impact in this region, it is critical to begin to connect partners with similar interests. There are many people and organizations working on similar types of tourism and recreation opportunities, and several are willing to think about how to scale up impact regionally. These are listed and

⁷ Benjamin, S. 2009. Economic Impacts of River Paddle Trails. East Carolina University. Center for Sustainable Tourism.

⁸ Office of Travel and Tourism Industries. 2011. U.S. Department of Commerce Releases First Cultural Heritage Visitor Profile. TI News. August 22, 2011.

<http://culturalheritagetourism.org/resources/documents/TINews-CulturalHeritageTravelerProfile2010.pdf>

⁹ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

¹⁰ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

their work explained later in the report. There may also be value in engaging agencies in each state devoted to consumptive and non-consumptive forms of recreation, historic preservation, and tourism to discuss cross-marketing and regional marketing opportunities.

There are a variety of next steps that could be taken to move this regional nature-based tourism endeavor forward. While the pilots on the ground are doing great work, a regional initiative requires more partners with shared goals and an interest in taking this work to scale. As possible next steps, we suggest convening people from the four-state region who have an interest in working at a regional scale in an effort to articulate shared goals. This could include developing a strategy to measure progress. Additional possible next steps include:

1. Enlist the assistance of a tourism development consultant. Yellow Wood has had experience with Solimar International¹¹ which has specific expertise in community-based tourism; David Brown is working with the Ford Foundation's community-based tourism grantee in Alabama, SURREF. There are undoubtedly other tourism development consultants.
2. Conduct a more detailed investigation into consumer tourism demand to provide information needed to determine priorities with respect to lodging, dining and other services and amenities. SURREF has worked with the Marketing Workshop¹² to do a study of consumer tourism demand in Alabama.
3. Plan one or more learning journeys. Walton Foundation staff, grantees in the four states, and those regional partners that are engaged need to think about what the focus of a learning journey would be, whether to learn more about a particular form of tourism (like paddling) or ways that regions have promoted themselves collaboratively.
4. Research best practices in addressing specific gaps such as public education, hospitality training or local dining options. There may also be value in researching best practices around educating community residents about the value of their hometowns and regions so that they are better able to promote what is interesting and fun about where they live.
5. Develop and test market sample potential tourism itineraries. This was discussed at the October meeting of Walton nature-based tourism grantees held in Louisiana. This still seems to make sense as a strategy for engaging state tourism directors and other tourism professionals in the offerings of the Lower Mississippi River region. The two we have discussed so far include one focused on John Jay Audubon's travels through the Lower Mississippi River region. The other we discussed was focused on blues or music in general along this corridor.
6. Bring together state tourism directors to explore the potential for these four states (Arkansas, Louisiana, Mississippi, and Tennessee) to work together to support the potential tourism offerings of a larger Lower Mississippi River region nature-based tourism group. There may be a discussion about cross-marketing between states, recognizing that the majority of tourists to this region are coming from within the region.
7. Consider the creation of a potential regional value chain or a regional network for nature-based tourism along the Lower Mississippi River region. There are many networks already operating in this area, but none that are specifically focused on nature-based tourism. This would allow Walton and its grantees to begin to collaborate with others who have similar interests and goals.

¹¹ Solimar International. David Brown. 202-518-6192. www.solimarininternational.com

¹² Marketing Workshop. 770-449-6767. <http://www.mwshop.com/>

Introduction

The Walton Family Foundation is interested in creating and supporting regional economic development strategies along the Lower Mississippi River region that may then support natural resource conservation in this region. To date, the Walton Family Foundation provides support to four grantees in the Lower Mississippi River region whose work is focused on nature-based tourism. These four grantees are the Louisiana State University AgCenter, Lower Mississippi Flyway of the National Audubon Society, Mississippi River Corridor – Tennessee, and the Lower Delta Partnership.

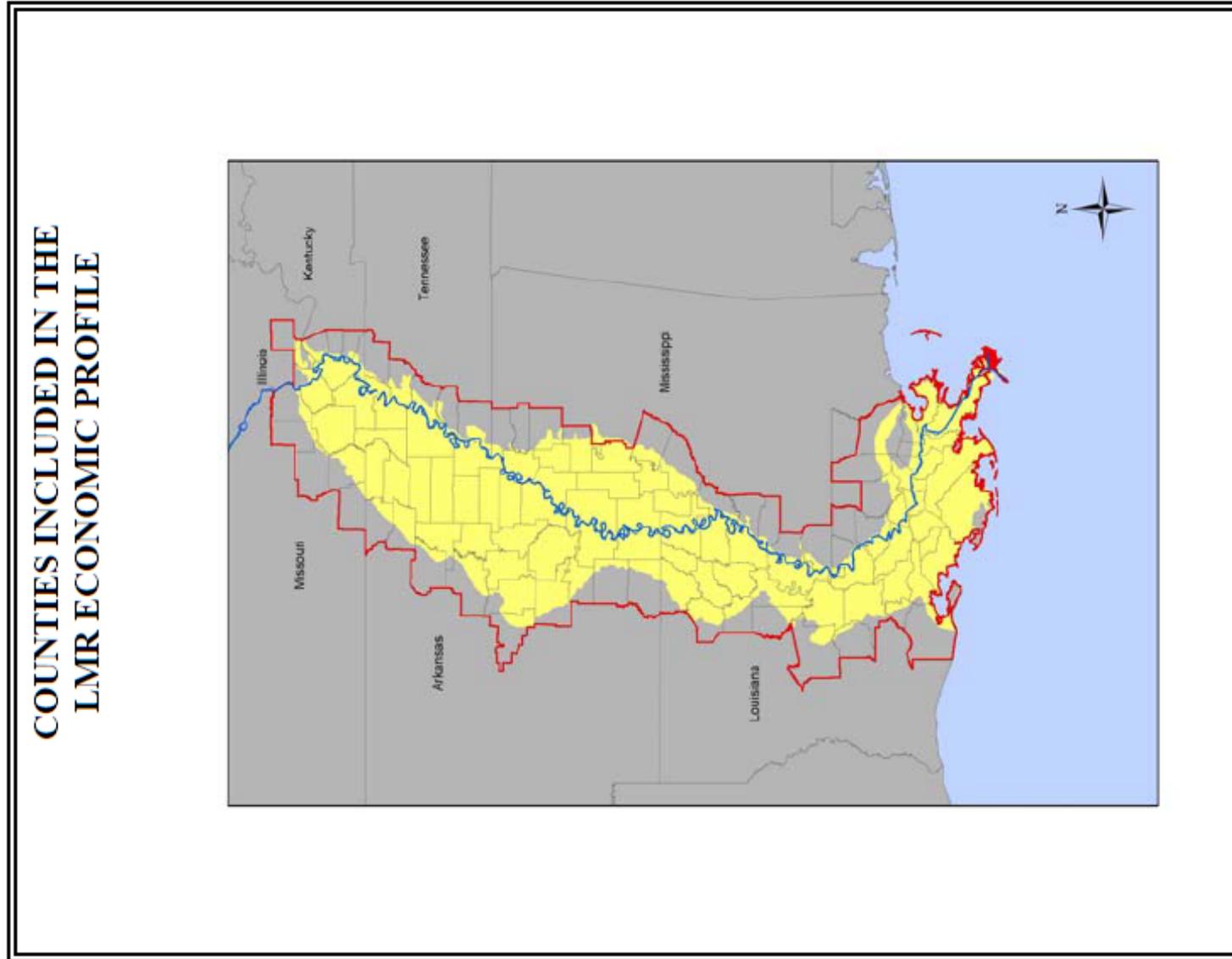
The Lower Mississippi Flyway program office of the National Audubon Society serves the National Audubon Society programs in Arkansas, Mississippi, and Louisiana. Audubon's mission is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity. For more than a century, Audubon has built a legacy of conservation success by mobilizing the strength of its network of members, Chapters, Audubon Centers, state offices and dedicated professional staff to connect people with nature and the power to protect it.

The **Louisiana State University Agricultural Center**, known as the LSU AgCenter, is one of 10 institutions within the Louisiana State University System. The LSU AgCenter's mission is to provide the people of Louisiana with research-based educational information that will improve their lives and economic well-being. The LSU AgCenter includes the Louisiana Agricultural Experiment Station, which conducts agricultural-based research, and the Louisiana Cooperative Extension Service, which extends the knowledge derived from research to the people of the state. The LSU AgCenter plays an integral role in supporting agricultural industries, enhancing the environment, and improving the quality of life through its 4-H youth, family and consumer sciences, and community development programs.

The **Mississippi River Corridor – Tennessee, Inc. (MRCT)** is a 501(C)(3) nonprofit Tennessee corporation. Its mission is to identify, conserve and interpret the region's natural, cultural and scenic resources to improve the quality of life and prosperity in West Tennessee. The MRCT is dedicated to the economic development, land conservation, environment and wildlife preservation of the six counties that border the Mississippi River along the entire western border of Tennessee. The six counties that comprise the Corridor are Shelby, Tipton, Lauderdale, Dyer, Lake and Obion.

The **Lower Delta Partnership** is a diverse group of individuals, state and federal agencies, and non-governmental organizations who are sensitive to the area's rich cultural history and who share a common vision of improving economic conditions for its citizens as well as for improving the natural environment of Mississippi's Lower Delta Area.

Figure 1: Counties Included in the Lower Mississippi River Economic Profile¹³



¹³ *Economic Profile of the Lower Mississippi River Region*. Industrial Economics, Inc. 2004. http://www.lmrcc.org/LMR_Eco_Prof.pdf

While the Lower Mississippi River Region as defined by the Lower Mississippi River Conservation Committee includes the portion of the Mississippi flowing from southern Illinois to the Gulf of Mexico, this initiative has been defining the Lower Mississippi River region as the parts of Arkansas, Tennessee, Mississippi and Louisiana around the River. The four Walton grantees in this region have very specific counties within which they work, which can be seen below. The maps below, from the US Census Bureau, indicate which counties are included in the target region addressed by this report. Larger maps are available in Appendix F.

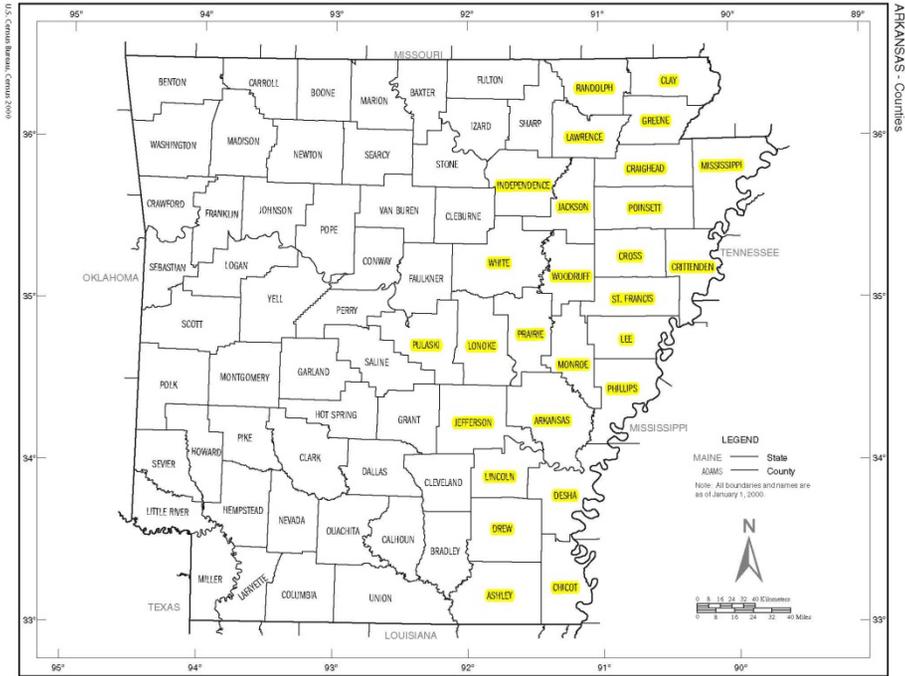


Figure 2: Arkansas Counties Included in Report

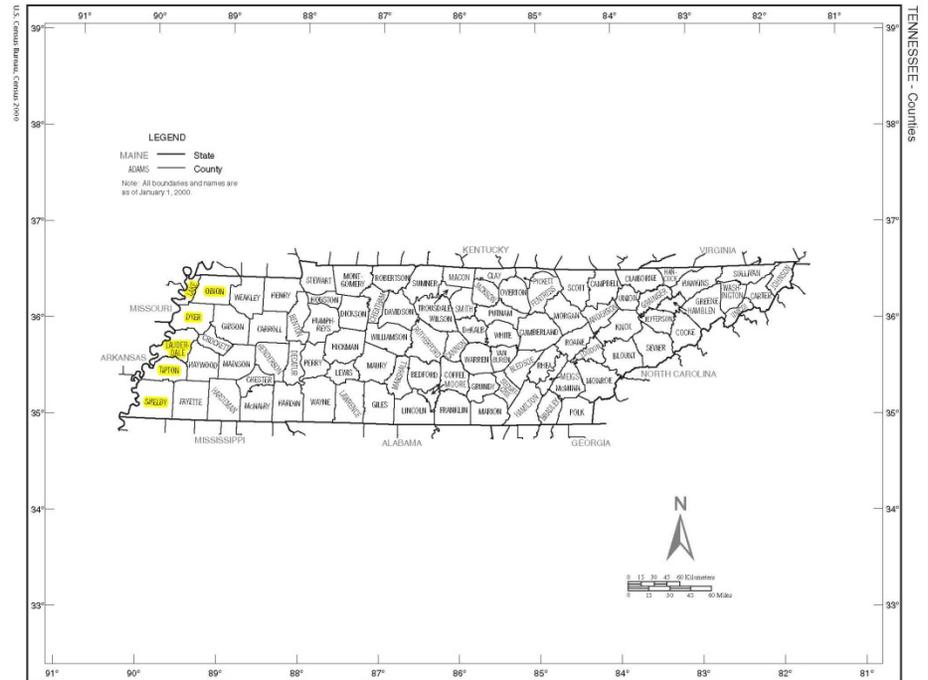


Figure 3: Tennessee Counties Included in Report.

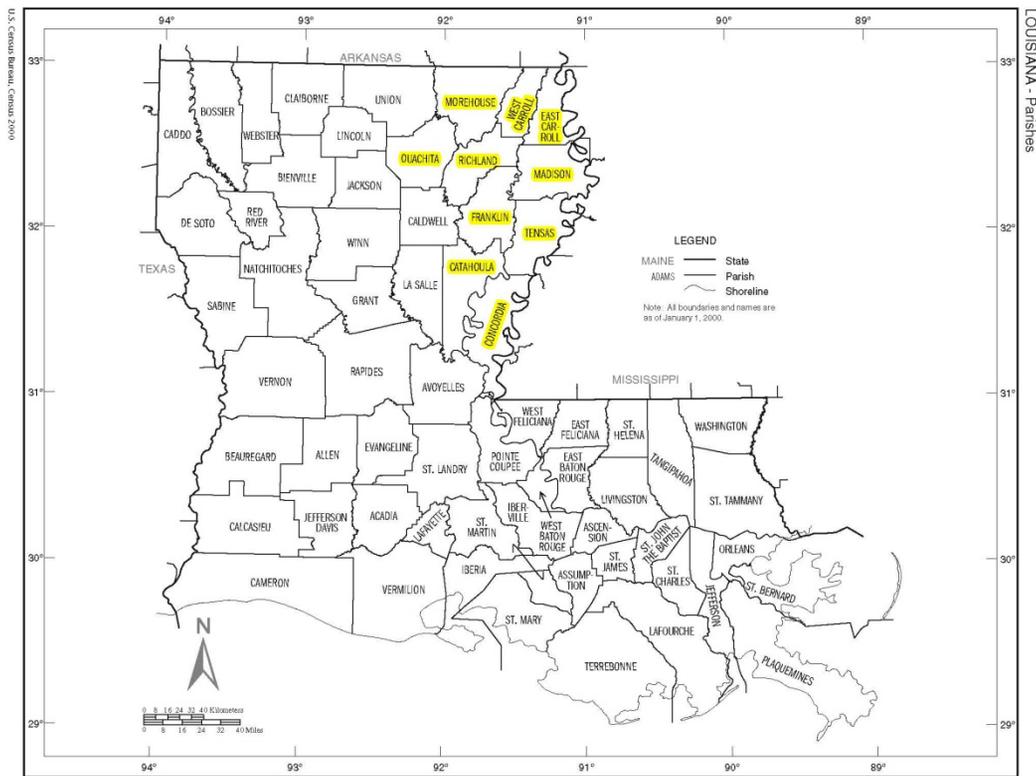


Figure 4: Louisiana Parishes Included in Report

The economic impacts of tourism on the selected counties represented by the Walton Family Foundation Lower Mississippi River pilots are impressive: tourism accounts for almost \$4 billion in expenditures, over \$2 billion in payroll, almost 60,000 jobs, \$183 million in state tax receipts and \$106 million in local tax receipts.¹⁴

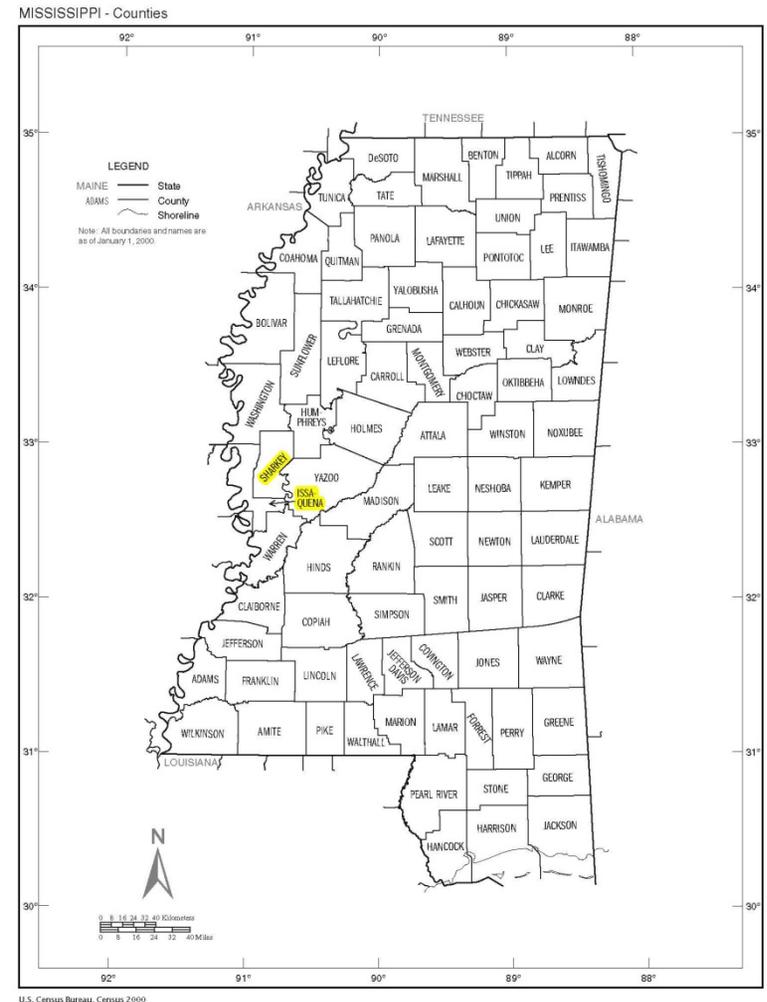


Figure 5: Mississippi Counties Included in Report

¹⁴ See Table 6 in Appendix B. Sources include:

1. TNS TravelsAmerica. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf
2. Fiscal Year 2011 Economic Contribution of Travel and Tourism in Mississippi. February 2012. http://www.visitmississippi.org/uploads/docs/PDF/FY2011_Economic_Contribution_Report.pdf
3. The Economic Impact of Travel on Tennessee Counties, 2011 <http://www.tnvacation.com/industry/uploads/105/2010%20Economic%20impact%20report%20FINAL.pdf>
4. The Economic Impact of Travel in Arkansas. 2011. http://www.arkansas.com!/userfiles/apt_2011_annual_report.pdf

Methodology

Yellow Wood Associates was engaged in the fall of 2011 to present two workshops to pilot grantees. The first workshop introduced the Ford Foundation's Wealth Creation in Rural Communities approach and the second focused more specifically around the conceptualization and construction of wealth creation value chains.

The next step in our work together was determining the demand for nature-based tourism in this region through a study of demand at the regional and local levels, related to specific focus areas of interest to the pilots.¹⁵ Understanding demand is a key part of developing a demand-driven wealth creation approach. In order to focus, we developed a table showing the focus areas of each of the four pilots with respect to nature-based tourism. While the pilots each have individual focus areas specific to their particular sub-region, there was overlap across the pilots in three areas: **paddling, historical/cultural tourism, and non-consumptive wildlife watching**. As a result, the group decided to focus the regional demand study on nature-based tourism in general, but also more specifically around these three more specific areas of shared tourism demand. Based on two pilots' interest in consumptive activities of **hunting and fishing**, there is also a section relating to those activities. This report shares the results of our investigation into the demand for nature-based tourism as well as paddling, historical/cultural tourism, non-consumptive wildlife watching, and hunting and fishing in the four states of the Lower Mississippi River region.

Much of the secondary data in this report is from state tourism agencies across the region. All data used is the most recent data available. Data limitations include inconsistent data collected state to state as well as limited data at the county level. National level data is also not aligned with the boundaries of the study region. In addition, between 20 and 30 interviews were conducted with key informants throughout the region and beyond focused on tourism in general or one of the sub-sectors mentioned above.

The intended use of this information is to better understand the tourists coming to the region, what they are looking for, and how what is on the ground in the region is or is not meeting that demand. In addition, this report begins to explore some of the regional players who might serve as partners to the pilots on the ground, and potential next steps for moving the nature-based tourism sector to scale in this region.

The research conducted for this report has revealed and/or confirmed the following:

- There is demand for all areas of tourism, including paddling, historical/cultural tourism, non-consumptive wildlife watching, and hunting and fishing, and opportunities for cross-over in participation among them.
- Tourists increasingly find information about tourism experiences online.
- There are regional tourism development efforts, but none that seem to be focused solely on tourism in the Lower Mississippi River region.
- Tourists like to participate in a variety of activities, so it is essential to develop multiple types of opportunities concurrently.
- Gaps in tourism infrastructure include:
 - Lodging
 - Dining

¹⁵ Two pilots were especially interested in consumptive wildlife activities, like hunting and fishing, which is the reason there is a section on those activities. Other pilots did not get as far in their specific areas of interest, which included educational tourism.

- Outfitters
- Online presence
- Marketing

Tourism in the Region

Tourism is one of the most powerful – and most often overlooked – tools for promoting economic and social development, in rich and poor countries alike. Tourism supports 10% of all economic activity on the planet.¹⁶ In most countries, the most interesting and unique attractions, such as indigenous culture, wildlife, and nature reserves, are nearly always located in rural areas. This presents real opportunities for tourism to contribute to both the economic development and conservation of a destination.

In the Mississippi River counties of Tennessee, Arkansas, Mississippi, and Louisiana (See Appendices A and F), the population has faced economic displacement and lack of opportunity. Despite the variety of river-related cultural, historical and natural assets, this region is one of the nation’s most economically distressed areas. Poverty levels significantly exceed the national average. The Mississippi River itself has the potential to be the main attraction of this region, increasing tourism and transforming the regional economy. Tourism on the river already generates some \$20 billion in annual revenue and supports more than 300,000 jobs, but most of this takes place on the river north of St. Louis, Missouri, where significant investment in public access infrastructure has been prioritized. While the Lower Mississippi River is on par with the Florida Everglades as a wildlife and wilderness experience, public use is hindered by private ownership of nearly all riverbank acreage on both sides of the river.¹⁷

It is clear that the Lower Mississippi River region already has a great deal to offer tourists. Much of the offerings in this region are centered on the larger urban areas of this region, including Memphis and New Orleans. Memphis is part of the target region this report studies but New Orleans is not, because none of the Lower Mississippi River region nature-based tourism grantees cover this area. Leaving New Orleans out of this study means that potential demand may be missing. Dora Ann Hatch of the LSU AgCenter, however, did make contact with New Orleans contacts, who explained that visitors to New Orleans are rarely traveling beyond New Orleans to other parts of Louisiana. While including New Orleans in the study may have increased the potential demand in the region, it is more likely that those visiting New Orleans are focusing their travel around New Orleans. New Orleans is an aggregation and entry point for travel into the Lower Mississippi River region, so potential next steps may include engaging potential partners in conversations about how to bring tourists to New Orleans farther into the Lower Mississippi River region.

Tourism-Related Activities

The next section of this report examines demand for four tourism-related activities in greater depth: paddling, historical/cultural tourism, non-consumptive wildlife watching, and consumptive activities like hunting and fishing.

¹⁶ Solimar International. <http://solimarininternational.com/about-us/why-tourism>

¹⁷ Restoring America’s Greatest River. http://www.alcnet.org/files/Lower_Mississippi_River.pdf

Overview of the Active Outdoor Recreation Economy

Two of the three areas of shared focus for the Walton grantees – paddling and wildlife watching – and consumptive activities of hunting and fishing (which are of interest to two grantees) are part of what is called the Active Outdoor Recreation Economy, which includes paddling, biking, camping, fishing, hunting, snow sports, trail and wildlife viewing. The active outdoor recreation economy:

- Contributes \$646 billion annually to the U.S. economy and supports nearly 6.5 million jobs across the U.S.
- Generates \$80 billion in annual local, state and national tax revenue and provides sustainable growth in rural communities.
- Generates \$645 billion annually in retail sales and services across the U.S.¹⁸

The outdoor recreation economy grew approximately 5 percent annually between 2005 and 2011 – this during an economic recession when many industries contracted.¹⁹

Table 1: National and Regional Economic Impacts of Active Outdoor Recreation on Economies, Employment, Sales and Taxes (2006 and 2012)²⁰

	National ²¹	East South Central (AL, KY, MS, TN) ²²	West South Central (AR, LA, OK, TX) ²³
Total contribution	\$646,000 billion	\$18,790 million	\$38,365 million
Jobs generated	6.1 million	215,126	379,933
Gear related sales	\$120.7 billion	\$2,636 million	\$4,787 million
Trip related sales	\$524.8 billion	\$10,875 million	\$19,077 million
Taxes (federal, state, local)	\$80 billion	\$2,545 million	\$3,782 million

¹⁸ Outdoor Industry Foundation. 2012. The Outdoor Recreation Economy. http://www.outdoorindustry.org/pdf/OIA_OutdoorRecEconomyReport2012.pdf

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid.

²² Outdoor Industry Foundation. 2006. The Outdoor Recreation Economy.

²³ Ibid.

In the table below, it is clear that wildlife watching has the highest participation of the outdoor recreation activities listed on a national basis, although the jobs generated and the federal and state taxes generated are on the lower side. Participation in bicycling and camping is similarly high, generating large numbers of jobs and significant federal and state taxes.

Table 2: Active Outdoor Recreation: U.S. Participation (2006)²⁴

	Participation	Jobs Generated	Federal/state taxes generated
Bicycling	60 million	1,135,000	\$17.7 billion
Camping	45 million	2,334,000	\$36.4 billion
Fishing	33 million	587,000	\$4.1 billion
Hunting	13 million	323,000	\$2.2 billion
Paddling	24 million	308,000	\$4.8 billion
Wildlife viewing	66 million	467,000	\$2.7 billion

In Tennessee and Louisiana, the two states in the region where data on the active outdoor recreation economy are available, wildlife viewing has the highest participation rates of the outdoor recreation activities. Twice as many Tennessee residents as Louisiana residents are paddling, 8% of residents compared with 4% in Louisiana. And almost twice as many residents in Tennessee are participating in wildlife viewing as are those in Louisiana, 1.7 million to 800,000.²⁵ See Appendix C for more information on the outdoor recreation economy in Tennessee and Louisiana.

The Outdoor Industry Foundation’s 2012 report about the Outdoor Recreation Economy focuses on direct economic impact rather than using indirect, implied, multiplier or ripple effects that include impacts of spending, jobs and wages as they circulate further through the economy. If these effects were used as the basis of the 2012 report, the stated economic impact and jobs impact would be substantially larger: \$1.6 trillion in economic impact and 12 million jobs.²⁶

Obstacles to Success

There are at least three significant obstacles to developing tourism on the Lower Mississippi River. First, a majority of the land in the Delta is privately owned by timber companies and hunt clubs which results in very limited public access. For example, 90% of Louisiana land is privately owned.²⁷ Second, in many places, the river is hidden from public view by private land and levees. There is also a fear of the river that needs attention. According to John Ruskey,²⁸ ninety percent of locals tell people not to go on the Mississippi River. The river is often associated with flooding and hardship. However, experience with the Lower Mississippi River Fishing and Boating Trail shows that with a collaborative approach, these obstacles can be overcome.

²⁴ Outdoor Industry Foundation. 2006. The Outdoor Recreation Economy.

²⁵ Outdoor Industry Foundation. 2006. Tennessee Active Outdoor Recreation Economy, <http://www.outdoorindustry.org/pdf/TennesseeRecEconomy.pdf>

Outdoor Industry Foundation. 2006. Louisiana Active Outdoor Recreation Economy, <http://www.outdoorindustry.org/pdf/LouisianaRecEconomy.pdf>

²⁶ Outdoor Industry Foundation. 2012. The Outdoor Recreation Economy. http://www.outdoorindustry.org/pdf/OIA_OutdoorRecEconomyReport2012.pdf

²⁷ Landscape American. 2008 – 2010 data. <http://www.landscape.org/louisiana/overview/>.

²⁸ Personal communication. John Ruskey. Quapaw Canoe. 662-627-4070. August 3, 2012.

Economic Impact of the Mississippi River Fishing and Boating Trail: Buck Island Case Study

One impressive example of collaboration is the creation of the Mississippi River Fishing and Boating Trail, with help from the American Land Conservancy, the Lower Mississippi River Conservation Committee (LMRCC), state and federal resource agencies, industry, elected officials and nonprofit organizations, which hopes to be a recreational river trail from St. Louis, Missouri down to the Gulf of Mexico. The purpose of the trail is to increase public use of the river by establishing a series of publicly owned islands, boat ramps, primitive campsites and parks for people to enjoy, thereby generating economic opportunities for river communities. The first segment of this trail, the Buck Island project, has been successful in offering recreational opportunities for hiking, camping, bird watching, fishing and picnicking. Several land-based trail initiatives will complement the Mississippi River Fishing and Boating Trail as it evolves, including the Delta Heritage Trail, the Audubon Society's Great River Birding Trail, the multi-use Mississippi River Trail, and for automobiles, the Great River Road.

With the restoration and development of Buck Island²⁹, which the American Land Conservancy purchased through auction in 2005³⁰, there have been some economic development gains. This purchase allowed 880 acres of previously private land to be available for public use.

The purchase of Buck Island created economic impacts and greater recreational usage in a 31 county area in the Arkansas Delta, which has a population of 1.3 million and a per capita income of \$24,800.³¹

There was a significant increase in days of usage from 2006 to 2009 as a result of the Lower Mississippi River Fishing and Boating Trail.

²⁹ Caudill, J. and T. Richardson. 2009. Economic Impacts of the Recreational Use of the Lower Mississippi River Fishing and Boating Trail.

http://www.southeastwaterforum.org/files/SEWTF09_Caudill.pdf

³⁰ American Land Conservancy. <http://www.alcnet.org/buckislandeasement>

³¹ Caudill, J. and Richardson, T. 2009. Economic Impacts of the Recreational Use of the Lower Mississippi River Fishing and Boating Trail.

This has led to an increase in expenditures in the region, creating economic impacts. Resident anglers spent \$36/day while non-resident anglers spent \$67/day. Resident wildlife watchers spent \$31/day while non-resident wildlife watchers spent \$97/day.

Table 3: Recreational Use of the Lower MS River Fishing & Boating Trail: 2006 Usage in the 31 County Area³²

Type of Use	Usage
Angler Days - Resident	5.7 million
Angler Days - Nonresident	751,000
Wildlife Watching Days - Resident	615,000
Wildlife Watching Days - Nonresident	167,000

Table 4: Increased Recreational Use since 2006 as a Result of the Lower Mississippi River Fishing and Boating Trail³³

Increase in Days as a Result of the Trail	Resident	Nonresident	Total
Angler Days	5% (287,000)	10% (75,100)	362,700
Wildlife Watching Days	10% (61,500)	15% (25,050)	86,550

Table 5: Economic Impacts of Buck Island Investments Since 2006³⁴

	Angling	Wildlife watching
Retail expenditures	\$14.3 million	\$4.1 million
Output	\$18.2 million	\$5.4 million
Jobs	275	89
Income	\$6.6 million	\$2 million
State/local tax revenues	\$767,700	\$229,000
Federal tax revenues	\$1.3 million	\$399,000

³² Ibid.

³³ Ibid.

³⁴ Caudill, J. and T. Richardson. 2009. Economic Impacts of the Recreational Use of the Lower Mississippi River Fishing and Boating Trail.

http://www.southeastwaterforum.org/files/SEWTF09_Caudill.pdf

Paddling

National Trends

According to the 2006 US Fish and Wildlife Survey, there were 24 million paddlers in North America. Since 2001 alone, recreational kayaking grew by 27 percent.³⁵ According to Wade Blackwood, Executive Director of the American Canoe Association³⁶, “Paddling is increasing. Every 10 years or so, the National Recreation Education Association puts out a report on different recreational activities. On the low end, 40 million people a year paddle twice a year. That’s big. And there are not enough people servicing that demand. It is putting pressure on areas where ecotourism is seemingly a good thing. We don’t have enough venues to provide it; you can hurt these areas by sheer volume.”

Paddlers tend to have a lot of crossover participation in other active, outdoor activities, such as biking, walking, fishing, camping, and hiking³⁷. Top motivations for paddling include relaxation, exercise, fun, exploration, health, new experience, escape from usual routine, challenge, available near home, feeling of accomplishment, and spending time with friends. Canoeing and kayaking are the most popular paddling sports.

According to 2009 data, over 55% of paddlers are male and 65% are from an urban area. The largest age group participating in paddling sports overall is age 25 – 44, and the second largest group overall is age 45+. The largest age groups participating in kayaking are age 25-44 (36%) and age 45+ (30%). The largest age groups participating in canoeing is age 25-44 (34%) and 45+ (28%).³⁸ The average number of outings per paddler is 10. Most paddlers have been participating for 5 or more years. Over 60% of paddlers own their own equipment. Only 2.5% of paddlers are members of a paddling club or organization. Over 6% of Americans participated in paddling in 2008 – 17.8 million individuals and 174 million paddling outings. Paddling is increasing each year. In the last year, participation in recreational kayaking grew by 27 percent. In the last 3 years, participation grew by 32 percent.³⁹

Economics of paddling

Research about the economic impact of river paddle trails located in North Carolina⁴⁰ shows:

- Water trails are a rapidly growing element of the marine recreation and tourism industry.
- In the eastern North Carolina region, the coastal plains water trail system produces 2.4 percent (\$55.14 million) of tourism economic impact.
- Paddlers will spend between \$27 and \$63 per day. A destination paddler on a multiple day water trail trip will spend about \$88 in a community.
- In 2008, paddlers in North Carolina spent \$270,075 on local paddling trips and \$947,800 on non-local trips.
- Paddlers spent an average of \$144 per party on their last local trip and an average of \$503 dollars per party on their last non-local trip.

³⁵ Outdoor Recreation Participation Report. 2012. http://www.outdoorindustry.org/images/researchfiles/OIA_OutdoorRecreationParticipationReport2012.pdf?170

³⁶ Personal communication. Wade Blackwood. Executive Director. American Canoe Association. September 18, 2012.

³⁷ A Special Report on Paddlesports. 2009. American Canoe Association. NSRE Paddlesports Participation Report. July 2010. www.americancanoe.org/resource/resmgr/spp-documents/2009_paddlesports_report.fin.pdf

³⁸ Ibid.

³⁹ A Special Report on Paddlesports. 2009. American Canoe Association. NSRE Paddlesports Participation Report. July 2010. Outdoor Recreation Participation Report 2012. Outdoor Foundation.

http://www.outdoorindustry.org/images/researchfiles/OIA_OutdoorRecreationParticipationReport2012.pdf?170

⁴⁰ Benjamin, S. 2009. Economic Impacts of River Paddle Trails. East Carolina University. Center for Sustainable Tourism.

Paddle trails do require some infrastructure to be successful. This includes both hard infrastructure (including roads, airports, lodging facilities, trails, etc.) and soft infrastructure (such as trail maps, accessible information on heritage and culture, ground operators/outfitters, and training programs for guides, local people who come into contact with tourists, interpreters, ecolodges, etc.).

Paddling-related Experience and Opportunities in the Lower Mississippi Region

Paddling information in the region is limited to Mississippi and Louisiana, based on data collected and conversations undertaken by grantees in those states. The two other grantees have limited data about paddling at this time.

Mississippi

In western Mississippi, according to Meg Cooper of the Lower Delta Partnership, “there is an increased interest in paddling as a whole and kayaking in particular.” While regional data shows that paddlers tend to be younger, those in the Mississippi Delta region tend to be closer to middle age. Demand for paddling in this area seems to come from educated, middle aged, white, middle class people (more male than female) mostly from outside the area. In this area, there is very little infrastructure available, including few boat ramps and very few outfitters. The vision for paddling in this area, according to Cooper, is “Increased outfitters, literature available with mapped paddling trails, increased interest in waterways and conserving them. We also want to grow the paddling experience through additional signage and mapping.”

Interviews with potential aggregators (John Ruskey of Quapaw Canoe Company and Bill Seratt of the Vicksburg Convention and Visitors Bureau) revealed an interest in offering Mississippi River tours, Sunflower River tours, and increasing development of interpretation and interpretive materials on nature related outings.

Louisiana

Paddling in northeastern Louisiana is growing. Dora Ann Hatch at LSU AgCenter is finding that paddling is more prevalent in urban areas. Paddlers in this area are of all ages, but predominantly young professionals and those active in paddling clubs. Most paddle in lakes; many are involved in clean-up campaigns on waterways. According to a survey by the Louisiana Department of Culture, Recreation and Tourism released in 2006, the total number of visitors to all facilities operated by the Office of State Parks was over 2 million, of which about half were overnight visitors and half were daytrippers. LSU AgCenter’s vision for paddling in this area is that northeastern Louisiana will become known as a paddling destination, increasing opportunities for other forms of tourism including natural, cultural and historical.

Interests in this area include guided paddling trips, blending archeology and paddling, blending storytelling with paddling, paddling classes, paddling from public to private lands, “Swamp People” experiences, and theme based paddling trips. According to Debra Creduer of the Atchafalaya Heritage Area, paddling is a niche market, which supports sustainable, cultural and natural resources by providing economic opportunities. People who come for paddling will also take advantage of cultural activities in the area, nature based tourism, ecotourism, etc.

Paddling aggregators may include churches, women’s clubs, boy scouts, girl scouts, 4-H school groups, college groups, continuing education classes, naturalists, yoga enthusiasts, artists, state police, military and business people. John Ruskey is the owner of Quapaw Canoe in Clarksdale, Mississippi, who is a visionary

when it comes to paddling the Mississippi River and its tributaries. Ruskey believes that paddlers like music, so there may be opportunities to add musicians to paddling offerings, or to add other music related destinations to a paddling trip.

Outfitters

Quapaw Canoe Company is one of the only outfitters in the area. John Ruskey⁴¹ of Quapaw Canoe focuses his business on the voyager style of canoes. John is interested in the superior design of birch bark canoes, which are active on the Great Lakes and Lake Champlain. He has been in business for 15 years. According to Ruskey, “We can’t keep up with the outfitting. If you look at our website (island63.com) and our calendar, you’ll see that we are solidly booked for the next two months.”

Quapaw would not survive if people were not coming from outside the State of Mississippi. About half of Quapaw’s clients come from the local area (through families, church groups, school groups and friends), a quarter come from the coasts and northern states and Montana (through the Missouri River connection), and the remainder from overseas (Eastern Europe, Australia, Africa, East). The mystique of the Mississippi River for foreign visitors is similar to that of the Grand Canyon, according to Ruskey. This mystique is something to build on to attract not only foreign visitors but also those domestic visitors that have not experienced this national treasure.

Quapaw’s marketing strategy revolves around its extensive internet presence. Quapaw is also lucky to have good publicity. John gets most of his business through repeat business, word of mouth and internet visitation. His business is a completely custom outfit, with radically different trips. Sometimes he might take 10 people on the river; other times he may do multi-day or weeklong trips. He’s taken people all the way to the Gulf of Mexico.

Ruskey guides 1,000 people each year on the water. He finds that cross-country travelers may come to Clarksdale to experience the blues and then add a paddle. Sometimes in one single day an activity like the National Park Service’s Summer of Paddling will bring 250 people to paddle the river. Quapaw serves the Lower and Middle Mississippi, from St. Louis, Missouri down to the Gulf. Quapaw will paddle any Lower Mississippi tributary, including the Big Yazoo, White River, and Arkansas River. He leads trips down the Atchafalaya, which is a World Heritage Site. Partnerships with educators, scientists, conservationists and other outfitters have worked for Quapaw by creating demand for Quapaw’s offerings.

John is also involved with the saving of Buck Island and the creation of public places on the river. He has contributed to the creation of a paddlers guide to the Lower Mississippi Water Trail, which was recently published online at rivergator.org. This is one component of a multi-pronged approach through the Lower Mississippi River Commission, which was started two years ago. The website brings up detailed descriptions of the first 100 plus miles of this water trail.

Paddling Events and Races

Tim McCarley is the organizer of the BluzCruz Kayak and Canoe Race. According to Tim, “I see more and more people all the time [on the river].” The BluzCruz included over 100 paddlers last year from eight states. According to Tim, the paddling crowd is older and has money.⁴²

There are several other paddling events in the Lower Mississippi River states including:

⁴¹ Personal communication. John Ruskey. Quapaw Canoe. 662-627-4070. August 3, 2012.

⁴² Personal communication. Tim McCarley. Bluzcruz.com. 601-634-0298. October 5, 2012

- **Outdoors Inc. Kayak Race** - Nation's oldest kayak sprint race – Memphis – 200-600 participants.
- **Phat Water** - 120 participants.
- **Battle on the Bayou** - 200-300 participants.
- **Arkansas Canoe and Kayak Race** - Little Rock – 50-60 participants.

Infrastructure and Service Gaps and Resources to Create and Meet Additional Demand for Paddling

There are several gaps in the region that need to be filled to meet growing demand for paddling. Gaps include a lack of lodging and dining options as well as equipment and support outfitters (shuttle drivers, etc.) and guides.

Lodging and dining are gaps that are found in all nature-based tourism subsectors; recommendations around those are found later in this report. There is a particular type of lodging that was mentioned by John Ruskey as a need for paddlers: dorm style accommodations for those participating in multi-day trips. This may be an opportunity to work with those interested in alternative forms of lodging to develop lodging at strategic points along the river. Daryl Jones of Mississippi State University runs the Natural Resource Enterprise (NRE) program, which provides training and outreach to those who are interested in developing natural resource-related businesses, whether agritourism operations, hunting leases, nature trails, or wildlife habitat management guides. Jones and his NRE program may be useful in engaging potential landowners in developing paddling accommodations, outfitter or guide businesses.

The need for outfitters is specific to paddling. John Ruskey is challenged to find guides. An outfitter provides gear and material necessities for an outdoor excursion. A guide shares their knowledge with a group or individual and may help plan routes or lead a trip. Any future movement in this area, for example to create additional outfitters or develop a training program for guides, should include John's expertise and perspective. An outfitter has to be driven in this atmosphere; it can take 1-2 years to build up a business. It has taken John Ruskey 10 years to get where he is. "We survived because of my passion for the river and ability to keep low overhead. That's the reason there aren't more outfitters." There are towns that are interested in recreation on the river. In the past five years, two Mississippi River towns have asked him about establishing an outfitter. John has helped to do this in Helena, Arkansas, and he believes it can be done in any of the river towns (Memphis, for example). An outfitter may simply be renting canoes, but there is education and liability around this activity. One Heritage Area manager suggested a tax credit program to assist businesses in the Heritage Area; this type of assistance may be helpful for outfitters wanting to get started. It may make sense to investigate other incentive programs for helping outfitters to get started.

There are also issues around having access in the right places (which can often be on private land), as well as a lack of defined and mapped trails. More uniformity of paddling information across individual states and across the region is also needed. To this effect, John Ruskey has been working with Walton grantees along the Lower Mississippi River to define and map trails in a more uniform and consistent manner, such as with Dora Ann Hatch of the LSU AgCenter and with Meg Cooper of the Lower Delta Partnership. Ruskey's expertise in defining and mapping trails is invaluable. However, this expertise needs to be further developed, so that John Ruskey is not called upon in every situation. The Heritage Areas, state parks, state forests, and other public land managers can be a resource in developing and providing consistency to paddling marketing, outreach and opportunities. Those interested in paddling in the region may want to consider working together to provide consistent information in terms of marketing their paddling opportunities, whether through brochures, maps, websites, marketing, itineraries, etc.

Efforts to market the region should build on the mystique of the Mississippi River for foreign visitors mentioned by John Ruskey. This mystique is something to build on to attract not only foreign visitors but also those domestic visitors that have not experienced this national treasure. Potential resources identified include the newly formed Mississippi Water Trails groups that can provide increased attention to paddling, possibly creating interest by potential outfitters, shuttle drivers, rentals, etc.

The American Canoe Association may also be a resource for expanding paddling opportunities in the region. Wade Blackwood, Executive Director of the American Canoe Association (ACA),⁴³ thinks that promotion of paddling tourism along the Mississippi River is a unique opportunity and can be a great teaching platform for a number of initiatives to promote safe boating. ACA⁴⁴ is also one of the only organizations that provides insurance to outfitters. As a member of ACA, an outfitter is able to acquire inexpensive insurance. ACA is skilled at teaching paddling skills and paddling safety. There are 6,000 ACA instructors around the US. ACA can educate and provide technical support to a Lower Mississippi River paddling initiative in addition to insurance for potential outfitters. ACA can also promote different paddling tourism and recreation opportunities through its magazines and its website.

The attitudes of locals toward the river also need to be addressed. Ruskey says, “Part of the challenge in the Lower Mississippi is helping the people who live here see the value of the outdoor landscape in a new way. This is a simple block but a huge one that is difficult to overcome.” According to John Ruskey, ninety percent of locals tell people not to go on the Mississippi River. Ruskey explains, “That’s the paradigm shift that will have to change.... Fear of the river.” There is a need to steer understanding and perception in a different direction. John Ruskey has been working toward overcoming this obstacle through 75 percent education (writing, talking, working with kids, etc.) and 25 percent spending time on the water. John runs an apprenticeship program for Mississippi Delta youth; this is a 15-year-old apprenticeship program, in which 12-18 year olds learn to build canoes, paddle canoes and guide people on tours of the Mississippi River. Quapaw’s apprentices eventually become guides. “Education is the key. Youth is an obvious place to start... get past the parents. This is a pretty wholesome and integrated thing. It’s worked with the KIPP School in Arkansas. As a school, it’s working for us because their education system demands participation of the parents. It has worked with individual families and the apprenticeship in Clarksdale. It has worked with ‘bad kids’ who find a place with us.” This is a great model of engaging youth in connecting with the river, thereby influencing their families and others, as they begin to establish their own outfitting operations. Engaging the pilots and other groups interested in paddling in public relations and experiences for locals on the river could help turn this perception around.

Potential resources identified that may be helpful include the newly formed Mississippi Water Trails group that can provide increased attention to paddling, possibly creating interest by potential outfitters, shuttle drivers, rentals, etc.

⁴³ Personal communication. Wade Blackwood. Executive Director. American Canoe Association. September 18, 2012.

⁴⁴ The ACA is interested in the educational side of paddling; it’s the only organization that offers certification for entry level paddlers to elite paddlers in all disciplines, and even has an adaptive paddling program for those with disabilities. ACA teaches sustainability in paddling; they have a large stewardship department. There are many marine debris issues that play a part in paddling safety; ACA makes sure that that is part of the education they provide, being a responsible paddler. ACA conduct events for stewardship and clean-up of waterways, which gives them an opportunity to promote themselves. Their members include a network of clubs and paddling organizations all around the country; they have instructors and members in all states.

Models

There are a variety of potential models to consider in developing paddling opportunities along the Lower Mississippi River. It may be possible to create a Lower Mississippi River Blueway. Water trails, or blueways, embody the nexus between rivers and trails. They provide recreational boating opportunities along a river, lake, canal or coastline; most water trails are managed in public-private partnership with the philosophies of environmental stewardship, environmental education, and accessibility for all users. The National Park Service has helped communities create water trails nationwide for almost two decades. There are many resources available about how to develop a blueway, including those from the National Park Service (<http://www.nps.gov/ncrc/portals/rivers/proj/pg/watertrails.htm>).

The Mississippi River Blueway, managed by Jon Summers of the Army Corps of Engineers, is one good model.

Mississippi River Blueway

Jon Summers⁴⁵ is a Natural Resource Specialist with the U.S. Army Corps of Engineers in the St. Louis District. Jon is developing a blueway on the Mississippi River in this district. The blueway is 120 river miles within the controlled sections of the river. His plans include taking it down to Cairo in the open section of the river, which is more similar to what is found in the Lower Mississippi. Eventually the water trail will run 300 river miles from Saverton, Missouri to Cairo, Illinois. A Mississippi River Water Trails Association has also been started along the trail.

The beginning came as Jon noticed more and more people asking where they could paddle, where they could put boats in and whether or not getting on the river was safe. The U.S. Army Corps of Engineers manages 300 miles of the Mississippi River; St. Louis is right in the center. There is a canoe and kayak club with about 300 members; Jon went to this club first because he figured they were in touch with the paddling community. The Corps came up with a conceptual plan that was presented to the community and modified through collaboration. “We wanted to make it the public’s trail. We got a lot of positive feedback from the community. We listened to the community.” This was collaboration between the Corps in Mississippi and Illinois and the National Park Service, but the driving force was the canoe and kayak club. The first section was dedicated in 2005.

The Corps was lucky to be able to put the trail on public property – state, city or county land that made it easier, with less liability issues, through easement or lease agreement. The Corps will be pushing to work with the American Land Conservancy.

In the 120 mile section completed from St. Louis north, there are three outfitters, an REI, a couple of local vendors/outdoor stores, Cabela’s and Bass Pro Shop. There are four locks and dams within the 120 mile section. The region is heavily involved with navigation and the towing industry. The last site ends at the gateway to the arch in St. Louis. Lodging is not provided, but there is lodging information on the brochures. There are campsites available mainly on islands owned by the Corps. Because of the flooding issues associated with the river, there is a need to maintain minimal infrastructure on the river. The sites along the trail are basically signs that provide information and a contained fire pit. Access areas are gravel parking lots with pit toilets. Some of the sites are located in towns where people can go into town and purchase supplies for a trip.

⁴⁵ Personal communication. Jon Summers. Natural Resource Specialist. U.S. Army Corps of Engineers, St. Louis District. 636-899-0094. June 19, 2012.

The Corps manages the trail and completes most maintenance. St. Charles County Park has a gravel parking lot that is maintained by the County. A volunteer base provides assistance on maintenance. Their partners and volunteers come and help out.

No visitor data has been collected yet. People use the trail year round unless it's iced over. Whenever a community is having a festival or event, the Corps tries to tap into that in order to get paddlers out onto the trail. Marketing is done by brochure; each pool (stretch between lock and dam) has its own brochure. Around 2009, the Corps went back and renumbered the trail system, hoping that as other sections came on board, it could be one trail. Social media is also being used to market and promote the trail. The Mississippi River Water Trail Association was developed to acquire grants, funding, etc. As a government entity, the Corps cannot be in competition with the private sector. Collaboration is the key; this is a collaboration between the Corps, St. Louis Canoe and Kayak Club, Mississippi River Water Trail Association, state agencies, U.S. Fish and Wildlife Service, National Park Service. The trail also collaborates with Convention and Visitors Bureaus and the Sierra Club. The Water Trail Association meets once a month; all the groups mentioned would be a part of that association.

Jon is interested in being involved as the trail expands south from Cairo, Illinois, as he believes there is a great deal of interest. Illinois Fish and Wildlife would like to be involved also. The ultimate goal is to make one trail for the entire 2400 miles of the river with consistency from the headwaters to the Gulf. According to Jon, the paddling community is interested in this as well.

Other Models

Trail Towns

Kentucky has another interesting model, called Trail Towns.⁴⁶ The goal of Trail Towns is to transform more than 30 Kentucky towns into gateways to the state's trails and rivers in an effort to boost local tourism spending. As part of the program, the state will advise towns on developing links to nearby trails and rivers, or on building new trails. Then the state will help promote the communities and their businesses, by helping communities develop signs directing hikers and others to local services and attractions, so that outdoor enthusiasts will know what is available, and the community can benefit from tourism spending locally. The first Trail Town, Livingston, has already benefited from tourism-related businesses opening in town or nearby as a result. Other regions have Trail Town programs, including the Great Allegheny Passage (from PA to MD) and the North Country Trail, which is a 4,600 mile trail through seven northern states from North Dakota to New York.

The National Water Trail System

The National Water Trail System is another model, which was established to protect and restore America's rivers, shorelines, and waterways and conserve natural areas along waterways, while also increasing access to outdoor recreation on shorelines and waterways. While national scenic trails and national historic trails may only be designated by an act of Congress, national recreation trails (including national water trails) may be designated by the Secretary of the Interior or the Secretary of Agriculture. Long water trails include two along the upper Mississippi River: the Mississippi River Water Trail (121 miles from Illinois to Missouri – mentioned above) and the 72 mile long Mississippi National River and Recreation Area Water Trail in Minnesota. A longer water trail, the Alabama

⁴⁶ Estep, Bill. 2012. Kentucky Towns Looking to Boost Tourism on Nearby Trails and Rivers. <http://www.kentucky.com/2012/08/22/2307770/kentucky-towns-looking-to-boost.html>

Scenic River Trail includes stretches of seven rivers, two creeks and one bay and moves through a variety of historical and cultural areas. The Kansas River Trail follows the Kansas River for 173 miles through remaining tallgrass prairie ecosystems.

Economic Potential of Paddling for the Target Region

Based on the assumption that paddlers spent an average of \$144 per party on their last local trip and an average of \$503 dollars per party on their last non-local trip,⁴⁷ if these gaps can be filled and obstacles can be overcome, there is significant economic potential to be realized. Every 1,000 additional paddlers in the Lower Mississippi River region would mean an additional \$144,000 to \$503,000 to the region in expenditures, depending on whether they were local or non-local.

⁴⁷ Benjamin, S. 2009. Economic Impacts of River Paddle Trails. East Carolina University. Center for Sustainable Tourism.

Cultural/Historical

Cultural/historical tourism is concerned with the culture and history of a specific region or country. It basically focuses on the traditional communities that have diverse customs as well as the forms of art and the distinct social practices that distinguish a certain culture. In some regions, the history of the Civil War, slavery and civil rights are every bit as important as the music, art and food. In many instances, the history of a particular region has driven the cultural elements.

Cultural/historical tourism is available in urban areas, including visits to facilities like theaters and museums, and rural areas, which showcase the traditions of the indigenous cultural communities like festivals and rituals, as well as personal values and lifestyle. Generally, cultural tourists spend more than the standard tourists do, since they usually travel to multiple cultural and historical sites.

National Trends

A 2009 study of U.S. Cultural and Heritage Travel⁴⁸ reveals that 78% of all U.S. leisure travelers participate in cultural and/or heritage activities while traveling, translating to 118.3 million adults each year.

Cultural and heritage travelers as a whole are more frequent travelers, reporting an average of 5.01 leisure trips in the past 12 months versus non-cultural/heritage travelers with 3.98 trips. They are also more frequent business travelers and are more likely to have taken an international trip in the past 12 months than their non-cultural/heritage counterparts. More than half of cultural/heritage travelers agree that they prefer their leisure travel to be educational and nearly half said they spend more money on cultural and heritage activities than other activities. They are also likely to travel farther to get the experiences they seek: about half of most recent overnight leisure trips were 500 miles or more from home. More than a third said they traveled between 100 and 300 miles for a day trip.

The study found that cultural and heritage travelers are more likely than other tourists to participate in culinary activities, such as sampling artisan food and wines, attending food and wine festivals, visiting farmers' markets, shopping for gourmet foods, and enjoying unique dining experiences as well as fine dining.

Other cultural and heritage activities identified by travelers include visiting historic sites (66%); attending historical re-enactments (64%); visiting art museums/galleries (54%); attending an art/craft fair or festival (45%); attending a professional dance performance (44%); visiting state/national parks (41%); shopping in museum stores (32%); and exploring urban neighborhoods (30%). The vast majority of these travelers (65%) say that they seek travel experiences where the "destination, its buildings and surroundings have retained their historic character."

The demographics of historical/cultural tourists follow:⁴⁹

- Average Age: 49

⁴⁸ Mandela, Laura. 2009. New Study Reveals Popularity of U.S. Cultural and Heritage Travel. http://mandalaresearch.com/images/stories/pressreleases/CHT_release_Oct_20.pdf

⁴⁹ National Trust for Historic Preservation. Cultural Heritage Tourism. <http://www.culturalheritagetourism.org/resources/visitorProfile.htm>

Office of Travel and Tourism Industries. 2010 Cultural Heritage Traveler. http://www.tinet.ita.doc.gov/outreachpages/download_data_table/2010-cultural-heritage-profile.pdf

- Likely to be retired: 20%
- Likely to have a graduate degree: 21%
- Travel longer: 5.2 nights average length of stay
- Main purpose of trip: Leisure/recreation, visit friends or relatives, business, convention or conference, studying or teaching.

Cultural heritage tourism is based on places, traditions, art forms, celebrations and experiences that portray and reflect the diversity and character of the United States. Cultural tourism activities include: art galleries, theater and museums, historic sites, communities or landmarks, cultural events, festivals and fairs, ethnic communities and neighborhoods, architectural and archaeological treasures. 78% of national vacationers who participated in heritage and cultural activities accounted for 90% of the economic impact of domestic tourism.⁵⁰

International Travelers

In 2011, the U.S. Department of Commerce released its first Cultural Heritage Visitor (CHV) Profile⁵¹. The CHV profile showcases select characteristics of overseas visitors who participated in one or more of the following activities: art gallery/museum, concert/play/musical, cultural heritage sites, ethnic heritage sites, American Indian community, historical places, and national parks.

According to the CHV Profile, the United States welcomed nearly 15.4 million overseas cultural heritage travelers in 2010, outpacing the average growth of all overseas arrivals to the United States (14% and 11%, respectively). Since 2004, the number of travelers participating in CHV activities has increased from 10.6 million (68.7% of the market) to the current 15.4 million, or 71.2 percent of all overseas visitors.

Visitors from Europe dominate this market, with almost 56 percent of all European travelers stating they participated in CHV activities while visiting the United States, followed by Asia (19%) and South America (13%). The top countries interested in cultural heritage related activities are: Brazil, France, Germany, Japan, and the United Kingdom. Among the top destinations visited by CHV travelers, the share was higher for: New York, California, Nevada, Massachusetts, and Illinois. Among the top cities, the CHV share was higher for: New York City, Los Angeles, San Francisco, Las Vegas and Washington, DC.⁵²

CHV travelers take longer to plan their trips and book their flights earlier than the average overseas visitor. They tend to be more first-time travelers, stay longer in the United States, and visit more destinations than the average traveler.

⁵⁰ National Trust for Historic Preservation. Cultural Heritage Tourism. <http://www.culturalheritagetourism.org/resources/visitorProfile.htm>

⁵¹ Office of Travel and Tourism Industries. 2011. U.S. Department of Commerce Releases First Cultural Heritage Visitor Profile. TI News. August 22, 2011. <http://culturalheritagetourism.org/resources/documents/TINews-CulturalHeritageTravelerProfile2010.pdf>

⁵² Southern cities and states are not major destinations when compared with the rest of the United States. Texas garners 3.4% of visitor market share, and Georgia garners 2.5% of visitor market share, compared with the highest state, New York, with 46.8% of visitor market share.

Source: 2010 Industry Sector Profile: Cultural Heritage. U.S. Department of Commerce. http://www.tinet.ita.doc.gov/outreachpages/download_data_table/2010-cultural-heritage-profile.pdf

Economics

Cultural and heritage travelers spend an average of \$994 per trip and contribute more than \$192 billion annually to the U.S. economy.⁵³ Helen Marano, Director, Office of Travel and Tourism Industries, U.S. Department of Commerce explained, “With 78% of all domestic leisure travelers participating in cultural and heritage activities, their expenditures confirm that this is a strong market, and they are contributing significantly to our communities during these challenging economic times.”⁵⁴ The segmentation analysis uncovered five different types of cultural and heritage travelers: Passionate, Well-rounded, Aspirational, Self-Guided, and Keeping it Light. Three segments – Passionate, Well-rounded, and Self-guided – were more serious about their travels and said that cultural and heritage activities had a greater impact on their destination choice. Together, these three segments represent 40% of all leisure travelers and contribute nearly \$124 billion to the U.S. economy. These travelers are affluent and travel frequently.

Additional data about economic impacts from visitation to Civil War sites⁵⁵ shows that there is significant impact from Civil War tourism in the states of Missouri, Pennsylvania, South Carolina, Tennessee and Virginia National Park Service affiliated Civil War battlefields and historic sites.

- 15 million visitors
- \$147 million in income/wages
- 7,700 jobs supported
- \$230 million in value added (rents and taxes, etc.)

Regional Trends and Activities Related to Cultural and Heritage Tourism

The four states of the Lower Mississippi River region – Arkansas, Mississippi, Louisiana and Tennessee – have a wide variety of historical and cultural tourism opportunities including Civil War and Civil Rights attractions, blues music, culinary traditions, and more. The target region discussed in this report encompasses parts of these four states – western Mississippi, eastern Louisiana, eastern Arkansas, and western Tennessee.

Mississippi

Mississippi is home to more award-winning writers per capita than any other state, a wide variety of music history, examples of three centuries of American architecture, rich culinary heritage and is home to some of the most important sites of the Civil War and the Civil Rights movement. For example, the Vicksburg National Military Park had 772,977 visitors in FY07, a 44.9% increase from FY06. The Civil War Sesquicentennial was marked in 2011. Preserve America awarded a grant to Vicksburg, Raymond, and Port Gibson. And the Mississippi Division of Tourism and Mississippi Department of Archives and History are developing a new driving tour of the state.⁵⁶

⁵³ The Economics Associated with Outdoor Recreation, Natural Resources Conservation and Historic Preservation in the United States. 2011. By Southwick Associates.

⁵⁴ Mandala Research. 2009. New Study Reveals Popularity of U.S. Cultural and Heritage Travel. <http://www.culturalheritagetourism.org/documents/CHTStudyOct2009.pdf>

⁵⁵ The Economics Associated with Outdoor Recreation, Natural Resources Conservation and Historic Preservation in the United States. 2011. By Southwick Associates.

⁵⁶ The Official Tourism Resource For The State Of Mississippi. <http://www.visitmississippi.org/>

The King Biscuit Blues Festival, also organized by Munnie Jordan, is another draw to the area. There are normally 10-12,000 residents in Helena; when the festival is happening, there are 50-60,000. This festival is always on Columbus Day weekend and features three days of music across five stages. The festival is advertised through the Memphis Convention and Visitors Bureau, Mississippi Tourism, Arkansas Tourism, TV, radio, magazines, and billboards. Then there is Bridging the Blues, in which all four states put on their own events and festivals leading up to the King Biscuit Blues Festival.

In Arkansas, the Historic Preservation Alliance of Arkansas⁵⁹ is the only statewide nonprofit organization focused on preserving Arkansas's architectural and cultural resources. The Alliance plans one very unique heritage tourism event, a ramble, where the Alliance maps out a route and takes a bus of people around the state. It is typically organized around a theme, showing historical and cultural sites along the way. It is very well received, fun and educational. The cost to rent a bus has been an impediment in being able to reach a wider audience because it raises the cost of local participation.

Louisiana

Louisiana is home to historic architecture, music and more. Blues music is a particular draw in this area of Louisiana and throughout the Lower Mississippi River Corridor. Groups tend to tour cultural tourism destinations in association with education, business or pleasure trips. School groups are one particular market, as these groups visit cultural attractions to learn about their heritage. Parents visiting college students often take advantage of cultural amenities in the area. The most popular attractions in northeastern Louisiana include Poverty Point Historical State Park, the Louisiana Cotton Museum, Frogmore Plantation, Chennault Aviation and Military Museum of Louisiana, and the Biedenharn Museum and Gardens, but others include Black Bayou Lake National Wildlife Refuge, Coke Museum, Northeast Louisiana Children's Museum, Masur Museum of Art, Landry Vineyards, University of Louisiana at Monroe Natural History Museum, Starr Homeplace, Jim Bowie Relay Station, Delta Museum, Winter Quarters Historic Site and Ike Hamilton Expo. Festivals include the Catfish Festival in Winnsboro and the Jim Bowie Festival in Vidalia.⁶⁰

Tourists are coming to northeastern Louisiana from Jackson, Mississippi and Greenville, Mississippi all the way up to Memphis, Tennessee and southern Arkansas. Those coming for historical/cultural tourism are typically more educated. Local aggregators include bus groups, religious tours, universities, conventions and sports markets. The Monroe area in particular is trying to reach larger cities; shopping is a draw.

Tennessee

Tennessee's Civil War Heritage Area (which covers the entire state) is just one of many historic and cultural attractions in Tennessee, which also includes wine trails, art trails and more. There is also a river trail system – Tennessee River Trail, heritage areas, and historic sites. Authentic and cultural amenities are significant draws; Memphis has over 60 known attractions with over one third labeled as cultural and unique. Musical history venues, educational exhibits and museums are of high quality (Stax/Soulsville, Rock and Soul Museum/Smithsonian exhibit, Pink Palace, Graceland and Sun Studios). There is a large inventory of "stories" about the history and folklore of the region. The rural communities have excellent small and medium sized museums for diverse educational opportunities. There are significant Civil War sites with national trail promotions (multi-state). There are historic and unique downtown Court Squares for

⁵⁹ Personal communication. Vanessa Norton McKuin. Historic Preservation Alliance of Arkansas. September 20, 2012.

⁶⁰ The Official Tourism Site of Louisiana. <http://www.louisianatravel.com/>

shopping and dining. The greatest trend and opportunity, according to Diana Threadgill and Glenn Cox of the Mississippi River Corridor- Tennessee, is an emerging new leisure travel trend known as experiential travel; more than four out of ten travelers are participating, particularly in rural areas.⁶¹

Gaps

There are shared gaps across the four states that seem amenable to shared solutions. Contacts want stronger broadband capabilities in the region, more use of travel technologies, more developed itineraries for visitors, more interpretive signage and tour guides, more marketing (internet and maps/brochures) and materials that promote the area, increased cross marketing with outdoor activities, a better mix of lodging and dining options, more ferries across the river, and a greater appreciation of local cultural and heritage assets by the local population. Recognizing the links between cultural and heritage tourism, contacts also want more river excursions, biking trails, more farm and agricultural tours, a craft/artisan cooperative, waterpark, hiking and biking trails on the levee, bayou tours, nature tours, paddling tours, horse drawn carriages on the riverfront, and more.

There is a need for greater partnership to leverage funding and increase reach. In addition, in rural areas, there is a further obstacle in that attractions are spread out and not easily accessible, providing a disincentive to visit them. In some states, improved collaboration between state agencies could help promote more heritage resources and natural resources. As with paddling, there is also a need to find cost effective ways to address the experience and knowledge gaps among the local population.

In addition, there are gaps specific to a particular area that would benefit from local attention and local solutions. For example, one gap noted by LSU AgCenter specific to eastern Louisiana is the lack of a large conference hotel to attract large conventions. While this area has diverse lodging options, these hotels are typically busy during the week (when conferences take place) and empty on the weekends.

Another specific desire noted by the Mississippi River Corridor – Tennessee is for more educational opportunities through academic institutions and other non-profit organizations for programming, outings and specific curriculums for experiential tourism, which is a focus for western Tennessee. This would require them to begin to make connections with Tennessee academic institutions and nonprofits and even those outside of Tennessee. MRCT is already beginning to do this.

Interests in the Lower Delta Partnership area in Mississippi include a familiarization or FAM tour, more live music performances, more children’s activities, and more information on the Teddy Roosevelt - Teddy Bear connection. There is a very specific need to have more extensive staffing for their visitors center, which is currently only staffed by volunteers for very limited hours on three days of each week. A FAM tour, more live music performances and more children’s activities would be useful region-wide. These may be part of a larger regional strategy.

In Arkansas, there are great places, such as Dyess County, Johnny Cash’s boyhood home, that are not always equipped to be tourist destinations. According to Vanessa Norton McCuin, the Alliance’s Executive Director, “the town does not even have a place to buy a coke. Infrastructure to support tourism industry is not in these places that have great attractions.” There is a need for hard and soft infrastructure to provide the amenities that tourists expect. This may be part of a region-wide strategy of making sure that there is sufficient infrastructure to make tourists comfortable.

⁶¹ Tennessee Department of Tourist Development. <http://www.tnvacation.com/>

One specific gap noted for Arkansas relates to their ramble, in which transportation cost has been an impediment to reaching a wider audience. While this gap is specific to this part of Arkansas, there is universal interest in engaging local people in tourism experiences that will open up their minds as to what's available and what's fun. Having people appreciate their own hometowns and what is available in their own backyards is the first step to being able to promote their areas to tourists. A great example of success related to this is in Jamaica, where Countrystyle Community Tourism Network and their Villages as Businesses program begin working with a community by having community residents learn about their own heritage and what makes their community special. By doing this, community residents are better able to appreciate their community and project that appreciation onto incoming tourists. Further research into best practices in this regard could be beneficial to the region.

Shared gaps in this area seem to include tour itineraries, more interpretive signage, tour guides, and marketing (internet and map/brochures) materials that promote this area.

Recommendations and Resources

Each of the four states holds pieces to the puzzle of a satisfying cultural and heritage tourism experience. We recommend engaging historic preservation contacts in each of the four states in a discussion about how best to work together to create coherent stories about this region. It may also make sense to engage Chambers of Commerce, Convention and Visitors Bureaus, and communities in this work. The historic preservation contacts we spoke with saw the potential for working together and creating economies of scale in the region. A group like this could help to secure and leverage funding. In addition, since historical/cultural tourists are also likely to take advantage of natural resources, it makes sense for those state agencies in charge of state parks and natural resource areas to collaborate with those agencies in charge of historic preservation.

A region-wide approach may be helpful in addressing shared gaps in lodging, dining, tour itineraries for visitors, interpretive signage, tour guides, marketing (internet and map/brochures) and promotional materials. There is a need for greater partnership to leverage funding and increase reach. In addition, in rural areas, there is a further obstacle in that attractions are spread out and not easily accessible, providing a disincentive to visit them. More collaboration between silo agencies within and across states could help promote connections between cultural and heritage resources and natural resources-based recreation.

There are interesting themes in this region that may provide strategies for all parts of the region. These include culinary trails, literary heritage, music heritage, civil rights history, and the region's Civil War history, which is particularly timely given the Sesquicentennial.

The Preserve America program,⁶² a federal initiative that encourages and supports community efforts to preserve and enjoy our cultural and natural heritage, is another potential resource for the region around the marketing of heritage tourism; while the funding may have dried up, the techniques, models and practices may be useful ones to replicate in the region.

⁶² Preserve America. <http://www.preserveamerica.gov/index.html>

Models

*Southern Literary Trail*⁶³

There are some interesting models in the area of historical/cultural tourism. Close to home there is the Southern Literary Trail. The Southern Literary Trail connects southern places in Alabama, Georgia and Mississippi that inspired great American writers to create classic fiction and plays. Every two years, the Trail's organizers host Trailfest, the only tri-state literary festival in the United States with free events, theatrical performances and heritage tours. The Trail also features writers' houses; the homes of classic fiction writers from the South of the 20th Century have been preserved for visitors to see how they lived. Writers featured include Tennessee Williams, Eudora Welty, Walker Percy, Richard Wright, Margaret W. Alexander, Borden Deal, and William Faulkner. Landmarks that inspired writers – courthouses, parks, churches, stores, banks – have been saved for contemporary readers to enjoy as settings for festivals and tours. In April 2005, the Fitzgerald House in Montgomery – a home for Scott and Zelda – hosted the first meeting of Southern Literature enthusiasts, festival organizers and museum directors from Alabama, Georgia, and Mississippi to begin work on the Southern Literary Trail, a project uniting homes of writers and literary landmarks into one tri-state pathway. The Trail's organizers dedicated three years to meetings in each state for making the difficult choices of the writers and the destinations that would be right for this unique collaboration, a map of novel journeys stretching from Natchez to Savannah.

*Southern Foodways Alliance*⁶⁴

The Southern Foodways Alliance is also active in the target region. The Southern Foodways Alliance (SFA) was formally founded in 1998, under a parent organization at the University of Mississippi, The Center for Southern Culture. Their goal is to disseminate their projects for popular consumption, not just academics. The oral history subjects, which many of the trails are based on, serve as a way to teach people about the larger cultural and regional story. The SFA's first documentary effort began in 2002, with funding through the National Pork Board, to document BBQ signage in Memphis, Tennessee. According to Oral Historian Amy Evans, the project quickly evolved into an oral history project, which culminated in what has become an annual October symposium. "In a broader sense, our work has done a lot to validate culinary tourism as a form of economic development," says Evans. As part of The Tamale Trail, the SFA achieved the first culinary historical marker in Mississippi, Joe's Tamale Place in Rosedale, which is also part of the Mississippi Blues Trail. In Mississippi, the Southern Foodways Alliance also includes a Hot Tamale Trail, Southern BBQ Trail, Southern Boudin Trail, and a Southern Gumbo Trail.

*Birmingham Civil Rights Trail*⁶⁵

A bit outside the Lower Mississippi River region is the Birmingham Civil Rights Trail. The Birmingham Civil Rights Institute is the centerpiece of the city's Civil Rights District. Some of the most vivid images of the turbulent 1960s were black demonstrators being attacked by police dogs and fire hoses in the streets of Birmingham, Alabama. The non-violent protesters, led by ministers including Dr. Martin Luther King Jr. and the Rev. Fred Shuttlesworth, were pressuring city leaders to overturn repressive segregation laws that divided blacks and whites. Today the battlefields trod by those foot soldiers of the civil rights movement have been turned into shrines visited by tourists from all over the world. Points of interest in Birmingham's Civil Rights District, on the edge of downtown, are within easy walking distance of each other. Points of interest include museum exhibits, outdoor monuments and trail markers, including a statue of Dr. Martin Luther King Jr., the Birmingham Civil Rights Institute which has the jail cell where King wrote his famous "Letter from the Birmingham Jail" that urged religious

⁶³ Southern Literary Trail. <http://southernliterarytrail.org/>

⁶⁴ Southern Foodways Alliance. <http://southernfoodways.org/>

⁶⁵ Birmingham Civil Rights Trail. <http://birminghamal.org/places/birmingham-civil-rights-heritage-trail/>

bystanders to become active in the movement, a statue in front of the Institute honoring Shuttlesworth, pastor of Bethel Baptist Church, who endured beatings and a house bombing while a leader in the Birmingham marches. The Greater Birmingham Convention & Visitors Bureau can arrange for step-on guide services for groups who wish to tour the downtown Civil Rights District and other neighborhoods that had connections to the movement. A civil rights tour of Birmingham also could include a brunch (every second Saturday) at Chris McNair Studio & Art Gallery, a photography and art business run by the surviving daughters of Chris McNair, whose youngest (Denise) was one of the four killed at the 16th Street Baptist Church.

The civil rights trail is laid out in five districts, starting with the downtown Civil Rights District centered on Kelly Ingram Park. The Orange route will focus on marches against the city's segregation laws, while the Blue route will commemorate protests and boycotts regarding retail hiring practices and lunch counter discrimination. A third set of downtown signs will identify churches, stores and other strategic centers.

Dr. Frank Adams gives an entertaining tour of the Alabama Jazz Hall of Fame. Kelly Ingram Park is part of the Fourth Avenue Historical District, once a thriving black retail/entertainment district and still home to many minority-owned businesses. Of special interest to tourists is the Alabama Jazz Hall of Fame, housed in the former Carver Theatre, a movie theater for blacks. Groups can request a tour guided by octogenarian Dr. Frank Adams, the museum's former executive director, who plays his clarinet along the way. Full of stories about the glory days of jazz, he once played in Duke Ellington's band. Eddie Kendrick Memorial Park, just down the block, honors the Birmingham native and lead singer for the Temptations, the Motown group celebrated for its fine-tuned choreography.

The Potential

There are significant historical and cultural attractions in the Lower Mississippi River region, including those related to the Civil War, Civil Rights, food, literature, and music. There are also significant gaps and challenges to overcome in making this area even more attractive to historical/cultural travelers. If we assume that cultural/historical travelers spend about \$1,000 per trip, then bringing in an additional 1,000 historical/cultural travelers would mean an additional \$1 million in direct spending to the region. Based on conversations with historical/cultural tourism representatives in the region, there is significant crossover between those tourists interested in cultural and heritage tourism and those interested in nature tourism. Through key informant interviews in the region, we have found that there is a real understanding that this area needs more cross-marketing between different types of tourism and specific tourism destinations, especially between historical/cultural tourism and paddling and nature tourism.

This suggests that, with solid coordination, developments in both sectors can benefit the other.

Non-consumptive Watchable Wildlife

National Trends

Wildlife watching includes birds and mammals, as well as insects, spiders, reptiles, amphibians, fish, and other wildlife. Wildlife watching is a favorite pastime for millions in the U.S. The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation defines wildlife watching as participants either taking a “special interest” in wildlife around their homes or taking a trip for the “primary purpose” of wildlife watching.

There were 71.8 million wildlife-watching participants in 2011 (up from 71.1 million in 2006), nearly 23% of the US population. Of that number, 96% participated around their homes (up from 77% in 2006), and 31% participated away from home (up from 26% in 2006). Away-from-home participants are defined as those who travel a mile or more from home to engage in wildlife watching, and around-the-home participants are those who wildlife watch less than a mile from home.⁶⁶

Birding

Birding is the most common form of wildlife watching.⁶⁷

- In 2011, there were 46.7 million birdwatchers or birders, 16 years of age and older, in the United States – about 15 percent of the population.
- The most common form of birding is backyard birding; 88% or 41.3 million of birders are backyard birders.
- The more active form of birding, taking trips away from home, is less common with 38 percent (17.8 million) of birders participating.
- Nationally, the number of away-from-home birders has increased 8 percent since 2006 as more birders are traveling to observe birds.

Birders are:

- Older (the average is 50 years old).
- Fairly well educated.
- Better than average income.
- Slightly more likely to be women.
- Highly likely to be white.

The sparser the population of an area, the more birders there are. The participation rate for people living in small cities and rural areas was 27 percent—6 percent above the national average.

⁶⁶ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. <http://www.census.gov/prod/2012pubs/fhw11-nat.pdf>

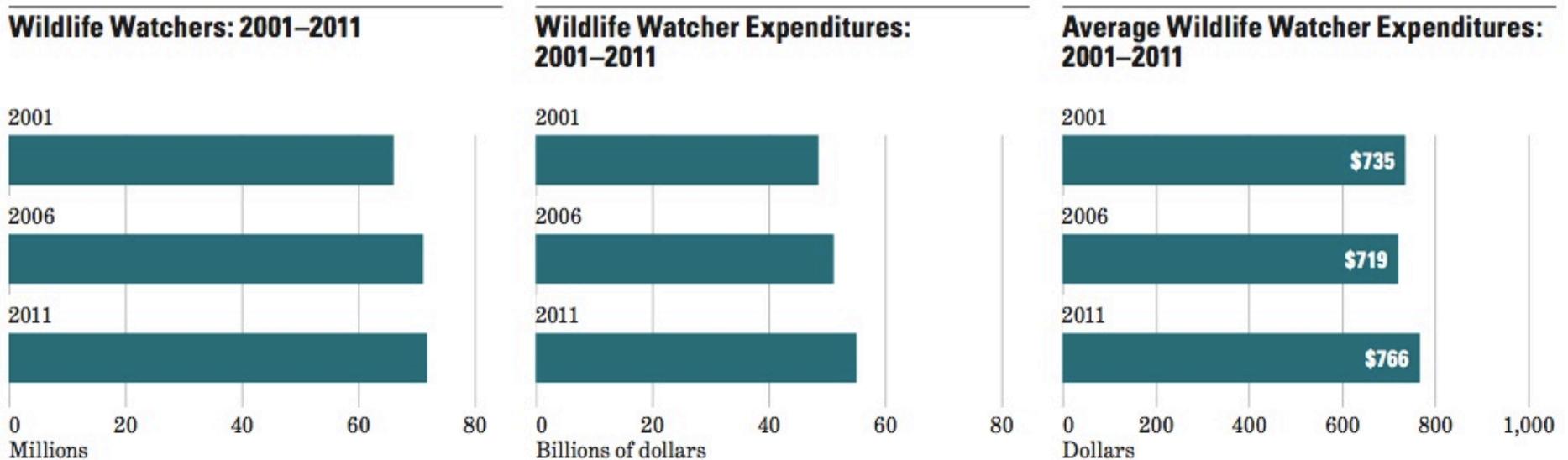
⁶⁷ Birding in the United States: A Demographic and Economic Analysis. U.S. Department of the Interior, Fish and Wildlife Service. 2006. http://library.fws.gov/Pubs/birding_natsurvey06.pdf

Economics

Nationally, wildlife watchers spent \$55 billion on their activities, according to the 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation. As the number of wildlife watchers has increased from 2001 to 2006 to 2011, so have their expenditures. Expenditures include:

- Trip-Related Expenditures – food and lodging, transportation, other trip costs (guide fees, pack trip or package fees, public land use fees, private land use fees, equipment rental, boating costs, heating and cooking fuel).
- Equipment and other expenses – wildlife watching equipment, binoculars, spotting scopes, cameras, video cameras, special lenses, and other photographic equipment, film and photo processing, bird food, commercially prepared and packaged wild bird food, other bulk foods used to feed wild birds, feed for other wildlife, nest boxes, bird houses, feeders, baths, day packs, carrying cases and special clothing, other wildlife watching equipment (field guides and maps), auxiliary equipment, tents, tarps, frame packs and backpacking equipment, other camping equipment, other auxiliary equipment like blinds and GPS devices, off road vehicles, travel or tent trailer, pickup, camper, van motor home, house trailer, RV, boats and boat accessories, cabins, magazines, books, DVDs, land leasing and ownership, membership dues and contributions, plantings.

Figure 7: Wildlife Watchers and Wildlife Watcher Expenditures, 2001-2011⁶⁸



⁶⁸ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. <http://www.census.gov/prod/2012pubs/fhw11-nat.pdf>

Economics of Birding⁶⁹

Nationally, birding expenditures include:

- Equipment related expenditures (binoculars, cameras, camping equipment, etc.). Of the estimated \$23 billion spent on equipment expenditures, 29% was for wildlife watching equipment (like binoculars, cameras, bird food, nest boxes and day packs), 3% was spent on auxiliary equipment (like tents, backpacking equipment, other camping equipment), 35% was spent on special equipment (like boats, campers, trucks and cabins), and 33% was spent on other items (like magazines, land leasing and ownership, membership dues, and plantings).
- Trip related expenditures (food, lodging, transportation and other miscellaneous items). Of the estimated \$12 billion in trip expenditures, 57% was allocated for food and lodging, 35% was spent on transportation, and 7% was spent on other costs such as guide fees, user fees, and equipment rental.

Birding expenditures in 2006 created:

- 671,000 jobs
- \$28 billion in employment income.
- \$6 billion in State tax revenue
- \$4 billion in Federal tax revenue.

Regional Trends and Activities Related to Non-Consumptive Wildlife Watching

According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation⁷⁰, in the West South Central region of the U.S., which includes Arkansas and Louisiana, 26% of the population watch wildlife around the home, and 6% watch wildlife away from home. The numbers for the East South Central region, including Tennessee and Mississippi, are 31% and 10% respectively. There were more birding participants in the South (33%), in which the Lower Mississippi Delta states are located, than in any other region of the country. According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, the percentage of the population that participates in birding in each of the target region states is as follows: Tennessee – 31%; Arkansas – 28%; Mississippi – 19%; Louisiana – 15%. Compared to the US average of 21%, half the states in the target region are above average and half are below. We do not know what accounts for this difference. However, it raises a question - what can Mississippi and Louisiana learn from Tennessee and Arkansas in this regard?

Louisiana, Arkansas, Mississippi, and Tennessee each collect data on the number of days of birding activity per year by residents. These range from a low of 1.3 million days in Arkansas to 4.4 million in Tennessee. Mississippi reports 3.6 million days of birding activity by residents and Louisiana 4.2 million. Tennessee is the only state that reports days of birding by in-state non-residents (almost 2 million) and days of birding by residents in other states (about 2 million).⁷¹ About 86-

⁶⁹ US Fish and Wildlife Service. 2006. Birding in the United States: A Demographic and Economic Analysis.

<http://www.fs.fed.us/outdoors/naturewatch/start/economics/Economic-Analysis-for-Birding.pdf>

⁷⁰ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

⁷¹ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

88% of birding activity in Arkansas, Mississippi and Louisiana and 76% of birding activity in Tennessee appears to involve state residents, while about 12-14% of birding activity in Arkansas, Mississippi and Louisiana and 24% in Tennessee brings in people from out of state.⁷²

Mississippi

There is increased interest by wildlife photographers, birders and butterflyers in the Mississippi Delta.⁷³ Assets in this region include many public lands, wildlife refuges (like the Yazoo National Wildlife Refuge), forests (like the bottomland hardwoods of the Delta National Forest), wildlife management areas and privately owned lands. Current watchable wildlife tourists include photographers (who come year-round), birders (who come in the spring and fall), and butterflyers (who come in the summer). These types of watchable wildlife tourists tend to be middle-aged and better educated with higher levels of income. The Lower Delta Partnership's vision for watchable wildlife tourism is to make wildlife watchers more aware of all the wonderful venues available for wildlife watching and photography in the South Delta. Meg Cooper, Executive Director of the Lower Delta Partnership, whom Yellow Wood spoke with, wants to know about more sites for birdwatchers and butterflyers, special events, walking trails and materials, dining and lodging places, and RV pads.

Louisiana

Dora Ann Hatch of LSU AgCenter reports that a locally owned store, Simmons Sporting Goods in Bastrop, recently increased its square footage to accommodate more outdoor retail items that birders would be interested in; this may be a draw for wildlife watchers visiting this region. Volunteers in this area participate in the Great Backyard Bird Count and the Christmas Bird Count. The Louisiana Ornithological Society provides a checklist by parish for birds (<http://losbirds.org>). As opportunities increase, the number of birders tends to increase. Birders travel in groups of 4-5 friends and often are women aged 55 and older. Birders generally make travel plans for a destination to bird. While they are there, they eat and enjoy staying in comfortable surroundings that allow for socializing, including bed and breakfasts. Trips to cultural events are not usually a part of birding trips.

The rich ecosystems created by Louisiana's unusual terrain offer a nurturing habitat for vast numbers of birds, including both those that are native to the region and many that migrate to or through the area each year. Area state parks and wildlife refuges are perfect for birdwatching and bird photography. The Mississippi River Birding Trail Loops 1-4 are marked birding trails. Visitors come from all over the country come to the Tensas River National Wildlife Refuge (NWR) to hear of the sighting of the ivory billed-woodpecker and to hear about the bear hunt with President Teddy Roosevelt.

There are 8 national wildlife refuges, 7 lakes, 4 bayous, 5 rivers, and 10 wildlife management areas, which provide opportunities for birdwatching within the target region. The two refuges interviewed have had visitors from all 50 states and the Black Bayou Lake Refuge has had visitors from 30 countries. The Tensas NWR has 20-30,000 visitors a year, mostly for hunting; the citizens of Louisiana, Arkansas, Mississippi and Texas are the most frequent visitors. There are also two public hunting lodges (Giles Island and Honey Brake) that offer birdwatching opportunities.

⁷² US Fish and Wildlife Service. 2006. Birding in the United States: A Demographic and Economic Analysis.

<http://www.fs.fed.us/outdoors/naturewatch/start/economics/Economic-Analysis-for-Birding.pdf>

⁷³ Lower Delta Partnership. 2012. Demand Research Report.

Gaps

Gaps specific to wildlife watching include a lack of bird watching guides or guided trips, bird maps, and broadband (internet and cell phone reception). The same gaps that apply to other forms of tourism, such as a lack of dining and lodging options, also apply to birding.

Models and Resources

*Alabama Coastal Birding Trail*⁷⁴

One great model for a regional birding trail is the **Alabama Coastal Birding Trail**, which is a 300-mile birding trail with 50 sites and six loops in Alabama's Gulf Coast region. The Alabama Coastal Birding Trail (ACBT) was opened in 2002 through a U.S. Fish and Wildlife Service grant to the Alabama Gulf Coast Convention and Visitor Bureau (CVB). The CVB, under the direction of Director Herb Malone, has focused on promoting eco-tourism initiatives in the region. Malone was reviewing data on the regional and national economic impact of birders on a community and thought a birding trail would be a way to overlay eco-tourism on the existing diverse bird population in the Gulf Coast. Hank Burch, manager of 5 Rivers, Alabama's Delta Resource Center, is now the current manager of the trail. Since taking over the trail maintenance in late 2011, Burch has worked to replace many of the private sites with sites that have better amenities for visitors. All sites have easily identifiable signs with an 800 number that visitors can call for more information. Burch is focusing on making sure each site is easily accessible to the public. Once the trail is updated, Burch plans to focus on promoting the trail through social media and events associated with the trail. One existing event is the Alabama Coastal Birdfest, which is an annual four-day fall event that draws 300 to 350 birders from 25-30 states. Burch thinks a similar event in the spring, to catch the northern bird migration, could be successful.⁷⁵

*Strawberry Plains Audubon Center*⁷⁶

Strawberry Plains Audubon Center in Holly Springs, Mississippi, hosts a successful annual Hummingbird Migration Celebration and Nature Festival each September. This award winning festival treats thousands of guests to renowned speakers on various nature topics, live animal shows, guided walks/wagon rides and a close-up look at the Ruby-throated Hummingbird, one of nature's most fascinating creatures. Strawberry Plains is the perfect site for these hummingbirds to stop and refuel before the grueling non-stop flight across the Gulf of Mexico. Feeders and an abundance of native plants that provide nectar and insects help the hummingbirds pack on the required weight for the 22-hour Gulf crossing. The setting around the historic Davis House plantation and gardens make this nature celebration an experience.

Tennessee Wildlife Resources Agency

The State of Tennessee and specifically the Tennessee Wildlife Resources Agency does a good job of showing watchable wildlife opportunities around the state (<http://www.tnwatchablewildlife.org/wheretowatch.cfm>). This may be a great model to build on in the entire region.

Audubon Society

There may be potential for a group like Audubon to help the four states develop consistent bird watching guides or guided trips, maps and online resources.

⁷⁴ Alabama Coastal Birding Trail. <http://www.alabamacoastalbirdingtrail.com/>

⁷⁵ Personal communication. Hank Burch. Alabama Coastal Birding Trail. 251-625-0814.

⁷⁶ Strawberry Plains Audubon Center. <http://strawberryplains.audubon.org/>

*Stork and Cork Birding Festival*⁷⁷

The Stork and Cork Birding Festival is an annual summer event at Tara Wildlife in Mississippi.

Aggregators

Aggregators are groups that bring birders together into organized activities. Potential aggregators for birders include birding clubs, couples groups, bus tour operators, garden clubs, paddling clubs, boy scouts, nature clubs, school groups, local organizations, churches, home school groups, fishermen and photographers. Next steps might include making aggregators more aware of the birding assets in the target region.

The Potential

Considering that the average wildlife watcher, factoring in non-residents and residents, spends \$766 each year, there is significant potential to increase spending in the Lower Mississippi River region. If the region attracted 1,000 more wildlife watchers, this would account for an additional \$766,000 in direct spending to the region on an annual basis.

⁷⁷ Stork and Cork Birding Festival. <http://www.tarawildlife.com/stork.htm>

Hunting and Fishing

Based on interest by two of the pilots, this report also includes some information about the consumptive wildlife activities of hunting and fishing.

National Trends

Hunting

In 2011 13.7 million people, 6% of the U.S. population 16 years old and older, went hunting. Hunters in the U.S. spent an average of 21 days pursuing wild game. Big game like elk, deer and wild turkey attracted 11.6 million hunters (85%) who spent 212 million days afield. Over 4.5 million (33%) pursued small game including squirrels, rabbits, quails, and pheasants on 51 million days. Migratory birds, such as geese, ducks and doves, attracted 2.6 million hunters (19%) who spent 23 million days hunting. Hunting for other animals such as coyotes, groundhogs and raccoons attracted 2.2 million hunters (16%) who spent 34 million days afield.

Overall hunting participation increased 9% from 2006 to 2011. The numbers of big game hunters rose 8%, migratory bird hunters increased 13%, and hunters seeking other animals increased by 92%. The number of small game hunters declined 6%.

The 10-year comparison between the 2001 and 2011 surveys shows an increase in both the number of hunters and their expenditures. Overall participation was up 5% over the time period. Big game hunting increased 6%. Small game and migratory bird hunting had declines of 17% and 13%, respectively. Other animal hunting increased 107%. Total hunting expenditures increased 27%. Expenditures for hunting equipment, such as firearms, ammunition, and archery equipment, increased 33%.⁷⁸

Fishing

As one of the most popular outdoor recreational activities in the United States, fishing attracted 33.1 million individuals 16 years old and older in 2011. These anglers spent an average of 17 days fishing. Freshwater fishing (excluding Great Lakes) was the most popular type of fishing with 27.1 million anglers devoting 443 million days to the sport. Great Lakes and saltwater fishing were also popular with 1.7 million and 8.9 million anglers, respectively.⁷⁹

Comparing results from the 2011 Fishing, Hunting, and Wildlife-Associated Recreation Survey with those of the 2006 Survey reveals the number of anglers increased 11%. The biggest increase was by Great Lakes anglers, a 17% increase in participation. The increases for saltwater and non-Great Lakes freshwater angling participation were 15% and 8%, respectively. While participation in fishing increased from 2006 to 2011, total fishing-related expenditures declined 11%. Expenditures for fishing equipment such as rods, reels, poles, and tackle did not decline, however.

Economics

Expenditures by hunters, anglers and wildlife-recreationists were \$145.0 billion. This equates to 1% of gross domestic product; meaning one out of every one hundred dollars of all goods and services produced in the U.S. was due to wildlife-related recreation.⁸⁰

⁷⁸ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

⁷⁹ Ibid.

Hunters spent \$34.0 billion on trips, equipment, licenses, and other items to support their hunting activities in 2011. The average expenditure per hunter was \$2,484. Total trip-related expenditures comprised 31% of all spending at \$10.4 billion. Other expenditures, such as licenses, stamps, land leasing and ownership, and plantings totaled \$9.6 billion, 28% of all spending. Spending on equipment such as guns, camping equipment, and 4-wheel drives comprised 41% of spending with \$14.0 billion.

Total hunting-related spending increased between 2006 and 2011. There was a 30% increase over the five-year period. Purchases of hunting equipment such as guns, decoys, and ammunition increased 29%. The category with the biggest increase was land leasing and ownership with 50%. Trip-related spending was up 39%.

Anglers spent \$41.8 billion on trips, equipment, licenses, and other items to support their fishing activities in 2011. The average expenditure per angler was \$1,261. Trip-related spending on food, lodging, transportation and other trip costs totaled \$21.8 billion, which is 52% of all angler spending. Spending on equipment was \$15.5 billion and comprised 37% of spending. Magazines, membership dues and contributions, licenses, and other fishing expenditures accounted for 11% at \$4.5 billion.⁸¹

Regional Trends

State data from the 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation is unavailable at this time.

Based on 2006 data, in Mississippi, there were 546,000 resident and non-resident anglers (80,000 were non-residents), and 304,000 resident and non-resident hunters (66,000 were non-residents). This data broke out spending by non-residents in each category, but provided information on resident spending only in combination with non-resident spending. Non-resident anglers were spending \$288 per trip and \$38 per day, while residents and non-residents combined were averaging \$434 per trip and \$14 per day. Non-resident hunters were spending \$1328 per trip and \$79 per day, while residents and non-residents combined were averaging \$1694 per trip and \$22 per day. In 2006, 656 thousand state resident and nonresident sportspersons 16 years old and older fished or hunted in Mississippi. This group comprised 546 thousand anglers (83 percent of all sportspersons) and 304 thousand hunters (46 percent of all sportspersons).⁸²

In Louisiana, there were 702,000 residents and non-resident anglers (112,000 were non-residents), and 270,000 resident and non-resident hunters. Non-resident anglers spent \$2,223 per trip and \$123 per day, while resident and non-resident anglers combined spent \$1,416 per trip and \$30 per day. Resident and non-resident hunters combined spent \$1,904 per trip and \$34 per day.⁸³

⁸⁰ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

⁸¹ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

⁸² 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Mississippi. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. <http://www.census.gov/prod/2008pubs/fhw06-ms.pdf>

⁸³ 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Louisiana. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. <http://www.census.gov/prod/2008pubs/fhw06-la.pdf>

Mississippi

The Lower Delta Partnership is interested in hunting and fishing, as many hunters and anglers come to the South Delta annually to hunt and fish. The hunting demographic has been getting older, but there is a new push to get youth involved in the outdoors. As a result, more youth are getting involved. Most hunters and anglers that come to this area either hunt on private land and belong to a private club or have been hunting the public lands for years. Newer hunters tend to belong to clubs. Alligator and hog hunting are increasingly popular as well as the standard deer and duck hunting. Target/clay shooting, which is offered by Tara Wildlife, but no place else, is another popular trend. Target/clay shooting appeals to people with camps and those on paid hunts during down time. Assets to support hunting and fishing include many public lands (like Delta National Forest), oxbow lakes, some outfitters, Tara Wildlife, Eagle Lake, Lake Washington, grocery stores and limited restaurants. Hunters and anglers are mostly male and at a variety of economic levels.

Louisiana

According to recreational license information from 2004-2012 (available at <http://www.wlf.louisiana.gov/licenses/statistics>), recreational licenses have increased in the area from 2004 to 2012; this area pulls hunters and fishermen from across the state that may have purchased their license from outside the region. There are many assets in terms of hunting and fishing, including 8 wildlife refuges, 7 lakes, 4 bayous, 5 rivers, and 10 wildlife management areas. There are two public hunting lodges (Giles Island and Honey Brake). People from all over the US travel to northeastern Louisiana to hunt; however, most of the hunters come from southeastern areas, from Texas to North Carolina down to Florida. These hunters lodge in some of the privately owned lodges, camps or recreational vehicle parks. Those who pay for lodging and a guide typically spend \$1,900 for a three-day hunt⁸⁴. A less costly experience can be had by leasing property and hunting or hunting on the wildlife refuges in the area. Many people belong to hunting clubs which provide the amenities as part of the price to join. Aggregators include corporations who offer retreats to employees, weddings, ecotourism groups, hunting clubs, men's groups, etc.

Consumptive Tourism Gaps

The gaps in this region related to hunting and fishing are not a lack of services for hunters and anglers; rather they are the lack of well-organized and publicized activities for guests who come to accompany hunters and anglers but do not fish or hunt themselves. The main message is that not everyone in a family hunts; activities and tourism opportunities need to cater to all members of a family. These people are looking for non-consumptive activities that might require increased staffing of hunting lodges and might include a camp for youth, equestrian trails, cultural and heritage activities, paddling, and other options.

Filling gaps in the other tourism areas will work toward filling this gap as well. Walton nature-based tourism grantees along the Lower Mississippi River may want to collaborate with hunting and fishing lodges to provide the non-consumptive activities they are seeking for families of hunters and anglers. With the assistance of an organization like the Audubon Society, it may be possible for the region to collaborate to create guides or guided trips, maps and itineraries.

Hunters and anglers could also benefit from improved lodging, including RV sites, dining options, accessible supplies, and guides.

Recommendations and Resources

The established hunting and fishing culture and infrastructure may provide a base on which to build in expanding access to and engagement in a wider variety of tourism activities, particularly for the families of hunters and anglers. Hunting lodges may provide part of the answer to lodging shortages off season.

⁸⁴ Hatch, Dora Ann. 2012. Demand Study for Northeastern Louisiana.

Tara Wildlife

One hunting resource in Mississippi is Tara Wildlife, which offers hunting trips, corporate retreats, and summer camps. Their archery hunts bring 25-30 hunters every 3 days; their rate of repeat business is 80%. Their surveys have said that hunting deer was not the top reason people came to Tara; the top reason was being with nature and seeing wildlife, getting away and seeing friends. According to Manager Mark Bowen, hunters come to Tara from up and down the East Coast. Tara also attracts companies wanting to hold business meetings and retreats; the average size is 20-40 people. Tara offers nature weekends twice a year. The last week of August, their nature weekend attracts 140-160 people and offers paddling, wildlife watching, and more. Their Stork and Cork Birding Festival is another draw. Tara also offers fishing memberships as they have 8 miles of river frontage.

The Potential

Based on the fact that the average annual hunter expenditure was \$2,484⁸⁵, if this region were to attract 1,000 hunters, that would account for almost \$2.5 million in direct spending a year. Based on the fact that the average annual angler expenditure was \$1,261⁸⁶, the addition of 1,000 anglers would lead to over \$1.2 million in direct spending a year.

⁸⁵ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

⁸⁶ 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau.

Recommendations for Strengthening Tourism related to Paddling, Culture and Heritage, Non-consumptive and Consumptive Wildlife Activities in the Lower Mississippi River Region

Based on the work done so far, it is clear that, while there is real potential to increase tourism related to Paddling, Culture and Heritage, Non-consumptive and Consumptive Wildlife Activities in the Lower Mississippi River region, it will take increased collaboration to realize it. There have been some successful examples of regional collaboration already, and there is clearly room for more. If the goal is to increase nature-based tourism in the Lower Mississippi River region in an effort to increase the amount of conservation and preservation happening in the region, collaboration is necessary. This may take the form of a wealth creation value chain or a network.

Wealth creation value chains are strategic alliances of partners who work together to provide specific products, services and values to meet market demand. A value chain is a set of processes, trading partner relationships, and transactions that delivers a product or service from the producer(s) to the consumer(s). There is a supply chain associated with every product or service we use. For example, members of a regional tourism value chain might include landowners, small businesses, lodging, dining, transportation, inbound tour operators, out of area tour companies and other aggregators, attractions, artisans and others.

In any value chain, there is a role for aggregators. For example, rather than marketing a region to individual tourists, it makes much more sense to engage aggregators (such as tour operators, bus companies, seniors groups, church groups, and colleges/universities) that can bring many more people to a region and organize these trips throughout the year.

Potential Aggregators

One bus company we spoke with, Cline Bus Tours, operates 100 buses in 4 locations. Most buses can carry 56 passengers, but some range from 20-40. Cline is equipped to provide transportation for 30 tours a day. Much of their work is around school field trips, but they also serve seniors, church groups and international visitors. Cline generally does not package tours, but rather provides transportation for those companies that are packaging tours. As for advertising, Cline finds that their sponsorship of Helena, Arkansas radio station KFFA helps them attract an international audience.

Another tour company, Sweet Magnolia Tours, has a large international presence; they cater to Europeans who want to listen to music in the Delta. They are another potential value chain partner. Sweet Magnolia has stated that there are not enough amenities in the region available for their customers. Sweet Magnolia offers fly/drive multi-city packages (including All-Arkansas, All-Mississippi, All-Tennessee, Nuttin' But Blues, Land of the Kings, Roots of Rock n Blues, Rhythms of the South, Romance of the Deep South, Southern Soul Experience, and Ultimate Music and Heritage Deep South Tour).

Jay Wood at Mississippi Audubon conducted research on tour operators in the region in 2012, which resulted in a resource list. Next steps for Jay and the Walton grantees over the next year are to determine the criteria by which they select destinations for their customers, and any unmet customer desires. Jay's research clearly suggests that connecting with the convention and visitors bureaus (CVBs) in the region is another possible strategy; CVBs are aware of groups seeking tours in the region.

There are two additional coalitions with which a regional initiative should connect to identify potential value chain partners. Travel South USA⁸⁷ is a coalition of southern state tourism directors who attend conferences, trade shows, etc. Escape to the Southeast⁸⁸ is a coalition of tourism industry companies and professionals, basically a professional trade association.

Potential Learning Journeys

In addition to identifying models for regional tourism development by activity, another goal for this study was to suggest potential learning journeys for the Lower Mississippi River grantees. A learning journey is a key tool to foster understanding and application of the wealth creation approach, as well as an excellent approach to foster learning and collaboration. It is a visit to a site where a value chain similar to the one you are trying to create has been created and maintained over time and successfully produces multiple forms of wealth. Learning journey participants learn why members of the value chain became engaged and how they have benefited, as well as what mistakes were made and lessons learned. To maximize learning and application of the learning journey back at home, it is important that the journey be intentionally structured around the fundamental challenges and opportunities facing the visiting group. Learning journeys make the most impact when visitors are able to meet and learn directly from colleagues who play roles in the value chain similar to the roles they envision for themselves. It is also important that group members be intentional in the questions they pose.

There are a variety of potential learning journeys relevant to developing regional tourism in the Lower Mississippi River region. The selection of a learning journey will depend on what the group wants to learn. For example, if the group is interested in learning about how tourism/recreation groups in different states collaborate to create something broader, the Northern Forest Canoe Trail might be an interesting journey. This trail ties together four states and Canada to provide a 740 mile long paddling opportunity. This learning journey would also offer an opportunity to learn more about how to develop paddling tourism. See more information in Appendix D.

If historical/cultural tourism is of interest, there are several potential learning journeys. Birmingham, Alabama is an excellent example of a city using the civil rights movement to attract tourists interested in history. See more information in Appendix D.

If wildlife watching is of interest, Texas or Alabama offer well-used and well-regarded birding trails. The Alabama Coastal Birding Trail is a great example of something relatively close. See more information in Appendix D.

Filling Common Gaps

In researching regional demand for nature based tourism as well as individual pilot demand, it became clear that there are common gaps to attracting tourists and aggregators to this region, which include hard infrastructure such as lodging and dining, as well as soft infrastructure such as outfitters, public education and

⁸⁷ 3400 Peachtree Road NE, Suite 939, Atlanta, GA 30326, Tel: 404.231.1790 Fax: 404.231.2364, info@travelsouthusa.com, <http://www.travelsouthusa.org/>

⁸⁸ 3400 Peachtree Road, NE, Suite 725, Atlanta, GA 30326-1170, Phone: (404) 364.9847, Fax: (404) 262.9518, STS@southeasttourism.org, <http://www.escapetothesoutheast.com/index.cfm>

training for people who come into contact with tourists, and an online presence with regard to marketing. Gaps and resources that are specific to different types of tourism opportunities have been identified above.

Hard Infrastructure

Lodging

The target region as a whole suffers from limited lodging opportunities for tourists. The range of desired lodging options mentioned by respondents includes more camping, RV options, dorm-style accommodations for John Ruskey's paddling trips, more bed and breakfasts and more high-end lodging. Large hotel chains are unlikely to build new hotels in the small towns around this region. Conversations with Jonathan Crisp of the American Ecotourism Society lead us to believe that he may be a good partner in developing lodging appropriate to the region. Jonathan is interested in the possibility of building large cabins around this area that would eventually be owned, managed and controlled by local communities. One gap noted by LSU AgCenter specific to eastern Louisiana is the lack of a large conference hotel to attract large conventions. While this area has diverse lodging options, these hotels are typically busy during the week (when conferences need lodging) and empty on the weekends.

Dining

Tourists today are challenged to finding adequate dining options in this region. Local food and restaurants are needed; there is value in encouraging more local cuisine as an opportunity to further promote cultural and heritage tourism, potentially through a culinary trail, such as the successful Southern Foodways Trail. To encourage entrepreneurs to develop such businesses, technical assistance, community financing, and small business assistance are needed.

Soft Infrastructure

Outfitters and Guides.

Increasing demand in the paddling, historical/cultural and non-consumptive wildlife watching subsectors suggests a need for more outfitters and guides. This implies a need for technical assistance and support for outfitters and guides, such as education, training and insurance. John Ruskey is training new outfitters and may be a good partner in developing this capacity in the region. The American Canoe Association may be a good ally in terms of providing technical assistance and support for outfitters, including education, training and insurance. With regard to wildlife watching, Audubon may be a good partner in training guides knowledgeable in watchable wildlife. As for historical/cultural guides, there are historical preservation agencies in each state, which may be a good first connection to pursue to help in the training and development of tour guides.

Collaborative Marketing and Online Presence

There is currently not enough online marketing for the region and what does exist is very disjointed. Part of a strategy moving forward may include having a regional marketing and promotional entity or network that would manage an online presence for the region. In addition, there is a need for consistent and comparable data across the region, as well as comparable information for tourists on what's available. This may be an area where bringing together the tourism agencies in each state may help to develop a regional solution. In addition, it may make sense to connect the tourism and recreation agencies in each state with the historical preservation agencies to develop the cross-marketing necessary to bring paddlers and recreational tourists to historical/cultural sites and vice versa.

“Destinations in which entrepreneurship in the business sector is thriving are more likely to become competitive in the active outdoor recreation travel market.”⁸⁹ Supporting entrepreneurship in this region may be a strategy for increasing the availability of lodging, dining and guides/outfitters.

There is also a need for greater partnership to leverage funding and increase reach.

Public Education and Hospitality Training

Destinations can have incredible attractions, but if the hospitality and education of the residents and businesses is lacking, the destination will not be successful. This is why public education and hospitality training are so important. The Countrystyle Community Tourism Network (CCTN)⁹⁰ has over the past 35 years developed positive relationships with communities all over Jamaica. In recognizing the need for communities to be properly trained, CCTN set up the Villages as Businesses program, which trains community entrepreneurs in villages to prepare them for market ready tours. Training is provided in hospitality skills, business management, product development, marketing and community governance.

Sustainable Rural Regenerative Enterprises for Families (SURREF)⁹¹ in the Black Belt of Alabama has taken the Jamaican model and built upon it, by also providing environmental literacy training through Roots of Success.⁹² SURREF has begun to collaborate with businesses, organizations and individuals in Black Belt communities to build capacity and quality of the local product offerings by offering training in core tourism areas of practice. This is done by preserving the unique knowledge and culture of rural communities, while focusing enterprises on conservation, cultural heritage, and agro-tourism as economic alternatives to generate synergy between the communities and these areas. Training is focused on best practices in hospitality (client arrivals/receptions, customer service, lodging services, dining services, client departure/checkout, transportation services, safety equipment and emergency planning, merchandise and souvenir sales, accounting/budgeting), and tour guiding services (interpretation and traveler engagement, cultural heritage, agro tourism, nature based tourism, species database development and publishing, activity based experiences).

The addition of the Roots of Success curriculum is meant to gain an empowering environmental literacy and job readiness curriculum that prepares youth and adults from underserved communities for opportunities in the green economy. The curriculum includes modules in fundamentals for environmental literacy; water; waste; transportation; energy; building; health, food and agriculture; community organizing and leadership; and application and practice.

“Eco-adventure travelers, unlike mainstream package tourists, are frequently less sensitive to deficiencies in hard infrastructure, but perhaps more sensitive than other travelers when it comes to conservation and soft tourism infrastructure. While hard infrastructure may take substantial capital investment and years to develop, sometimes the soft infrastructure required by eco-adventure travelers can be developed with comparatively little capital outlay.”⁹³

⁸⁹ Adventure Travel Trade Association. 2010. Adventure Tourism Development Index. 2010 Report. http://www.adventuretravel.biz/wp-content/uploads/2011/07/atdi_2010_report.pdf

⁹⁰ Countrystyle Community Tourism Network. Diana McIntyre-Pike. ijptcaribbean@yahoo.com. www.countrystylecommunitytourism.com

⁹¹ Sustainable Rural Regenerative Enterprises for Families (SURREF). Euneika Rogers-Sipp. e.rogsipp@gmail.com. 404-468-8236

⁹² Roots of Success. <http://rootsofsuccess.org>

⁹³ Benjamin, S. 2009. Economic Impacts of River Paddle Trails. East Carolina University. Center for Sustainable Tourism. <http://www.carolinathreadtrail.org/assets/files/The%20Economic%20Impacts%20of%20River%20Paddle%20Trails.pdf>

Bringing the Region Together

The Walton Family Foundation Lower Mississippi River nature-based tourism grantees have ambitious plans to further develop and promote their nature-based tourism offerings. Over the past year, these grantees have studied their value chains and potential demand for the tourism offerings they are providing. Based on conversations with the pilots as well as regional and state representatives in the areas of nature-based tourism, there seems to be a great deal of potential to develop the individual offerings of the individual pilots and connect with larger initiatives. Before developing a regional initiative, it seems prudent to allow the pilots the time and space to further develop their own value chains. Once this happens, the pilots will be better able to engage in a regional initiative.

Regarding a regional initiative, while the initial hope was for a regional value chain, it is our feeling that there may be more immediate use for a regional network that allows for networking of different place-based tourism initiatives throughout the Lower Mississippi River region and beyond. There are a number of regional initiatives with which the pilots could connect through a network, such as the Great River Road, the Mississippi River Trail, the two National Water Trails along the River, etc. A regional nature based tourism value chain is still a possibility, but a wider variety of partners will need to be engaged.

Networking Opportunities

To scale up impact in this region, it is critical to begin to connect with partners with similar interests. There are many people and organizations working on similar types of tourism and recreation opportunities, and several are willing to think about how to scale up impact regionally. All the organizations listed below have either expressed interest in a regional conversation or seem to be open to considering it.

Lower Mississippi Resource Conservation Committee

Ron Nasser, Coordinator, (601-629-6602, Ron_Nassar@fws.gov) and Angeline Rodgers, Assistant Coordinator (601-629-6621, Angeline_Rodgers@fws.gov)
<http://www.lmrcc.org/>

The LMRCC, based in Vicksburg, Mississippi, is a coalition of 12 state natural resource conservation and environmental quality agencies in Arkansas, Kentucky, Louisiana, Mississippi, Missouri and Tennessee. It provides the only regional forum dedicated to conserving the natural resources of the Mississippi's floodplain and focuses on habitat restoration, long-term conservation planning and nature-based economic development. This organization works cooperatively with the Army Corps of Engineers. The LMRCC is now engaged in the Lower Mississippi Resource Assessment, which is looking at three components:

1. River engineering
2. Habitat assessment
3. Recreation needs.

One of their goals is to be of use to organizations and networks operating in this region. The LMRCC has an impressive array of GIS layers for this region and can be a resource in terms of mapping also.

Miss Lou Rural Tourism Association

Rachael Carter, 662-325-1619, carter@sig.msstate.edu

This association is interested in rural tourism in Mississippi and Louisiana, which is half of our region.

Mississippi River Trail

479-236-0938

<http://www.mississippirivertrail.org/map.html>

The Mississippi River Trail (MRT) is a biking trail that runs the entire length of the Mississippi River. It is the leader in connecting people and communities with the river through development and promotion of multi-use pathways and bicycle friendly roads. Its vision is to connect people with the river, communities to each other, and the river and its unique history and culture to the nation and the world. MRT's goals include organizational development, route development, and encouraging use.

Natural Resource Enterprises Program, Mississippi State University

Daryl Jones, 662-325-5769, djones@cfr.msstate.edu

<http://www.naturalresources.msstate.edu/>

Daryl Jones, Program Coordinator of the Natural Resources Enterprise program at MSU, is a great ally to the work of the individual pilots and to a regional approach to nature-based tourism in the Lower Mississippi River region. The Natural Resource Enterprises (NRE) Program was established in the Department of Wildlife and Fisheries and Cooperative Extension Service at MSU to educate non-industrial private landowners in the Southeast about sustainable natural resource enterprises and compatible habitat management practices. The Natural Resource Enterprises Program is focused on effectively delivering information to landowners and community leaders that will encourage informed decision-making regarding the management of land and enterprises.

Mississippi River Institute

Larry Jarrett, Director, DeSoto County Greenways and Parks, 662-489-9708, desotogreenways@gmail.com

In conversations with Larry Jarrett of the Mississippi River Institute, it's clear that this group can be a great regional partner as well. Natural Resources Initiative of North Mississippi (NRI) brings together federal, state and local representatives from the natural resources and economic development sectors to protect and sustain natural resources while promoting business development opportunities. NRI began in November 2001 with a series of meetings and planning sessions. NRI incorporates the goals and objectives of its network organizations by promoting partnerships and leveraging of resources. Their mission is to facilitate achievement of an environmentally sustainable, healthy and dynamic economy through creative leadership and proactive partnerships that value the use and protection of natural resources and human capabilities for the benefit of present and future generations.

Some accomplishments that relate to a Lower Mississippi River regional tourism approach:

- Selected as one of nine organizations and communities from across the southeast to receive planning and technical assistance from the National Park Service's Rivers, Trails and Conservation Assistance Program.
- Sponsor of the Mississippi Naturalist Program and Teacher Environmental Education Workshops in North MS.

- Set up a Land Trust (North MS Land Trust) to serve North MS.
- Initiated a State-wide Nature Based Tourism Task Force in 2005.
- Helped Start a County Greenways and Parks Program in DeSoto County, MS.
- Conducted the 2009 and 2010 Mississippi Green Infrastructure Training conference. Developed Green Infrastructure education and outreach materials for Mississippi that were distributed to the U S Environmental Protection Agency and the Mississippi Department of Environmental Quality to promote awareness of and lead to the incorporation of Green Infrastructure principles in future projects.

National Trust for Historic Preservation

Beth Wiedower, National Trust for Historic Preservation, 870.816.0774, bwiedower@savingplaces.org www.arkansasdelta.org

Beth Wiedower was a preservationist with experience in the fields of community revitalization and cultural heritage development. She was the Arkansas Delta Field Director for the National Trust for Historic Preservation’s Rural Heritage Development Initiative in Arkansas – a multi-year pilot program focusing on heritage based economic development in the 15 county Arkansas Delta. As part of her work, she was incubating and initiating projects, and looking at cutting edge innovation in the field of preservation and community revitalization. The Main Street model has been broadened to work better for rural and regional areas to look at building stock, entrepreneurs, economic development, marketing and design. Her approach in her region was an asset based economic development approach to build on existing assets to create unique places in the region. She was also a part of a project with Audubon called Birding the Byways, working in 15 counties from the Missouri Line to the Louisiana border, developing birding experiences along the scenic byways. Part of this work with Audubon involved creating a curriculum for hunting lodges, hoteliers, B&Bs to help them to gain off-season value added business and to educate them that birding is a major industry around the country and the world. Beth worked with Phillips Community College in Arkansas County to develop that curriculum. Beth has also worked with Arkansas Delta Made, which supports 70 entrepreneurs and small businesses throughout the Delta, modeled on Handmade in America. Beth thinks there may be a way to connect with the Brand USA tourism initiative, which is meant to market and rebrand the US to international travelers.

Beth has great insights into how to build up entrepreneurs in this region to serve the tourism industry. She is interested in regional thinking across state lines. She was part of the MidSouth Regional Greenprint Steering Committee, which is another model of collaboration. This steering committee is exciting because it is on a large enough scale and representations have come together across state lines and collaboratively applied for and received federal money for implementation. Beth believes that the region needs to work toward some organization or board or advisory committee with political will to work together across states to implement great ideas around tourism. However, there is a need for political will which can, in turn, attract funding.

NOTE: Since we last spoke with Beth, she has changed jobs and is now the Senior Field Officer at the new Houston Field Office for the National Trust for Historic Preservation.

American Society of Ecotourism

Jonathan Crisp, President, The American Society of Ecotourism (ASET), 901-833-7570, jzcrisp@gmail.com

<http://www.etourism-usa.com/>

One opportunity to consider is a continuing conversation with Jonathan Crisp, President of the American Society of Ecotourism in Cordova, Tennessee. Jonathan grew up along the Mississippi River in Lauderdale County, between Shelby Forest and Tipton County. He feels that this region is one of the best kept secrets, being along the flyway from Canada to Mexico. Jonathan works for Kimmons Wilson, a hotel operator that operates Holiday Inns, Embassy Suites and Hampton Inns and brings in \$800 million in revenues. He is also an adjunct professor at the University of Memphis, training hotel managers through his hospitality program. Jonathan is very interested in a triple bottom line approach to tourism as well as attempts to change human behavior. He feels that ecotourism is a balance between people, profit and planet. The American Society of Ecotourism will have its own website soon; www.etourism-usa.com. Jonathan is interested in enrolling students in the hospitality school in order to change the thinking about ecotourism.

Jonathan's newest endeavor is to use structural insulated panel technology or SIPS to develop lodging in this area of the Mississippi River. He's built 25 hotels and realizes that big hotels are not going to locate in the region of the Lower Mississippi River. He's considering the bottoms between Lauderdale County and Reelfoot Lake for a test. Jonathan wants to use SIPS to panelize LEED certified cabins that would hold 18 campers with men's and women's bathrooms, as well as meeting space, pantry, and heating and cooling. The sides of the buildings are designed with garage doors so that the building can turn into a pavilion. Jonathan hopes to get corporations to adopt cabins, which could be built by a community barn raising. Kids could get hands-on experience and grist for their resumes. Without debt, the cabins can then be turned over to a community organization for maintenance and management. There must be a guarantee that 20% of the revenues that come out of the cabins would go back to the nearest Wildlife Refuge. Jonathan's focus would be 40-60 miles outside of Memphis to start, to service those people looking for stay-cations. Cabins could be rented for \$100 or more a day. He wants to build these cabins and make them attractive enough to bring mass tourists to the area, supporting nature, and creating minimal impacts, learning about the environment and being friendlier to local habitats. Jonathan has an architectural firm, A2H in Memphis, that volunteered to do the architectural pieces.

Jonathan feels that the largest demand for this type of lodging right now would be Reelfoot Lake, where there are bald eagle tours now. However, he believes that these cabins could be built anywhere in the US where there is a demand generator. He wants people and/or communities to adopt buildings and build them like Habitat for Humanity. A national nonprofit support team could manage the big picture, and turn over the cabins to a nonprofit in each community. It could become part of a neighborhood association. However, he wants there to be inspections to make sure there is no abuse of the system. This would create a local supply or value chain, so that local people are supplying consumables, cleaning and maintenance. This would require training locally.

The main objective is to build these and keep the cost as low as possible in order to support the community and habitat. "You can't build a big hotel in these areas... it would have a high impact on the area."

Next steps for Jonathan are to talk to large hotel chains and foundations, like the Wilson Family Foundation, about grants to get this started, and to find a place to build the first one. "I think I can use this system to protect what needs to be protected in nature... and make a sustainable profit without allowing capitalism to rape and pillage. And create poverty alleviation."

Mississippi River Water Trail

Jon D. Summers, Rivers Project Office, Mississippi River Water Trail, 636-899-0094, Jon.D.Summers@usace.army.mil

<http://www.greatriverwatertrail.org/>

Jon Summers is a Natural Resource Specialist with the U.S. Army Corps of Engineers in the St. Louis District. Jon is developing a blueway on the Mississippi River in this district. The blueway is 120 river miles within the controlled sections of the River. His plans include taking it down to Cairo in the open section of the River, which is similar to what is faced in the Lower Mississippi. Eventually the water trail will run 300 river miles from Saverton, Missouri to Cairo, Illinois. A Mississippi River Water Trails Association has also been started along the trail.

This blueway is a collaboration between the Corps, St. Louis Canoe and Kayak Club, Mississippi River Water Trail Association, state agencies, U.S. Fish and Wildlife Service, National Park Service. The trail also collaborates with Convention and Visitors Bureaus and the Sierra Club. The Water Trail Association meets once a month; all the groups mentioned would be a part of that association. The ultimate goal is to make one trail for the entire 2,400 miles of the River with consistency.

Next Steps

There are a variety of next steps that could be taken to move this regional nature-based tourism endeavor forward. While the pilots on the ground are doing great work, a regional initiative requires more partners with shared goals and an interest in taking this work to scale. As possible next steps, we suggest convening people from the four-state region who have an interest in working at a regional scale in an effort to articulate shared goals. This could include developing a strategy to measure progress. Additional possible next steps include:

1. Enlist the assistance of a tourism development consultant. Yellow Wood has had experience with Solimar International⁹⁴ which has specific expertise in community-based tourism; David Brown is working with a community-based tourism initiative in Alabama, SURREF. There are undoubtedly other tourism development consultants.
2. Conduct a more detailed investigation into consumer tourism demand to provide information needed to determine priorities with respect to lodging, dining and other services and amenities. SURREF has worked with the Marketing Workshop⁹⁵ to conduct a study of consumer tourism demand in Alabama.
3. Plan one or more learning journeys. Walton Foundation staff, grantees in the four states, and those regional partners that are engaged need to think about what the focus of a learning journey would be, whether to learn more about a particular form of tourism (like paddling) or ways that regions have collaboratively promoted themselves.
4. Research best practices in addressing specific gaps such as public education, hospitality training or local dining options. There may also be value in researching best practices around educating community residents about the value of their hometowns and regions so that they are better able to promote what is interesting and fun about where they live.
5. Develop and test market sample potential tourism itineraries. This was discussed at the October meeting of Walton nature-based tourism grantees held in Louisiana. This still seems to make sense as a strategy for engaging state tourism directors and other tourism professionals in the offerings of the Lower Mississippi River region. The two we have discussed so far include one focused on John Jay Audubon's travels through the Lower Mississippi River region. The other we discussed was focused on blues or music in general along this corridor.
6. Bring together state tourism directors to explore the potential for these four states (Arkansas, Louisiana, Mississippi, and Tennessee) to work together to support the potential tourism offerings of a larger Lower Mississippi River region nature-based tourism group. There may be a discussion about cross-marketing between states, recognizing that the majority of tourists to this region are coming from within the region.
7. Consider the creation of a potential regional value chain or a regional network for nature-based tourism along the Lower Mississippi River. There are many networks already operating in this area, but none that are specifically focused on nature-based tourism. This would allow Walton and its grantees to begin to collaborate with others who have similar interests and goals.

⁹⁴ Solimar International. David Brown. 202-518-6192. www.solimarinternational.com

⁹⁵ Marketing Workshop. 770-449-6767. <http://www.mwshop.com/>

Appendices

Appendix A: Lower Mississippi River Resource Assessment Area

Counties & Parishes in the Lower Mississippi River Resource Assessment Area (As defined by the Army Corps of Engineers)

Counties in **bold** are those targeted by Walton grantees. Counties in **bold** and parentheses () are targeted by Walton grantees but not a part of the Lower Mississippi River Resource Assessment Area.

Illinois

Alexander

Kentucky

Ballard

Carlisle

Hickman

Fulton

Missouri

Scott

Mississippi

New Madrid

Pemiscot

Tennessee

Lake

Dyer

Lauderdale

Tipton

Shelby

(Obion)

Arkansas

Mississippi

Crittenden

Lee

Monroe

Phillips

Arkansas

Desha

Chicot

(Ashley)

(Clay)

(Craighead)

(Cross)

(Drew)

(Greene)

(Independence)

(Jackson)

(Jefferson)

(Lawrence)

(Lincoln)

(Lonoke)

(Poinsett)

(Prairie)

(Pulaski)

(Randolph)

(St. Francis)

(White)

(Woodruff)

Mississippi

Desoto

Tunica

Coahoma

Bolivar

Washington

Leflore

Holmes

Humphreys

Sharkey

Yazoo

Issaquena

Warren

Claiborne

Jefferson

Adams

Wilkinson

Louisiana

East Carroll

Madison

Caldwell

Franklin

Tensas

Catahoula

Concordia

Rapides

Avoyelles

East Feliciana

West Feliciana

Point Coupee

St. Landry

East Baton Rouge

West Baton Rouge

St. Martin

Iberville

Ascension

Iberia

St. Mary

Assumption

St. James

St. John the Baptist

St. Charles

Jefferson

Orleans

Terrebonne

Lafourche

St. Bernard

Plaquemines

(Ouachita)

(Morehouse)

(West Carroll)

(Richland)

Appendix B: State Specific Tourism Data

Table 6: Economic Impact of Tourism in the Selected Counties of Grantees in this Region (see list in Appendix A)

	Expenditures (\$ Millions)	Payroll (\$ Millions)	Employment (Thousands)	State Tax Receipts (\$ Millions)	Local Tax Receipts (\$ Millions)
Louisiana - Selected County Total ⁹⁶	340.06	56.07	2.74	15.67	7.92
Mississippi - Selected County Total ⁹⁷	1.44	19	2.2	.12	.027
Tennessee - Selected County Total ⁹⁸	3,039.92	1882.21	48.53	133.84	87.86
Arkansas – Selected County Total ⁹⁹	545.35	100.71	6.5	33.6	10.43
Total – Regional Counties	\$3,926.77	\$2057.99	59.97	\$183.23	\$106.237

Tourists to this region like to shop, dine, sightsee, visit museums, national and state parks, historic sites, nature and ecotravel. Many visitors to these states are visiting family and friends, which provides an opportunity to engage them in seeing the sights.

In general, tourists to the states of the Lower Mississippi River region are coming from within the region. Visitors to each of the Lower Mississippi River states come from their own states and surrounding states, including Texas, Missouri, Oklahoma, Florida, Alabama, Georgia, Illinois, Ohio and Kentucky. Tourists visiting this region are generally visiting for 2-3 nights. The average age of tourists ranges from the high 40s to low 50s.

⁹⁶ TNS TravelsAmerica. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf

⁹⁷ Fiscal Year 2011 Economic Contribution of Travel and Tourism in Mississippi. February 2012. http://www.visitmississippi.org/uploads/docs/PDF/FY2011_Economic_Contribution_Report.pdf

⁹⁸ The Economic Impact of Travel on Tennessee Counties, 2011 <http://www.tnvacation.com/industry/uploads/105/2010%20Economic%20impact%20report%20FINAL.pdf>

⁹⁹ The Economic Impact of Travel in Arkansas. 2011. http://www.arkansas.com/userfiles/apt_2011_annual_report.pdf

Arkansas

Arkansas is known as the Natural State due to the abundance of opportunities for outdoor recreation. There are 52 state parks, seven National Park System sites, and three national forests. Arkansas was also the site of more than 770 military actions during the Civil War. Many of these sites are open to visitors as parks or museums.

The top visitor origin states, accounting for 53% of total visitors, were Texas, Missouri, Arkansas, Oklahoma and Louisiana. The top five Arkansas counties listed as a final destination are Garland, Pulaski, Carroll, Benton and Fulton; none are in the Lower Mississippi River region.¹⁰⁰ The Arkansas Delta Byways region of the state, which is part of the Lower Mississippi River region, brings in over \$545 million in tourism expenditures.

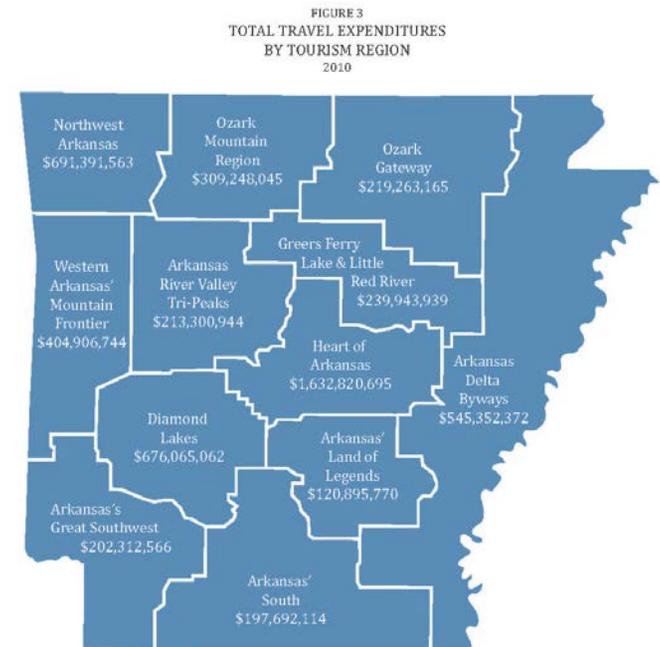


Figure 8: Arkansas - Total Travel Expenditures by Tourism Region, 2010

¹⁰⁰ The Economic Impact of Travel in Arkansas. 2011. http://www.arkansas.com/userfiles/apt_2011_annual_report.pdf
Figure 4 is also drawn from this report.

Table 7: Impact of Travel on Arkansas Tourism Regions, 2010¹⁰¹

Table 4 – Impact of Travel on Arkansas Tourism Regions by County – 2010 Preliminary* (continued)

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX (Dollars)	TRAVEL-GENERATED LOCAL TAX (Dollars)	VISITORS (Person Trips)
ARKANSAS DELTA BYWAYS						
ARKANSAS	29,932,552	4,825,805	305	1,819,925	653,091	135,087
CHICOT	10,992,380	2,234,062	133	669,170	226,386	48,765
CLAY	12,788,842	1,968,453	120	775,533	316,881	55,397
CRAIGHEAD	82,742,156	16,128,328	1,047	5,084,756	1,358,280	376,329
CRITTENDEN	138,904,770	25,235,348	1,705	8,678,741	2,530,393	632,193
CROSS	12,668,520	2,270,559	143	774,138	240,734	58,340
DESHA	20,272,510	3,688,308	251	1,238,032	378,573	95,020
DREW	21,045,018	4,018,900	281	1,289,998	380,467	94,884
GREENE	20,406,674	3,766,813	252	1,238,505	434,842	94,022
LEE	3,344,741	480,130	34	203,043	93,754	11,312
MISSISSIPPI	88,321,843	18,800,565	1,165	5,413,805	1,762,919	416,478
MONROE	24,866,153	4,267,507	291	1,517,502	452,184	108,246
PHILLIPS	30,223,334	5,016,378	303	1,857,653	655,234	132,424
POINSETT	10,855,974	1,314,354	82	688,233	196,185	52,332
ST. FRANCIS	37,986,905	6,694,475	406	2,357,783	759,992	171,835
TOTALS	545,352,372	100,709,985	6,518	33,606,817	10,439,915	2,482,661
STATE TOTALS	5,453,192,978	1,029,444,562	58,336	284,743,974	103,553,016	22,770,435

* Data is preliminary and will be revised when new benchmark is received.

NOTE: Some details may not add due to rounding.

The average visitor to Arkansas in 2010 traveled in a party of 2.2 people, stayed for 3 nights, had an income of \$60,563, spent 5.4 weeks trip planning, and was of an average age of 53.1. About 75% of visitors came with their family and 24% came as individuals.¹⁰²

¹⁰¹ The Economic Impact of Travel in Arkansas. 2011. http://www.arkansas.com/userfiles/apt_2011_annual_report.pdf

The top reasons tourists give for their travel to Arkansas include:¹⁰³

- Visiting friends/relatives (41%)
- Sightseeing (19%)
- Entertainment (12%)
- Business (10%)
- Recreation (8%)
- Family affairs (7%)
- Other (3%)

Table 8: Activities Participated In by Arkansas Tourists, 2009 and 2010¹⁰⁴

Activities participated in:	2010	2009
Sightseeing	85%	88%
Shopping	51%	57%
Attractions	46%	44%
Historic sites	23%	26%
Museums	16%	18%
Live performance	11%	10%
Hiking	10%	10%
Camping	9%	9%
Fishing/hunting	8%	7%
Arts/crafts show	8%	6%
Water sports	5%	3%
Birdwatching	4%	4%
Golf	3%	4%
Antiques	3%	3%
Festivals	3%	2%
Sporting events	2%	2%
Racing	1%	1%
Other	19%	16%

¹⁰² The Economic Impact of Travel in Arkansas. 2011. http://www.arkansas.com/userfiles/apt_2011_annual_report.pdf

¹⁰³ Ibid.

¹⁰⁴ Ibid.

The Arkansas Delta Byways region has a rich natural and cultural heritage, including history of early settlers and Native Americans. Today, this fertile region is known for its agriculture. Visitors will find state parks, wildlife refuges, museums and galleries, archeology sites, national heritage sites, a national forest, and recreational opportunities ranging from world-class hunting and fishing, to hiking, biking and birdwatching. Local festivals and events convey the unique flavor of the Delta, while regional museums interpret the impact of such historic events as the De Soto Expedition, the Louisiana Purchase, the Civil War, the New Madrid Earthquakes, and the Flood of 1927.

The top destinations in Arkansas¹⁰⁵ include the Arkansas Arts Center (Little Rock), Bathhouse Row (Hot Springs), Eureka Springs Downtown Historic District, Garvan Woodland Gardens (Hot Springs), MacArthur Museum of Arkansas Military History (Little Rock), Ozark Folk Center State Park (Mountain View), Ozark Medieval Fortress (Lead Hill), Petit Jean State Park (Morrilton), Shiloh Museum of Ozark History (Springdale), and Turpentine Creek Wildlife Refuge (Eureka Springs).

¹⁰⁵ Arkansas Department of Parks and Tourism. <http://www.inarkansas.com/25319/you-voted-top-10-places-to-visit-in-arkansas>

Louisiana¹⁰⁶

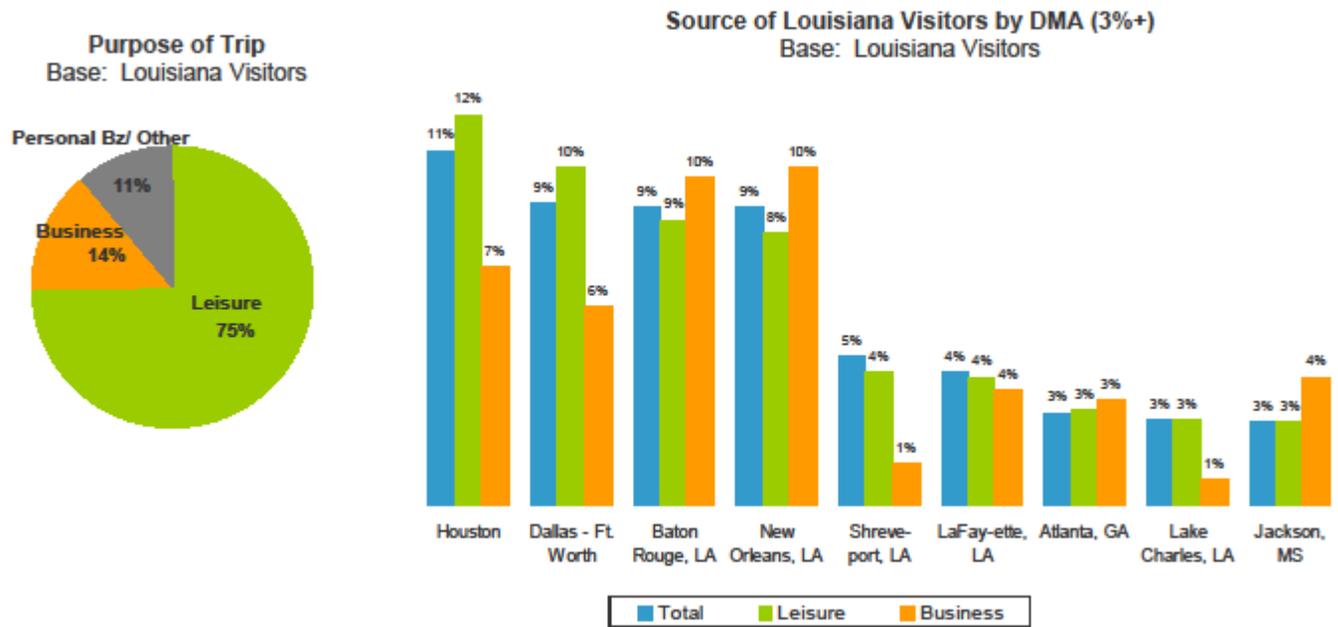
Louisiana hosts more than double the US average of African-Americans, at 16%, but the majority of visitors are Caucasian.¹⁰⁷ Two-thirds of visitors originate from the West South Central census region, driven primarily by Louisiana (36%) and Texas (25%). Mississippi (6%) and Florida (4%) tie for third among Louisiana’s sources of visitors. Because many travelers arrive from nearby areas, most drive (70%).

Tourism in Louisiana, including in-state and out-of-state visitors, is reported by TNS TravelsAmerica to be rebounding after a number of weak years from the economic recession, the Gulf Oil Spill, and Hurricane Katrina.¹⁰⁸

New Orleans is the top destination for out of state visitors. Alexandria, Baton Rouge, and Lafayette depend more heavily on locals for tourism (LA residents).

Lake Charles and Shreveport attract the largest share of High Business Development Index (BDI) residents, and also attracts the oldest visitors, who note greater participation in gaming.

Figure 9: Louisiana Visitors by Purpose of Trip and Source of Visitor, from TNS TravelsAmerica.



¹⁰⁶ Data in this section and the graphs in http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf

¹⁰⁷ African-Americans travel less to most states. Florida and Georgia enjoy the greatest number of African-American visitors. A few states grow the number of African-American visitors in 2010 – notably North Carolina and Texas, while the numbers slip in California, Alabama, and New York. In terms of proportion of visitors, Georgia remains at the top (19%; 18% last year) while Mississippi (17%) and Louisiana (15%) continue to vie for the second spot.

TNS TravelsAmerica. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf

¹⁰⁸ TNS TravelsAmerica. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf

Younger visitors choose Alexandria, New Orleans, and Baton Rouge. Over 40% of visitors plan their trip within two weeks of travelling.

None of the cities mentioned above are in the counties focused on by the LSU AgCenter Walton pilot work.

Visitors stay in hotels/casinos about 50% of the time. About half (53%) pay for accommodations. The largest share of Louisiana visitors come to see friends/family and many stay with them rather than in hotels/motels/B&Bs/condos. As shown previously, Louisiana residents are least likely to take an overnight trip in Louisiana; even when they do, they spend relatively few of those nights (34%) in paid accommodations. Those traveling farthest, living outside of Louisiana and the High BDI marketing area, stay the longest (4.2 nights) and more often opt for hotels/motels.¹⁰⁹

¹⁰⁹ TNS. 2011. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report. http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf.

Table 9: 2010 Impact of Travel on Louisiana¹¹⁰

	Expenditures (\$ Millions)	Payroll (\$ Millions)	Employment (Thousands)	State Tax Receipts (\$ Millions)	Local Tax Receipts (\$ Millions)
Caldwell	7.12	0.99	0.05	0.33	0.47
Catahoula	5.45	0.93	0.06	0.22	0.35
Concordia	11.64	1.44	0.08	0.58	0.55
East Carroll	8.16	0.93	0.06	0.48	0.19
Franklin	7.38	1.14	0.08	0.29	0.24
Madison	40.6	3.44	0.16	2.69	0.62
Morehouse	14.45	2.34	0.13	0.7	0.39
Ouachita	221.42	41.54	1.92	9.16	4.26
Richland	16.73	2.02	0.12	0.94	0.33
Tensas	3.34	0.7	0.04	0.13	0.37
West Carroll	3.77	0.6	0.04	0.15	0.15
Selected County Total	340.06	56.07	2.74	15.67	7.92

¹¹⁰ TNS TravelsAmerica. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf

The average visitor has the following characteristics: ¹¹¹

- Average Age: 47
- Married: 59%
- With Kids: 32%
- Retirees: 17%
- Income: \$67k
- College Grad: 45%
- Length of stay: 3 nights

Top reasons for visiting Louisiana include visiting friends or relatives, entertainment, and outdoor recreation.

Attractions in northern and eastern Louisiana include historical attractions like Poverty Point Historical State Park, the Louisiana Cotton Museum, Frogmore Plantation, Chennault Aviation and Military Museum of Louisiana, and the Biedenharn Museum and Gardens, but others include Black Bayou Lake National Wildlife Refuge, Coke Museum, Northeast Louisiana Children's Museum, Masur Museum of Art, Landry Vineyards, University of Louisiana at Monroe Natural History Museum, Starr Homeplace, Jim Bowie Relay Station, Delta Museum, Winter Quarters Historic Site and Ike Hamilton Expo. Festivals include the Catfish Festival in Winnsboro and the Jim Bowie Festival in Vidalia. There are also many bodies of water that are perfect for paddling or other water recreation.

¹¹¹ NS TravelsAmerica. Calendar Year 2010 Louisiana TravelsAmerica Visitor Profile Report http://www.crt.state.la.us/tourism/research/Documents/2011-12/CY2010_TNS_Louisiana_Visitor_Profile_Report_Final.pdf

Mississippi

Mississippi is rich in cultural history with many Civil War battlefield sites, antebellum homes, a strong musical tradition, and the Blues Trail and Country Music Trail. Hunting, fishing and other wildlife-related activities also entice visitors to many parts of Mississippi.

The average visitor has the following characteristics:¹¹²

- Average annual household income: \$66,200
- Average age: 49
- Average travel party size: 2.7 persons
- Average length of stay: Mississippi residents spent 2.2 nights while non-residents spent 3.1 nights in the state.

About 46% traveled in pairs. Another 25% traveled with children. Only 5% of all visitors arrived by air. Vacation activity niche characteristics varied, with casino gamers the largest market, comprising 30%. 73% of all visitors were from out-of-state. About two-thirds of the leisure visitors overnighted. Some 78% of all FY 2011 overnight leisure visitors came from seven states—Mississippi (27%), Louisiana (11%), Alabama (10%), Texas (9%), Georgia (8%), Tennessee (7%) and Florida (6%). Reasons for visiting: 84% leisure; 7% business; and 8% personal business/other in FY 2011.

¹¹² Fiscal Year 2011 Economic Contribution of Travel and Tourism in Mississippi. February 2012.
http://www.visitmississippi.org/uploads/docs/PDF/FY2011_Economic_Contribution_Report.pdf

Table 10: Estimated County Travel and Tourism Expenditures, Employment, Taxes, TCI, FY 2011¹¹³

	Travel and Tourism Expenditures by Visitors	Direct Travel and Tourism Employment	Travel and Tourism Employment Percentage	State/Local Taxes/Fees Attributed to Tourism	Tourism Capital Investment
Issaquena	\$191,999	3	0.8	\$12,208	0
Sharkey	\$1,251,546	16	1.4	\$109,241	\$27,192
Selected County Total	\$1,443,545	19	2.2	\$121,449	\$27,192

The top 10 states of origin, after Mississippi, were: Louisiana, Alabama, Texas, Georgia, Tennessee, Florida, Arkansas, Missouri, North Carolina, and Illinois. 71 % of the 30 state-licensed casino patrons were from out-of-state, particularly from Alabama, Arkansas, Florida, Georgia, Illinois, Louisiana, Oklahoma, Tennessee and Texas.

The top attractions¹¹⁴ in Mississippi include Annual Angels on the Bluff Tour (Natchez), Museum of Natural Science (Jackson), Catfish Capitol Visitor Center (Belzoni), Sam Wilhite Transportation Museum (West Point), Movie Museums (Canton), Oldest Slave Founded Town in Mississippi (Mound Bayou), Rock ‘n Roll & Blues Heritage Museum (Clarksdale), Natchez Trace Parkway (Tupelo), and the Redding House (Biloxi).

¹¹³ Fiscal Year 2011 Economic Contribution of Travel and Tourism in Mississippi. February 2012. http://www.visitmississippi.org/uploads/docs/PDF/FY2011_Economic_Contribution_Report.pdf

¹¹⁴ America Beautiful Network. <http://top10mississippiattractions.ianis.net/>

Tennessee

Tourism is Tennessee's second largest industry. The state is divided into three main regions:

- West Tennessee is surrounded by the Tennessee and Mississippi Rivers and features music, cultural history and natural beauty.
- Middle Tennessee is largely defined by Nashville and also features whiskey trails and is a paradise for history buffs.
- East Tennessee features the Smokey Mountains, part of the Appalachian Mountains, and is also the birthplace of NASCAR.

Fall and summer are the dominant travel seasons. Dining, shopping, entertainment, sightseeing, nature/eco-travel, national/state parks, and visiting historic sites are the most popular activities.

The average visitor to Tennessee has the following characteristics¹¹⁵:

- Average Age: 45
- Average Household Income: \$76,141
- Visitors stay an average of 2.2 nights.

Visitors to Tennessee are coming from the following states:

- Tennessee: 38.1%
- Georgia: 8%
- Alabama: 6.4%
- Illinois: 4.2%
- Kentucky: 4.1%
- Ohio: 4.1%



Figure 10: Mud Island River Park, TN

¹¹⁵ 2010 Tennessee Visitor Profile. D.K. Shifflet & Associates, Ltd.

<http://www.tnvacation.com/industry/uploads/106/2010%20TN%20State%20Visitor%20Profile%20Final.pdf>

Table 11: 2010 Impact of Travel on Tennessee¹¹⁶

	Expenditures (\$ Millions)	Payroll (\$ Millions)	Employment (Thousands)	State Tax Receipts (\$ Millions)	Local Tax Receipts (\$ Millions)
Dyer	43.6	7.45	0.38	2.66	1.04
Lake	9.9	2.15	0.11	0.55	0.75
Lauderdale	15.33	2.11	0.09	0.9	1.25
Obion	42.64	7.37	0.35	2.54	1.31
Shelby	2900.95	1859.25	47.42	125.46	82.6
Tipton	27.5	3.88	0.18	1.73	0.91
Selected County Total	3039.92	1882.21	48.53	133.84	87.86

Based on the Mississippi River Corridor – Tennessee preliminary demand research, there are some overall tourism findings:

- \$3 billion in economic impact on Memphis and Shelby County in travel expenditures
- 10 million visitors annually (daytrippers add another 4 million)
- 50,000 jobs created
- \$211 million in state and local taxes.

Memphis, Tennessee is one of the larger urban areas along the Lower Mississippi River so it makes sense that tourism in Memphis would have a large economic impact. Memphis is home to most of the urban attractions along the river, outside of New Orleans.

There are three different categories of visitors to the area:

- Regional (includes daytrippers)
- National – commonly from California (3 nights average stay)
- International (3-4 nights average stay).

¹¹⁶ The Economic Impact of Travel on Tennessee Counties, 2011

<http://www.tnvacation.com/industry/uploads/105/2010%20Economic%20impact%20report%20FINAL.pdf>

Attributes that tourists are seeking in the city offerings include:

- Plentiful live music venues.
- Authenticity and cultural amenities
- High quality musical history venues, educational exhibits and museums (Stax/Soulsillve, Rock and Soul Museum/Smithsonian exhibit, Graceland and Sun Studios).
- Large inventory of “stories” about the history and folklore of the region.
- Regional food – diverse offerings, high quality and unique menus.
- Memphis International Airport
- MCVB has an office in Europe and Japan for international marketing and promotions.

Attributes of rural communities include:

- Excellent small and medium sized museums for diverse educational opportunities.
- Significant Civil War sites with national trail promotions (multi-state)
- Numerous state parks for daytrippers and more cost effective vacations.
- Federal public lands for recreation: hunting/fishing, hiking, birding, camping, paddling, etc.
- Successful internet marketing efforts.
- American Steamboat Company – based in Memphis but stops in rural communities up and down the Mississippi River.
- Historic and unique downtown Court Squares for shopping and dining.
- Regional festivals (major draw in Covington in Tipton County)
- Opportunities for attract retirees.
- Experiential travel – greatest trend and opportunity. More than 4 out of 10 travelers are participating.

Gaps in this area include:

1. Lack of public access and viewing options on the Mississippi River and tributaries.
2. The need for more facilities on the Lower Mississippi River that cater to tourists (boat ramps, observation towers, unique restaurants, destination hotels/motels, camping sites).

3. More educational opportunities through academic institutions and other nonprofit organizations for programming, outings, and specific curricula to experience and learn more about bird watching, environmental education, river ecology, photography, cooking regional foods, hunting, fishing and wildlife interpretation.
4. Lack of available services for cycling.
5. Lack of marketing (internet and maps/brochures) that promote the entire MRCT and Lower MS Walton partners.

Major attractions in western Tennessee include the River, Graceland, Civil Rights Museum, Beale Street, Rock and Soul Museum, Stax Museum and Soulsville, Memphis in May and other festivals, Memphis Zoo, Children’s Museum, Pink Palace Museum, Sun Studio.

Appendix C: State Outdoor Recreation Data

Data on the active outdoor recreation economy is available for only two states in the region, Tennessee and Louisiana. Data for Arkansas and Mississippi is not available from the Outdoor Industry Foundation. The Foundation is currently updating these numbers for all 50 states and will be releasing new information in 2013.

Table 12: Tennessee Outdoor Recreation, 2006¹¹⁷

	# Participants	% of Population
Bicycling	771,509	17%
Camping	945,588	21%
Fishing	685,603	14%
Hunting	283,104	6%
Paddling	362,741	8%
Snow Sports	195,498	4%
Trail	944,677	21%
Wildlife Viewing	1,701,000	36%

Table 13: Louisiana Outdoor Recreation, 2006:¹¹⁸

	# Participants	% of Population
Bicycling	668,978	20%
Camping	426,965	13%
Fishing	728,151	20%
Hunting	288,019	8%
Paddling	129,902	4%
Snow Sports	76,531	2%
Trail	432,671	13%
Wildlife Viewing	819,000	23%

¹¹⁷ Outdoor Industry Foundation. 2006. Tennessee Active Outdoor Recreation Economy, <http://www.outdoorindustry.org/pdf/TennesseeRecEconomy.pdf>

¹¹⁸ Outdoor Industry Foundation. 2006. Louisiana Active Outdoor Recreation Economy, <http://www.outdoorindustry.org/pdf/LouisianaRecEconomy.pdf>

Appendix D: Case Studies

Northern Forest Canoe Trail: Case Study

A 740 mile water trail in Northern New York, Vermont, Quebec, New Hampshire, and Maine.

In the early 1990s a citizen's group was conducting research on Native American paddling trails to secure the route information of ancient travel routes. This work became the basis of the Northern Forest Canoe Trail (NFCT). The NFCT is essentially a historical artifact, preserving ancient routes by mapping and preserving the trails, and serving to connect people to history by being on the route.

By 2000 the NFCT incorporated as a nonprofit with the mission of building a paddling trail. In 2006, the trail map was completed and the trail was officially opened. In 2010, the NFCT completed their next major milestone by publishing a guidebook. These milestones are key markers of recreational trail legitimacy.

Executive Director Kate Williams says, "We are completely dependent on partners – it's a big part of who we are." The NFCT works with a mix of communities, states, regional and federal agencies, as well as local guides and outfitters, chambers of commerce, and local paddlers.

The NFCT used the process of creating maps with local partners and state agencies to build a coalition. Williams says, "We use the trail to serve larger goals other than just recreation – we are committed to communities and the impacts of sustainable tourism."

One way the NFCT has worked with communities is through a Trail Town Initiative. Williams says, "We drill down in particular communities to help community partners look at the full range of recreation opportunities, which help towns position themselves as recreation destinations."

At first, the NFCT worried that the Trail Town Initiative was outside of their mission. In one of six community Trail Town pilots that has been meeting for six months, NFCT is already being included in the town plan. The NFCT put pieces for the trail in place at a broad level, and now they are drilling down into the community level.

"We realized our mission and our role, given that we've built our whole trail on this partnership model, is to provide leadership in bringing partners together," says Williams. "We've found these Trail Towns are tapping into our skill at seeing the big picture and bringing partners together. We serve as a linchpin. We realized to have the impact that we intend, we need to think and act more broadly, so we are approaching our mission more broadly."

Northern Forest Canoe Trail, www.NorthernForestCanoeTrail.org

Information provided by Kate Williams, Executive Director

Northern Forest Canoe Trail, PO Box 565, 4403 Main Street, 2nd Floor, Waitsfield, VT 05673

802-496-2285 | kate@northernforestcanoetrail.org



Mission:

- 1) Take care of the physical trail.
- 2) Support local partners to ensure they benefit from paddlers and they provide services tourists need.
- 3) Focus on connecting people to waterways, particularly rural youth.

Membership: About 1,000 members representing almost every state.

Trail Users:

- According to member surveys - largely male, 60+, affluent
- Anecdotally – young individuals and families and college aged people who may not choose to be members.

Trips: Trend toward 3-4 day trips, with some extended week long trips.

Spending:

- About \$200/person/trip.
- One through paddler - \$5,000 total.

Recreation: Biking, fishing, wildlife viewing, hiking, hunting, ATV trails, historical trails, logging history.

Mississippi River Water Trail: Case Study

A 300 mile water trail on the Upper Mississippi River from Saverton, MO to Cairo, IL



The U.S. Army Corps of Engineers, in the St. Louis District, began to get an influx of inquiries from the public around 2003 – “Where can we paddle?” “Where can we put boats in?” “Is it safe?”

As more calls came in, the office decided to create a conceptual plan for a water trail and presented it to the St. Louis Canoe and Kayak Club, which has about 300 members. The Corps listened to the community and made sure that the water trail would be what the community wanted and needed. By 2005, the first section of the trail was completed.

The Corps is working on continuing the trail in the southern stretch of the River. The greater goal is to work with partners to create a river trail from the headwaters of the Mississippi River to the Gulf. The Corps is interested in collaborating with southern partners to create a trail that is consistent for the paddling community. One question to answer is how to separate and name trail sections so that the entire river trail will be easy to navigate.

A key factor in the success of the trail is that the Corps was able to put the trail entirely on public property – city, state, or county land. This lessened liability issues and made the process easier. Easements or lease agreements were used. Going forward, the American Land Conservancy may have public land available and the Corps plans to work closely with them as the southern trail sections are developed.

The trails are maintained by the Corps with the help of volunteers and parks that share infrastructure, such as access areas.

There is no data to date on visitor use or economic impact, but the Corps has faced little opposition, mostly due to the collaborative, and community based approach that has been used.

Mississippi River Water Trail, <http://www.greatriverwatertrail.org/>.

Information provided by Jon Summers, Rivers Projects Office,

301 Riverlands Way, West Alton, MO 63386

636-899-0094 | Jon.D.Summers@usace.army.mil

The Trail

The U.S. Army Corps of Engineers manages 300 miles of the MS River and St. Louis District is right in the center of the area. To date, 120 miles of the trail have been completed, from St. Louis to the north.

Campsites

To deal with the river flooding, campsites are very minimal, with just signage and a fire pit. Most campsites are on owned islands.

Access Areas

The access areas are gravel parking lots with a pit toilet.

Outfitters

There are outfitters along the river trail, such as REI and some small local vendors.

Lodging, Dining, Recreation

Brochures are available with information on lodging, dining, camping, and other things to do in the area.

Southern Foodways Alliance: Case Study



The Southern Foodways Alliance (SFA) was formally founded in 1998, under a parent organization at the University of Mississippi, The Center for Southern Culture. Their goal is to disseminate their projects for popular consumption, not just academics. The oral history subjects, which many of the trails are based on, serve as a way to teach people about the larger cultural and regional story.

The SFA's first documentary effort began in 2002, with funding through the National Pork Board, to document BBQ signage in Memphis, Tenn. According to Oral Historian Amy Evans, the project quickly evolved into an oral history project, which culminated in what has become an annual October symposium. Ten years after the initial BBQ theme, the SFA revisited the theme for 2012.

After reflecting on ten years, Evans says the organization was surprised as how much it had accomplished and the growing interest in programs. "We want to keep a small symposium, but demand for the event has grown," says Evans. "We are trying to deal with issues of growth, and how to have an intimate feel, but grow our message along with it. We are at a bit of a crossroads, but we are thrilled at how we have established the SFA and the area of food ways and food studies."

"In a broader sense, our work has done a lot to validate culinary tourism as a form of economic development," says Evans. As part of The Tamale Trail, the SFA achieved the first culinary historical marker in Mississippi, Joe's Tamale Place in Rosedale, which is also part of the Mississippi Blues Trail.

Southern Foodways Alliance

Amy C. Evans, Oral Historian

Barnard Observatory, P.O. Box 1848, University, MS 38677

(662) 915-5993 | amy@southernfoodways.org

Mission

To celebrate the diverse foodways of the changing American South.

Trails Include

- Mississippi Delta Hot Tamale Trail, www.tamaletrail.com
- Southern BBQ Trail, www.southernbbqtrail.com
- Southern Boudin Trail, www.southernboudintrail.com
- Southern Gumbo Trail, www.southerngumbotrail.com

Most Popular Trail

The Tamale Trail, opened in 2005, was the first trail SFA created, and it continues to be the most popular. Each site has a sticker that the site chooses how to display.

Technology

The SFA has an iPhone app that lists projects and has a map that allows users to create a custom itinerary.

Birmingham Civil Rights Heritage Trail: Case Study



*Birmingham Civil Rights Heritage Trail
Renee Kemp-Rotan, Birmingham City Hall
710 20th Street North, Birmingham, Alabama 35203-2216
205-254-2000*

The Birmingham Civil Rights Trail (BCRT) will be completed in 2013. The trail begins at the Birmingham Civil Rights Institute (BCRI) and goes uptown. Each stop is designated with a metal sign.

The BCRT connects to the larger Alabama Civil Rights Trail. Visitors to Alabama are often surprised by the emphasis on Civil Rights history and the open and honest portrayal of events. Tourism officials in Alabama feel it is important to remember and to continue to serve as an inspiration for people to stand up for their rights.

The BCRT records sites with the National Historic Register, and brands the trail and sites for easy public consumption.

Goal:

To encourage critical thinking and create curiosity, drawing a link from cultural tourism to economic development.

Visitors:

In 2007 about 4.2 million people visited Birmingham. About 150,000 visit the Birmingham Civil Rights Institute annually.

The Alabama Coastal Birding Trail: Case Study

A 300 mile birding trail with 50 sites in Alabama's Gulf Coast Region.

The Alabama Coastal Birding Trail (ACBT) was opened in 2002 through a U.S. Fish and Wildlife Service grant to the Alabama Gulf Coast Convention and Visitor Bureau (CVB). The CVB, under the direction of Director Herb Malone, has focused on promoting eco-tourism initiatives in the region. Malone was reviewing data on the regional and national economic impact of birders on a community and thought a birding trail would be a way to overlay eco-tourism to the existing diverse bird population in the Gulf Coast.

Hank Burch, manager of 5 Rivers, Alabama's Delta Resource Center, is now the current manager of the trail. Burch says, "The original 50 sites on the trail included public and private sites that may have been good for birding, but some sites were odd choices to have visitors." For example, a sod farm was originally listed as a site, but there weren't any parking areas. A public boat ramp was also listed, which had a good view, but may not have been the best place for a site, says Burch.

Since taking over the trail maintenance in late 2011, Burch has worked to replace many of the private sites with sites that have better amenities for visitors. All sites have easily identifiable signs with an 800 number that visitors can call for more information. Burch is focusing on making sure each site is easily accessible to the public.

Once the trail is updated, Burch plans to focus on promoting the trail through social media and events associated with the trail. One existing event is the Alabama Coastal Birdfest, which is an annual four day fall event that draws 300 to 350 birders from 25-30 states. Burch thinks a similar event in the spring, to catch the northern bird migration, could be successful.

Alabama Coastal Birding Trail, <http://alabamacoastalbirdingtrail.com/>

Information provided by Hank Burch, Manager

5 Rivers – Alabama's Delta Resource Center

30945 Five Rivers Blvd., Spanish Fort, AL 36527

251-625-0814 | hank.burch@dcnr.alabama.gov



The Trail

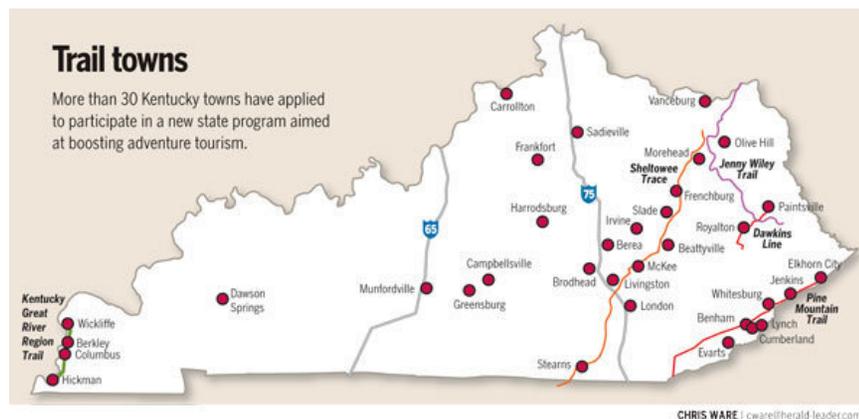
Six Loops

- Gulf Shores-Orange Beach Loop
- Fort Morgan Loop
- South Baldwin County Loop
- Eastern Shore, Mobile Bay Causeway and Blakeley Island Loop
- East Mobile River - Tensaw Delta Loop
- Dauphin Island - Bayou La Batre Loop

Recreation

Beaches, historic homes and fortresses, golf, fishing, hunting

Kentucky Trail Town Program: Case Study



Source: Kentucky towns looking to boost tourism on nearby trails and rivers. August 22, 2012. Bill Estep. <http://www.kentucky.com/2012/08/22/2307770/kentucky-towns-looking-to-boost.html>.

at the same time they develop their downtowns and Main Streets.”¹²¹

The Kentucky Office of Tourism has created a Trail Town How-To Guide, available at:

<http://www.kentuckytourism.com/userfiles/Industry/Adventure/4%20-%20Trail%20Town%20How%20to%20Guide.pdf>

www.kentuckytourism.com

502.564.4270

Office for Adventure Tourism, Kentucky Trail Town Program

500 Mero Street, 24th Floor, Frankfort, KY 40601

¹¹⁹ Kentucky towns looking to boost tourism on nearby trails and rivers. August 22, 2012. Bill Estep. <http://www.kentucky.com/2012/08/22/2307770/kentucky-towns-looking-to-boost.html>.

¹²⁰ Ibid.

¹²¹ Governor Beshear, First Lady Announce Trail Town Program. August 22, 2012. Kerri Richardson and Terry Sebastian. <http://migration.kentucky.gov/Newsroom/governor/20120822trailtown.htm>

In 2011, the Kentucky Office of Tourism began to look at the towns along the Sheltowee Trace and the Daniel Boone National Forest (DBNF) as potential locations to become Trail Towns. Through the Trail Town Program, the state will advise towns on developing links to nearby trails and rivers, or on building new trails, and then will help promote the communities and their businesses.¹¹⁹

According to an August 22, 2012 press release, “The program includes helping communities develop signs directing hikers and others to local services and attractions, so outdoor enthusiasts will know what is available, and the community can benefit from the visitors' spending.”¹²⁰

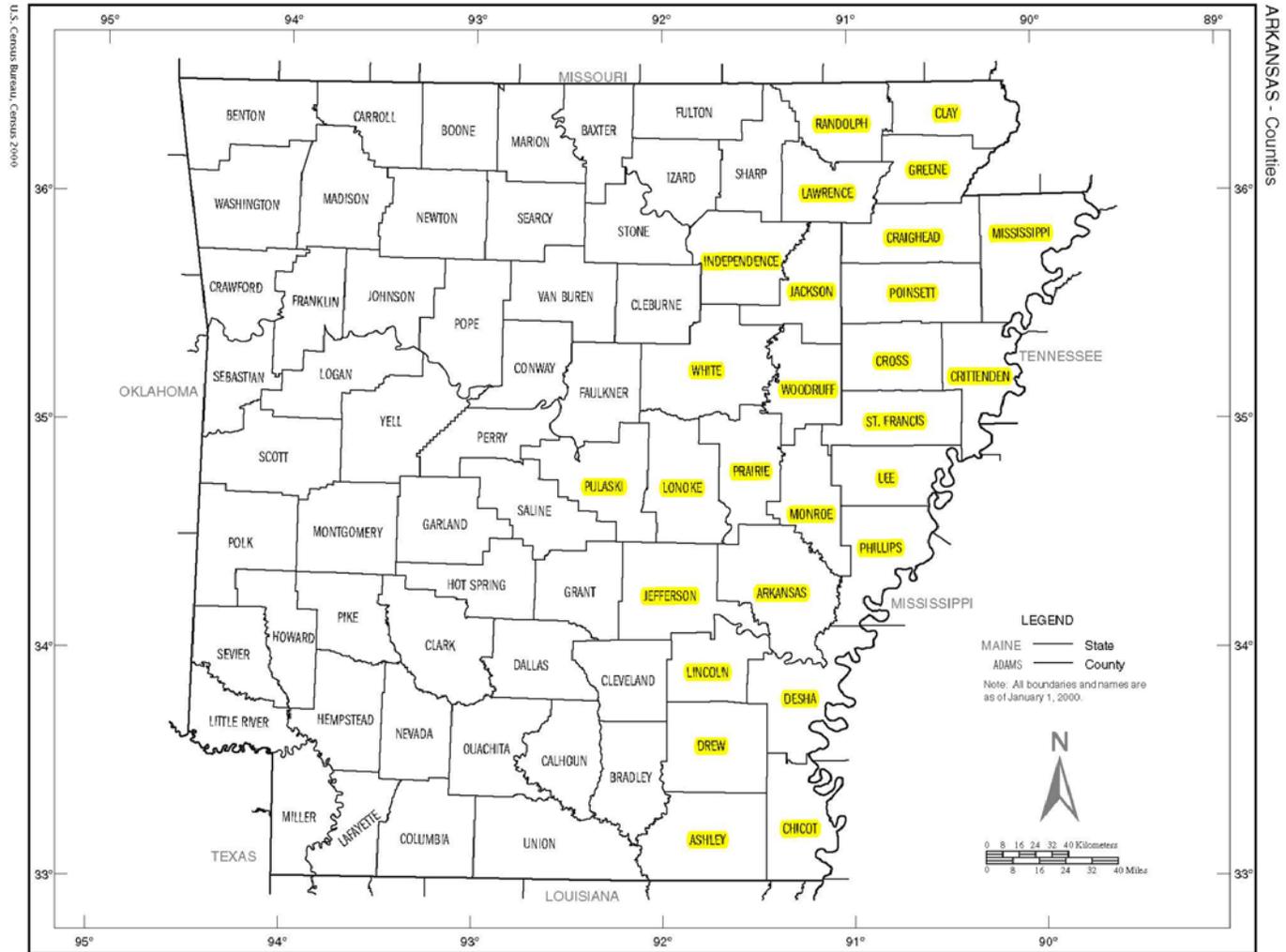
“The most important part of Trail Towns is that each community decides what approaches it wants to take to tie in the trail system and other services that trail users need,” Tourism, Arts and Heritage Secretary Marcheta Sparrow said. “These communities can work together and share ideas while

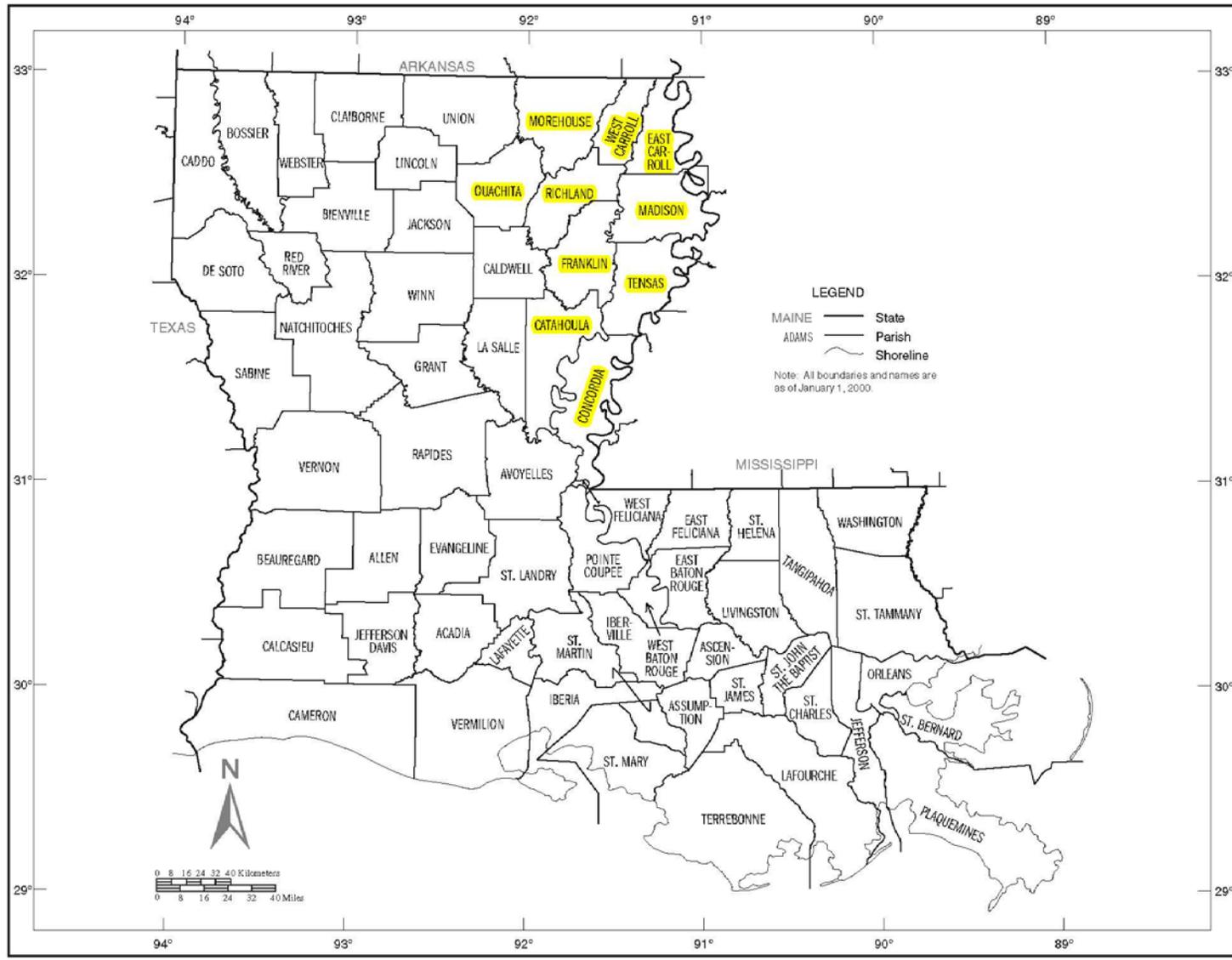
Appendix E: Contact Information for Potential Resources and Network Participants

1. Rachael Carter, Miss Lou Rural Tourism Association, 662-325-1619
2. Tim McCarley, BluzCruz, 601-634-0298
3. Mark Bowen, Tara Wildlife, 601-279-4261, <http://www.tarawildlife.com>
4. Ron Nasser, LMRCC, 601-629-6602, <http://www.lmrcc.org/index.htm>
5. Jonathan Crisp, American Ecotourism Society, 901-833-7570
6. John Ruskey, Quapaw Canoe Company, 662-627-4070
7. Cathleen Collet, Tennessee Preservation Trust, 615-963-1255
8. Vanessa Norton McKuin, Historic Preservation Alliance of Arkansas, 501-372-4757, <http://www.preservearkansas.org/index.php?page=preserve-america>
9. Elizabeth Wiedower, National Trust for Historic Preservation, 202-588-6000, <http://www.preservationnation.org/>
10. Angie Rodgers, LMRCC, 601-629-6621, <http://www.lmrcc.org/index.htm>
11. Angie Erves, LMRCC, 601-629-6613 , <http://www.lmrcc.org/index.htm>
12. Daryl Jones, MSU Natural Resource Enterprise Program, 662-325-3174, <http://www.naturalresources.msstate.edu/about-nre.html>
13. Wade Blackwood, American Canoe Association, 540-907-4460 x111, <http://www.americancanoe.org/>
14. Jon Summers, Mississippi River Water Trail, 636-899-0094
15. Hank Burch, Alabama Coastal Birding Trail, 251-625-0814
16. John McCommon, Cline Tours, 205-591-7555, <http://www.clinetours.com/>
17. Munnie Jordan, Delta Heritage Tours, Mississippi River Trail, King Crimson Blues Festival, 870-338-8972
18. Avery Stonich, Outdoor Industry Association, 303-327-3511.
19. Larry Jarrett, Mississippi River Institute, 662-489-9708
20. Amy Evans, Southern Foodways Alliance, 662-915-5993
21. Bruce Reid, LMRCC, <http://www.lmrcc.org/index.htm>
22. Sarah McCullough, Bureau of Film and Cultural Heritage Development, Mississippi Development Authority / Division of Tourism, 601.359-3297
23. Kate Williams, Northern Forest Canoe Trail, 802-496-2285
24. Dennis West, Northern Initiatives U.P., 906-226-1671
25. Debra Creduer, Atchafalaya Heritage Area, 225-219-0768
26. Dora Ann Hatch, LSU AgCenter , 318-927-9654 Ext. 229, dhatch@agcenter.lsu.edu, www.lsuagcenter.com/agritourism

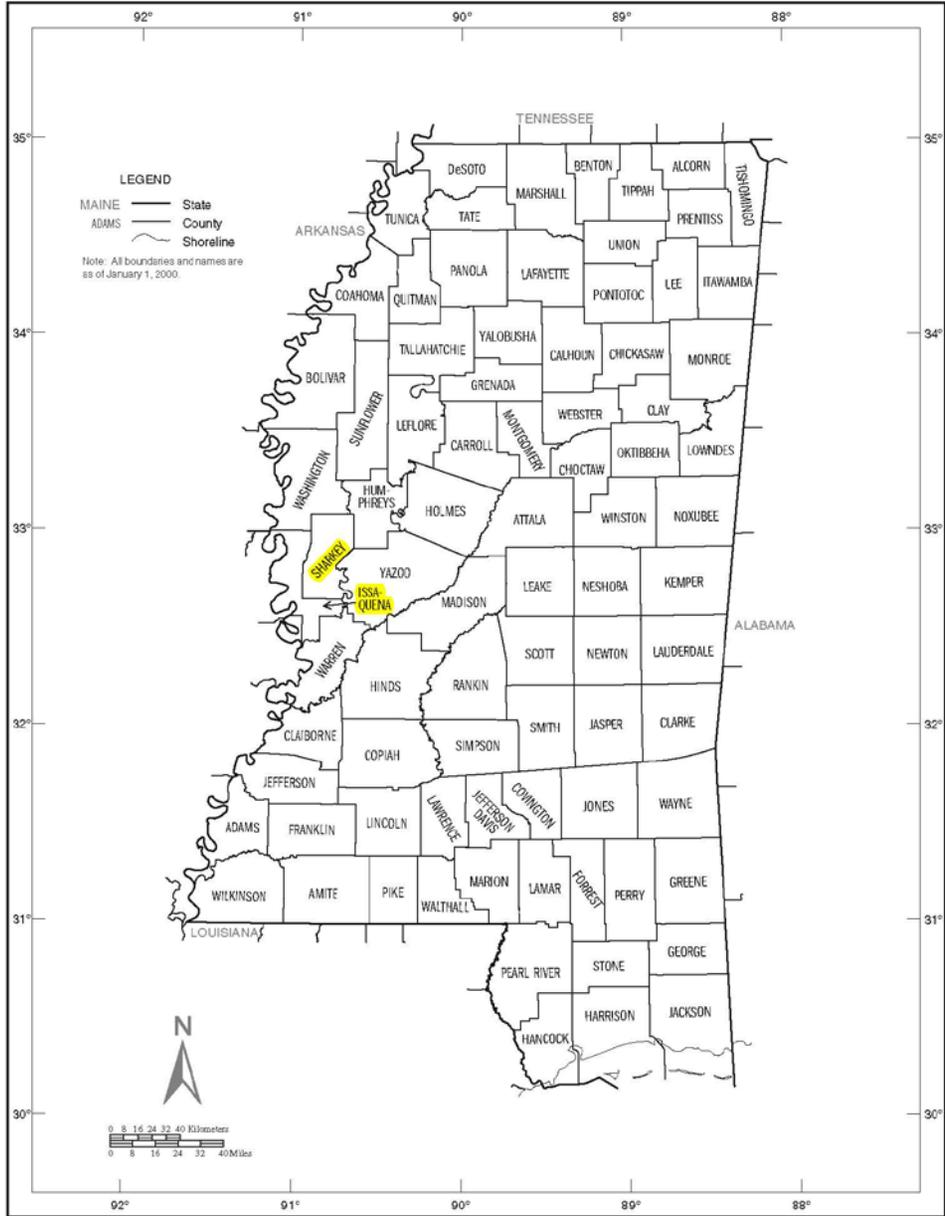
27. Meg Cooper, Lower Delta Partnership, 662-873-6261, megldp@bellsouth.net, <http://www.lowerdelta.org/>
28. Glenn Cox, Mississippi River Corridor –Tennessee, 901-278-8459, wglenncox@comcast.net, <http://www.msrivertn.org>
29. Diana Threadgill, Mississippi River Corridor – Tennessee, 901-278-8459, dianathreadgill@comcast.net, <http://www.msrivertn.org>
30. Kevin Pierson, National Audubon Society, 479-527-0700, kpierson@audubon.org
31. Jay Wood, Mississippi Audubon Society, jwoods@audubon.org, <http://ms.audubon.org/>

Appendix F: State Maps Showing Counties Included in Report.





MISSISSIPPI - Counties



U.S. Census Bureau, Census 2000

