

**APPENDIX LS-C  
INDIRECT AND CUMULATIVE EFFECTS ANALYSIS**

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# Indirect and Cumulative Effects Analysis

WIS 23 Supplemental EIS

Updated: June 21, 2013



# TABLE OF CONTENTS

Table of Contents..... i

Table of Figures ..... iii

Chapter 1: Introduction ..... 1

    Methodology ..... 1

    Project Location and Study Area..... 6

Chapter 2: Inventory of the Study Area ..... 9

    Local and Regional Trend Data ..... 9

    Income and Employment Characteristics ..... 14

    Commuting Patterns..... 14

    Environmental Justice Data..... 16

    Agricultural Resources ..... 25

    Natural Resources ..... 25

    Historic and Archeological Resources ..... 33

    Existing Land Uses..... 34

    Review of Federal, State, County, Regional and Local Plans and Initiatives ..... 39

    Local Regulations and Tax Incremental Financing Districts ..... 47

Chapter 3: Indirect Effects Analysis..... 51

    Indirect Effects of No Build Alternative..... 52

    Indirect Effects of Build Alternative..... 58

Chapter 4: Cumulative Effects Analysis..... 67

    Scoping for the Cumulative Effects Analysis ..... 67

    The Affected Environment..... 70

    Determining the Environmental Consequences..... 74

Chapter 5: Activities to Avoid, Minimize, or Mitigate Effects ..... 89

    Avoidance Measures..... 90

    Minimization Measures..... 91

    Mitigation Measures ..... 92

Avoidance, Minimization, and Mitigation Measures Outside of WisDOT’s Jurisdiction..... 92

Monitoring and Evaluation of Cumulative Effects..... 94

Appendix A: Expert Panel Summary Maps .....95

Appendix B: Expert Panel Survey Results ..... 109

## TABLE OF FIGURES AND MAPS

Figure 0: Projected 2035 Traffic Volume Forecasts.....	3
<i>Map 1: Study Area.....</i>	<i>7</i>
Figure 1: Population Trends.....	9
Figure 2: Population Projections.....	11
Figure 3: Household Projections (2010-2030).....	12
Figure 4: Housing Characteristics.....	13
Figure 5: Income and Employment.....	14
Figure 6: Top Workplace Destinations for Fond du Lac County Residents, 2000.....	15
Figure 7: Top County's of Residence for Fond du Lac County Workers, 2000.....	15
Figure 8: Top Workplace Destinations for Sheboygan County Residents, 2000.....	16
Figure 9: Top County's of Residence for Sheboygan County Workers, 2000.....	16
Figure 10: Race and Ethnicity of ICE Study Area Communities.....	17
Figure 11: Poverty Rate in ICE Study Area Communities.....	18
Figure 12: Age in Study Area Counties.....	19
<i>Map 2: Minority Population Concentration.....</i>	<i>21</i>
<i>Map 3: Hispanic or Latino Population Concentration.....</i>	<i>22</i>
<i>Map 4: Population Concentration of Individuals Below Poverty Level.....</i>	<i>23</i>
<i>Map 5: Elderly (65+) Population Concentration.....</i>	<i>24</i>
Figure 13: Impacts of the Agricultural Economy.....	25
Figure 14: Rare Species Occurrences in Towns and Counties within ICE Study Area.....	31
Figure 15: National Ambient Air Quality Standards.....	32
<i>Map 6: Agricultural Resources.....</i>	<i>35</i>
<i>Map 7a: Natural Resources.....</i>	<i>36</i>
Map 7b: Natural Resources.....	37
<i>Map 8: Existing Land Use.....</i>	<i>38</i>
Figure 16: Kettle Moraine State Forest – Northern Unit Designated Trails and Public Use Areas.....	41
Figure 17: Land Regulations and Tax Incremental Financing (TIF) Districts.....	48
<i>Map 9a: Future Land Use (Towns).....</i>	<i>49</i>
<i>Map 9b: Future Land Use (Cities and Villages).....</i>	<i>50</i>

Figure 18: Existing and Forecasted Average Daily Traffic .....	53
Figure 19: Existing and Forecasted Average Daily Traffic .....	59
Figure 20: Annual New Privately Owned Residential Building Permits, Estimates with Imputation.....	68
Figure 21: Household Projections (2010-2030) .....	69
Figure 21: Agriculture Trends .....	70
Figure 22: Stresses Affecting Resources .....	73
Figure 23: Emission vs. Speed .....	77
Map 10: Expert Panel Summary of No Build Alternative Land Use Impacts.....	97
Map 11: Expert Panel Summary of No Build Alternative Resource Impacts.....	98
Map 12: Build Alternative Improvements (West) .....	99
Map 13: Build Alternative Improvements (Central) .....	100
Map 14: Build Alternative Improvements (East) .....	101
Map 15: Expert Panel Summary of Build Alternative (West) Land Use Impacts .....	102
Map 16: Expert Panel Summary of Build Alternative (Central) Land Use Impacts .....	103
Map 17: Expert Panel Summary of Build Alternative (East) Land Use Impacts .....	104
Map 18: Expert Panel Summary of Build Alternative (West) Resource Impacts.....	105
Map 19: Expert Panel Summary of Build Alternative (Central) Resource Impacts.....	106
Map 20: Expert Panel Summary of Build Alternative (East) Resource Impacts .....	107

# CHAPTER 1: INTRODUCTION

## Methodology

The methodology used in this report is based on the Wisconsin Department of Transportation's Guidance for *Conducting an Indirect Effects Analysis* (November 2007) and *Guidance for Conducting a Cumulative Effects Analysis* (November 2007). The guidance for indirect effects was based on a variety of resources and references including *NCHRP Report 466, 2002* and *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, FHWA, January 2003*. The cumulative effects guidance was based on the CEQ "Eleven Step" process that is described in *Considering Cumulative Effects Under the National Environmental Policy Act (NEPA), Council on Environmental Quality, January 1997*.

The study team gained substantial knowledge of natural, cultural and historic resources, key demographic and development trends, and local comprehensive plans and development regulations in the ICE study area through compiling the ICE Study Background Report. To provide more detailed local knowledge, the study team engaged the participation of an expert panel comprised of planning, development and conservation officials active in the ICE study area. The expert panel members were asked to complete a lengthy questionnaire about potential indirect and cumulative effects of the WIS 23 No-Build and Build Alternatives, including mapping the locations of identified impacts. Following the compilation of questionnaire and mapping results, the study team held a 2.5 hour workshop with expert panel members to confirm points of consensus and disagreement about potential impacts. During the course of the workshop, many contending opinions were discussed in detail, additional information and insights came to the fore, and a very high degree of consensus emerged.

In addition to compiling the ICE Study Background Report, and reviewing the results of the Expert Panel Questionnaire and Workshop, the ICE study team also drew on substantial internal professional planning, zoning and development expertise. Specifically, the study team consisted of Michael Slavney, FAICP, with 30 years of professional experience for over 30 local governments and Jessica Schmiedicke, AICP, with 7 years of professional experience, and Tom Lynch, PE, with 24 years of professional experience. Mr. Slavney and Ms. Schmiedicke designed the expert panel Questionnaire and accompanying Impact Maps, compiled expert panel input, and facilitated the Expert Panel Workshop to discuss and confirm points of consensus and disagreement. Following the Workshop, the study team combined the local and professional knowledge of the expert panel, with their professional knowledge to write the ICE Report.

### *Indirect Effects Methodology*

The WisDOT six-step method for analyzing a transportation project's potential indirect effects was used to conduct the WIS 23 indirect impacts analysis.

1. Scope, select the tools/activities, and determine the study area.  
In selecting tools, the study team referenced Appendix B in WisDOT's Guidance for Conducting an Indirect Effects Analysis. Of the various methods referred to in this document, trend analysis, expert panels, and the Delphi method<sup>1</sup> were most appropriate because these methods leveraged the use of existing information and knowledge. Local land use staff and community officials have the greatest

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<sup>1</sup> The Delphi method is a structured communication technique that relies on a panel of experts. Typically a panel of experts answer questionnaires. After the questionnaires are completed, a facilitator provides an anonymous summary of the findings and reasons for them. In a meeting, or otherwise, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel.

insight into local development trends and have the greatest awareness of potential development proposals.

2. Inventory the study area and notable features.  
See Chapter 2: Inventory of the Study Area.
3. Identify the impact causing activities of the proposed project alternatives.

The No-Build Alternative does not provide access management features, does not provide travel time improvements, and does not include trail enhancements. The No-Build Alternative will have no impacts since it serves as the baseline condition.

The Preferred Build Alternative would expand WIS 23 to 4 lanes and construct interchanges and J-turns at high use intersections. It also extends the Old Plank Road Trail to Fond du Lac and installs a grade-separated crossing for the Ice Age Trail and State Equestrian Trail. The net benefits include improved travel time, increased safety, and better trail facilities along and across WIS 23. The possible disadvantages include the purchase of about 424 acres of new right of way consisting of cropland, uplands, and wetlands. Disadvantages also include the relocation of 51 residences, 10 businesses, and 19 farms.

The benefits of the Preferred Build Alternative could also enable effects that are indirectly associated with the project. Improved travel times could, over time, cause people to make location choices that increase the pace of development along the corridor. Access management features could affect the location of new development, particularly commercial development. The indirect effects of changes to development pace and location would create impacts to the natural environment.

The improved travel times, mobility, and safety would also increase daily travel volumes in the corridor. Figure 0 illustrates the difference in 2035 traffic volumes the corridor would experience between the No-Build and Preferred Build Alternatives<sup>2</sup>.

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<sup>2</sup> Forecast volumes were updated in July 2012 by WisDOT's Traffic Forecasting Section in Madison using both a newly developed travel demand model (TDM) for the Northeast Region, and other post processing measures that use traffic counts. See Section 1.3 of the LS SDEIS.

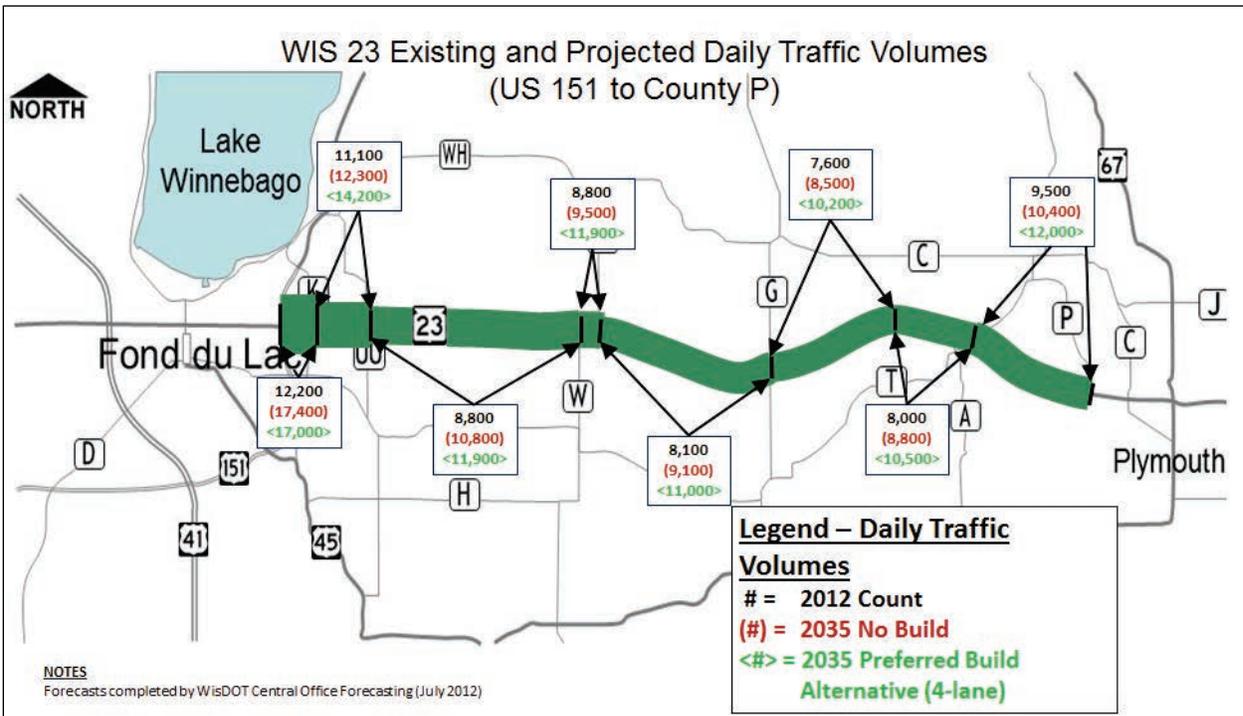


Figure 0: Projected 2035 Traffic Volume Forecasts

4. Identify the potentially significant indirect effects.  
See Chapter 3: Indirect Effects Analysis.
5. Analyze the indirect effects and evaluate assumptions.  
See Chapter 3: Indirect Effects Analysis.
6. Assess consequences and identify mitigation activities.  
See Chapter 5: Activities to Avoid, Minimize, or Mitigate Effects.

### *Cumulative Effects Methodology*

The Council on Environmental Quality's "Eleven-Step" Process was used to conduct the WIS 23 cumulative impacts analysis.

#### SCOPING FOR THE CUMULATIVE EFFECTS ANALYSIS

1. Identify the significant issues associated with the proposed action and define the assessment.  
See Chapter 2: Inventory of the Study Area.
2. Establish geographic scope for the analysis.  
See Project Location and Study Area section below.
3. Establish timeframe for analysis (into future).  
The timeframe for this cumulative effects analysis is 20 years which corresponds with the planning horizon of the majority of local comprehensive plans; however, it can be assumed that the effects

identified in this analysis would continue to be valid after 20 years if local policies and regulations remain the same.

4. Identify other actions affecting the natural, historic, cultural resources, ecosystems and human communities of concern.  
See Chapter 4: Cumulative Effects Analysis.

#### DESCRIBING THE AFFECTED ENVIRONMENT

5. Characterize resources identified in scoping in terms of their response to change and capacity to withstand stress.  
See Chapter 4: Cumulative Effects Analysis.
6. Characterize the stresses affecting these resources and their relation to regulatory thresholds.  
See Chapter 4: Cumulative Effects Analysis.
7. Define a baseline condition for the resources.  
See Chapter 2 Inventory of the Study Area.

#### DETERMINING THE ENVIRONMENTAL CONSEQUENCES

8. Identify the important cause and effect relationships between human activities including the proposed project and resources.  
See Chapter 4: Cumulative Effects Analysis.
9. Determine the magnitude and significance of cumulative effects to those resources identified in the analysis.  
See Chapter 4: Cumulative Effects Analysis.
10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.  
See Chapter 5: Activities to Avoid, Minimize or Mitigate Effects.
11. Monitor the cumulative effects of the selected alternative and adapt management.  
See Chapter 5: Activities to Avoid, Minimize or Mitigate Effects.

The ICE study team solicited opinions on potential indirect and cumulative impacts of project alternatives from local experts using the Delphi method. Experts were selected based on their professional areas of expertise and their local knowledge of the project study area. The expert panel members included local and regional land use and transportation planners, economic development professionals, and agricultural, natural, and cultural resource experts. The inventory report was provided to panel members to provide an overview of the project and proposed alternatives as well as existing conditions and policies of state and local government. Panel members were asked to review the inventory report, respond to an online survey, and complete a mapping exercise identifying potential indirect and cumulative effects for each of the WIS 23 alternatives. Panelists were also asked to attend a facilitated panel discussion where panelists shared their survey and map responses. The discussion format enabled the identification of points of consensus and disagreement on possible impacts.

Representatives from the following agencies and communities participated:

- Town of Plymouth
- Town of Greenbush
- Town of Forest
- Town of Marshfield
- Town of Taycheedah

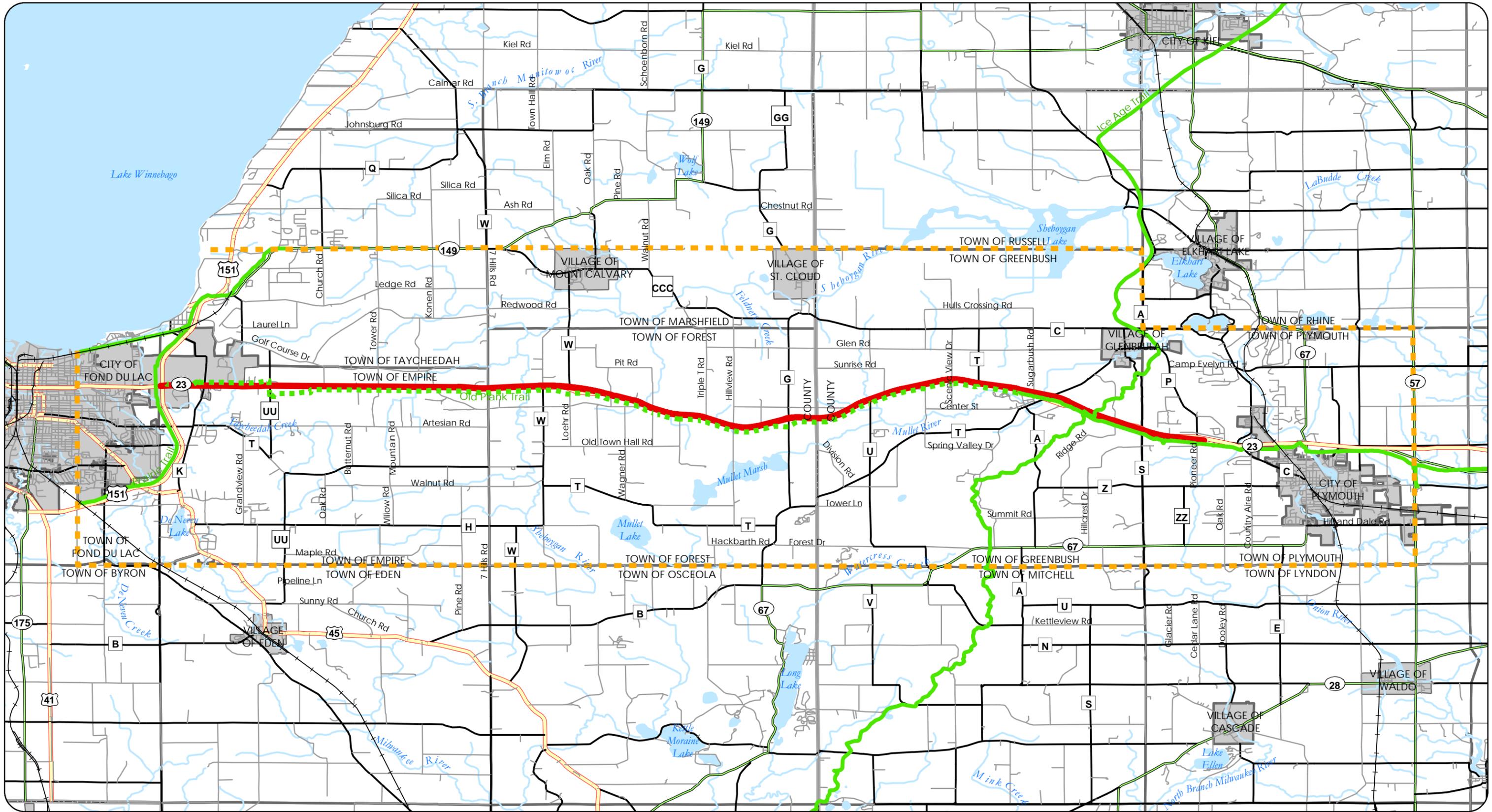
- Village of St. Cloud
- Village of Mt Calvary
- Village of Glenbeulah
- City of Plymouth
- City of Fond du Lac
- Sheboygan County Planning Department
- Fond du Lac County Planning Department
- Fond du Lac Metropolitan Planning Organization
- East Central Wisconsin Regional Planning Commission
- Bay-Lake Wisconsin Regional Planning Commission
- WisDNR Wildlife Management, Eastern Fond du Lac and Sheboygan Counties
- Wisconsin Department of Agriculture, Trade, and Consumer Protection
- University of Wisconsin-Extension, Sheboygan County
- University of Wisconsin-Extension, Fond du Lac County
- Wade House Historic Site-Wisconsin Historical Society
- Glacial Lakes Conservancy
- Niagara Escarpment Resource Network

Expert panel responses to the online survey and mapping exercise were tabulated and summarized; the findings of which were used to inform the indirect and cumulative effects analysis sections of this document. Appendix B includes a summary of all survey responses.

## Project Location and Study Area

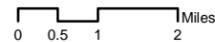
WIS 23 is a connector route in the WisDOT Corridors 2030 state highway plan, is a major east-west highway connecting US 41 and I-43 between the Fox Cities and Milwaukee, and provides a direct route between Fond du Lac and Sheboygan.

This WIS 23 project extends from County K on the east side of the city of Fond du Lac, about one-half mile east of the new US 151/WIS 23 interchange, easterly approximately 19 miles to County P on the west side of the city of Plymouth. The ICE study area for indirect and cumulative impacts is depicted on Map 1. The study area is defined by commutershed and civil boundaries. Land use planners on the study team interacted with staff planners from Fond du Lac County, Sheboygan County, and East Central Wisconsin Planning Commission to determine the likely range of influence from the WIS 23 corridor. Beyond the study area, the influence of WIS 23 diminishes as other arterial corridors provide access to adjacent lands. It includes the following jurisdictions: city of Fond du Lac, village of Mt. Calvary, village of St. Cloud, town of Empire, town of Forest, town of Taycheedah, and town of Marshfield in Fond du Lac County and the city of Plymouth, village of Glenbeulah, town of Greenbush, and town of Plymouth in Sheboygan County.



**WIS 23  
Supplemental EIS**  
Map 1: Study Area

Sources: Fond du Lac County, Sheboygan County, WIDNR, WisDOT,  
US Census Bureau, Strand Associates, Vandewalle & Associates



4/1/2013



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- WIS 23
- - - WIS 23 ICE Study Area

- US Highway
- State Highway
- County Highway
- + Railroad

- Existing Trail
- - - Proposed Trail

- County Boundary
- City or Village Boundary
- Town Boundary
- Surface Water

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## CHAPTER 2: INVENTORY OF THE STUDY AREA

The project team gathered data on existing characteristics and current trends in the study area. This information was provided to the expert panel.

### Local and Regional Trend Data

Figure 1 displays population trends and projections for study area communities as well as for Fond du Lac and Sheboygan counties as a whole. As indicated below, population changes have varied greatly. At the west end of the study area, the towns nearest the city of Fond du Lac experienced the highest percentage changes between 1990 and 2010.

Figure 1: Population Trends

	1990	2000	2010	# Change 2000-2010	% Change 2000-2010
Town of Fond du Lac	2,308	2,027	3,015	988	48.7%
Town of Empire	2,485	2,620	2,797	177	6.8%
Town of Taycheedah	3,383	3,666	4,205	539	14.7%
Town of Forest	1,094	1,108	1,080	-28	-2.5%
Town of Marshfield	1,130	1,118	1,138	20	1.8%
Village of Mt. Calvary	558	956	762	-194	-20.3%
Village of St. Cloud	594	497	477	-20	-4.0%
City of Fond du Lac	37,757	42,203	43,021	818	1.9%
Fond du Lac County Portion of Study Area Total	49,309	54,195	56,495	2,300	4.2%
Town of Greenbush	1,943	2,773	1,534	-1,239	-44.7%
Town of Plymouth	2,911	3,115	3,195	80	2.6%
Village of Glenbeulah	386	378	463	85	22.5%
City of Plymouth	6,769	7,781	8,445	664	8.5%
Sheboygan County Portion of Study Area Total	12,009	14,047	13,637	-410	-2.9%
<b>Study Area Total</b>	<b>61,318</b>	<b>68,242</b>	<b>70,132</b>	<b>1,890</b>	<b>2.8%</b>
Fond du Lac County	90,083	97,296	101,633	4,337	4.5%

Sheboygan County	103,877	112,646	115,507	2,861	2.5%
Wisconsin	4,891,769	5,363,675	5,686,986	323,311	6.0%

*Source: US Census Bureau, 1990, 2000, 2010 Population of the Census.*

Figure 2 displays Wisconsin Department of Administration population projections for the study area communities. In general, communities throughout the study area are projected to grow. The village of Mt. Calvary and the city of Plymouth are projected to have the largest percentages changes while the town of Marshfield's population is expected to decrease.

**Figure 2: Population Projections**

	2015	2020	2025	2030	# Change 2015-2030	% Change 2015-2030
Town of Fond du Lac	2,542	2,603	2,657	2,697	155	6.1%
Town of Empire	2,971	3,081	3,181	3,265	294	9.9%
Town of Taycheedah	4,258	4,446	4,622	4,773	515	12.1%
Town of Forest	1,166	1,186	1,201	1,211	45	3.9%
Town of Marshfield	1,136	1,140	1,140	1,133	-3	-0.3%
Village of Mt. Calvary	1,066	1,128	1,186	1,237	171	16.0%
Village of St. Cloud	517	520	523	523	6	1.2%
City of Fond du Lac	46,072	47,664	49,118	50,312	4,240	9.2%
Fond du Lac County Portion of Study Area	59,728	61,768	63,628	65,151	5,423	9.1%
Town of Greenbush	2,903	3,063	3,216	3,355	452	15.6%
Town of Plymouth	3,526	3,647	3,760	3,857	331	9.4%
Village of Glenbeulah	449	467	484	499	50	11.1%
City of Plymouth	9,197	9,726	10,233	10,696	1,499	16.3%
Sheboygan County Portion of Study Area	16,075	16,903	17,693	18,407	2,332	14.5%
<b>Study Area Total</b>	<b>75,803</b>	<b>78,671</b>	<b>81,321</b>	<b>83,558</b>	<b>7,755</b>	<b>10.2%</b>
Fond du Lac County	106,183	109,391	112,268	114,557	8,374	7.9%
Sheboygan County	123,209	127,195	130,875	133,979	10,770	8.7%
Wisconsin	5,988,420	6,202,810	6,390,900	6,541,180	552,760	9.2%

Source: Wisconsin Department of Administration, 2015-2030 Population Projections, 2008.

Figure 3 shows household projections for study area communities and counties. As indicated below, the study area is expected to see increases in the number of households, primarily in the city of Fond du Lac. The villages of Mt. Calvary, St. Cloud, and Glenbeulah and the towns of Marshfield and Forest are projected to only see modest increases in the number of households by 2030.

**Figure 3: Household Projections (2010-2030)**

	2010	2015	2020	2025	2030	# Change 2015-2030	% Change 2015-2030
Town of Fond du Lac	1,014	1,055	1,092	1,122	1,144	130	12.8%
Town of Empire	1,045	1,100	1,153	1,198	1,236	191	18.3%
Town of Taycheedah	1,539	1,634	1,724	1,803	1,872	333	21.6%
Town of Forest	432	445	458	467	473	41	9.5%
Town of Marshfield	397	405	410	413	413	16	4.0%
Village of Mt. Calvary	225	242	259	274	288	63	28.0%
Village of St. Cloud	199	204	207	210	211	12	6.0%
City of Fond du Lac	18,398	19,332	20,199	20,946	21,569	3,171	17.2%
Fond du Lac County Portion of Study Area	23,249	24,417	25,502	26,433	27,206	3,957	17.0%
Town of Greenbush	576	616	654	691	727	151	26.2%
Town of Plymouth	1,208	1,263	1,316	1,368	1,413	205	17.0%
Village of Glenbeulah	179	188	198	207	214	35	19.6%
City of Plymouth	3,744	4,008	4,270	4,527	4,767	1,023	27.3%
Sheboygan County Portion of Study Area	5,707	6,075	6,438	6,793	7,121	1,414	24.8%
<b>Study Area Total</b>	<b>28,956</b>	<b>30,492</b>	<b>31,940</b>	<b>33,226</b>	<b>34,327</b>	<b>5,371</b>	<b>18.5%</b>
Fond du Lac County	41,036	42,933	44,692	46,164	47,362	6,326	15.4%
Sheboygan County	47,310	49,304	51,241	53,092	54,718	7,408	15.7%

Source: Wisconsin Department of Administration, 2015-2030 Housing Projects, 2008.

Figure 4 lists 2010 housing characteristics in the study area including average household size, number of housing units and vacancy rates for the year, and median home value estimates. In terms of home values, housing is considerably more affordable in the city of Fond du Lac and villages of St. Cloud and Glenbeulah compared to other communities in the study area. Home values in the towns of Taycheedah, Plymouth, Empire, and Fond du Lac are the highest among study area communities and respective counties.

**Figure 4: Housing Characteristics**

	Average Household Size	Total Housing Units	Occupied Housing Units	Home Owner Vacancy Rate	Median Value Owner Occupied Housing
Town of Fond du Lac	2.58	1,239	1,167	2.50%	\$218,200
Town of Empire	2.64	991	957	0.00%	\$227,600
Town of Taycheedah	2.62	1,755	1,602	1.60%	\$228,800
Town of Forest	2.67	436	404	1.60%	\$174,000
Town of Marshfield	2.51	497	422	1.10%	\$176,500
Village of Mt. Calvary	2.59	197	183	0.00%	\$136,400
Village of St. Cloud	2.29	216	208	2.70%	\$129,500
City of Fond du Lac	2.28	19,181	17,942	2.40%	\$122,900
Town of Greenbush	2.7	594	568	1.50%	\$196,000
Town of Plymouth	2.64	1,229	1,152	1.40%	\$211,600
Village of Glenbeulah	2.39	204	194	3.00%	\$131,300
City of Plymouth	2.26	4,039	3,710	2.30%	\$149,700
Fond du Lac County	2.41	43,451	40,484	1.10%	\$143,000
Sheboygan County	2.42	50,766	46,390	2.20%	\$151,100

Source: U.S. Census 2010

## Income and Employment Characteristics

Figure 5 shows income and employment information in the study area. Median household income ranged from \$43,000 to nearly \$85,000. The town of Empire had the highest median household income compared to other study area communities; the cities of Fond du Lac and Plymouth had the lowest. The percentage of families below the poverty level was highest in the cities of Fond du Lac and Plymouth. Communities with low percentages of families in poverty include the towns of Plymouth, Fond du Lac, Forest, and Marshfield, and the village of Glenbeulah has no families in poverty. The percentage of the population in the labor force for each community is also depicted in Figure 5. Study area communities were generally comparable to the overall percentage for Fond du Lac and Sheboygan counties, with the town of Empire and village of Mt. Calvary having the highest percentage of population in the labor force compared to other study area communities.

Figure 5: Income and Employment

	Median Household Income	Percent of Families below Poverty Level	% Population in Labor Force
Fond du Lac County	\$51,549	9.2%	70.8%
Town of Fond du Lac	\$70,509	1.4%	70.2%
Town of Empire	\$85,169	3.4%	78.1%
Town of Taycheedah	\$71,823	4.4%	67.4%
Town of Forest	\$62,639	2.2%	79.6%
Town of Marshfield	\$69,643	2.7%	74.2%
Village of Mt. Calvary	\$56,875	4.3%	78.1%
Village of St. Cloud	\$57,411	5.9%	71.1%
City of Fond du Lac	\$44,128	12.4%	70.2%
Sheboygan County	\$51,127	8.4%	69.7%
Town of Greenbush	\$66,339	6.5%	34.7%
Town of Plymouth	\$76,667	1.4%	66.9%
Village of Glenbeulah	\$51,250	0.0%	71.5%
City of Plymouth	\$43,318	13.1%	68.8%

Sources: American Community Survey, 2006-2010

## Commuting Patterns

United States Census Bureau “place of work” data provides an indication of how the WIS 23 corridor is used for worker commuting. Figures 6 through 9 list the volume of commuters between counties based on the 2000 Census (2010 Census commuting data was not available at the time of writing).

In 2000, there were 53,717 workers in the Fond du Lac County workforce (58,491 in 2010). Of those, 36,585 workers (68 percent) in Fond du Lac County remained in Fond du Lac County to work. As shown in Figure 6, Dodge County was the top workplace destination for Fond du Lac County residents who work outside of their county of residence. As shown in Figure 7, the majority of workers residing outside of Fond du Lac County live in Winnebago County.

In 2000, there were 61,080 in the Sheboygan County workforce (62,748 in 2010). A total of 51,484 workers (84 percent) remained in Sheboygan County to work. As shown in Figure 8, Ozaukee County was the top workplace destination for Sheboygan County residents who work outside of their county of residence. As shown in Figure 9, the majority of workers residing outside of Sheboygan County live in Manitowoc County.

**Figure 6: Top Workplace Destinations for Fond du Lac County Residents, 2000**

County	Workers	Percentage
Fond du Lac County	36,585	68.1%
Dodge County	4,401	8.2%
Winnebago County	2,721	5.1%
Washington County	2,057	3.8%
Sheboygan County	980	1.8%
Green Lake County	755	1.4%

*Source: US Census, 2000*

**Figure 7: Top County's of Residence for Fond du Lac County Workers, 2000**

County	Workers	Percentage
Fond du Lac County	36,585	68.1%
Winnebago County	2,544	4.7%
Dodge County	1,852	3.4%
Green Lake County	1,803	3.4%
Washington County	541	1.0%
Sheboygan County	530	1.0%

*Source: US Census, 2000*

**Figure 8: Top Workplace Destinations for Sheboygan County Residents, 2000**

County	Workers	Percentage
Sheboygan County	51,484	84.3%
Ozaukee County	1,931	3.2%
Manitowoc County	1,199	2.0%
Milwaukee County	1,198	2.0%
Washington County	705	1.2%
Fond du Lac County	530	0.9%

Source: US Census, 2000

**Figure 9: Top County's of Residence for Sheboygan County Workers, 2000**

County	Workers	Percentage
Sheboygan County	51,484	84.3%
Manitowoc County	3,676	6.0%
Fond du Lac County	980	1.6%
Ozaukee County	896	1.5%
Calumet County	632	1.0%
Milwaukee County	365	0.6%

Source: US Census, 2000

## Environmental Justice Data

### *ICE Study Area County Race and Ethnicity Data*

Figure 10 lists the 2010 Census statistics for race and ethnicity in ICE study area communities. As indicated below, the majority of the population is white in all study area communities. Map 2 depicts census tracts in ICE study area communities where the raw number of and percentage of minority population (non-white) is greater than the county per tract average. As depicted on the map, minority populations are located near the city of Fond du Lac where two tracts have a higher number of minorities than the county average and two tracts have a higher percentage of minority population than the county. Map 3 depicts census tracts in ICE study area communities where the raw number of and percentage of Hispanic or Latino population exceeds the county per tract average. Again, these populations are located in the city of Fond du Lac.

Figure 10: Race and Ethnicity of ICE Study Area Communities

	Race						Ethnicity
	% White	% Black or African American	% American Indian or Alaskan Native	% Asian	% Native Hawaiian or Other Pacific Islander	% Some Other Race	% Hispanic/Latino
Town of Fond du Lac	97.2	0.3	0.1	1.0	0.0	0.7	2.7
Town of Empire	97.8	0.6	0.1	0.6	0.1	0.2	1.5%
Town of Taycheedah	97.9	0.2	0.2	0.7	0.0	0.2	1.7
Town of Forest	98.4	0.1	0.2	0.2	0.5	0.2	0.9%
Town of Marshfield	98.3	0.2	0.0	0.0	0.0	1.0	1.0
Village of Mt. Calvary	83.6	1.3	1.0	8.3	0.0	5.2	10.9
Village of St. Cloud	96.9	0.0	0.6	0.4	0.0	1.5	2.7
City of Fond du Lac	90.6	2.5	0.7	1.8	0.0	2.5	6.4%
Fond du Lac County	94.1	1.3	0.5	1.1	0.0	1.7	4.3%
Town of Greenbush	97.7	0.0	0.6	0.7	0.0	0.4	1.4%
Town of Plymouth	98.4	0.1	0.1	0.4	0.0	0.3	0.8
Village of Glenbeulah	98.7	0.0	0.2	0.0	0.0	0.4	1.1
City of Plymouth	96.2	0.4	0.4	0.7	0.0	0.9	2.4
Sheboygan County	89.9	1.5	0.4	4.6	0.0	1.6	5.5%

Source: U.S. Census Bureau, 2010.

*ICE Study Area County Poverty Rates*

Figure 11 lists the percentage of individuals living below the poverty level in study area communities. Map 4 depicts census tracts where the percentage of individuals living below the poverty level is greater than the county average. As depicted on the map, concentrations of populations individuals living below the poverty level are located near the cities of Fond du Lac and Plymouth where two tracts in both cities have a percentage of individuals living below the poverty level than their respective county.

**Figure 11: Poverty Rate in ICE Study Area Communities**

	% Individuals Living Below the Poverty Level
Town of Fond du Lac	0.9
Town of Empire	4.1
Town of Taycheedah	5.4
Town of Forest	3.1
Town of Marshfield	4.1
Village of Mt. Calvary	13.1
Village of St. Cloud	6.0
City of Fond du Lac	13.1
Fond du Lac County	9.5
Town of Greenbush	6.0
Town of Plymouth	1.2
Village of Glenbeulah	0.0
City of Plymouth	13.6
Sheboygan County	8.2

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

### *ICE Study Area County Age Statistics*

Figure 12 lists the median age of residents in study area communities as well as the percentages of the population in each county under age 5, under age 18, and over age 65. Map 5 depicts census tracts in study area communities where the raw number of and percentage of elderly (65+) is greater than the county average. As depicted on the map, most census tracts in the study area have a large elderly population with the exceptions of the town of Greenbush and the village of Glenbeulah. The village of Mt. Calvary has a low median age and high percentage of population under age 18 due to the presence of St. Lawrence Seminary High School in addition to the public schools.

**Figure 12: Age in Study Area Counties**

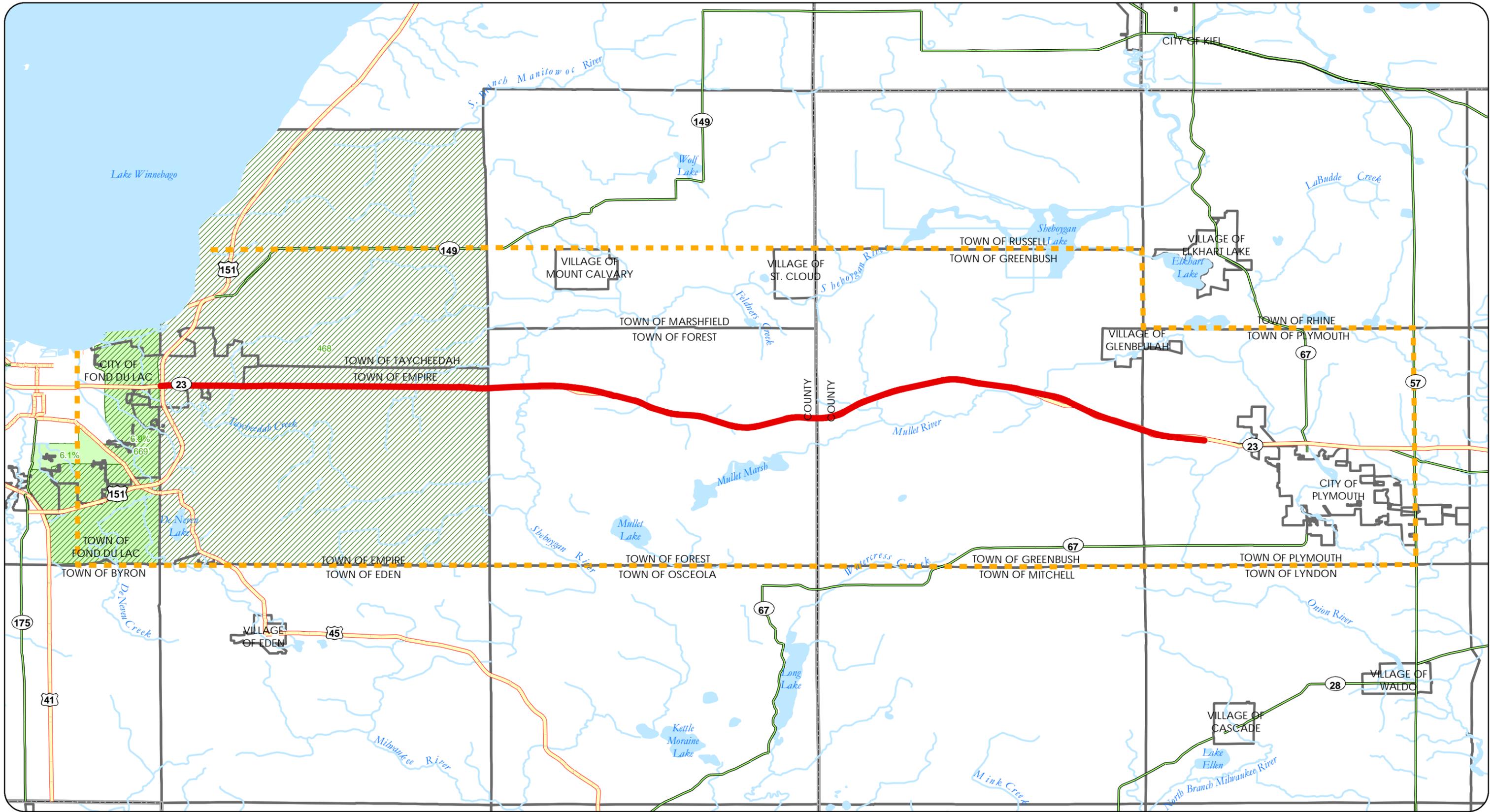
	Median Age	% Pop. Under Age 18	% Pop. Age 65 and Over
Town of Fond du Lac	43.6	22.8	15.2
Town of Empire	46.7	22.2	13.6
Town of Taycheedah	45.1	22.6	15.0
Town of Forest	43.4	22.8	13.5
Town of Marshfield	47.5	19.2	21.8
Village of Mt. Calvary	26.8	39.6	16.1
Village of St. Cloud	43.3	20.3	16.4
City of Fond du Lac	36.9	22.6	14.7
Fond du Lac County	40.2	22.7	15.0
T. Greenbush	43.2	25.7	11.5
Town of Plymouth	47.7	22.8	16.1
Village of Glenbeulah	41.4	22.0	12.1
City of Plymouth	43.2	25.7	11.5
Sheboygan County	40.3	23.9	14.6

Source: *U.S. Census 2010*

### *Study Area Disabled Populations*

The study team did not analyze disabled populations in the study area due to lack of available data on such populations. However, these populations tend to be located in the same areas as other EJ populations.

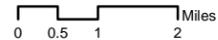
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**WIS 23  
Supplemental EIS**

Map 2: Minority Population Concentration

Sources: Fond du Lac County, Sheboygan County, WIDNR, WisDOT, US Census Bureau, Strand Associates, Vandewalle & Associates



4/1/2013

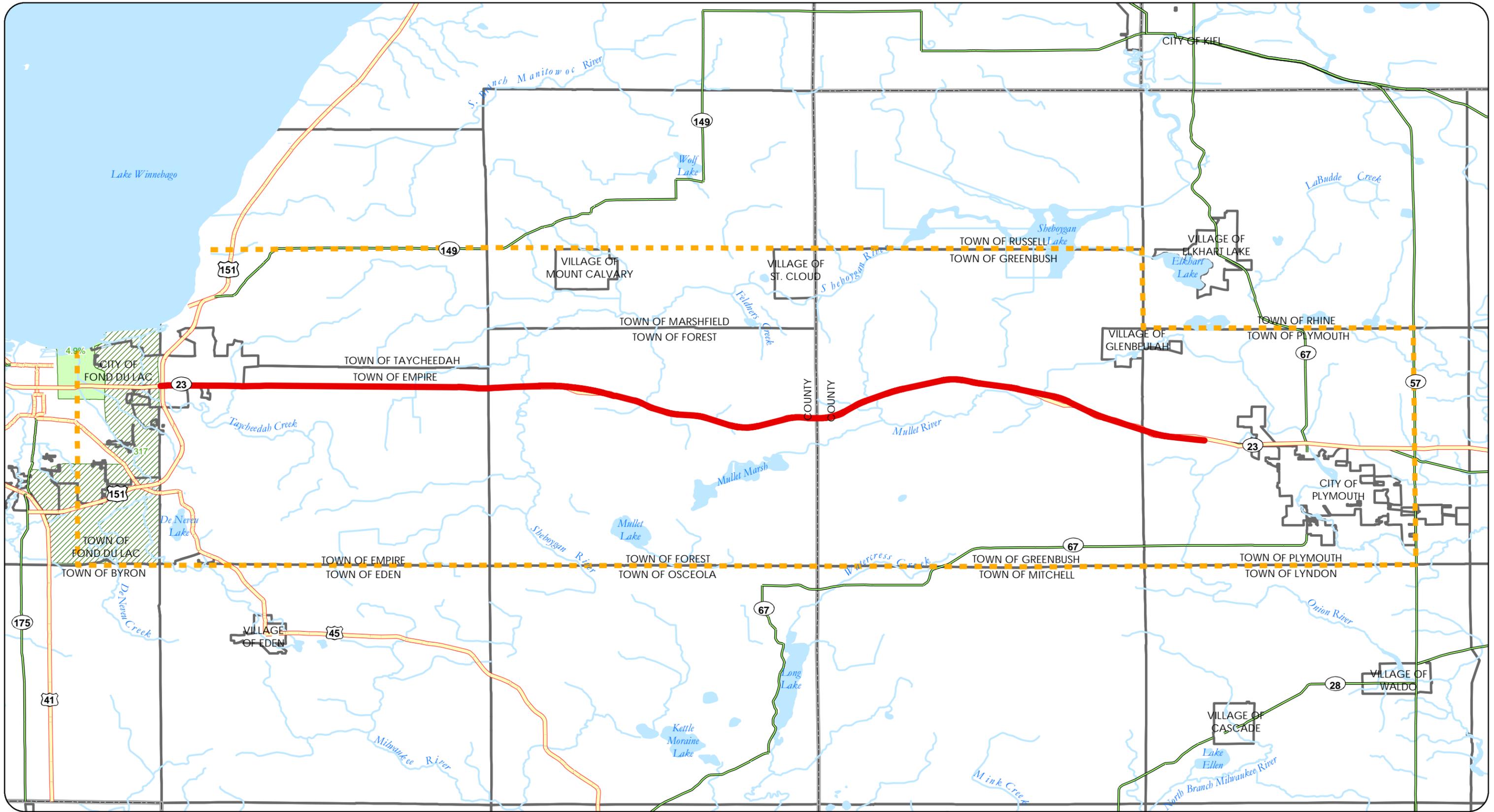


- WIS 23
- WIS 23 ICE Study Area
- County Boundary
- Municipal Boundary
- Surface Water
- Census Tracts with Percentage of Minority Population Greater than County Percentage\*
- Census Tracts with Minority Population Number Greater than County Average\*\*
- US Highway
- State Highway

\*Overall Percentage of Minorities in Fond du Lac County: 5.9%  
\*Overall Percentage of Minorities in Sheboygan County: 10.1%

\*\*Average Minority Population Number Per Tract in Fond du Lac County: 298  
\*\*Average Minority Population Number Per Tract in Sheboygan County: 448

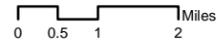
Draft: June 21, 2013



**WIS 23  
Supplemental EIS**

Map 3: Hispanic or Latino Population Concentration

Sources: Fond du Lac County, Sheboygan County, WIDNR, WisDOT, US Census Bureau, Strand Associates, Vandewalle & Associates

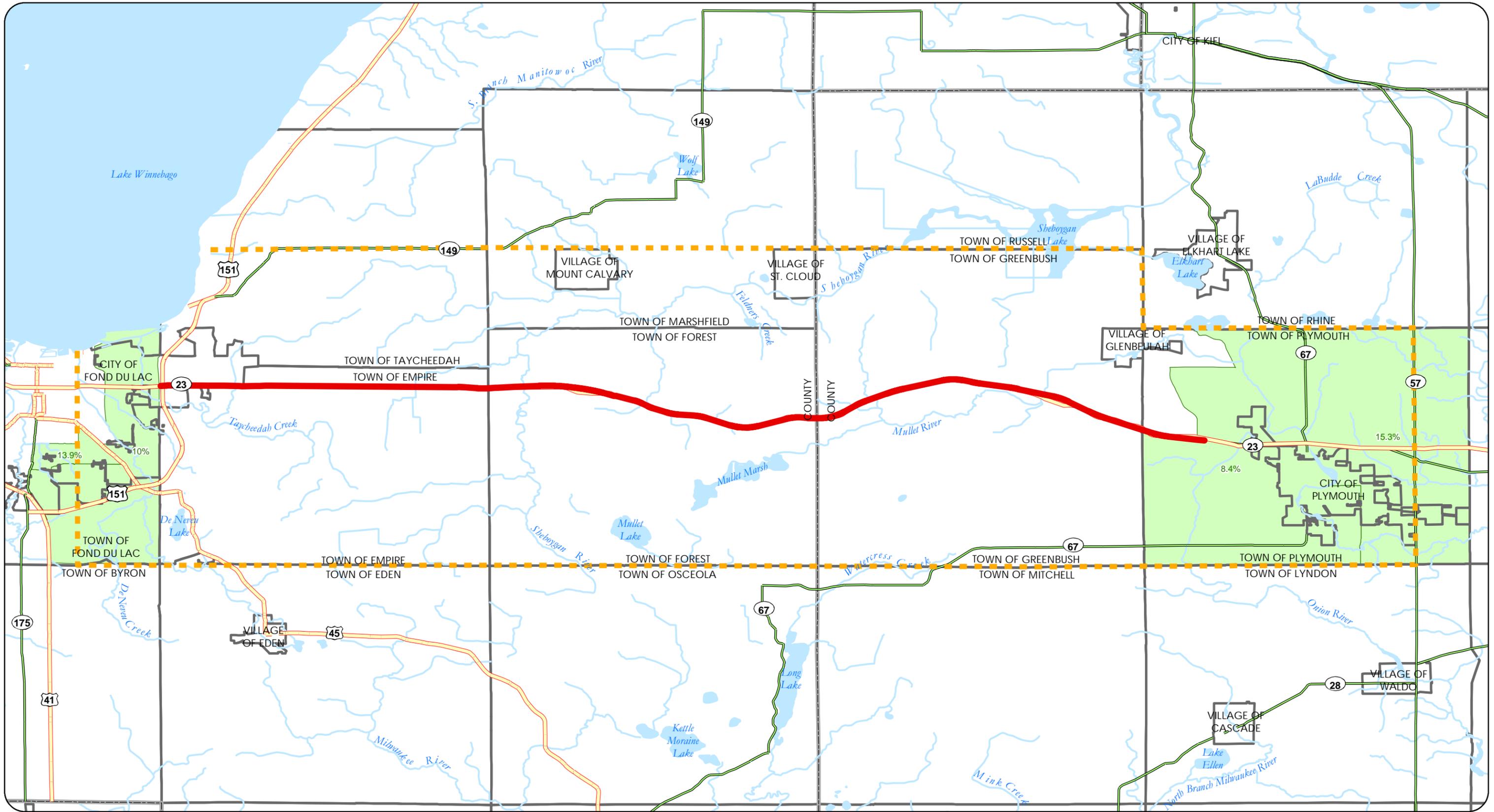


4/1/2013



- WIS 23
- WIS 23 ICE Study Area
- County Boundary
- Municipal Boundary
- Surface Water
- Census Tracts with Percentage of Hispanic/Latino Population Greater than County Percentage\*
- Census Tracts with Hispanic/Latino Population Number Greater than County Average\*\*
- US Highway
- State Highway

\*Overall Percentage of Hispanic or Latinos in Fond du Lac County: 4.3%  
 \*Overall Percentage of Hispanic or Latinos in Sheboygan County: 5.5%  
 \*\*Average Hispanic or Latino Population Number Per Tract in Fond du Lac County: 218  
 \*\*Average Hispanic or Latino Population Number Per Tract in Sheboygan County: 243

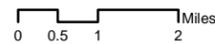


**WIS 23**

**Supplemental EIS**

Map 4: Population Concentration of Individuals Below Poverty Level

Sources: Fond du Lac County, Sheboygan County, WIDNR, WisDOT, US Census Bureau, Strand Associates, Vandewalle & Associates



4/1/2013

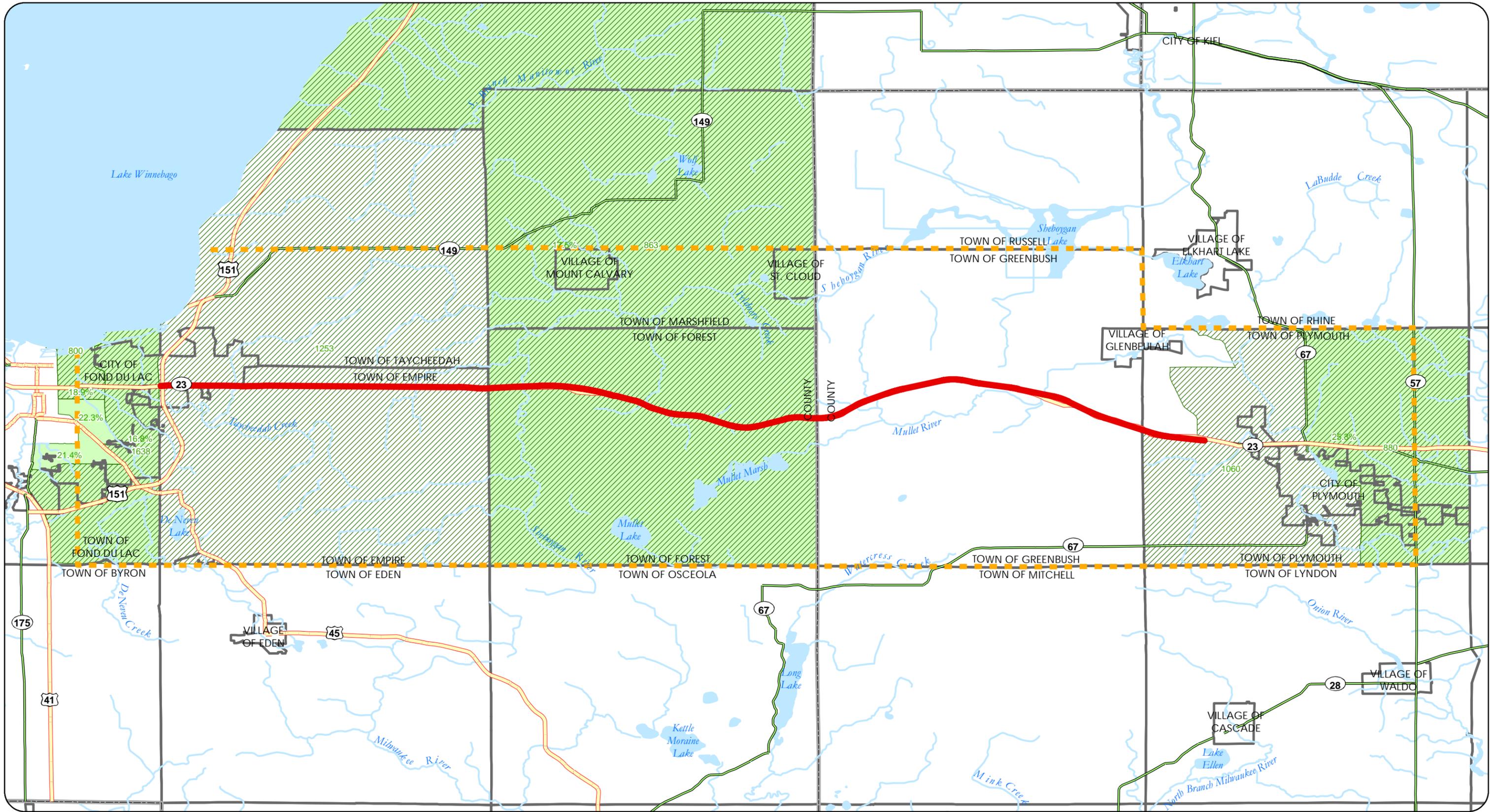


- WIS 23
- - - WIS 23 ICE Study Area
- County Boundary
- Municipal Boundary
- Surface Water

Census Tracts with Percentage of Population in Poverty Greater than County Percentage\*

- US Highway
- State Highway

\*Overall Percentage of Population in Poverty in Fond du Lac County: 9.5%  
 \*Overall Percentage of Population in Poverty in Sheboygan County: 8.2%

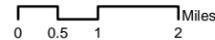


**WIS 23**

**Supplemental EIS**

Map 5: Elderly (65+) Population Concentration

Sources: Fond du Lac County, Sheboygan County, WIDNR, WisDOT, US Census Bureau, Strand Associates, Vandewalle & Associates



4/1/2013



— WIS 23

- - - WIS 23 ICE Study Area

▭ County Boundary

▭ Municipal Boundary

▭ Surface Water

▭ Census Tracts with Percentage of Elderly Population Greater than County Percentage\*

▨ Census Tracts with Elderly Population Number Greater than County Average\*\*

— US Highway

— State Highway

\*Overall Percentage of Elderly Population in Fond du Lac County: 15.0%

\*Overall Percentage of Elderly Population in Sheboygan County: 14.6%

\*\*Average Elderly Population Number Per Tract in Fond du Lac County: 761

\*\*Average Elderly Population Number Per Tract in Sheboygan County: 647

Draft: June 21, 2013

## Agricultural Resources

Agricultural activities dominate land use along the rural parts of the study area. This contributes significantly to the study area's economy and character. Farm commodities produced in the study area counties include dairy, winter wheat, corn silage, sweet corn, green peas, soybeans, alfalfa, mushrooms, mink, and beef. Figure 13 lists economic impacts of the agricultural economies of Fond du Lac and Sheboygan Counties.

**Figure 13: Impacts of the Agricultural Economy**

	Jobs	Business Sales	Income	Taxes paid
Fond du Lac County	8,692	\$2.3 billion	\$576 million	\$52 million
Sheboygan County	8,464	\$3.3 billion	\$629 million	\$49 million

*Source: USDA 2007 Census of Agriculture and University of Wisconsin-Extension, Cooperative Extension*

Map 6 depicts soil classifications within the study area. The Natural Resources Conservation Service groups soils into classes based on their capability to produce common cultivated crops and pasture plants. These capability classifications are based on numerous criteria that include, but are not limited to, the soil's salinity; capacity to hold moisture; potential for erosion; depth, texture, and structure; and local climatic limitations (e.g., temperature and rainfall). Under this system of classification, soils are separated into eight classes. Generally, Class I and II soils are the best suited for the cultivation of crops. Approximately 53 percent of the lands within the study area are classified as Class I and II soils, the most productive agricultural soil categories.

## Natural Resources

Consideration of natural resources and environmentally sensitive areas is essential in local land use decision making. Long-term preservation of natural features is identified as a goal in the comprehensive plans of each of the study area communities as well as preserving the appearance of the landscape. Natural resources in the study area are depicted on Maps 7a and 7b and described below.

### *Environmental Corridors*

Environmental corridors are depicted on Maps 7a, 8, 9a, and 9b. These areas include generally continuous open space systems based on lands that have sensitive natural resources and limitations for development, including WDNR identified wetlands, subject to existing State-mandated zoning, FEMA designated floodplains, and slopes of 12 percent or greater. Environmental corridors have environmental, ecological, passive recreational, stormwater management, groundwater protection and recharge, erosion control, wildlife, timber, and scenic value. Since environmental corridors have severe limitations for development, minimizing development in these areas also protects private property.

### *Steep Slopes*

Steep slopes of greater than 12 percent are depicted on Map 7a. Steep slopes are generally concentrated in the Kettle Moraine State Forest on the eastern side of the study area. There are also scattered areas of steep slopes in the towns of Empire, Taycheedah, Forest, and Marshfield.

### *Floodplains*

Floodplains are depicted on Map 7a as a component of environmental corridors. Flood hazard areas are located along the rivers, creeks, and public natural areas in the study area such as the Sheboygan Marsh and the Mullet Marsh. These have been identified and mapped by the Federal Insurance Administration for risk management purposes. The 100-year flood area, where the flooding probability is greater than 1% in any given year, is generally restricted to no development by state statute-authorized local zoning.

### *Wetlands*

Most wetlands within the study area are located along the rivers, creeks, and public natural areas in the study area such as the Sheboygan Marsh and the Mullet Marsh. There are also isolated wetlands in the north part of the town of Empire and the southern part of the town of Taycheedah. Wetlands have been identified and mapped by the Army Corps of Engineers and the Wisconsin Department of Natural Resources. These areas are important for aquifer recharge, groundwater and surface water quality improvement, and wildlife habitat. Generally, wetlands are restricted to no development by state statute-authorized local zoning. The Sheboygan Marshes are identified as a Land Legacy Place described in the plans and initiatives section of this document.

### *Glacial Features*

More than 10,000 years ago, glaciers, sheets of ice over a mile thick, covered much of the northern United States, including most of Wisconsin and the entire study area. As they were forming, the slow-moving glaciers ground bedrock into fine powder and transformed a rough terrain into rolling plains. In the Kettle Moraine area, these features are found in unusual abundance. The Kettle Moraine is also unusual in that it is an interlobate moraine, formed where two lobes of the continental glacier are flowing close to and roughly parallel to one another. The Kettle Moraine, formed between the Lake Michigan lobe and the Green Bay lobe, is one of the best examples of an interlobate moraine in the world. The following geological formations are the result of the glacier.

- **Drumlin:** Oval teardrop-shaped hills formed under the glacial ice near the advancing front of a glacier.
- **Erratic:** Boulders and large rocks carried by glaciers and deposited on the surface of the land after the ice melted.
- **Esker:** A long, narrow ridge of coarse gravel deposited by a stream flowing in an ice-walled valley or tunnel in a melting glacier.
- **Kame:** A conical-shaped hill of sand and gravel that was formed by glacial meltwater swirling into a vertical shaft in the glacier.
- **Kettle:** A depression formed by the melting of a large block of glacial ice that was partially or completely buried. Some kettles hold water to form kettle lakes.
- **Moraine:** Jumbled hills of unsorted, unstratified glacial debris found at the sides or front of a glacier.

### *Niagara Escarpment*

The Niagara Escarpment is the steep face of a 650-mile bedrock ridge that runs from Rochester, New York, across portions of southeastern Canada, and then southward north and west of Lake Michigan to southeastern Wisconsin. In Wisconsin, the escarpment extends for over 230 miles from Door Peninsula to northern Waukesha and Milwaukee counties. In the study area, the Escarpment runs north to south through the center of Fond du Lac County and is a prominent feature near the southeastern shore of Lake Winnebago.

### *Conservation Easements*

Conservation easements protect land from future development. Fond du Lac County administers the Conservation Reserve Enhancement Program (CREP), which is a voluntary land retirement program that helps protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. As of 2009, approximately 1,100 acres of land in Sheboygan County have been protected through acquisition by WDNR or through private donations to the Glacial Lakes Conservancy.

### *Basins and Watersheds*

The Sheboygan River Basin covers the eastern  $\frac{3}{4}$  of the study area. The western portion of the study area is located in the Upper Fox River Basin. Watersheds within these basins covering the study area include Lake Winnebago-East, Sheboygan River, Mullet River, and the Onion River watersheds. These areas are described below and depicted on Map 7b.

- The Sheboygan River basin has been identified by the International Joint Commission as a Great Lakes Area of Concern. The lower portion of the basin, east of the study area, is characterized by poor water quality. Identified pollutants are suspended solids, fecal coliform bacteria, phosphorus, nitrogen, PCBs, PAHs, and heavy metals. Contamination is the result of both point and nonpoint sources of pollution, including industrial and municipal wastewater discharge and runoff from agricultural lands, roadways, parking lots, construction sites, and other urban and suburban areas.
- The westernmost portion of the study area is located in the Upper Fox River Basin. Groundwater quality varies throughout the basin. Some natural threats to groundwater quality are hardness, iron, manganese, radium/radon, and arsenic. WDNR identified the following threats in the Fond du Lac County portion of the basin: nutrient (i.e., phosphorus and nitrogen) and sediment loading to surface waters from agricultural and urban sources; groundwater contamination; use of fertilizers and pesticides in urban communities; and wildlife habitat destruction and fragmentation.
- The Lake Winnebago-East watershed is located along the east and south shores of Lake Winnebago in Calumet and Fond du Lac counties. This watershed generally flows east to west and drains into Lake Winnebago and contains Taycheedah Creek. This watershed is dominated by agriculture but does include more than a third of the city of Fond du Lac as well as the rapidly developing area east of Fond du Lac on the west slope of the Niagara Escarpment. This watershed is ranked high for nonpoint source issues affecting streams and groundwater. Agricultural nutrient and soil erosion runoff have been dominant pollutants, but nonpoint urban runoff is an increasing concern.
- The Sheboygan River watershed is the largest and possibly the most diverse watershed in the Sheboygan River basin. The Sheboygan River originates in east-central Fond du Lac County and flows generally southeastward into the city of Sheboygan where it enters Lake Michigan. Water quality is good in the headwaters and fair to poor in the lower reaches.
- The Mullet River watershed covers the majority of the study area and connects with the Sheboygan River watershed. Crop farming and public and private forestry comprise the majority of the land uses in the watershed. Water quality ranges from good to fair in the watershed and is affected by agricultural and urban runoff, point source discharges in the urban areas, stream channelization, and dams. Over the years, a number of conservation practices have been employed on farms within the watershed including contour plowing, crop rotation, nutrient management planning, designed manure storage installations, grassed waterways, filter strips, stream buffers, and barnyard runoff measures. Use of these farm practices has a beneficial impact on water quality. However, runoff from agricultural lands continues to impact water quality in the watershed and there is a need to further reduce sediment and nutrient impacts to waterways in the Mullet River watershed.
- Water quality in the Onion River watershed ranges from excellent to good in the headwater areas to fair to poor in the lower sections. Agricultural and urban runoff is the primary source of pollution as well as point source discharges. Excessive sedimentation and channelization limit stream habitat

quality. The Onion River watershed was one of the very first watersheds targeted under the Nonpoint Source Water Pollution Abatement (Priority Watershed) Program. A follow-up report found that the watershed continues to be affected by nonpoint pollution sources.

### *Surface Waters*

Significant surface water resources located within the study area include the following:

- Lake Winnebago is the largest lake entirely within the state and has two primary tributaries, the Wolf River and the Fox River. It is drained by the Fox River, which flows north toward Green Bay. Lake Winnebago is classified as an impaired water by the state under the Clean Water Act (Section 303(d)). Water quality concerns range from urban stormwater discharge to agricultural runoff. [http://en.wikipedia.org/wiki/Lake\\_Winnebago](http://en.wikipedia.org/wiki/Lake_Winnebago) - cite note-0#cite note-0
- Taycheedah Creek is classified as a warm water sport fish community. Evaluations of water quality in the Taycheedah Creek show that it is in a degraded state. After rainfall or snowmelt, the stream is very turbid and water clarity is very poor. Agriculture and increased urbanization are the suspected sources of pollution.
- Feldner's Creek, located southwest of the village of St. Cloud in Fond du Lac County, is classified as a Class II trout stream. The headwater of Feldner's Creek is also considered an Exceptional Resource Waterway by WDNR, which are characterized by excellent water quality, high recreational value, and high quality fisheries.
- The Sheboygan River originates in east-central Fond du Lac County and flows generally southeastward to the city of Sheboygan where it enters Lake Michigan. The US EPA declared 14 miles of the Sheboygan River east of the study area a superfund site, jeopardizing the integrity and quality of Lake Michigan. Environmental cleanup of the upper portion of the Sheboygan River has been completed. Cleanup efforts for the lower river and inner harbor in the city of Sheboygan will likely be completed by the end of 2012.
- De Neveu Lake is an 80-acre lake in the town of Empire. It has a maximum depth of 67 feet and moderate water clarity. Fish include panfish, largemouth bass, northern pike, and walleye.
- De Neveu Creek is the longest stream in the Lake Winnebago East Watershed. De Neveu Creek is classified as an impaired water by the state under the Clean Water Act (Section 303(d)). The majority of the city of Fond du Lac's stormwater is discharged into De Neveu Creek. Water quality impacts are water turbidity, loss of habitat, hydrologic modifications, sediment, and nutrient loading from urban and rural sources. After snowmelt or rainfall, this stream can become extremely turbid. This stream is also classified as supporting a warm water forage fish community.
- The Mullet River originates at the outlet of Mullet Lake in Fond du Lac County and runs generally east before joining the Sheboygan River in the city of Sheboygan Falls.
- Mullet Lake and Marsh is a 200-acre hard-water seepage lake surrounded by a wetland complex of tamarack, shrub carr, sedge meadow, and swamp forest. The lake and swamp complex is the headwaters of the Mullet River in the priority watershed of the Sheboygan River. This undeveloped inland lake with intact wetland vegetation provides important breeding, nesting, and migratory habitat for numerous bird, reptile, and amphibian species.
- The Onion River flows southerly for about half its length before turning northward, entering the Sheboygan River in Rochester Park in Sheboygan Falls. The headwater of the Onion River, known as Ben Nutt Creek, is a trout stream downstream to the top of the pool formed by the Waldo dam.
- The Plymouth Mill Pond is a 41-acre impoundment of the Mullet River located in the city of Plymouth. The water body is maintained by a dam at the southern end of the pond and it extends north WIS 23. The pond is utilized for boating, fishing, and public ice skating. In recent years, degraded water quality has led to algal blooms and aquatic plant growth, which have caused odor problems, impeded recreational use of the pond, and negatively impacted the aesthetics of the Mill Pond area. A Comprehensive Management Plan was adopted for the pond in 2008.

Other nearby water bodies include the Fond du Lac River, Sheboygan River, Supple Marsh, Wolf Lake, and Long Lake.

### *Groundwater*

Groundwater is an important source of potable water and groundwater contamination has been a significant issue along the Niagara Escarpment for some years. In areas of karst (a geologic formation shaped by the dissolution of layers of soluble bedrock) in the study area, pathways develop for water movement through the rock leading directly to the groundwater with little or no filtration. Surface activities such as agriculture (both crops and grazing), road salting, and non-point source pollution can contaminate water moving directly into the groundwater. The thin soils in the area can create other difficulties including the adverse effects of leaking underground storage tanks or deteriorating septic tanks.

### *Parks and State Natural and Wildlife Areas*

The WIS 23 corridor traverses the northern unit of the Kettle Moraine State Forest in the town of Greenbush. This and other significant parks and state natural and wildlife areas within the study area are described below.

- Kettle Moraine State Forest - Northern Unit is a 27,725-acre forest stretching across Sheboygan, Fond du Lac, and Washington counties. Made up of geological formations caused by retreating glaciers, the forest is managed for forestry and outdoor recreation. Textbook examples of glacial landforms are scattered throughout the forest, such as drumlins, kames, eskers, and kettles. Botanically, the forest is quite diversified with nearly 60 species of trees present, together with numerous shrubs, wild flowers, ferns, and other plant life. This state park is comprised mostly of forests and lakes and provides habitat for a diversity of species, including whitetail deer, hawks, turkeys, raccoons, squirrels, and possums. The Kettle Moraine State Forest – Northern Unit is part of the Ice Age National Scientific Reserve established in 1964 to project glacial landforms and landscapes in Wisconsin. The Wade House State Historic Site, situated in Greenbush at the entrance of the Kettle Moraine State Forest, once served as an inn and stopping point for stage coaches traveling on the Fond du Lac-Sheboygan Plank Road.
- The Ice Age Trail is a 1,000-mile footpath highlighting Wisconsin's ice age heritage. The Ice Age Trail is one of only eleven National Scenic Trails in the country. Within the study area, the trail passes through the towns of Greenbush and Plymouth in Sheboygan County.
- Sheboygan Marsh Park and Wildlife Area is located in northwestern Sheboygan County and 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 by the state. The remainder is privately owned, some of which is publicly accessible. The marsh adjoins the Ice Age National Scientific Reserve. Archaeological investigations have classified Sheboygan Marsh as an "archaeological treasure" of national significance; it remains a candidate for nomination to the National Register of Historic Places. The Sheboygan River flows easterly through the marsh.
- The Calvary Marsh public hunting ground is a 280-acre Fond du Lac County-owned property. It is mainly marsh and provides an excellent habitat for wildlife. The property is landlocked and only accessible to the public via the Sheboygan River. Overland access to the public is only available if neighboring landowners grant permission to cross their land. According to the county's Outdoor Recreation and Open Space Plan, the county would like to acquire land to provide direct public access in the future.
- Mullet Creek Wildlife Area is a 2,217-acre WDNR property in the town of Forest that consists of a rich array of wetland, forest, grassland, and farmland. Mullet Creek flows through the entire property

eventually joining the Sheboygan River. The central portion of this property consists of shallow open water with submergent vegetation and cattail wetland totaling over 700 acres. Sedge, reed canary grass, willow, dogwood, swamp conifers, and swamp hardwoods occur in the lowland areas. Oak, aspen, and grass fields occur on the upland sites.

- Mullet Lake State Natural Area is a 495-acre WDNR property located about one-half mile southwest of Mullet Creek Wildlife Area. A 200-acre hard-water seepage lake is surrounded by a wetland complex of tamarack, shrub carr, sedge meadow, and swamp forest. The lake and swamp complex is the headwaters of the Mullet River in the priority watershed of the Sheboygan River. This undeveloped inland lake with intact wetland vegetation provides important breeding, nesting, and migratory habitat for numerous bird, reptile, and amphibian species.
- Old Plank Road Trail is a popular 17-mile trail accommodating bicyclists, runners, walkers, in-line skaters, horseback riders, moped users, skiers, and snowmobiles. The trail parallels WIS 23 from Sheboygan, past Kohler, Sheboygan Falls, Plymouth, and on to historic Greenbush, linking with the Ice Age Trail in the northern unit of the Kettle Moraine State Forest.
- There are numerous snowmobile trails in the study area maintained by area clubs. Private land owners provide the majority of the land used for the public trail system.

### *Threatened and Endangered Species*

Within the WIS 23 corridor area, there are 21 plant and animal species listed as either threatened, endangered, or special concern within the approximately 19 miles between Fond du Lac and Sheboygan Counties. Eight state threatened species and two state endangered species are considered a potentially affected based on WDNR project coordination. The state endangered species include rainbow shell mussel and Midwest Pleistocene vertigo upland snail. State threatened species include the snow trillium, slippershell mussel, ellipse mussel, red-shouldered hawk, cerulean warbler, Acadian flycatcher, hooded warbler, and Blanding's turtle. More information is contained in Section 3 of the LS SDEIS. The project team worked with WDNR and USFWS to obtain rare species data for the ICE study area, which is larger than the corridor study area. WIS 23 crosses through Empire and Forest Townships in Fond du Lac County and Greenbush and Plymouth Townships in Sheboygan County.

Figure 14 shows the number of rare species occurrences by township, county and cumulative project. This information is provided to summarize the general density of threatened and endangered species in both Fond du Lac and Sheboygan County in comparison to the project alignment and occurrences within the four townships that the project traverses. The Sheboygan County towns of Greenbush and Plymouth contain more threatened and endangered species than towns adjacent to WIS 23 in Fond du Lac County. This is partially based on the presence of the Kettle Moraine Forest in Sheboygan County. Fond du Lac County has 36 reported threatened and endangered species occurrences and Sheboygan County has reported 40.

Figure 14: Rare Species Occurrences in Towns and Counties within ICE Study Area

Town	Town	Range	Rare Plants	Rare Terrestrial Animals (incl. birds)	Aquatic Animals	Total Rare Species per Town (or County)	Total Rare Habitats
Empire (FDL County)	15N	18E	1	--	--	1	-
Forest (FDL County)	15N	19E	--	2	--	2	2
Greenbush (Sheboygan Co.)	15N	20E	2	6	3	11	2
Plymouth (Sheboygan Co.)	15N	21E	4	3	2	9	3
<b>Total Occurrence Summary for all WIS 23 Towns</b>	<b>4</b>	<b>4</b>	<b>6</b>	<b>10</b>	<b>5</b>	<b>20</b>	<b>7</b>
Occurrences Summary for Fond du Lac Co.	T13N to T17N	R14E to R19E	9	19	8	36	30
Occurrences Summary for Sheboygan Co.	T13N to T16N	R20E to R22E	18	14	8	40	33
<b>Occurrence Summary for both WIS 23 Project Counties</b>	<b>4</b>	<b>9</b>	<b>22</b>	<b>10</b>	<b>22</b>	<b>54</b>	<b>39</b>

*Threatened and Endangered Species Data obtained from WDNR on-line Natural Heritage Inventory (NHI 11/14/12) and from WDNR correspondence March 2013. Note: Only Threatened and endangered species are included in table. State Special Concern Species were not included in tallies.*

### Air Quality

The proposed WIS 23 project is located in the Lake Michigan Intrastate Air Quality Control Region. These air quality regions monitor National Ambient Air Quality Standards established by the US EPA under the authority of the Clean Air Act. Primary standards are designed to protect human health with an adequate margin of safety. Secondary standards are designed to protect public welfare from any known or anticipated adverse effect. Figure 15 lists the standards for the different air pollutants and whether they are a primary or secondary standard.

Figure 15: National Ambient Air Quality Standards

Pollutant	Type	Standard	Averaging Time a	Regulatory Citation
SO <sub>2</sub>	Primary	0.14 ppm (365 µg/m <sup>3</sup> )	24-hour	40 CFR 50.4(b)
SO <sub>2</sub>	Primary	0.030 ppm (80 µg/m <sup>3</sup> )	Annual	40 CFR 50.4(a)
SO <sub>2</sub>	Secondary	0.5 ppm (1,300 µg/m <sup>3</sup> )	3-hour	40 CFR 50.5(a)
PM <sub>10</sub>	Primary and Secondary	150 µg/m <sup>3</sup>	24-hour	40 CFR 50.6(a)
PM <sub>2.5</sub>	Primary and Secondary	35 µg/m <sup>3</sup>	24-hour	40 CFR 50.7(a)
PM <sub>2.5</sub>	Primary and Secondary	15 µg/m <sup>3</sup>	Annual	40 CFR 50.7(a)
CO	Primary	35 ppm (40 mg/m <sup>3</sup> )	1-hour	40 CFR 50.8(a)(2)
CO	Primary	9 ppm (10 mg/m <sup>3</sup> )	8-hour	40 CFR 50.8(a)(1)
O <sub>3</sub>	Primary and Secondary	0.12 ppm (235 µg/m <sup>3</sup> )	1-hour b	40 CFR 50.9(a)
O <sub>3</sub>	Primary and Secondary	0.075 ppm (150 µg/m <sup>3</sup> )	8-hour	40 CFR 50.10(a)
NO <sub>2</sub>	Primary and Secondary	0.053 ppm (100 µg/m <sup>3</sup> )	Annual	40 CFR 50.11(a) and (b)
Pb	Primary and Secondary	0.15 µg/m <sup>3</sup>	Rolling 3 months	40 CFR 50.1

*a* Each standard has its own criteria for how many times it may be exceeded, in some cases using a three year average.

*b* As of June 15, 2005, the 1-hour ozone standard no longer applies to areas designated with respect to the 8-hour ozone standard (which includes most of the United States, except for portions of 10 states).

The EPA uses six criteria pollutants as indicators of air quality: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. The EPA's National Ambient Air Quality Standards (NAAQS) for each criteria pollutant are intended to protect public health and welfare. Areas where air pollution levels persistently exceed these standards may be designated "nonattainment."

The EPA designated ten counties in Wisconsin, including Sheboygan County, as nonattainment areas for the 8-hour NAAQS for ozone, meaning the recorded ozone levels exceed the acceptable federal air quality standards during 8-hour periods. According to current EPA guidelines, once a nonattainment designation takes effect, state and local governments must develop implementation plans outlining how areas will attain and maintain the standards by reducing air pollutant emissions contributing to ground-level ozone concentrations.

In 2009, WDNR submitted an 8-Hour Ozone Redesignation Request and Maintenance Plan for the ten counties in Wisconsin, including Sheboygan County. On July 31, 2012, EPA published this final rule regarding the attainment status of Sheboygan County.

*40 CFR Parts 52 and 81*

*[EPA-R05-OAR-2009-0730; FRL-9702-9]*

*SUMMARY: EPA is approving a request from the Wisconsin Department of Natural Resources (WDNR) to redesignate the Milwaukee-Racine area to attainment for the 1997 8-hour National Ambient Air Quality Standard (NAAQS or standard). The Milwaukee-Racine area includes Milwaukee, Ozaukee, Racine, Washington, Waukesha, and Kenosha Counties. WDNR submitted this request on September 11, 2009, and supplemented the submittal on November 16, 2011. These submittals also requested the redesignation of the Sheboygan area (Sheboygan County) to attainment for the 1997 8-hour ozone NAAQS. EPA proposed to approve the redesignation of both areas on February 9, 2012, and provided a 30-day review and comment period. EPA received comments submitted on behalf of Sierra Club and Midwest Environmental Defense Center and from the Wisconsin Manufacturers and Commerce. EPA is not taking final action on the Sheboygan redesignation request at this time because preliminary 2012 ozone monitoring data indicate that the area has violated the 1997 standard. In addition to approving the redesignation of the Milwaukee-Racine area, EPA is taking several other related actions. EPA is approving, as a revision to the Wisconsin State Implementation Plan (SIP), the State's plan for maintaining the 1997 8-hour ozone standard through 2022 in the Milwaukee-Racine area. EPA is approving the 2005 emissions inventories for the Milwaukee-Racine and Sheboygan areas as meeting the comprehensive emissions inventory requirement of the Clean Air Act (CAA or Act). Finally, EPA finds adequate and is approving the State's 2015 and 2022 Motor Vehicle Emission Budgets (MVEBs) for the Milwaukee-Racine area.*

### *Wind Energy*

The development of wind energy generators and transmission has emerged in the study area in recent years. The Cedar Ridge Wind Farm, located in the towns of Empire and Eden (just south of the study area), has been in operation since December 2008. Cedar Ridge is situated on the Niagara Escarpment, a ridgeline that peaks at 1,200 feet, and offers an exceptional wind resource. Cedar Ridge is spread out over 12.2 square miles on 7,800 acres. Its 41 turbines produce approximately 68 megawatts of energy, enough to power about 17,000 homes a year. Seventeen of the 41 turbines are located in the town of Empire.

The Blue Sky Green Field Wind Energy Center is also situated on the Niagara Escarpment. Blue Sky is located in the towns of Marshfield and Calumet (just north of the study area) and consists of 88 turbines producing 145 megawatts of energy, enough to power 36,000 homes per year. Forty-four of the 88 turbines are in the Town of Marshfield. Blue Sky has been in operation since May 2008.

## Historic and Archeological Resources

Within the broader ICE study area there are numerous historic resources. Wisconsin's Architecture and Historic Inventory (AHI) is a search engine that provides historical and architectural information for about 120,000 properties within Wisconsin. Listing on the AHI is not an indication of whether the property is eligible for the NRHP. This resource indicates that there are 4,119 listings for Fond du Lac County and 2,664 listings for Sheboygan County.

Directly within the WIS 23 corridor there are 17 potential historic sites and another 2 sites associated with the connection roads and interchange. Effects to all these resources were avoided except for those discussed below. Among historic resources potentially directly affected by WIS 23 alternatives are two historic, and one archaeological, resources eligible for or on the National Register of Historic Places (NRHP). The St. Mary's Springs Academy is on the east end of Fond du Lac and has two contributing buildings that are built in the Georgian Revival style, and Richardsonian Romanesque Revival style. It is associated with the Sisters of St. Agnes of the Roman Catholic Church. The Old Wade House is now a state park near the Kettle Moraine State Forest and is run by the State Historical Society. It is a living history portrayal of a restored stagecoach inn built around 1850. Within the park are three buildings that are on the National Register of Historic Places. The Sippel archaeological site is a small Yankee homestead/farm in the town of Greenbush. It was occupied between 1848 and 1875. The owners and inhabitants played instrumental roles in the early development of the Greenbush community, serving as farmers and merchants.

## Existing Land Uses

Existing land uses in the study area are depicted on Map 8. The WIS 23 study area passes through rural and urban landscapes. The largest urban areas in the study area are the cities of Fond du Lac and Plymouth. As depicted on Map 8, agriculture is the predominant land use in the unincorporated towns, with scattered, low density housing either associated with farm operations or located in rural subdivisions served by septic and private well systems. Small areas of non-urban commercial development are also scattered throughout the study area. The majority of large woodlands and environmental corridors within the study area are located within the Kettle Moraine State Forest, Sheboygan Marsh Park and Wildlife Area, and other state and/or county owned natural areas.