
3.0 AFFECTED ENVIRONMENT

This section provides an overview of the existing natural, social, cultural, and economic conditions within the area affected by the alternatives presented in **Section 2.0, Alternatives Considered**. Discussion in this section is focused on data, issues, or information, which will assist in the selection of a Recommended Alternative. A map of the study area showing the Practical Alternatives under consideration is located in **Appendix E** at the end of this document and can be folded out for reference purposes. Environmental constraints are depicted on foldout aerial photographs at the end of **Section 4.0, Environmental Consequences**.

The US-131 improvement study area is located in St. Joseph County in southwestern Michigan, and Elkhart County in north central Indiana. The US-131 study area is roughly one mile wide and begins at the Indiana Toll Road, approximately one mile south of the Michigan/Indiana State border, extending north 17 miles to approximately one mile north of Cowling Road in Lockport Township. The corridor passes through York Township in Indiana, and Mottville Township, White Pigeon Township, the Village of White Pigeon, Constantine Township, the Village of Constantine, Fabius Township, the City of Three Rivers, and Lockport Township in Michigan. The study area is roughly bounded by the following roads:

- Southern Boundary: Indiana Toll Road
- Eastern Boundary: US-131
- Western Boundary: Blue School and Schaffer Roads
- Northern Boundary: Null Road

3.1 Land Use

The study area land use is primarily agricultural, with scattered single-family homes and farmsteads surrounding the Villages of Constantine and White Pigeon, and the City of Three Rivers. Light industrial and commercial development can also be found along US-131, primarily at its intersections with M-60 and US-12, and within the Village of Constantine and the City of Three Rivers. South of M-60 the area relies heavily upon agricultural business and light manufacturing production for economic stability. Commercial development also contributes to the economy of the more urbanized sections of the study area. The study area covers approximately 18 square miles, or approximately 11,500 acres.

3.1.1 Existing Regional Land Cover

Agricultural land uses comprise over 234,823 acres, or 64% of all land uses, within St. Joseph County, according to the 1997 St. Joseph County Master Plan. **Figure 3.1** provides a breakdown of the overall land cover within St. Joseph County.

The City of Three Rivers and the Village of Constantine contain the densest residential development within the US-131 study area. However, residential uses comprise only 3% of the overall land use within St. Joseph County. **Figure 3.2** illustrates the existing land cover within the study area.

3.1.2 Study Area Existing Land Uses

The study area land use patterns consist predominantly of farmland and scattered residential parcels outside of the developed areas. Commercial and light industrial developments are also found along portions of the US-131, US-12, and M-60 road frontage. North of M-60 within Three Rivers there are a large number of commercial developments fronting on US-131. Other commercial development is centered around the US-131/US-12 intersection and along US-131 within the Village of Constantine. The study area includes a small portion of York Township in Elkhart County, Indiana that contains agricultural, light industrial, and commercial development along US-131 between the Michigan State Line and the Indiana Toll Road. A detailed description of the primary land uses found within the study area follows.

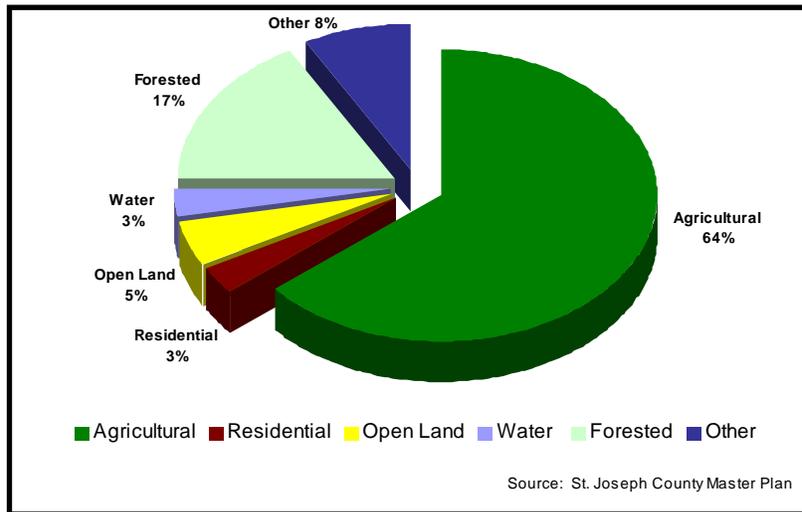


Figure 3.1 St. Joseph County Land Cover

3.1.3 Residential

Farmsteads and small groupings of single-family or subdivision housing are the primary residential uses in the study area. Exceptions to this pattern occur west of US-131 within Constantine, which has typical small lot single-family dwellings. Adjacent to US-131 in Three Rivers, there are several subdivisions and small-lot residences. Multi-family residential land uses are found within the more developed areas of Three Rivers and Constantine. There are also some outlying multi-family complexes such as the Riverside Apartments, located west of Constantine on Riverside Drive. Several manufactured housing subdivisions are located within the study area, including the Colonial Estates development located on the east side of US-131 north of US-12, and the Whispering Pines development located south of the Village of Constantine, both of which currently have access off of US-131. Clusters of newer residential development are also found throughout the study area, most notably to the northwest of Constantine, and to the west of Three Rivers.

3.1.4 Commercial

Commercial land uses within the study area are located primarily adjacent to existing US-131. Small clusters of highway-oriented service developments (gas stations, fast-food restaurants, and convenience stores) are located just north of the Indiana Toll Road and at the intersection of US-131 and US-12. Downtown Constantine features several small stores and service stations. A large retail development is located just north of M-60 on US-131. Several retail establishments (banks, restaurants, hotels/motels, auto parts, and gas stations) exist along US-131 between Broadway Road and Coon Hollow Road in the City of Three Rivers. Downtown Three Rivers is located east of US-131 outside of the study area.

Place Holder for Figure 3.2

3.1.5 Industrial/Manufacturing

A number of light industrial mobile home and recreational camper fabrication facilities exist on US-131, north and south of the Indiana Toll Road (I-80/90) near the southern project terminus. A large grain elevator and gravel transfer facility exists just north of the Indiana/Michigan State Line, within Mottville Township. Within White Pigeon Township and the Village of White Pigeon, two van conversion businesses operate east of US-131, and the intersection of US-12 and US-131 houses a recently vacated manufactured housing facility. Two large seed production plants operate within Constantine Township adjacent to US-131 south of the Village of Constantine. All of these facilities require access by commercial trucks making frequent deliveries. The US-131 highway also provides access to the Village of Constantine industrial park located five blocks east of US-131 on Sixth Street. US-131 also provides access to several industrial areas within the City of Three Rivers, including:

- The Three Rivers Area Enterprise Park located at the southeast corner of the intersection of US-131 and M-60
- Several industrial facilities located along US-131 south of Michigan Avenue
- The American Axle plant located on the east side of US-131, just north of Hoffman Road

3.1.6 Recreation

Recreational land uses are discussed in **Section 3.22, Parks and Recreation.**

3.1.7 Institutional, Community Facilities, and Services

Institutional land uses within the US-131 improvement study area consist primarily of churches, schools, cemeteries, and emergency service facilities. **Figure 3.3** illustrates community facilities located within the study area. A description of these facilities follows;

Churches: Several churches are located adjacent to US-131, including the Riverview Mennonite Church in White Pigeon, the First Congregational United Church of Christ located within the Village of Constantine, the Trinity Missionary Church in Constantine Township, and the Charity Baptist Church located north of King Road on US-131 in Fabius Township. Within the City of Three Rivers, four churches are located adjacent to the US-131/Coon Hollow Road intersection; they include the Church of the Nazarene, the Christian Reformed Church of Three Rivers, the Seventh Day Adventist Church, and St. Peter's Evangelical Lutheran Church. The Three Rivers Missionary Church is also located west of US-131 on Hoffman Road and the Agape Family Church is located on Wilbur Road and backs up to US-131.

Police: A Michigan State Police post is located in the northeast quadrant of the US-131/US-12 intersection in White Pigeon. This post serves the Michigan portion of the study area. The St. Joseph County Sheriff's Department also serves the study area. The Village of Constantine and the City of Three Rivers each employ between one and five officers to provide police protection within their respective jurisdictions. The Indiana State Police and the Elkhart County Sheriff's Department serve the portions of the study area within Indiana.

Fire: The Village of Constantine, Fabius Township, Lockport Township, and the City of Three Rivers provide the majority of fire protection coverage within the study area. The remainder of the study area relies on assistance from these four departments, as well as assistance from surrounding communities. The Lockport/Fabius/Park Township Fire Station #3 is located within the study area, 0.1 mile west of the intersection of Millard Road and US-131.

Place Holder for Figure 3.3

Emergency Services: The majority of the study area relies on various private and/or public organizations to provide emergency services. Although none of the providers of emergency services are headquartered in the study area, the Three Rivers Area Hospital that receives emergency patients is located one block east of US-131 on Broadway Road. The Village of Constantine and the City of Three Rivers Fire Departments provide emergency services for their respective communities and are assisted by private agencies.

Health Care: No private or public health care facilities are located within the study area. The Three Rivers Area Hospital is the only health care facility located within the vicinity of the study area. The hospital has 72 beds and employs a 24-hour emergency service.

Schools: The US-131 study area covers portions of the White Pigeon, Constantine, and Three Rivers School Districts. White Pigeon Community Schools instruct 1,200 students at four facilities. Constantine Public Schools teach 1,700 students at four schools. Three Rivers Community Schools manages seven schools serving a total of 3,000 students. Four school facilities exist within the US-131 study area. Constantine's Senior High and Middle Schools and Riverside Elementary are all located two to four blocks west of existing US-131. In Three Rivers, the Johnnycake Pre-School is located west of US-131 on Millard Road within the study area.

Cemeteries: The Broadstreet Cemetery located north of Zerbe Road in Constantine Township is the only cemetery located within the study area. This cemetery is located behind an existing single-family residence, approximately 70 feet west of the existing US-131 right-of-way.

3.1.8 Utilities

The Village of White Pigeon, Constantine Village and Township, and the City of Three Rivers all have functional water and sewage treatment systems. The remainder of the study area utilizes well and septic systems. The Village of Constantine no longer operates their treatment facilities, instead a ten-inch ductile iron sewer force main runs adjacent to US-131 on the west side and carries Constantine's waste to the Three Rivers treatment facility. Michigan Gas Utilities, Consumers Energy, and Indiana-Michigan Power Company have established natural gas pipeline networks throughout the corridor. A six-inch ANR pipeline is crossed by US-131 approximately one mile north of US-12, while a 24-inch ANR pipeline is crossed by US-131 at the Indiana State Line. A six-inch Consumers Energy pipe is crossed by US-131 approximately two miles north of Constantine (near Garber Road) while a 30-inch Consumers Energy pipe is crossed just north of the Indiana State Line. Telephone service is provided by Verizon. American Electric Power (AEP) owns and operates hydroelectric dams on the St. Joseph River in Mottville Township and the Village of Constantine.

3.1.9 Land Use Planning and Zoning

In 1997, the South-Central Michigan Planning Council updated the St. Joseph County Master Plan. Most communities within the study area have either a Master Plan or Comprehensive Planning Document. **Figure 4.1 in Section 4.1, Land Use Impacts** combines the future land uses shown in the plans for each of the study area communities.

Zoning: All communities within the study area are zoned communities with the exception of York Township in Indiana. Zoning throughout the study area is administered at either a township or a village/city level and land use plans and zoning ordinances were acquired from local officials for this study. The primary zoning districts and zoning setbacks for properties

located within the US-131 study area are presented in **Section 4.1.1, Compatibility with Zoning/Official Plans.**

3.1.10 Committed Developments

The American Axle manufacturing plant located on the east side of US-131 north of Hoffman Road is currently expanding its manufacturing facility. This facility currently employs just over 1,000 individuals. Company officials have stated they have plans to double the size of their facility by the year 2005. A light industrial site development has also been proposed on the west side of US-131, just north of the Indiana State Line.

3.2 Farmland

According to the St. Joseph County Soil Conservation Service, agricultural farm operations constitute 65% of all land uses within the study area. This is slightly above the county average of 64%. The 1997 St. Joseph County Master Plan indicated that from 1987 to 1992 there was a 9.8% growth in agricultural land uses in St. Joseph County. This growth highlights the importance of agriculture to the region's economy. Despite this growth, the number of active farms has been in decline over the last fifty years. Within St. Joseph County there were 1,424 farms in operation in 1964; in 1992 855 remained. However, the average farm size has increased over the years. From 1978 to 1992, farms with less than 500 acres declined by 26%, 500 to 999 acre farms remained constant, while those with 1,000 acres or more increased by 153%.

The 1997 Master Plan also states that St. Joseph County is the largest seed corn-producing county east of the Mississippi River. Within St. Joseph County, seed corn production accounts for nearly one-quarter of the agricultural acreage use, totaling 50,000 acres. Within the study area, a majority of the agricultural fields are utilized for seed corn production. Area farms also grow cash crops such as corn and soybeans.

Approximately 24% of the farmland within the study area is irrigated through the use of center-pivot irrigation systems. **Figure 3.4** shows the locations of these irrigation systems. No major feedlots or pasturelands exist within the study area.

3.2.1 Prime and Unique Farmland

The Farmland Protection Policy Act (PL 97-98) of 1981, modified in 1987, protects "prime farmland," "unique farmland," or "farmland that is of statewide or local importance". Since the supply of prime farmland is limited, actions resulting in its direct loss put pressure on more marginal lands. Excessive farming of marginal lands, which are generally more erodible and subject to drought and flooding, reduces productivity and places greater strains on the natural environment. Prime farmlands as defined by the Department of Agriculture's Natural Resource Conservation Service (NRCS) are found throughout the US-131 study area. **Figure 3.4** illustrates the locations of approximately 6,140 acres of prime farmland that have been identified within the study area.

The NRCS defines prime farmland as that land best suited for food, feed, forage, fiber, and oilseed crops. It includes land used for cultivation, pasture, and woodland. The soil must be of sufficient quality, with an adequate growing season and sufficient moisture to produce a high-yield crop.

Place holder for Figure 3.4.

“Unique Farmland” is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. No unique farmland has been identified within the study area.

The 250 acre Constantine Turf Farm, located along Miller’s Mill Road, is prime farmland and is the only farmland within the study area that is classified as having statewide and local importance due to its unique use.

Within St. Joseph County, approximately 164,000 acres (37% of total land use) are considered prime farmland. An additional 34,000 acres would meet the prime farmland criteria with additional flood control measures. The prime farmland is primarily located in the northern, western, and central sections of the County, with the majority of the land being used for crops, pasture, and hay.

3.2.2 Farmland and Open Space Preservation Program

The Farmland and Open Space Preservation Program (Part 361 of the Natural Resources and Environmental Act of 1994, as amended) commits farmlands to agricultural use by the landowner for ten-year periods. The landowner enters into a contract with the Michigan Department of Agriculture whereupon property tax credits are provided to the landowner as enticement to maintain the property in agricultural use. According to Michigan Department of Agriculture records, 103 parcels occupying 3,662 acres in the study area are enrolled in the Farmland and Open Space Preservation Program.

3.3 Socio-Demographics

3.3.1 Population

United States census data indicates the study area population has increased steadily over the last fifty years, with modest growth occurring since 1980. **Figure 3.5** illustrates this growth within the study area communities since 1950.

Population Centers: Three developed areas (Villages of White Pigeon and Constantine, and the City of Three Rivers) are located within or adjacent to the study area. The principal areas of development for these jurisdictions are located within or east of the study area.

Parts of six townships also lie within the study area. The townships generally exhibit rural development patterns. **Table 3.1** provides the population trends and future population projections for each of these units of government, as well as state and county growth trends.

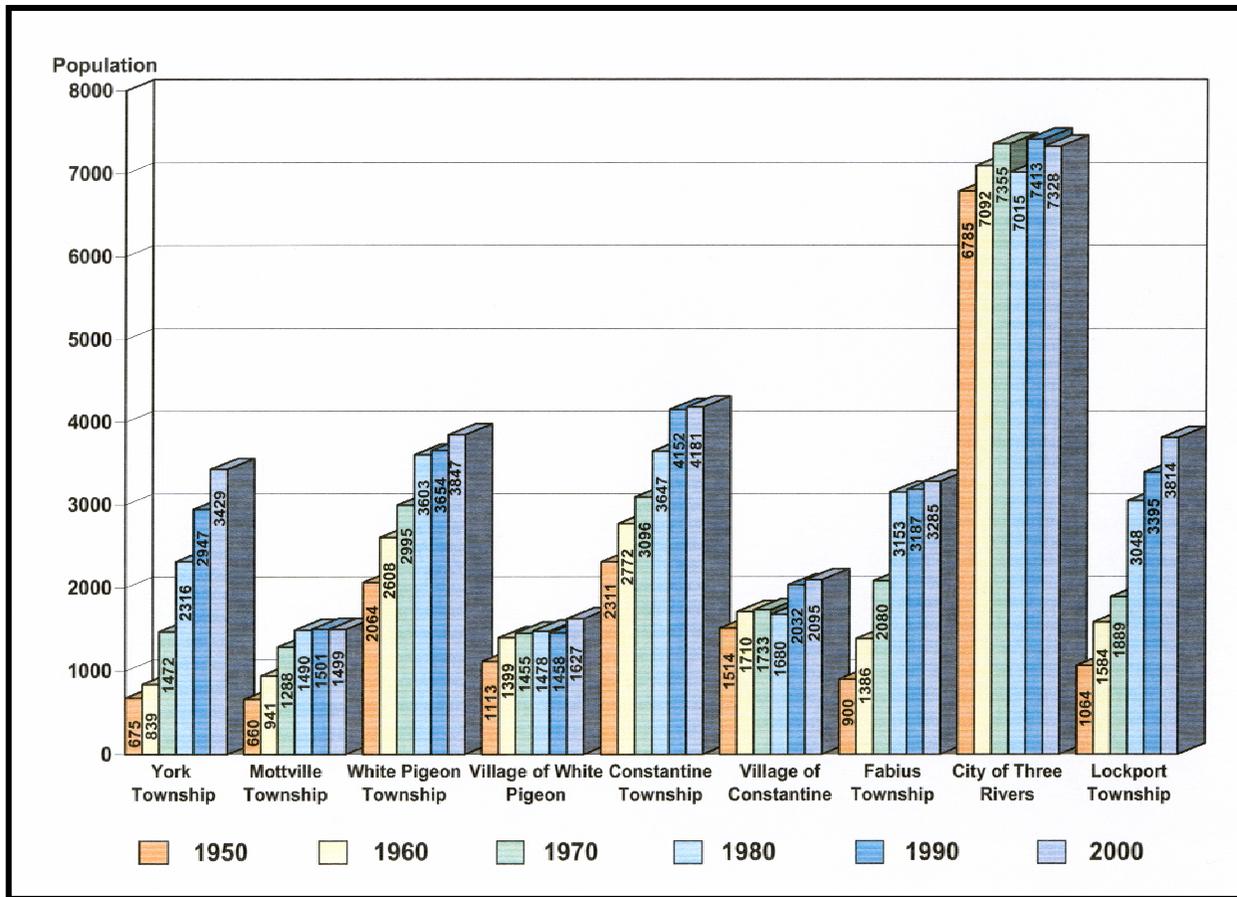


Figure 3.5 Historical Population Trends Over the Past 50 Years

Table 3.1 Population History and Growth Trends

Jurisdictions	1980 ¹	1990 ²	2000 ³	2025 ⁴	% Change 2000-2025
State of Indiana	5,492,730	5,555,090	6,080,485	7,336,183	20.65%
Elkhart County, IN	137,360	156,380	182,791	223,400	22.22%
York Township	2,316	2,947	3,429	4,191	22.22%
State of Michigan	9,262,078	9,295,287	9,938,444	11,519,690	15.91%
St. Joseph County, MI	56,083	58,913	62,422	74,370	19.14%
Mottville Township	1,490	1,501	1,499	1,786	19.13%
White Pigeon Township	3,603	3,654	3,847	4,583	19.13%
Village of White Pigeon	1,478	1,458	1,627	1,938	19.15%
Constantine Township	3,647	4,152	4,181	4,981	19.13%
Village of Constantine	1,680	2,032	2,095	2,496	19.14%
Fabius Township	3,153	3,187	3,285	3,914	19.15%
City of Three Rivers	7,015	7,413	7,328	8,731	19.15%

¹ Source: U.S. Census Bureau, 1980 Census Data

² Source: U.S. Census Bureau, 1990 Census Data.

³ Source: U.S. Census Bureau, 2000 Census Data.

⁴ Source: Woods & Poole Countywide Population Projection interpolated for communities by WSA

3.3.2 Housing

The housing within the study area is comprised mostly of ranch-style homes on large lots except within the population centers where there are older homes on relatively small lots. According to 2000 census data, 61% of the US-131 study area population resides in either one-person or two-person households, which is above the National and State averages of 58.6% and 59.2%, respectively.

As illustrated in **Table 3.2**, housing values are fairly consistent throughout the study area. The 2000 median housing value for the study area communities was \$85,892. Housing values tend to be higher in Fabius and York Townships, where the median values were \$115,800 and \$112,700 respectively.

Table 3.2 Housing Values for Study Area Communities

Jurisdictions	Median Housing Value (2000)	Number of Units Surveyed by Census
Lockport Township	\$93,700	924
Fabius Township	\$115,800	873
City of Three Rivers	\$63,400	1,682
Village of Constantine	\$74,600	405
Constantine Township	\$83,300	843
Village of White Pigeon	\$68,100	358
White Pigeon Township	\$89,000	953
Mottville Township	\$83,300	359
York Township, Indiana	\$112,700	582
Study Area*	\$85,892	6,979

Source: U.S. Census Bureau, 2000 Census Data
 *Based on the average for the communities located within the study area, weighted by number of units

3.4 Selected Population Characteristics

3.4.1 Gender, Age and Ethnicity

Table 3.3 presents selected population characteristics for the communities within the study area. These characteristics assist in comparing the study area demographics with those of the surrounding area. The characteristics also provide useful information regarding specific subgroups that may be impacted by the different Practical Alternatives.

The median age of the population within the study area (35 years) is similar to those of the surrounding communities. The minority population of the study area (7.2%) is similar to that of many of the surrounding communities, but significantly lower than that of the City of Three Rivers (18.4%), Elkhart County (22.5%), the State of Michigan (21.4%), and the State of Indiana (16%). The average household size of 2.7 persons for the study area is similar for all study area jurisdictions.

Table 3.3 Selected Population Characteristics

Population (Pop.) Characteristics	Study Area*	Lockport Township	Fabius Township	City of Three Rivers	Constantine Township	Village of Constantine	White Pigeon Township	Village of White Pigeon	Mottville Township	York Township	St. Joseph County	Elkhart County	Michigan	Indiana
Total Persons	--	3,814	3,285	7,328	4,181	2,095	3,847	1,627	1,499	3,429	62,422	182,791	9,938,444	6,080,485
Median Age (Years)	35	35	42	32	35	30	38	33	37	35	36	33	36	35
Males as a % of All Persons	49.7%	49.4%	50.6%	48.0%	50.2%	49.1%	48.4%	46.0%	50.7%	50.5%	49.4%	49.5%	49.0%	49.0%
Females as a % of All Persons	50.3%	50.6%	49.4%	52.0%	49.8%	50.9%	51.6%	54.0%	49.3%	49.5%	50.6%	50.3%	51.0%	51.0%
Persons 65 and Over as % of All Persons	12%	11.3%	15.3%	13%	10.9%	10.3%	12.7%	10.2%	10.9%	6.9%	13.0%	10.9%	12.3%	12.4%
Persons Under 18 Years as a % of All Persons	26%	28.7%	22.7%	28.9%	28.6%	32.0%	25.4%	29.1%	25.9%	31.6%	27.5%	28.9%	26.1%	25.9%
Total Households	--	1,451	1,304	2,910	1,560	763	1,505	602	570	1,149	23,381	66,154	6,485	2,336,306
Average Household Size	2.7	2.6	3.0	2.0	3.0	3.0	3.0	3.0	3.0	2.9	3.0	2.7	2.5	2.5
% Family Households	75.0%	73.6%	75.5%	60.8%	73.8%	73.1%	71.2%	71.6%	74.0%	81.5%	71.0%	72.0%	65.1%	68.6%
Total Minority as a % of All Persons	7.2%	15.8%	4.3%	18.4%	5.0%	6.0%	5.1%	7.9%	3.9%	4.1%	8.7%	22.5%	21.4%	16.0%
White Pop. as a % of All Persons	92.8%	84.2%	95.7%	81.6%	95.0%	94.0%	94.9%	92.1%	96.1%	95.9%	92.0%	77.5%	78.6%	84.0%
African American Pop. as a % of All Persons	2.8%	10.4%	0.9%	10.5%	0.5%	0.6%	0.2%	0.2%	0.3%	0.3%	2.6%	5.2%	14.1%	8.4%
American Indian Pop. as a % of All Persons	0.5%	0.4%	0.4%	0.4%	0.2%	0.1%	0.6%	1.1%	0.7%	0.7%	0.4%	0.3%	0.5%	0.3%
Asian Pop. as a % of All Persons	0.3%	0.0%	0.5%	0.7%	0.7%	0.9%	0.7%	0.6%	0.1%	0.3%	0.6%	0.9%	1.8%	1.0%
Hispanic (all races) Pop. as a % of All Persons	1.5%	2.2%	1.0%	2.7%	1.1%	1.4%	1.6%	2.6%	1.0%	1.0%	1.5%	8.9%	3.3%	3.5%
Other Race Alone Pop. as a % of All Persons	0.6%	0.9%	0.3%	1.7%	0.5%	0.5%	1.0%	2.0%	0.3%	0.1%	1.5%	5.4%	0.1%	1.6%
Two or More Races Pop. as a % of All Persons	1.4%	1.8%	1.1%	2.3%	2.0%	2.5%	1.0%	1.5%	1.5%	1.7%	1.5%	1.8%	1.6%	1.2%

Source: U.S. Census Bureau, 2000 Census Data
 *Based on the average for the communities located within the study area, weighted by population

3.4.2 Income Characteristics

Income characteristics of the communities within the study area and the associated State and County jurisdictions are presented in **Table 3.4**. On average, the per capita income within the study area is slightly higher than that of St. Joseph County, but lower than those of Elkhart County and the States of Indiana and Michigan. The poverty rate for the study area is approximately 8.2%, which is lower than those of St. Joseph County (11.3%), the State of Michigan (10.5%), and the State of Indiana (9.5%), but slightly higher than that of Elkhart County, Indiana (7.8%).

3.5 Relocations

The average selling price of residential homes in the study area in 2003 was \$107,580 according to the St. Joseph County Association of Realtors (a 15.5% increase over the 2000 average selling price). This indicates that housing prices within the study area have risen substantially in the past three years. A detailed relocation analysis is provided in **Section 4.5, Relocation Impacts**.

3.6 Economics

The local and regional economy is heavily dependant upon agriculture and light industrial facilities located throughout the study area. Commercial and industrial land uses have historically had a high turnover rate within the study area and within St. Joseph County, Michigan. As of March 2004, the County unemployment rate of 7.0% was below the State of Michigan's average of 7.6%, having fallen from a 7.6% average in 2003 (Michigan Department of Labor and Economic Growth).

Table 3.4 Study Area Income Data

Jurisdictions	Median Household Income	% Difference from 2000 State Median	Per Capita Income	% of Population Below Poverty
State of Indiana	\$41,567	N/A	\$20,397	9.5%
Elkhart County	\$44,478	7.0%	\$20,250	7.8%
York Township	\$49,634	19.4%	\$19,325	6.1%
State of Michigan	\$44,667	N/A	\$22,168	10.5%
St. Joseph County	\$40,355	-9.7%	\$18,247	11.3%
Mottville Township	\$43,421	-2.8%	\$17,917	10.0%
White Pigeon Township	\$42,908	-3.9%	\$22,441	11.6%
Village of White Pigeon	\$41,292	-7.5%	\$16,895	13.1%
Constantine Township	\$43,125	-3.5%	\$16,909	10.5%
Village of Constantine	\$40,428	-9.5%	\$15,542	15.5%
Fabius Township	\$50,888	13.9%	\$23,474	3.6%
City of Three Rivers	\$32,460	-27.3%	\$16,279	19.3%
Lockport Township	\$43,931	-1.6%	\$21,184	9.9%
Study Area*	--	--	\$19,288*	8.2%*

Source: U.S. Census Bureau, 2000 Census Data
 *Based on the average for the communities located within the study area, weighted by population

3.6.1 Income

Table 3.4 provides the most recent township level estimates of household income within the US-131 study area. The St. Joseph County median household income was \$40,355 according to the 2000 U.S. Census, 9.7% lower than the State of Michigan's median of \$44,667. The Elkhart County median household income, \$44,478 (2000 U.S. Census) is 7.0% higher than the State of Indiana's median of \$41,567. The 2000 Census poverty rates for St. Joseph County and the State of Michigan were 11.3% and 10.5%, respectively.

3.6.2 Employment

Agriculture employs many individuals within the study area, employing 1,136 fulltime (2000, Michigan Economic Development Corporation) and over 5,000 seasonal employees; 64% of the population are members of the civilian labor force. The American Axle plant in Three Rivers is the largest single facility employer within the study area with over 1,000 employees.

3.6.3 State Equalized Value (SEV) and Taxes

Land and property values are on average lower in St. Joseph County than elsewhere in Michigan. St. Joseph County had a year 2000 per capita State Equalized Value (SEV) of \$25,794 and a per capita taxable value of \$20,170. The respective State of Michigan averages were \$29,803 and \$25,223. The 2001 SEV average for non-exempt parcels in the study area was \$76,561, while the 2001 taxable value average was \$63,064. Non-exempt parcels are those that are not a homeowner's principle residence.

3.6.4 Business Operators Survey

In September 2001, a business operators' survey was conducted to assess: the economic stability of existing businesses along the US-131 corridor, the estimated customer base, and the perceived importance of US-131 for business operators. A total of 136 surveys were distributed to existing businesses along US-131. Of these, a total of 110 surveys were completed and returned, which represents an 81% return rate. Key findings of the business survey included:

- Greater than 55% of businesses surveyed felt that 10% or less of their business came from unplanned stops, while only 4.5% felt that more than 50% of their customers were drive-by patrons
- 70.9% of the businesses surveyed stated their general outlook for business activity over the next ten years was very good and that they would consider expansion, with 25.5% saying their outlook was fair
- 47.3% of the business owners indicated the ability to cross over US-131 to get to their business was a key problem with the existing US-131 facility
- Traffic congestion was cited by 36.4% of the business operators as a key constraint on their future business activity

3.6.5 Patron Survey

In September 2001, a business patron survey was conducted at businesses located adjacent to US-131. Over 400 patrons were surveyed at over 20 locations to identify the origins and destinations of patrons, the reason they chose to stop, which other businesses they had visited, and how much money they had spent at local businesses that day. Key findings of the patron survey included:

- 32.9% of the survey respondents were from the Three Rivers area
- 55.2% of the trips made by the business patrons were entirely within the study area communities
- 16.8% of the trips made by business patrons were through trips originating outside of the study area and ending outside of the study area (i.e., pass-through trips)
- a majority of survey respondents (334) visited a retail and/or restaurant facility within the study area, on the day that they were surveyed
- 91.1% of the patrons were already aware of the business they were visiting, while 6.4% saw roadside advertising and then decided to stop, and
- 58% of the survey respondents spent \$25 dollars or less at their planned business stop

The full 2001 business operator and patron survey and associated analysis is contained in a separate Technical Memorandum and is summarized in **Appendix A.3**.

3.7 Joint Development

There are no current joint development initiatives to enhance non-motorized facilities or transit services, or to provide new parkland in the study area. For an analysis of the potential of future joint development initiatives see **Section 4.7, Joint Development Impacts**.

3.8 Non-Motorized Facilities

There are no non-motorized facilities existing on US-131 except within the Village of Constantine where there are sidewalks. Minor pedestrian traffic and joggers utilize some of the local roads that cross existing US-131 and each of the proposed alternatives. There is a series of "Bicycle Tour Routes" using existing local roads, which are unmarked but published by the St. Joseph County Parks and Recreation Commission. Some of these routes cross existing US-131 and are shown in **Figure 3.3**. **Section 4.8, Non-Motorized Facility Impacts** provides an analysis of potential non-motorized travel impacts within the study area.

3.9 Air Quality

The Clean Air Act of 1970, as amended in 1990, mandated a reduction in emission of the following six criteria pollutants: nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), lead (Pb), ozone(O₃), and particulate matter (PM, microscopic solid or liquid particles suspended in air). Of these, only ozone is not a direct pollutant; it is formed when nitrogen oxides and reactive organic gases (hydrocarbons) combine in the presence of sunlight.

The United States Environmental Protection Agency (USEPA) is responsible for the National Ambient Air Quality Standards (NAAQS). Under the authority of the Clean Air Act and the 1990 Clean Air Act Amendments (CAAA) [42 USC 7401 *et. seq.*], maximum pollutant concentration limits for attainment of primary and secondary ambient air quality standards were established. The primary standards are levels intended to protect the public health; secondary standards are intended to protect the public welfare and are based on a pollutant's effect on vegetation and other materials. See **Table 3.5** for the National Ambient Air Quality Standards.

Table 3.5 National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ¹	None
	35 ppm (40 mg/m ³)	1-hour ¹	None
Lead	1.5 µg/m ³	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM ₁₀)	50 µg/m ³	Annual ² (Arithmetic Mean)	Same as Primary
	150 µg/m ³	24-hour ¹	
Particulate Matter (PM _{2.5})	15 µg/m ³	Annual ³ (Arithmetic Mean)	Same as Primary
	65 µg/m ³	24-hour ⁴	
Ozone	0.08 ppm	8-hour ⁵	Same as Primary
	0.12 ppm	1-hour ⁶	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arithmetic Mean)	-----
	0.14 ppm	24-hour ¹	-----
	-----	3-hour ¹	0.5 ppm (1300 µg/m ³)

¹ Not to be exceeded more than once per year.

² To attain this standard, the expected annual arithmetic mean PM₁₀ concentration at each monitor within an area must not exceed 50 µg/m³.

³ To attain this standard, the 3-year average of the annual arithmetic mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15 µg/m³.

⁴ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m³.

⁵ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

⁶ (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1, as determined by appendix H.
 (b) The 1-hour NAAQS will no longer apply to an area one year after the effective date of the designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas is June 15, 2004 (40 CFR 50.9; see Federal Register of April 30, 2004 (69 FR 23996).)

St. Joseph County, Michigan is not within a designated air quality non-attainment area for any of the air pollutants for which the U.S. Environmental Protection Agency (USEPA) has established standards. (Non-attainment is a designation utilized by the USEPA for any place in the United States failing to meet the NAAQS.) On April 30, 2004 the USEPA published in the Federal Register the "Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard-Phase I", which designated new non-attainment boundaries for 8-hour ozone. St. Joseph County in Michigan continues to be an attainment area for all air pollutants, including the standards for 8-hour ozone and PM of 2.5 microns or less adopted in 1997.

3.9.1 Microscale Analysis for Carbon Monoxide (CO) and Ozone (O₃)

The Michigan Department of Environmental Quality (MDEQ) operates an air-monitoring network in 28 counties to monitor and report the air quality in the State. Since carbon monoxide (CO) is a site-specific pollutant and is normally recognized as a precursor to air quality problems, a microscale air quality analysis for CO was conducted to assess the impacts of this improvement project on local CO levels for a maximum level at a “worst case” location. The major sources of CO emissions are passenger cars and trucks, with the highest concentrations of CO found immediately adjacent to highways. The “worst case” location is the property with the highest volume of traffic closest to a residential type receptor, where occupants could be expected to remain for eight consecutive hours. The “worst case” location evaluated for this study is a motel in the northeast quadrant of the intersection of US-131 and Broadway Road.

The microscale air quality analysis CO concentrations were determined with USEPA computerized mathematical models (MOBILE5b and CAL3QHC). These models were used to calculate the “worst-case” CO levels for the peak eight hour time period that corresponds to the averaging periods of the Federal and State ambient CO standards. The default background CO concentration of 3.0 parts per million (ppm) was used for the eight-hour analysis. For future year analysis (shown in **Section 4.9, Air Quality Impacts**), no rollback was used to adjust the background concentrations.

The maximum existing 2002 eight-hour CO concentration (3.6 ppm) was calculated at the right-of-way line in the southeast quadrant of the intersection of US-131 and Broadway Road. For the “worst case” receptor, the eight-hour value is 3.1 ppm. Neither concentration of CO exceeds the NAAQS eight-hour standard of 9.0 ppm. The complete microscale CO analysis for the existing and future maximum and “worst case” locations and conditions is presented in **Section 4.9, Air Quality Impacts**.

Ozone is not a concern at the microscale level. As part of Michigan’s State Implementation Plan and conformity process, ozone is analyzed as a regional pollutant. Therefore, a microscale analysis of ozone (O₃) or nitrogen oxides (NO_x) and reactive organic gases was not conducted.

3.10 Noise

Noise is defined as unwanted sound and is subjectively variable by person. Sound becomes noise when it interferes with everyday activities such as sleeping, reading, and conversation. The human ear has different sensitivity to sound energy than does a microphone. A microphone responds to sound in a linear fashion, while the human ear responds in a logarithmic manner. The logarithmic manner allows our ears to easily adjust to sounds with a tremendous range of intensity. The range of the human ear covers a pin dropping, to something that emits a billion times more sound energy, such as a rocket taking off. In order to account for this, the “A” weighted decibel curve (dBA) was developed to approximate the sensitivity of the average human ear. “Logarithmic” means that two amounts of sound cannot be directly added to each other to calculate a total combined noise level. Doubling of sound energy yields a three dBA increase in sound level. Extensive tests have shown that a three dBA change in noise level is barely perceptible to the average human. A six dBA change is clearly perceptible, and a ten dBA increase is perceived as twice as loud. Some common sound levels are shown in **Figure 3.6**.

For the purposes of measuring and modeling noise over a period of time, the Federal Highway Administration (FHWA) uses a noise “metric,” or descriptor, called L_{eq} . A one-hour L_{eq} has the same cumulative noise energy as all of the varying noise levels measured continuously over 60 minutes. In essence, the L_{eq} value covers all of the “peaks and valleys” associated with continuously varying noise levels; the result is a single comparable value that can be used to establish noise evaluation criteria. Noise levels are measured and predicted for evaluation purposes at a height of five feet above the ground, or about the same height as a human ear.

Studies in noise propagation have shown that doubling the distance between a point source of sound (e.g., a loudspeaker) and the listener generally reduces the sound level by six dBA, unless the source is a linear source such as a road or highway. In this case, the sound level drops by approximately three dBA. Topographic features, ground cover, structural barriers, or atmospheric conditions (wind, rain) can alter noise levels dramatically.

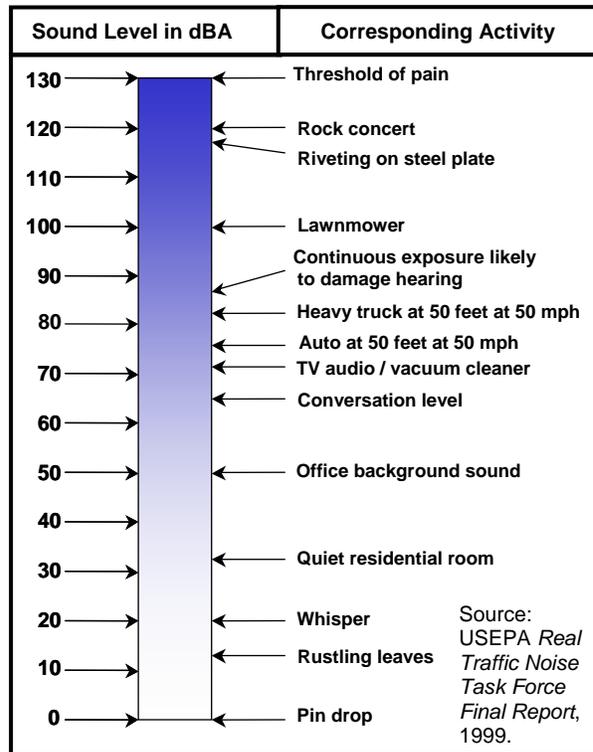


Figure 3.6 Common Sound Levels

3.10.1 Noise Regulations

Potential traffic noise impacts for US-131 improvements were evaluated in accordance with FHWA traffic noise assessment guidelines. *The Federal-Aid Highway Act of 1970* requires Federal-Aid projects that increase roadway capacity consider traffic noise impacts during planning, design, and construction. The FHWA has developed guidelines (23 CFR 772) for conducting noise studies and has established traffic Noise Abatement Criteria (NAC) for different land uses and outdoor activities. The guidelines codify the level at which there is a recognized noise impact. These criteria are provided in **Table 3.6**. MDOT noise abatement guidelines are found in **Appendix A.5**.

Table 3.6 FHWA Noise Abatement Criteria, Hourly A-Weighted Sound Level - decibels (dBA)

Land Use Category	L _{eq} [hour] (dBA)	Description of Land Use Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E*	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.
<p>* Use of interior noise levels shall be limited to situations where exterior noise levels are not applicable, i.e., where there are no identified exterior activities to be affected by traffic noise, or where exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities.</p> <p>Note: The Noise Abatement Criteria are noise impact thresholds for considering abatement. Abatement is considered for new roadway construction when predicted traffic noise levels for the design year approach [i.e., are within one decibel of] or exceed the noise abatement criteria. Abatement is also considered when the predicted traffic noise levels are substantially higher [i.e., are more than ten decibels greater] than the existing noise level. The NAC are not attenuation design criteria or targets. The goal of noise abatement measures is to achieve a substantial reduction in future design year noise levels. The reductions may or may not result in future noise levels at or below the NAC.</p>		

3.10.2 Existing Noise Levels

The study area was surveyed using topographic maps, aerial photographs, and site visits. Two hundred and sixty sensitive noise receptors were selected for analysis. These locations were selected based on traffic volumes and proximity to existing US-131 and the Practical Alternatives.

To establish existing and future noise levels, the FHWA's *Traffic Noise Model (TNM) Look-Up Tables (TNMLOOK)* were utilized. These tables have pre-calculated noise levels based upon speeds of traffic, distance from traffic, and volumes of traffic, and provide a preliminary level calculation of noise levels without monitoring or extensive computer modeling. Modeling will be performed using the FHWA's *Traffic Noise Model (TNM version 2.5)* for the Recommended Alternative, which will be presented in the Final Environmental Impact Statement (FEIS).

All traffic noise levels (dBA, L_{eq}) discussed are for the peak traffic hour. The predicted existing conditions and design year traffic noise levels are depicted with generalized contours of 66, 67, 71, and 72 dBA in a separate Noise Technical Memorandum, summarized in **Appendix A.5**. All properties that are "within" a contour (i.e., between the roadway and the contour line) would have a calculated noise level of at least the contour value. Therefore, any properties that are between the 72 dBA contour and the roadway would have a calculated L_{eq} noise level of 72 dBA or greater, thereby exceeding the NAC "C." Because "approaching" the NAC is defined by MDOT policy as being within one dBA of the NAC, all properties covered by NAC "B" (generally residential) that have a calculated L_{eq} value of 66 dBA or higher would "approach or exceed" the 67 dBA NAC "B" criterion. All properties covered by NAC "C" (commercial) with a L_{eq} value of 71 dBA or higher would "approach or exceed" the 72 dBA NAC "C" criteria.

Under existing conditions, noise levels at 152 residential locations (Land Use Category "B" Properties) approach or exceed the NAC of 67 dBA. Noise levels at 0 properties approach or

exceed the NAC of 72 dBA for commercial, industrial, and manufacturing locations (Land Use Category “C” Properties).

Table 3.7 provides the number of properties impacted by existing noise levels. The impacted properties in the table are broken down by segment in order to illustrate the noise impacts of US-131 in various parts of the study area. The locations of project segments are illustrated on the foldout map in **Appendix E**.

Table 3.7 Existing Noise Levels Impacting Receptors in the Corridor

Scenario	NAC Type	NAC	Number of Receptors Approaching/Exceeding NAC				Total Receptors that Approach / Exceed NAC
			Segment A*	Segment B*	Segment C*	Segment D*	
2003 Existing	B	66 dBA L_{eq}	14	138	0	0	152
	C	71 dBA L_{eq}	0	0	0	0	0
*Segment A - White Pigeon Area: From Southern Project Terminus to Dickinson Road *Segment B - Constantine Bypass: From Dickinson Road to Gleason Road *Segment C - Three Rivers South: From Gleason Road to Hoffman Road *Segment D - Three Rivers North: From Hoffman Road to One-Mile North of Cowling Road							

The physical locations of these noise receptors are shown on **Figure A.1 (pages 1-4)** in **Appendix A.5**. The majority of the properties that were calculated to be approaching or exceeding the NAC are Category “B” properties located along existing US-131 in the Constantine area. These are mostly residences, but also include churches, motels, and parks.

3.11 Groundwater and Irrigation

There are no sole source aquifers in the State of Michigan as defined by Section 11424 (e) of the Safe Drinking Water Act. The U.S. Environmental Protection Agency (USEPA), however, has identified a sole source aquifer south of the Indiana Toll Road. The St. Joseph Aquifer is located along the alluvial deposits of the St. Joseph River in Indiana. Wellhead protection programs are required for sole source aquifers to prevent the contamination of drinking water sources.

Groundwater resources within the study area are found in coarse to medium glacial till. These materials result in well-drained soils that allow precipitation to percolate to deeper groundwater areas. Depth to groundwater within the glacial till is relatively shallow and varies from 15 to 60 feet. The major aquifers in the study area are found in Pennsylvanian-era Saginaw Sandstone, which ranges from 100 to 200 feet thick, and in Mississippian-era Marshall Sandstone, which underlays the Saginaw formation at a greater depth.

Groundwater in the project area is potable, although there are pockets that have high levels of nitrates. Within the study area, potable water is obtained from both private wells, four municipal wells in the Village of Constantine, and four municipal wells in the City of Three Rivers drilled to depths of 25 to 100 feet. Information on wells located within the Village of White Pigeon was unavailable.

Irrigation is a common practice in the St. Joseph River basin. In Michigan, 85% of irrigated water is utilized for agriculture. Many of the center-pivot irrigation systems depicted in **Figure 3.4** utilize groundwater wells.

3.12 Wetlands

Development within wetlands in Michigan is regulated by Part 303, Wetland Protection, of the Natural Resources and Environmental Protection Acts of 1994, and by Section 404 of the 1973 *Clean Water Act*, which regulates the discharge of materials into “Waters of the United States”. This includes jurisdictional wetlands (those regulated by the Michigan Department of Environmental Quality and the U.S. Army Corps of Engineers) and other special aquatic sites.

Five field investigations were conducted within the study area for the purpose of identifying and delineating wetlands in the fall 2000, spring 2001, fall 2001, and spring 2002. The entire project corridors for all of the Practical Build Alternatives were traversed within both the Indiana and Michigan portions of the study area. There were no wetlands identified within the Indiana portion of the study area.

Within the Michigan portion of the study area, 32 natural areas that appeared to meet some criteria (hydrology, soils, or vegetation) for wetlands were assessed. Thirty-one fulfilled the criteria necessary for classification as jurisdictional wetlands. The majority of the wetlands assessed for this project, including several high-quality wetlands, are associated with the floodplains of the three rivers in the study area, the White Pigeon, St. Joseph, and Rocky Rivers. There are additional isolated wetlands of various classifications dispersed throughout the study area. The wetlands associated with the floodplains of the three rivers that were determined to be high quality wetlands were so classified because they have relatively undisturbed plant communities and/or are riparian buffer zones (wetland areas between rivers and upland areas) that provide natural areas and support a variety of wildlife.

Among the highest quality wetlands located within the study area are the floodplain forests associated with the rivers; two acidic peatland bogs, the Stag Lake bog, and the Old Cranberry bog; and one high quality fen complex, the Kerr Creek fen. The floodplain forested wetlands are considered to have exceptional quality because they contain both relatively undisturbed plant communities and they support a variety of wildlife. The bogs are considered high quality habitats because of their scarcity and the difficulty in replacing them through conventional mitigation. **Figure 4.10 (sheets 1-4)** located at the end of **Section 4.0** illustrates the locations of these complexes along with other wetlands in the study area. These high quality wetland complexes have the greatest potential habitat for a wide variety of flora, fauna, and aquatic species, including threatened and endangered and special concern species, and are discussed in greater detail in **Section 3.20, Threatened and Endangered Species**. As discussed in **Section 4.12, Wetland Impacts**, alternatives were designed to avoid impacting these high quality wetland complexes and sensitive habitats.

The wetlands were classified utilizing the *Classification of Wetlands and Deepwater Habitats of the United States* (1979) by Cowardin, et al. for the U.S. Fish and Wildlife Service. The study area contains four types of jurisdictional wetlands:

- ***Forested Wetlands:*** Forested wetlands are characterized by trees more than 20 feet tall and are primarily found adjacent to the three rivers within the study area. Dominant vegetation includes silver maple, slippery elm, green ash, and willow species. A large

complex of forested wetlands is located north of Gleason Road, west of US-131, with additional floodplain forested complexes located adjacent to the White Pigeon and St. Joseph Rivers.

- *Emergent Wetlands:* Emergent wetlands, including marshes and wet meadows, are stable wetlands that have primarily herbaceous vegetation growing out of wet soil but are not dominated by trees or shrubs. The study corridor contains pockets of emergent wetlands at numerous locations. Many of these areas are located north of Drummond Road and west of US-131. Others are associated with the White Pigeon River and St. Joseph River floodplains. Dominant vegetation found within these wetlands includes: cattails, sedges, reed canary grass, and orange jewelweed. A variety of emergent species are also found in roadside ditches located throughout the corridor.
- *Scrub-Shrub Wetlands:* Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall. One scrub-shrub wetland was observed within the study area. The wetland is located on the west side of King Road, west of existing US-131. The dominant vegetation includes blue flag iris, reed canary grass, common fox sedge, orange jewelweed, rough bedstraw, late goldenrod, crack willow, and eastern cottonwood.
- *Unconsolidated Bottom Wetlands:* Unconsolidated bottom wetlands are those characterized by the lack of large stable surfaces for plant and animal attachment and are less than 30% covered by vegetation. Two unconsolidated bottom wetlands exist in the study area. One is located in the northeast quadrant of the M-60/US-131 intersection. The dominant vegetation includes willow species, soft-stem bulrush, and grass species. The other is north of M-60, west of US-131 on the edge of a forested wetland.

The study area also contains the open water riverine wetlands of the St. Joseph River, White Pigeon River, and Rocky River. These riverine areas provide habitat for various mammals, aquatic species such as fish, amphibians, and invertebrates, and migratory birds. Habitat value of these wetlands is discussed further in **Section 3.13, Aquatic Issues**.

3.12.1 Identification Methodology

The following sources of information aided in preliminary determination of wetland locations: United States Geological Survey topographic maps, the National Wetland Inventory (NWI) maps, *Soil Survey of St. Joseph County*, Natural Resource Conservation Service (NRCS) farmed wetland maps, aerial photographs, and the *National List of Plant Species that Occur in Wetlands, North Central (Region 3)*.

Wetlands were delineated during field investigations that occurred during both the 2000 and 2001 growing seasons. The *Michigan Department of Environmental Quality (MDEQ) Wetland Identification Manual: A Technical Manual for Identifying Wetlands in Michigan* was used to determine both the presence and extent of wetlands within the study area. This methodology mandates that two criteria be met before an area is identified as a wetland; the dominant presence of wetland vegetation (50% or more) and sufficient hydrology. At the potential wetland sites, the following procedures were followed:

- Dominant floral species were visually estimated for each vegetative stratum
- Indicators of inundated and/or saturated soils, i.e., wetland hydrology, were noted

- In some cases, soil samples were obtained and the soil colors were compared to the Munsell Color chart and the descriptions in the NRCS County Soil Surveys
- Locations of observation points for each determination were established based upon plant community borders and changes in topography
- The extent of the wetland was determined when one of the two above mentioned criteria ceased to be met

A complete description of each wetland, including its wetland classification, dominant vegetation, soil type, and hydrology is included in a separate **Wetland Technical Memorandum**, summarized in **Appendix A.6**, and available through MDOT.

3.12.2 Wetland Functional Methodology

Functional assessments of the quality and function of each wetland were also performed using the Wisconsin Department of Natural Resources *Rapid Assessment Methodology for Evaluating Functional Values* (1987) as a starting point, and making a further determination of high, moderate, or low value using the assessment methodology described below. The following functions were evaluated with the *Rapid Assessment Methodology*:

- Floral diversity
- Wildlife habitat
- Fish and invertebrate habitat
- Flood and stormwater storage
- Non-point source pollution abatement including filtering of sediment and nutrients
- Groundwater discharge/recharge
- Streambank protection
- Aesthetic and recreational opportunities

Based on the *Rapid Assessment Methodology's* determination of the functions fulfilled by a particular wetland, a determination was made as to whether the wetland was a high quality, moderate quality, or low quality wetland. A wetland was determined to be high quality if it possesses a high quality vegetative community, provides either high quality or a large quantity of wildlife habitat, and performs four or more additional functions to a considerable degree. All of the high quality wetlands in the study area are associated with either the floodplains of the White Pigeon or St. Joseph Rivers, or are associated with bog habitat. High quality wetlands also frequently have protected plant or animal species associated with them. See **Section 3.20, Threatened and Endangered Species** for additional details.

A wetland was determined to be of moderate quality if it possesses either a high quality vegetative community or high quality/quantity wildlife habitat, and performs three or more functions to a considerable degree. The moderate quality wetlands often have only moderate quality vegetation, or are smaller in size and therefore do not possess considerable wildlife habitat. Many of these wetlands perform similar functions as high quality wetlands, but are missing the shoreline protection and groundwater discharge/recharge functions that wetlands associated with rivers provide.

A wetland was determined to be low quality if it possesses neither a high quality vegetative community nor provides considerable wildlife habitat, and performs few functions to a considerable degree. The low quality wetlands tend to perform only a few of the above functions, most often

flood and stormwater conveyance, and nutrient and sediment filtering. In some cases, they have moderate habitat value.

A complete description of each wetland assessed, including the functions it performs, is included in the **Wetland Technical Memorandum**. The Rapid Wetland Function Assessment score sheet for each wetland is also included in this document.

3.12.3 Jurisdictional Wetlands in the Study Area

The wetlands located within the study area are listed in **Table 3.8** and are labeled on **Figure 4.10 (sheets 1-4)** at the end of **Section 4.0** by the number found in the first column of the table. Further description of the wetlands is contained in the **Wetland Technical Memorandum**, summarized in **Appendix A.6**.

3.13 Aquatic Issues

The study area is wholly located within the 4,685 square-mile St. Joseph River watershed which includes the sub-watersheds of the Rocky River and the White Pigeon River. This watershed has been subdivided into five sections, based on major changes in hydrology, catchment land cover, surficial geology, and channel shapes. This project is wholly located within Section Three of the watershed (Middle). The study area includes the White Pigeon River, St. Joseph River, and the Rocky River tributaries. The three rivers were evaluated for surface water quality and the quality of fish, mussel, and macro-invertebrate habitat. The information gathered for this evaluation was acquired from the Michigan Department of Natural Resources (MDNR) *St. Joseph River Assessment*, September 1999, and during a site reconnaissance in April, 2002.

The entire St. Joseph River is designated as a migratory route for trout (*anadromous salmonids*), meaning that permitted discharges into the system must not increase water temperature or decrease dissolved oxygen content to the point that migrations of these fish would be adversely impacted. Information related to fish species within the study area was obtained from the MDNR and the Michigan Department of Environmental Quality (MDEQ) Water Quality Division.

The St. Joseph River was historically navigable well beyond the study area, but currently the U.S. Army Corps of Engineers does not exercise jurisdiction beyond Berrien Springs, far downstream and outside of the study area. Dams are located on the St. Joseph River downstream and immediately upstream of US-131. The upstream hydroelectric dam in Constantine was built in 1873 and has fragmented the river system and turned the high gradient habitat into still-water habitat. The dam also traps sediment and woody debris, disrupts seasonal flow variations, and dramatically increases daily flow variations based on electricity use.

Table 3.8 Wetlands in the US-131 Study Area

Figure 4.10 Label	Type (Classification)	Wetland Hydrology	Total Acres*	Overall Quality**
1	Forested (PFO1A)	Soil saturation upper 12"	NA	Low
2	Forested (PFO1Cd)	Inundation, soil saturation upper 12"	NA	Moderate
3	Forested (PFO1C)	Inundation, soil saturation upper 12"	NA	High
4	Forested (PFO1C)	Soil saturation upper 12"	NA	High
5	Forested (PFO1C)	Inundation, soil saturation upper 12"	NA	High
6	Forested (PFO1C)	Inundation, soil saturation upper 12"	NA	High
7	Emergent (PEMA)	Inundation	0.17	Low
8	Forested (PFO1C)	Soil saturation upper 12"	NA	High
9	Forested (PFO1C)	Inundation, soil saturation at ground surface	NA	High
10	Emergent (PEMA)	Inundation	NA	Low
11	Forested (PFO1C)	Inundation	NA	Low
12	Forested (PFO1C)	Inundation	0.07	Low
13	Scrub-Shrub (PSS1F)	Inundation, soil saturation upper 12"	NA	High
14	Emergent (PEMF)	Inundation, soil saturation upper 12"	NA	Moderate
15	Emergent (PEMC)	Inundation, soil saturation upper 10"	1.51	Moderate
16	Forested (PFO1C)	Soil saturation upper 12"	1.85	Moderate
17	Emergent (PEMA)	Inundation	NA	Low
18	Forested (PFO1A)	Inundation	16.67	Moderate
19	Emergent (PEMA)	Inundation	1.32	Low
20	Forested (PFO1C)	Inundation	1.61	Low
21	Forested (PFO1C)	Inundation, soil saturation upper 12"	33.99	Moderate
22	Forested (PFO1C)	Inundation	NA	Moderate
23	Unconsolidated Bottom (PUBGx)	Inundation	0.34	Low
24	Forested (PFO1C)	Inundation	1.73	Moderate
25	Emergent (PEMC)	Inundation, soil saturation upper 12"	3.51	Low
26	Emergent (PEMC)	Soil saturation upper 12"	0.12	Low
27	Forested (PFO1C)	Inundation, water marks, drift lines, drainage patterns	5.80	Moderate
28	Forested (PFO1A)	Water marks, water stained leaves	0.12	Moderate
29	Forested (PFO1C)	Inundation, soil saturation upper 12", drainage patterns, water marks, drift lines	NA	Moderate
30	Emergent (PEMC)	Inundation	NA	Moderate
31	Unconsolidated Bottom, Forested (PUBG, PFO1E)	Inundation	4.01	Moderate

*NA - The wetland is contiguous to the riverbanks and extends outside the project area, or it may not show on the map.
** Methodology for quality determination discussed in **Section 3.12.2 – Wetland Functional Methodology**

3.13.1 Surface Water Quality

The following is a discussion of the water quality currently found within the three rivers located within the project area. Currently, water quality is being impacted by a variety of sources. Within the project vicinity, water quality is primarily impacted by non-point sources such as stormwater runoff from agricultural land and to a lesser degree, stormwater runoff from roadways. Stormwater runoff from roadways can contribute heavy metal contaminants, oils,

and deicing chemicals such as chlorides. The MDEQ Water Quality Division is responsible for water quality in the State waterways. Regulations dictate the water quality standards and use designation for each water body.

St. Joseph River: Unregulated discharges by industries and municipalities have contributed to the historically 'poor' water quality in the St. Joseph River basin. However, water quality in many waterbodies has improved and water quality in the basin can now be described as 'good'. Combined sewer overflows (CSOs), nonpoint source flows, and adjacent sites of contamination contribute to on-going water quality degradation. Open-ended public health warnings exist in several segments of the St. Joseph River. Animal feed lots, pasture runoff, and untreated sewage water deposition into the St. Joseph River account for the presence of the bacteria *E. coli*. These potential sources of *coliform* bacteria are located upstream and within the study area.

Michigan has posted contaminant advisories for fish consumption in the area. Between 1989 and 1993, levels of pesticides such as chlordane, heptachlor, dieldrin, and DDT (as well as DDT's metabolites DDE and DDD) displayed a slight decrease in concentration in caged fish in the St. Joseph River. Both a mercury advisory and a fish consumption advisory exist in the waterway, due to high concentrations in fish. Polychlorinated biphenyl (PCB) levels in the waterway exceeded the Michigan Water Quality Standards, although PCBs in sediment levels have not been detected. The source of these PCBs is unknown.

White Pigeon River: A 1995 study near the study area along the White Pigeon River listed the water quality as 'acceptable'; elevated levels of phosphorus, ammonia, arsenic, selenium, mercury, and copper, as compared with the normal ranges in this area.

Rocky River: An undated study reported that alkalinity, hardness, magnesium, and pH were all above normal within the study area.

3.13.2 Fisheries and Aquatic Habitat

Aquatic habitat includes all of the instream and riparian habitat that influences the structure and function of the aquatic community in a stream. The purpose for evaluating the physical habitat features of the selected stream locations was to ascertain the condition and quality of the instream and riparian habitat. Two USEPA evaluative criteria, Aquatic Habitat assessment and Benthic Macroinvertebrate Communities assessment, were used to determine potential habitat suitability for threatened and endangered species within the portions of the study area that are not covered by other data (e.g., studies by MDNR in the St. Joseph River). The summary of these assessments are provided in a **Threatened and Endangered Species Technical Memorandum**, a separate document summarized in **Appendix A.8**.

Drainage of land for agricultural and urban use has altered natural flow regimes throughout the watershed. Channelization of streams to improve conveyance and flood-carrying capacity, and to drain wetlands, eliminates in-stream and juvenile nursery habitats. Structural diversity was further reduced when meanders, riffles, and pools were eliminated. Removal of snags and riparian vegetation reduce valuable habitat, such as: backwaters, pools, and woody debris that fish use as refuge against high flows. Clearing and development of lands for agriculture, urban, and suburban uses increases unvegetated and impervious lands. This results in a higher flow rate of surface water runoff instead of in-ground drainage. Surface runoff is quicker, warmer, has a higher flow rate, and lower duration, than in-ground drainage. It also increases nonpoint source pollution from pesticides, herbicides, and fertilizers that can be toxic to fish and

vegetation. Bare soils accelerate erosion and increase stream sediment loads. Fine sediment reduces fish feeding, covers spawning habitats, and may clog fish gills.

Existing habitat conditions for fish, mussel, and macroinvertebrate were assessed at the White Pigeon, St. Joseph, and Rocky Rivers. The following is a discussion of gradient, substrate, bank cover, channel morphology, and flow at the various crossings of the three rivers. The St. Joseph watershed originally had 97 species of fish, and now contains 114 species. Although the diversity remains high, there has been a change as silt and warm water tolerant fish have increased, while fish dependent on gravel substrate and aquatic vegetation have declined. Introduction of non-native species have also influenced the types and numbers of species due to predation and competition.

All of the rivers in the study area are listed as at least top-quality warm water streams, which is defined as a waterway containing self-sustaining populations of warm water and cold water sport fish.

White Pigeon River: This river is characterized as a cool to warm water system with smallmouth and rock bass, common shiner, hog sucker, and various redhorse species dominating the fish community. The White Pigeon River has maintained its natural channel morphology inside the entire study area. It primarily contains run habitat (fast, non-turbulent water) with small amounts of riffle and pool habitat on the east side of US-131. The flat floodplain in this vicinity is flooded in the spring, providing sheltered backwaters for fish spawning. However, hydrology within the floodplain does not support habitat through the summer.

The site reconnaissance revealed that the White Pigeon River consists of run habitat at all of the crossing locations, and that the substrate of the river is primarily silt as observed at the river banks at all crossing locations. Stream flow in the vicinity of the study area has not been influenced by man-made structures and so follows natural, gradual variations in alignment and topography.

The MDNR has identified fish habitat in the area as “fair” or “good” and improved between 1990 to 1995 due to improvements in bottom substrate, bottom deposition, bank stability, and overall habitat diversity. A 1995 fish sampling location in the White Pigeon River identified 71 individual fish from 14 species, including honeyhead, a shiner, bluntnose minnows, suckers, bullhead, pirate perch, sunfish, bass, bluegill, and darters. As a part of the same site visit, the macroinvertebrate community on the White Pigeon River at three locations in the Village of White Pigeon upstream and downstream of US-131 was rated “acceptable” or “excellent” by the MDNR, though overall biological quality ranged from “poor” to “acceptable”.

St. Joseph River: The MDNR classifies the substrate of the St. Joseph River in the vicinity of the project as sand and gravel with some silt. Sand and gravel substrates provide better macroinvertebrate and fish spawning habitat than silt substrates. In the study area, the St. Joseph River is characterized as a low gradient river, with water flows of 0-2.9 feet per mile. Low gradient rivers consist primarily of run habitat with very little riffle or pool habitat, thereby providing poor diversity of habitat for macroinvertebrates or fish. The MDEQ, Water Quality Division conducted a biological assessment of the St. Joseph River at Mottville in July 1990. The Mottville sampling location is located where US-12 crosses the St. Joseph River and is the closest sampling station to the project area. This study determined that elevated levels of turbidity and sedimentation has resulted in minor habitat degradation in the project area. Fish species identified included gars, minnows and carp, suckers, catfish, sunfish, and perch. A total of 24 taxa were identified, with four taxa noted to be intolerant of pollution and 15% of the taxa

tolerant of pollution. Macroinvertebrate sampling indicated that 13 taxa were identified, including mayflies, caddisflies, beetles, flies, limpets, bivalves, and mussels. Mayflies and caddisflies made up 64% of the total number of individuals collected, indicating good water quality.

Rocky River: The Rocky River has historically been classified as a cold water stream by MDNR. However, in 2002 it was recommended for reclassification as a warm water stream. All trout stocking in the river was discontinued in 1997, as it was determined that its waters were too warm to maintain trout.

A 1995 MDEQ Staff Report indicated that in the vicinity of the US-131 project, just upstream of the Rocky River's confluence with the St. Joseph and Portage River at Three Rivers, an overall biological quality rating of "excellent" was recorded, with an "excellent" fish community, good habitat availability, and a high macroinvertebrate diversity. In the 1995 survey, 149 individual fish from 15 species were collected, including species of lamprey, pike, shiners, minnow, sculpins, suckers, bullhead, bass, perch, and darters. The MDNR classifies the substrate of the Rocky River as mostly rock rubble, gravel, and sand, with some silt.

The site reconnaissance determined that the substrate of the Rocky River in the vicinity US-131 is gravel and sand. According to the MDNR *Status of Fishery Resource Report 2000-2002*, the Rocky River, in the study area east of US-131 contains only run habitat, while west of US-131 some riffle habitat was noted. No pools or backwaters were noted within the Rocky River in the vicinity of US-131. The Rocky River maintains most of its natural channel morphology except for some minor channelization that occurred to accommodate the US-131 bridge and commercial development east of US-131.

According to the MDNR *Status of Fishery Resource Report 2000-2002*, the Rocky River has moderate flow (50-75 cubic feet per second) in the summer months. One remnant dam exists on the Rocky River near its confluence with the St. Joseph River. This dam has failed and is no longer in service. Stream flow of the Rocky River is therefore influenced mainly by natural seasonal and daily changes at the US-131 crossing. There is riffle (spawning) habitat downstream of this location.

3.13.3 Water Bodies

Other than the rivers, the only other water body of consequence in the study area is Stag Lake. It is located in the southwest quadrant of the study area and contains a bog. More information is available in **Section 3.12, Wetlands**.

3.14 Hydrological Issues

The river systems within the southern portion of the Lower Peninsula of Michigan are slow-moving, low-gradient systems. These types of river systems tend to produce wider, flatter floodplains. The study area is located within the St. Joseph River watershed, which includes the Rocky River and White Pigeon River subwatersheds.

"Floodplains" are defined as any area susceptible to being inundated by floodwaters from any source. The 100-year floodplain is the area which has a one percent chance of being flooded in a given year. The Federal Emergency Management Agency (FEMA) maps 100-year floodplains on Flood Insurance Rate Maps (FIRMs). Development in floodplains is discouraged without

purchase of flood insurance, a program administered by FEMA's National Flood Insurance Program.

The 100-year floodplains within the study area are illustrated in **Figure 4.10 (sheets 1-4)** at the end of **Section 4.0**.

3.14.1 Floodplains

Flooding is common within the St. Joseph River basin, with large floods periodically occurring. In 1950, flooding impacted urban areas in the City of Three Rivers and Village of Constantine. The City of Three Rivers is situated at the confluence of the Rocky, Portage, and St. Joseph Rivers, and seasonal flooding occurs regularly, but is generally confined to the 100-year floodplain.

3.14.2 Stream Crossings

Bridges currently cross the White Pigeon, St. Joseph, and Rocky Rivers on existing US-131. Except for Kerr Creek, there are no stream tributaries of the three rivers within the study area.

3.15 Wild and Scenic Rivers

The study area crosses no Federal Wild or Scenic River systems. There are no State designated Natural Rivers, as defined in the Natural Rivers Act (Act 231 of 1970), within the study area.

3.16 Coastal Barriers/Critical Dunes

The study area contains no federally designated coastal barriers or critical dunes, as defined in the Coastal Barriers Act of 1982 (P.L. 97-348).

3.17 Coastal Zones

The study area is not located within a federal coastal zone management boundary, as defined by the Coastal Zone Management Act of 1972.

3.18 Geological Resources

St. Joseph County lies within the Kalamazoo glacial moraine, a large deposit of unstratified glacial till over bedrock. Bedrock consists of limestones, sandstones, and shales covered by unconsolidated tills, gravels, sands, silts, and clays. The Soil Survey of St. Joseph County Michigan identifies six different soil associations located within the study area. They are: Adrian-Granby, Oshtemo-Spinks, Elston, Sebewa-Cohoctah, Kalamazoo-Oshtemo, and Hillsdale-Riddles associations. There are no Karst formations and no earthquake hazard zones within the study area.

The topography of the study area varies. Rolling terrain is present in Fabius Township south of M-60. In the remainder of the study area, the prevailing landform is nearly level to undulating outwash plains.

3.19 Wildlife and Vegetation

Major biotic communities observed within the US-131 study area include wet floodplain, upland hardwood forests, marshes, and bogs, although the predominant land cover is agricultural cropland.

3.19.1 Vegetation

According to the U.S. Geologic Survey, the study area is located within the Battle Creek Outwash Plain ecosystem. This ecosystem is made up of broad, flat outwash plains with small lakes, wetlands, and small ridges of ground moraines scattered throughout. Presettlement vegetation consisted primarily of tallgrass prairie or oak savannas ((*Regional Landscape Ecosystems of Michigan, Minnesota, and Wisconsin: A Working Map and Classification*; Dennis A. Albert, 1995). The more poorly drained outwash areas adjacent to rivers and streams contained extensive swamp forests dominated by black ash or wet meadows. On steep or irregular topography in the study area, oak-hickory forest dominated.

Within the study area, tallgrass prairie, wet prairie, oak savanna, and prairie fen are now all rare. Most of the upland areas have been converted to agriculture. Many of the wetlands have been drained for agricultural purposes, and those still existing are often used for pasture. Where natural areas still exist, forests are dominated by oak-hickory communities. These communities are found within drier areas and contain red, black, white, and bur oaks, as well as shagbark and pignut hickories, black cherry, black walnut, and red maple. In more mesic areas, the forests are dominated by beech-maple communities. These communities contain American beech, sugar maple, black cherry, red oak, and white oak. Wetlands found within the floodplain forests are dominated by American elm, green ash, black ash, red maple, and sugar maple. Wetlands found outside of the floodplain often contain ash, red maple, pin oak, and swamp white oak.

The areas adjacent to the White Pigeon, St. Joseph, and Rocky Rivers contain well-developed riparian corridors consisting of floodplain forest with interspersed deciduous woods and forested wetlands.

The floodplain of the White Pigeon River is a high to very high quality floodplain forest with a diverse understory. A floristic quality assessment of the entire White Pigeon River floodplain area indicated a high quality vegetative community. State threatened and special concern species were observed during a site visit in April, 2002. More information is provided in **3.20, Threatened and Endangered Species**.

Bank cover of the St. Joseph River consists of floodplain forest on the south side of the river. This forested area consists of high quality forest with a diverse understory. Minor disruptions occur due to scattered residences. On the east north side of the river, the banks have undergone residential development and the bank cover is disturbed. Vegetation on the north banks consists primarily of mowed lawn with scattered trees. On the west side of the study area the bank cover on the St. Joseph River consists of high quality floodplain forest on the north bank. A floristic quality assessment of the entire St. Joseph River floodplain area indicated a high quality vegetative community; professional judgment identified the area located on the west side of the study area as a very high quality forest because of its diverse understory, and the backwaters previously described. Bank cover on the south banks of the St. Joseph River in this

location consists of a steep slope which is forested. No floodplain exists on the southern bank, but bank cover does exist in the form of trees.

Bank cover of the Rocky River in the vicinity of US-131 consists of floodplain forest on the west side of US-131. This forested area consists of moderate quality forest with some diversity within the understory. East of US-131, native trees have been removed and the floodplain is dominated by reed canary grass (*Phalaris arundinacea*), an aggressive, non-native grass species.

3.19.2 Natural Areas

The one-mile wide study area is adjacent to the Fabius State Game Area. Two other State Game Areas are located within St. Joseph County. These are the 2,100-acre Three Rivers State Game Area and the 80-acre Spring Creek State Game Area, located three miles west and two miles east of the study area respectively. No State parks, privately owned nature preserves, or federally owned forests are located within the vicinity of the project corridor. Information related to natural areas within the project area was obtained from telephone conversations with the MDNR.

Fabius State Game Area: One of the three State game and wildlife areas managed by the MDNR in St. Joseph County is found within the study area. The Fabius State Game Area is a 119-acre brushland and forested area located on the east side of US-131, approximately one-quarter mile north of Drummond Road, in Fabius Township. The facility is used primarily for hunting. Wetland species such as waterfowl, sandhill cranes, great blue heron, eastern box turtle, and a variety of amphibians inhabit the Fabius State Game Area. The Fabius State Game Area provides habitat for a variety of mammals and bird species.

3.19.3 Vertebrates

Thirty-two species of amphibians and reptiles are known to occur within the study area, primarily associated with the rivers and wetlands. Very little published information is available regarding distribution or abundance of amphibians and reptiles elsewhere within the St. Joseph River watershed. Site investigations conducted in May and August of 2000, and June 2001 observed the following species:

American toad, Blanding's turtle, bullfrog, eastern box turtle, garter snake, green frog, midland painted turtle, pickerel frog, northern leopard frog, snapping turtle, and spring peeper.

The St. Joseph River watershed is a part of the Mississippi flyway and due to its riparian nature in an otherwise predominantly agricultural area it is an important migratory route. The area is home, for at least part of the year, to many birds including songbirds, ducks, geese, hawks, owls, and herons. There is a heron rookery located west and outside of the study area on the White Pigeon River. Hardwood stands in river lowland areas are crucial to many songbirds such as the state species of special concern yellow-throated warblers. Site investigations conducted in May and August of 2000, and June 2001 observed the following species:

American crow, American goldfinch, American kestrel, American redstart, American robin, bank swallow, barn swallow, black-capped chickadee, black-throated green warbler, blue jay, blue-gray gnatcatcher, brown-headed cowbird, Canada goose, cedar waxwing, chimney swift, shipping sparrow, common grackle, common yellowthroat,

downy woodpecker, eastern kingbird, eastern meadowlark, eastern phoebe, eastern towhee, eastern wood-pewee, field sparrow, European starling, great blue heron, great egret, great crested flycatcher, green heron, grey catbird, hairy woodpecker, hermit thrush, house finch, house sparrow, house wren, indigo bunting, killdeer, loggerhead shrike, mallard, marsh wren, mourning dove, mute swan, northern flicker, northern oriole, northern cardinal, prothonotary warbler, red-bellied woodpecker, red-eyed vireo, red-headed woodpecker, red-tailed hawk, red-winged blackbird, ring-necked pheasant, rose breasted grosbeak, ruby-crowned kinglet, ruby-throated hummingbird, Savannah sparrow, song sparrow, swamp sparrow, tree sparrow, tree swallow, tufted titmouse, turkey vulture, warbling vireo, white-breasted nuthatch, white-throated sparrow, wild turkey, wood duck, wood thrush, yellow warbler, yellow-bellied sapsucker, and yellow-throated warbler.

The study area contains numerous mammals, most of which occur adjacent to rivers and streams within the St. Joseph River basin. Site investigations conducted in May and August of 2000, and June 2001 observed the following species:

Beaver, deer mouse, eastern chipmunk, eastern cottontail, eastern fox squirrel, eastern gray squirrel, eastern mole, muskrat, raccoon, red squirrel, whitetail deer, and woodchuck.

3.20 Threatened and Endangered Species

The Endangered Species Act of 1973, as amended, protects endangered and threatened species. The State of Michigan, the State of Indiana, and the U.S. Fish and Wildlife Service (USFWS) all maintain lists of State and federal threatened and endangered species for both plants and animals. "Endangered" Species are defined by USFWS as an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range. "Threatened" is defined as an animal or plant likely to become endangered within the foreseeable future throughout all or a significant portion of its range. These terms also apply at the State level.

States often list additional species as "special concern", meaning that while they are not officially designated as endangered or threatened, these species should be monitored because of relative rarity or lack of information, to ensure that they do not eventually become threatened or endangered. The "special concern" designation does not have any formal regulatory protection.

The Michigan Natural Features Inventory (MNFI) and Indiana Natural Heritage maintain a list of endangered, threatened, or otherwise significant plant and animal species, special plant communities, and other natural features. Vascular plants are the most commonly listed group of threatened or endangered species in the region. Many of these are wetland plants found in floodplains and along river corridors.

The Indiana Department of Natural Resources, Division of Fish and Wildlife and Natural Heritage Program staff were contacted and indicated that no listed plant or animal species have been reported to occur in the Indiana portion of the study area. No listed plants, animals or protected habitats were observed in the Indiana portion of the study area. There are no rivers, streams, or unique habitat locations (such as bogs or wetlands) within the study area in Indiana.

Information was requested from the MDNR, Divisions of Fish and Wildlife and Diversity and Habitat Protection Unit on the potential for protected species to exist within the project area. The MDNR provided information on which species were known to inhabit the area prior to the actual field investigation for listed threatened, endangered, or special concern species. Site investigations were conducted in May and August of 2000, and June 2001. Site investigations were conducted utilizing the MDNR, Endangered Species Program, Wildlife Division's *Guidelines for Conducting Endangered and Threatened Species Surveys* (May 2001). Habitat for five listed plant species and 14 listed animal species exists in the study area.

3.20.1 Listed Plant Species

Correspondence received from the MNFI indicated that nine state threatened or state special concern plant species had the potential to be found within the study area (November 18, 1999). Of these nine species, the threatened and endangered species field investigations identified three State threatened and two State special concern plant species as having habitat in the study area. Three of the five listed plant species were actually observed. One of the observed species, wild rice (*Zizania aquatica*), was located in wetlands within the St. Joseph River floodplain. It is not clear whether this population of wild rice is a natural population or a naturalized remnant of a historically seeded population. The other two observed species, hairy-fruited sedge (*Carex trichocarpa*) and tall beak-rush (*Rhynchospora macrostachya*), were located within areas that would be avoided by the proposed project. No other State or federally listed endangered plant species were observed.

Table 3.9 lists the species that were identified during the site investigations and the location where they were found, as well as those locations that had habitat and therefore could possibly have specimens that were not found. Locations are shown in **Figure 4.10 (sheets 1-4)**. All State status listings are for Michigan. Sites not listed in the table did not have suitable habitat or sightings of listed species.

Table 3.9 Threatened, Endangered, or Special Concern Plant Species Potential Habitat

Species	Status	Habitat Site Numbers
Bog bluegrass	ST	8, 25
Cut-leaved water parsnip	ST	9, 36
Wild rice	ST*	12
Hairy-fruited sedge	SSC*	25
Tall beak rush	SSC*	8
ST - State Threatened SSC - State Special Concern * Species actually observed at site. Habitat site number locations are depicted on Figure 4.10 .		

3.20.2 Listed Animal Species

Correspondence received from the USFWS indicated that one federal listed endangered species, one federal threatened species, and one federal candidate species had the potential to be found within the study area (June 15, 2000). Correspondence received from the MNFI indicated that three State threatened or State special concern animal species had the potential to be found within the study area (November 18, 1999). The threatened and endangered species surveys conducted in 2000 and 2001 identified habitat for an additional seven State or federal protected animal species. A total of 14 threatened, endangered, or special concern

animal species were identified as having habitat within the study area. Vegetation cover types with habitat for these animal species were surveyed during the site investigations. The presence of five of the 14 species was verified. These are discussed below.

Three State species of special concern, prothonotary warbler (*Protonotaria citrea*), yellow-throated warbler (*Dendroica dominica*), and eastern box turtle (*Terrapene carolina carolina*), were observed in the White Pigeon River floodplain. An adult prothonotary warbler was observed feeding a fledgling, which provides evidence that the prothonotary warblers are successfully breeding. Peterson (*A Field Guide to Birds*, R. T. Peterson, 1980) reports the prothonotary warbler as breeding in river swamps. The yellow-throated warbler requires sycamores, which are locally common in the White Pigeon River floodplain. The MNFI describes the eastern box turtle as requiring forested habitats with sandy soils near a source of water such as a stream. The White Pigeon River floodplain fulfills the habitat requirements for these species.

A single loggerhead shrike (*Lanius ludovicianus migrans*), a state endangered species, was observed in a mid-successional woodlot found between M-60 and Gleason Road, approximately one-half mile west of US-131. Habitat requirements for the shrike include thorny trees, thorny shrubs, or barbed wire on which to impale their prey. Several barbed wire fences were located within this site.

A Blanding's turtle (*Emydoidea blandingii*), a State species of special concern, was found in an emergent wetland located on the north side of Garber Road, approximately one-half mile west of US-131. MNFI lists preferred habitat for the Blanding's turtle as productive, clean, shallow waters with abundant aquatic vegetation, and soft muddy bottoms over firm substrates. This site provides this habitat.

In accordance with the USFWS letter dated July 26, 2001 (**Appendix D.1**), a qualified biologist surveyed the study area to determine if suitable habitat was present to support federally protected species. Site investigations revealed that potential habitat exists within the study area for the federally protected species listed in **Table 3.10**. No biological assessment was conducted, since no evidence of federally listed species was observed and likely will not be affected by the project.

Rapid assessment field techniques were used to yield a high probability of locating listed species while reducing the overall time required to complete the survey. All surveys were conducted when species were in a conspicuous condition and at least two site visits were made at suitable habitats. The site investigations did not, however, include trapping or other methodologies intended to conclusively confirm the presence or absence of a protected species. There is a reasonable degree of certainty, however, that these habitats have been adequately investigated and the species are not present within the study area.

No specimens of the following species were noted during any field investigation.

The wet floodplain and sedge meadows along the White Pigeon River and the two bogs provide suitable habitat for the eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*), a federal candidate species. The habitat of this rattlesnake generally includes a wintering area of low woods, bogs, fens, or marshes and a summering area of drier ground, usually grassy with low shrubs. Although the White Pigeon River floodplain is predominantly forested, the open sedge meadow "pockets" have some massasauga habitat in addition to the two bogs. However, none of the adjacent upland habitats provides good summer habitat for the massasauga.

Therefore, there is only a low probability for the presence of the eastern massasauga within the study area, based on available habitat.

Table 3.10 Threatened, Endangered, or Special Concern Animal Species Potential Habitat

Species	Status	Habitat Site Numbers
River redhorse	ST	12
Lake herring	ST	36
Snuffbox	SE	12, 37, 38
Loggerhead shrike	SE*	27
Blazing star borer	SSC	2**
Prothonotary warbler	SSC*	9
Yellow-throated warbler	SSC*	9, 33
Eastern box turtle	SSC*	9
Eastern massasauga	FC	9
Blanding's turtle	SSC*	20
Purple wartyback	SSC	12, 37, 38
Copperbelly water snake	FT	9
Indiana bat	FE	9
Karner blue butterfly	FE	7

ST - State Threatened
 SE - State Endangered
 SSC - State Special Concern
 FT - Federal Threatened
 FE - Federal Endangered
 FC - Federal Candidate
 * Species actually observed at site
 ** Site 2 is located slightly south of the southern project terminus in Indiana and is not shown in the figures. The blazing star borer is not a listed species in Indiana, but rather, in Michigan.

The White Pigeon River floodplain may provide some potential habitat for the Indiana bat (*Myotis sodalists*), a federal endangered species. The study area does not provide suitable wintering habitat or optimal roosting habitat, since there are no upland intermittent streams; however, the floodplain may provide suitable foraging habitat, as it is a floodplain forest community near a perennial stream, which has roosting habitat.

Site investigations revealed that the wet floodplain along the White Pigeon River and the St. Joseph River provide potentially suitable habitat for the federally threatened copperbelly water snake (*Nerodia erythrogaster neglecta*). Preferred habitat for this snake is recorded as bottomland forests and shrub swamps. Available information indicates that adjacent upland forests are essential for hibernation sites for the long-term survival of populations of this snake. Although spring and summer habitats are available at both river floodplains, the adjacent upland areas are less desirable. Upland areas adjacent to the White Pigeon River floodplain consist of agricultural fields that are row-cropped. The St. Joseph River floodplain contains many residences, businesses, and agricultural fields. Therefore, there is only a low probability for the presence of this snake within the study area.

Wild lupine (*Lupinus perennis*) populations provide a required larval food source for the Karner blue butterfly (*Lycaeides Melissa samuelis*), which is a federal endangered species. Wild lupine was observed in the Norfolk & Southern Railroad right-of-way during the May 2000 field visits. However, during the August 2000 field visits, it was found that all vegetation within the right-of-way had been herbicided, presumably due to railroad maintenance activities. No evidence of living lupine was observed at that time.

Species and habitat site numbers are listed in **Table 3.10** while habitat site locations are shown in **Figure 4.10 (sheets 1-4)**. All State status listings are for Michigan. Sites not listed in the table did not have suitable habitat or sightings of listed species.

3.21 Cultural Resources

To satisfy Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act, the Michigan Department of Transportation (MDOT) coordinated with the Michigan State Historic Preservation Office (SHPO) to identify an Area of Potential Effects (APE) for the project. The SHPO recommended that MDOT conduct historic and archaeological surveys to locate sites eligible for listing on the National Register of Historic Places (NRHP). Information was also sent to local preservation groups and Native American tribes to assist in identifying historic resources.

3.21.1 Above-Ground Resources

A Phase I Reconnaissance Survey of above-ground resources was conducted to identify properties within the study area that potentially meet the minimum criteria of eligibility for listing on the NRHP. The NRHP has established criteria for determining historic significance. These criteria require a property to have integrity of location, design, setting, materials, workmanship, feeling, and association. To be eligible, properties typically must be at least 50 years old, remain fairly unaltered, and meet one or more of the National Register criteria for significance:

- A) Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B) Property is associated with the lives of persons significant in our past.
- C) Property embodies the distinctive characteristics of a type, period, or method of construction; or represents the works of a master; or possesses high artistic values; or represents a significant and distinguishable entity whose components lack individual distinction.
- D) Ability to yield information important in prehistory or history.

No improvements are proposed on new alignment in Indiana. All Indiana improvements call for simple widening of US-131 and would not affect any buildings meeting minimum NRHP requirements. Less than one acre of additional right-of-way (ROW) would be needed for the Indiana improvements.

The area examined in the Reconnaissance Survey corresponds to the area within which Practical Alternatives for the proposed project have been developed. The study areas, shown in **Figure 3.7**, have generally been determined as the limits of the APE. In rural areas, the APE includes those properties within one-quarter mile of the Illustrative Alternatives, but does not extend east of existing US-131. Properties falling within the APE and adjoining existing US-131 were considered as a part of this analysis. North of M-60, the APE includes areas east of existing US-131, but west of the Penn Central railroad tracks. Within Constantine and Three Rivers, the APE is limited to properties adjoining existing US-131. This APE is reasonable because the study area encompasses all of the Practical Alternatives considered for the US-131

Improvement Study, and no impacts associated with constructing any of the alternatives would extend beyond the limits of the study area.

The Reconnaissance Survey listed 15 potentially historic properties, one monument listed on the NRHP, and one historic district on the NRHP that could be affected by the proposed project. The project team and the SHPO visited these sites on August 22, 2002. Of the 17 potential sites, the field visit determined that six of the properties are not eligible for the NRHP. Four have a “no effect” determination as a result of the field visit. The results of the field visit are shown below in **Table 3.11**.

Table 3.11 August 22, 2002 SHPO Site Tour Results

Properties Not Eligible for the NRHP	Properties NRHP Eligible, No Effect
14558 Indian Prairie Road	Constantine Downtown Historic District
14870 Indian Prairie Road	200 Locust Road
13577 Quarterline Road	14760 Millers Mill Road
484 N. Washington	63941 US-131
62501 US-131	
15352 Gleason	

Of the seven sites that were determined to be potentially affected by the proposed project, six have been determined to be eligible for listing on the NHRP while one site is already listed on the NRHP. The seven sites are listed in **Table 3.12** and their locations are depicted on **Figure 3.7**.

Table 3.12 Historic or Potentially Historic Properties that could be Affected by the Proposed Project

Site	Property Location	Township/ Village	Property Type	Possible Eligibility Criteria
A	101 N. US-131	White Pigeon	Michigan State Police Post	A, C
B	Wahbememe Memorial Park (NW quadrant US-12 and US-131)	White Pigeon	Monument and Park	Placed on NRHP in 1995
C	63280 US-131	Constantine	Farmhouse not including outbuildings	A, B, C
D	63000 US-131	Constantine	Entire property	A, C
E	62249 US-131	Constantine	Farm including outbuildings	A, C
F	15303 W. Broadway	Three Rivers	Entire property	A, C
G	59019 US-131	Three Rivers	Factory building	A, C

Site A Description: The Michigan State Police post at 101 N. US-131 in White Pigeon is located in the northeast quadrant of the intersection of US-131 and US-12 and is one of just a dozen surviving posts constructed as a Works Progress Administration project. The Michigan State Police was formed in 1917 with their initial posts located in vacant houses, acquired and remodeled to serve as offices and barracks of the local post. The White Pigeon police post is recommended eligible for listing on the NRHP for the important role it has played in the history of the Michigan State Police as well as its association with the Works Progress Administration.

Site B Description: The Wahbememe Memorial Park in White Pigeon is located within a one-acre park in the northwest quadrant of the intersection of US-131 and US-12. The memorial marks the burial site of Chief Wahbememe (White Pigeon). Chief Wahbememe was the leader of a Potawatomi Village situated in the upper St. Joseph River valley in the early nineteenth century. The Village of White Pigeon takes its name from Chief Wahbememe. Dedicated in 1909, the monument was subsequently listed on the Michigan Historic Register in 1988 and on the NRHP in 1995. The site is significant as a historical monument as well as a burial site.

Site C Description: 63280 US-131, Constantine, is a farmhouse located on the west side of US-131 south of Garber Road. The house, built by Samuel Gibson, is a well-maintained example of the Gothic Revival style, and was constructed in 1860. Mr. Gibson was important for his farming efforts on his extensive agricultural holdings, as well as being a real estate developer and banker. The outbuildings were constructed in the late 1930s following a fire that destroyed all of the farm's original outbuildings. While the present outbuildings are at least 50 years old, they are not recommended eligible for the NRHP since the outbuildings lack an association with the time period when the original owners held the property. However, the farmhouse is recommended eligible for listing on the NRHP. See **Section 5.4.3** for a discussion of 4(f) impacts.

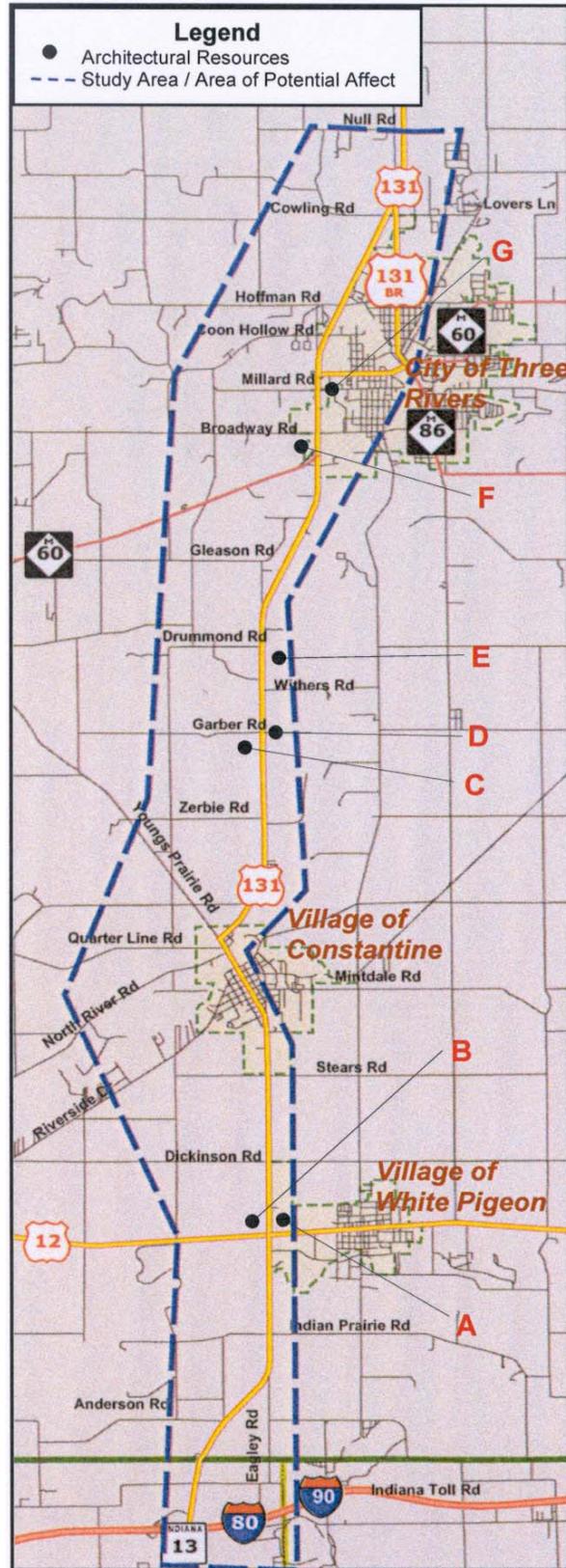


Figure 3.7 Cultural Resource Location

Site D Description: 63000 US-131, Constantine, is an abandoned farmstead situated on the east side of US-131 and immediately east of the junction with Garber Road. The farmstead complex consists of a house, barns, and grain bins. The house was built around 1850, and the barn complex was built after 1900. The grain bins are contemporary and do not contribute to the historic significance of the property. The house stands out for its intact I-house form and its federal-style front entry. The barn complex also appears to be one of the older ones in the study area. This property has been recommended eligible for listing on the NRHP.

Site E Description: 62249 US-131, Constantine, is a farm located on the east side of US-131 between Withers Road and Drummond Road. The farmstead is recommended eligible for listing on the NRHP based on the long association of the property with the George W. Hamilton family in Constantine, and because the farm, which continues its agricultural function, retains elements from each of its major periods of farming. These include its original function as a family farm, its use as a dairy farm and subsequent beef production facility, and its current focus on field crops. Although the house has undergone some alterations, it retains the ornamental elements and simple form of the original Italianate style Gabled Ell farmhouse.

Site F Description: 15303 W. Broadway, Three Rivers, is a former farm located on the south side of W. Broadway, west of US-131. The property consists of the house, a gambrel roof barn, a small shed, and a garage erected around 1960 and does not contribute to the significance of the property. The house is potentially significant as a well-preserved brick example of the Greek Revival style where the great majority of examples of Greek Revival houses in the study area have been altered. Furthermore, Greek Revival houses constructed from brick are uncommon in the region; most traditionally had wood siding. This property has been recommended for listing on the NRHP.

Site G Description: 59019 US-131, Three Rivers, is a factory located at the southeast corner of US-131 and M-60, on the outskirts of Three Rivers. This is a large manufacturing facility in a simple Art Modern style popular between 1930 and 1945. The building, which has had some alterations, features a smooth brick front façade with rounded corners and four large barrel vaulted elements placed side-by-side. It may have historic significance under several themes exclusive of architecture and has been recommended eligible for the NRHP.

3.21.2 Archaeological Resources

A total of 211 archaeological sites are listed within St. Joseph County, according to the archaeological site files housed at the Office of the State Archaeologist (OSA) in Lansing, Michigan. A file search conducted at the OSA determined that no known archaeological sites are listed within the study area.

As archaeological sites are more easily mitigated and archaeological surveys are a disturbance to those property owners affected, an archaeological reconnaissance survey will only be conducted for the Recommended Alternative due to the highly invasive procedure required to complete the deep testing.

3.22 Parks and Recreation

Existing recreational land uses within the study area are illustrated on **Figure 3.3** and an overview of these facilities follows. **Section 5.0, Draft Section 4(f) Evaluation** contains more information on the Wahbememe Memorial Park, which could potentially be impacted; such impacts would be regulated under Section 4(f) of the Department of Transportation Act of 1966.

Wahbememe Memorial Park: Situated on one acre in the northwest quadrant of the US-131 and US-12 intersection, this park is owned and operated by the St. Joseph County Parks Commission. This park is listed on the National Register of Historic Places and is a monument to Chief White Pigeon, who is buried at the site. A monument provided by the Alba Columbia Club in 1909 is located on the site. The park is maintained by the neighboring Welders Supplies and Gas Inc., under a 1986 agreement with the St. Joseph County Parks Commission (St. Joseph County Park & Recreation Master Plan, 2000).

St. Joseph County Parks: The St. Joseph County Parks Commission maintains 14 parks within the County, one of which is located within the study area. This park, which contains the Wahbememe Historical Monument, is described above. Adjacent to the study area is the Constantine Portage Park. It is located within the St. Joseph River in Constantine, east of US-131, and is accessible only by boat. It is used as a location for canoeists to rest (St. Joseph County Park & Recreation Master Plan, 2000).

Fabius State Game Area: Located on the east side of US-131 approximately one-quarter mile north of Drummond Road, the Fabius State Game Area is managed by the Michigan Department of Natural Resources (MDNR). This facility is used primarily for hunting as full access to the property and the St. Joseph River is limited due to terrain and foliage impediments. There are no other state parks or recreation areas within the study area.

Village of Constantine Parks: Several community parks are located adjacent to existing US-131, including Tailwater Park, Shelby Park, and Rotary Park. Tailwater Park and Shelby Park are located east of US-131 and on the north side of the St. Joseph River. Tailwater Park is a 0.2-acre park, with limited recreation facilities, and Shelby Park (one acre) consists of an open space with benches and picnic tables. Rotary Park is located immediately east of US-131, and provides two acres of recreational land within the Village of Constantine. Facilities at Rotary Park include a playground and benches.

Other Community Parks: The townships located within the study area do not offer any parks and recreation programs, with the exception of White Pigeon Township, which partners with the Village of White Pigeon to offer programs and facilities. No parks within the Three Rivers or White Pigeon parks systems are located within the study area.

Waterways: US-131 crosses the White Pigeon, St. Joseph, and Rocky Rivers within the study area. These rivers provide quality recreational fishing opportunities. In addition to acting as a major fishery resource, the St. Joseph River is becoming an established canoeing/boating route. Riverview Park (four acres in Constantine) and a boat launch above the Constantine reservoir dam offer canoe/boat launch facilities on the St. Joseph River. This segment of the St. Joseph River is not classified as a navigable waterway by the U.S. Army Corps of Engineers and larger recreational boats, like pontoon boats, are not able to pass beneath the existing US-131 bridge. There is also a hydroelectric dam immediately east of US-131 on the St. Joseph River that limits navigation.

St. Joseph County "Bicycle Tour Routes": Within the study area, US-131 crosses four locally suggested "Bicycle Tour Routes" that utilize existing local roads. These routes are not designated as bicycle routes. None of these routes is marked with signs and public knowledge of these routes is limited (St. Joseph County Park & Recreation Master Plan, 2000).

School Facilities: The Constantine High School and Middle School facilities on West Sixth Street in Constantine provide playing fields, outdoor basketball courts, and a track that are accessible to the public. Members of the general public utilize the track on a regular basis and both formal and informal groups use the playing fields. Rental fees are not charged. Other school districts do not have recreational facilities within the study area.

3.23 Potential Contaminated Sites

A search for potential contaminated sites within the study area was conducted by reviewing the databases of regulatory agencies that monitor hazardous materials and by performing on-site inspections. The database review and the on-site investigations were conducted for the geographical areas suggested by the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (Standard E1527-00). Site reconnaissances were conducted on April 2, 2000, May 4, 2000, June 17 - 19, 2000, and May 16, 2001. The site reconnaissances were conducted in order to locate the sites identified from the database review and to locate any sites not identified through the database review.

Based upon site and database review, 143 potential contaminated sites within recommended ASTM distances were identified within the Indiana and Michigan portions of the study area. Each of these sites may be impacted by one or more sources of potential contamination or hazardous materials. These sites are summarized below. The total number of sites listed below adds to more than 143 because some sites contain more than one potential source or type of contamination. For example, a site may have both an underground storage tank and a leaking underground storage tank. Site types discussed in the following list are defined in **Section 10.0, Glossary of Terms.**

- 69 Underground storage tank (UST) sites
- 18 Leaking UST (LUST) sites
- 26 Aboveground storage tank (AST) sites
- 43 Resource Conservation and Recovery Act (RCRA) small quantity generator (SQG) sites
- 8 State Hazardous Waste Sites
- 5 Automotive junkyard or salvage yard sites
- 4 Petroleum or natural gas pipeline utilities
- 3 Landfill, historical landfill, or suspect landfill sites
- 1 RCRA large quantity generator (LQG) site
- 1 Material Licensing Tracking System site
- 1 Toxic chemical Release Inventory System site (TRIS)
- 1 Comprehensive Environmental Response, Compensation, and Liability Act site (CERCLA)

3.24 Aesthetics and Visual Character

Much of the study area, especially south of M-60, has a distinct rural character. The combination of farmland and rolling hills provides a countryside view for many of the residents in the study area. Wooded areas east of Stag Lake provide a contrast for residents living on primarily agricultural and open land south of US-12. Although farmland dominates much of the southern part of the study area, a number of points of high elevation provide contrast to the landscape. West of US-131, Garber Road rises substantially, providing a distant vista overlooking the fields to the southeast. Steep, forested hills run along both sides of US-12 near King Road, providing the local residents with some seclusion.

The Village of Constantine has an established downtown, which includes a historic commercial district. The downtown streetscape is very busy due to the heavy traffic on US-131, especially commercial traffic, which reduces the view of the character of the downtown setting for non-motorized users and motorists.

The area north of M-60 is a mixture of small town, suburban, and rural visual characteristics. Although the streetscape along US-131 through the City of Three Rivers is busy, properties located a few blocks to the west feature a calmer, more serene countryside view. A restaurant near the intersection of Hoffman Road and US-131 has a view of the Rocky River, although it is somewhat obstructed by vegetation.

The study area provides both residents and travelers with a contrast between the busy nature of the developed areas along US-131 and the more rural character of the neighboring landscape with scattered farmsteads, drains, hills, and wooded areas found among the farm fields.