# SECTION 3
# AFFECTED ENVIRONMENT

THIS PAGE INTENTIONALLY LEFT BLANK

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. The Affected Environment is described within the broader Indirect and Cumulative Effects boundaries and incorporates the area evaluated for direct impacts. 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 2014 Limited Scope Supplemental Final Environmental Impact Statement (LS SFEIS) except that:

- The demographic and income data have been updated from more recent data sources.
- The threatened and endangered species data has been updated with one species removed, two species with changed status, and three federal species added.
- Section 6(f) conversion requests and property transfers associated with the Northern Unit of the Kettle Moraine State Forest (KMSF-NU) have occurred and this is reflected in the document.

Yellow highlight signifies updates since the May 2018 Limited Scope Supplemental Draft Environmental Impact Statement (LS SDEIS). Minor changes to grammar, punctuation, and usage are not highlighted. Highlighting of a figure or table title signifies updated or new information.

## 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 extends east 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 generally consists of 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 KMSF-NU 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 KMSF-NU.

## 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. Four of the five 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 to 2040 population growth and the town of Plymouth having the highest anticipated growth rate of 11.4 percent during this period.

**Table 3.2-1 Population Trends and Projections**

| Municipality | Census | | | | Projections | | | Population Change 2010-2040 | Percent Change 2010-2040 |
|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1990 | 2000 | 2010 | 2020 | 2030 | 2040 | | |
| T. Greenbush | 1,665 | 1,849 | 2,773 | 2,565 | 2,620 | 2,705 | 2,630 | 65 | 2.5% |
| T. Empire | 2,359 | 2,485 | 2,620 | 2,797 | 2,935 | 3,105 | 3,130 | 333 | 10.6% |
| T. Forest | 1,098 | 1,094 | 1,108 | 1,080 | 1,045 | 1,020 | 950 | -130 | -12.0% |
| T. Plymouth | 3,068 | 2,911 | 3,115 | 3,195 | 3,345 | 3,555 | 3,560 | 365 | 11.4% |
| C. Fond du Lac | 35,863 | 37,755 | 42,203 | 43,021 | 44,510 | 46,300 | 45,920 | 2,899 | 6.7% |

Sources: Wisconsin Department of Administration, Population Estimates–Time Series (1970-2017), Minor Civil Divisions within Counties. Population Projections for Wisconsin Municipalities: 2010-2040, Wisconsin Department of Administration (produced in 2013, based from 2010 census).

[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.

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 48. As indicated below, the town of Greenbush has the most diverse population in terms of race and ethnicity.

**Table 3.2-2 Demographic Characteristics**

| Municipality | Median Age | % Pop. Under Age 18 | % Pop. Over Age 65 | % Non-White | % Hispanic/Latino |
|---|---|---|---|---|---|
| T. Greenbush | 37.1 | 13.3% | 7.5% | 23.5% | 5.4% |
| T. Empire | 46.7 | 22.2% | 13.6% | 2.2% | 1.5% |
| T. Forest | 43.4 | 22.8% | 13.5% | 1.6% | 0.9% |
| T. Plymouth | 47.7 | 22.8% | 16.1% | 1.6% | 0.8% |
| 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: 2010 United States Census Data, Table P-5, Hispanic or Latino Origin by Race: 2010, Summary File 1 (County Subdivision, Place within State, and County) and 2012-2016 American Community Survey 5-Year Estimates, Table B03002, ACS Demographic and Housing Estimates (County Subdivision)–Used for Town of Greenbush because of error in 2010 census.

C. Housing

Table 3.2-3 lists the number of owner-occupied housing units for municipalities in the study area. The town of Empire has the highest median home value at $249,400 while the city of Fond du Lac has the lowest median home value at $121,400.

**Table 3.2-3 Owner-Occupied Housing Units Year 2015**

| Municipality | 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 | 90.5% | 13 | 17 | 75 | 55 | 216 | 82 | 14 | 6 | $236,600 |
| T. Empire | 98.3% | 29 | 22 | 77 | 168 | 388 | 245 | 96 | 0 | $249,400 |
| T. Forest | 88.7% | 9 | 24 | 87 | 102 | 95 | 40 | 8 | 18 | $180,900 |
| T. Plymouth | 94.8% | 195 | 298 | 853 | 533 | 276 | 117 | 0 | 0 | $137,600 |
| C. Fond du Lac | 58.2% | 496 | 2,926 | 3,681 | 1,810 | 1,142 | 297 | 60 | 7 | $121,400 |

Source: 2012-2016 American Community Survey United States Census Data, Table DP-04, Selected Housing Characteristics (County Subdivision and Place within State).

D. Incomes

FHWA defines a low-income person as a person whose median household income is at or below the United States Department of Health and Human Services (HHS) poverty guideline. This is different, and more simplified, than US Census Bureau poverty thresholds. Table 3.2-4a illustrates the difference between the poverty guidelines issued by HHS and the poverty thresholds issued by the US Census Bureau.

**Table 3.2-4a Difference Between Poverty Thresholds and Guidelines**

| | HHS Poverty Guidelines | US Census Poverty Thresholds |
|---|---|---|
| Issuing Agency | Department of Health and Human Services | Census Bureau |
| Purpose/Use | Administrative–Determining financial eligibility for certain programs | Statistical–calculating the number of people in poverty |
| Characteristics by Which They Vary | Guidelines vary by family size. In addition, there is one set of figures for the 48 contiguous states and D.C.; one set for Alaska; and one set for Hawaii. | Detailed (48-cell) matrix of thresholds varies by family size, number of children, and, for 1- and 2-person units, whether or not elderly. Weighted average thresholds vary by family size and, for 1- and 2-person units, whether or not elderly. There is no geographic variation; the same figures are used for all 50 states and D.C. |
| Timing of Annual Update | HHS issues poverty guidelines in late January of each year. Some programs make them effective on date of publication, others at a later date. | The Census Bureau issues preliminary poverty thresholds in January, and final poverty thresholds in September of the year after the year for which poverty is measured. The poverty thresholds are adjusted to the price level of the year for which poverty is measured. |
| How Updated or Calculated | The 48 contiguous state guidelines are updated from the latest published (final) weighted average poverty thresholds using the Consumer Price Index for all Urban Consumers(CPI-U). (Figures are rounded, and differences between adjacent family-size figures are equalized.) | The individual 48-cell matrix is updated each year from the 1978 threshold matrix using the CPI-U. The preliminary weighted average thresholds are updated from the previous year's final weighted average thresholds using the CPI-U. The final weighted average thresholds are calculated from the current year's 48-cell matrix using family weighting figures from the Current Population Survey's Annual Social and Economic Supplement. |
| Rounding | Rounded to various multiples of $10–May only end in zero | Rounded to the nearest dollar |

Source: https://aspe.hhs.gov/frequently-asked-questions-related-poverty-guidelines-and-poverty#differences

Table 3.2-4b compares the HHS poverty guidelines for 2018 and the Census Bureau poverty thresholds for 2017, the most-recent year available.

**Table 3.2-4b Comparison of HHS Poverty Guidelines with Census Poverty Thresholds**

| Persons in family/household | HHS 2018 Poverty guideline | Census 2017 Weighted Ave Poverty Threshold* |
|---|---|---|
| 1 | $12,140 | $12,752 |
| 2 | $16,460 | $16,414 |
| 3 | $20,780 | $19,730 |
| 4 | $25,100 | $24,858 |
| 5 | $29,420 | $29,253 |
| 6 | $33,740 | $32,753 |
| 7 | $38,060 | $36,685 |
| 8 | $42,380 | $40,332 |

* Householder under 65 years of age, assumes household members 3 to 8 are under 18 years old.
Source: US Health and Human Services https://aspe.hhs.gov/poverty-guidelines
US Census http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html

While FHWA defines low income using the HHS poverty guidelines, there is limited HHS poverty guideline data on a census tract or block level. The US Census Bureau provides poverty threshold data at the census block level. Therefore, this LS SEIS uses poverty threshold data to identify the presence of low-income populations within the project corridor.

In 2016, the city of Fond du Lac had the lowest median household income at $47,079 while the town of Empire had the highest median household income at $99,097. The city of Fond du Lac had the highest poverty rate in the study area, with 9.1 percent of families and 12.4 percent of individuals living below the poverty level. Table 3.2-5 shows the percentages of those living below the poverty level for municipalities in the study area.

**Table 3.2-5 Year 2012-2016 Income and Poverty Statistics**

| 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 | $20,915 | $78,821 | $90,673 | 2.5% | 2.6% |
| T. Empire | $41,768 | $99,097 | $103,563 | 2.0% | 0.7% |
| T. Forest | $32,654 | $70,795 | $77,500 | 4.3% | 1.4% |
| T. Plymouth | $37,687 | $77,778 | $92,721 | 6.3% | 5.7% |
| C. Fond du Lac | $25,108 | $47,079 | $61,406 | 12.4% | 9.1% |

Source: 2012-2016 American Community Survey United States Census Data, Table DP-03, Selected Economic Characteristics (County Subdivision and Place within State).

Figure 3.2-1 shows the location of low-income populations, by census tract, within the study area.

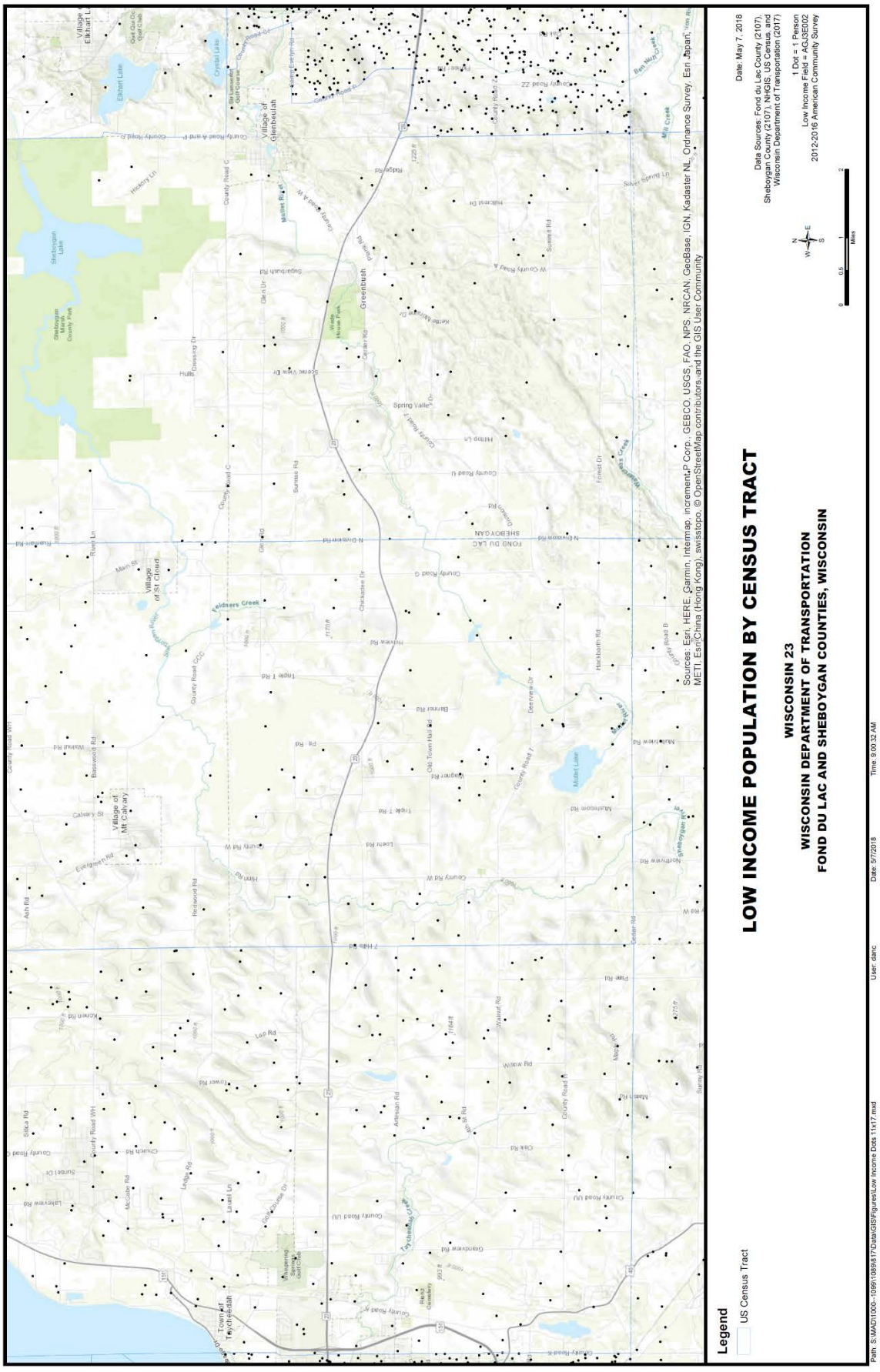
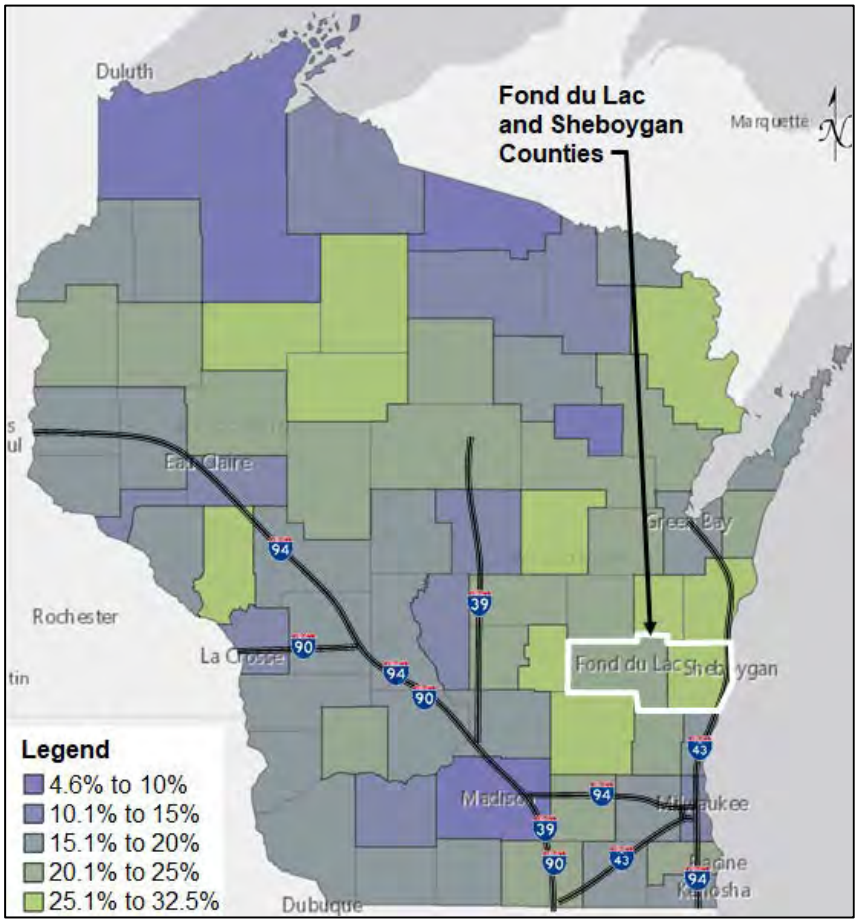



**Figure 3.2-1 Low Income Population by Census Tract**

E. Tax Base

Combined, Sheboygan and Fond du Lac counties employ more than 25,000 workers in the manufacturing industry. The largest employers in each county are manufacturers (see Tables 3.2-6 and 3.2-7). The manufacturing industry in both counties also produces the highest sales in the respective counties (see Tables 3.2-8 and 3.2-9). In 2012, the manufacturing industry in Fond du Lac County produced $4 billion in sales, receipts, or shipments while Sheboygan County produced $7.3 billion in sales, receipts, or shipments. Figure 3.2-2 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.




Source: 2012-2016 American Community Survey United States Census Data, Table DP-03, Selected Economic Characteristics (All Counties within Wisconsin). Thematic Map of Percent; INDUSTRY --Civilian employed population 16 years and over–Manufacturing Geography: by County.

**Figure 3.2-2 Percentage of County Employed in Manufacturing**

**Table 3.2-6 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 | 5,000+ |
| 2 | Bemis Manufacturing Co | Plastic products | 1,000+ |
| 3 | Nemak | Aluminum die-casting foundries | 1,000+ |
| 4 | Aurora Medical Group, Inc | Physician Offices | 1,000+ |
| 5 | Sargento Foods | Cheese Manufacturing | 1,000+ |

Source: Sheboygan County Economic Development Corporation, Top employers, accessed September 9, 2018, http://www.sheboygancountyedc.com/market-info/top-employers/.

**Table 3.2-7 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 | Michels Corporation | Construction, engineering, and procurement services | 3,000 |
| 2 | Mercury Marine | Produces marine motors | 2,700 |
| 3 | Alliance Laundry Systems | Commercial laundry equipment and service | 1,838 |
| 4 | Quad Graphics, Inc | Printing | 1,400 |
| 5 | CN Wisconsin Central Ltd | Transportation | 750 |

Source: Fond du Lac Area Association of Commerce, Largest Industries 2015, accessed September 9, 2018, https://www.fdlac.com/demographics.html.

**Table 3.2-8 2012 Economic Census: Summary Statistics for Fond du Lac County**

| Description | Establishments | Sales, Receipts or Shipments ($1,000) | Annual Payroll ($1,000) | Paid Employees |
|---|---|---|---|---|
| Mining (npfc) | NA | NA | NA | NA |
| Utilities (npfc) | 2 | NA | NA | 100-249 |
| Construction (npfc) | NA | NA | NA | NA |
| Manufacturing | 144 | 3,989,865 | 407,579 | 9,140 |
| Wholesale Trade | 111 | 1,372,036 | 74,354 | 1,541 |
| Retail Trade | 354 | 1,402,363 | 130,049 | 5,462 |
| Transportation and Warehousing | 122 | 238,446 | 57,549 | 1,569 |
| Information (npfc) | 35 | NA | 21,976 | 532 |
| Finance and Insurance (npfc) | 155 | NA | 74,590 | 1,605 |
| Real Estate and Rental and Leasing | 64 | 37,709 | 5,950 | 235 |
| Professional, Scientific, and Technical Services | 154 | 154,371 | 76,345 | 1,337 |
| Management of Companies and Enterprises (npfc) | NA | NA | NA | NA |
| Administrative and Support and Waste Management and Remediation Services | 98 | 70,034 | 33,212 | 1,706 |
| Educational Services | 8 | NA | NA | 20 - 99 |
| Health Care and Social Assistance | 281 | 758,837 | 248,771 | 5,764 |
| Arts, Entertainment and Recreation | 44 | 31,495 | 6,647 | 492 |
| Accommodation and Food Services | 240 | 140,834 | 39,759 | 3,872 |
| Other Services (except public admin.) | 191 | 114,368 | 31,323 | 1,245 |

npfc = Not available for counties; NA = Not available

Source: 2012 Economic Census of the United States, U.S. Census Bureau, EC120A1, All sectors: Geographic Area Series: Economy-Wide Key Statistics: 2012.

**Table 3.2-9 2012 Economic Census: Summary Statistics for Sheboygan County**

| Description | Establishments | Sales, Receipts or Shipments ($1,000) | Annual Payroll ($1,000) | Paid Employees |
|---|---|---|---|---|
| Mining (npfc) | NA | NA | NA | NA |
| Utilities (npfc) | 5 | NA | 13,727 | 160 |
| Construction (npfc) | NA | NA | NA | NA |
| Manufacturing | 230 | 7,346,168 | 825,110 | 16,716 |
| Wholesale Trade | 86 | 593,874 | 47,853 | 1,002 |
| Retail Trade | 395 | 1,400,026 | 133,522 | 6,124 |
| Transportation and Warehousing | 112 | NA | 69,733 | 1,784 |
| Information (npfc) | 3 | NA | 10,764 | 347 |
| Finance and Insurance (npfc) | 183 | NA | 116,416 | 1,955 |
| Real Estate and Rental and Leasing | 73 | 58,171 | 10,428 | 298 |

**Table 3.2-9 2012 Economic Census: Summary Statistics for Sheboygan County**

| Description | Establishments | Sales, Receipts or Shipments ($1,000) | Annual Payroll ($1,000) | Paid Employees |
|---|---|---|---|---|
| Professional, Scientific, and Technical Services | 179 | 207,937 | 65,750 | 1,240 |
| Management of Companies and Enterprises (npfc) | NA | NA | NA | NA |
| Administrative and Support and Waste Management and Remediation Services | 103 | 95,875 | 53,167 | 2,654 |
| Educational Services | 13 | NA | NA | 0 - 19 |
| Health Care and Social Assistance | 299 | 597,170 | 247,807 | 6,483 |
| Arts, Entertainment and Recreation | 56 | 76,233 | 20,763 | 1,360 |
| Accommodation and Food Services | 269 | 188,755 | 53,443 | 4,151 |
| Other Services (except public admin.) | 202 | 67,360 | 19,451 | 992 |

npfc = Not available for counties; NA = Not Available
Source: 2012 Economic Census of the United States, U.S. Census Bureau, EC120A1, All sectors: Geographic Area Series: Economy-Wide Key Statistics: 2012.

F. Workforces and Occupations

The manufacturing sector and education, health, and social services sectors employ the majority of residents in the study area. Table 3.2-10 presents the number employed in these fields for municipalities within the WIS 23 study area.

**Table 3.2-10 Percent of Residents Employed by Industry**

| Municipality | Manufacturing | Education, Health, Soc. Serv. |
|---|---|---|
| Town of Forest | 23.5% | 15.6% |
| Town of Empire | 22.7% | 26.5% |
| Town of Greenbush | 30.8% | 15.4% |
| Town of Plymouth | 34.7% | 15.9% |
| City of Fond du Lac | 24.1% | 21.1% |

Source: 2012-2016 American Community Survey United States Census Data, Table DP-03, Selected Economic Characteristics (County Subdivision and Place within State).

## 3.3 PROTECTED CLASSES

Executive Order 12898 (EO 12898), commonly called the Executive Order on Environmental Justice, focuses on low income and minority populations. EO 12898 states that "each federal agency shall make achieving environmental justice (EJ) part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." EO 12898 emphasizes that Federal agencies should use existing laws and programs to achieve EJ, including Title VI of the Civil Rights Act of 1964 (Title VI).

The Executive Order on Environmental Justice addresses disproportionately high and adverse effects on minority and low-income populations.

- A minority population is defined as any readily identifiable group of minority persons who live in geographic proximity to the project area.
- Low-income population means any readily identifiable group of low income persons (having a household income at or below the United States Department of Health and Human Services poverty guidelines) who live in geographic proximity to the project area.

A disproportionately high and adverse effect means:

- An adverse effect that is largely borne by a minority population and/or low-income population.

- An adverse effect that will be suffered appreciably more severely or in greater magnitude by a minority and/or low-income population than by nonminority and/or non-low-income populations.

Note that US Census data does not classify Hispanic or Latino as a race, but as a culture or origin. Therefore, when using US Census data there is an overlap between Hispanic or Latino and the racial minorities of Black or African American, American Indian, Asian, and Pacific Islander. An individual can be African American and have a Hispanic origin. Also, an individual can be white and have a Hispanic or Latino origin. Figure 3.3-1 illustrates the FHWA definition of minority for the purposes of EJ with respect to race and Hispanic or Latino origin.

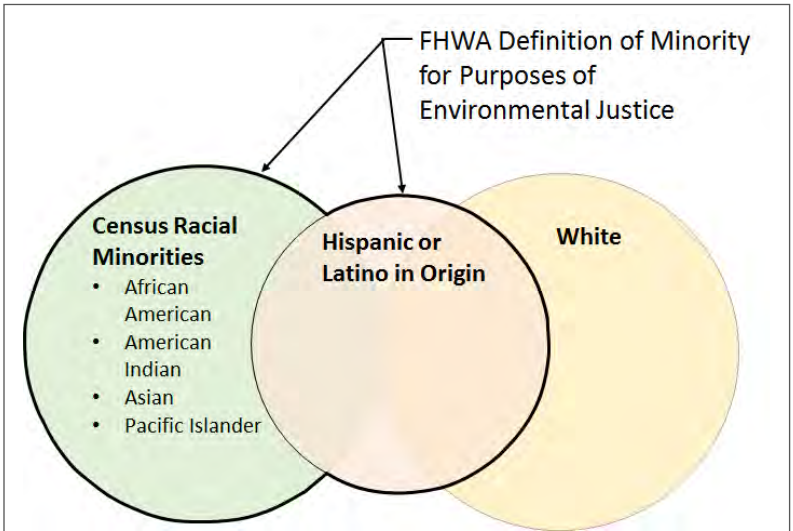



**Figure 3.3-1 FHWA Definition of Minority**

The concept of EJ is tied to Title VI of the Civil Rights Act that prohibits discrimination on the basis of race, color, or national origin. Title VI of the 1964 Civil Rights Act requires each federal agency to ensure that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any programs or activities receiving federal financial assistance on the basis of race, color, national origin, age, sex, or disability. It is different from EJ because it does not include low income populations but does include race, national origin, and color. It is the policy of the FHWA to ensure compliance with Title VI of the Civil Rights Act of 1964; 49 CFR part 21; and related statutes and regulations. In addition to discrimination, a feature of Title VI is the prohibition of disparate impacts.

The FHWA Title VI Program includes other nondiscrimination statutes and authorities under its umbrella, including Executive Order 12898 (EJ). FHWA's Office of Civil Rights oversees the Title VI Program, which ensures that FHWA policies, programs, and activities do not discriminate based on race, color, national origin, income, sex, age, disability, or limited English proficiency.
In addition to minority and low-income populations associated with EJ, the Title VI Program covers:

- Race, color, or National Origin (Civil Rights Act).
- Limited English Proficiency (EO 13166).
- Disabilities (American Disabilities Act).
- Age (Age Discrimination Act).
- Sex (Civil Rights Act).

It is FHWA's continuing policy to "identify and prevent discriminatory effects by actively administering its programs, policies, and activities to ensure that social impacts to communities and people are recognized early and continually throughout the transportation decision making process from early planning throughout implementation."

The demographics of the study area and the affected municipalities are described in detail in Section 3.2 and Section 4.7 A-2 and 4.7 B-1 and EJ is specifically addressed in Section 4.7 B-4. The EJ populations within the study area are depicted on Figure 3.3-2. This figure displays census block groups where the percentage of minorities is greater than the percent in the county and census block groups where the percentage of individuals living below the poverty level is greater than the percent in the county. Note that locations of low-income populations are shown in Figure 3.2-1. Figures 3.3-3 and -4 show the locations of minority and Hispanic populations respectively within the study corridor.

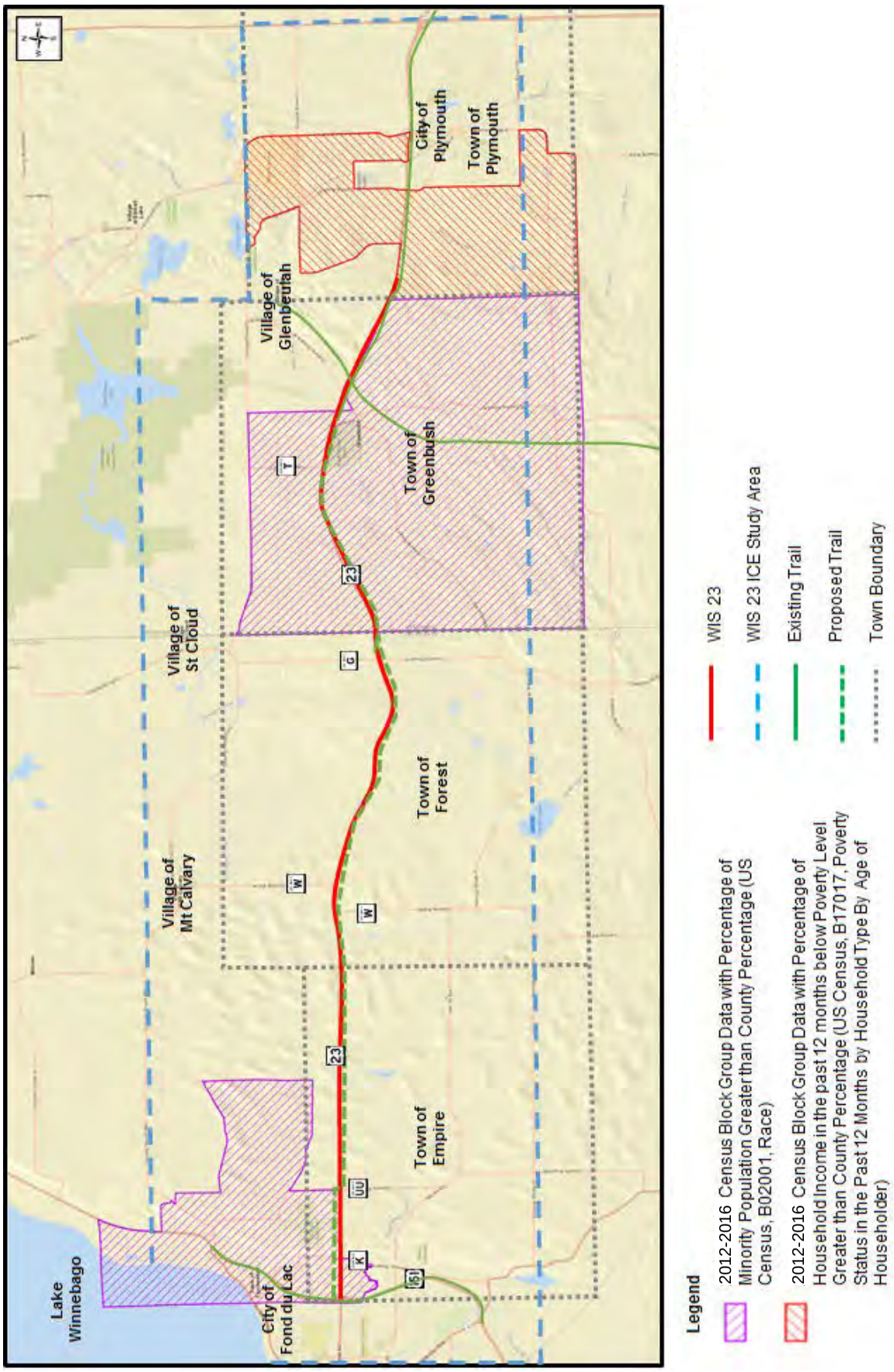



**Figure 3.3-2 Environmental Justice Populations**

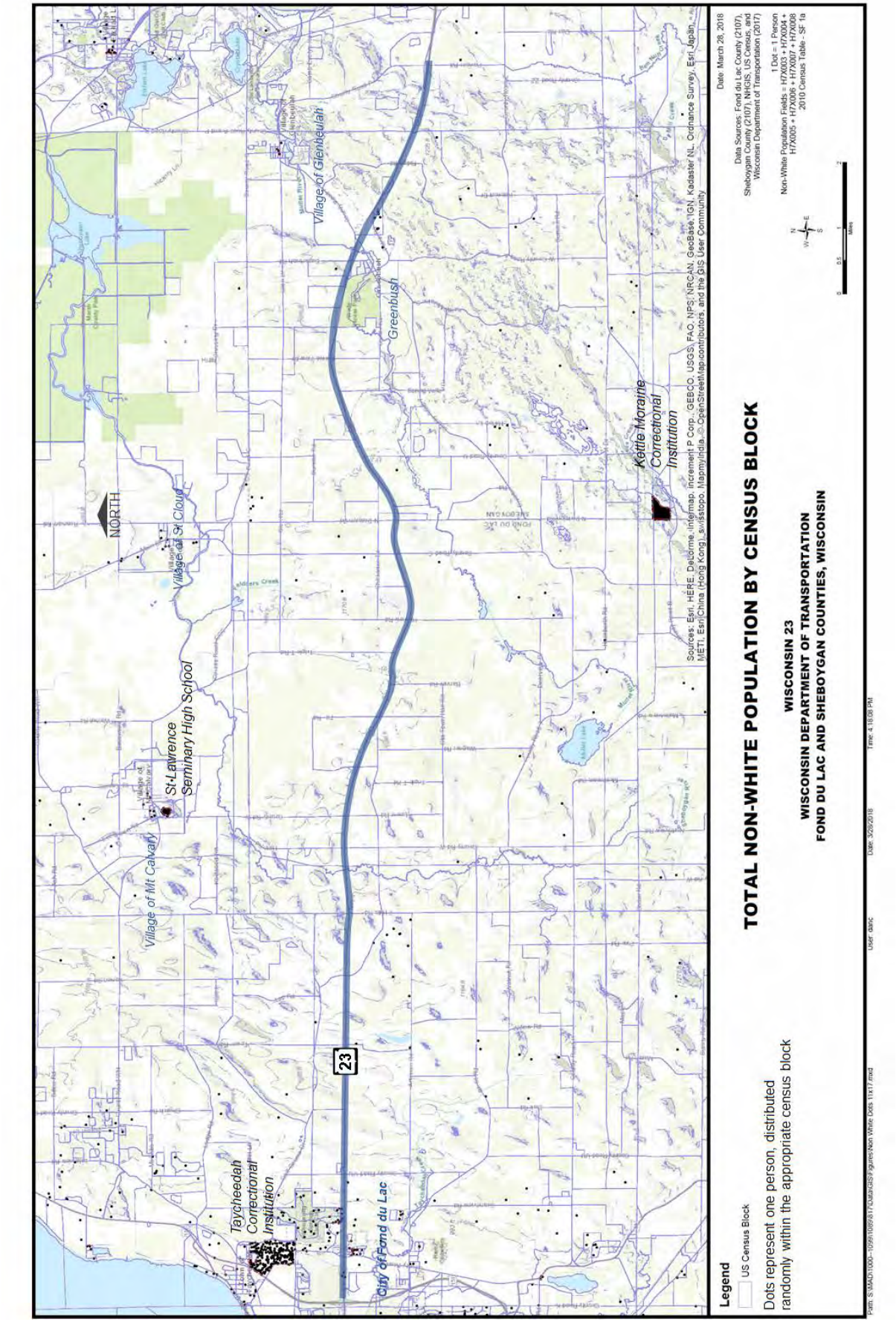



**Figure 3.3-3 Non-white Population by Census Block**

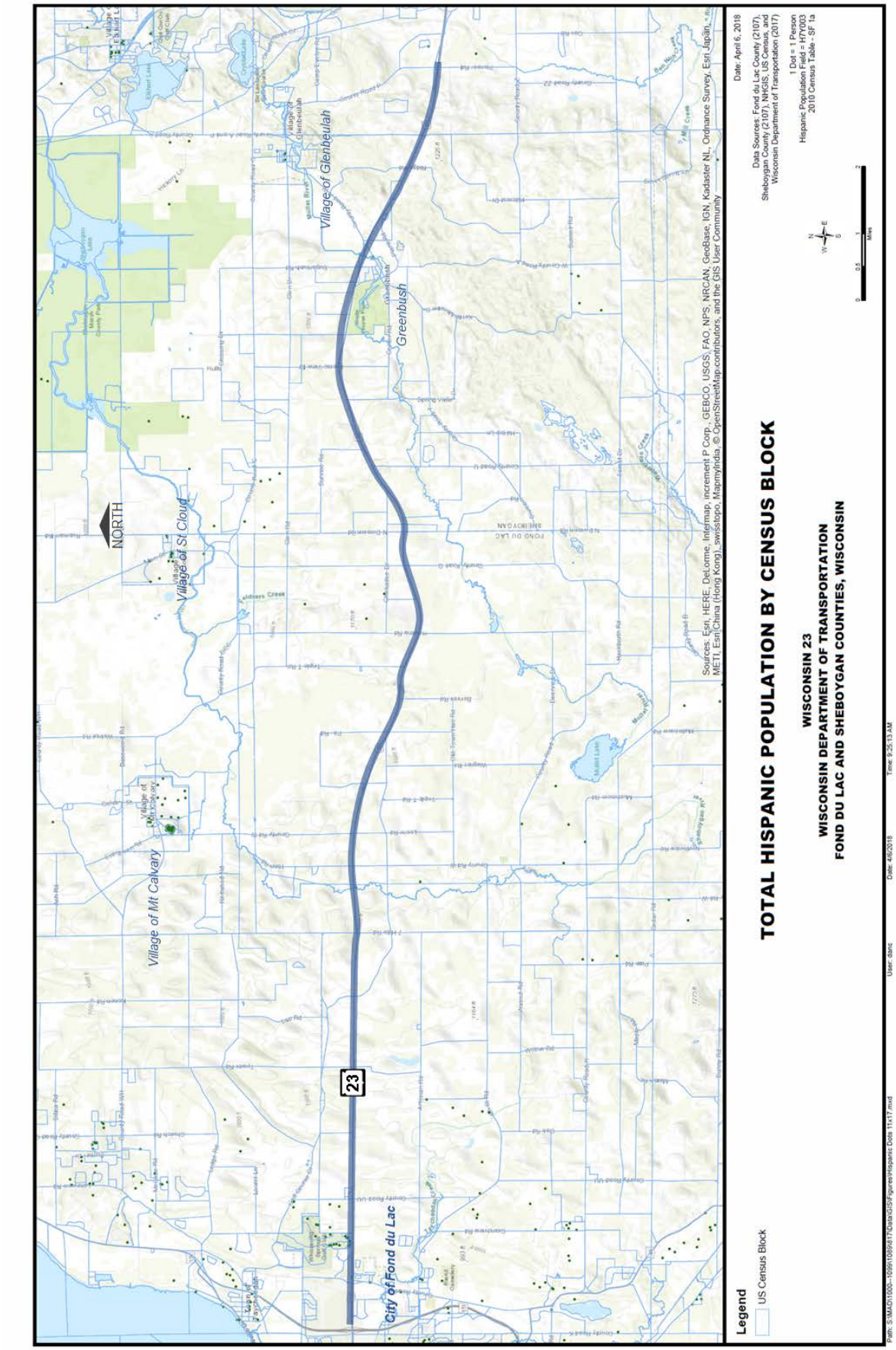



**Figure 3.3-4 Hispanic Population by Census Block**

## 3.4 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. The corridor travels through the towns of Empire, Forest, Greenbush, and Plymouth, and ends just west of the city of Plymouth. See Figure 3.4-1 for the location of these communities.

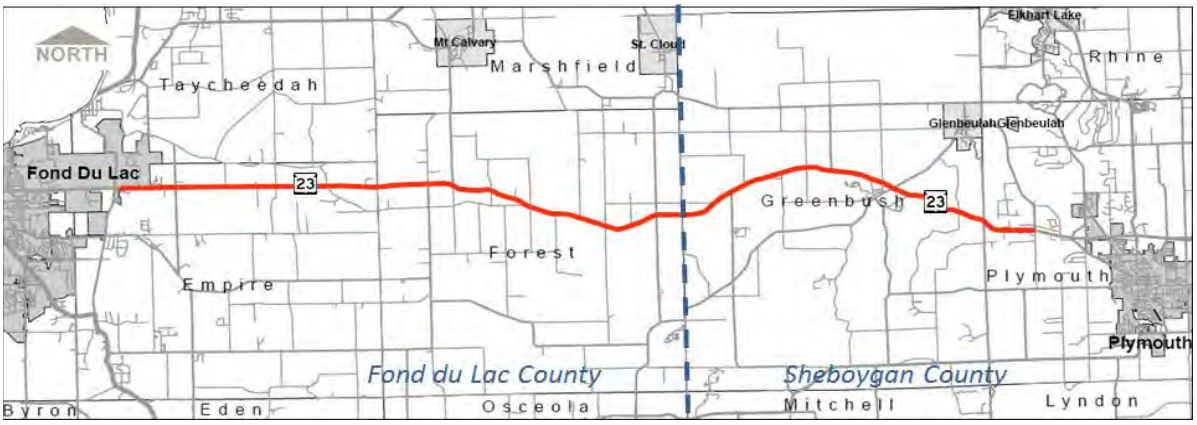



**Figure 3.4-1 Area Communities**

D. Public Lands

Public lands are located throughout the project area. The KMSF-NU, a Section 4(f) and Section 6(f) resource, is located at the east end of the project area. It is a 30,000-acre forest stretching across Sheboygan, Fond du Lac, and Washington counties. The Ice Age Trail (IAT) and the State Equestrian Trail are located within the KSMF-NU. These trails cross existing WIS 23 at Julie Court and are Section 4(f) resources.[2] See Section 5 for more information regarding the IAT, the State Equestrian Trail, and the KMSF-NU.

The Wade House Historic Site is located in the east portion of the corridor near Plymouth and just west of the KMSF-NU. Located on the south side of WIS 23, the site is run by the State Historical Society and is an educational, living history portrayal of a restored stagecoach inn built around 1850. The Wade House Historic Site contains three structures listed on the National Register of Historic Places (NRHP) It is a Section 4(f) resource and a Section 6(f) resource. (See Section 5.)

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

[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.

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 Wisconsin Department of Natural Resources (WDNR).

The 2,217-acre Mullet Marsh and Mullet Creek State Wildlife Area are one mile south of the corridor near Hillview Road. Mullet Creek flows through the entire property eventually joining the Sheboygan River. Figure 3.4-2 illustrates the public lands near the corridor.

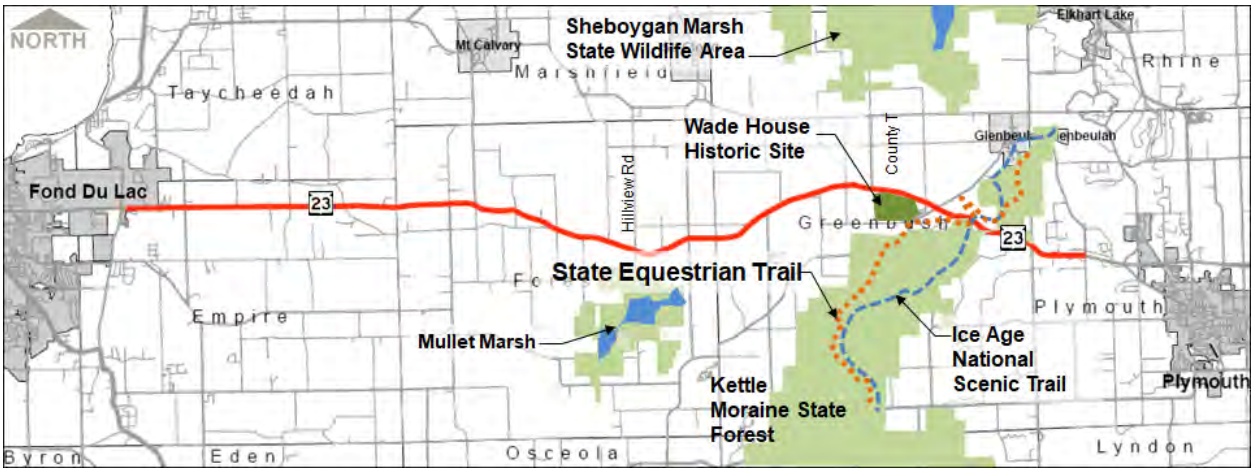



**Figure 3.4-2 Public Use Lands**

E. Other Trails and Resources

The 115-mile Kettle Moraine Scenic Drive travels across six Wisconsin counties. The northern end begins near Elkhart Lake in northern Sheboygan County and the southern end begins at Whitewater Lake in southeastern Walworth County. Traveling mostly on rustic roads, there are side road features such as picnic locations, natural areas, and historical sites. The Kettle Moraine Scenic Drive crosses the WIS 23 corridor at Scenic Drive on the east end of the corridor. Figure 3.4-3 illustrates a portion of the Kettle Moraine Scenic Drive.

There are several snowmobile trails along the WIS 23 project corridor with two mapped trail crossings in Fond du Lac County and two mapped crossings in Sheboygan County (see Figure 3.4-4). Snowmobilers use both county and state trails and private snowmobile club trails on private land. Snowmobiling is allowed on the existing Old Plank Road Trail.

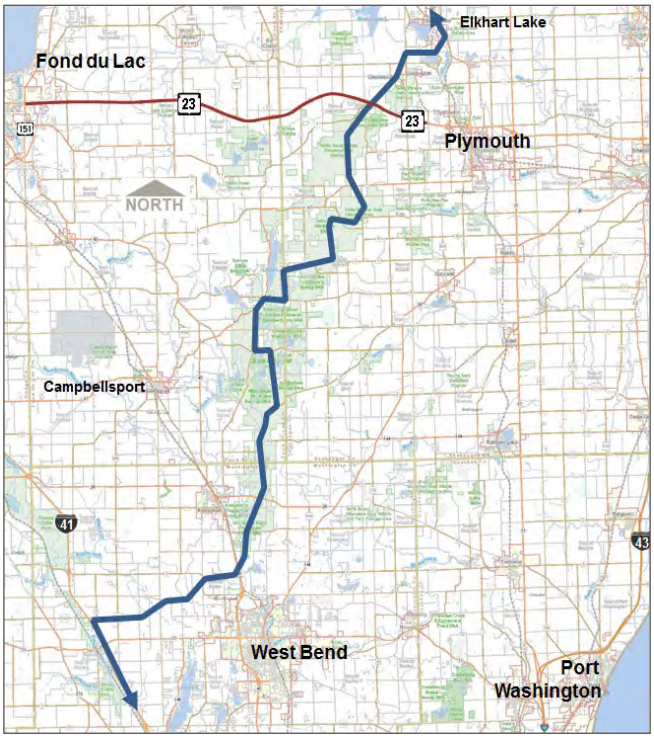



**Figure 3.4-3 Kettle Moraine Scenic Drive**


**Figure 3.4-4 Snowmobile Trails in the Project Corridor**

F. 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 publicly owned lands and urban areas. According to the 2012 Agricultural Census, Fond du Lac County has 262,142 acres of cropland and Sheboygan County has 155,878 acres of cropland. Corn for grain is the primary crop for Fond du Lac County (9.2 million bushels) with soybeans for beans following (1.9 million bushels). Corn for grain is also the primary crop for Sheboygan county (5.0 million bushels) followed by soybeans (1.4 million bushels). Figures from the University of Wisconsin (UW) Extension indicate that in 2012, Fond du Lac County's top commodities by sales were milk ($255 million), grain ($91.7 million), and cattle and calves ($43.5 million). Sheboygan County's top commodities include milk ($108.9 million), grains ($55.2 million), and other animals and products ($36.3 million). Both counties rely on agriculture jobs, providing 7,790 jobs in Fond du Lac County and 8,662 jobs in Sheboygan County. Farmers manage approximately 69 percent of the land in Fond du Lac County and 58 percent of the land in Sheboygan County.

Farm operations are scattered throughout the corridor. More details on agricultural land impacts can be found in Section 4.4 and Section 4.7 A-3 and the Executive Summary of the Agricultural Impact Statement (AIS) provided as Appendix K of the 2010 FEIS.

G. Institutions

The Fond du Lac School District, the Campbellsport School District, the Elkhart Lake-Glenbeulah School District, and the Plymouth School 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 the city of Fond du Lac.

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

Kettle Moraine Correctional Institution for adult males is located adjacent to KMSF-NU 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 the city of Fond du Lac is located on County K and is about two miles north of WIS 23. The presence of this institution skews income level and ethnic population demographic data for the town of Taycheedah.

H. Cemeteries

Forest Home Cemetery, Forest Cemetery, and Greenbush Cemetery are located about 1,000, 1,500, and 2,000 feet from WIS 23, 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.

I. Planning and Zoning

Municipalities in the project study area share a common goal of agricultural preservation. The towns of Forest, Empire, and Greenbush adopted comprehensive plans that list agricultural preservation as a goal.

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 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
- Village of Mount Calvary
- Village of St. Cloud
- Town of Taycheedah
- Town of Plymouth
- Town of Fond du Lac
- Town of Marshfield
- Sheboygan County

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. The rolling terrain makes this area attractive for residential development and residential subdivisions will likely occur in this growth area north and south of WIS 23.

The following bullets list the municipal and county land use-related and zoning ordinances within the project study area.

- Town of Forest–Zoning ordinance.
- Town of Empire–Subdivision ordinance and zoning ordinance.
- Village of Mount Calvary–Subdivision ordinance and zoning ordinance.
- Village of St. Cloud–Subdivision ordinance and zoning ordinance.
- Village of Glenbeulah–Zoning ordinance and shore land zoning ordinance.
- Town of Marshfield–Zoning ordinance.
- Town of Fond du Lac–Subdivision ordinance and zoning ordinance.
- City of Fond du Lac–Subdivision ordinance, zoning ordinance, and shore land/wetland zoning ordinance.

- City of Plymouth–Subdivision ordinance, zoning ordinance, and shore land/wetland zoning ordinance.
- Town of Taycheedah–Subdivision ordinance, zoning ordinance, and erosion control and stormwater management zoning ordinance.
- Town of Plymouth–Subdivision ordinance and zoning ordinance.
- Fond du Lac County–Subdivision ordinance, sanitary ordinance, shore land and floodplain ordinances, nonmetallic mining ordinance, traffic ordinance, and waterways ordinance.
- Town of Greenbush–Zoning ordinance.
- Sheboygan County–Subdivision ordinance, sanitary ordinance, shore land ordinance, floodplain ordinance, erosion control and stormwater ordinance, and nonmetallic mining ordinance.

More information on land use, land use plans, and zoning is included in the Indirect and Cumulative Effects Analysis in Appendix E.

J. Land Use Patterns

Existing land use in the study area is shown in Figures 3.4-5 and 3.4-6. Most of the land in the study area is nonirrigated cropland. Large portions in Sheboygan County include forested land that is part of the KMSF-NU.

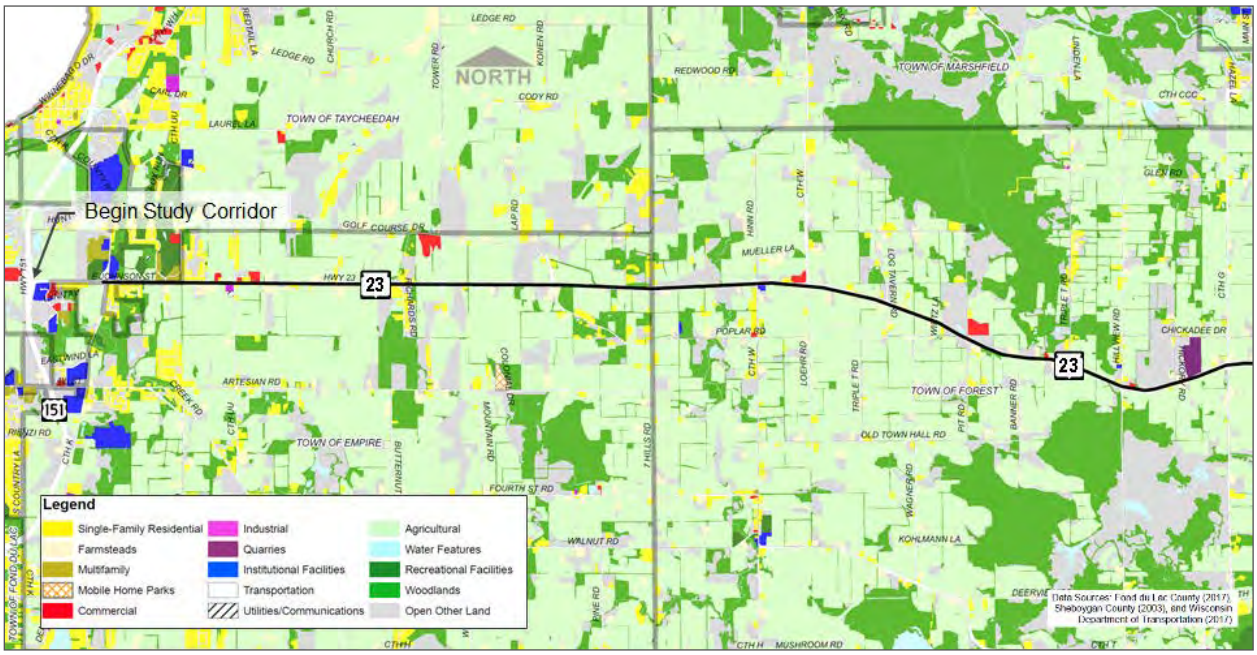



**Figure 3.4-5 WIS 23 Existing Land Use–Fond du Lac County**

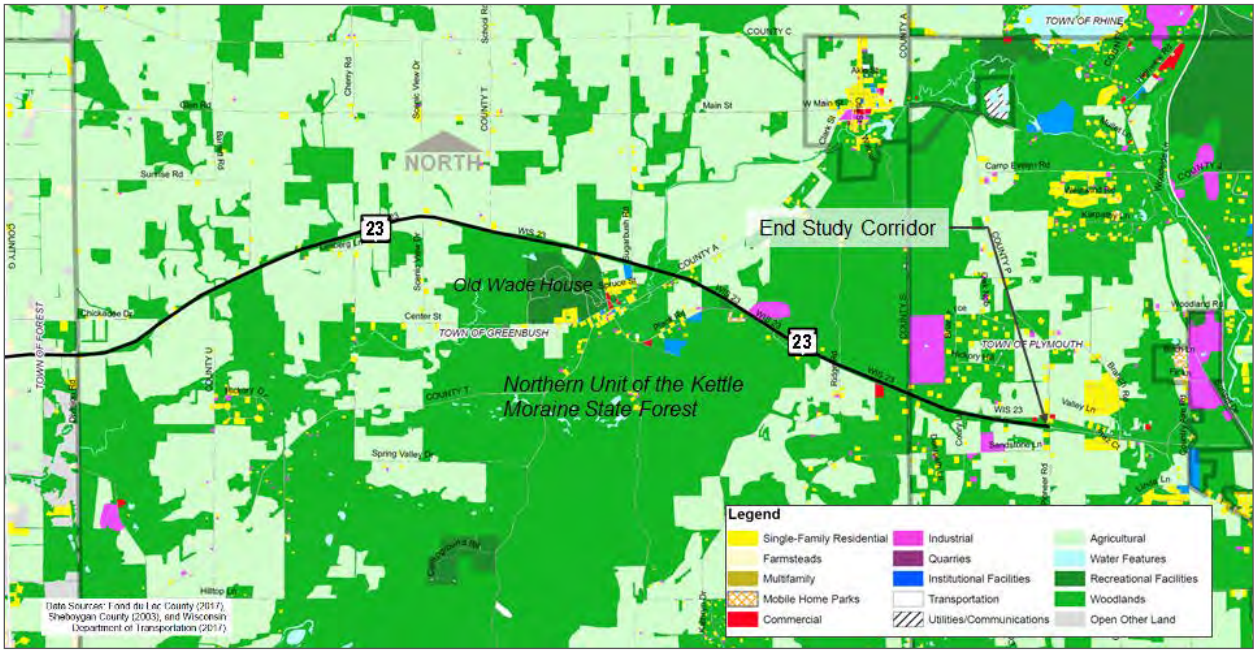



**Figure 3.4-6 WIS 23 Existing Land Use–Sheboygan County**

K. 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.

L. Utilities

Underground and overhead utilities are located throughout the project corridor. The following paragraphs summarize which utilities are located in different portions of the corridor. All of the utilities within Sheboygan County have been relocated to accommodate the 2014 LS SFEIS Preferred Alternative (4-lane On-alignment Alternative). See Section 6 for a listing of utility relocations.

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 five 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.

M. 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 I-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 U, County T, County A, County S, and County P in Sheboygan County all intersect WIS 23 and serve mostly north and south traffic movements.

There is no rail service in the area of WIS 23. Fond du Lac County Airport is approximately five miles west of the project, and the Sheboygan country Memorial Airport is approximately nine 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.

## 3.5 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 that 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 online at: http://dnr.wi.gov/). There are no Designated Natural Areas within the study area.

B. Surface Water and Fishery

There are four watershed areas within the study area: the Eastern Lake Winnebago Watershed, the Onion River Watershed, the Sheboygan River Watershed, and the Mullet River Watershed. There are three stream/river crossings of the corridor, the Sheboygan River, a tributary to the Sheboygan River, and the Mullet River. Taycheedah Creek also crosses US 151 south of its junction with WIS 23 and crosses WIS 23 just west of US 151. 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. 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 3.5-1). There are no WIS 23 crossings of Taycheedah Creek within the project limits.

2. Onion River Watershed

   The Onion River drains 99 square miles of the southernmost portion of the Sheboygan River Basin to the Sheboygan River (see Figure 3.5-2). The junction of Ben Nutt Creek and Mill Creek in the Kettle Moraine region, west and southwest of the city of Plymouth, join to form the Onion 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.

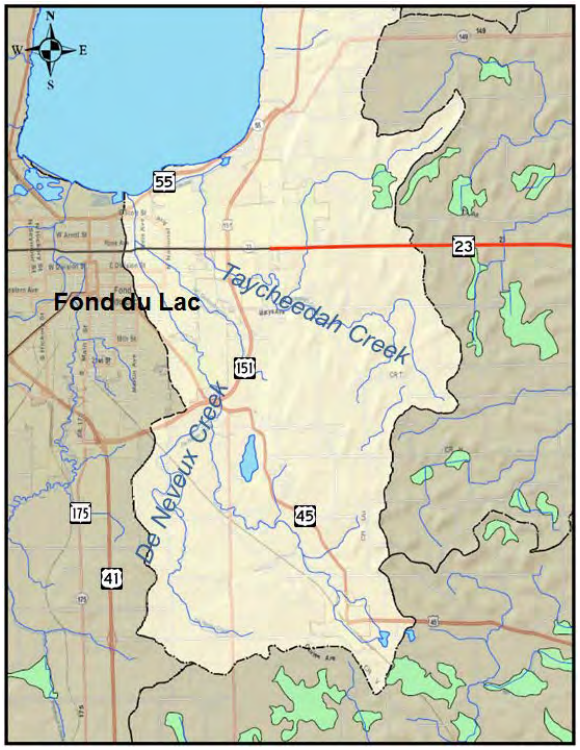



**Figure 3.5-1 Eastern Lake Winnebago Watershed**

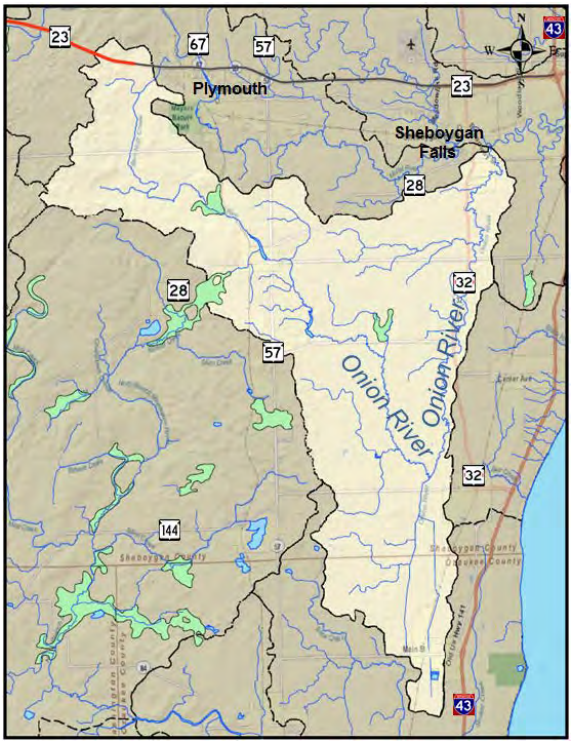



**Figure 3.5-2 Onion River Watershed**

*Source: WDNR Watershed maps*

3. Sheboygan River Watershed

WIS 23 has one major crossing of the Sheboygan River Watershed within the corridor study area. Within the watershed, WIS 23 crosses the Sheboygan River and an unnamed tributary of the Sheboygan River. In the study area, this reach of the Sheboygan River (Segment 5) originates at the headwaters and terminates 12.7 miles downstream at County W. The two waterways crossing WIS 23 support warm water sport fish and water quality is somewhat degraded by sedimentation, excess nutrients, and loss of habitat. Segment 5 of the Sheboygan River is not on the 303 (d) List of Impaired Waters, but farther downstream it is on the 303(d) List because of contaminated sediments. River mile 0 to 13.58 is on the 303(d) list because of polychlorinated biphenyl (PCB)-contaminated sediments. This segment is not in the corridor study area.

The Sheboygan River segment near WIS 23 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 primarily include 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, is a Class II trout stream. The creek begins about two miles north of WIS 23 and flows north. The creek is spring-fed and 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 3.5-3 for a diagram of the Sheboygan River Watershed.

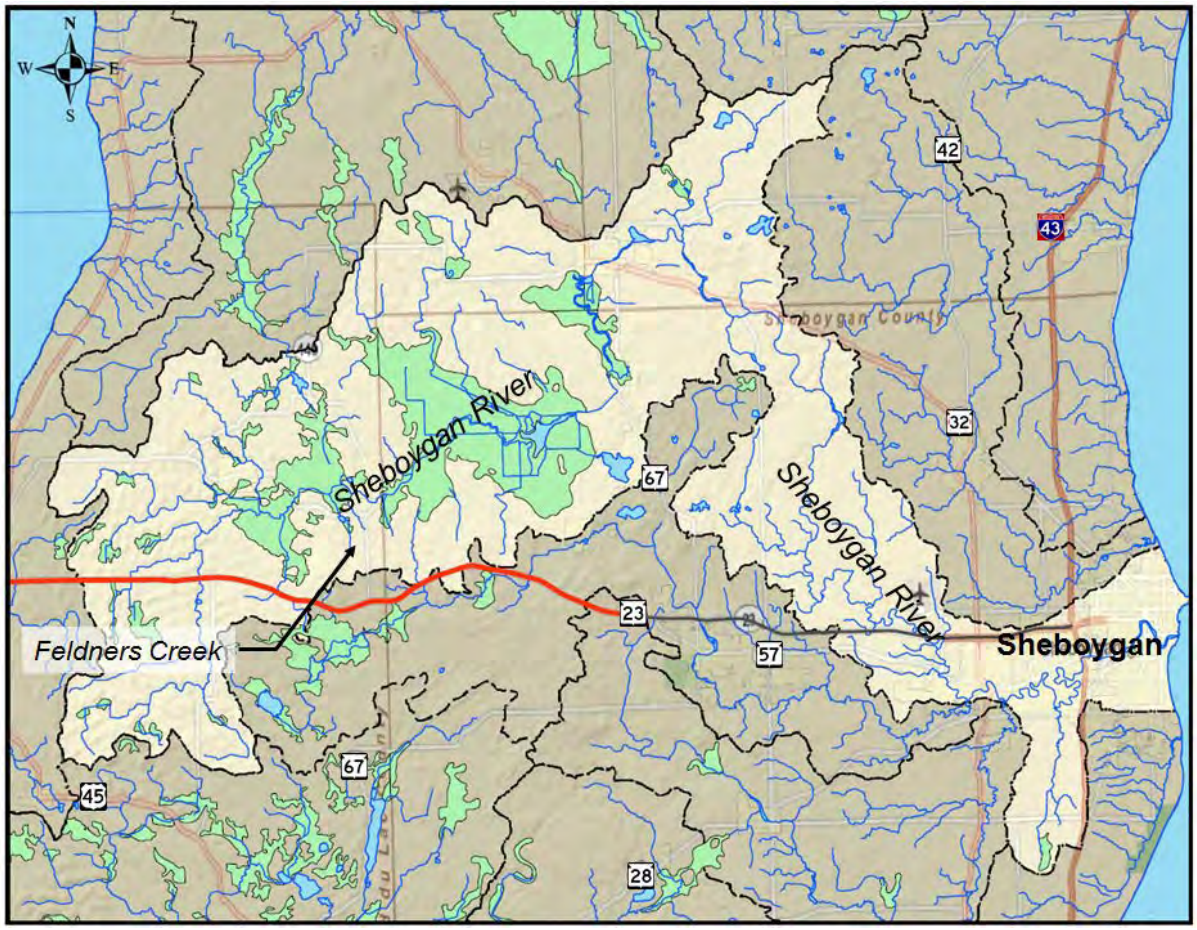



**Figure 3.5-3 Sheboygan River Watershed**
*Source: WDNR Watershed maps*

4. Mullet River Watershed

The Mullet River originates from the outflow of Mullet Lake and the Mullet Creek State Wildlife Area in Fond du Lac County and flows east approximately 40 miles to its confluence with the Sheboygan River in the town of Sheboygan Falls, 17 miles upstream of Lake Michigan. WIS 23 crosses the Mullet River once within the study area near the town of Greenbush. See Figure 3.5-4 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 central segment of the river, from the city of Plymouth to the village of Glenbeulah, has an increased spring flow and is classified as a Cold Water Community stream. 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. The river segment that crosses WIS 23 and flows through the KMSF-NU, the Mullet Creek State Wildlife Area, and the Wade House Historic Site, is located within the warm water segment.

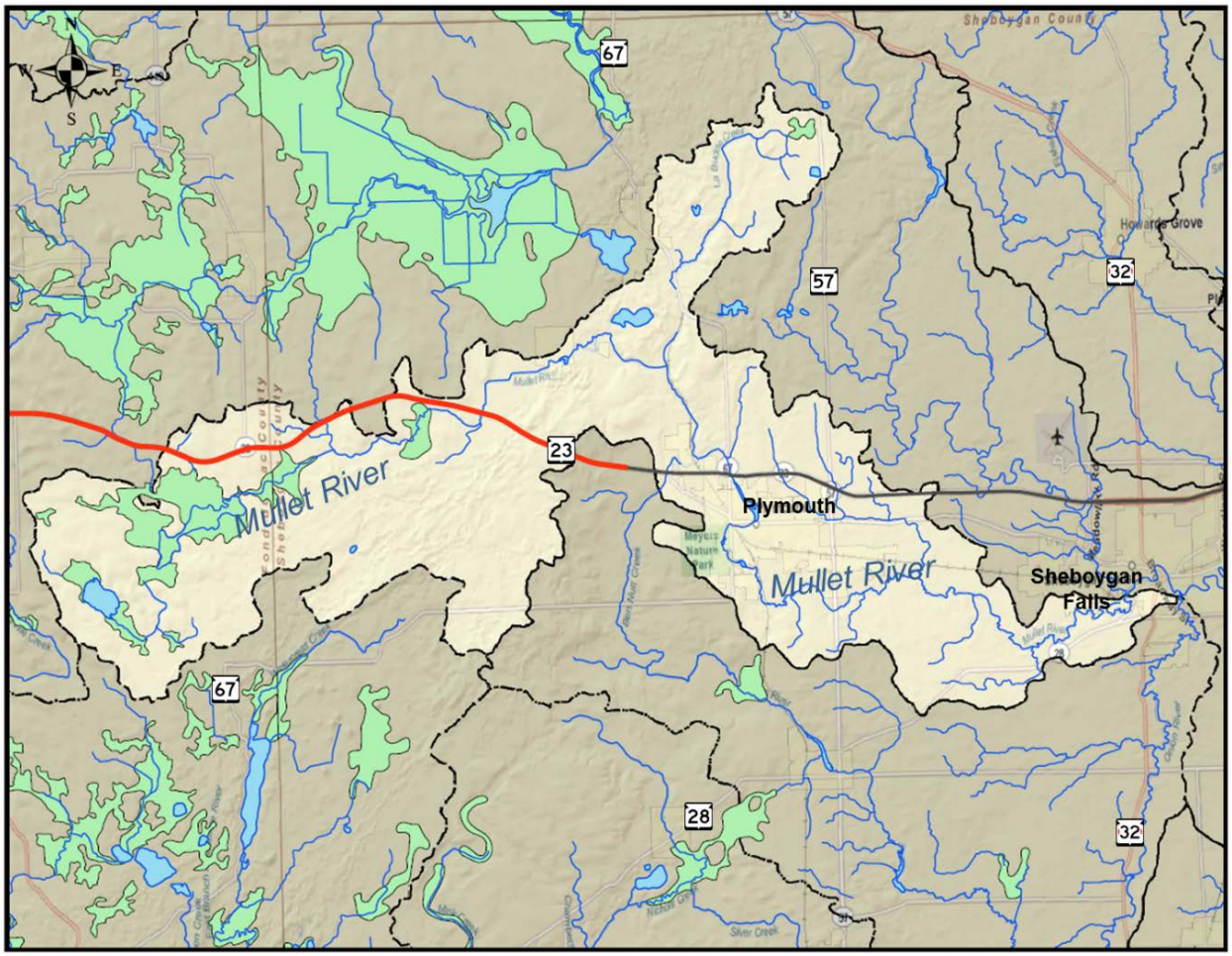



**Figure 3.5-4 Mullet River Watershed**
*Source: WDNR Watershed maps*

C. Floodplains

River crossings along WIS 23 with designated 100-year floodplains that provide several ecosystem functions include the Sheboygan and Mullet Rivers.

D. Groundwater and Water Supply

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

E. Wetlands

In Sheboygan County, high quality wetlands occur in the following areas:

- South of WIS 23 in the vicinity of the KMSF-NU–Riparian forested, riparian emergent, wooded swamp, and wet kettles.
- Wade House Historic Site–Riparian forested and riparian emergent.
- Along the Mullet River–Riparian forested and wooded swamp.

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.
- Where the Sheboygan River crosses WIS 23–Riparian emergent wet meadow.
- South of WIS 23 near Division Road–Shrub swamp.
- South of WIS 23 adjacent to Hillview Road and the Mullet Creek State Wildlife Area–Mixed hardwoods and emergent wet meadow.

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 3.5-5 shows an aerial photograph of the site.


**Figure 3.5-5 Pit Road Wetland Mitigation Site**

The Wade House Wetland Enhancement and Mitigation Site was created during the Robinson Herrling Sawmill and Dam restoration project. The U.S. Army Corps of Engineers (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 (Wisconsin Historical Society (WHS)/WDNR) and federal agencies (US Army Corps of Engineers (USACE)) has not identified "covenants" or permit conditions placed on existing mitigation lands. Figure 3.5-6 shows an aerial photograph of the site with the enhancement and mitigation site boundaries.


**Figure 3.5-6 Wade House Wetland Enhancement and Mitigation Site**

F. Uplands

Upland areas in the corridor are predominantly found in the vicinity of the KMSF-NU 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 in the central area of the project corridor provides good upland 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 non-tilled 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 (United States Fish and Wildlife Service (USFWS)) agencies do not provide direct location of the rare species to protect them from disturbance or collection. Publicly available WDNR rare species data from the Natural Heritage Inventory(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 3.5-1 shows the number of rare species (threatened or endangered) occurrences by township listed in the NHI. More rare species occur in Greenbush and Plymouth because of the KMSF-NU.

**Table 3.5-1 Rare Species Occurrences**

| Municipality | Town | Range | Plants | Terrestrial Animals | Aquatic Animals | Total Rare Species per Town |
|---|---|---|---|---|---|---|
| Empire | 15N | 18E | 1 | -- | -- | 1 |
| Forest | 15N | 19E | -- | 1 | 1 | 2 |
| Greenbush | 15N | 20E | -- | 5 | 3 | 8 |
| Plymouth | 15N | 21E | 3 | 3 | 2 | 8 |
| Data obtained from WDNR on-line Natural Heritage Inventory (NHI 10/31/17) | | | | | | |

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 listed 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. WisDOT also conducted a survey for snow trillium and no snow trillium was found. In general, the habitat near the Sheboygan River in Section 7 of Forest Township (T15N, R19E) and the Mullet River near the Wade House Historic Site 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 October 2017. 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 (see Section 6). The results of the October 2017 WDNR interaction are summarized in Table 3.5-2.

**Table 3.5-2 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 | | | | | | |
| Plant | Forked aster | *Eurybia furcata* | - | 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 | Snow trillium | *Trillium nivale* | - | THR | Hardwood forests, sometimes second-growth, often adjacent to rivers or streams. Rich, moist soils. | N |
| Plant | Marsh valerian | *Valeriana ulginosa* | - | THR | Calcareous, coniferous swamps. Wet to mesic, peaty, calcareous soils. | N |
| Plant | Many headed sedge | *Carex sychnocephala* | - | SC | Muddy, sandy, marly, and peaty shorelines of lakes and ponds. Wet, sandy, peaty, calcareous soils. | N |
| Plant | Yellow evening primrose | *Oenothera serrulata* | - | SC | Found mostly on steep bluff prairies along the Mississippi and lower St. Croix Rivers; cedar glades and, occasionally, in moist prairies. | N |
| Plant | Pitcher's thistle | *Cirsium pitcher* | THR | ND | Found in open sand dunes and low open beach ridges of the Great Lakes' shores. | N |
| Plant | Eastern prairie fringed orchid | *Platanthera leucophaea* | THR | ND | Found in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. | N |

**Table 3.5-2 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 | | | | | | |
| Mammal | Northern long-eared bat | *Myotis septentrionalis* | THR | ND | Found in caves and mines–swarming in surrounding wooded areas in autumn. During late spring and summer, the northern long-eared bat (NLEB) roosts and forages in upland forests. | May affect, but will not result in a prohibited take |
| Mussel | Slippershell mussel | *Alasmidonta viridis* | - | 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 | *Venustaconcha ellipsiformis* | - | 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 | *Villosa iris* | - | 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, and rock bass. Not found in surveys to date, but reported as occurring in the Sheboygan River on the WIS 23 corridor. | Y |
| 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. | N |
| 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. | N |

**Table 3.5-2 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 | Acadian flycatcher | *Empidonax virescens* | - | THR | Requires large tracts of mature mesic forest, with semi-open 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 KMSF-NU in southeast Wisconsin, they have nesting history in over mature 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. | N |
| Bird | Hooded warbler | *Wilsonia citrina* | - | THR | Found in large upland forest tracts in south Wisconsin. 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. | N |
| Bird | Whooping crane | *Grus americana* | NEP (experimental population, non-essential) | - | Species depends on large, open wetland ecosystems to eat, roost, and make their nests. No 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 | 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 |
| 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 |

**Table 3.5-2 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 | | | | | | |
| Snake | Butler's garter snake | *Thamnophis butleri* | - | SC | 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 (less than 24 inches), although will occupy habitats with taller vegetation such as reed canary grass. Investigated and not identified as concern on WIS 23 corridor. | N |
| Turtle | Blanding's turtle | *Emydoidea blandingii* | - | SC | 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 to October. Overwinters in standing water greater than 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. | 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 |
| 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,(*Cirsium muticum*) is host plant. Has a single two-week flight period between mid-July and mid-August. | N |
| **WDNR addition though initially distant T16N, R18E | | | | | | |

As presented in Table 3.5-2, 23 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 federally-listed species in Table 3.5-2 include the whooping crane, the NLEB, pitcher's thistle, and the eastern prairie fringed orchid. The 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. The federally listed NLEB, eastern prairie fringed orchid and pitcher's thistle are reported for Fond du Lac and Sheboygan counties and are all listed as threatened. According to WDNR, there are no known NLEB maternity roosting sites within 150 feet of the proposed project and no known hibernacula within 0.25 miles of the proposed project. According to the WDNR, suitable habitat is not anticipated within the project area for either the eastern prairie fringed orchid or the pitcher's thistle.

The endangered rainbow shell mussel and the endangered upland midwest pleistocene vertigo snail are the only WDNR S1-ranked species reported in the study area environments. An S1 species is 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 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. An S2-ranked species is 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 of 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 red shouldered hawk is ranked as S4 by WDNR. An S4 ranking means the species is apparently 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.

On January 1, 2014, the WDNR revised Wisconsin's Threatened and Endangered Species list by adding eight species and removing fifteen species. In the study area townships there are two reptiles that WDNR has changed the status for and one plant species the WDNR has removed from the threatened species list. These are the state-threatened Blanding's turtle (*Emydoidea blandingii*) and Butler's garter snake (*Thamnophis butleri*) (both made species of special concern), and the state-threatened yellow gentian (*Gentiana alba*) (removed).

There are also three threatened federal species that are located within the study area townships. These are the Pitcher's thistle (*Cirsium pitcher),* Eastern prairie fringed orchid *(Platanthera leucophaea*), and the NLEB *(Myotis septentrionalis).*

See Section 4.7 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 ($O_3$), nitrogen oxides (NO), carbon monoxide (CO), sulfur dioxide ($SO_2$), 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 WIS 23 corridor is located in the Lake Michigan Intrastate Air Quality Control Region. Fond du Lac County is presently in attainment of all NAAQS.

The project was included in the Metropolitan Planning Organization (MPO) assessment of conformity of the *Year 2045 Sheboygan Area Transportation Plan*, and although the project is located outside of the Sheboygan MPO's boundaries, through interagency consultation, it was agreed that this project (4-lane On-alignment Alternative) would be included in the Assessment of Conformity of the *Year 2045 Sheboygan Area Transportation Plan*, as it has been customary of the MPO to conduct conformity analyses for all of Sheboygan County and include modeling of capacity modifying projects in portions of the county outside the Sheboygan Metropolitan Planning Area in the analysis. WIS 23 is open to traffic by 2025 in the conformity analysis.

Per the Clean Air Act, states recommend designations to the USEPA following promulgation of a new NAAQS. In September 2016, Governor Walker recommended that the entire state of Wisconsin be designated as attainment of the 2015 ozone standard. On November 6, 2017 USEPA finalized "round 1" of its initial area designations for the 2015 standard. In April 2017, WDNR provided supplemental information to USEPA in support of the governor's recommendation. In February 2018, WDNR submitted additional comments to USEPA in response to USEPA's intended nonattainment area designations. On May 1, 2018 USEPA notified the state of its final designations for nonattainment of the 2015 ozone NAAQS. For Sheboygan County, the final moderate nonattainment area (the final rule was published in the Federal Register on June 4, 2018 and became effective 60 days later on August 3, 2018) is:

> Inclusive and east of the following roadways going from the northern county boundary to the southern county boundary: Highway 43, Wilson Lima Road, Minderhaud Road, County Road KK/Town Line Road, N 10th Street, County Road A S/Center Avenue, Gibbons Road, Hoftiezer Road, Highway 32, Palmer Road/Smies Road/Palmer Road, Amsterdam Road/County Road RR, Termaat Road.

The portion of proposed WIS 23 in Sheboygan County is not located in the 2015 Ozone NAAQS nonattainment area. However, the 2008 standard has not been revoked; control measures and transportation conformity continue to apply for the whole county under the 2008 standard.

According to the October 18, 2016, Updated FHWA Guidance 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 2040 WIS 23 traffic volumes of between 6,800 and 21,100 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. Because 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 3.5-3 provides an illustration of typical sound levels in dBA.

**Table 3.5-3 Typical A-Weighted Sound Levels**

| Sound Source | Sound Level (dBA) | Subjective Response |
|---|---|---|
| | 140 | Threshold of Pain |
| 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
http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/environment/typical-a-weighted-sound-lvl.pdf

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 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 4.7 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 4.7 D-2.

K. Contaminated Materials

A Phase 1 Hazardous Materials Assessment inventory was done within the corridor study area along WIS 23. 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 4.7 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 and 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, Onion River, and Eastern Lake Winnebago Watersheds).

Moderate to highly permeable 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 and gravel pits within the study area. Under WisDOT construction contracts, the contractor may select its 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 KMSF-NU to the east near the town of Greenbush, a forested glacial moraine area. Both features provide exceptional and unique views of Wisconsin geologic features. 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 and a bridge spanning the Sheboygan River. The existing roadway is exhibiting some signs of distress (cracks and ruts). Aesthetic quality of the majority of this corridor is considered moderate to high.

## 3.6 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 a 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 one 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 I 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. The APE is the viewshed of the 19.1-mile long WIS 23 project corridor from County K to County P, extending approximately one mile on either side of WIS 23. 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 was determined to be eligible for listing on the NRHP. The other three sites are not eligible for listing and no additional archaeological investigation is recommended.

In fall of 2017 WisDOT performed a review of the Phase I archeological surveys for the corridor and compiled the results of previous efforts. Of the 23 archaeological and cemetery/burial sites identified within the final project alignment by previous studies, 20 are not eligible, two are unevaluated, and one is eligible for the NRHP. Archaeological mitigation and data recovery at the NRHP eligible site 47SB0394 (Sippel Site) has been completed and the results are currently under review by the State Historic Preservation Office. Archaeological monitoring would be recommended if a build alternative is selected near two burial sites (47FD0245/BFD0197, 47FD0017/BFD0150). One archaeological site (47SB0440) was identified in 2015 near the study corridor. Further evaluations in the fall of 2017 determined that site 47SB0440 does not extend into the currently defined APE.

Additional information is provided in Section 4.7 B-6.

The project historian completed an identification survey, including a windshield survey of historic properties located within the APE. Background research identified three structures at the Wade House Historic Site 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 (DOE) 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 C (architecture). 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 the historic boundary for St. Mary's Springs Academy was provided to the State Historic Preservation Officer (SHPO). A revised Memorandum of Agreement (MOA) was signed by SHPO in 2013 and included in Appendix D of the 2014 LS SFEIS. To address schedule changes, the MOA was revised again (Amendment #2), signed by SHPO in 2018, and is included in Section 4.7 B-6. A more detailed discussion of the reduction of the historic boundary is provided in Section 4.7 B-5.

In 2017, an architectural review was performed to determine if there have been structures within the corridor that are now 50 years old or more, that did not fit into this category during the original architectural survey. The survey determined that no additional structures are eligible for the NRHP. 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 alternatives under consideration in this document. A copy of the Architecture/History Survey Form and the 2017 updates are available from WisDOT upon request.

Additional information related to historic structures can be found in Section 4.7 B-5.

THIS PAGE INTENTIONALLY LEFT BLANK