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The Affected Environment section provides background information on regional and local planning, the human environment, and the natural environment in the WIS 23 corridor study area. Information is also provided for cultural resources, economic resources, agricultural resources, and the public use of lands. This review of the affected environment establishes the background in which the WIS 23 alternatives are evaluated. This section is the same as presented in the 2010 FEIS except that:

- The demographic and income data have been updated using the 2010 census, the 2007-2011 American Community Survey, and other more recent data sources.
- The threatened and endangered species data has been updated and clarified based on recent communications with the WDNR. Clarifications include consolidation of information from various areas within the 2010 FEIS, along with other review information that was not originally included in the 2010 FEIS.
- The Northern Unit of the Kettle Moraine State Forest is now considered a Section 4(f) resource and is briefly discussed in this section. A more complete discussion occurs in Section 5 of this **combined LS SFEIS and ROD (LS SFEIS/ROD)**.
- The historic boundary of the St. Mary's Springs Academy has changed and is briefly discussed in this section. A more complete discussion occurs in Section 5 of this **LS SFEIS/ROD**.

Maroon text signifies updates addressing changed conditions or analysis, clarifications, or additional information. Items that are considered revisions that target specifically identified issues in the January 19, 2012 Notice of Intent to prepare an LS EIS are shown in blue text.

Yellow highlight signifies updates from the LS SDEIS to this LS SFEIS/ROD.

For tables and figures, the title of the Table or Figure has been shown in maroon or blue to indicate whether it has been revised since the 2010 FEIS.

3.1 GEOGRAPHICAL SETTING

The WIS 23 corridor is located in Fond du Lac and Sheboygan Counties in east central Wisconsin. The west end of the corridor begins in the city of Fond du Lac and follows through the towns of Empire, Forest, Greenbush, and Plymouth. The east terminus of the corridor is just west of the city of Plymouth. The topography along this section of WIS 23 runs through rolling glacial moraines and drumlins. WIS 23 also crosses two unique glacial features, the Niagara Escarpment on the far west section of WIS 23, rising 300 feet above the lowlands adjacent to Lake Winnebago, and the uplands of the Kettle Moraine State Forest in the Town of Greenbush, which is an interlobate moraine.¹ Elevations range from 800 feet (USGS Datum) near County K in the city of Fond du Lac to 1,170 feet in the **Northern Unit** Kettle Moraine State Forest.

3.2 SOCIOECONOMIC CHARACTERISTICS

A. Population Levels and Trends

Table 3.2-1 lists the population levels and trends for municipalities in the study area. **Three of the four communities are projected to see population growth between 2010 and 2040**, with the city of Fond du Lac accounting **for the majority** of the area's 2010-2030 population growth and the town of **Empire** having the highest anticipated growth rate of **10.6 percent** during this period. **These projections have been updated by WDOA since the publication of the LS SDEIS and are generally lower.**

¹ Interlobate moraines form where two or more ice sheets make direct edge-to-edge contact. At this contact between ice lobes, or at the "interlobate" area, large amounts of glacial debris are deposited, leading to high, hilly landscapes. An escarpment is a steep slope or long cliff that occurs from erosion or faulting and separates two relatively level areas of differing elevations.

Table 3.2-1 Population Trends and Projections

Name of Municipality	Census				Projections				Population Change 2010-2040	Percent Change 2010-2040
	1980	1990	2000	2010	2015	2020	2030	2040		
T. Greenbush	1,665	1,943	2,773	2,565	2,560	2,620	2,705	2,630	65	2.5%
T. Empire	2,359	2,485	2,620	2,797	2,840	2,935	3,105	3,130	333	10.6%
T. Forest	1,098	1,094	1,108	1,080	1,055	1,045	1,020	950	-130	-12.0%
C. Fond du Lac	35,863	37,755	42,203	43,021	43,430	44,510	46,300	45,920	2,899	6.7%

Sources: U.S. Census Bureau, 2010 and 2000; Town of Greenbush Comprehensive Plan; Town of Empire Comprehensive Plan; Population Projections for Wisconsin Municipalities: 2010-2040, Wisconsin Department of Administration 2014.

B. Demographic Characteristics

Table 3.2-2 lists the 2010 demographic statistics for age, race, and ethnicity in the study area as well as Fond du Lac and Sheboygan Counties. As indicated below, the median age in the study area ranges from 36 to 47. Also as indicated below, the city of Fond du Lac has the most diverse population in terms of race and ethnicity.

Table 3.2-2 Demographic Characteristics

Name of Municipality	Median Age	% Pop. Under Age 18	% Pop. Over Age 65	% Minority	% Hispanic/Latino
T. Greenbush	43.2	25.7%	11.5%	2.3%	1.4%
T. Empire	46.7	22.2%	13.6%	2.2%	1.5%
T. Forest	43.4	22.8%	13.5%	1.6%	0.9%
C. Fond du Lac	36.9	22.6%	14.7%	9.4%	6.4%
Fond du Lac County	40.2	22.7%	15.0%	5.9%	4.3%
Sheboygan County	40.3	23.9%	14.6%	10.1%	5.5%

Source: U.S. Census Bureau, 2010.

C. Housing

Table 3.2-3 lists the number of specified owner-occupied housing units for municipalities in the study area. The town of Empire has the highest median home value at \$224,600 while the city of Fond du Lac has the lowest median home value at \$122,400.

Table 3.2-3 Owner-Occupied Housing Units Year 2011

Municipality Name and Type	Total Specified Owner-Occupied Housing Units	Less Than \$50,000	\$50,000 To \$99,999	\$100,000 To \$149,999	\$150,000 To \$199,999	\$200,000 To \$299,999	\$300,000 To \$499,999	\$500,000 To \$999,999	\$1,000,000 Or More	Median Value
T. Greenbush	503	35	32	53	137	118	111	17	0	\$197,600
T. Empire	916	35	19	127	195	251	192	86	11	\$224,600
T. Forest	364	26	20	57	105	112	41	3	0	\$183,800
C. Fond du Lac	10,476	369	2,858	3,991	1,718	1,072	332	84	52	\$122,400

Source: U.S. Census Bureau, 2007-2011 American Community Survey.

D. Incomes

In 2011, the city of Fond du Lac has the lowest median household income at \$43,457 while the town of Empire has the highest median household income at \$85,647. The city of Fond du Lac has the highest poverty rate in the study area, with 10 percent of families and 13 percent of individuals living below the poverty level. Table 3.2-4 shows the percentages of those living below the poverty level for the towns and cities within the study area.

Table 3.2-4 Income and Poverty Statistics for Wisconsin Counties And Municipalities 2011

Municipality	Per Capita Income	Median Income		Percentage of Families and People whose Income in the Past 12 Months was Below the Poverty Level	
		Households	Families	Percent of Persons Below Poverty	Percent of Families Below Poverty
T. Greenbush	\$18,518	\$69,063	\$80,000	6.0%	5.3%
T. Empire	\$36,513	\$85,647	\$91,382	4.1%	1.8%
T. Forest	\$27,944	\$65,139	\$70,089	3.1%	0.9%
C. Fond du Lac	\$23,709	\$43,457	\$57,487	13.1%	10.0%

Source: U.S. Census Bureau, 2007-2011 American Community Survey.

* Poverty Status was determined for all persons except institutionalized persons, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old. These groups also were excluded from the denominator when calculating poverty rates.

E. Tax Base

Combined, Sheboygan and Fond du Lac counties employ more than 30,000 workers in the manufacturing industry. The largest employers in each county are manufacturers (see Tables 3.2-5 and 3.2-6). Two of the largest employers in Sheboygan County include Kohler Company and Bemis Manufacturing Company. Two of the largest employers in Fond du Lac County include Brunswick Corporation and Alliance Laundry Systems. The manufacturing industry in both counties also produces the highest sales in the respective counties (see Tables 3.2-7 and 3.2-8). In 2007, the manufacturing industry in Fond du Lac County produced \$2.9 billion in sales, receipts, or shipments while Sheboygan County produced \$6.1 billion in sales, receipts, or shipments. Figure 3.2-1 shows the percentage of Wisconsin workers employed in manufacturing by county. Both Fond du Lac and Sheboygan counties have a high number of workers in the manufacturing industry.

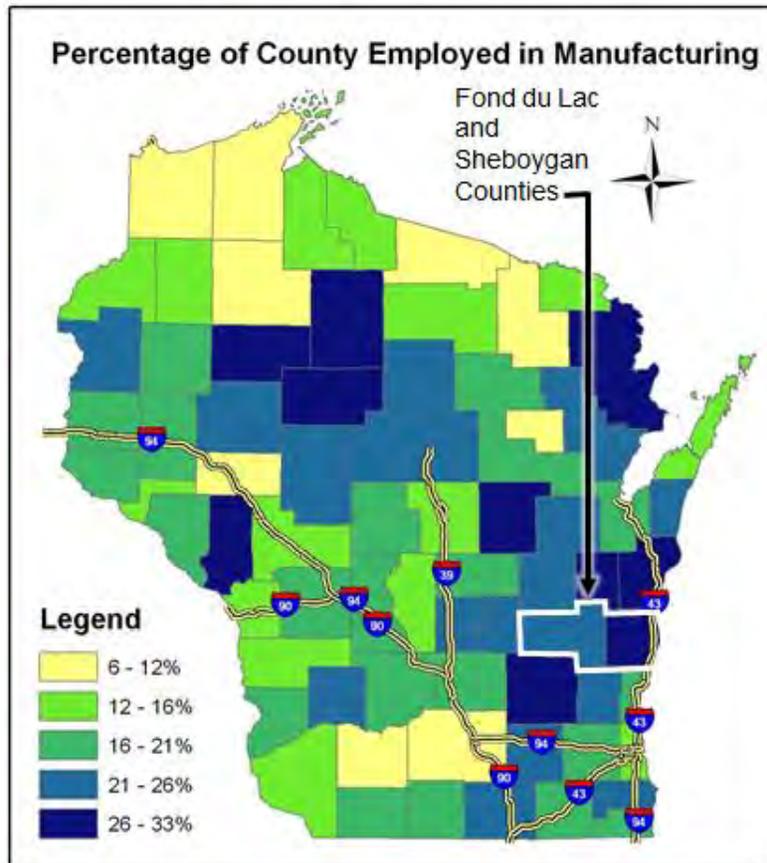


Figure 3.2-1 Percentage of County Employed in Manufacturing

Source: U.S. Census Bureau, 2007-2011 American Community Survey.

Table 3.2-5 Wisconsin Labor Market Information—Sheboygan County

Sheboygan County—Top 5 Employers			
Rank	Employer Legal Name	Product or Service	Employment Size Range
1	Kohler Co	Enameled iron and metal sanitary ware	1000+
2	Sheboygan Public School	Elementary and secondary schools	1000+
3	Bemis Mfg. Co	Plastic products	1000+
4	J L French LLC.	Human Resources	500-999
5	Sargento Foods	Cheese Manufacturing	500-999

Source: Wisconsin Large Employer County Summary, Second Quarter 2013, Wisconsin WORKnet

Table 3.2-6 Wisconsin Labor Market Information—Fond du Lac County

Fond du Lac County— Top 5 Employers			
Rank	Employer Legal Name	Product or Service	Employment Size Range
1	Brunswick Corp	Internal combustion engines	1000+
2	Agnesian Healthcare Inc.	Healthcare	1000+
3	Alliance Laundry Systems	Laundry machines	1000+
4	Fond du Lac School District	Elementary and secondary schools	1000+
5	County of Fond du Lac	Executive and legislative offices	500-999

Source: Wisconsin Large Employer County Summary, Second Quarter 2013, Wisconsin WORKnet

Table 3.2-7 2007 Economic Census: Summary Statistics for Fond du Lac County, WI

Description	Establishments	Sales, Receipts or Shipments (\$1,000)	Annual Payroll (\$1,000)	Paid Employees
Mining (npfc)	NA	NA	NA	NA
Utilities (npfc)	NA	NA	NA	NA
Construction (npfc)	NA	NA	NA	NA
Manufacturing	151	2,903,240	392,312	9,745
Wholesale Trade	104	993,646	59,467	1,330
Retail Trade	407	1,277,658	118,270	5,999
Transportation and Warehousing (npfc)	NA	NA	NA	NA
Information (npfc)	40	NA	33,733	942
Finance and Insurance (npfc)	NA	NA	NA	NA
Real Estate and Rental and Leasing	77	34,308	5,335	305
Professional, Scientific, and Technical Services	157	101,892	65,387	1,320
Management of Companies and Enterprises (npfc)	NA	NA	NA	NA
Administrative and Support and Waste Management and Remediation Services	95	80,190	41,148	1,621
Educational Services	11	2,247	674	56
Health Care and Social Assistance	266	607,247	223,919	6,180
Arts, Entertainment and Recreation	39	23,055	5,406	445
Accommodation and Food Services	242	131,511	37,473	4,001
Other Services (except public admin.)	193	88,351	24,422	1,206

npfc = Not available for counties; NA = Not available

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

Table 3.2-8 2007 Economic Census: Summary Statistics for Sheboygan County, WI

Description	Establishments	Sales, Receipts or Shipments (\$1,000)	Annual Payroll (\$1,000)	Paid Employees
Mining (npfc)	NA	NA	NA	NA
Utilities (npfc)	NA	NA	NA	NA
Construction (npfc)	NA	NA	NA	NA
Manufacturing	246	6,126,057	815,955	18,774
Wholesale Trade	88	503,477	58,061	1,206
Retail Trade	427	1,398,661	131,455	6,386
Transportation and Warehousing (npfc)	NA	NA	NA	NA
Information (npfc)	29	NA	10,339	331
Finance and Insurance (npfc)	NA	NA	NA	NA
Real Estate and Rental and Leasing	80	73,804	12,099	372
Professional, Scientific, and Technical Services	176	209,104	70,488	1,743
Management of Companies and Enterprises (npfc)	NA	NA	NA	NA
Administrative and Support and Waste Management and Remediation Services	106	85,571	44,884	2,580
Educational Services	15	3,158	832	69
Health Care and Social Assistance	292	501,440	242,662	6,709
Arts, Entertainment and Recreation	57	72,443	17,284	1,361
Accommodation and Food Services	271	193,012	54,848	4,869
Other Services (except public admin.)	217	76,814	20,155	1,093

npfc = Not available for counties; NA = not available

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

F. Workforces and Occupations

The manufacturing sector and education, health, and social services sectors employ the majority of residents in the study area. Table 3.2-9 presents the number employed in these fields for governments within the WIS 23 study area.

Table 3.2-9 Percent of Residents Employed by Industry Year 2011

	Manufacturing	Education, Health, Soc. Serv.
Town of Forest	23.6%	17.3%
Town of Empire	24.8%	19.0%
Town of Greenbush	28.2%	13.8%
city of Fond du Lac	22.1%	20.7%

Source: U.S. Census Bureau, 2007-2011 American Community Survey.

3.3 LAND USE AND RELATED CHARACTERISTICS

A. Residential

Residential development is sparsely scattered throughout the study area, with slightly greater numbers located close to the existing WIS 23 corridor. Residential development is also concentrated in the community of Greenbush and the western portion of the study area near the city of Fond du Lac. Individual residences are intermixed with farm residences throughout the study area.

B. Commercial/Industrial

Only minor industrial development exists adjacent to the corridor area. Commercial development is sparsely scattered along WIS 23.

C. Area Communities

The unincorporated community of Greenbush and a portion of the city of Fond du Lac are located in the project study area. See Figure 3.3-1 for the location of these communities.



Figure 3.3-1 Area Communities

D. Public Lands

Public lands are located throughout the project area. The Northern Unit of the Kettle Moraine State Forest is located at the east end of the project area. It is a 27,725-acre forest stretching across Sheboygan, Fond du Lac, and Washington counties. The Ice Age National Scenic Trail (IAT) and the State Equestrian Trail are located within the Northern Unit of the Kettle Moraine State Forest. These trails cross existing WIS 23 at Julie Court and are Section 4(f) resources². In the 2010 FEIS the Kettle Moraine State Forest was not considered a Section 4(f) resource. FHWA has since determined that the forest is a Section 4(f) resource. See Section 5 for more information regarding the Ice Age Trail, the State Equestrian Trail, and the Northern Unit of the Kettle Moraine State Forest.

The Old Wade House State Park is located in the east portion of the corridor near Plymouth and just west of the Kettle Moraine State Forest. Located on the south side of WIS 23, the site is run by the State Historical Society and is a living history portrayal of a restored stagecoach inn built around 1850. The Old Plank Road Trail runs along the south side of WIS 23 from the city of Plymouth to Greenbush and is within the WisDOT right of way. The Park contains three structures listed on the National Register of Historic Places (See Section 5). It is a Section 4(f) resource.

More distant to the corridor, the Sheboygan Marsh County Park and the Sheboygan Marsh State Wildlife Area are located 2 miles north of WIS 23 on the east end of the corridor near County T. The wildlife area contains the largest restored wetland in the Wisconsin watersheds of Lakes Michigan and Superior. It encompasses over half of the towns of Russell and Greenbush and includes about 14,000 acres of land and surface water; 8,166 acres are publicly owned, of which 7,414 acres are owned by Sheboygan County (including the County's Broughton Park) and 752 acres are owned by the state.

The Mullet Marsh and Mullet River State Wildlife Area are 1 mile south of the corridor near Hillview Road. It is a 2,217-acre property. Mullet Creek flows through the entire property eventually joining the Sheboygan River.

Local snowmobile trails are found on private and public lands throughout the study corridor.

² Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. The law, now codified in 49 U.S.C. §303 and 23 U.S.C. §138, is implemented by the Federal Highway Administration (FHWA) through the regulation 23 CFR 774.



Figure 3.3-2 Public Use Lands

E. Agriculture

The majority of land in the project study area is nonirrigated cropland. Fond du Lac County has a slightly larger agricultural base, while Sheboygan County has less because of the publically owned lands and urban areas. According to the 2007 Agricultural Census, Fond du Lac County has 280,000 acres of crop land and Sheboygan County has 157,000 acres of cropland. Corn for grain is the primary crop for Fond du Lac County (13.3 million bushels) with soybeans following (1.9 million bushels). Corn for grain is also the primary crop for Sheboygan County (6.1 million bushels) followed by soybeans (1.1 million bushels). Figures from the UW Extension indicate that in 2007, Fond du Lac County's top commodities by sales were milk (\$192 million), grain (\$54 million), and cattle and calves (\$24 million). Sheboygan County's top commodities include milk (\$104 million), grains (\$26 million), and other animals and products (\$14 million). Both counties rely on dairy and dairy processing, providing 4,526 jobs in Fond du Lac County and 4,669 jobs in Sheboygan County. Farmers manage 73 percent of the land in Fond du Lac County and 59 percent of the land in Sheboygan County.

Farm operations are scattered throughout the corridor. Details on agricultural land impacts can be found in Section 4.6 A-3 of this report and the Executive Summary of the Agricultural Impact Statement (AIS) provided as Appendix K of the 2010 FEIS.

F. Institutions

The Fond du Lac School District, the Campbellsport School District, the Elkhart Lake-Glenbeulah School District, and the Plymouth District serve the project study area. All school districts use school buses. St. Mary's Springs High School (private) is located at the intersection of County K and WIS 23, and St. Paul's Church and School (private) are located at County W and WIS 23.

The project area is served by the Moraine Park Technical College, the UW Extension-Fond du Lac County, and the UW-Fond du Lac campuses on the northeast side of the city of Fond du Lac, approximately 1 mile west of the project limits. Marian College is also located within 2 miles of the project limits in Fond du Lac.

St. Agnes Hospital in Fond du Lac and the Valley View Medical Center in Plymouth serve the project study area.

Kettle Moraine Correctional Institution for adult males is located adjacent to Kettle Moraine State Forest in Sheboygan County approximately 10 miles west of the city of Plymouth and 17 miles southeast of Fond du Lac. The Taycheedah Correctional Institution in Fond du Lac is located on County K and is about 2 miles north of WIS 23.

G. Cemeteries

Forest Home Cemetery, Forest Cemetery, and Greenbush Cemetery are near existing WIS 23, located about 1,000, 1,500, and 2,000 feet from the highway, respectively. Forest Home Cemetery is north of WIS 23 on Hillview Road in Fond du Lac County. Forest Cemetery is located south of WIS 23 just north of Poplar Road, west of County W. Greenbush Cemetery is south of WIS 23 between Plank Road and Cemetery Lane in Sheboygan County.

H. Planning and Zoning

Municipalities in the project study area share a common goal—agricultural preservation. The towns of Forest, Empire, and Greenbush **adopted** comprehensive plans that list agricultural preservation as a goal. The Sheboygan County University of Wisconsin-Extension Office in cooperation with the town of Greenbush long-range planning committee and the Greenbush town board prepared a document titled *Town of Greenbush, Long Range Planning Program Report of Trends, Survey Results and Recommendations*. The report indicated the town of Greenbush residents (69.6 percent of 167 survey responses) agree that the town government should develop agricultural land preservation as a priority goal and implement policies to achieve it.

Farmland preservation is also a common goal for Sheboygan and Fond du Lac counties. Each county has a farmland preservation plan as well as a recreation plan.

The Fond du Lac County recreation plan includes a recommendation for the provision of a trail facility along WIS 23.

The following municipalities **adopted** comprehensive plans:

- Town of Forest
- Town of Empire
- City of Fond du Lac
- City of Plymouth
- Town of Greenbush
- Village of Glenbeulah

Future Land Use maps **were** included in Appendix H of the 2010 FEIS. Because of its proximity to the city of Fond du Lac urbanized area, the town of Empire faces more development pressure than the other towns in the project study area. A cooperative boundary agreement exists between the town of Empire and city of Fond du Lac. The city's growth area boundary extends just east of County UU. Residential subdivisions will likely occur in **this** growth area north and south of WIS 23. The rolling terrain also makes this area attractive for residential development.

Below is a list of municipal and county land use-related and zoning ordinances within the project study area.

- Town of Forest—Zoning ordinance.
- Town of Empire—Land division and zoning ordinances.
- City of Fond du Lac—Subdivision ordinance, zoning ordinance, floodplain zoning ordinance.
- Fond du Lac County—Subdivision (land division) ordinance, sanitary ordinance, shore land and flood ordinances, nonmetallic mining ordinance, traffic ordinance, and waterways ordinance.
- **Town of Greenbush—Zoning ordinance.**
- **Sheboygan County—Subdivision (land division) ordinance, sanitary ordinance, shoreland floodplain ordinance, and nonmetallic mining ordinance.**

I. Land Use Patterns

Existing land use in the study area is shown in Figures 3.3-3 through 3.3-5. Most of the land in the study area is nonirrigated cropland.

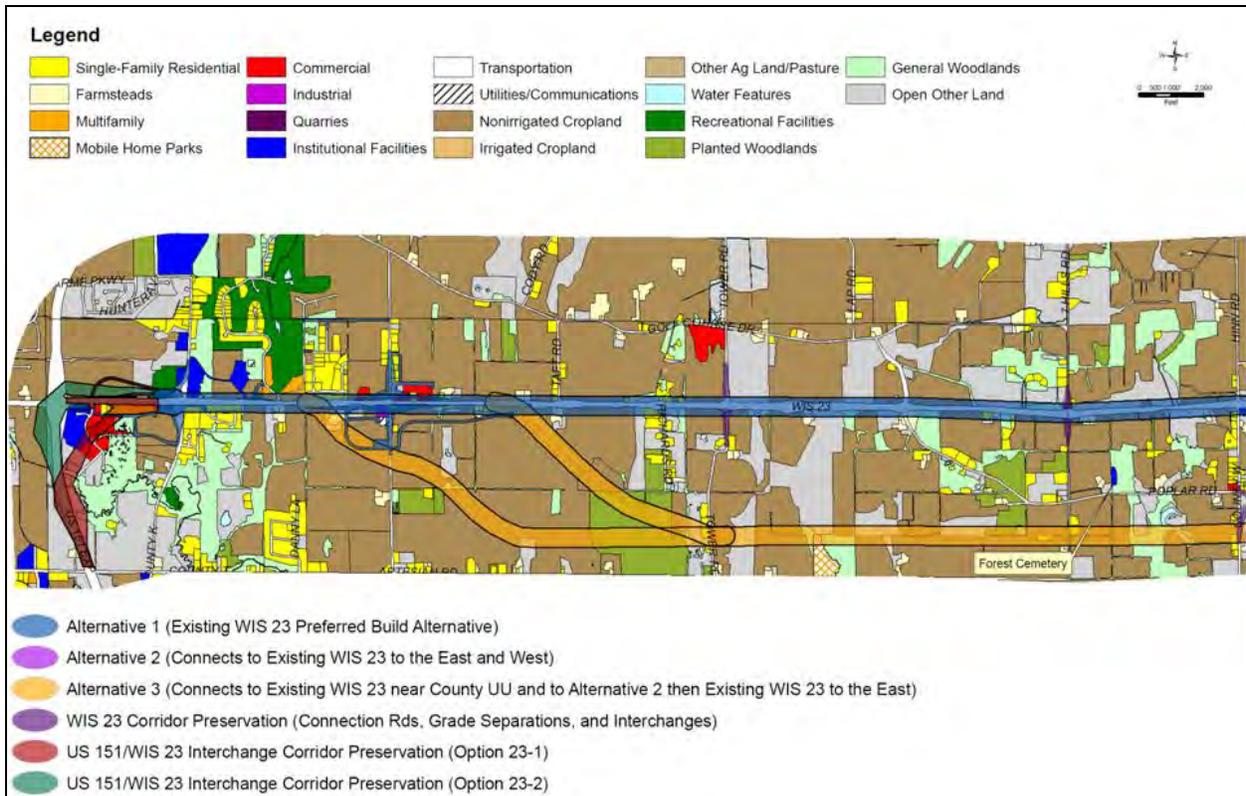


Figure 3.3-3 WIS 23 Existing Land Use-West Section

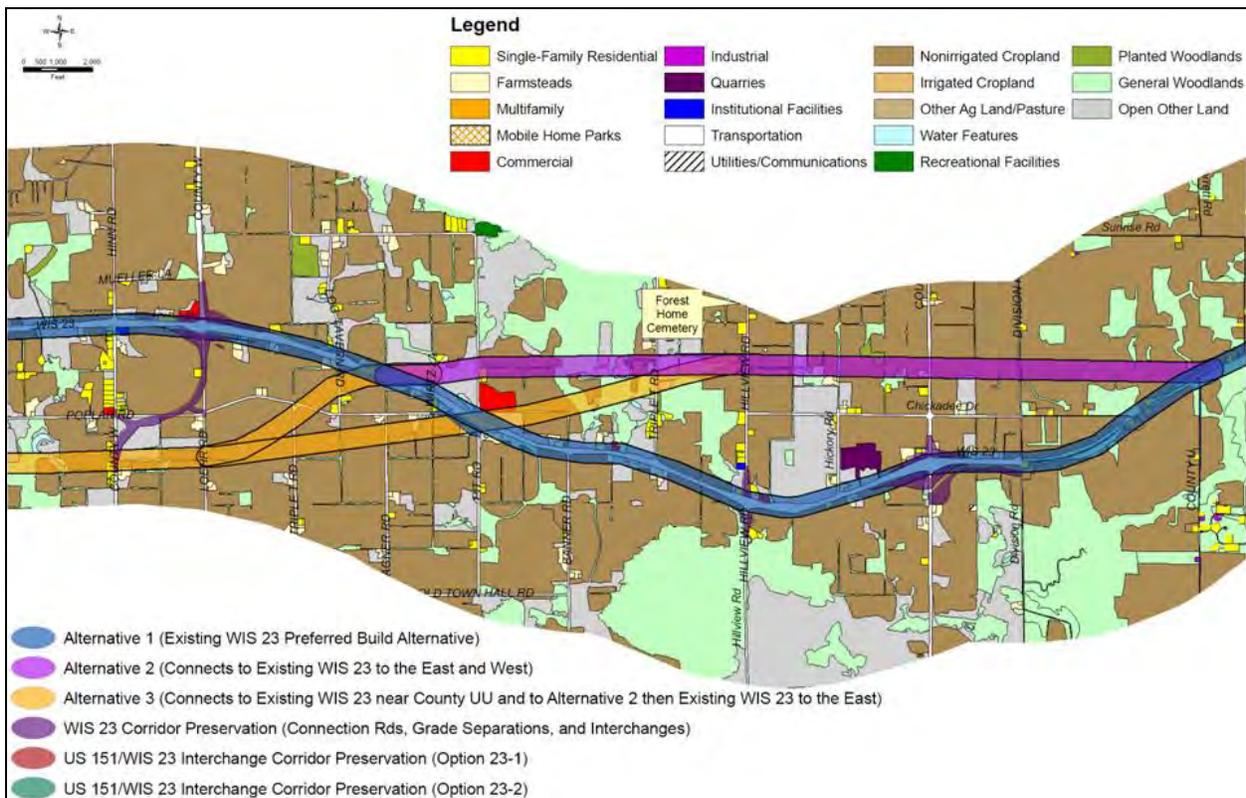


Figure 3.3-4 WIS 23 Existing Land Use-Middle Section

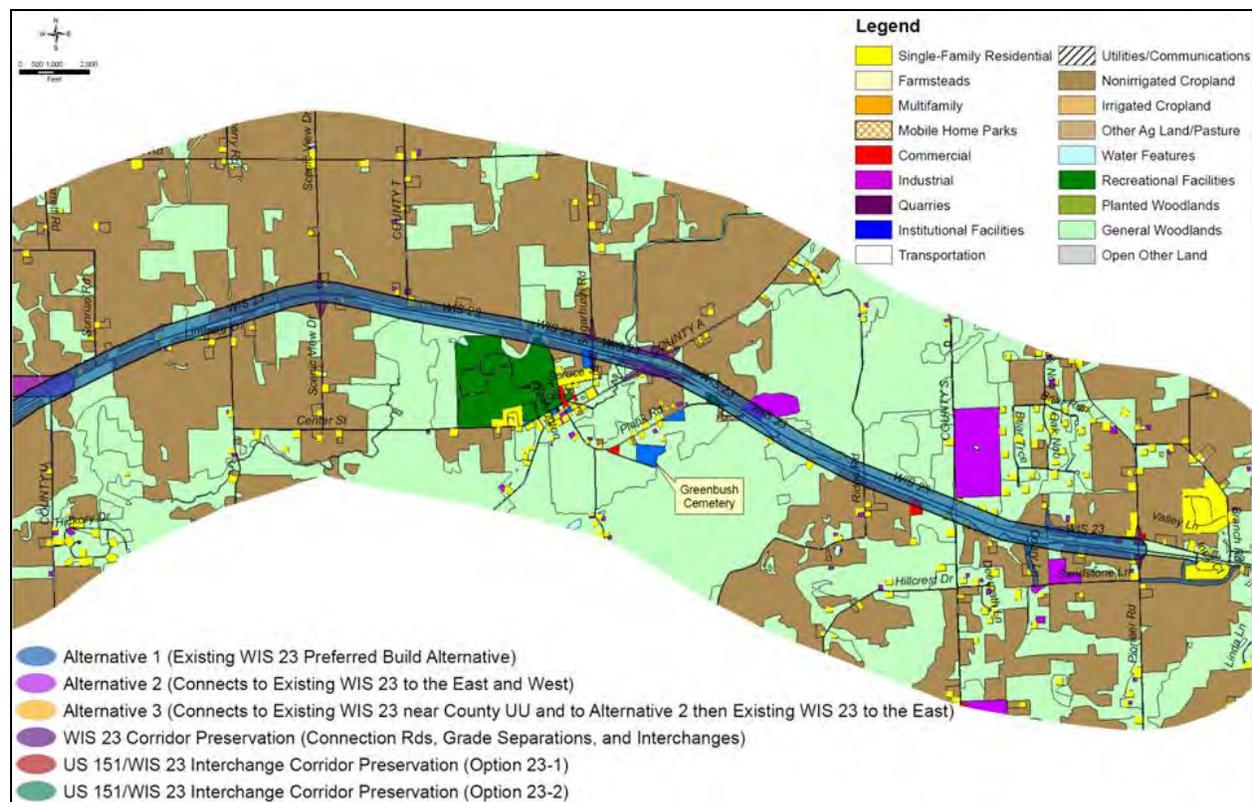


Figure 3.3-5 WIS 23 Existing Land Use-East Section

J. Emergency Service

The county sheriffs in Fond du Lac and Sheboygan counties provide police protection in most of the project area. Mt. Calvary provides fire protection from County UU to Hillview Road and ambulance service from County UU to the county line with County W as a main route. St. Cloud provides fire service from Hillview Road to the county line with County G as a main route. The city of Fond du Lac ambulance services portions of WIS 23 between County K and County UU. Some portions are covered by the town of Eden fire department. The Sheboygan County portion is covered by the Greenbush fire department and Plymouth ambulance service. **The Greenbush fire department has a station on the corner of WIS 23 and Sugarbush Road.**

K. Utilities

Underground and overhead utilities are located throughout the project corridor. The utilities summarized in this section include electrical, phone, cable, gas, sewer, and water lines. Utility poles are located along WIS 23 as follows:

- From US 151 to Whispering Springs Drive, poles are on the north side. Also, from US 151 to County W south, poles are on the south side of WIS 23.
- From County W south to County W north, the poles are on the north side of WIS 23.
- From County W north to Triple T Road, the poles are on the south side of WIS 23.
- At Hickory Road, there are four poles to the north and two poles to the south.
- From County G east to County U, the poles are located on the south side of WIS 23.
- From County U to Sugarbush Road, the poles are located on the north side of WIS 23.
- From Sugarbush Road to the eastern termini, the poles are located on the south side of WIS 23.

The following paragraphs summarize which utilities are affected in different portions of the corridor.

US 151 to Taft Road

Alliant/Wisconsin Power & Light (WPL) has 78 poles along this segment of WIS 23 and 8,730 linear feet (LF) of gas pipeline. American Transmission Company (ATC) has 17 poles, some of which are transmission towers. AT&T has 12,970 LF of underground lines and 14,280 LF of fiber-optic line,

Charter has 250 LF of underground lines and 6,360 LF of overhead lines, and the Mary Hill Park Sanitary District has one well and 750 LF of underground lines.

The city of Fond du Lac has sewer lines parallel to WIS 23, eastward toward County UU. The city plans to provide both sewer and water to County UU on both sides of WIS 23.

Taft Road to Division Road

Alliant/WPL has 213 poles along this segment of WIS 23 and 400 LF of gas pipeline. AT&T has 6,050 LF of overhead lines, 40,915 LF of underground lines, and 10,280 LF of fiber-optic line.

Division Road to Pioneer Road

We Energies has 116 poles along this segment of WIS 23 and 995 LF of underground line. ANR Pipeline has 310 LF of underground pipeline, and Kettle Moraine has 400 LF of underground line. Plymouth Utilities has 13 poles and 150 LF of underground line while Time Warner Cable has 5 poles and 475 LF of underground line. West Shore and WPS have 125 LF and 1,100 LF of underground line, respectively. Verizon has 17,645 LF of underground line and 18,375 LF of underground fiber-optic line.

Additionally, Verizon Communications lines cross WIS 23 and run parallel to the highway within the Sheboygan County portion of the corridor. Time Warner has lines that cross WIS 23 in several places but do not run parallel to the highway.

L. Transportation

WIS 23 is the only major highway serving the corridor study area. The western terminus of this project is bounded by the US 151 Fond du Lac Bypass. Several other US and state highways intersect WIS 23 within 5 miles of either end of the project area. These include US 41, US 45, and WIS 175 in Fond du Lac and WIS 57 and WIS 67 in Plymouth. In addition, access to I-43 is about 10 miles east of Plymouth.

County highways in the corridor are important to the local transportation network. County K, County UU, County W, and County G in Fond du Lac County and County T, County A, County S, and County P in Sheboygan County all intersect WIS 23 and serve mostly north and south traffic movements. They are classified as major collectors.

There is no rail service in the area of WIS 23. Fond du Lac County Airport is approximately 5 miles west of the project, and the Sheboygan Country Memorial Airport is approximately 9 miles east of the project. There are no regularly scheduled bus routes on WIS 23 between the city of Fond du Lac and the city of Sheboygan.

3.4 NATURAL ENVIRONMENT AND RELATED RESOURCES

A. Natural and Conservancy Areas

Designated Natural Areas, as defined by the Wisconsin Natural Areas Preservation Council, are tracts of land or water so little modified by man's activity or sufficiently recovered from the effects of such activity that they contain intact native plant and animal communities believed to be representative of the pre-settlement landscape. Designated Natural Areas are those officially listed by the WDNR and the Preservation Council (available on line at: <http://dnr.wi.gov/>). There are no Designated Natural Areas adjacent to WIS 23.

B. Surface Water and Fishery

There are four watershed areas that are found within the study area: the eastern Lake Winnebago Watershed, the Onion River Watershed, the Sheboygan River Watershed, and the Mullet River Watershed. Taycheedah Creek flows into Lake Winnebago. The Mullet River and Onion River watersheds flow into the Sheboygan River. The Sheboygan River flows into Lake Michigan. There are three stream/river crossings along the corridor, the Sheboygan River, a tributary to the Sheboygan River, and the Mullet River. Taycheedah Creek also crosses US 151 near its junction with WIS 23 and would be

affected by some of the corridor preservation options being considered for this connection. The following paragraphs describe the watersheds feeding these waterways.

1. Eastern Lake Winnebago Watershed

Taycheedah Creek drains a small area of the eastern Lake Winnebago Watershed, within the northwest quarter of the Town of Empire (see Figure 3.4-1). There are no crossings of the WIS 23 corridor study area, but it does cross US 151 near the US 151/WIS 23 connection. Additionally, WisDOT has a wetland mitigation bank on the west side of US 151 on Taycheedah Creek (see section 3.4E for a discussion on wetlands).

2. Onion River Watershed

The Onion River drains 99 square miles of the southernmost portion of the Sheboygan River Basin tributary to the Sheboygan River (see Figure 3.4-2). The junction of Ben Nutt Creek and Mill Creek in the Kettle Moraine region, west and southwest of the city of Plymouth, forms the river. The Onion River flows southerly for more than half of its length and then turns northward and flows into the Sheboygan River in the city of Sheboygan Falls. The northernmost region of this watershed crosses WIS 23.

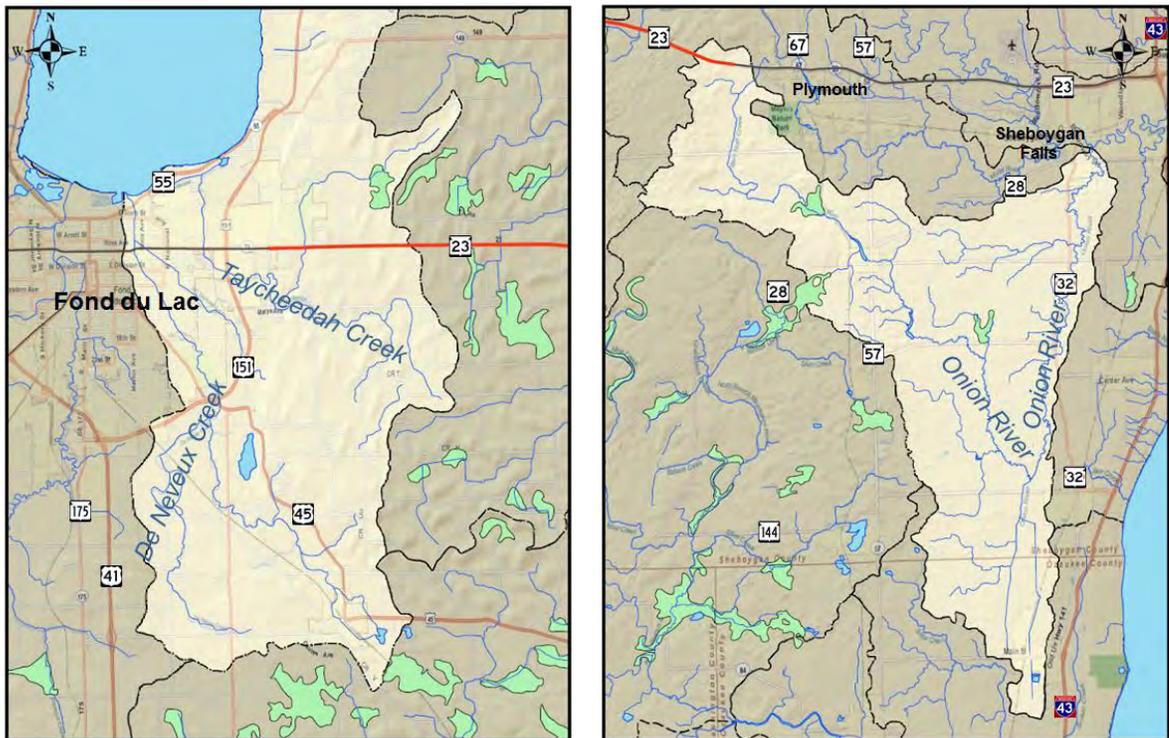


Figure 3.4-1 Eastern Lake Winnebago Watershed Figure 3.4-2 Onion River Watershed

Source: WDNR Watershed maps

3. Sheboygan River Watershed

There is one major crossing of the Sheboygan River Watershed with the corridor study area. This reach of the Sheboygan River Segment 5 originates at the headwaters and terminates 12.7 miles downstream at County W. The waterway supports warm water sport fish such as northern pike, sunfish, yellow perch, and bullheads and tolerant forage fish species such as shiners, white suckers, and creek chubs. Water quality is somewhat degraded by sedimentation, excess nutrients, and loss of habitat. A portion of the Sheboygan River is on the draft 2011 303(d) List of Impaired Waters because of contaminated sediments. River mile 0 to 13.58 is on the draft 2011 303(d) list because of PCB-contaminated sediments and river mile 13.58 to 33.91 is on the delist status. These segments are not in the corridor study area.

This segment is classified as supporting a warm water sport fish community. Habitat and water

quality currently support an assemblage of tolerant forage and warm water game fish. Representative sport fish consist primarily of northern pike, sunfish, yellow perch, and bullheads. Common forage species include shiners, white suckers, and creek chub. A tributary to the Sheboygan River, Feldner's Creek, begins about 2 miles north of WIS 23 and flows north. The creek is a spring-fed Class II trout stream. Water quality in the upper reach of Feldner's Creek is very good, with gravel spawning areas for brook trout, intolerant forage fish, and warm water sport fish. See Figure 3.4-3 for a diagram of the Sheboygan River Watershed.

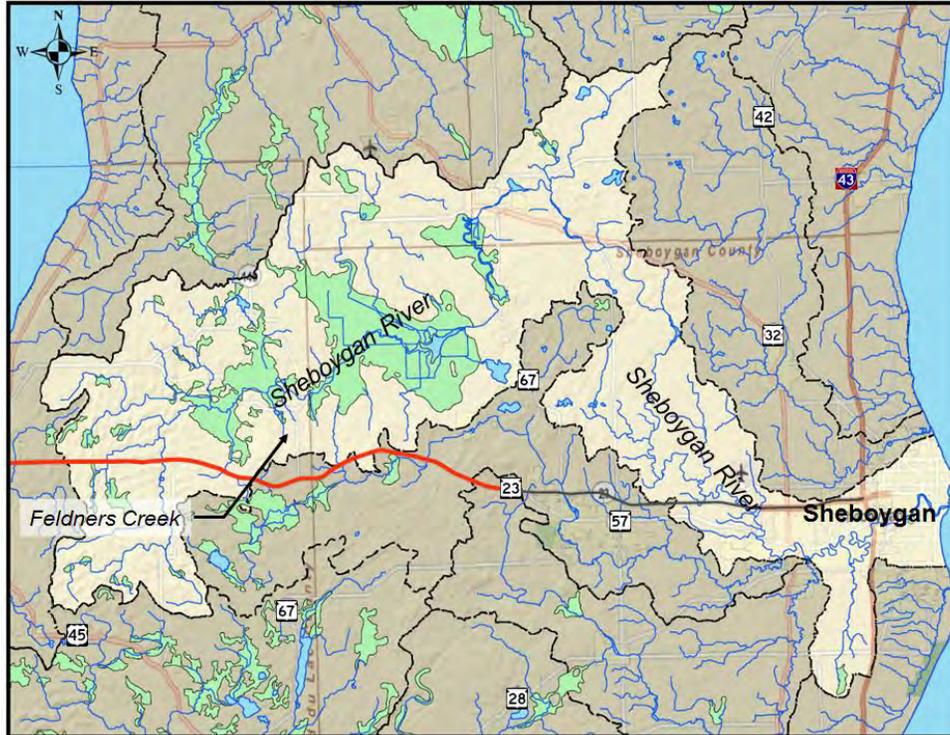


Figure 3.4-3 Sheboygan River Watershed

Source: WDNR Watershed maps

4. Mullet River Watershed

The Mullet River originates from the outflow of Mullet Lake and the Mullet River State Wildlife Area in Fond du Lac County and flows in an easterly direction for approximately 40 miles to its confluence with the Sheboygan River in the town of Sheboygan Falls, 17 miles upstream of Lake Michigan. See Figure 3.4-4 for a diagram of the Mullet River Watershed. The water quality of the Mullet River is considered good from its headwaters to the city of Plymouth. The middle of the river, from the city of Plymouth to the village of Glenbeulah, has an increase in spring flow that lowers stream water temperatures and is classified as a Cold Water Community stream (trout). Upstream of Glenbeulah and downstream of WIS 67 near the city of Plymouth, the Mullet River is classified as a Warm Water Sport Fish Community stream. The Mullet River is unique in that it flows from the warm water headwaters into a cold water segment. All the other major tributaries in the Sheboygan Basin, including the Sheboygan and Onion Rivers, originate as cold water streams and change over to warm water farther downstream. The river segment that flows through the Kettle Moraine State Forest Northern Unit, the Mullet Creek State Wildlife Area, and the Old Wade House State Park is located within the warm water sport fish community segment. WIS 23 crosses the Mullet River once near the town of Greenbush.

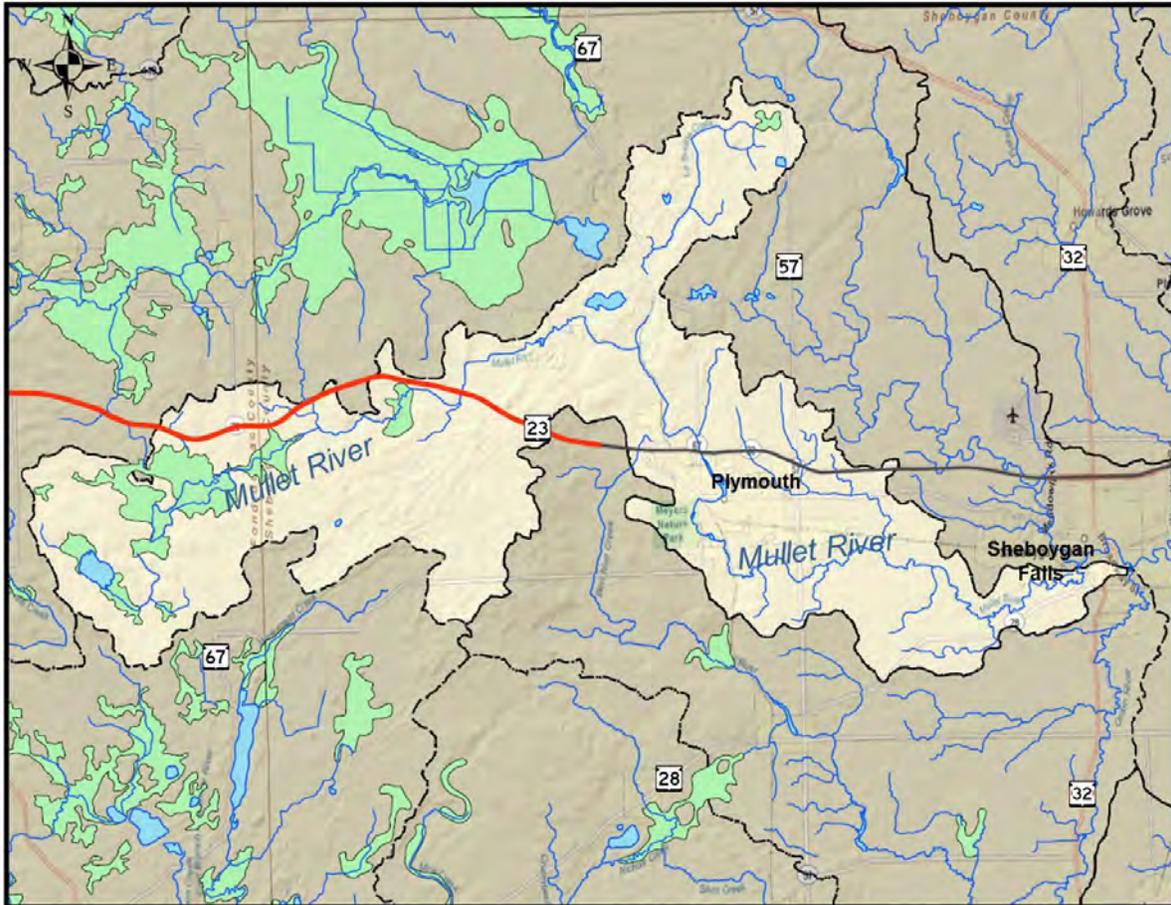


Figure 3.4-4 Mullet River Watershed

Source: WDNR Watershed maps

C. Floodplains

River crossings along WIS 23 with designated 100-year floodplains that provide several ecosystem functions include the Sheboygan and Mullet Rivers. The Corridor Preservation interchange proposals at US 151/WIS 23 **are in the area of** the 100-year floodplain of Taycheedah Creek.

D. Groundwater and Water Supply

Groundwater comes from natural underground reservoirs, or aquifers. There are three main aquifer types: sand and gravel glacial drift aquifer (shallow system), the dolomite aquifer (shallow system), and the sandstone aquifer (deep artesian system). The depths of the aquifers vary throughout the study area. Groundwater used domestically within the project corridor is supplied from the sand and gravel aquifer consisting of permeable sediments of unconsolidated glacial deposits. Depth to groundwater varies with land surface characteristics. Drinking water in the study area is supplied by private wells.

E. Wetlands

Along the corridor in Sheboygan County, **high quality wetlands** are concentrated south of WIS 23 in the vicinity of the Kettle Moraine State Forest, Old Wade House Historic Site, and along the Mullet River. Similarly in Fond du Lac County, high quality wetlands occur in the following areas:

North of WIS 23 between Pit Road and Triple T Road	–Mixed hardwood and cedar swamp
At the Sheboygan River area crossing WIS 23	–Riparian emergent wet meadow
South of WIS 23 near Division Road	–Shrub swamp
South of WIS 23 adjacent to Hillview Road	–Mullet Creek Wildlife Area, mixed hardwoods and emergent wet meadow

There is one wetland mitigation site in the southwest quadrant of the US 151/WIS 23 interchange, the Taycheedah Creek Wetland Mitigation Site. There are also two wetland mitigation sites adjacent to the WIS 23 corridor, the Pit Road Wetland Mitigation Site, and the Old Wade House Wetland Enhancement and Mitigation Site.

The Taycheedah Creek Wetland Mitigation Site is a wetland mitigation bank site constructed by WisDOT's Southeast Region to offset wetland losses incurred for the US 151 Fond du Lac Bypass project. The restoration involved the acquisition of approximately 17 acres of agricultural land that was graded to create restored wetlands and wildlife habitat. In addition to the wildlife ponds are three finger-shaped channels designed for northern pike spawning habitat. Each channel is designed as part of the riparian ecosystem and is interdependent on the abutting Taycheedah Creek. In addition to the function of wildlife habitat, the mitigation also provides additional flood storage capacity within the immediate watershed during melting and rain events when the creek is flashy and reaches bankful. The ponds account for approximately 1 acre, the shallow marsh pike channels 1.7 acres, wet meadow seeding zones 11.3 acres, and an additional 2.5 acres of upland buffer. Vegetative buffers help protect the integrity of the restoration wetlands. The floristic quality of the mitigation site is high with minimal invasive species. Planted rootstock and native seeding are evident throughout the site and are becoming more dominant. The Army Corps of Engineers (USACE) required protective covenants that are now standard for mitigation sites. The site was a condition for the US 151 project's individual 404 permit. Figure 3.4-5 shows an aerial photograph of the site.



Figure 3.4-5 Taycheedah Creek Wetland Mitigation Site

The Pit Road Wetland Mitigation Site north of WIS 23 at Pit Road was created to offset wetland losses from previous WIS 23 highway projects. WisDOT constructed this 3.6-acre site to mitigate 2.48 acres of wetland losses for WIS 23 between Fond du Lac and Sheboygan around 1990. The site is located in the northwest quadrant of WIS 23 and Pit Road. There are no known protective “covenants” or conservation easements on the lands. During preliminary design, agencies and WisDOT agreed to avoid wetland losses to the site. Figure 3.4-6 shows an aerial photograph of the site.



Figure 3.4-6 Pit Road Wetland Mitigation Site

The Old Wade House Wetland Enhancement and Mitigation Site was created during the Robinson Herring Sawmill and Dam restoration project. The USACE issued a permit allowing for wetland mitigation and enhancement south of WIS 23 as a result of the wetland impacts of that project. To date, coordination with state (SHS/WDNR) and federal agencies (USACE) has not identified “covenants” or permit conditions placed on existing mitigation lands. Figure 3.4-7 shows an aerial photograph of the site.

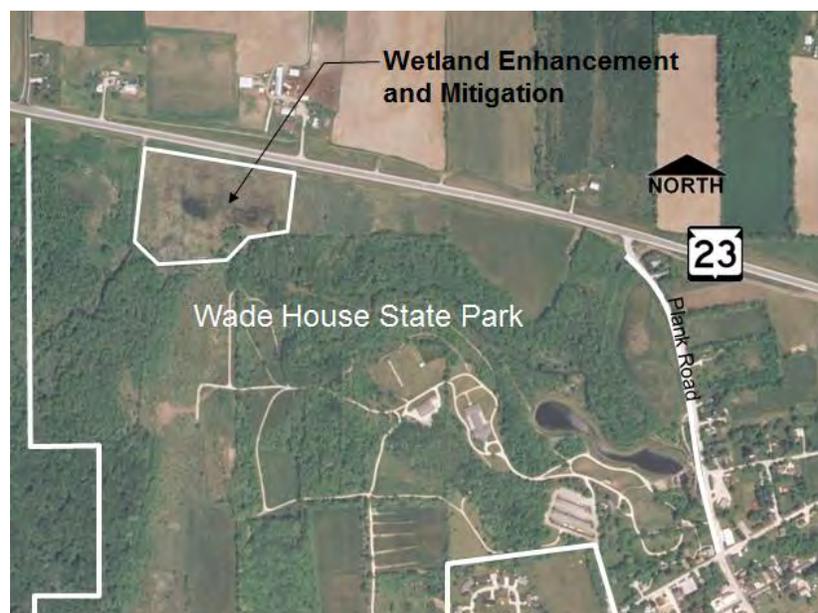


Figure 3.4-7 Old Wade House Enhancement and Wetland Mitigation Site

F. Uplands

Upland areas in the corridor are predominantly found in the Kettle Moraine region in Sheboygan County and the Niagara Escarpment in Fond du Lac County. Between these two features is an undulating region made up of outwash plains, moraines, and drumlins. A large ridge rises up in the central area of the project corridor that provides a good habitat for a variety of plants and wildlife. The vegetated uplands along the corridor include the dominant tree species of sugar maple, basswood elm, red oak, white oak, and black oak. Common ground plants are sweet cicely, mayapple, wild leek, wild geranium, and false Solomon's seal. Other less common plants found are black spruce, tamarack, white cedar, and hemlock. Native vegetation of these areas supports a variety of deciduous forest, forest-edge, and riparian species.

G. Wildlife

The mix of wetlands, upland woods, and nontilled farmland provides habitat for a variety of wildlife species. White-tailed deer, raccoon, striped skunk, turkey, squirrel, and grouse are common in forest and forest-edge habitats. Open areas support populations of rabbit, coyote, and a variety of small rodents, as well as songbirds and raptors. Aquatic mammals, turtles, freshwater mussels, migratory waterfowl, and a variety of fish are present in the river and wetland settings in the region.

H. Endangered or Threatened Species

The rare species data provided by state (WDNR) and federal (USFWS) agencies do not provide direct location of the rare species to protect from disturbance or collection. Publically available WDNR rare species data (Natural Heritage Inventory Data - NHI) is provided at the township level for occurrences (i.e., if a species is located in one or multiple sections in a 36-square-mile township, it is reported only according to the township). USFWS endangered species data is provided at the county level.

WIS 23 crosses through Empire, Forest, Greenbush, and Plymouth townships in Fond du Lac and Sheboygan counties. Table 3.4-1 shows the number of rare species occurrences by township. More rare species occur in Greenbush and Plymouth because of the Northern Unit of the Kettle Moraine Forest.

Table 3.4-1 Rare Species Occurrences

Township	Town	Range	Plants	Terrestrial Animals	Aquatic Animals	Total Rare Species per Town
Empire	15N	18E	1	--	--	1
Forest	15N	19E	--	2	--	2
Greenbush	15N	20E	1	6	3	10
Plymouth	15N	21E	3	3	2	8
Data obtained from WDNR on-line Natural Heritage Inventory (NHI 02/17/14)						

Various project-specific surveys and investigations have occurred to identify specific rare species that could be impacted by the project. At the Mullet River crossing, WDNR performed a wading survey that identified the two freshwater mussels (slipper shell and ellipse). WDNR also performed a wading survey in the Sheboygan River that also identified ellipse mussels. Based on the habitat, WDNR has identified three species (slipper shell, ellipse, and rainbow shell) as being potentially affected by WIS 23 improvements. A WisDOT consultant conducted a survey for Butler's garter snake (*Thamnophis butleri*) in November 2005. Seven sampling areas were investigated and no Butler's garter snakes were observed. In general, the habitat near the Sheboygan River in Section 7 of Forest Township (T15N, R19E) and the Mullet River near the Old Wade House in Section 10/11 of Greenbush Township (T15N, R20E) provide the most reptilian or riparian habitat.

The occurrences of state and federal limited rare species within the towns of Empire, Forest, Greenbush, and Plymouth were updated with the WDNR in December 2012. Information obtained included the presence or absence of species, a determination of affected species, and potential mitigative measures to eliminate incidental takes for various species, and potential mitigation. The results of the December 2012 WDNR interaction are summarized in Table 3.4-2.

Group Name	Species Common Name	Species Scientific Name	Federal Status	State Status	Habitat Preferences	Potentially Affected by Project
END = Endangered, THR = Threatened, SC= Special Concern N=No, Y=Yes, ND = Not Determined						
Plant	Forked Aster	<i>Aster furcatus</i>	-	THR	Dry-mesic to mesic hardwoods, often adjacent to lakes or streams, or on slopes with dolomite near the surface. Moist or calcareous soils.	N
Plant	Yellow Gentian	<i>Gentiana alba</i>	-	THR†	Dry, open woodlands, ridges and bluffs (often w/dolomite near the surface), moist sand prairies, roadside ditches. Thin, dry to moist, sometimes calcareous or sandy soils (known on corridor based on NHI candidate for delisting).	N
Plant	Snow Trillium	<i>Trillium nivale</i>	-	THR	Hardwood forests, sometimes second-growth, often adjacent to rivers or streams. Rich, moist soils.	Y
Plant	Marsh Valerian	<i>Valeriana sitchensis</i> ssp. <i>ulginosa</i>	-	THR	Calcareous, coniferous swamps. Wet to mesic, peaty, calcareous soils.	N
Plant	Many Headed Sedge	<i>Carex sychnocephala</i>	-	SC	Muddy, sandy, marly, and peaty shorelines of lakes and ponds. Wet, sandy, peaty, calcareous soils.	N
Plant	Yellow Evening Primrose	<i>Calylophus serrulatus</i>	-	SC	Found mostly on steep bluff prairies along the Mississippi and lower St. Croix Rivers; cedar glades and, occasionally, in moist prairies.	N
Mussel	Slippershell Mussel	<i>Alasmidonta viridis</i>	-	THR	Found in small to medium-sized streams with flowing hard water, sand or gravel bottoms. Mainly in east and south parts of Wisconsin. Known hosts are banded/mottled sculpins and johnny darter. Usually found and confirmed in sand or fine gravel in shallow water or small streams. Reported as occurring in the Sheboygan and Mullet Rivers on the WIS 23 corridor.	Y
Mussel	Ellipse Mussel	<i>Venustaconcha ellipsiformis</i>	-	THR	Prefers shallow, flowing, clean small streams with sand or gravel bottoms and stable substrate in the east and south part of Wisconsin. Host fish are mostly small stream species including rainbow darter, johnny darter and mottled sculpin. Surveyed and reported in the Sheboygan and Mullet Rivers on the WIS 23 corridor.	Y
Mussel	Rainbow Shell Mussel	<i>Villosa iris</i>	-	END	Found in shallow, flowing, clean small streams with stable gravel substrate in the eastern part of Wisconsin (very restricted range). Lives within and below riffles on a sand, gravel or mud bottom in water less than 3 feet deep. Host fish include smallmouth/largemouth bass and rockbass. Not found in surveys to date, but reported as occurring in the Sheboygan River on the WIS 23 corridor.	Y

Table 3.4-2 Rare Species within WIS 23 Townships						
Group Name	Species Common Name	Species Scientific Name	Federal Status	State Status	Habitat Preferences	Potentially Affected by Project
END = Endangered, THR = Threatened, SC= Special Concern N=No, Y=Yes, ND = Not Determined						
Bird	Red Shouldered Hawk	Buteo lineatus	-	THR	Strongest history of suitable habitat includes unfragmented, mature floodplain forests along major rivers, including the Mississippi, St. Croix River north to St. Croix Falls, the Chippewa River to Chippewa Falls, the Wisconsin River to Wausau, and the Wolf River. Nests reported near WIS 23.	Y
Bird	Cerulean Warbler	Dendroica cerulea	-	THR	Mature mesic deciduous woodlands, including maple, basswood, and oak in uplands and lowland forests. Often found near small canopy openings in large continuous forest tracts; prefer medium and large tracts over small tracts (less than 40 acres). WDNR suspects presence near Mullet River floodplain.	Y
Bird	Acadian Flycatcher	Empidonax virescens	-	THR	Requires large tracts of mature mesic forest, with semiopen understory, and prefer forested streamsides and ravines. Breed in mesic, dry-mesic, and wet-mesic forests, as well as in hemlock, yellow birch, and white pine relics. In Kettle Moraine State Forest in southeast Wisconsin, they have nesting history in overmature conifer plantations. Also nests in pines/spruce, pioneer species and red oak. Prefers lowland deciduous forests, heavily wooded hillsides in large blocks of forests. WDNR suspects presence near Mullet River floodplain.	Y
Bird	Hooded Warbler	Wilsonia citrina	-	THR	Found in large upland forest tracts in South WI. Occurs in mature silver maple-elm forest and southern sugar maple-basswood forest, and in pine plantations in southeast Wisconsin. Occupy pockets of dense understory near small or partial canopy openings. WDNR suspects presence near Mullet River floodplain.	Y
Bird	Whooping Crane	Grus americana	* Federal (experimental population, non-essential)	NA	Species depends on large, open wetland ecosystems to eat, roost, and make their nests. No known nesting or migrational sites known for corridor. Migratory nonessential experimental population (NEP) as listed by USFWS but not extensively tracked by WDNR within natural heritage inventory.	N
Bird	American Bittern	Botaurus lentiginosus	-	SC/M	Uses shallow marshes, meadows/wetlands of many sizes; prefers large open marshes and meadows. Occupies thick, emergent vegetation like cattails, sedges, reed, and bulrushes during breeding season.	N

*Experimental population, nonessential (NEP)

Table 3.4-2 Rare Species within WIS 23 Townships

Group Name	Species Common Name	Species Scientific Name	Federal Status	State Status	Habitat Preferences	Potentially Affected by Project
END = Endangered, THR = Threatened, SC= Special Concern N=No, Y=Yes, ND = Not Determined						
Snail	Midwest Pleistocene Vertigo Snail	Vertigo hubrichti**	-	END**	Inhabitants of cold, undisturbed, and well-forested algific sites occurring characteristically in small patches of decaying deciduous tree leaves (most often paper birch or mountain maple) on or in front of open vents in areas otherwise dominated by mosses and lichens. Primary habitat is the soil and fern covered ledges of limestone cliffs. Not identified on NHI on project. Added to species review list based on project proximity to Niagara escarpment.	N-ND
Snake	Butler's garter snake	Thamnophis butleri	-	THR†	Prefers almost any open-canopy wetland type (not open water) and adjacent open to semi open canopy upland, including prairies, old fields and weedy vacant lots. Also prefers low-canopy vegetation (<24"), although will occupy habitats with taller vegetation such as reed canary grass. Investigated and not identified as concern on WIS 23 corridor.	N
Snake	Eastern Ribbon Snake	Thamnophis sauritus	-	END	Semiaquatic snake primarily found in bog relics and associated vegetation near or south of the Tension Zone.	N
Turtle	Blanding's Turtle	Emydoidea blandingii	-	THR†	Uses wide variety of aquatic habitats including deep/shallow marshes, shallow bays of lakes/impoundments with dense emergent and submergent vegetation, sluggish streams, oxbows and other backwaters of rivers, drainage ditches, and sedge meadows/wet meadows adjacent to these habitats. Semiterrestrial; moves between a variety of wetland types between March-October. Overwinters in standing water > 3 feet with a deep organic substrate of warm and cold water streams and rivers. Nests mid-May to July. Nest preference is sandy soils, may travel up to 900 feet from a wetland or waterbody to find suitable soils. Displays nest site fidelity, returning to sites and nesting in a similar location annually.	Y
Fish	Striped Shiner	Luxilus chrysocephalus	-	END	Prefers clear to slightly turbid waters of runs and shallow pools of the lower Milwaukee River, with dense aquatic vegetation over substrates of cobble, boulders, silt, sand, mud or bedrock. Spawning occurs from late May through June.	N
Butterfly	Swamp Metalmark	Calephelis muticum	-	END	Alkaline wetlands (fens) and wet meadows, marshes or tamarack bogs surrounding fen areas. Swamp thistle, <i>Cirsium muticum</i> is host plant. Has a single two-week flight period between mid-July and mid-August.	N

**WDNR addition though initially distant T16N, R18E

† currently under evaluation for removal from Threatened List as of May 2012

The federally listed whooping crane is reported for Fond du Lac County but no breeding (resident or nonmigratory) crane population is known for the project area. According to the WDNR, there are no known migrational stopover areas along the project corridor.

As presented in Table 3.4-3, 21 plant and animal species are listed as either threatened, endangered, or special concern in the project area within Fond du Lac and Sheboygan counties. Habitat loss, habitat disruption or degradation, loss of travel corridors, fragmentation, and mortality from development (whether agricultural or municipal expansion) are some of the primary reasons why these species are state threatened or endangered species.

The endangered rainbow shell freshwater mussel and the endangered upland Midwest Pleistocene ertigo snail are the only WDNR S1 ranked species reported in the study area environs. S1 species are critically imperiled in Wisconsin because of extreme rarity (five or fewer occurrences or very few remaining individuals or limited acreage) or because of some factor(s) making it especially vulnerable to local extinction from the state. The concern of most note for the snail on this project would be avoidance of impacts to the Niagara Escarpment that might contain the snail species' habitat preference of moist agilic habitat. Similarly, the continued minimization of siltation and aquatic habitat degradation for the rainbow shell mussel would be a benefit to this species.

Of the species that could likely be impacted by the project through waterway alterations, the threatened slippershell freshwater mussel is the only WDNR S2 ranked species. S2 ranked species are imperiled in Wisconsin because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state. Surveys in two project waterways have identified potential habitat but no specific occurrences for this species.

Five of the remaining threatened species in the project area ranked as S3 by the WDNR. This includes plants (snow trillium), mussels (ellipse), and potential breeding populations of birds (Cerulean and hooded warblers, Acadian flycatcher). These species' S3 rankings indicate they are rare or uncommon in Wisconsin (21 to 100 occurrences).

The remaining three threatened species are ranked as S4. An S4 ranking means the species is apparently secure in Wisconsin, with many occurrences. These species included the red shouldered hawk and two species that are candidates for delisting (Blanding's turtle and Butler's garter snake). WDNR considers these species as secure in Wisconsin, with many occurrences; however, it is noted that the red-shouldered hawk occurrence in the project corridor in Sheboygan County is atypical of its normal large river habitat preference.

Since construction is anticipated to occur in 2015/2016 and beyond, some of these species may be delisted. As of May 2012, the WDNR was considering revisions to the Wisconsin's Threatened and Endangered Species list by amending Natural Resources Rule [NR 27.03 (2) and NR 27.03 (3)]. Based on the analysis prepared by the WDNR to date (Wisconsin Natural Resources Board Order ER-27-11), there are two reptile and one plant species the WDNR may remove from the threatened species list that are listed as occurring in the townships near, or on, WIS 23. These are currently the state-threatened Blanding's turtle (*Emydoidea blandingii*) and Butler's garter snake (*Thamnophis butleri*) and the state-threatened yellow gentian (*Gentiana alba*).

See Section 4.6 C-7 for more information regarding threatened and endangered species

I. Air Quality

Air pollution is the contamination of the atmosphere with gases or particulate matter that is harmful to the human environment. The United States Environmental Protection Agency (USEPA), through the 1970 Clean Air Act, has established National Ambient Air Quality Standards (NAAQS) for six Criteria Air Pollutants. These Criteria Air Pollutants are regulated by USEPA on the basis of information on health and environmental effects. The six pollutants are ozone (O₃), nitrogen oxides (NO), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM), and airborne lead (Pb). The 1977 and 1990 Clean Air Act Amendments reinforced attainment and maintenance of these standards.

These standards have been adopted by the State of Wisconsin through Wisconsin Administrative Code Chapter NR 404. Air quality standards are definitions of the characteristics of ambient air quality that, in terms of present day knowledge, need to be maintained to protect the public health and welfare and our environment from adverse effects of air pollution. The goal of the air quality regulations is to ensure that various levels of pollutants do not exceed set standards and, where pollution levels are presently less than standards, to prevent the significant deterioration of the ambient air quality.

The proposed WIS 23 project is located in the Lake Michigan Intrastate Air Quality Control Region. Fond du Lac County is presently in attainment of all NAAQS. Sheboygan County was designated nonattainment for the 2008 Ozone Standard on April 30, 2012 (Federal Register / Vol. 77, No. 98 / Monday, May 21, 2012). Sheboygan County is also designated nonattainment for the 1997 Ozone standard, but that standard was revoked on July 20, 2013.

According to the December 6, 2012, FHWA Memorandum regarding Interim Guidance on Air Toxic Analysis in NEPA Documents, this project is considered to have low potential Mobile Source Air Toxics (MSAT) effects. The types of projects that fall into this category are those that serve to improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. Examples of these types of projects include projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT). The projected 2035 WIS 23 traffic volumes of between 10,200 and 17,000 AADT fall substantially short of this threshold. Therefore this project falls into the "low potential for MSAT" category.

J. Noise

Sound levels are measured in units called decibels. Since the human ear does not respond equally to all frequencies (or pitches), measured sound levels are often adjusted or weighted to correspond to the frequency response of human hearing and the human perception of loudness. The weighted sound level is expressed in units called A-weighted decibels (dBA) and is measured with a calibrated sound level meter. Table 3.4-3 provides an illustration of typical sound levels in dBA.

Table 3.4-3 Typical A-Weighted Sound Levels

Sound Source	Sound Level (dBA)	Subjective Response
Military jet takeoff with afterburner at 50 feet	130	
Rock and roll band	120	Uncomfortably loud
Jet fly-over at 1,000 feet	110	
Power lawn mower at operator	100	Very loud
Diesel truck (55 mph) at 50 feet	90	
High urban ambient sound automobile (55 mph) at 50 feet	80	Moderately loud
TV audio, vacuum cleaner	70	
Normal conversation	60	
	50	Quiet
Lower limit urban ambient sound	40	
	30	Very Quiet
Unoccupied broadcast studio	20	
	10	
	0	Threshold of Hearing

Sources:

Noise Assessment Guidelines Technical Background, HUD Report No. TE/N/A 172

Handbook of Noise Control, C.M. Harris, 1979

FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108, 1978

Noise is defined as unwanted sound. The sounds generated by vehicular traffic and residential and commercial development in the study area constitute noise to people and can interrupt normal activities when they reach certain levels. Areas that would likely be sensitive to noise include residential developments, recreational areas, schools, churches, and cemeteries. Commercial and industrial land uses would generally be less sensitive to noise.

Noise sensitive sites along WIS 23 and in the area of the US 151/WIS 23 Corridor Preservation Alternatives have been identified and readings have been taken at representative locations using a Larsen Davis 312 Noise Meter to determine existing noise levels. See Section 4.6 D-3 for sound level reading locations and a more detailed discussion of the existing and future sound levels, possible noise impacts, and possible mitigation measures. A discussion of construction-related noise impacts and possible mitigation measures can be found in Section 4.6 D-2.

K. Contaminated Materials

A Phase 1 hazardous material screening inventory was done within the corridor study area along WIS 23 and for the US 151/WIS 23 Corridor Preservation Alternatives. The review identified apparent sources of hazardous materials and assessed the potential for affecting sites that may contain environmental contaminants. The results are discussed in Section 4.6 D-4.

L. Soils and Mineral Resources

Glacial landforms dominate the WIS 23 corridor and most soils were derived from till and outwash deposits. Bedrock along WIS 23 consists of dolomite limestone with varying thickness of up to 200 feet. Marsh deposits of varying depth can be found near any of the four watershed areas along the project (Sheboygan, Mullet, and Onion Rivers and Eastern Lake Winnebago Watersheds).

Moderate to rapid permeability soils dominate the project area. Soils along WIS 23 in Fond du Lac County can be identified within four soil classification groups:

- Theresa-Pella-Lamartine association: Well-drained to poorly drained, silty, moderately permeable soils underlain by calcareous loam and sandy loam till.
- Kewaunee-Manawa-Polgan association: Well-drained to poorly drained, silty and clayey, moderately slowly to slowly permeable soils underlain by calcareous till or lacustrine sediments.
- Fox-Casco association: Well-drained loamy, moderately permeable soils underlain by calcareous sand and gravel.
- Houghton-Palms association: Organic soils over calcareous outwash, till, or lacustrine deposits.

Soils along WIS 23 in Sheboygan County can be identified within two soil classification groups:

- Hochheim-Theresa association: Well-drained soils that have a subsoil of mainly clay loam or silty clay loam and are underlain by gravelly sandy loam glacial till.
- Casco-Fox-Rodman association: Well-drained to excessively drained soils that have a subsoil of mainly silty clay loam to sandy clay loam or gravelly sandy loam and are underlain by stratified gravel and sand outwash.

There are active sand/gravel pits within the study area. Under WisDOT **construction** contracts, the contractor may select his own source of materials as long as they meet contract specifications.

M. Aesthetics

The visual character and aesthetic quality of an area is created by its composition of landscape features including landforms, streams and other water bodies, wetlands, woodlands, open space such as cropland, historic structures, commercial and residential development, parkland, and other recreational facilities.

The natural scenery along this section of WIS 23 runs through rolling glacial moraines and drumlins and crosses two unique geologic features. The first is the Niagara Escarpment, located on the far west section of WIS 23. The Escarpment rises 300 feet above Lake Winnebago. Second is the Kettle Moraine State Forest to the east near the town of Greenbush, a forested glacial moraine area. Both features provide exceptional and unique views of this area of Wisconsin. Other unique views are found along WIS 23. Visible at the Sheboygan River crossing is a wetland basin adjacent to WIS 23. Also, several drumlins, hills, and outwash plains that consist of several wetlands and woodlands are visible between the two major geologic features.

This region has been settled mostly as a farming area, thus providing a scenic rural setting and scenic panoramas of the countryside on these hills. Visible landscape features include pasturelands, farm operations, and residential homesteads. The existing highway consists of concrete and bituminous pavements with gravel shoulders. The existing roadway is exhibiting some signs of distress (cracks and ruts). A bridge spans the Sheboygan River. Aesthetic quality of the majority of this corridor is considered moderate to high.

3.5 CULTURAL RESOURCES

A. Archaeological/Historical Resources

This region has been the scene of human occupation for at least 10,000 years, spanning the Paleoindian Period to modern times. The Lake Winnebago and Fox River drainage areas have been the primary focus of historical and archaeological study since the late 1800s.

An archaeological literature and records search was undertaken to identify previously reported resources and burial sites near the corridor study area. Archaeological and burial sites have been reported within approximately 1 mile of the study area and Native American components have been identified at several of these previously recorded sites. Between 2002 and 2006, a records search and a Phase 1 Survey were completed to identify other sites along the corridor, verify sites identified in the literature review, and determine the need for Phase II archaeological investigations. In all, 54 archaeological sites and 10 isolated finds were identified. Two historic cemeteries and four previously recorded sites were also investigated.

Five sites were located within the area of potential effect (APE) and recommended for Phase II evaluation. WisDOT refined the corridor alignment to avoid one of the five sites, and in 2005 and 2006, Phase II evaluations were completed at the remaining four sites along WIS 23. The sites are known as Sippel, Limberg, Mullet River North, and Mullet River South. Only the Sippel site is eligible for listing on the National Register of Historic Places (NRHP). The other three sites are not eligible for listing and no additional archaeological investigation is recommended. Additional information is provided in Section 4.6 B-6 of this document.

The project historian completed an identification survey, including a windshield survey of historic properties located within the Area of Potential Effect (APE). The APE is the viewshed of the 19.1-mile-long WIS 23 project corridor from County K to County P, extending approximately 1 mile on either side of WIS 23. Background research identified 3 structures at the Old Wade House State Park as listed on the NRHP. Within the APE, 10 properties were found to be included in the Wisconsin Architecture and History Inventory. The survey identified 12 additional properties within the APE with potential for being listed on the NRHP. Of the properties identified, the Wisconsin Historical Society recommended completion of a Determination of Eligibility for one property, the St. Mary's Springs Academy complex, which was found to be eligible for the NRHP. It is eligible for the NRHP under Criterion A (religious property with architectural importance) and Criterion C (a birthplace or grave of a historical figure is eligible if the person is of outstanding importance). Contributing resources to this designation include Boyle Hall Main Building, the First Powerhouse Building, and Second Powerhouse Building.

In 2005, St Mary's Springs demolished two of the resources in the complex that led to the site being eligible for the NRHP. Upon re-examination of the surviving resources in 2012, the project historian concluded that the demolition of Boyle Hall removed the historic resource which gave other items/resources on the property their historic significance. Documentation that reduces the size of historic boundary for St. Mary's Springs Academy was provided to SHPO. A revised Memorandum of Agreement (MOA) was signed by SHPO and is included in Appendix D. A more detailed discussion of the reduction of the historic boundary is provided in Section 5 in this LS SFEIS/ROD.

Other properties in or adjacent to the project area have either been determined to be not eligible for the NRHP or will not be impacted by the Preferred Build Alternative. A copy of the Architecture/History Survey Form was provided as Appendix M of the 2010 FEIS and additional information related to historic structures can be found in Section 4.6 B-5 of this document.

3.6 ENVIRONMENTAL JUSTICE

Executive Order on Environmental Justice 12898 requires all federal agencies to address the impact of their programs with respect to environmental justice (EJ). The Executive Order states that to the extent practicable and permitted by law, neither minority nor low-income populations may receive disproportionately high or adverse impacts as a result of a proposed project. It also requires that representatives of any low-income or minority populations that could be affected by the project in the community be given the opportunity to be included in the impact assessment and public involvement process. Consistent with Title VI of the 1964 Civil Rights Act and Executive Order 12898 on Environmental

Justice, the project should benefit all segments of society, including those that have been underserved and underrepresented. The project should improve accessibility for all persons, including minorities and the economically disadvantaged in urban and rural areas.

The demographics of the study area and the affected municipalities are described in detail in Section 3.2 and Factor Sheets A-2 and B-1. The EJ study area is depicted on Figure 3.6-1. This figure displays census block groups where the percentage of minorities is greater than the percent in the county and census tracts where the percentage of individuals living below the poverty level is greater than the county. As depicted in Figure 3.6-1, concentrations of EJ populations are located at the east and west ends of the corridor around the cities of Fond du Lac and Plymouth.

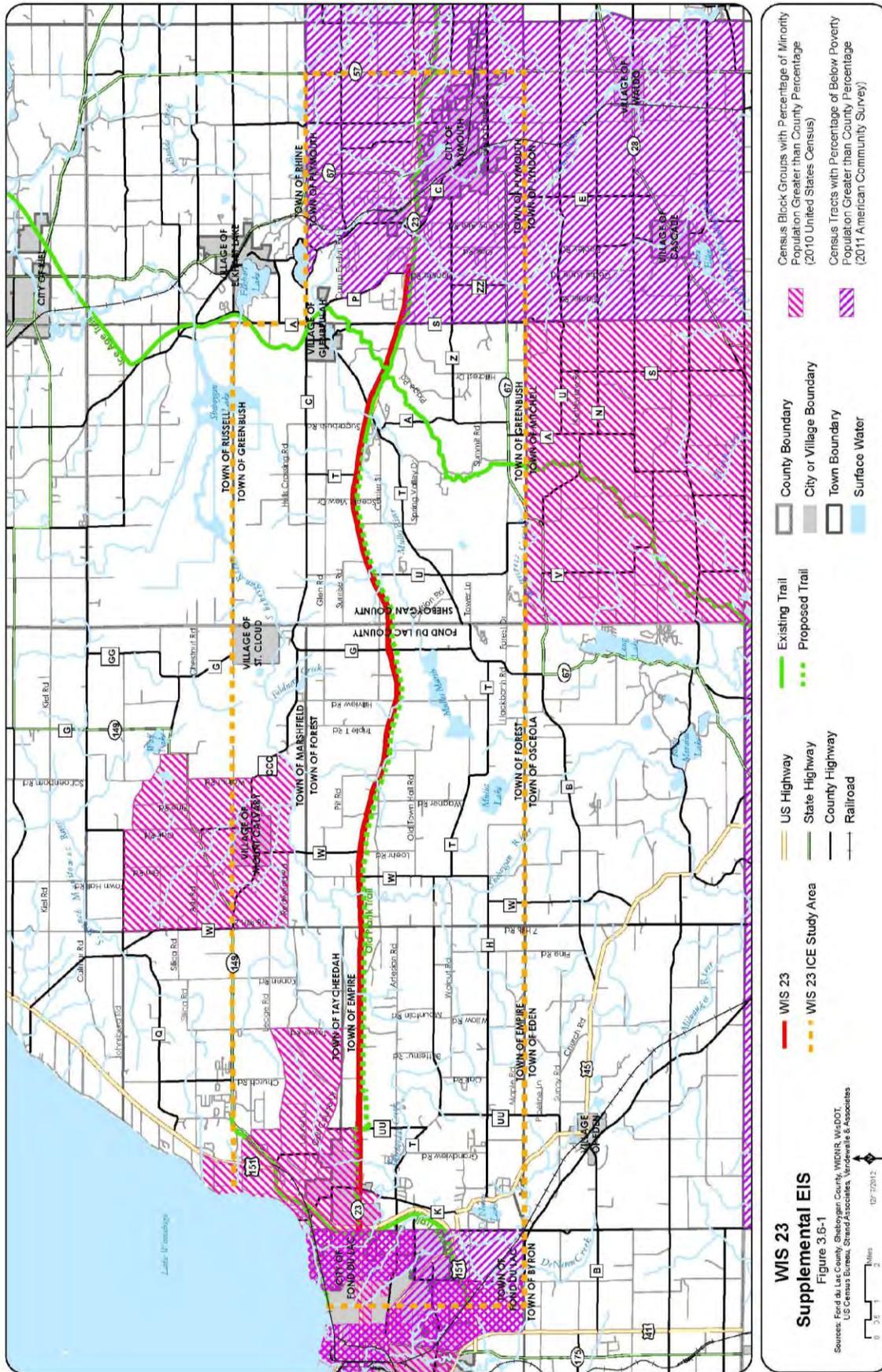


Figure 3.6-1 Environmental Justice Populations