

Section 3: AFFECTED ENVIRONMENT

This section presents a general description of the existing conditions and resources relevant to the I-69 Study. Existing conditions are described for the transportation, socioeconomic, and physical and biological environment within the Study Area that may be affected by the I-69 project. Specific impact assessments and potential mitigation measures are presented in Section 4: Environmental Consequences and Mitigation.

3.1 SOCIAL ENVIRONMENT

The Study Area is located in northwestern Louisiana and encompasses portions of DeSoto, Caddo, and Bossier Parishes. The Study Area is predominantly rural in nature with dense residential development limited to the towns of Haughton and Stonewall except for the northern portion that is bordered by the cities of Shreveport and Bossier City.

3.1.1 Demographics

Population data and growth rates are presented in Table 3-1. All Study Area parishes, and communities experienced a positive increase in population between 2000 and 2010. Caddo Parish experienced the smallest increase (1 percent), while the communities of Haughton and Stonewall had population increases of 24 percent and 9 percent, respectively. The increases for Haughton and Stonewall could be attributed to the outward migration of Shreveport and Bossier City workers who desire rural living within an easy commuting distance. Of the three parishes in the Study Area, Bossier Parish exhibited the greatest population increase, at 19 percent, nearly twenty times the 1 percent statewide average.

Table 3-1 POPULATION DATA			
State, Parish or Community	2000	2010	Percent Change
<i>Louisiana</i>	4,468,976	4,533,372	1
Bossier Parish	98,310	116,979	19
Haughton	2,792	3,454	24
Caddo Parish	252,161	254,969	1
DeSoto Parish	25,494	26,656	5
Stonewall	1,668	1,814	9
All Project Parishes	375,965	398,604	6

Source: U.S. Department of Commerce – Bureau of the Census – 2000 Summary of General Characteristics – Population of Places and 2010 Profile of General Population and Housing Characteristics

Minority populations comprise a large portion of the Study Area with the Black or African American population maintaining the greatest percent of minority groups (see Table 3-2). The community of Stonewall had the smallest minority population (10 percent) that was well below the statewide and Study Area parish averages.

3.1.2 Community Characteristics

Shreveport and Bossier City represent the largest well-established communities near the Study Area with a combined population of over 250,000. They have well-defined networks of businesses, schools, churches, and residential development.

State, Parish or Community	Total Pop.	White		Black or African American		Other	
		Pop.	%	Pop.	%	Pop.	%
<i>Louisiana</i>	4,533,372	2,836,192	63	1,452,396	32	244,784	5
Bossier Parish	116,979	84,430	72	24,461	21	8,088	7
Haughton	3,454	2,700	78	630	18	124	4
Caddo Parish	254,969	124,942	49	120,264	47	9,763	4
DeSoto Parish	26,656	15,456	58	10,449	39	751	3
Stonewall	1,814	1,632	90	133	7	49	3
Study Area Parishes	398,604	224,828	56	155,174	39	18,602	5

Source: U.S. Department of Commerce – Bureau of the Census – 2010 Profile of General Population and Housing Characteristics

Beyond the city limits, the landscape changes to a more rural setting. Smaller communities are encountered within the Study Area and include Stonewall, Frierson, Gayles, Caspiana, Elm Grove, Oakland, Koran, and Haughton. Stonewall and Haughton represent the only communities with a well established network of streets while the other communities are generally clusters of residential areas, churches and cemeteries located along parish or state highways. Trips to Shreveport and Bossier City are required to meet the domestic needs of local residents.

Very limited primary healthcare needs are provided for within the Study Area. Major medical care is provided at facilities in Shreveport and Bossier City such as Willis – Knighton Medical Centers, Christus Schumpert Healthcare System, Shriners Hospital, and Louisiana Healthcare Science Center.

Primary and secondary educational needs for area residents are limited to the communities of Stonewall, Elm Grove, and Haughton. Elementary, middle and high schools are located in the communities of Stonewall and Haughton, and a middle school in Elm Grove. No elementary,

middle, or high schools are located within the Caddo Parish portion of the Study Area. Post secondary education is available beyond the Study Area in Shreveport and Bossier City. These opportunities are offered at Bossier Parish Community College, Louisiana Technical College of Shreveport/Bossier, Centenary College, Louisiana State University of Shreveport, Southern University of Shreveport, Louisiana Baptist University, and Louisiana State University Medical School in Shreveport.

Forty-one churches of various denominations and fourteen cemeteries are scattered throughout the Study Area and have been identified by the public as sensitive community and family resources.

Local, parish, and state police departments provide law enforcement protection. Local police departments are located in Stonewall and Haughton. Bossier, Caddo, and DeSoto Parishes

all maintain a sheriff's department. Additionally, state police protection is provided by Troop G located in Bossier City that provides protection to a seven-parish area that includes Bossier, Caddo, and DeSoto Parishes.

Fire protection is available for area residents. The DeSoto Parish Fire District No. 3 provides fire protection for the Stonewall area, East Central Bossier Fire District No. 1 for Haughton, and the Caddo Parish Fire District No. 5 serves southeastern Caddo Parish. A volunteer fire department is located in Frierson.

General housing characteristics for the Study Area are provided in Table 3-3. Stonewall and Haughton were comparable with regard to the percent of owner occupied housing (75 and 76 percent respectively) while Caddo Parish exhibited the lowest percent (56 percent).

State, Parish or Community	Total Housing Units	Owner Occupied		Renter Occupied		Vacant		Median Value Owner Occupied Unit
		Units	%	Units	%	Units	%	
<i>Louisiana</i>	1,964,981	1,162,299	59	566,061	29	236,621	12	121,300
Bossier Parish	49,351	30,213	61	15,002	31	4,136	8	122,900
Haughton	1,417	1,077	76	240	17	100	7	72,900
Caddo Parish	112,028	63,198	56	38,941	35	9,889	9	106,700
DeSoto Parish	12,290	7,964	65	2,598	21	1,728	14	78,600
Stonewall	785	588	75	137	17	60	8	137,800

Source: U.S. Department of Commerce – Bureau of the Census – 2010 Profile of General Population and Housing Characteristics and 2005-2009 American Community Survey 5-Year Estimates

Additionally, Stonewall and Haughton had the lowest percent of renter occupied units (17 percent). DeSoto Parish has the highest percentage of vacant units (14 percent). The median value of owner occupied units ranged from \$122,900 in Bossier Parish to \$78,600 in DeSoto Parish and from \$137,800 in Stonewall to \$72,900 in Haughton.

3.1.3 Recreational Resources

Several types of outdoor and indoor recreation are available within the Study Area. In the Elm Grove area, Clark's Marina provides the public with boat launch access to the Red River as well as cabin rentals and RV hookups. This facility provides access to the Red Rivers' various pools, sloughs, and oxbows for recreational boating and fishing, primarily for catfish and bass. Along LA 612 between U.S. 71 and LA 157, the Olde Oaks Golf Club offers a 27-hole golf facility spread out over about 340 acres.

In Caddo Parish near LA 175 at Ellerbe Road, the Corps of Engineers operates Wallace Lake Dam. Built in 1941, the dam is a flood control structure built to protect 90,000 acres of farmland from the floodwaters of the Cypress Bayou and Pierre Bayou (COE 2004). Additionally, the Wallace Lake area provides opportunities for fishing, hunting, and hiking. Astronomy enthusiasts can enjoy the cosmos at the LSU-operated Ralph Worley Observatory along LA 175.

Additionally, outdoor recreation is available at two other locations near the Study Area. To the east in Webster Parish, Lake Bistineau State Park offers beautiful vistas, hiking trails, campgrounds, boating, and fishing. About 15 minutes north of Bossier City in Bossier Parish is the Cypress Black Bayou Park and Recreation Area, which offers camping, fishing, swimming, picnic areas, a nature center and a petting zoo.

3.2 ECONOMIC ENVIRONMENT

Historically, development patterns in the Study Area, as well as the Shreveport/Bossier metropolitan area, have emphasized agricultural and oil and gas activities. As the 20th century progressed, the economic base of the Shreveport/Bossier area diversified with over 250 manufacturing and retail shopping facilities with a well-defined public school system. Shreveport/Bossier also provides numerous cultural and recreational activities for northwest Louisiana, southwest Arkansas, and northeast Texas. The towns of Haughton and Stonewall developed in response to this economic growth as Shreveport and Bossier City workers moved to more quiet rural areas while still able to experience the conveniences of larger cities. This influx of residents has led to the establishment of smaller scale oriented businesses such as small grocery stores, gas stations, and various farm equipment supply/repair shops that serve the local populous.

Between 2000 and 2009, the civilian labor force demonstrated a positive increase at the state, parish, and community levels (see Table 3-4). The greatest labor force increases were in Haughton (39 percent) and Stonewall (21 percent). This trend demonstrates the desires of homeowners to relocate to less populated areas near the Shreveport/Bossier metropolitan areas. The largest increase on the parish level was in Bossier Parish (17 percent), which was above the 5-percent statewide rate.

Table 3-5 presents the 1990 and 2000 dominant employment industries in the Study Area parishes. Comparisons with the 2005-2009 American Community Survey (ACS) 5-year estimates were not possible because the employment sectors included in the occupation summaries are different. Employment in agriculture showed a positive increase in all Study Area parishes with the greatest increase in Bossier Parish (40 percent) while the statewide average dropped 34 percent. The three-parish average was 21 percent.

State/Parish/Community	Civilian Labor Force			Unemployment Rate (%)		
	2000	2009	% Change	2000	2009	Difference
Louisiana	1,997,995	2,095,192	5	7.3	4.6	-2.7
Bossier Parish	45,405	53,274	17	5.6	4.7	-0.9
Haughton	1,377	1,660	21	8.4	4.4	-4.0
Caddo Parish	115,370	119,229	3	9.3	5.6	-3.7
DeSoto Parish	10,563	11,890	13	8.1	4.7	-3.4
Stonewall	746	1,038	39	3.2	8.2	+5.0

Source: U.S. Department of Commerce – Bureau of the Census – 2000, Census of Population and Housing – General Housing Characteristic and 2005-2009 American Community Survey 5-Year Estimates

Parish	Agriculture**			Manufacturing			Retail trade			Health services			Education		
	1990	2000	% Change	1990	2000	% Change	1990	2000	% Change	1990	2000	% Change	1990	2000	% Change
Louisiana	41,805	27,630	-34	205,420	187,499	-9	287,778	220,343	-23	147,984	224,226	52	168,257	177,852	6
Bossier	705	984	40	3,876	3,649	-6	6,557	5,170	-21	3,815	6,038	58	2,811	3,482	24
Caddo	1,608	1872	16	13,419	11,585	-14	17,187	12,434	-28	12,494	15,806	27	9,764	9,702	-1
DeSoto	516	583	13	2,015	1,926	-4	1,148	1,104	-4	602	1,241	106	826	826	0
Study Area Parishes	2,829	3,439	21	19,310	17,160	-11	24,892	18,708	-25	16,911	23,085	37	13,401	14,010	5

Source: U.S. Department of Commerce – Bureau of the Census – 2000 Census of Population and Housing – General Housing Characteristics

Source: U.S. Department of Commerce – Bureau of the Census – 1990 Census of Population and Housing – General Housing Characteristics

* Values are presented as % of employed persons 16 years of age and older

** Includes forestry, fishing, and hunting

Employment in manufacturing declined at both the state and parish levels. The greatest decrease was experienced in Caddo Parish (14 percent). Statewide, the decrease was 9 percent. Additionally, retail trade exhibited a greater decrease in employment. Caddo and Bossier Parishes were near the statewide rate of 23 percent while DeSoto Parish had a slight reduction of 4 percent.

Employment in health care services showed the greatest overall increase. DeSoto Parish experienced the largest increase of over 100 percent. This surge in healthcare is mostly attributed to the 2001 expansion of a new 23,000 square foot ambulatory wing at the DeSoto Regional Hospital in Mansfield as well as new clinics in the parish. Caddo Parish exhibited the smallest growth at 27 percent.

Employment in education in the Study Area parishes experienced a diverse change from 1990 to 2000. Positive growth was exhibited in Bossier Parish (24 percent) that was four times that of the statewide increase (6 percent). Caddo Parish had a slight reduction in employment of 1 percent. Education employment in DeSoto Parish remained constant during the 10-year period.

Barksdale Air Force Base represents the largest employer in the Shreveport/ Bossier metropolitan area and the largest single site employer in Louisiana (Shreveport Chamber, 2004). As the

largest bomber base in the world, encompassing about 4,000 acres of developed land, Barksdale Air Force Base generates an annual payroll of over \$268 million dollars that includes a workforce of over 5,000 active duty military personnel, over 1,000 reservists, and over 2,000 civilians.

Another site that plays a major role in the economic environment within the Study Area is the Port of Shreveport – Bossier. This 2,300 acre complex, located about 5.5 miles south of the intersection of LA 1 and LA 526, includes a 3,200 foot long slack water harbor and turning basin, a comprehensive rail network service, a Regional Commerce Center, and an on-dock rail and rail switch yard (Port 2004 and Port 2011).

Businesses located at the Port include ADS Logistics Company LLC, Blount Brothers Construction, Inc, ChemTrade Logistics, Davison Transportation Services, Inc., Oakley Louisiana, Inc., Omni Specialty Packaging, Omni Industrial Solutions, Pratt Industries Paper Mill & Recycling Facility, Red River Terminals, Select Energy Services LLC, Southern Composite Yachts, Southern Precision Sands LLC, Ternium, T.G. Mercer Consulting Services Inc., and TruSouth Oil (Port 2011).

Some of the largest employers by parish include:

- ❑ Bossier Parish – Bossier Parish School Board, Horseshoe Entertainment, LLC, Casino Magic Bossier City, Diamond Jacks Casino and

Resort Bossier City, Barksdale Air Force Base, Schumpert Medical Center, Willis-Knighton Medical Center, Wal-Mart Stores, Inc., City of Bossier, Bossier Parish Community College.

☐ Caddo Parish – Caddo Parish School Board, LSU Medical Center – Shreveport, Willis-Knighton Medical Center, Schumpert Medical Center, City of Shreveport, North American Truck Group, Harrah Shreveport Management Company, Wal-Mart Stores, Inc., VA Medical Center.

☐ DeSoto Parish – International Paper Company, Louisiana Pacific Corporation, DeSoto Regional Health System, DeSoto Parish School Board, Dolet Hills Power Station, Mims Lumber, Acme Tube Inc. of Louisiana, Dolet Hills Mining, Brown and Hills Industrial Services, Inc., Hendrix Manufacturing Company, Inc., Mansfield Nursing Center, Wal-Mart Stores, Inc.

Median household income is provided in Table 3-6. Incomes vary at the parish level from \$36,536 in Caddo Parish to \$49,815 in Bossier Parish. Community level income ranges from \$57,396 in Stonewall to \$44,653 in Haughton. Stonewall exhibited the greater percent increase in median household income (46 percent).

State/Parish/Community	2000	2009	% Change
<i>Louisiana</i>	32,566	42,167	29
Bossier Parish	39,203	49,815	27
Haughton	33,417	44,653	34
Caddo Parish	31,467	36,536	16
DeSoto Parish	28,252	36,867	30
Stonewall	39,375	57,396	46

Source: U.S. Department of Commerce – Bureau of Census
2000 Census of Population and Housing – General Housing Characteristics and 2005-2009 American Community Survey 5-Year Estimates

3.3 ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations” (February 1994) was issued: 1) to promote nondiscrimination in federal programs substantially affecting human health and the environment, 2) to ensure that there will be no disproportionately high and adverse impacts to low-income and minority populations, and 3) to provide low-income and minority communities access to public information on, and the opportunity for public participation in proposed federal actions. The United States Department of Transportation’s (USDOT) Final Order on Environmental Justice (April 1997) was used to provide guidance in complying with EO 12898. In addition, the 1997 U.S. Environmental Protection Agency’s (EPA), “Interim Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses” and the Council on Environmental Quality’s, “Environmental Justice Guidance Under

the National Environmental Policy Act” (1997) provided additional guidance in addressing these issues.

3.3.1 Identification of Minority and Low-income Populations

U.S. Census Bureau 2000 Census Block Group level data for Census Tracts 110, 111.05, 111.06, and 9501 were examined to determine the presence of minority and low-income populations within the Study Area. Comparisons with the 2005-2009 ACS 5-year estimates were not possible because population data is not aggregated down to the Block Group level. Although not specifically required by Executive Order 12898, elderly populations (> 65 years old) were also identified. Fifteen Block Groups within the Study Area were examined to better characterize these populations that may be affected by the proposed project (see Exhibit 3-1).

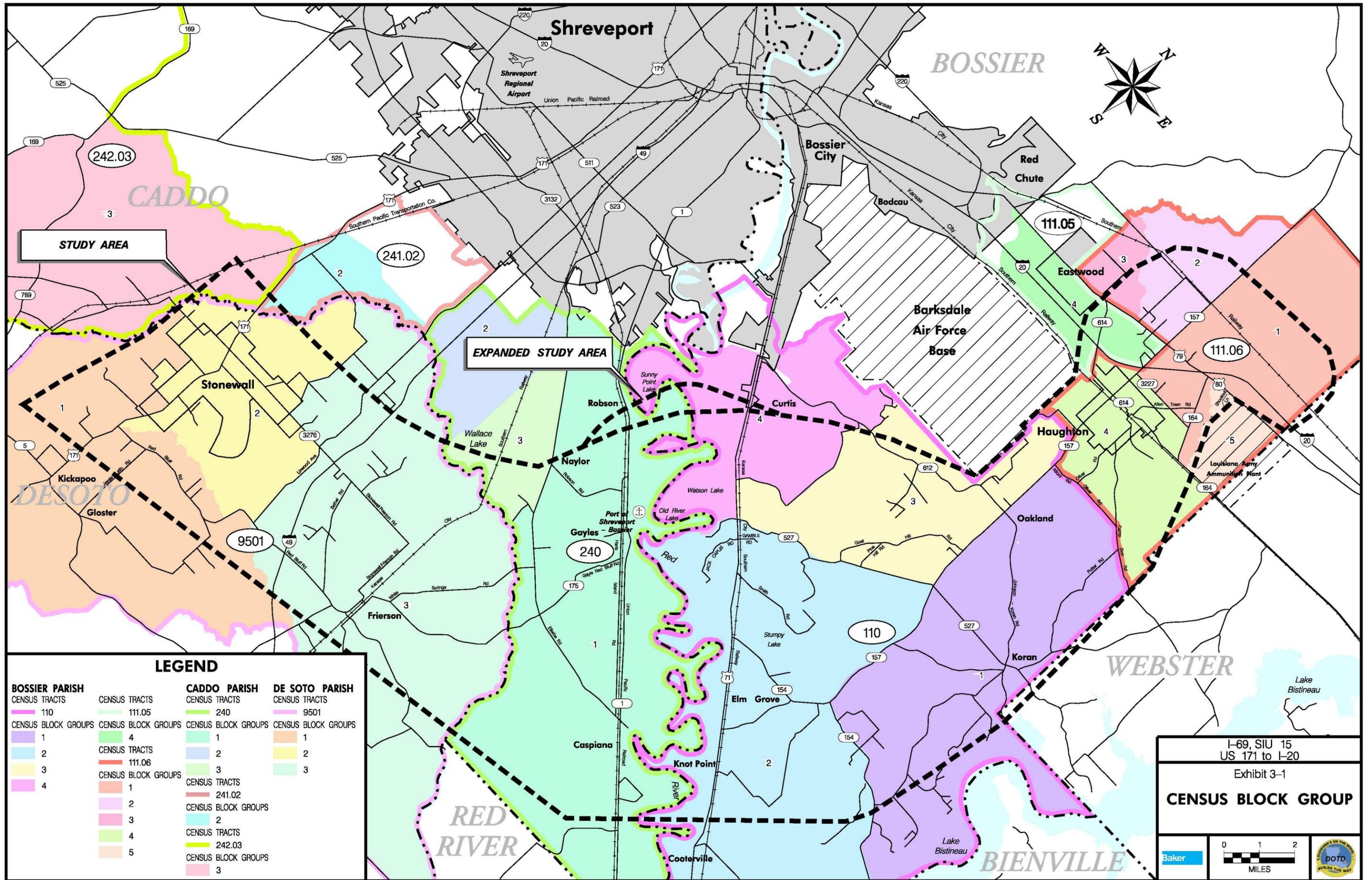
Table 3-7 lists information on minority, low-income, and elderly populations within the Study Area. The highest concentration of minority populations was found within Block Group 5 of Census Tract 111.06 in Bossier Parish. Block Group 5 is generally located south of U.S. 80, west of the Webster Parish line and east of Clarke Bayou near Haughton and primarily consists of undeveloped woodlands and scattered homes.

The highest percentage of persons in poverty is located in Block Group 3 of Census Tract 110 in Bossier Parish. Block Group 3 is generally located south of the community of Haughton west of LA 157 and north of LA 527 adjacent to the boundary of the Barksdale Air Force Base. This was slightly above the statewide rate (19 percent).

The highest percentage of persons over 65 were found in Block Group 1 in Caddo Parish (35 percent) and was more than double the statewide and parish average. No persons over 65 were reported in Block Group 5 of Census Tract 111.06 in Bossier Parish.

3.4 BICYCLE AND PEDESTRIAN FACILITIES

The Study Area was reviewed for pedestrian walkway facilities, designated bikeways, scenic trails, and proposed trails to identify any areas where these facilities may be impacted by the proposed project. No exclusive bikeways or hiking trails exist or are planned in the Study Area. Due to the rural nature of the majority of the Study Area, most of the bicycle and pedestrian activity is limited to the larger communities such as Stonewall and Haughton.



LEGEND

BOSSIER PARISH		CADDO PARISH		DE SOTO PARISH	
CENSUS TRACTS	CENSUS TRACTS	CENSUS TRACTS	CENSUS TRACTS	CENSUS TRACTS	CENSUS TRACTS
110	111.05	240	240	9501	9501
1	4	1	1	1	1
2	111.06	2	2	2	2
3	1	3	3	3	3
4	2	241.02	2	2	2
	3	2	3	3	3
	4	242.03	2	2	2
	5	3	242.03	2	2
		3	3	3	3

I-69, SIU 15
US 171 to I-20
Exhibit 3-1
CENSUS BLOCK GROUP

Baker

0 1 2
MILES

Table 3-7 MINORITY, LOW-INCOME, AND ELDERLY POPULATIONS BY CENSUS TRACT					
State/Parish	Population	% Minority	% 65 and Older	Median Household Income	% Poverty
<i>Louisiana</i>	<i>4,468,976</i>	<i>36</i>	<i>12</i>	<i>32,566</i>	<i>19</i>
Bossier Parish	98,310	25	10	39,203	13
Census Tract 110					
Block Group 1	1,715	24	15	35,560	14
Block Group 2	851	22	10	48,802	20
Block Group 3	1,928	35	7	32,548	24
Block Group 4	2,121	6	6	55,781	4
Census Tract 111.05					
Block Group 4	1,941	5	11	44,583	10
Census Tract 111.06					
Block Group 1	1,124	10	8	38,611	15
Block Group 2	935	39	11	34,219	13
Block Group 3	1,625	15	15	39,694	6
Block Group 4	3,317	24	9	33,542	16
Block Group 5	14	71	0	61,250	0
Caddo Parish	252,161	47	14	31,467	21
Census Tract 240					
Block Group 1	1,238	9	35	72,222	19
Block Group 3	2,115	13	6	133,460	3
DeSoto Parish	25,494	44	14	28,252	25
Census Tract 9501					
Block Group 1	2,423	37	10	39,028	13
Block Group 2	1,646	19	12	37,679	15
Block Group 3	2,875	27	10	36,650	19

Source: U.S. Department of Commerce – Bureau of Census – 2000 – Census of Housing and Population

3.5 LAND USE

Land use practices observed within the Study Area include a mixture of areas developed for agricultural, commercial, and residential development. Agricultural activities consist of abundant row crops along the Red River floodplain in Caddo and Bossier Parishes as well as timber management in the upland areas. Residential and commercial development is primarily limited to the

towns of Haughton and Stonewall. Residential land use consists of single-family houses of brick or frame construction or mobile homes. Multiple family dwellings also occur. Beyond the community limits, scattered rural residential development occurs along state and county roadways.

3.5.1 Agricultural Land

Crop production in the Study Area varies widely and includes fruits, pecans, commercial

vegetables, nursery crops and home gardens. The dominant commercial crops planted include cotton, corn, soybeans, grain sorghum, hay, and wheat. Generally, the type of crop planted is dependent on the market price and cost of production. Historically, cotton has been the dominant row crop planted within the Study Area with lesser amounts of soybeans, corn, wheat, and grains.

In 2002, over 90,000 acres of Caddo Parish were in some form of agricultural production. The top crop items included corn for grain (16,495 ac), forage crops such as hay (15,839 ac), cotton (14,640 ac), and soybeans (8,570 ac) (USDA 2002). Most of the Study Area that lies in Caddo Parish is within the Red River Alluvial Plain. This area is dominated by level to gently undulating loamy or clayey soils that have formed on Red River alluvial material (USDA 1980). Periodic flooding throughout time has laid down accumulations of Red River sediments that are now fertile farmland soils.

Fertile farmland in agricultural production occurs in Bossier Parish along the Red River floodplain. Soybeans are the dominant crop in Bossier Parish followed by wheat and cotton. Additionally, timberland is abundant across the parish with approximately 388,000 acres. A 1991 timber survey by the Louisiana Department of Agriculture and Forestry (LDAF 1991) indicated that timberland in Bossier Parish was roughly an even mix of

natural loblolly-shortleaf pine and mixed hardwoods.

DeSoto Parish has only minor agricultural crop production with less than 1,700 acres total for cotton, soybeans and corn/grain crops combined. This is primarily because most of DeSoto Parish is west of the fertile Red River Alluvial Plain. Acreage of timberland in DeSoto Parish is similar to that of Caddo and Bossier Parishes with a total of approximately 370,000 acres (LDAF 1991).

The NRCS for DeSoto Parish reported in March of 2002 that there were approximately 38 cattle and dairy farms operating in DeSoto Parish. Consequently there is a significant acreage in pasture grasses for cattle food production. In DeSoto Parish, within the Study Area, most of the land is in timber or pasture.

Forestry

Forestry is the largest agricultural industry in Louisiana producing saw timber, pulpwood, and poles for a variety of private and commercial uses. Caddo, Bossier and DeSoto Parish have similar acreages of forested land, 317,200, 388,000 and 369,700 respectively (LDAF 1991). Limited timberland occurs within the Study Area in Caddo Parish.

Forest products remain a major land and economic component of these Parishes. Within the Study Area, forestland is primarily found north and east of U.S. 71 in Bossier Parish and west of LA 1 in

DeSoto Parish. Large tracts of pine-dominated forest occur in this area. The majority of timberland in Bossier and DeSoto Parishes is privately owned with nearly 232,000 acres in Bossier Parish and 265,000 acres in DeSoto Parish. Pine plantations are distributed throughout the parishes. Loblolly and Shortleaf pine (*Pinus taeda* and *Pinus echinata*) are the major wood producing tree species harvested in this area.

The Nature Conservancy of Louisiana has identified a large tract of bottomland hardwood forest associated with Cannisnia Lake south of Caspiana in Caddo and Bossier Parishes as one of the most important remnant natural areas and the largest remaining forested wetland in the Northern Red River Valley (The Nature Conservancy 2001).

3.6 GEOLOGIC RESOURCES

The Study Area is located within the Gulf Coastal Plain Physiographic Province of Louisiana. The underlying bedrock consists of unconsolidated and semi-consolidated sedimentary rocks composed of sand, silt, clay, limestone, and anhydrite. Geologic forces caused the bedrock to fold upward into a dome shaped subsurface feature known as the Sabine uplift. Folding and faulting of the bedrock has trapped and concentrated oil and natural gas into reservoirs or pools. The existence of these geologic conditions led to the successful development of the petroleum industry in this area.

3.6.1 Oil and Natural Gas

The exploration for oil and natural gas has occurred in northwest Louisiana as well as within the Study Area since the early part of the 20th century and continues today. Several oil and gas fields are located within the Study Area (see Exhibit 3-2) with the largest fields being the Bellevue, Caspiana, Elm Grove, and the Sligo oil and gas fields. The Caspiana field is located in Caddo Parish, the Elm Grove, Sligo, and Bellevue fields are found in Bossier Parish.

Oil and gas wells are scattered throughout the central portion of the Study Area within the Red River floodplain and upland areas in a variety of land use settings. In 2003, 164 oil and gas fields were identified within the Shreveport District, and wells located within the Caspiana, Elm Grove, and Sligo fields each produced over 10,000,000 million cubic feet (mcf) of natural gas. The Sligo field produced over 57,000 barrels of crude oil, and the Elm Grove field slightly over 2,000 barrels (SONRIS 2003).

Haynesville Shale came into prominence in 2008 as a potentially major shale gas resource, with the most active areas located in Caddo, Bienville, Bossier, Desoto, Red River and Webster Parishes and adjacent areas of southwest Arkansas and east Texas (LADNR 2011) and encompasses the entire Study Area. In March 2011, the Haynesville formation surpassed the Barnett Shale in Texas as the most productive US natural gas field, producing

approximately 5.5 billion cubic feet (bcf) of natural gas daily. More than 1,000 wells are already producing record levels of natural gas, and 900 more are permitted and awaiting drilling or are currently being drilled. Estimates indicate that 10,000 wells could be drilled to fully develop the area (EIA 2011).

3.7 FARMLANDS

The U.S. Department of Agriculture, through the Natural Resources Conservation Service (NRCS), administers the Farmland Protection Policy Act (FPPA 1981) to insure that Federal programs minimize unnecessary and irreversible conversion of farmland to nonagricultural uses. Farmland as defined by the FPPA includes Prime Farmland, Unique Farmland, or Land of Statewide or Local Importance.

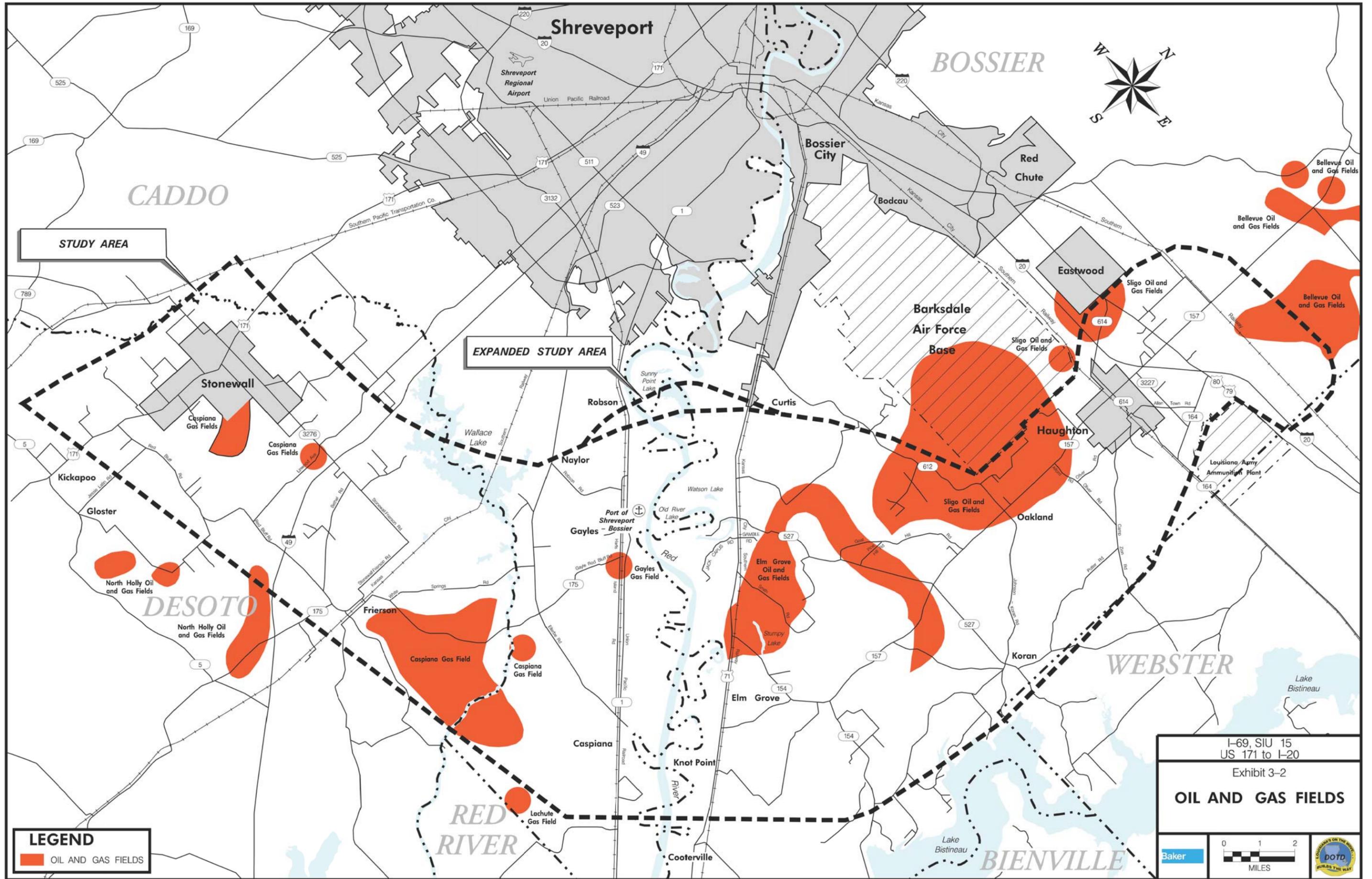
The NRCS defines Prime Farmland as soils that have the best combination of physical and chemical characteristics to economically produce high yields of agricultural crops when treated and managed according to acceptable farming practices. Current land uses of areas having Prime Farmland soils include cropland, pastureland, and timberlands. Land in urban or residential development is not considered Prime Farmland. Coordination with the Caddo, Bossier and DeSoto Parish NRCS offices identified Prime Farmland soil types within the Study Area.

Statewide or Locally Important Farmland is land that has been identified by state or local agencies for agricultural use, but is not of national importance. These farmlands generally demand a slightly higher level of management than Prime Farmlands for statewide production of agricultural crops. Coordination with the Bossier and DeSoto Parish NRCS offices identified Statewide or Locally Important Farmland soil types with the Study Area. Caddo Parish has no soil types designated as Statewide or Locally Important.

3.8 WATER QUALITY

3.8.1 Surface Water Resources

The Study Area lies within the Gulf Coastal Plain Physiographic Province and is primarily located within the Red River Basin. The Red River flows south into Louisiana from Arkansas and forms the boundary between Caddo and Bossier Parishes. The river flows south to Shreveport, where it turns southeast and flows for approximately 160 miles to its junction with the Atchafalaya River. The river drains approximately 7,760 square miles within Louisiana. Historically, the Red River valley was forested with bottomland hardwoods, cypress sloughs, and shrub swaps. However, in the last 30 years, much land has been cleared for agricultural production.



STUDY AREA

EXPANDED STUDY AREA

LEGEND
 OIL AND GAS FIELDS

I-69, SIU 15
 US 171 to I-20

Exhibit 3-2
OIL AND GAS FIELDS

Baker  MILES 

Surface water resources within the Study Area include perennial and intermittent streams or bayous, lakes, and man-made ponds. Perennial and intermittent streams were identified from U.S. Geological Survey (USGS) 7.5 minute quadrangle mapping. The Red River, Red Chute Bayou, Clarke Bayou, Flat River, Bayou Pierre are the major streams within the Study Area. Information obtained from the Louisiana Department of Wildlife and Fisheries indicated that no state listed Natural or Scenic Rivers occur within or near the Study Area. The National Park Service indicated that no rivers designated as Wild and Scenic or rivers on the Nationwide Rivers Inventory occur within or near the Study Area.

Wallace Lake is the only impoundment within the Study Area operated by the U.S. Army Corps of Engineers for flood control. Wallace Lake is approximately 3,200 acres in extent and offers limited secondary contact activities such as hunting and fishing. Additional small to medium sized oxbow lakes have formed along the abandoned portions of the Red River channel.

The Louisiana Department of Environmental Quality's (LADEQ) Office of Water Resources (OWR) is responsible for monitoring, protecting, and enhancing the quality of Louisiana's surface and groundwater. OWR monitors surface water quality through a series of fixed long term sampling stations located throughout the state.

Results from Louisiana's 2008 Integrated Report (IR) was used to identify the water quality of several Study Area streams and whether these streams met state water use designations.

Louisiana Water Quality Standards define eight designated uses for surface waters: primary contact recreation (PCR), secondary contact recreation (SCR), fish and wildlife propagation (FWP), drinking water supply (DWS), oyster propagation (OYS), agriculture (AGR), outstanding natural resource (ONR), and limited aquatic and wildlife use (LAL). Results of analytical data, statistical analysis, and input from regional staff are used to determine the support classification for each measured parameter. A stream classified as "fully supporting" is typical of good water quality while a stream classified as "not supporting" is of poor water quality.

Table 3-8 shows the assessment data compiled for some Study Area waterbodies. All waterbodies, except for Red Chute Bayou, have suspected cause of impairment. About 45% of the impairments to Study Area waterbodies are attributed to natural conditions and sources from beyond the state border. Of the three state use designations identified for streams within the Study Area, Red Chute Bayou fully supports each designation while Flat River supports the least.

**Table 3-8
SURFACE WATER QUALITY ASSESSMENT**

Water Body	Designated Uses								Suspected Cause of Impairment	Suspected Impairment Source
	PCR	SCR	FWP	DWS	ONR	OYS	AGR	LAL		
Flat River	N	F	N	-	-	-	-	-	Non-Native Aquatic Plants	Source Unknown
									Total Dissolved Solids	Residential Districts
									Dissolved Oxygen	Source Unknown
									Fecal Coliform	Managed Pasture Grazing
Red Chute Bayou	F	F	F	-	-	-	-	-	None	None
Red River	F	F	N	F	-	-	F	-	Sulfates	Natural Sources & Sources outside state jurisdiction or borders
Wallace Bayou	X	X	N	-	-	-	X	-	Dissolved Oxygen	Natural Conditions & Source Unknown
Wallace Lake	F	F	N	-	-	-	F	-	Nitrate/Nitrate	Natural Conditions
									Non-Native Aquatic Plants	Source Unknown
									Dissolved Oxygen	Natural Conditions
									Total Phosphorus	Natural Conditions

Source: Louisiana Department of Environmental Quality, 2008 Integrated Report

- F = Fully Supports Designated Uses
- N = Not Supporting Designated Uses
- I = Insufficient data
- X = No data available

3.8.2 Groundwater

The LADEQ’s Environmental Evaluation Division conducts an ambient monitoring program of the aquifers in Louisiana to determine groundwater quality. Well water is tested for water quality and nutrient parameters in accordance with the Federal primary and secondary drinking water standards. Results provided in a Tri-Annual Report were primarily used to broadly assess the quality of groundwater in the Study Area.

Three aquifers are used as water supplies in the Study Area. The Red River alluvial aquifer is the

largest source of groundwater in the Red River Valley in Louisiana and is hydraulically connected to the Red River and its major streams. Water is primarily used for aquaculture and rice irrigation. Groundwater is considered to be very hard. Generally, as the concentration of calcium carbonate in the water increases the hardness increases. Typical well yields range from 500 to 2,800 gallons per minute (gpm). Results from the monitoring program of the Red River Alluvial Aquifer indicated that no wells exceeded the primary drinking water standards. Secondary

standards were exceeded for iron, copper, chloride and total dissolved solids.

The North Louisiana Terrace aquifer lies within Bossier Parish and consists of a blanket of deposits that occur outside of major floodplains at higher elevations along the flanks of hills dissected by streams. These sediments were deposited by streams that were higher in elevation than they are today. The aquifer is primarily used for public and industrial water supply, and rice irrigation. The groundwater in the terrace aquifer is considered to be moderately hard. Typical well yields range from 100 to 1,700 gpm. Results from the monitoring program of the North Louisiana Terrace aquifer indicated that no wells exceeded the primary drinking water standards. Secondary standards were exceeded for color, sulfate, and total dissolved solids.

The Carrizo-Wilcox aquifer is the most aerially extensive aquifer in northwestern Louisiana and underlies the entire Study Area. Water quality varies both laterally and vertically based on the structure of the underlying bedrock. Water can range between calcium bicarbonate to a sodium bicarbonate type. The aquifer is primarily used for public and rural water supplies. Groundwater is generally soft. Typical well yields range from 30 to 150 gpm with large capacity wells that approach 400 gpm. Results from the monitoring program of the Carrizo-Wilcox aquifer indicated that no wells exceeded the primary drinking water

standards. Secondary standards were exceeded for color, pH, iron, and total dissolved solids.

3.8.3 Public Water Supplies

The Safe Drinking Water Act of 1974 and amendments passed in 1986, established two programs to help protect groundwater quality: the Wellhead Protection Program and the Sole Source Aquifer Demonstration Program. The Louisiana Department of Environmental Quality's Office of Environmental Assessment, Environmental Evaluation Division administers the Wellhead Protection Program. LADEQ was contacted to identify the location of wellhead protection areas (WHPA) within the Study Area. Currently, nine WHPA's are located the within the Study Area and are shown on Exhibit 3-3.

The EPA has the authority to designate an underground body of water as a sole source aquifer (SSA). EPA defines a SSA as an aquifer, which is needed to supply 50% or more of the drinking water for a given area and for which there are no reasonably available alternative sources should the aquifer become contaminated. The EPA was contacted to identify the location of any SSA's within the Study Area. No sole source aquifers are located within the Study Area.

3.9 FLOODPLAINS AND FLOODWAYS

The protection of floodplains and floodways is required by Executive Order 11988, Floodplain Management; 23 CFR Part 650, Location and

Hydraulic Design of Encroachments on Floodplains; and USDOT 5650.2, Floodplain Management and Protection. These regulations were designed to minimize highway encroachments within the 100-year floodplain and to avoid land use development inconsistent with floodplain values. Flood Insurance Rate Maps and Flood Hazard Boundary Maps were obtained for DeSoto, Caddo, and Bossier Parishes and used to identify the limits of the 100-year floodplain and regulatory floodways.

During periods of high water, floodplains serve to moderate flood flow, provide water quality maintenance, and serve as temporary habitat for a number of plant and animal species. Within the Study Area, the largest floodplains are associated with the Red River (see Exhibit 3-4). Agricultural land dominates the floodplain in the Red River valley in addition to scattered forested areas.

3.10 WETLANDS

Wetlands are defined by the EPA and the U.S. Army Corps of Engineers (COE) as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (40 CFR 230.3 and 33 CFR 328.3).

To help slow and minimize wetland losses nationwide, Executive Order 11990 (EO 11990,

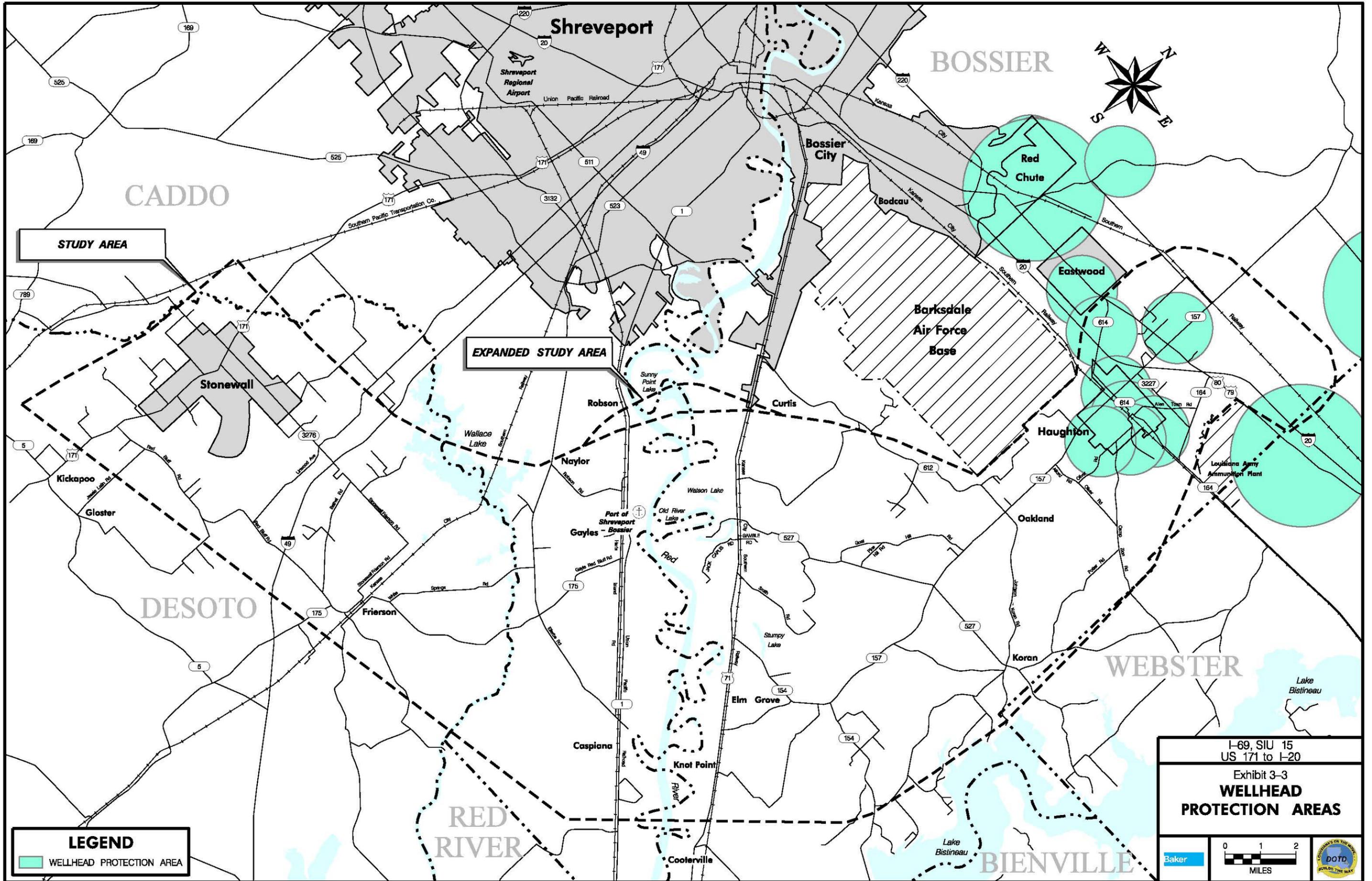
May 1977) Protection of Wetlands, established a national policy to “avoid to the extent possible the long-term and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative”.

Potential wetland areas were initially identified using aerial photography. Photointerpretation of 1998-1999 National Aerial Photography Program (NAPP) color infrared photography was conducted to identify potential wetland areas within the Study Area and is shown on Exhibit 3-4.

3.10.1 Wetland Communities

Wetlands were classified as herbaceous, scrub-shrub or forested wetlands based on dominant vegetative characteristics (Cowardin et al., 1979). A number of published sources were consulted to aid identification of plant species within the Study Area (Allen 1980, Brown 1945, Godfrey and Wooten 1981, MacRoberts 1979, and Overly 1974). The dominant wetland systems in the Study Area are forested wetlands, typically associated with stream or river systems.

Soils associated with the wetlands generally consist of level to gently sloping loamy and clay soils that reduce soil permeability and result in poor drainage. Most wetland soils are dark gray to gray with distinct reddish-yellow to yellowish-red mottles in the upper 20 inches (Munsell 1994).



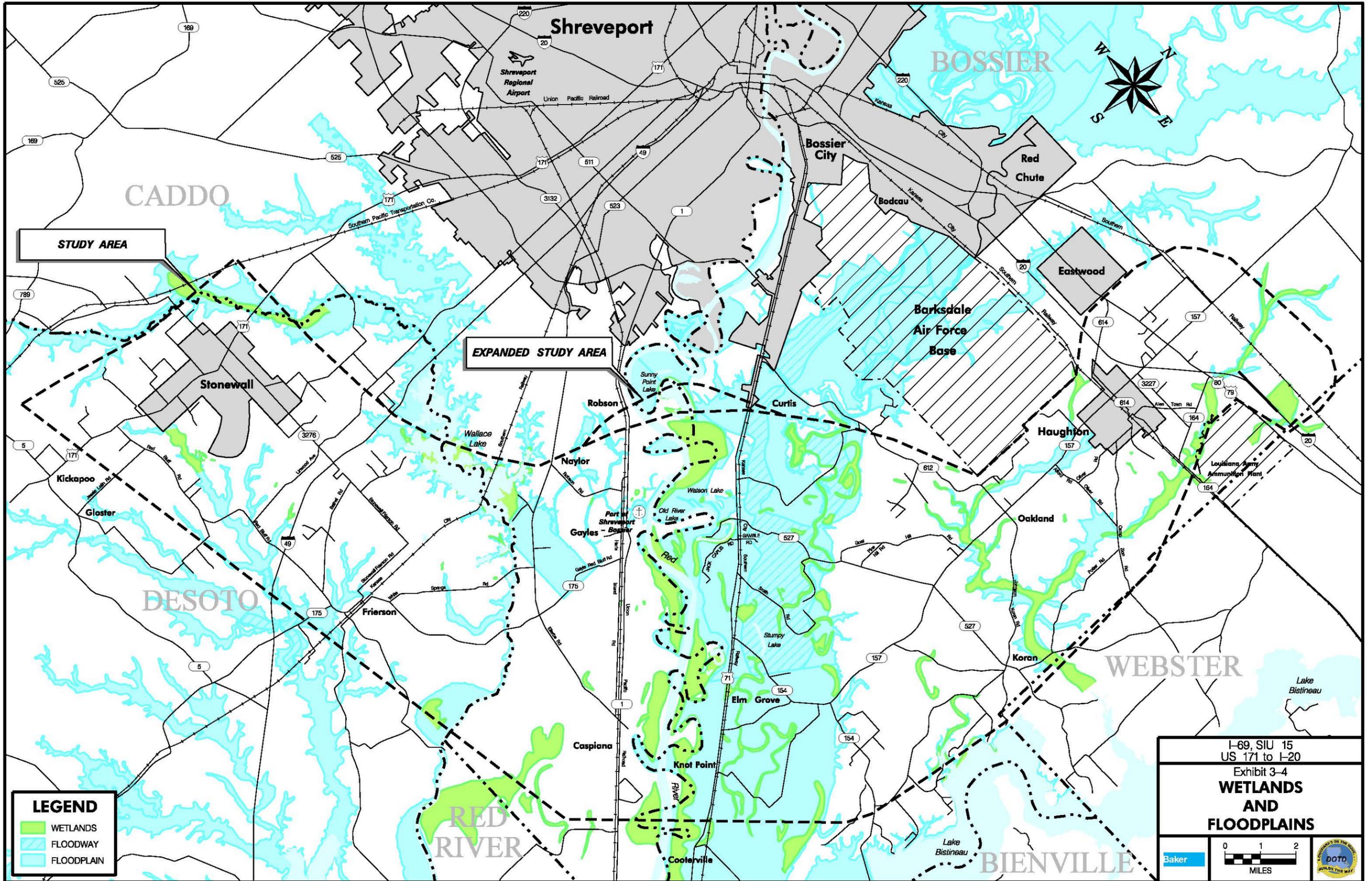
STUDY AREA

EXPANDED STUDY AREA

LEGEND
 WELLHEAD PROTECTION AREA

I-69, SIU 15
 US 171 to I-20

Exhibit 3-3
WELLHEAD PROTECTION AREAS



STUDY AREA

EXPANDED STUDY AREA

LEGEND

- WETLANDS
- FLOODWAY
- FLOODPLAIN

I-69, SIU 15
 US 171 to I-20
 Exhibit 3-4
**WETLANDS
 AND
 FLOODPLAINS**

Baker

0 1 2
 MILES

These coloring and mottling characteristics are indicative of hydric soils (USCOE 1987). Due to the predominance of clay in the area soils, wetland areas remained inundated or saturated for long periods after heavy rains due to low soil permeability. The Vicksburg District COE was contacted to discuss important considerations regarding red, non-gleyed soil color exhibited in parts of the Red River Basin. Any areas exhibiting hydric vegetation and positive hydrological indicators but soils color and Chromo indicative of non-hydric conditions would be reviewed with appropriate COE personnel prior to confirming wetland or non-wetland status.

Herbaceous Wetlands

Herbaceous wetlands were found associated with ponds, bayous, and in low areas previously cleared for timber or agricultural purposes. Herbaceous wetland vegetation within the Study Area consists primarily of a mixture of grasses, sedges and rushes. Typical herbaceous species identified include soft rush (*Juncus effusus*), alligator weed (*Alternanthera philoxeroides*), shallow sedge (*Carex lurida*), smartweed (*Polygonum* spp.), spike rush (*Eleocharis* spp.), and cattail (*Typha latifolia*).

The herbaceous wetlands were generally small and ephemeral or temporary in nature. Evidence of wetland hydrology and vegetation is often limited to the spring and early summer when rainwater is trapped for extended periods of time due to low soil permeability.

Scrub-Shrub Wetlands

Scrub-shrub wetlands were also found associated with the Red River, ponds and streams and in low areas previously cleared for timber or agricultural purposes. These areas are often associated with both herbaceous and forested wetlands. Common shrub species observed include black willow (*Salix nigra*), cottonwood (*Populus deltoids*), buttonbush (*Cephalanthus occidentalis*), and deciduous holly (*Ilex decidua*).

Forested Wetlands

Bottomland hardwood forests were the dominant wetland type in the Study Area. Most were associated with floodplains of the Red River and area streams or bayous. Typical canopy species observed included bald cypress (*Taxodium distichum*), sugarberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*), and water oak (*Quercus nigra*).

The Nature Conservancy of Louisiana has identified a large tract of bottomland hardwood forest associated with Cannisnia Lake south of Caspiana in Caddo and Bossier Parishes as one of the most important remnant natural areas and the largest remaining forested wetland in the Northern Red River Valley (The Nature Conservancy 2001).

Wetland Wildlife

Herbaceous, scrub-shrub, and bottomland hardwood forested wetlands are generally diverse vegetative communities that provide habitat for a

wide array of vertebrate species. Study Area species occurrence information was obtained from a variety of published sources (Dundee and Rossman 1989, Lowery 1981, Hardy 1979, 1982, Ingold 1995, Hardy and LeGrande 1979) and through field observations. Common mammalian species using these wetland areas include the beaver (*Castor canadensis*), opossum (*Ondatra zibethica*), white-tailed deer (*Odocoileus virginianus*), mink (*Mustela vison*), and raccoon (*Procyon lotor*). Birds associated with wetland habitats include warblers, vireos, thrushes, wading birds, and waterfowl. The barred owl (*Stryx varia*), and red-shouldered hawk (*Buteo lineatus*) are birds of prey commonly associated with these habitats. Permanent and ephemeral ponded water areas in these wetlands are used by a number of frog and salamander species for breeding purposes such as the green frog (*Rana clamitans*), green treefrog (*Hyla cinerea*), and marbled salamander (*Ambystoma opacum*). Wetland areas are also used by many species of snakes and turtles as foraging and reproductive habitats.

3.11 UPLAND COMMUNITIES

Pine-oak-hickory forests are the dominant upland vegetative community within the Study Area. These areas primarily occur in Bossier Parish north and east of U.S. 71 and west of LA 1 in DeSoto Parish. In addition to this forest community, several other distinct upland community types

occur within the Study Area; pastureland, old field, and croplands.

3.11.1 Forests

Within the Study Area, forests are associated with moderately to steeply sloping soils, often containing sands that increase soil permeability and promote drainage. The pine-oak-hickory community dominates the upland forest vegetation within Bossier and DeSoto Parishes. The Study Area within Caddo Parish has very little upland and most of the bottomland has been cleared for agricultural production.

This forest type is dominated by a combination of oak and hickory species with pine increasing on drier sites. Common tree species include loblolly and shortleaf pine (*Pinus taeda* and *Pinus echinata*), southern red oak (*Quercus falcata*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), black hickory (*Carya texana*), and mockernut hickory (*Carya tomentosa*), as well as sassafras (*Sassafras albidum*), and winged elm (*Ulmus alata*). Common understory species include flowering dogwood (*Cornus florida*), blueberries (*Vaccinium* spp.), serviceberry (*Amelanchier arborea*), yaupon (*Ilex vomitoria*), southern blackhaw (*Viburnum rufidulum*), poison ivy (*Toxicodendron radicans*), japanese honeysuckle (*Lonicera japonica*), and greenbrier (*Smilax* spp.).

A wide range of wildlife species are present within the upland forests of Bossier, Caddo, and DeSoto Parishes ranging from the white-tailed deer (*Odocoileus virginianus*) to the nine-banded armadillo (*Dasypus novemcinctus*). Important small game and furbearing mammals include the fox squirrel (*Sciurus niger*), gray squirrel (*Sciurus carolinensis*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), and opossum (*Didelphis virginiana*). Forest dwelling small mammals of mice, moles, and shrews provide a valuable food resource for larger forest predators such as the coyote and red fox.

Forest birds include a variety of warblers, wrens, thrushes, vireos, and woodpeckers. Forest raptors include the great horned owl (*Bubo virginianus*), cooper's hawk (*Accipiter cooperii*), and red-shouldered hawk (*Buteo lineatus*).

The presence of forest floor litter such as decayed logs, flat rocks, fallen limbs, and leaf material is an important habitat component, providing foraging cover and daytime refuge for many species of reptiles and amphibians. Common species include the box turtle (*Terrepenne carolina*), fence lizard (*Sceloporus undulatus*), hognose snake (*Heterodon platyrhinos*), copperhead (*Agkistrodon contortrix*), and spring peeper (*Hyla crucifer*).

3.11.2 Pastureland / Old Fields

Previously forested portions within the Study Area have been cleared for a number of agricultural and

oil and gas related activities and many areas now consist of pasture-old field communities. Pasture areas are primarily used for raising livestock and/or growing forage crops to feed livestock. Pasturelands generally consist of a variety of native and cultivated grasses and legumes such as bahaigrass (*Paspalum notatum*), bermuda grass (*Cynodon dactylon*), tall fescue (*Festuca arundinacea*), clover (*Trifolium* spp.), goldenrod (*Solidago* spp.), broomsedge (*Andropogon virginicus*), and lespedeza (*Lespedeza* spp.). DeSoto Parish, because of a high number of cattle and dairy farms, has a significant acreage planted in livestock grass crops.

Old field communities contain similar herbaceous species with the addition of blackberry (*Rubus* spp.), japanese honeysuckle (*Lonicera japonica*), and scattered pioneer shrub and tree species such as sumac (*Rhus* spp.), cedar (*Juniperus virginiana*), winged elm (*Ulmus alata*), and black locust (*Robinia psuedoacacia*).

Pastureland / old field communities provide habitat for a number of wildlife species adapted to early successional vegetation. In addition, these communities can create surrounding edge environments where they intersect with one another or with other habitat types such as forests or wetlands. The resultant edge environment often provides greater habitat diversity and attracts a greater number of vertebrate species than the individual communities by themselves.

Vertebrate wildlife species are typically dominated by small mammals, primarily the cottontail rabbit (*Sylvilagus floridanus*) and a variety of mice, voles, moles, and shrews. Larger predators such as the coyote and fox frequently hunt for small mammals in these areas where multiple habitat types are interspersed and interconnected.

A variety of bird species forage in pasture-old field areas and use the shrubby edge habitat for nesting and cover. Typical species include the indigo bunting (*Passerina cyanea*), sparrows (*Ammodramus savannum*, *Chondestes grammacus*, and *Spizella*, *Zonotrichia*, *Melospiza* spp.), eastern meadowlark (*Sturnella magna*), cardinals (*Cardinalis cardinalis*), eastern bluebird (*Sialia sialis*), and blackbirds. In addition, these areas are utilized as foraging habitat by raptor species such as the red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*).

The relative open space and lack of adequate ground cover within these habitats generally results in poor species diversity and population numbers for most reptile and amphibian species. However, some snake species such as the black rat snake (*Elaphe obsoleta obsoleta*), garter snake (*Thamnophis sirtalis*), and hognose snake (*Heterodon platyrhinos*), prey on the resident small mammal and insect populations.

3.11.3 Cropland

Most of the Study Area cropland is located in the Red River Alluvial Basin near the Red River in Caddo and Bossier parishes. The primary crops are cotton, soybeans, and corn. Wildlife community diversity in croplands is reduced due to the large expanses of monotypic stands of row crops that provide marginal habitat for most wildlife species. Wildlife use of these areas is largely dependent on the crop being grown and the time of year. Crops such as corn and wheat provide cover and food for a number of birds and small mammals. After harvest, waste material attracts many resident, migrating, and wintering bird species, while spring flooded fields provide habitat for many species of shorebirds and waterfowl.

3.12 AQUATIC COMMUNITIES

Surface water resources within the Study Area include the Red River, perennial and intermittent streams or bayous, lakes, and man-made ponds. These water bodies provide important habitat for a number of fish and wildlife species. The Red River, bayous, lakes, and ponds within the Study Area typically support species such as mosquitofish (*Gambusia affinis*), catfish (*Ictalurus spp.*), gizzard shad (*Dorosoma cepedianum*), bowfin (*Amia calva*), sunfish (*Lepomis spp.*), and bass (*Micropterus salmoides*). Area waterbodies also provide important foraging and nesting habitat for a number of wading bird and waterfowl species including the great blue heron (*Ardea herodias*),

great egret (*Ardea alba*), tricolored heron (*Egretta tricolor*), and wood duck (*Aix sponsa*).

3.13 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (ESA) of 1973 (16 USC §1531-1543) declares the intention of Congress to protect all federally listed threatened and endangered species and designated critical habitat of such species occurring both in the United States and abroad. Section 7 of the ESA requires that federal agencies, such as FHWA, ensure that any action authorized, funded or carried out by an agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The U.S. Fish and Wildlife Service (FWS) is the primary regulatory agency responsible for ESA compliance.

The state of Louisiana relies upon Federal legislation to protect vertebrate, invertebrate and plant resources. The Louisiana Department of Wildlife and Fisheries Natural Heritage Program (LNHP) maintains a database with the known locations of federally listed threatened and endangered species as well as a list of state species of special concern. State species of special concern are not afforded legal protection as are federally listed threatened and endangered species. The FWS and the LNHP were contacted regarding sensitive species within the Study Area.

LNHP provided digital information that was entered into the project GIS.

3.13.1 Federally Listed Species

Consultation with the FWS (Refer to December 21, 2001 Dept. of Interior letter) indicated that one federally listed species, the interior least tern (*Sterna antillarum*), has been sited within the Study Area.

The interior least tern was listed as an endangered species in May 1985 (50 FR 21784-21792). The interior least tern is a migratory shorebird that breeds, nests, and rears its young on non-vegetated portions of sandbars and islands. Under natural river conditions, islands and sandbars are created and destroyed by the river's erosion and deposition processes causing the nesting location of this species to be dynamic. Interior least tern sites within the Study area were also identified through consultation with local experts.

Additionally, the FWS suggested that potential habitat for the red-cockaded woodpecker (*Picoides borealis*), listed as an endangered species in October 1970 (35 FR 16047), may occur within the Study Area. Open stands of mature pine trees (greater than 60 years of age) with little understory provides suitable nesting habitat. Foraging habitat is provided by pine and pine/hardwood stands 30 years or older.

3.13.2 State Species of Special Concern

The LNHP identified 11 different elements of special concern with the Study Area: five animal species, two plant species, and four natural

habitats. These species are not afforded special protection, but coordination will continue with the LNHP to protect these species and special areas wherever feasible (see Table 3-9).

Species	Category	State Status	Last Documented Documented Date
<i>Sterna antillarum</i> Interior Least Tern	Animal	Very Rare	2001
<i>Eumeces septentrionalis</i> Southern Prairie Skink	Animal	Very Rare	1970
<i>Ribes curvatum</i> Granite Gooseberry	Plant	Rare	1973
<i>Faxonella beyeri</i> Sabine Fencing Crawfish	Animal	Very Rare	1975
* <i>Vireo gilvus</i> Warbling Vireo	Animal	Very Rare	1998
<i>Dodecatheon media</i> Common Shooting Star	Plant	Rare	1969
<i>Ambystoma tigrinum</i> Eastern Tiger Salamander	Animal	Very Rare	1925
* Wet Hardwood Flatwoods	Habitat	Rare	1993
* Morse Clay Calcareous Prairie	Habitat	Very Rare	1993
Mixed Hardwood-loblolly Pine	Habitat	Secure	1993
Bottomland Hardwood Forest	Habitat	Secure	1993

Source: LA Dept. Wildlife and Fisheries, Natural Heritage Program 2001

* Two occurrences within the Study Area

3.14 PUBLIC LANDS

Information was obtained from Bossier, Caddo and DeSoto Parishes, Shreveport, Haughton, and Stonewall regarding the location of public lands within the Study Area. No public parks, recreation areas, or wildlife and waterfowl refuges were located within the Study Area.

3.15 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended, protects those properties that are listed in or eligible for listing in the National

Register of Historic Places (NRHP). In addition, Section 4(f) of the Department of Transportation Act of 1966, as amended (49 U.S.C. 303) protects public parks, publicly owned recreation areas, wildlife and waterfowl refuges, and historic and/or cultural resources of national, state or local significance from conversion to highway use unless there is no prudent or feasible alternative. In accordance with the requirements of Section 4(f), Section 106, the NEPA, and Executive Order 11593, an assessment was made of the cultural resources within the Study Area.

The Study Area lies in a portion of Louisiana that contains known and potential prehistoric and historic cultural resources. Native American archaeological resources date from the initial occupation of the Louisiana area during the Paleoindian period through the late prehistoric and historic Caddo Indian occupations. Historic Euro-American and African American settlement in the region began during the eighteenth century, and flourished throughout the nineteenth century. The historic occupations are evident through both archaeological remains and surviving standing structures.

A records search conducted at the Louisiana Division of Archaeology and the Louisiana Division of Historic Preservation identified 172 previously recorded cultural resources within the Study Area. Of these, 2 are listed in the NRHP, 3 are eligible for listing in the NRHP, 19 are potentially eligible for listing in the NRHP, 34 have an unknown NRHP eligibility status, and 114 are not eligible for listing in the NRHP. The cultural resources identified included standing structures, prehistoric and historic archaeological sites, and NRHP listed properties. The 24 recorded Study Area cultural resources that are listed, eligible, and potentially eligible for listing in the NRHP are summarized in Table 3-10.

3.16 AIR QUALITY

The 1990 Clean Air Act Amendments (CAAA) require that a proposed project not cause any new violation of the National Ambient Air Quality Standards (NAAQS), or increase the frequency or severity of any existing violations, or delay attainment of any NAAQS. The EPA established the NAAQS for Carbon Monoxide (CO), Ozone (O₃), Nitrogen Oxide (NO₂), and Particulate Matter (PM_{2.5} and PM₁₀). The State of Louisiana adopted the standards set forth in the NAAQS. The National Air Monitoring System (NAMS) and the State and Local Air Monitoring System (SLAMS) programs conduct ambient air monitoring for these pollutants at various locations throughout Louisiana.

Louisiana is divided into attainment and non-attainment areas, with classifications based upon the severity of the air quality problems. The Study Area is located in Bossier, Caddo, and DeSoto Parishes, which is within the Northwest Louisiana Council of Government's (the regional Metropolitan Planning Organization) (MPO) planning boundaries and is in an area designated as in attainment by the EPA. Attainment areas are areas that meet the National Ambient Air Quality Standards (NAAQS).

Table 3-10 LISTED, ELIGIBLE, AND POTENTIALLY ELIGIBLE CULTURAL RESOURCES		
Name Site Number	NRHP Eligibility Status	Description
Architectural Resources		
Buena Vista Plantation	Listed	A two and a half story frame Greek revival plantation house with a documented date of 1859. Buena Vista is locally significant in the area of architecture because it is one of the finest examples of Greek Revival architecture in a parish known for the style.
Lands End, NRS	Listed	A two and a half story frame house of Greek Revival design built in 1835. Lands End was the home of Colonel Henry Marshall, signer of the Louisiana Ordinance of Secession and Constitution of the Confederate States of America; Member of First Confederate Congress.
Magenta Plantation House, 16BO430	Potentially Eligible	The Magenta Plantation House is a 19 th century post-bellum structure. Associated with the structure are numerous 19 th century farm implements that are stored under the building.
Caspiana Plantation, 16CD77	Potentially Eligible	Caspiana Plantation is a mid-19 th century plantation house with associated out buildings.
Archaeological Resources		
16CD54	Eligible	A large, dense prehistoric site covering over 15 acres, with a Caddo cultural affiliation dating from the Alto Focus (A.D. 700-900) and a minor Bossier Focus (A.D. 1200-1600) component.
16CD55	Eligible	A moderately large 120 x 40 m prehistoric archeological site with a middle to late Caddoan occupation.
16CD235	Eligible	A moderately large 175 x 65 m archaeological site containing both Caddo II-III/Caddo IV and historic/modern occupations. The historic occupation of the site was not considered significant. Features found at the site include prehistoric post-molds, a hearth, and midden deposits.
16BO49	Potentially Eligible	A large prehistoric Caddoan site dating from the Bossier Focus (1200-1300 A.D.). The site is presumed to be a prehistoric village or hamlet.
16BO192	Potentially Eligible	This is an historic site located on a low mound dating from post-1890. Historical records suggest that the site represents the Wimbush family home between ca. 1907 and 1923.
16BO196	Potentially Eligible	This is an historic site consisting of a pile of ferruginous sandstone slabs and historic artifacts. Historical records suggest that the site represents the former location of the Henry Bailey home from 1904 to 1915, and possibly the residence of tenants after that time.
Betsy McDade site 16BO331	Potentially Eligible	A large 550 x 150 m prehistoric Caddoan site dating from the Middle to Late Caddoan periods. Cultural features recorded at the site include a possible posthole, a human burial, and midden deposits.
Mulberry Bayou site, 16BO395	Potentially Eligible	A moderately sized site measuring 70 x 65 m consisting of a prehistoric Caddoan occupation and a historic, possibly late 19 th to early 20 th century occupation. Possible prehistoric midden deposits extend 135 to 165 cm below the surface.

Source: Louisiana Division of Archaeology, Louisiana Division of Historic Preservation, Michael Baker Jr., Inc., Gulf South Research Corporation 2001 & 2002.

Table 3-10 (cont.)		
LISTED, ELIGIBLE, AND POTENTIALLY ELIGIBLE CULTURAL RESOURCES		
Name Site Number	NRHP Eligibility Status	Description
Archaeological Resources (cont.)		
Mulberry Bayou site, 16BO395	Potentially Eligible	A moderately sized site measuring 70 x 65 m consisting of a prehistoric Caddoan occupation and a historic, possibly late 19 th to early 20 th century occupation. Possible prehistoric midden deposits extend 135 to 165 cm below the surface.
O. G. Pipkin No. 3 site, 16BO401	Potentially Eligible	A moderately sized 38 x 55 m scatter of prehistoric Caddoan II-III ceramic and lithic artifacts recovered primarily from around a canal trench dug by the property owner. The site contains a possible intact prehistoric midden.
Dennis Ray Clark site, 16BO402	Potentially Eligible	The site consists of a concentration of historic artifacts corresponding with six structures located on a 1930 map. In addition a possible prehistoric intact midden was also located within the site boundary.
Tones Bayou site, 16BO414	Potentially Eligible	A moderately sized site, 35 x 35 m, dating from the protohistoric/historic Caddoan period (ca. 1500-1840 A.D.). A prehistoric midden with associated cultural material was identified at the site.
16BO429	Potentially Eligible	A multi-component site dating from several different periods; prehistoric with Caddo III-V occupations, and historic dating from early to middle 20 th century. The site has evidence of possible intact midden deposits under the plow zone.
16CD38	Potentially Eligible	The Wallace Lake Mound site consists of a single "mound", which may be a natural remnant of old levee deposits recorded originally by Dr. Clarence Webb in 1982. The mound has had several different occupations including Archaic, Troyville and Caddo.
16CD66	Potentially Eligible	The site represents a Civil War battery placed on the west bank of Tones Bayou to protect the Confederate "Hotchkiss" dam.
16CD72	Potentially Eligible	The site is a dam built by the U.S. Army Corps of Engineers in 1876 and represents one of the first earthen dams ever erected by the Corps of Engineers in Louisiana. The dam was used to plug the channel created by James B. Gilmore in 1850 to divert the flow of the Red River away from Shreveport.
16CD224	Potentially Eligible	The site represents a multi-component prehistoric and historic site located on a slight rise in cultivated field.
Wilkerson Point Cut-off site, 16CD233	Potentially Eligible	The site consists of a concentration of Protohistoric /historic Caddoan and historic non-Native American artifacts eroding from the bank of the Red River Wilkerson Point Cut-off. Noted at this site is a possible intact subsurface prehistoric midden and possible pit feature with a large amount of charcoal as well as deer tibia.
Knox Point Cholera Cemetery, 16CD243	Potentially Eligible	The site was identified by one 19 th century gravestone marker along with scattered broken marble on the bank of the Red River. Local informants reported that the cemetery is associated with a cholera epidemic that broke out on a steamboat traveling the Red River during the late 19 th century. It is reported that coffins have eroded from the cemetery into the river
16DS6	Potentially Eligible	The site consists of a Caddoan prehistoric scatter. The site may date from the late Caddoan period, ca. 1500-1700, with a possible Late Archaic component.
16DS12	Potentially Eligible	The site consists of a single Caddoan conical earthen mound and a possible associated borrow pit.

Source: Louisiana Division of Archaeology, Louisiana Division of Historic Preservation, Michael Baker Jr., Inc., Gulf South Research Corporation 2001 & 2002.

3.17 NOISE

Noise is defined as unwanted or excessive sound that interferes with normal activities such as sleep, work, or recreation. Noise is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units known as decibels (dB). For community noise impact assessment, sound level frequency characteristics are based upon human hearing, using an A-weighted (dBA) frequency filter that approximates the way humans hear sound.

3.17.1 Measured Noise Levels

A noise monitoring program was conducted to establish existing sound levels for various highway conditions in accordance with the DOTD Highway Traffic Noise Policy (DOTD 2011). The DOTD policy is approved and sanctioned by the Federal Highway Administration.

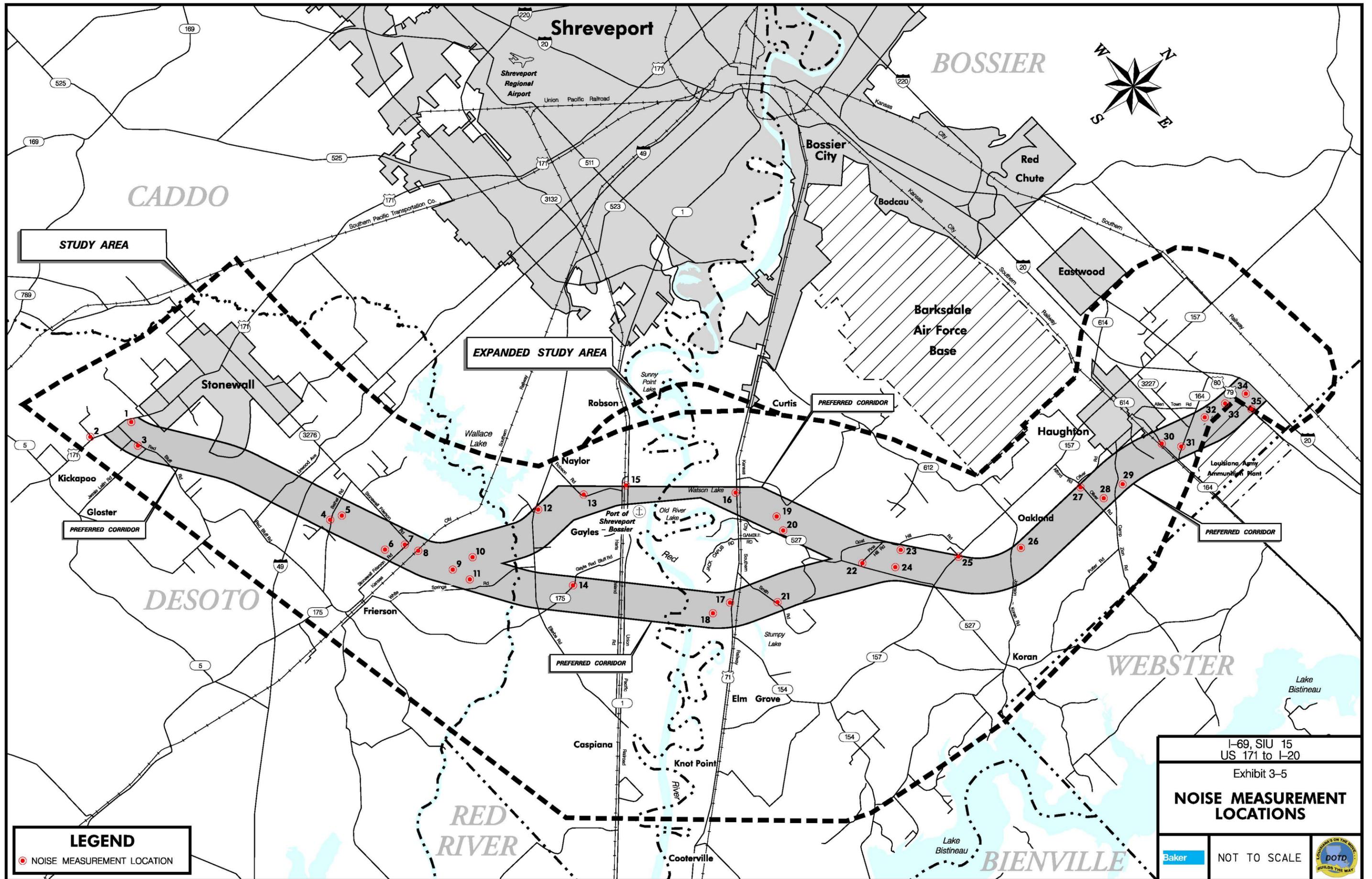
Thirty-five ambient noise measurements were taken along roadways within the Preferred Corridor and are shown in Exhibit 3-5 and described in Table 3-11. Noise levels taken ranged between 61 and 42 dBA. The highest noise level was identified along LA 157 and U.S. 80 in Bossier Parish, both relatively high-speed locations. The lowest noise level was identified along Hayes-Ball Road slightly north of Johnson-Koran Road in Bossier Parish. Typical noise levels for quiet rural areas range from 35 to 40 dBA.

3.18 VISUAL CHARACTERISTICS

The visual characteristics within the Study Area consist of a landscape dominated by extensive row crop production within the Red River floodplain, timber producing forests, and scattered pastures. Dense residential and commercial development is concentrated within the larger communities of Houghton and Stonewall while scattered single-family dwellings are scattered along the rural highways in between. Beyond the more developed communities, a rural landscape of upland dominated pine and hardwood forests contribute to relatively limited visual resources. Additionally, agricultural land along the Red River floodplain bounded by tree stands along adjacent bayous provides limited long scenic views of the landscape. This predominately rural setting within the Study Area does not contain sensitive visual resources.

3.19 HAZARDOUS MATERIALS

An Initial Site Assessment of the Study Area was conducted to identify and locate any hazardous materials sites in accordance with ASTM E-1527-00. The database search resulted in the identification of nineteen potential hazardous materials sites within the Study Area, which are shown on Exhibit 3-6 and described in Table 3-12.



STUDY AREA

EXPANDED STUDY AREA

PREFERRED CORRIDOR

PREFERRED CORRIDOR

PREFERRED CORRIDOR

PREFERRED CORRIDOR

LEGEND
 ● NOISE MEASUREMENT LOCATION

I-69, SIU 15
 US 171 to I-20
 Exhibit 3-5
**NOISE MEASUREMENT
 LOCATIONS**

Baker NOT TO SCALE

Location	Land Use	L _{eq} (dBA)	Dominant Noise Source(s)
1	Desoto Parish Elementary School	52	U.S. 171
2	Canaan Baptist Church	52	U.S. 171
3	Residential	52	Red Bluff Road
4	Residential	47	Bethel Road
5	Residential	43	Lois Lane
6	Residential	46	Los Adais Road
7	Frierson Plaza Apartments	52	Stonewall Frierson Road
8	Residential	48	Utz Road
9	Residential	49	Good Times Lane
10	Hodge Cemetery	44	Near Miles Lane
11	Residential	51	Old Church Road
12	Residential	48	Ellerbe Road
13	Residential	44	Robson Road
14	Residential	50	Gayle Red Bluff Road
15	Residential	51	Harts Island Road
16	New Elm Grove Baptist Church	51	U.S. 71
17	Elm Grove Baptist Church	56	U.S. 71
18	Residential	48	Oil Field Road
19	Residential	44	Bullfight Drive
20	Residential	47	LA 527
21	Residential	44	Smith Road
22	Residential	50	Pine Hill Road
23	Residential	45	Silverwood Trail
24	Residential	52	Thomas Jones Road
25	Residential	61	LA 157
26	Residential	42	Hayes-Ball Road
27	Bethlehem Baptist Church	50	Oliver Road
28	Residential	44	Hickory Nut Lane
29	Residential	43	Chestnut Lane
30	Missions Ministry Training Center	50	LA 614
31	Business	57	LA 164
32	Residential	46	Piney Forest
33	Residential	44	Shoot Out Lane
34	Residential	47	Elsie Drive
35	Residential	58	U.S. 80

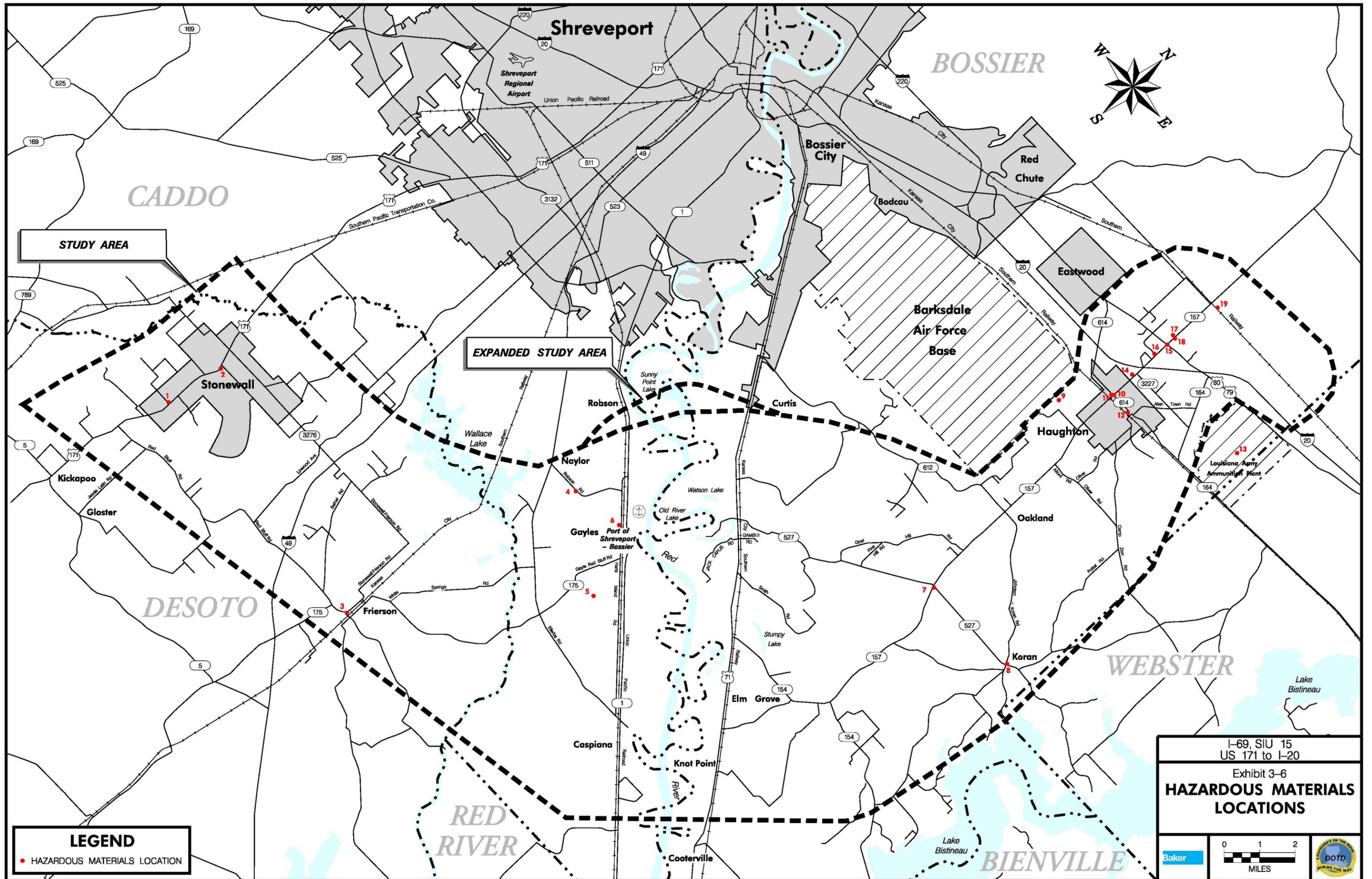
Source: Michael Baker Jr., Inc. 2004

Site Number	Site Name	General Location	Site Type
1	Chevron	Gloster	UST
2	Texaco	Stonewall	UST
3	Bits Country Store	Frierson	UST
4	NOR-WES, Inc	Naylor	UST
5	Lucas Sludge Disposal Facility	Gayles	UST
6	Arch Chemical	Gayles	TRI
7	J.J's Fastrac	Sligo	UST
8	Honest Jon's Country Store	Koran	UST
9	Reliant Energy – Sligo Plant	Haughton	RCRA
10	Exxon Country Corner	Haughton	UST
11	Unnamed Gas Station	Haughton	UST
12	Haughton Grocery Store	Haughton	UST
13	Louisiana Army Ammunition Plant	Doyline	Superfund
14	Pilot Travel Center	Haughton	UST
15	Citgo	Fillmore	UST
16	Phillips 66	Fillmore	UST
17	Grey Wolf Drilling Company	Fillmore	RCRA
18	Benson Construction	Fillmore	RCRA
19	Calumet Lubricants Company	Princeton	RCRA, TRI

Source: Environmental Data Resources, Inc., Michael Baker Jr., Inc. 2004

Federal databases at the EPA and state databases at the LADEQ were reviewed to determine the location of any hazardous materials. Federal databases searched included the Comprehensive Environmental Response and Liability Act Information System (CERCLIS), the National Priorities List (NPL), and the Resource Conservation and Recovery Act Information System Listing (RCRIS). The CERCLIS database

was searched to determine the presence of abandoned or uncontrolled hazardous waste sites. These sites include facilities that were placed on the NPL which are commonly known as Superfund sites. One Superfund site was identified in the Study Area. The Louisiana Army Ammunition Plant (LAAP) is located to the east of Haughton generally between U.S. 80 on the north and LA 164 to the south.



STUDY AREA

EXPANDED STUDY AREA

LEGEND
 ● HAZARDOUS MATERIALS LOCATION

I-69, SIU 15
 US 171 to I-20
 Exhibit 3-6
**HAZARDOUS MATERIALS
 LOCATIONS**

0 1 2
 MILES

Baker

LOUISIANA'S ON THE MOVE
 DOTD
 BUILDS THE WAY

The historic use of the plant involved the loading, assembling, and packing of military ammunitions and the manufacture of metal ammunition parts. The most western portion of the LAAP property is located within the Study Area. Coordination with the EPA determined that the portion of the plant property adjacent to Clarke Bayou was not involved with any plant operations (Carroll, 2001).

The Resource Conservation Recovery Information System (RCRIS) was searched to identify any generators of hazardous materials. RCRIS is a national management and inventory system of Resource Conservation and Recovery Act (RCRA) hazardous waste handlers.

RCRA, a comprehensive regulatory program, ensures proper management of hazardous waste from its generation to disposition. Handlers are characterized as falling into five categories that include transporters, small quantity generators, large quantity generators, or treatment, storage, and disposal facilities. The database search identified four facilities regulated under RCRA with regard to hazardous waste within the Study Area.

State databases researched included the Louisiana Site Remediation Information System List (LASRIS), the state equivalent of the CERCLIS list, registered underground storage tanks (UST), leaking underground storage tanks (LUST) and permitted landfills. Thirteen UST sites were

identified within the Study Area. No LUST, LASRIS or permitted landfills were identified in the Study Area.

In 1986, Congress passed the Emergency Planning and Community Right to Know Act (EPCRA) establishing the Toxics Release Inventory (TRI) under Section 313 (LADEQ 2003). This Act gives citizens the right to know about toxic chemicals being released into their environment. Facilities are required to report releases of toxic chemicals which would contain information about the types and amounts of toxic chemicals released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management (EPA 2004). The database search identified two sites within the Study Area that have reported releases.

Three other sites have been identified in the Study Area with regard to solid waste: the Lucas sludge disposal site, Old Port Petroleum site, and US Liquids of Louisiana. The Lucas Sludge Disposal is owned and operated by the City of Shreveport and is located in the central portion of the Study Area on the western side of Harts Island Road south of LA 175. The disposal site, or landfarm, receives treated sewage sludge, more commonly known as biosolids, through a pipeline from the Lucas Wastewater Treatment Plant located north of the Study Area and into a lagoon at the disposal site.

The liquid is pumped from the lagoon and sprayed onto one of various cells on the property. Through regulation (The Standards for the Use and Disposal of Sewage Sludge, Title 40 CFR – Part 503), biosolids can be recycled and applied as fertilizer, incinerated, or buried in a landfill. Land application of biosolids has been practiced for decades and continues to be the most common method for using biosolids (EPA, 1999).

The Old Port Petroleum site is located on the western side of U.S. 171 approximately two miles south of the intersection of U.S. 171 and Stonewall Frierson Road. Coordination with the Solid Waste and Water Resource Divisions of LADEQ, identified the Old Port Petroleum site as a refinery that began operation in 1978. Complaints from local residents after a petroleum spill in 1982 into Brushy Creek prompted several site investigations by LADEQ. Port Petroleum ceased operations in 1983 due to numerous complaints by residents. As of 2002, the

owner of the Old Port Petroleum site was under a compliance order to remediate the property.

The U.S. Liquids of Louisiana, LP operates a facility near Elm Grove south of Smith Road and east of U.S. 71 in Bossier Parish. Coordination with the Exploration and Production Waste Management Section of the Louisiana Department of Natural Resources identified this facility as receiving exploration and production waste (formerly known as non-hazardous oil field waste). The facility operates two Class II injection wells that are used to pump liquid waste (brine) into underlying geologic formations.

In 1980, Section 1425 of the Safe Drinking Water Act was created to relieve Class II well programs from having to meet the technical requirements in the Underground Injection Control regulations (EPA, 2002). Additionally, a landfarm at the facility is used to apply the treated solids from the exploration and production waste.