

The State of Wisconsin's  
2011 Base Year Emissions Inventory  
for the Sheboygan and Kenosha Nonattainment Areas

A CAA-required State Implementation Plan Revision addressing  
the 2008 8-Hour Ozone National Ambient Air Quality Standard

Developed By:  
The Wisconsin Department of Natural Resources

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## ABBREVIATIONS

AERR	Air Emissions Reporting Rule
BLRPC	Bay-Lake Regional Planning Commission
CAA	Clean Air Act
DOA	Department of Administration
FHWA	Federal Highway Administration
GIS	Geographic Information System
HPMS	Highway Performance Monitoring System
LADCO	Lake Michigan Air Directors Consortium
MAR	Marine, Aircraft and Railroad
MCDs	Minor Civil Divisions
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NMIM	National Mobile Inventory Model
OBD	On-Board Diagnostic
OTAQ	Office of Transportation and Air Quality
SCC	Source Classification Code
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SIP	State Implementation Plan
tpsd	tons per summer day
tpy	tons per year
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation

## **1.0 Introduction**

### **1.1 Overview and Background**

This document provides Wisconsin's 2011 base year emissions inventory as required by the State Implementation Plan (SIP) for the 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS). Since ground-level ozone is not emitted directly by sources, the emissions of the precursors of ground-level ozone (NO<sub>x</sub> and VOC) have been considered in compiling this document. In accordance with Section 172(c)(3) of the Clean Air Act (CAA), this document includes a comprehensive inventory of actual emissions from all sources of these relevant pollutants in the nonattainment areas for the inventory year. In addition, CAA section 182(a)(1) requires a specific base year inventory for ozone SIPs. To meet these requirements, point, nonpoint, onroad and nonroad emissions inventories have been estimated for summer days as well as per year. While the results are summarized in Table 1, the Appendices incorporate the detailed emissions inventories and the methodologies used for emission estimations.

In the State of Wisconsin, there are only two ozone nonattainment areas: the whole of Sheboygan County and the eastern portion of Kenosha County. Effective July 20, 2012, EPA designated both of these areas as marginal nonattainment for the 2008 8-hour ozone NAAQS. The partial Kenosha County nonattainment area is essentially east of I-94, including the Village of Pleasant Prairie, the Town of Somers, and the City of Kenosha. This inventory contains both annual and seasonal emissions estimates for these ozone nonattainment areas and considers the spatial and temporal extent of these emissions. The units of measurements for annual emissions are in tons per year (tpy), whereas seasonal emission estimates are reported in tons per summer day (tpsd).

To maintain the quality of the inventory, systematic planning and a series of logical steps were applied to ensure accuracy, completeness, comparability and representativeness. All estimates were calculated and documented using standard methods and all applicable source categories are included in the inventory to ensure its completeness. The NO<sub>x</sub> and VOCs presented in this report were compared to the 2011 National Emissions Inventory (NEI) to assess their accuracy. The temporal and annual profiles of actual 2011 emission estimates were used whenever possible in generating this inventory.

## **1.2 Document Organization**

Chapter 1 presents an overview and background including the geographical settings of 2008 ozone NAAQS nonattainment areas in the State of Wisconsin, a summary of document organization, the significance of presenting summer temporal profiles for ozone precursors and the summary of the base year emissions inventory. Chapters 2, 3, 4 and 5 present the methodology for developing the 2011 NO<sub>x</sub> and VOC emissions inventories for point, nonpoint, nonroad mobile and onroad mobile sources. Chapter 6 describes the emission estimation methods used in allocating emissions for the partial Kenosha County nonattainment area. The detailed temporal profiles of stationary emissions and nonroad and onroad emissions and modeling data are presented in Appendices 1 through 4. Emissions from Commercial Marine Vessels, Aircraft, and Railroad are presented in Appendices 6, 8, and 9. Appendix 5 provides a detailed description on emission estimations methods for nonpoint sources category-by-category. Appendix 7 includes the Consultants' Report on Commercial Marine Emissions, a document on commercial, marine emissions in the Lake Michigan Air Directors Consortium (LADCO) region, developed by Energy and Environmental Research Associates LLC. and Alpine Geophysics in 2011.

## **1.3 Temporal Resolution**

In developing this emissions inventory, temporal profiles of emission variations over time are an important factor to be considered. To allocate the emissions temporally, the days and hours that report the peak activity for an emission source were considered to obtain the best estimates of emissions released to the atmosphere. The presence of ozone precursors, sufficient sunlight and other meteorological factors play a significant role in ozone formation. Compared to the air quality emissions throughout the year, emissions during summer months are more important for ozone formation, as it is typically a summertime pollutant. To address all these temporal issues related to ozone emissions, the seasonal profiles of ozone precursors are presented in this report in units of tpsd.

In accordance with the Air Emissions Reporting Rule (AERR) (40 CFR 51.50), annual emissions are defined as actual emissions for a plant, point, or process that are measured and calculated to represent a calendar year. As a consequence, for this inventory, the annual emissions include all emissions of the relevant sources at a facility, nonpoint source or mobile process occurring during calendar year 2011.

#### 1.4 Summary of the 2011 Base Year Emissions Inventory

The following two tables provide an overall summary of the 2011 emissions inventories developed for NO<sub>x</sub> and VOCs in Sheboygan County and the eastern part of Kenosha County.

Table 1.2 2011 Base Year SIP Emissions Inventory for Sheboygan County

Sheboygan	NO <sub>x</sub> (tpsd)	VOC (tpsd)	NO <sub>x</sub> (tpy)	VOC (tpy)
Point	11.73	2.63	3730.16	769.83
Area	1.02	5.19	371.23	1895.45
Nonroad	3.26	4.36	935.72	948.72
Onroad	5.18	2.49	1846.35	859.58
<b>Total</b>	<b>21.19</b>	<b>14.67</b>	<b>6883.46</b>	<b>4473.58</b>

Table 1.3 2011 Base Year SIP Emissions Inventory for Eastern Part of Kenosha County

Kenosha (East of I-94)	NO <sub>x</sub> (tpsd)	VOC (tpsd)	NO <sub>x</sub> (tpy)	VOC (tpy)
Point	8.80	0.70	2530.81	201.85
Area	0.83	3.35	303.67	1221.09
Nonroad	2.33	2.42	668.44	474.76
Onroad	4.67	2.14	1671.60	773.69
<b>Total</b>	<b>16.63</b>	<b>8.61</b>	<b>5174.52</b>	<b>2671.39</b>

## 2.0 Stationary Point Sources Inventory

This section presents the development of 2008 8-hour ozone NAAQS nonattainment area stationary point source emissions inventory. As defined by the AERR in 40 CFR 51.50, point sources are large, stationary, identifiable sources of emissions that release pollutants into the atmosphere through a stack or vent. A point source is a facility that is a major source under 40 CFR part 70 for one or more of the pollutants for which reporting is required by 40 CFR 51.50(a)(1). A facility contains one or more point sources. Examples of important point source emissions categories include power plants, industrial boilers, petroleum refineries, cement plants, and other industrial plants.

The point source emissions inventory presented in this document consists of actual NO<sub>x</sub> and VOC emissions for both a typical ozone season day and for the entire year in the year of 2011. The inventory includes point sources located in the state of Wisconsin's 2008 ozone NAAQS nonattainment areas.

The list of point sources in the inventory was developed by applying the appropriate thresholds to the emission levels in the databases to differentiate between point and area stationary sources. The AERR governs the size above which sources are inventoried as point sources. Special point source reporting thresholds apply for certain pollutants by type of the nonattainment area. In developing this inventory, Wisconsin Department of Natural Resources (WDNR) considered the facilities that report NO<sub>x</sub> emissions greater than or equal 5 tons per year or VOC emissions greater than or equal to 3 tons per year as point sources. The threshold value depends on the severity of the nonattainment area classification. Since the both ozone nonattainment areas in the State of Wisconsin are designated as marginal, this report focuses only on the NO<sub>x</sub> and VOC thresholds that apply for marginal ozone nonattainment areas.

The point source emissions inventory was created using annually reported point source emissions for 2011. Whenever feasible, federal, state and local controls were factored into the emission calculations. Emissions were estimated by collecting process-level information from each facility that qualifies for inclusion into the state's point source database. The WDNR is responsible for developing point source emissions inventories and maintaining the data. To include in this emissions inventory document, WDNR compiled the ozone summer day and annual emissions data. A table of detailed 2011 point source emissions is presented in Appendix 1.

To calculate tons per summer day emissions, the typical ozone days were considered. A typical ozone season day is defined as a day from July to September, the 3rd quarter of the calendar year, in which VOC or NO<sub>x</sub> are emitted and contribute to the generation of ground-level ozone. The following equation was used to calculate this number:

$$EM = \{(Annual \times Third\ Quarter\ Percentage) / (DPW \times N_{weeks})\} \times 2000$$

Where:

*EM* = Typical ozone season day emission

*Annual* = Annual emissions of VOC or NO<sub>x</sub> in tons

*DPW* = Days per week the facility operates as reported to WDNR

*N<sub>weeks</sub>* = Number of weeks in the ozone season months from July to September

2000 = Conversion from pounds to tons

### **3.0 Stationary Nonpoint (Area) Sources Inventory**

Nonpoint (area) sources collectively represent individual sources of emissions that have not been inventoried as specific point or mobile sources. These individual sources treated collectively as nonpoint sources that are typically too small, numerous, or difficult to inventory using the methods for other classes of sources.

The 2011 area source emissions inventory was created based on the Wisconsin 2011 base year emissions inventory submitted to the U.S. EPA in 2013. A table of 2011 area source emissions by county and source classification code (SCC) is located in Appendix 2 of this document. SCC is a process-level code that describes the equipment and/or operation that is emitted pollutants (40 CFR 51.50). For nonpoint and mobile sources, these codes comprise 10 digits. The area source emission estimation methodologies used to develop VOC and NO<sub>x</sub> emissions for the 2011 base year for the counties in Wisconsin are described source category-by-category in Appendix 5.

### **4.0 Onroad Mobile Sources Inventory**

Onroad mobile sources are motor vehicles traveling on streets and highways, including cars, trucks, motorcycles and buses. A motor vehicle is any self-propelled vehicle used to carry people or property on a street or highway (40 CFR 51.50). The emissions reported in this document were estimated by the Motor Vehicle Emission Simulator (MOVES), the U.S. EPA's recommended onroad mobile source model. The version used was MOVES2010b. All estimates were made in accordance with the User's Guide to MOVES (U.S. EPA, Office of Transportation and Air Quality, Assessment and Standards Division, June 2012, EPA 420-B-12-001b) and Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity: Technical Guidance for MOVES2010, 2010a and 2010b (U.S. EPA, Office of Transportation and Air Quality, Transportation and Climate Division, April 2012, EPA-420-B-12-028).

The onroad mobile 2011 NO<sub>x</sub> and VOC emissions for the two nonattainment areas are presented in Appendix 3, broken down by source type (vehicle class), fuel type and road type. Tables summarizing vehicle activity data are presented in Appendix 3 after the emissions tables. The modeling inputs are consistent with those provided to U.S. EPA for the 2011 NEI.

#### **4.1 Transportation Data**

The modeling inputs to MOVES include detailed transportation data (e.g., vehicle-miles of travel by vehicle class, road class and hour of day, and average speed distributions), requiring support from the Metropolitan Planning Organizations (MPOs) covering the two nonattainment areas and the Wisconsin Department of Transportation (WDOT).

##### **4.1.1 Southeastern Wisconsin Regional Planning Commission**

The gubernatorially designated MPO for the Kenosha urbanized area is the Southeastern Wisconsin Regional Planning Commission (SEWRPC). Under state law SEWRPC is

responsible for preparing travel and traffic estimates and forecasts within their seven-county region, which includes Kenosha County. SEWRPC maintains transportation network inventory data, including traffic counts by WDOT and local agencies, and has developed and validated travel simulation models to estimate and forecast vehicle-miles of travel (VMT) and average speed distributions for their region. SEWRPC has provided WDNR the MOVES input files used for their most recent transportation conformity assessment, dated October 2012. A link to this assessment is: <http://www.sewrpc.org/SEWRPCFiles/Publications/mr/mr-205-assessment-of-conformity-air-quality-standards.pdf>

These MOVES input files include files with data limited to the Kenosha sub-county nonattainment area.

#### **4.1.2 Bay-Lake Regional Planning Commission**

The gubernatorially designated MPO for the Sheboygan urbanized area is the Bay-Lake Regional Planning Commission (BLRPC). Under state law BLRPC is responsible for preparing travel and traffic estimates and forecasts within their eight-county region, which includes Sheboygan County. The BLRPC and the WDOT jointly maintain transportation network inventory data and have jointly developed and validated travel simulation models to estimate and forecast VMT and average speed distributions for Sheboygan County. To develop the MOVES input files for 2011 Sheboygan County emissions, WDNR has utilized data in the BLRPC's Update to the 2035 Sheboygan Area Transportation Plan, March, 2011. A link to this report is: <http://www.baylakerpc.org/media/53031/update%20to%20year%202035%20satp%20-%20text%20and%20maps.pdf>

Relevant data in this report is found in Table C.5 in Appendix C (transportation conformity assessment), on pages C-13 to C-17. This table provides 2005 VMT estimates and 2012 and later VMT forecasts for Sheboygan County by facility type (road type) and by 5 mph speed bins within each facility type.

#### **4.1.3 Wisconsin Department of Transportation**

The WDOT annually develops VMT estimates by county and facility type, based on traffic counts throughout the state. These estimates are incorporated into the Federal Highway Administration's (FHWA's) Highway Performance Monitoring System (HPMS). These WDOT VMT estimates are posted at: <http://www.dot.wisconsin.gov/travel/counts/vmt.htm>

### **4.2 Descriptions of MOVES Modeling Inputs**

#### **4.2.1 Vehicle-Miles of Travel (VMT)**

The base VMT data used for the MOVES modeling were summer weekday VMT. Annual VMT was determined from summer weekday VMT using monthly distributions and weekday vs. weekend distributions, provided by U.S. EPA for the 2011 NEI.

For the partial Kenosha County nonattainment area, SEWRPC provided summer weekday 2011 VMT data by vehicle class. The data were obtained from their transportation network inventory data and were limited to travel on Interstate Highway 94 and all travel in Kenosha County to the east of that interstate.

For Sheboygan County, the WDNR adjusted 2005 summer weekday VMT from BLRPC's above-cited transportation plan report using the HPMS VMT estimates for the years 2005 and 2011 provided by the WDOT.

#### **4.2.2 VMT by Hour of Day and Weekday vs. Weekend**

SEWRPC provided hourly VMT fractions for weekdays. Otherwise, MOVES defaults were used.

#### **4.2.3 Vehicle Population**

WDNR estimated vehicle populations for each vehicle class by dividing annual VMT by the MOVES defaults for average annual mileage accumulation.

#### **4.2.4 Average Speed Distribution**

SEWRPC provided 2011 speed distributions, in MOVES input format, for the partial Kenosha County area, developed from their transportation inventory data and travel simulation models.

For Sheboygan County, BLRPC's above-cited transportation plan report includes estimated speed distributions for 2005 and forecasted distributions for 2012. The WDNR calculated distributions for 2011 by interpolating between those two years and then converting the distributions from VMT to the vehicle hours of travel (VHT) units required by the MOVES model.

The distributions from both SEWRPC and BLRPC provided for speeds up to only 65 miles per hour. To estimate the speed fractions for the highest two speed bins in MOVES (70 mph and 75 mph), the WDNR allocated the speed fraction for the 65 mph bin to the three bins of 65 mph, 70 mph and 75 mph based on the MOVES default fractions for those three bins.

#### **4.2.5 Vehicle Age Distribution**

Local age distributions were developed for five source types: passenger cars, passenger trucks, light commercial trucks, intercity buses and school buses. The U.S. EPA default distributions were used for the other eight source types (motorcycles, transit buses and six medium to heavy truck classes). WDNR calculated the local distributions from a file of select fields from the state's registration database as of March 2014, provided by the WDOT. The WDOT data include the county in which each vehicle is registered, enabling WDNR to calculate separate distributions for southeastern Wisconsin (which includes both of the ozone nonattainment areas) and the rest of the state. WDNR adjusted the 2014 distributions back to 2011 based on differences between the U.S. EPA default age distributions for those two years.

#### **4.2.6 Road Type Distribution**

SEWRPC provided the 2011 road type distributions for the partial Kenosha County nonattainment area developed from their transportation inventory data. WDNR calculated road type distributions for Sheboygan County based on 2011 HPMS VMT data provided by WDOT by county and roadway functional class.

#### **4.2.7 Ramp Fraction**

SEWRPC provided WDNR the fraction of driving time on ramps for restricted access roadways. WDNR calculated the ramp travel time fractions from the ramp VMT data provided in BLRPC's above-cited transportation plan report for Sheboygan County.

#### **4.2.8 Fuel Formulation and Supply**

Data provided by U.S. EPA for the 2011 NEI were used. The EPA data correctly reflect the fact that Kenosha County is subject to reformulated gasoline while Sheboygan County is not. Almost all of the gasoline sold throughout Wisconsin, both reformulated and not, is blended with ethanol at a volume of about 10%. The modeling assumed 96% of the fuel supply in Sheboygan County and 100% of the fuel supply in Kenosha County was ethanol-blended fuel.

#### **4.2.9 Vehicle Inspection and Maintenance Program**

Both Kenosha and Sheboygan Counties are within the seven-county southeastern Wisconsin vehicle inspection program region. On-Board Diagnostic (OBD) checks were assumed for most model year 1996 and newer vehicles.

#### **4.2.10 Meteorology Data**

Temperatures conducive to peak ozone formation were assumed for the summer weekday modeling. The WDNR has consistently used the same minimum and maximum temperatures for onroad modeling for ozone SIP's since the early 1990's. The temperatures were developed from an analysis of peak ozone days and have minimum/maximum values of 65/93 degrees Fahrenheit for Sheboygan County and 70/94 degrees Fahrenheit for Kenosha County.

For the annual modeling, the temperatures U.S. EPA provided for the 2011 NEI were used.

### **5.0 Nonroad Mobile Sources Inventory**

Off-highway mobile sources are identified as nonroad mobile sources which are defined as nonroad engines or nonroad vehicles. According to 40 CFR 51.50, a nonroad *engine* is an internal combustion engine that is not used in an onroad motor vehicle or a vehicle used solely for competition. A nonroad *vehicle* is a vehicle that is run by a nonroad engine and that is not an onroad motor vehicle or a vehicle used solely for competition.

For purposes of inventory calculation, nonroad mobile sources are divided into two major groups:

- Commercial Marine, Aircraft and Railroad (MAR)
- All other nonroad categories

Nonroad categories other than MAR include:

- Recreational vehicles
- Construction equipment
- Industrial equipment
- Lawn and garden equipment
- Agricultural equipment
- Commercial equipment
- Logging equipment
- Underground mining equipment
- Oil field equipment
- Pleasure craft
- Railway maintenance equipment

A detailed listing of the nonroad emissions for each of the 224 nonroad source subcategories, which include both the MAR and non-MAR subcategories, is presented in Appendix 4.

For the MAR categories, annual emission estimates were obtained from the U.S. EPA's 2011 NEI, version 1, or the U.S. EPA's 2011 Emissions Modeling Platform, version 6 (Modeling Platform). For aircraft and railroad, the emissions values in the NEI and Modeling Platform are equal. For commercial marine, the Modeling Platform has updated emission estimates, provided by the LADCO, from those in the NEI. WDNR used the updated commercial marine emission values provided by LADCO, but allocated those emissions to Kenosha and Sheboygan Counties based on the distribution on emissions in the NEI.

Neither Kenosha nor Sheboygan Counties have ports, inland lakes or inland rivers with commercial marine activity. All commercial marine emissions attributable to those two counties come from vessels traveling on Lake Michigan past those counties. The LADCO-provided data has no emissions allocated to Sheboygan County. Instead all of the emissions from commercial marine traffic passing Sheboygan County are allocated to Oceana County, Michigan, on the other side of Lake Michigan, across from Sheboygan County. Conversely, all of the emissions from commercial marine traffic passing Kenosha County are allocated to Kenosha County. No emissions are allocated to Allegan County, Michigan, on the other side of Lake Michigan, across from Kenosha County. Therefore, to obtain a more refined distribution of emissions from vessels passing Sheboygan and Kenosha Counties, the distribution of cruise emissions in Lake Michigan by county in the 2011 NEI was used to allocate the LADCO-provided emissions to Kenosha and Sheboygan Counties. Appendix 6 provides details of this allocation. To obtain summer day emissions, the annual to summer day ratios for each of the three MAR categories found in the LADCO modeling inventory for the year 2007 were applied.

Appendices 6, 8 and 9 provide more detail on the emission estimates for the three MAR categories, commercial marine, aircraft and railroad, respectively. And, Appendix 7 provides a

report on the development of emission estimates for the LADCO-provided commercial marine emissions.

For the non-MAR categories, 2011 emission inventory estimates were generated using the National Mobile Inventory Model (NMIM), version dated May 4, 2009, the U.S. EPA's nonroad emissions estimation model. This model was run for each month of 2011. Summer day estimates were obtained by dividing the emissions for the months of June, July and August by 92 (the number of days in those three months).

## **6. Emission Estimates for Partial Kenosha County**

Most inventories and many underlying datasets are available at the county level. It is challenging to generate emissions calculations for partial counties, particularly for mobile sources. Among the two ozone nonattainment areas in the State of Wisconsin, only Kenosha is designated as part of the county. The approaches used for estimating emissions from different sources for the eastern part of the Kenosha County are described in sections 6.1 through 6.4.

### **6.1 Point Source Emission Estimates for Partial Kenosha County**

For point sources, Geographic Information System (GIS) technology enables straightforward selection of point sources into a partial county nonattainment area by intersecting a shapefile of point sources with a shapefile of the nonattainment area boundaries. The result of such intersection clearly identified the point sources located within the partial Kenosha County nonattainment area.

### **6.2 Nonpoint Source Emission Estimates for Partial Kenosha County**

For nonpoint sources, available inventories and methods are often designated to create county totals, making partial county estimations much more difficult. After considering a variety of acceptable approaches for calculating partial county emissions, WDNR used spatial allocation surrogates at sub-county level. Based on 2010 population data available at the minor civil divisions (MCDs) level, whole-county area source emissions were re-estimated and allocated for the eastern part of Kenosha County. The Wisconsin census data available with the Wisconsin Department of Administration (DOA) was used for this emission allocation analysis.

### **6.3 Onroad Mobile Source Emission Estimates for Partial Kenosha County**

The SEWRPC provided WDNR the following transportation data for the nonattainment part of Kenosha County:

- VMT by vehicle class
- Road type distributions
- Average speed distributions
- Vehicle populations

The remaining MOVES inputs for the nonattainment part of Kenosha County were the same as those developed for the entire county.

These inputs are:

- Vehicle age distribution
- Ramp fractions
- Vehicle Inspection program data
- Fuel formulation and supply
- Meteorology data

#### 6.4 Nonroad Mobile Source Emission Estimates for Partial Kenosha County

Given the vast variety of nonroad mobile sources, several surrogates were employed to estimate the proportion of countywide emissions in the nonattainment area. The surrogates used were:

##### 6.4.1 Land Area

The land area in the nonattainment area comprises 30.9% of the total county land area. But if one excludes the City of Kenosha, where no significant agricultural activity occurs, this percentage becomes 24.2%.

The nonroad categories allocated to the nonattainment area based on land area are: **Agriculture, Logging, Oilfields, Recreational, and Underground Mining**. The 24.2% factor was used for agriculture and the 30.9% factor was used for the other four categories.

##### 6.4.2 Population

Based on the 2010 census, 76.1% of the county's population is in the nonattainment area.

The nonroad categories allocated to the nonattainment area based on population are: **Commercial, Construction, Industrial, and Lawn & Garden**.

##### 6.4.3 Water Area

Based on external files in the NMIM database (WI\_WIB.ALO and WI\_WOB.ALO), there are 81 square kilometers of water area in Kenosha County, with 56 square kilometers in the nonattainment area (all part of Lake Michigan) and 25 square kilometers outside the nonattainment area (several inland lakes). Thus,  $56/81 = 69.1\%$  of the county's surface water is in the nonattainment area.

The nonroad category allocated to the nonattainment area based on water area is: **Pleasure Craft**. However, instead of applying the 69.1% value to all pleasure craft, a higher percentage was used for the boats with inboard motors, since those boats are more common in Lake Michigan, and a smaller percentage used for boats with outboard motors, since those boats are more common in the smaller lakes outside the nonattainment area. The inboard/outboard split for the nonattainment part of Kenosha County was obtained by adjusting the full county split by the split for Ozaukee County. (Like eastern Kenosha County, almost all the water area of Ozaukee County is Lake Michigan waters.) And, the inboard/outboard split for the attainment part of Kenosha County was obtained by adjusting the full county split by the split for Washington County. (Like western Kenosha County, almost all the water area in Washington

County is small lakes.) The resulting allocation percentages for the nonattainment part of Kenosha County calculated out to be:

For NO<sub>x</sub>: 78.9% for inboard and 30.4% for outboard

For VOC: 93.5% for inboard and 62.9% for outboard

#### **6.4.4 Lake Michigan Shoreline**

All (100.0%) of the Lake Michigan shoreline is in the nonattainment area. The nonroad category allocated to the nonattainment area based on Lake Michigan shoreline is: **Commercial Marine**.

#### **6.4.5 Airport Location**

The U.S. EPA's 2011 Modeling Platform, version 6, provides the emissions and geographical location (longitude and latitude) for each airport in the United States.

(See: [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point_by_state/))

Thus, **Aircraft** emissions inside the nonattainment area were calculated by adding the emissions for those airports located in the nonattainment area.

The percentages of Kenosha County aircraft emissions located in the nonattainment area vary by aircraft type and are as follows:

Military aircraft: 100.0% for both NO<sub>x</sub> and VOC

General aviation, piston engine: 59.6% for both NO<sub>x</sub> and VOC

General aviation, turbine engine: 61.2% for NO<sub>x</sub> and 61.5% for VOC

Air taxi, piston engine: 100.0% for NO<sub>x</sub> and 97.5% for VOC

Air taxi, turbine engine: 100.0% for NO<sub>x</sub> and 97.5% for VOC

#### **6.4.6 Railroad Link Location**

The U.S. EPA's 2011 Modeling Platform, version 6, provides the emissions and location for each link of railway in the United States.

(See: [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint_by_state/))

Thus, **Railroad** emissions inside the nonattainment area were calculated by adding the emissions for those rail links located in the nonattainment area. The percentages of Kenosha County railroad emissions located in the nonattainment area are: Diesel locomotives, line haul, class I operations: 60.0% for both NO<sub>x</sub> and VOC. This 60.0% value was also used to allocate the **Railroad Maintenance** emissions in Kenosha County to the nonattainment area.

**Appendix 1**  
**2011 Point Source Emissions**

Prepared By:  
Wisconsin Department of Natural Resources

FID	Facility Name	County	Pollutant	2011 (tpy)	2011(tpsd)
230006260	Wisconsin Electric Power Company, D/B/A We Energies-Pleasant Prairie Power Plant	Kenosha	NOX	2498.49	8.72
230008350	Kenosha Steel Castings	Kenosha	NOX	2.13	0.01
230009450	Ocean Spray Cranberries Inc	Kenosha	NOX	8.83	0.02
230012530	Laminated Products, Inc.	Kenosha	NOX	0.43	0
230035410	Mondi Akrosil Llc	Kenosha	NOX	0.63	0.01
230058180	Wis Doa / Uw-Parkside Power Plant	Kenosha	NOX	5.87	0.01
230059280	United Hospital Systems Inc/St Catherines	Kenosha	NOX	4.26	0.01
230072040	Rust - Oleum Corp	Kenosha	NOX	1.5	0
230094590	Kenosha Medical Center Campus	Kenosha	NOX	3.81	0.01
230099100	Carthage College	Kenosha	NOX	4.49	0.01
230141780	Horizon Milling Llc	Kenosha	NOX	0.01	0
230167520	Iea, Inc - Kenosha	Kenosha	NOX	0.29	0
230198760	K & K Screw Products Llc	Kenosha	NOX	0.07	0
460008120	Pemco Inc.	Sheboygan	NOX	0.38	0
460008230	Georgia-Pacific Corrugated Llc	Sheboygan	NOX	2.85	0.01
460012740	Old Wisconsin Sausage Co Plant 2	Sheboygan	NOX	1.36	0
460013510	Curt G. Joa, Incorporated	Sheboygan	NOX	0.4	0
460023520	Manning Lighting, Inc.	Sheboygan	NOX	0.33	0
460023740	Lakeshore Display Co., Inc.	Sheboygan	NOX	0.16	0
460027810	Aldrich Chemical Company	Sheboygan	NOX	0.01	0
460029460	Nemschoff Chairs, Inc.	Sheboygan	NOX	0.08	0
460029570	Nemschoff Chairs Inc	Sheboygan	NOX	1.16	0
460032760	Adell Corporation	Sheboygan	NOX	11.79	0.03
460032870	Kohler Co-Metals Processing Complex	Sheboygan	NOX	231.39	1.09
460033090	Wpl - Edgewater Generating Station	Sheboygan	NOX	3297.64	9.86
460033420	Johnsonville Foods	Sheboygan	NOX	7.9	0.02
460034410	Bemis Mfg. Co. - Plant D	Sheboygan	NOX	1.22	0
460034630	Bemis Mfg. Co. Plant B	Sheboygan	NOX	3.78	0.01
460034740	Plastics Engineering Co N 15th St Plant	Sheboygan	NOX	15.49	0.04
460034960	Austin Gray Iron Foundry	Sheboygan	NOX	0.15	0
460035180	The Vollrath Company, Llc	Sheboygan	NOX	4.1	0.01
460035730	Willman Industries	Sheboygan	NOX	1.94	0.01
460036170	The Mayline Co.(Wood Plant)	Sheboygan	NOX	0.45	0
460036280	Aurora Sheboygan Memorial Medical Center	Sheboygan	NOX	3.02	0.01
460037820	Sheboygan Co Highway Commission	Sheboygan	NOX	6.46	0.05
460038700	Kohler Co - Town Of Mosel Plant	Sheboygan	NOX	23.8	0.08
460040460	Anr Pipeline Co.(Kewaskum Comp. Station)	Sheboygan	NOX	17.52	0.05
460041230	J. L. French Corp.	Sheboygan	NOX	10.16	0.03
460041670	Momentive Specialty Chemicals Inc	Sheboygan	NOX	15.78	0.04
460061250	Richardson Yacht Interiors	Sheboygan	NOX	0.36	0
460067190	Wpl - Sheboygan Falls Energy Facility	Sheboygan	NOX	3.44	0.2
460086990	Times Printing Co Inc	Sheboygan	NOX	1.26	0
460094470	Bremer Manufacturing	Sheboygan	NOX	0.75	0
460098760	Plymouth Foam Incorporated	Sheboygan	NOX	2.41	0.01
460106570	American Excelsior	Sheboygan	NOX	0.17	0
460119330	Bemis Wood Flour Mill	Sheboygan	NOX	0.09	0
460141330	J.L. French Corporation, Gateway Plant	Sheboygan	NOX	49.5	0.14
460141660	Lakeland College	Sheboygan	NOX	1.89	0.01
460145840	The Mayline Co.(Steel Plant)	Sheboygan	NOX	0.58	0
460147820	Kohler Company - Vitreous Plant	Sheboygan	NOX	6.73	0.02
460147930	Kohler Co-Engine Plant	Sheboygan	NOX	2.96	0.01
460153980	Aurora Medical System - Valley View Medical	Sheboygan	NOX	0.7	0
230006260	Wisconsin Electric Power Company, D/B/A We Energies-Pleasant Prairie Power Plant	Kenosha	ROG	123.62	0.43
230008350	Kenosha Steel Castings	Kenosha	ROG	15.66	0.05
230009450	Ocean Spray Cranberries Inc	Kenosha	ROG	1.32	0
230012530	Laminated Products, Inc.	Kenosha	ROG	3.29	0.01
230035410	Mondi Akrosil Llc	Kenosha	ROG	0.69	0.02
230058180	Wis Doa / Uw-Parkside Power Plant	Kenosha	ROG	0.32	0
230059280	United Hospital Systems Inc/St Catherines	Kenosha	ROG	0.22	0

FID	Facility Name	County	Pollutant	2011 (tpy)	2011(tpsd)
230072040	Rust - Oleum Corp	Kenosha	ROG	14.6	0.05
230094590	Kenosha Medical Center Campus	Kenosha	ROG	0.23	0
230099100	Carthage College	Kenosha	ROG	0.25	0
230117580	Honeywell Automation And Control Solutions	Kenosha	ROG	1.2	0
230134960	Lmi Packaging Solutions	Kenosha	ROG	6.52	0.02
230135290	Five Star Fabricating, Incorporated	Kenosha	ROG	13.58	0.05
230141780	Horizon Milling Llc	Kenosha	ROG	0	0
230167520	Iea, Inc - Kenosha	Kenosha	ROG	3.94	0.01
230198760	K & K Screw Products Llc	Kenosha	ROG	16.41	0.06
460008120	Pemco Inc.	Sheboygan	ROG	2.55	0.01
460008230	Georgia-Pacific Corrugated Llc	Sheboygan	ROG	3.82	0.01
460012740	Old Wisconsin Sausage Co Plant 2	Sheboygan	ROG	2.67	0.01
460013510	Curt G. Joa, Incorporated	Sheboygan	ROG	3.34	0.01
460022530	Sheboygan Paperbox Co.	Sheboygan	ROG	27.71	0.12
460023520	Manning Lighting, Inc.	Sheboygan	ROG	0.45	0
460023740	Lakeshore Display Co., Inc.	Sheboygan	ROG	16.61	0.14
460027480	Kieffer & Co., Inc.	Sheboygan	ROG	2.11	0.01
460027810	Aldrich Chemical Company	Sheboygan	ROG	23.8	0.07
460029460	Nemschoff Chairs, Inc.	Sheboygan	ROG	11.74	0.05
460029570	Nemschoff Chairs Inc	Sheboygan	ROG	14.36	0.05
460032760	Adell Corporation	Sheboygan	ROG	0.72	0
460032870	Kohler Co-Metals Processing Complex	Sheboygan	ROG	56.78	0.2
460033090	Wpl - Edgewater Generating Station	Sheboygan	ROG	110.32	0.33
460033420	Johnsonville Foods	Sheboygan	ROG	5.24	0.02
460034410	Bemis Mfg. Co. - Plant D	Sheboygan	ROG	5.61	0.03
460034630	Bemis Mfg. Co. Plant B	Sheboygan	ROG	171.05	0.48
460034740	Plastics Engineering Co N 15th St Plant	Sheboygan	ROG	7.43	0.02
460034960	Austin Gray Iron Foundry	Sheboygan	ROG	2.98	0.01
460035180	The Vollrath Company, Llc	Sheboygan	ROG	0.23	0
460035730	Willman Industries	Sheboygan	ROG	25.71	0.1
460036170	The Mayline Co.(Wood Plant)	Sheboygan	ROG	0.44	0
460036280	Aurora Sheboygan Memorial Medical Center	Sheboygan	ROG	0.17	0
460037820	Sheboygan Co Highway Commission	Sheboygan	ROG	0.44	0
460038700	Kohler Co - Town Of Mosel Plant	Sheboygan	ROG	9.42	0.03
460038810	Sheboygan Paint Co.	Sheboygan	ROG	57.5	0.24
460039470	Poly Vinyl Company Inc	Sheboygan	ROG	3.24	0.02
460040460	Anr Pipeline Co.(Kewaskum Comp. Station)	Sheboygan	ROG	0.34	0
460041230	J. L. French Corp.	Sheboygan	ROG	4.08	0.01
460041670	Momentive Specialty Chemicals Inc	Sheboygan	ROG	22.87	0.06
460061250	Richardson Yacht Interiors	Sheboygan	ROG	4.39	0.02
460067190	Wpl - Sheboygan Falls Energy Facility	Sheboygan	ROG	0.31	0.02
460086990	Times Printing Co Inc	Sheboygan	ROG	12.26	0.05
460094470	Bremer Manufacturing	Sheboygan	ROG	0.02	0
460098760	Plymouth Foam Incorporated	Sheboygan	ROG	54.17	0.15
460100080	Ajs & Associates, Inc	Sheboygan	ROG	2.4	0.01
460106570	American Excelsior	Sheboygan	ROG	9.07	0.04
460119330	Bemis Wood Flour Mill	Sheboygan	ROG	0	0
460120760	Lakeland Sports Center	Sheboygan	ROG	2.15	0.01
460130440	Saco Polymers Inc	Sheboygan	ROG	7.45	0.02
460141330	J.L. French Corporation, Gateway Plant	Sheboygan	ROG	18.03	0.05
460141660	Lakeland College	Sheboygan	ROG	0.1	0
460145730	Westshore Industries	Sheboygan	ROG	6.43	0.03
460145840	The Mayline Co.(Steel Plant)	Sheboygan	ROG	17.3	0.06
460147820	Kohler Company - Vitreous Plant	Sheboygan	ROG	0.43	0
460147930	Kohler Co-Engine Plant	Sheboygan	ROG	23.07	0.06
460148150	Universal Lithographers	Sheboygan	ROG	3.99	0.02
460153980	Aurora Medical System - Valley View Medical	Sheboygan	ROG	0.04	0
460157500	Certain Teed	Sheboygan	ROG	3.3	0.02
460169600	Franzen Lithoscreen Inc.	Sheboygan	ROG	11.19	0.04

**Appendix 2**  
**2011 Nonpoint (Area) Source Emissions**

Prepared By:  
Wisconsin Department of Natural Resources

SCC	CATEGORY DESCRIPTION	FIPS	POLLUTANT	2011(tpy)	2011(tpsd)
2810060100	Cremation	55059	NOx	0.41	0.00
2102004001	Fuel combustion Industrial/Distillate Oil	55059	NOx	0.42	0.00
2102004002	Fuel combustion Industrial/Distillate Oil Engine	55059	NOx	2.36	0.01
2102005000	Fuel combustion Industrial/Residual oil	55059	NOx	0.25	0.00
2102011000	Fuel combustion Industrial/Kerosene	55059	NOx	0.02	0.00
2102007000	Fuel combustion Industrial/LPG	55059	NOx	0.07	0.00
2102006000	Fuel combustion Industrial/NG	55059	NOx	25.55	0.07
2102008000	Fuel combustion Industrial/wood	55059	NOx	0.00	0.00
2103004001	Fuel combustion CI/Distillate Oil Boiler	55059	NOx	1.72	0.00
2103004002	Fuel combustion CI/Distillate Oil Engine	55059	NOx	58.15	0.16
2103011000	Fuel combustion CI/Kerosene	55059	NOx	0.01	0.00
2103007000	Fuel combustion CI/LPG	55059	NOx	3.34	0.01
2103006000	Fuel combustion CI/Natural Gas	55059	NOx	40.86	0.11
2103005000	Fuel combustion CI/Residual Oil	55059	NOx	0.00	0.00
2103008000	Fuel combustion CI/Wood	55059	NOx	0.03	0.00
2104011000	Residential Heating Kerosene	55059	NOx	0.07	0.00
2104007000	Residential Heating LPG	55059	NOx	5.68	0.02
2104006000	Residential Heating Natural Gas	55059	NOx	161.33	0.44
2104004000	Residential Heating Distillate Fuel	55059	NOx	3.39	0.01
2810060100	Cremation	55117	NOx	0.38	0.00
2102004001	Fuel combustion industrial/Distillate Oil	55117	NOx	0.95	0.00
2102004002	Fuel combustion industrial/Distillate Oil(eng)	55117	NOx	5.29	0.01
2102005000	Fuel combustion Industrial/Residual oil	55117	NOx	0.55	0.00
2102011000	Fuel combustion industrial/Kerosene	55117	NOx	0.05	0.00
2102007000	Fuel combustion industrial/LPG	55117	NOx	0.15	0.00
2102006000	Fuel combustion industrial/NG	55117	NOx	57.16	0.16
2102008000	Fuel combustion industrial/wood	55117	NOx	0.00	0.00
2103004001	Fuel combustion CI/Distillate Oil Boiler	55117	NOx	2.05	0.01
2103004002	Fuel combustion CI/Distillate oil Engine	55117	NOx	69.52	0.19
2103011000	Fuel combustion CI/Kerosene	55117	NOx	0.02	0.00
2103007000	Fuel combustion CI/LPG	55117	NOx	4.00	0.01
2103006000	Fuel combustion CI/NG	55117	NOx	48.84	0.13
2103005000	Fuel combustion CI/Res Oil	55117	NOx	0.00	0.00
2103008000	Fuel combustion CI/Wood	55117	NOx	0.03	0.00
2104011000	Residential Kerosene	55117	NOx	0.00	0.00
2104007000	Residential LPG	55117	NOx	27.81	0.08
2104006000	Residential NG	55117	NOx	147.15	0.40
2104004000	Residential Distillate Fuel	55117	NOx	7.30	0.02
2461850000	Agricultural Pesticides	55059	VOC	32.93	0.09
2501080050	Aviation gasoline Distribution Stage 1	55059	VOC	18.25	0.05
2501080100	Aviation gasoline Distribution Stage 2	55059	VOC	0.95	0.00
2302002100	Commercial Cooking conveyORIZED charbroiling	55059	VOC	0.76	0.00
2302002200	Commercial Cooking under-fired charbroiling	55059	VOC	2.62	0.01
2302003000	Commercial Cooking deep fat frying	55059	VOC	0.80	0.00
2302003100	Commercial Cooking flat griddle frying	55059	VOC	0.38	0.00
2302003200	Commercial Cooking clamshell griddle frying	55059	VOC	0.01	0.00
2460600000	cons comm adhesives sealents whaps	55059	VOC	36.05	0.10
2460400000	cons comm auto aftermarket whaps	55059	VOC	86.01	0.24
2460200000	cons comm cleaning products whaps	55059	VOC	113.84	0.31
2460500000	cons comm coatings and related products whaps	55059	VOC	60.08	0.16
2460800000	cons comm fifra whaps	55059	VOC	112.57	0.31
2460900000	cons comm misc products whaps	55059	VOC	4.43	0.01
2460100000	cons comm personal care products whaps	55059	VOC	120.16	0.33
2810060100	Cremation	55059	VOC	0.00	0.00
2415000000	Degreasing whaps	55059	VOC	86.08	0.24
2420000000	Dry cleaning	55059	VOC	0.21	0.00
2102004001	Fuel combustion Industrial/Distillate Oil	55059	VOC	0.00	0.00
2102005000	Fuel combustion Industrial/Residual oil	55059	VOC	0.00	0.00

SCC	CATEGORY DESCRIPTION	FIPS	POLLUTANT	2011(tpy)	2011(tpsd)
2102011000	Fuel combustion Industrial/Kerosene	55059	VOC	0.00	0.00
2102007000	Fuel combustion Industrial/LPG	55059	VOC	0.00	0.00
2102006000	Fuel combustion Industrial/NG	55059	VOC	1.41	0.00
2102008000	Fuel combustion Industrial/wood	55059	VOC	0.00	0.00
2103004001	Fuel combustion CI/Distillate Oil Boiler	55059	VOC	0.03	0.00
2103011000	Fuel combustion CI/Kerosene	55059	VOC	0.00	0.00
2103007000	Fuel combustion CI/LPG	55059	VOC	0.12	0.00
2103006000	Fuel combustion CI/NG	55059	VOC	2.25	0.01
2103005000	Fuel combustion CI/Res Oil	55059	VOC	0.00	0.00
2103008000	Fuel combustion CI/Wood	55059	VOC	0.00	0.00
2501060100	Gas distribution stage 2	55059	VOC	24.02	0.07
2501070100	Gas distribution stage 2	55059	VOC	1.65	0.00
2501060053	Gas distribution service station unloading	55059	VOC	14.67	0.04
2501055120	Gasoline distribution stage1 bulk plants	55059	VOC	3.94	0.01
2501050120	Gasoline distribution stage1 bulk terminals	55059	VOC	12.54	0.03
2505040120	Gasoline distribution stage1 pipelines	55059	VOC	4.30	0.01
2505030120	Gasoline distribution stage1 tank trucks in transit	55059	VOC	1.31	0.00
2501060201	Gasoline distribution stage1 ust	55059	VOC	20.04	0.05
2425000000	Graphic Arts	55059	VOC	46.32	0.13
2501011011	Portable fuel containers (pfc) Residential Permeation	55059	VOC	13.24	0.04
2501011012	Portable fuel containers (pfc) Residential Evaporation	55059	VOC	25.85	0.07
2501011013	Portable fuel containers (pfc) Residential Spillage during transport	55059	VOC	3.77	0.01
2501011014	Portable fuel containers (pfc) Residential Refilling at the pump vapor displacement	55059	VOC	1.12	0.00
2501011015	Portable fuel containers (pfc) Residential Refilling at the pump spillage	55059	VOC	0.10	0.00
2501012011	Portable fuel containers (pfc) Commercial Permeation	55059	VOC	0.42	0.00
2501012012	Portable fuel containers (pfc) Commercial Evaporation	55059	VOC	0.83	0.00
2501012013	Portable fuel containers (pfc) Commercial Spillage during transport	55059	VOC	5.15	0.01
2501012014	Portable fuel containers (pfc) Commercial Refilling at the pump vapor displacement	55059	VOC	2.16	0.01
2501012015	Portable fuel containers (pfc) Commercial Refilling at the pump spillage	55059	VOC	0.20	0.00
2630020000	Publicly Owned Treatment Work (potw)	55059	VOC	2.37	0.01
2104011000	Residential Kerosene	55059	VOC	0.00	0.00
2104007000	Residential LPG	55059	VOC	0.22	0.00
2104006000	Residential NG	55059	VOC	9.44	0.03
2104004000	Residential Distillate Fuel	55059	VOC	0.13	0.00
2401005000	Surface coating automobile refinishing	55059	VOC	23.75	0.07
2401065000	Surface coating electronic and other electrical coating	55059	VOC	2.18	0.01
2401015000	Surface coating factory finished wood	55059	VOC	0.91	0.00
2401100000	Surface coating industrial maintenance	55059	VOC	38.14	0.10
2401055000	Surface coating machinery and equipment	55059	VOC	0.71	0.00
2401080000	Surface coating marine mfg	55059	VOC	0.86	0.00
2401025000	Surface coating metal furniture	55059	VOC	8.18	0.02
2401090000	Surface coating miscellaneous manufacturing	55059	VOC	2.79	0.01
2401070000	Surface coating motor vehicles	55059	VOC	52.87	0.14
2401200000	Surface coating other special purpose	55059	VOC	4.05	0.01
2401030000	Surface coating paper film foil	55059	VOC	31.82	0.09
2401020000	Surface coating wood furniture	55059	VOC	33.00	0.09
2401001000	Surface coating arch coating	55059	VOC	147.99	0.41
2401008000	Surface coating traffic markings	55059	VOC	0.12	0.00
2461850000	Agricultural Pesticides	55117	VOC	81.00	0.22
2501080050	Aviation gasoline Distribution Stage 1	55117	VOC	15.95	0.04
2501080100	Aviation gasoline Distribution Stage 2	55117	VOC	0.83	0.00
2302002100	Commercial Cooking conveyerized charbroiling	55117	VOC	0.70	0.00
2302002200	Commercial Cooking under-fired charbroiling	55117	VOC	2.40	0.01
2302003000	Commercial Cooking deep fat frying	55117	VOC	0.73	0.00
2302003100	Commercial Cooking flat griddle frying	55117	VOC	0.34	0.00

SCC	CATEGORY DESCRIPTION	FIPS	POLLUTANT	2011(tpy)	2011(tpsd)
2302003200	Commercial Cooking clamshell griddle frying	55117	VOC	0.01	0.00
2460600000	cons comm adhesives sealents whaps	55117	VOC	32.92	0.09
2460400000	cons comm auto aftermarket whaps	55117	VOC	78.54	0.22
2460200000	cons comm cleaning products whaps	55117	VOC	103.96	0.28
2460500000	cons comm coatings and related products whaps	55117	VOC	54.87	0.15
2460800000	cons comm fifra whaps	55117	VOC	102.80	0.28
2460900000	cons comm misc products whaps	55117	VOC	4.04	0.01
2460100000	cons comm personal care products whaps	55117	VOC	109.73	0.30
2810060100	Cremation	55117	VOC	0.00	0.00
2415000000	Degreasing whaps	55117	VOC	164.71	0.45
2420000000	Dry cleaning	55117	VOC	0.24	0.00
2102004001	Fuel combustion industrial/Distillate Oil	55117	VOC	0.01	0.00
2102005000	Fuel combustion Industrial/Residual oil	55117	VOC	0.00	0.00
2102011000	Fuel combustion industrial/Kerosene	55117	VOC	0.00	0.00
2102007000	Fuel combustion industrial/LPG	55117	VOC	0.01	0.00
2102006000	Fuel combustion industrial/NG	55117	VOC	3.14	0.01
2102008000	Fuel combustion industrial/wood	55117	VOC	0.00	0.00
2103004001	Fuel combustion CI/Distillate Oil Boiler	55117	VOC	0.03	0.00
2103011000	Fuel combustion CI/Kerosene	55117	VOC	0.00	0.00
2103007000	Fuel combustion CI/LPG	55117	VOC	0.15	0.00
2103006000	Fuel combustion CI/NG	55117	VOC	2.69	0.01
2103005000	Fuel combustion CI/Res Oil	55117	VOC	0.00	0.00
2103008000	Fuel combustion CI/Wood	55117	VOC	0.00	0.00
2501060100	Gas distribution stage 2	55117	VOC	28.06	0.08
2501070100	Gas distribution stage 2	55117	VOC	1.90	0.01
2501060053	Gas distribution service station unloading	55117	VOC	21.32	0.06
2501055120	Gasoline distribution stage1 bulk plants	55117	VOC	55.97	0.15
2501050120	Gasoline distribution stage1 bulk terminals	55117	VOC	178.28	0.49
2505040120	Gasoline distribution stage1 pipelines	55117	VOC	61.11	0.17
2505030120	Gasoline distribution stage1 tank trucks in transit	55117	VOC	1.60	0.00
2501060201	Gasoline distribution stage1 ust	55117	VOC	24.46	0.07
2425000000	Graphic arts whaps	55117	VOC	164.08	0.45
2501011011	portable fuel containers (pfc)	55117	VOC	15.00	0.04
2501011012	portable fuel containers (pfc)	55117	VOC	29.28	0.08
2501011013	portable fuel containers (pfc)	55117	VOC	4.28	0.01
2501011014	portable fuel containers (pfc)	55117	VOC	1.27	0.00
2501011015	portable fuel containers (pfc)	55117	VOC	0.12	0.00
2501012011	portable fuel containers (pfc)	55117	VOC	0.48	0.00
2501012012	portable fuel containers (pfc)	55117	VOC	0.94	0.00
2501012013	portable fuel containers (pfc)	55117	VOC	5.83	0.02
2501012014	portable fuel containers (pfc)	55117	VOC	2.45	0.01
2501012015	portable fuel containers (pfc)	55117	VOC	0.23	0.00
2630020000	Publicly owned treatment work (potw)	55117	VOC	2.17	0.01
2104011000	Residential Kerosene	55117	VOC	0.01	0.00
2104007000	Residential LPG	55117	VOC	1.08	0.00
2104006000	Residential NG	55117	VOC	8.61	0.02
2104004000	Residential Distillate Fuel	55117	VOC	0.28	0.00
2401075000	Surface coating aircraft mfc	55117	VOC	0.05	0.00
2401005000	Surface coating automobile refinishing	55117	VOC	35.70	0.10
2401065000	Surface coating electronic and other electrical coating	55117	VOC	0.98	0.00
2401015000	Surface coating factory finished wood	55117	VOC	4.06	0.01
2401100000	Surface coating industrial maintenance	55117	VOC	34.83	0.10
2401055000	Surface coating machinery and equipment	55117	VOC	16.35	0.04
2401025000	Surface coating metal furniture	55117	VOC	173.60	0.48
2401090000	Surface coating miscellaneous manufacturing	55117	VOC	29.51	0.08
2401070000	Surface coating motor vehicles	55117	VOC	6.05	0.02
2401200000	Surface coating other special purpose	55117	VOC	3.70	0.01
2401020000	Surface coating wood furniture	55117	VOC	86.65	0.24
2401001000	Surface coating arch coating	55117	VOC	135.14	0.37
2401008000	Surface coating traffic markings	55117	VOC	0.23	0.00

**Appendix 3**  
**2011 Onroad Mobile Source Emissions**

Prepared By:  
Wisconsin Department of Natural Resources

Table 3-a: Kenosha Sub-County Nonattainment Area (I-94 and to the East);  
NOX Emissions: tons per year (tpy) and tons per summer weekday (tpswd)

Source Type	Fuel Type	Road Type	Kenosha (part) NOX Exhaust Emissions		Kenosha (part) NOX Evaporative Emissions		Kenosha (part) Total NOX Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Motorcycle	Gasoline	Off-Network	0.2709	0.0002	0.0000	0.0000	0.2709	0.0002
Motorcycle	Gasoline	Rural Restricted	0.5902	0.0014	0.0000	0.0000	0.5902	0.0014
Motorcycle	Gasoline	Rural Unrestricted	1.3664	0.0032	0.0000	0.0000	1.3664	0.0032
Motorcycle	Gasoline	Urban Restricted	0.0789	0.0002	0.0000	0.0000	0.0789	0.0002
Motorcycle	Gasoline	Urban Unrestricted	2.7022	0.0061	0.0000	0.0000	2.7022	0.0061
Passenger Car	Gasoline	Off-Network	92.1852	0.2267	0.0000	0.0000	92.1852	0.2267
Passenger Car	Gasoline	Rural Restricted	79.3850	0.2221	0.0000	0.0000	79.3850	0.2221
Passenger Car	Gasoline	Rural Unrestricted	51.9801	0.1581	0.0000	0.0000	51.9801	0.1581
Passenger Car	Gasoline	Urban Restricted	9.0040	0.0254	0.0000	0.0000	9.0040	0.0254
Passenger Car	Gasoline	Urban Unrestricted	129.4370	0.4414	0.0000	0.0000	129.4370	0.4414
Passenger Car	Diesel	Off-Network	0.7812	0.0010	0.0000	0.0000	0.7812	0.0010
Passenger Car	Diesel	Rural Restricted	0.3790	0.0012	0.0000	0.0000	0.3790	0.0012
Passenger Car	Diesel	Rural Unrestricted	0.3118	0.0011	0.0000	0.0000	0.3118	0.0011
Passenger Car	Diesel	Urban Restricted	0.0455	0.0001	0.0000	0.0000	0.0455	0.0001
Passenger Car	Diesel	Urban Unrestricted	0.8584	0.0033	0.0000	0.0000	0.8584	0.0033
Passenger Truck	Gasoline	Off-Network	115.3812	0.2936	0.0000	0.0000	115.3812	0.2936
Passenger Truck	Gasoline	Rural Restricted	78.7640	0.2216	0.0000	0.0000	78.7640	0.2216
Passenger Truck	Gasoline	Rural Unrestricted	49.9214	0.1534	0.0000	0.0000	49.9214	0.1534
Passenger Truck	Gasoline	Urban Restricted	8.9273	0.0254	0.0000	0.0000	8.9273	0.0254
Passenger Truck	Gasoline	Urban Unrestricted	118.5184	0.4046	0.0000	0.0000	118.5184	0.4046
Passenger Truck	Diesel	Off-Network	3.3075	0.0047	0.0000	0.0000	3.3075	0.0047
Passenger Truck	Diesel	Rural Restricted	4.1183	0.0132	0.0000	0.0000	4.1183	0.0132
Passenger Truck	Diesel	Rural Unrestricted	3.5981	0.0124	0.0000	0.0000	3.5981	0.0124
Passenger Truck	Diesel	Urban Restricted	0.5055	0.0016	0.0000	0.0000	0.5055	0.0016
Passenger Truck	Diesel	Urban Unrestricted	10.6125	0.0419	0.0000	0.0000	10.6125	0.0419
Light Commercial Truck	Gasoline	Off-Network	53.5650	0.1391	0.0000	0.0000	53.5650	0.1391
Light Commercial Truck	Gasoline	Rural Restricted	35.8564	0.0984	0.0000	0.0000	35.8564	0.0984
Light Commercial Truck	Gasoline	Rural Unrestricted	24.0518	0.0725	0.0000	0.0000	24.0518	0.0725
Light Commercial Truck	Gasoline	Urban Restricted	4.1521	0.0115	0.0000	0.0000	4.1521	0.0115
Light Commercial Truck	Gasoline	Urban Unrestricted	57.5649	0.1921	0.0000	0.0000	57.5649	0.1921
Light Commercial Truck	Diesel	Off-Network	7.7063	0.0112	0.0000	0.0000	7.7063	0.0112
Light Commercial Truck	Diesel	Rural Restricted	10.7210	0.0338	0.0000	0.0000	10.7210	0.0338
Light Commercial Truck	Diesel	Rural Unrestricted	9.3273	0.0321	0.0000	0.0000	9.3273	0.0321
Light Commercial Truck	Diesel	Urban Restricted	1.3087	0.0041	0.0000	0.0000	1.3087	0.0041
Light Commercial Truck	Diesel	Urban Unrestricted	27.5321	0.1079	0.0000	0.0000	27.5321	0.1079
Intercity Bus	Diesel	Off-Network	0.0606	0.0000	0.0000	0.0000	0.0606	0.0000
Intercity Bus	Diesel	Rural Restricted	3.5648	0.0092	0.0000	0.0000	3.5648	0.0092
Intercity Bus	Diesel	Rural Unrestricted	3.4489	0.0088	0.0000	0.0000	3.4489	0.0088
Intercity Bus	Diesel	Urban Restricted	0.4386	0.0011	0.0000	0.0000	0.4386	0.0011
Intercity Bus	Diesel	Urban Unrestricted	8.9291	0.0233	0.0000	0.0000	8.9291	0.0233
Transit Bus	Gasoline	Off-Network	0.0011	0.0000	0.0000	0.0000	0.0011	0.0000
Transit Bus	Gasoline	Rural Restricted	0.0034	0.0000	0.0000	0.0000	0.0034	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0025	0.0000	0.0000	0.0000	0.0025	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0004	0.0000	0.0000	0.0000	0.0004	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0055	0.0000	0.0000	0.0000	0.0055	0.0000
Transit Bus	Diesel	Off-Network	0.0450	0.0000	0.0000	0.0000	0.0450	0.0000
Transit Bus	Diesel	Rural Restricted	0.9051	0.0023	0.0000	0.0000	0.9051	0.0023
Transit Bus	Diesel	Rural Unrestricted	0.6932	0.0018	0.0000	0.0000	0.6932	0.0018
Transit Bus	Diesel	Urban Restricted	0.1089	0.0003	0.0000	0.0000	0.1089	0.0003
Transit Bus	Diesel	Urban Unrestricted	1.6764	0.0043	0.0000	0.0000	1.6764	0.0043

Source Type	Fuel Type	Road Type	Kenosha (part) NOX Exhaust Emissions		Kenosha (part) NOX Evaporative Emissions		Kenosha (part) Total NOX Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0236	0.0001	0.0000	0.0000	0.0236	0.0001
Transit Bus	CNG	Rural Unrestricted	0.0173	0.0001	0.0000	0.0000	0.0173	0.0001
Transit Bus	CNG	Urban Restricted	0.0030	0.0000	0.0000	0.0000	0.0030	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0378	0.0001	0.0000	0.0000	0.0378	0.0001
School Bus	Gasoline	Off-Network	0.0739	0.0002	0.0000	0.0000	0.0739	0.0002
School Bus	Gasoline	Rural Restricted	0.0453	0.0001	0.0000	0.0000	0.0453	0.0001
School Bus	Gasoline	Rural Unrestricted	0.0294	0.0001	0.0000	0.0000	0.0294	0.0001
School Bus	Gasoline	Urban Restricted	0.0059	0.0000	0.0000	0.0000	0.0059	0.0000
School Bus	Gasoline	Urban Unrestricted	0.0633	0.0001	0.0000	0.0000	0.0633	0.0001
School Bus	Diesel	Off-Network	0.6687	0.0000	0.0000	0.0000	0.6687	0.0000
School Bus	Diesel	Rural Restricted	1.6594	0.0043	0.0000	0.0000	1.6594	0.0043
School Bus	Diesel	Rural Unrestricted	1.2748	0.0033	0.0000	0.0000	1.2748	0.0033
School Bus	Diesel	Urban Restricted	0.1884	0.0005	0.0000	0.0000	0.1884	0.0005
School Bus	Diesel	Urban Unrestricted	3.1679	0.0082	0.0000	0.0000	3.1679	0.0082
Refuse Truck	Gasoline	Off-Network	0.0073	0.0000	0.0000	0.0000	0.0073	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0413	0.0001	0.0000	0.0000	0.0413	0.0001
Refuse Truck	Gasoline	Rural Unrestricted	0.0306	0.0001	0.0000	0.0000	0.0306	0.0001
Refuse Truck	Gasoline	Urban Restricted	0.0053	0.0000	0.0000	0.0000	0.0053	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0781	0.0002	0.0000	0.0000	0.0781	0.0002
Refuse Truck	Diesel	Off-Network	0.0547	0.0000	0.0000	0.0000	0.0547	0.0000
Refuse Truck	Diesel	Rural Restricted	2.0587	0.0053	0.0000	0.0000	2.0587	0.0053
Refuse Truck	Diesel	Rural Unrestricted	1.4194	0.0036	0.0000	0.0000	1.4194	0.0036
Refuse Truck	Diesel	Urban Restricted	0.2546	0.0007	0.0000	0.0000	0.2546	0.0007
Refuse Truck	Diesel	Urban Unrestricted	3.7424	0.0098	0.0000	0.0000	3.7424	0.0098
Single Unit Short-haul Truck	Gasoline	Off-Network	5.5341	0.0187	0.0000	0.0000	5.5341	0.0187
Single Unit Short-haul Truck	Gasoline	Rural Restricted	11.3947	0.0265	0.0000	0.0000	11.3947	0.0265
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	8.1671	0.0189	0.0000	0.0000	8.1671	0.0189
Single Unit Short-haul Truck	Gasoline	Urban Restricted	1.5551	0.0036	0.0000	0.0000	1.5551	0.0036
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	19.3006	0.0446	0.0000	0.0000	19.3006	0.0446
Single Unit Short-haul Truck	Diesel	Off-Network	4.1387	0.0001	0.0000	0.0000	4.1387	0.0001
Single Unit Short-haul Truck	Diesel	Rural Restricted	28.6813	0.0746	0.0000	0.0000	28.6813	0.0746
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	23.6882	0.0605	0.0000	0.0000	23.6882	0.0605
Single Unit Short-haul Truck	Diesel	Urban Restricted	3.6626	0.0095	0.0000	0.0000	3.6626	0.0095
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	68.0559	0.1786	0.0000	0.0000	68.0559	0.1786
Single Unit Long-haul Truck	Gasoline	Off-Network	0.4186	0.0014	0.0000	0.0000	0.4186	0.0014
Single Unit Long-haul Truck	Gasoline	Rural Restricted	1.4424	0.0034	0.0000	0.0000	1.4424	0.0034
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	1.0193	0.0024	0.0000	0.0000	1.0193	0.0024
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.1995	0.0005	0.0000	0.0000	0.1995	0.0005
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	2.3584	0.0054	0.0000	0.0000	2.3584	0.0054
Single Unit Long-haul Truck	Diesel	Off-Network	0.4268	0.0000	0.0000	0.0000	0.4268	0.0000
Single Unit Long-haul Truck	Diesel	Rural Restricted	3.5766	0.0093	0.0000	0.0000	3.5766	0.0093
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	3.0331	0.0077	0.0000	0.0000	3.0331	0.0077
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.4721	0.0012	0.0000	0.0000	0.4721	0.0012
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	8.7565	0.0230	0.0000	0.0000	8.7565	0.0230
Motor Home	Gasoline	Off-Network	0.4001	0.0010	0.0000	0.0000	0.4001	0.0010
Motor Home	Gasoline	Rural Restricted	1.8625	0.0043	0.0000	0.0000	1.8625	0.0043
Motor Home	Gasoline	Rural Unrestricted	1.2106	0.0028	0.0000	0.0000	1.2106	0.0028
Motor Home	Gasoline	Urban Restricted	0.2402	0.0006	0.0000	0.0000	0.2402	0.0006
Motor Home	Gasoline	Urban Unrestricted	2.8406	0.0065	0.0000	0.0000	2.8406	0.0065
Motor Home	Diesel	Off-Network	0.0620	0.0000	0.0000	0.0000	0.0620	0.0000
Motor Home	Diesel	Rural Restricted	1.3559	0.0035	0.0000	0.0000	1.3559	0.0035
Motor Home	Diesel	Rural Unrestricted	0.9120	0.0023	0.0000	0.0000	0.9120	0.0023

Source Type	Fuel Type	Road Type	Kenosha (part) NOX Exhaust Emissions		Kenosha (part) NOX Evaporative Emissions		Kenosha (part) Total NOX Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Motor Home	Diesel	Urban Restricted	0.1552	0.0004	0.0000	0.0000	0.1552	0.0004
Motor Home	Diesel	Urban Unrestricted	2.6001	0.0068	0.0000	0.0000	2.6001	0.0068
Combination Short-haul Truck	Gasoline	Off-Network	0.0095	0.0000	0.0000	0.0000	0.0095	0.0000
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0785	0.0002	0.0000	0.0000	0.0785	0.0002
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0148	0.0000	0.0000	0.0000	0.0148	0.0000
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0098	0.0000	0.0000	0.0000	0.0098	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0368	0.0001	0.0000	0.0000	0.0368	0.0001
Combination Short-haul Truck	Diesel	Off-Network	0.5793	0.0000	0.0000	0.0000	0.5793	0.0000
Combination Short-haul Truck	Diesel	Rural Restricted	82.1649	0.2131	0.0000	0.0000	82.1649	0.2131
Combination Short-haul Truck	Diesel	Rural Unrestricted	16.5003	0.0423	0.0000	0.0000	16.5003	0.0423
Combination Short-haul Truck	Diesel	Urban Restricted	10.2711	0.0269	0.0000	0.0000	10.2711	0.0269
Combination Short-haul Truck	Diesel	Urban Unrestricted	42.2671	0.1103	0.0000	0.0000	42.2671	0.1103
Combination Long-haul Truck	Diesel	Off-Network	57.2399	0.1236	0.0000	0.0000	57.2399	0.1236
Combination Long-haul Truck	Diesel	Rural Restricted	122.2818	0.3172	0.0000	0.0000	122.2818	0.3172
Combination Long-haul Truck	Diesel	Rural Unrestricted	24.5814	0.0630	0.0000	0.0000	24.5814	0.0630
Combination Long-haul Truck	Diesel	Urban Restricted	15.3268	0.0401	0.0000	0.0000	15.3268	0.0401
Combination Long-haul Truck	Diesel	Urban Unrestricted	63.0631	0.1646	0.0000	0.0000	63.0631	0.1646
ALL	ALL	ALL	1671.5956	4.6740	0.0000	0.0000	1671.5956	4.6740
Motorcycle	ALL	ALL	5.0087	0.0110	0.0000	0.0000	5.0087	0.0110
Passenger Car	ALL	ALL	364.3671	1.0804	0.0000	0.0000	364.3671	1.0804
Passenger Truck	ALL	ALL	393.6542	1.1724	0.0000	0.0000	393.6542	1.1724
Light Commercial Truck	ALL	ALL	231.7856	0.7027	0.0000	0.0000	231.7856	0.7027
Intercity Bus	ALL	ALL	16.4419	0.0425	0.0000	0.0000	16.4419	0.0425
Transit Bus	ALL	ALL	3.5231	0.0090	0.0000	0.0000	3.5231	0.0090
School Bus	ALL	ALL	7.1771	0.0169	0.0000	0.0000	7.1771	0.0169
Refuse Truck	ALL	ALL	7.6924	0.0198	0.0000	0.0000	7.6924	0.0198
Single Unit Short-haul Truck	ALL	ALL	174.1782	0.4356	0.0000	0.0000	174.1782	0.4356
Single Unit Long-haul Truck	ALL	ALL	21.7032	0.0543	0.0000	0.0000	21.7032	0.0543
Motor Home	ALL	ALL	11.6393	0.0282	0.0000	0.0000	11.6393	0.0282
Combination Short-haul Truck	ALL	ALL	151.9320	0.3929	0.0000	0.0000	151.9320	0.3929
Combination Long-haul Truck	ALL	ALL	282.4929	0.7084	0.0000	0.0000	282.4929	0.7084
ALL	ALL	ALL	1671.5956	4.6740	0.0000	0.0000	1671.5956	4.6740
ALL	Gasoline	ALL	972.1892	2.8384	0.0000	0.0000	972.1892	2.8384
ALL	Diesel	ALL	699.3248	1.8353	0.0000	0.0000	699.3248	1.8353
ALL	CNG	ALL	0.0817	0.0003	0.0000	0.0000	0.0817	0.0003
ALL	ALL	ALL	1671.5956	4.6740	0.0000	0.0000	1671.5956	4.6740
ALL	ALL	Off-Network	342.9175	0.8216	0.0000	0.0000	342.9175	0.8216
ALL	ALL	Rural Restricted	470.9539	1.2654	0.0000	0.0000	470.9539	1.2654
ALL	ALL	Rural Unrestricted	226.5995	0.6502	0.0000	0.0000	226.5995	0.6502
ALL	ALL	Urban Restricted	56.9197	0.1536	0.0000	0.0000	56.9197	0.1536
ALL	ALL	Urban Unrestricted	574.2051	1.7832	0.0000	0.0000	574.2051	1.7832
ALL	ALL	ALL	1671.5956	4.6740	0.0000	0.0000	1671.5956	4.6740

Table3-b: Kenosha Sub-County Nonattainment Area (I-94 and to the East);  
VOC Emissions: tons per year (tpy) and tons per summer weekday (tpswd)

Source Type	Fuel Type	Road Type	Kenosha (part) VOC Exhaust Emissions		Kenosha (part) VOC Evaporative Emissions		Kenosha (part) Total VOC Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Motorcycle	Gasoline	Off-Network	1.1678	0.0006	11.3662	0.0831	12.5340	0.0837
Motorcycle	Gasoline	Rural Restricted	0.5033	0.0016	0.1836	0.0006	0.6869	0.0022
Motorcycle	Gasoline	Rural Unrestricted	1.5211	0.0048	0.8243	0.0026	2.3454	0.0073
Motorcycle	Gasoline	Urban Restricted	0.0680	0.0002	0.0275	0.0001	0.0954	0.0003
Motorcycle	Gasoline	Urban Unrestricted	4.2499	0.0135	2.7729	0.0089	7.0228	0.0224
Passenger Car	Gasoline	Off-Network	171.4103	0.2540	39.8528	0.2522	211.2632	0.5062
Passenger Car	Gasoline	Rural Restricted	13.0320	0.0459	4.2456	0.0142	17.2776	0.0601
Passenger Car	Gasoline	Rural Unrestricted	10.4178	0.0357	5.8556	0.0190	16.2734	0.0547
Passenger Car	Gasoline	Urban Restricted	1.5218	0.0053	0.6354	0.0021	2.1572	0.0074
Passenger Car	Gasoline	Urban Unrestricted	30.6484	0.1069	19.6763	0.0658	50.3246	0.1727
Passenger Car	Diesel	Off-Network	0.2470	0.0002	0.0000	0.0000	0.2470	0.0002
Passenger Car	Diesel	Rural Restricted	0.0224	0.0001	0.0000	0.0000	0.0224	0.0001
Passenger Car	Diesel	Rural Unrestricted	0.0247	0.0001	0.0000	0.0000	0.0247	0.0001
Passenger Car	Diesel	Urban Restricted	0.0032	0.0000	0.0000	0.0000	0.0032	0.0000
Passenger Car	Diesel	Urban Unrestricted	0.0721	0.0002	0.0000	0.0000	0.0721	0.0002
Passenger Truck	Gasoline	Off-Network	178.3025	0.3190	18.0228	0.1225	196.3253	0.4415
Passenger Truck	Gasoline	Rural Restricted	10.4097	0.0369	1.5090	0.0051	11.9186	0.0420
Passenger Truck	Gasoline	Rural Unrestricted	7.9550	0.0274	2.0814	0.0068	10.0364	0.0342
Passenger Truck	Gasoline	Urban Restricted	1.1494	0.0040	0.2258	0.0007	1.3752	0.0048
Passenger Truck	Gasoline	Urban Unrestricted	23.4454	0.0825	6.9933	0.0236	30.4387	0.1062
Passenger Truck	Diesel	Off-Network	0.6843	0.0003	0.0000	0.0000	0.6843	0.0003
Passenger Truck	Diesel	Rural Restricted	0.4041	0.0015	0.0000	0.0000	0.4041	0.0015
Passenger Truck	Diesel	Rural Unrestricted	0.4683	0.0016	0.0000	0.0000	0.4683	0.0016
Passenger Truck	Diesel	Urban Restricted	0.0595	0.0002	0.0000	0.0000	0.0595	0.0002
Passenger Truck	Diesel	Urban Unrestricted	1.3949	0.0049	0.0000	0.0000	1.3949	0.0049
Light Commercial Truck	Gasoline	Off-Network	82.2723	0.1627	11.5810	0.0788	93.8532	0.2415
Light Commercial Truck	Gasoline	Rural Restricted	5.4668	0.0192	0.8998	0.0030	6.3667	0.0222
Light Commercial Truck	Gasoline	Rural Unrestricted	4.8888	0.0166	1.2411	0.0040	6.1299	0.0207
Light Commercial Truck	Gasoline	Urban Restricted	0.6425	0.0022	0.1347	0.0004	0.7772	0.0027
Light Commercial Truck	Gasoline	Urban Unrestricted	14.8404	0.0518	4.1701	0.0139	19.0106	0.0657
Light Commercial Truck	Diesel	Off-Network	1.8338	0.0008	0.0000	0.0000	1.8338	0.0008
Light Commercial Truck	Diesel	Rural Restricted	1.2323	0.0044	0.0000	0.0000	1.2323	0.0044
Light Commercial Truck	Diesel	Rural Unrestricted	1.4281	0.0050	0.0000	0.0000	1.4281	0.0050
Light Commercial Truck	Diesel	Urban Restricted	0.1814	0.0006	0.0000	0.0000	0.1814	0.0006
Light Commercial Truck	Diesel	Urban Unrestricted	4.2507	0.0150	0.0000	0.0000	4.2507	0.0150
Intercity Bus	Diesel	Off-Network	0.0232	0.0000	0.0000	0.0000	0.0232	0.0000
Intercity Bus	Diesel	Rural Restricted	0.1076	0.0003	0.0000	0.0000	0.1076	0.0003
Intercity Bus	Diesel	Rural Unrestricted	0.1495	0.0005	0.0000	0.0000	0.1495	0.0005
Intercity Bus	Diesel	Urban Restricted	0.0150	0.0000	0.0000	0.0000	0.0150	0.0000
Intercity Bus	Diesel	Urban Unrestricted	0.4162	0.0013	0.0000	0.0000	0.4162	0.0013
Transit Bus	Gasoline	Off-Network	0.0017	0.0000	0.0003	0.0000	0.0020	0.0000
Transit Bus	Gasoline	Rural Restricted	0.0004	0.0000	0.0000	0.0000	0.0005	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0007	0.0000	0.0000	0.0000	0.0008	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0019	0.0000	0.0001	0.0000	0.0020	0.0000
Transit Bus	Diesel	Off-Network	0.0188	0.0000	0.0000	0.0000	0.0188	0.0000
Transit Bus	Diesel	Rural Restricted	0.0356	0.0001	0.0000	0.0000	0.0356	0.0001
Transit Bus	Diesel	Rural Unrestricted	0.0369	0.0001	0.0000	0.0000	0.0369	0.0001
Transit Bus	Diesel	Urban Restricted	0.0050	0.0000	0.0000	0.0000	0.0050	0.0000
Transit Bus	Diesel	Urban Unrestricted	0.1023	0.0003	0.0000	0.0000	0.1023	0.0003
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Off-Network	0.1080	0.0003	0.0081	0.0001	0.1160	0.0004
School Bus	Gasoline	Rural Restricted	0.0051	0.0000	0.0003	0.0000	0.0053	0.0000
School Bus	Gasoline	Rural Unrestricted	0.0082	0.0000	0.0005	0.0000	0.0087	0.0000
School Bus	Gasoline	Urban Restricted	0.0007	0.0000	0.0000	0.0000	0.0007	0.0000

Appendix 3

Source Type	Fuel Type	Road Type	Kenosha (part) VOC Exhaust Emissions		Kenosha (part) VOC Evaporative Emissions		Kenosha (part) Total VOC Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
School Bus	Gasoline	Urban Unrestricted	0.0226	0.0001	0.0017	0.0000	0.0243	0.0001
School Bus	Diesel	Off-Network	0.2191	0.0000	0.0000	0.0000	0.2191	0.0000
School Bus	Diesel	Rural Restricted	0.0909	0.0003	0.0000	0.0000	0.0909	0.0003
School Bus	Diesel	Rural Unrestricted	0.1106	0.0003	0.0000	0.0000	0.1106	0.0003
School Bus	Diesel	Urban Restricted	0.0133	0.0000	0.0000	0.0000	0.0133	0.0000
School Bus	Diesel	Urban Unrestricted	0.3049	0.0010	0.0000	0.0000	0.3049	0.0010
Refuse Truck	Gasoline	Off-Network	0.0106	0.0000	0.0039	0.0000	0.0144	0.0001
Refuse Truck	Gasoline	Rural Restricted	0.0054	0.0000	0.0003	0.0000	0.0057	0.0000
Refuse Truck	Gasoline	Rural Unrestricted	0.0063	0.0000	0.0004	0.0000	0.0067	0.0000
Refuse Truck	Gasoline	Urban Restricted	0.0007	0.0000	0.0000	0.0000	0.0008	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0221	0.0001	0.0013	0.0000	0.0234	0.0001
Refuse Truck	Diesel	Off-Network	0.0215	0.0000	0.0000	0.0000	0.0215	0.0000
Refuse Truck	Diesel	Rural Restricted	0.0666	0.0002	0.0000	0.0000	0.0666	0.0002
Refuse Truck	Diesel	Rural Unrestricted	0.0709	0.0002	0.0000	0.0000	0.0709	0.0002
Refuse Truck	Diesel	Urban Restricted	0.0096	0.0000	0.0000	0.0000	0.0096	0.0000
Refuse Truck	Diesel	Urban Unrestricted	0.2031	0.0006	0.0000	0.0000	0.2031	0.0006
Single Unit Short-haul Truck	Gasoline	Off-Network	7.1360	0.0207	2.5424	0.0147	9.6784	0.0354
Single Unit Short-haul Truck	Gasoline	Rural Restricted	1.1630	0.0037	0.0941	0.0003	1.2571	0.0040
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	1.3479	0.0041	0.1222	0.0004	1.4701	0.0045
Single Unit Short-haul Truck	Gasoline	Urban Restricted	0.1707	0.0005	0.0141	0.0000	0.1848	0.0006
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	4.7217	0.0153	0.3964	0.0014	5.1181	0.0167
Single Unit Short-haul Truck	Diesel	Off-Network	1.5076	0.0001	0.0000	0.0000	1.5076	0.0001
Single Unit Short-haul Truck	Diesel	Rural Restricted	2.0833	0.0067	0.0000	0.0000	2.0833	0.0067
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	2.4358	0.0076	0.0000	0.0000	2.4358	0.0076
Single Unit Short-haul Truck	Diesel	Urban Restricted	0.3079	0.0010	0.0000	0.0000	0.3079	0.0010
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	7.1406	0.0228	0.0000	0.0000	7.1406	0.0228
Single Unit Long-haul Truck	Gasoline	Off-Network	0.6392	0.0018	0.1438	0.0008	0.7830	0.0026
Single Unit Long-haul Truck	Gasoline	Rural Restricted	0.1334	0.0004	0.0092	0.0000	0.1426	0.0005
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	0.1548	0.0005	0.0120	0.0000	0.1667	0.0005
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.0202	0.0001	0.0014	0.0000	0.0215	0.0001
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.5429	0.0018	0.0387	0.0001	0.5816	0.0019
Single Unit Long-haul Truck	Diesel	Off-Network	0.1485	0.0000	0.0000	0.0000	0.1485	0.0000
Single Unit Long-haul Truck	Diesel	Rural Restricted	0.2950	0.0009	0.0000	0.0000	0.2950	0.0009
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	0.3446	0.0011	0.0000	0.0000	0.3446	0.0011
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.0436	0.0001	0.0000	0.0000	0.0436	0.0001
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	1.0079	0.0032	0.0000	0.0000	1.0079	0.0032
Motor Home	Gasoline	Off-Network	0.7425	0.0017	0.5975	0.0040	1.3400	0.0057
Motor Home	Gasoline	Rural Restricted	0.2808	0.0009	0.0289	0.0001	0.3098	0.0010
Motor Home	Gasoline	Rural Unrestricted	0.2640	0.0008	0.0375	0.0001	0.3015	0.0009
Motor Home	Gasoline	Urban Restricted	0.0373	0.0001	0.0043	0.0000	0.0416	0.0001
Motor Home	Gasoline	Urban Unrestricted	0.8830	0.0028	0.1215	0.0004	1.0045	0.0033
Motor Home	Diesel	Off-Network	0.0252	0.0000	0.0000	0.0000	0.0252	0.0000
Motor Home	Diesel	Rural Restricted	0.0850	0.0003	0.0000	0.0000	0.0850	0.0003
Motor Home	Diesel	Rural Unrestricted	0.1015	0.0003	0.0000	0.0000	0.1015	0.0003
Motor Home	Diesel	Urban Restricted	0.0126	0.0000	0.0000	0.0000	0.0126	0.0000
Motor Home	Diesel	Urban Unrestricted	0.2993	0.0010	0.0000	0.0000	0.2993	0.0010
Combination Short-haul Truck	Gasoline	Off-Network	0.0130	0.0000	0.0111	0.0001	0.0240	0.0001
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0155	0.0000	0.0013	0.0000	0.0168	0.0001
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0046	0.0000	0.0005	0.0000	0.0051	0.0000
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0020	0.0000	0.0002	0.0000	0.0022	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0158	0.0001	0.0015	0.0000	0.0172	0.0001
Combination Short-haul Truck	Diesel	Off-Network	0.2286	0.0000	0.0000	0.0000	0.2286	0.0000
Combination Short-haul Truck	Diesel	Rural Restricted	2.6107	0.0083	0.0000	0.0000	2.6107	0.0083
Combination Short-haul Truck	Diesel	Rural Unrestricted	0.7334	0.0023	0.0000	0.0000	0.7334	0.0023
Combination Short-haul Truck	Diesel	Urban Restricted	0.3717	0.0012	0.0000	0.0000	0.3717	0.0012
Combination Short-haul Truck	Diesel	Urban Unrestricted	2.1141	0.0067	0.0000	0.0000	2.1141	0.0067
Combination Long-haul Truck	Diesel	Off-Network	10.1321	0.0315	0.0000	0.0000	10.1321	0.0315
Combination Long-haul Truck	Diesel	Rural Restricted	3.8829	0.0124	0.0000	0.0000	3.8829	0.0124
Combination Long-haul Truck	Diesel	Rural Unrestricted	1.0425	0.0033	0.0000	0.0000	1.0425	0.0033
Combination Long-haul Truck	Diesel	Urban Restricted	0.5452	0.0017	0.0000	0.0000	0.5452	0.0017
Combination Long-haul Truck	Diesel	Urban Unrestricted	2.9716	0.0094	0.0000	0.0000	2.9716	0.0094

Source Type	Fuel Type	Road Type	Kenosha (part) VOC Exhaust Emissions		Kenosha (part) VOC Evaporative Emissions		Kenosha (part) Total VOC Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
ALL	ALL	ALL	637.1944	1.4091	136.4948	0.7303	773.6892	2.1394
Motorcycle	ALL	ALL	7.5101	0.0206	15.1744	0.0952	22.6845	0.1158
Passenger Car	ALL	ALL	227.3996	0.4484	70.2658	0.3533	297.6654	0.8018
Passenger Truck	ALL	ALL	224.2730	0.4784	28.8323	0.1587	253.1054	0.6371
Light Commercial Truck	ALL	ALL	117.0371	0.2783	18.0267	0.1002	135.0638	0.3785
Intercity Bus	ALL	ALL	0.7116	0.0022	0.0000	0.0000	0.7116	0.0022
Transit Bus	ALL	ALL	0.2035	0.0006	0.0004	0.0000	0.2040	0.0006
School Bus	ALL	ALL	0.8834	0.0021	0.0106	0.0001	0.8940	0.0021
Refuse Truck	ALL	ALL	0.4169	0.0013	0.0059	0.0000	0.4228	0.0013
Single Unit Short-haul Truck	ALL	ALL	28.0145	0.0825	3.1693	0.0169	31.1838	0.0994
Single Unit Long-haul Truck	ALL	ALL	3.3299	0.0099	0.2051	0.0010	3.5350	0.0109
Motor Home	ALL	ALL	2.7311	0.0079	0.7898	0.0047	3.5209	0.0126
Combination Short-haul Truck	ALL	ALL	6.1094	0.0187	0.0145	0.0001	6.1239	0.0187
Combination Long-haul Truck	ALL	ALL	18.5743	0.0583	0.0000	0.0000	18.5743	0.0583
ALL	ALL	ALL	637.1944	1.4091	136.4948	0.7303	773.6892	2.1394
ALL	Gasoline	ALL	582.3956	1.2467	136.4948	0.7303	718.8904	1.9769
ALL	Diesel	ALL	54.7988	0.1625	0.0000	0.0000	54.7988	0.1625
ALL	CNG	ALL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	ALL	ALL	637.1944	1.4091	136.4948	0.7303	773.6892	2.1394
ALL	ALL	Off-Network	456.8936	0.7937	84.1299	0.5562	541.0234	1.3499
ALL	ALL	Rural Restricted	41.9317	0.1442	6.9722	0.0234	48.9039	0.1675
ALL	ALL	Rural Unrestricted	33.5159	0.1124	10.1754	0.0330	43.6913	0.1454
ALL	ALL	Urban Restricted	5.1815	0.0175	1.0435	0.0034	6.2251	0.0209
ALL	ALL	Urban Unrestricted	99.6717	0.3414	34.1738	0.1143	133.8455	0.4557
ALL	ALL	ALL	637.1944	1.4091	136.4948	0.7303	773.6892	2.1394

Table 3-c: Sheboygan County Nonattainment Area;  
NOX Emissions: tons per year (tpy) and tons per summer weekday (tpswd)

Source Type	Fuel Type	Road Type	Sheboygan NOX Exhaust Emissions		Sheboygan NOX Evaporative Emissions		Sheboygan Total NOX Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Motorcycle	Gasoline	Off-Network	0.4192	0.0002	0.0000	0.0000	0.4192	0.0002
Motorcycle	Gasoline	Rural Restricted	0.5642	0.0013	0.0000	0.0000	0.5642	0.0013
Motorcycle	Gasoline	Rural Unrestricted	2.5372	0.0061	0.0000	0.0000	2.5372	0.0061
Motorcycle	Gasoline	Urban Restricted	1.1084	0.0027	0.0000	0.0000	1.1084	0.0027
Motorcycle	Gasoline	Urban Unrestricted	3.0839	0.0074	0.0000	0.0000	3.0839	0.0074
Passenger Car	Gasoline	Off-Network	96.9288	0.2403	0.0000	0.0000	96.9288	0.2403
Passenger Car	Gasoline	Rural Restricted	53.9832	0.1521	0.0000	0.0000	53.9832	0.1521
Passenger Car	Gasoline	Rural Unrestricted	99.6396	0.3066	0.0000	0.0000	99.6396	0.3066
Passenger Car	Gasoline	Urban Restricted	34.9380	0.0982	0.0000	0.0000	34.9380	0.0982
Passenger Car	Gasoline	Urban Unrestricted	90.0138	0.3298	0.0000	0.0000	90.0138	0.3298
Passenger Car	Diesel	Off-Network	0.8393	0.0011	0.0000	0.0000	0.8393	0.0011
Passenger Car	Diesel	Rural Restricted	0.2527	0.0008	0.0000	0.0000	0.2527	0.0008
Passenger Car	Diesel	Rural Unrestricted	0.5901	0.0020	0.0000	0.0000	0.5901	0.0020
Passenger Car	Diesel	Urban Restricted	0.1744	0.0005	0.0000	0.0000	0.1744	0.0005
Passenger Car	Diesel	Urban Unrestricted	0.5981	0.0024	0.0000	0.0000	0.5981	0.0024
Passenger Truck	Gasoline	Off-Network	117.2849	0.3005	0.0000	0.0000	117.2849	0.3005
Passenger Truck	Gasoline	Rural Restricted	51.1688	0.1448	0.0000	0.0000	51.1688	0.1448
Passenger Truck	Gasoline	Rural Unrestricted	91.7936	0.2840	0.0000	0.0000	91.7936	0.2840
Passenger Truck	Gasoline	Urban Restricted	32.8160	0.0926	0.0000	0.0000	32.8160	0.0926
Passenger Truck	Gasoline	Urban Unrestricted	79.8074	0.2943	0.0000	0.0000	79.8074	0.2943
Passenger Truck	Diesel	Off-Network	3.4293	0.0048	0.0000	0.0000	3.4293	0.0048
Passenger Truck	Diesel	Rural Restricted	2.6672	0.0084	0.0000	0.0000	2.6672	0.0084
Passenger Truck	Diesel	Rural Unrestricted	6.6004	0.0229	0.0000	0.0000	6.6004	0.0229
Passenger Truck	Diesel	Urban Restricted	1.8936	0.0060	0.0000	0.0000	1.8936	0.0060
Passenger Truck	Diesel	Urban Unrestricted	7.3436	0.0305	0.0000	0.0000	7.3436	0.0305
Light Commercial Truck	Gasoline	Off-Network	54.5456	0.1428	0.0000	0.0000	54.5456	0.1428
Light Commercial Truck	Gasoline	Rural Restricted	23.3762	0.0645	0.0000	0.0000	23.3762	0.0645
Light Commercial Truck	Gasoline	Rural Unrestricted	44.4555	0.1350	0.0000	0.0000	44.4555	0.1350
Light Commercial Truck	Gasoline	Urban Restricted	15.3332	0.0422	0.0000	0.0000	15.3332	0.0422
Light Commercial Truck	Gasoline	Urban Unrestricted	38.9742	0.1401	0.0000	0.0000	38.9742	0.1401
Light Commercial Truck	Diesel	Off-Network	7.9800	0.0113	0.0000	0.0000	7.9800	0.0113
Light Commercial Truck	Diesel	Rural Restricted	6.9359	0.0216	0.0000	0.0000	6.9359	0.0216
Light Commercial Truck	Diesel	Rural Unrestricted	17.1089	0.0591	0.0000	0.0000	17.1089	0.0591
Light Commercial Truck	Diesel	Urban Restricted	4.8918	0.0152	0.0000	0.0000	4.8918	0.0152
Light Commercial Truck	Diesel	Urban Unrestricted	19.1353	0.0788	0.0000	0.0000	19.1353	0.0788
Intercity Bus	Diesel	Off-Network	0.0519	0.0000	0.0000	0.0000	0.0519	0.0000
Intercity Bus	Diesel	Rural Restricted	4.4888	0.0117	0.0000	0.0000	4.4888	0.0117
Intercity Bus	Diesel	Rural Unrestricted	4.6009	0.0120	0.0000	0.0000	4.6009	0.0120
Intercity Bus	Diesel	Urban Restricted	1.7789	0.0046	0.0000	0.0000	1.7789	0.0046
Intercity Bus	Diesel	Urban Unrestricted	1.7957	0.0047	0.0000	0.0000	1.7957	0.0047
Transit Bus	Gasoline	Off-Network	0.0009	0.0000	0.0000	0.0000	0.0009	0.0000
Transit Bus	Gasoline	Rural Restricted	0.0044	0.0000	0.0000	0.0000	0.0044	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0032	0.0000	0.0000	0.0000	0.0032	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0018	0.0000	0.0000	0.0000	0.0018	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0012	0.0000	0.0000	0.0000	0.0012	0.0000
Transit Bus	Diesel	Off-Network	0.0396	0.0000	0.0000	0.0000	0.0396	0.0000
Transit Bus	Diesel	Rural Restricted	1.1639	0.0030	0.0000	0.0000	1.1639	0.0030
Transit Bus	Diesel	Rural Unrestricted	0.9073	0.0024	0.0000	0.0000	0.9073	0.0024
Transit Bus	Diesel	Urban Restricted	0.4576	0.0012	0.0000	0.0000	0.4576	0.0012
Transit Bus	Diesel	Urban Unrestricted	0.3641	0.0010	0.0000	0.0000	0.3641	0.0010

Source Type	Fuel Type	Road Type	Sheboygan NOX Exhaust Emissions		Sheboygan NOX Evaporative Emissions		Sheboygan Total NOX Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0303	0.0001	0.0000	0.0000	0.0303	0.0001
Transit Bus	CNG	Rural Unrestricted	0.0221	0.0001	0.0000	0.0000	0.0221	0.0001
Transit Bus	CNG	Urban Restricted	0.0125	0.0000	0.0000	0.0000	0.0125	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0080	0.0000	0.0000	0.0000	0.0080	0.0000
School Bus	Gasoline	Off-Network	0.0600	0.0002	0.0000	0.0000	0.0600	0.0002
School Bus	Gasoline	Rural Restricted	0.0589	0.0001	0.0000	0.0000	0.0589	0.0001
School Bus	Gasoline	Rural Unrestricted	0.0365	0.0001	0.0000	0.0000	0.0365	0.0001
School Bus	Gasoline	Urban Restricted	0.0253	0.0001	0.0000	0.0000	0.0253	0.0001
School Bus	Gasoline	Urban Unrestricted	0.0133	0.0000	0.0000	0.0000	0.0133	0.0000
School Bus	Diesel	Off-Network	0.5827	0.0000	0.0000	0.0000	0.5827	0.0000
School Bus	Diesel	Rural Restricted	2.1297	0.0056	0.0000	0.0000	2.1297	0.0056
School Bus	Diesel	Rural Unrestricted	1.6728	0.0044	0.0000	0.0000	1.6728	0.0044
School Bus	Diesel	Urban Restricted	0.8015	0.0021	0.0000	0.0000	0.8015	0.0021
School Bus	Diesel	Urban Unrestricted	0.6824	0.0018	0.0000	0.0000	0.6824	0.0018
Refuse Truck	Gasoline	Off-Network	0.0059	0.0000	0.0000	0.0000	0.0059	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0311	0.0001	0.0000	0.0000	0.0311	0.0001
Refuse Truck	Gasoline	Rural Unrestricted	0.0492	0.0001	0.0000	0.0000	0.0492	0.0001
Refuse Truck	Gasoline	Urban Restricted	0.0150	0.0000	0.0000	0.0000	0.0150	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0258	0.0001	0.0000	0.0000	0.0258	0.0001
Refuse Truck	Diesel	Off-Network	0.0467	0.0000	0.0000	0.0000	0.0467	0.0000
Refuse Truck	Diesel	Rural Restricted	1.5253	0.0040	0.0000	0.0000	1.5253	0.0040
Refuse Truck	Diesel	Rural Unrestricted	2.2598	0.0059	0.0000	0.0000	2.2598	0.0059
Refuse Truck	Diesel	Urban Restricted	0.6933	0.0018	0.0000	0.0000	0.6933	0.0018
Refuse Truck	Diesel	Urban Unrestricted	1.2745	0.0033	0.0000	0.0000	1.2745	0.0033
Single Unit Short-haul Truck	Gasoline	Off-Network	4.4689	0.0152	0.0000	0.0000	4.4689	0.0152
Single Unit Short-haul Truck	Gasoline	Rural Restricted	8.7114	0.0206	0.0000	0.0000	8.7114	0.0206
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	12.8988	0.0306	0.0000	0.0000	12.8988	0.0306
Single Unit Short-haul Truck	Gasoline	Urban Restricted	4.4667	0.0106	0.0000	0.0000	4.4667	0.0106
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	6.7047	0.0159	0.0000	0.0000	6.7047	0.0159
Single Unit Short-haul Truck	Diesel	Off-Network	3.5658	0.0003	0.0000	0.0000	3.5658	0.0003
Single Unit Short-haul Truck	Diesel	Rural Restricted	22.0318	0.0576	0.0000	0.0000	22.0318	0.0576
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	37.9467	0.0991	0.0000	0.0000	37.9467	0.0991
Single Unit Short-haul Truck	Diesel	Urban Restricted	10.7630	0.0281	0.0000	0.0000	10.7630	0.0281
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	24.1306	0.0631	0.0000	0.0000	24.1306	0.0631
Single Unit Long-haul Truck	Gasoline	Off-Network	0.3366	0.0011	0.0000	0.0000	0.3366	0.0011
Single Unit Long-haul Truck	Gasoline	Rural Restricted	1.1025	0.0026	0.0000	0.0000	1.1025	0.0026
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	1.6034	0.0038	0.0000	0.0000	1.6034	0.0038
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.5718	0.0014	0.0000	0.0000	0.5718	0.0014
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.8189	0.0019	0.0000	0.0000	0.8189	0.0019
Single Unit Long-haul Truck	Diesel	Off-Network	0.3622	0.0001	0.0000	0.0000	0.3622	0.0001
Single Unit Long-haul Truck	Diesel	Rural Restricted	2.7617	0.0072	0.0000	0.0000	2.7617	0.0072
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	4.8570	0.0127	0.0000	0.0000	4.8570	0.0127
Single Unit Long-haul Truck	Diesel	Urban Restricted	1.3900	0.0036	0.0000	0.0000	1.3900	0.0036
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	3.1102	0.0081	0.0000	0.0000	3.1102	0.0081
Motor Home	Gasoline	Off-Network	0.3231	0.0008	0.0000	0.0000	0.3231	0.0008
Motor Home	Gasoline	Rural Restricted	1.4371	0.0034	0.0000	0.0000	1.4371	0.0034
Motor Home	Gasoline	Rural Unrestricted	1.9347	0.0045	0.0000	0.0000	1.9347	0.0045
Motor Home	Gasoline	Urban Restricted	0.6960	0.0016	0.0000	0.0000	0.6960	0.0016
Motor Home	Gasoline	Urban Unrestricted	1.0000	0.0024	0.0000	0.0000	1.0000	0.0024
Motor Home	Diesel	Off-Network	0.0531	0.0000	0.0000	0.0000	0.0531	0.0000
Motor Home	Diesel	Rural Restricted	1.0317	0.0027	0.0000	0.0000	1.0317	0.0027
Motor Home	Diesel	Rural Unrestricted	1.4625	0.0038	0.0000	0.0000	1.4625	0.0038

Source Type	Fuel Type	Road Type	Sheboygan NOX Exhaust Emissions		Sheboygan NOX Evaporative Emissions		Sheboygan Total NOX Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Motor Home	Diesel	Urban Restricted	0.4505	0.0012	0.0000	0.0000	0.4505	0.0012
Motor Home	Diesel	Urban Unrestricted	0.9227	0.0024	0.0000	0.0000	0.9227	0.0024
Combination Short-haul Truck	Gasoline	Off-Network	0.0144	0.0000	0.0000	0.0000	0.0144	0.0000
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0747	0.0002	0.0000	0.0000	0.0747	0.0002
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0773	0.0002	0.0000	0.0000	0.0773	0.0002
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0302	0.0001	0.0000	0.0000	0.0302	0.0001
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0269	0.0001	0.0000	0.0000	0.0269	0.0001
Combination Short-haul Truck	Diesel	Off-Network	0.9200	0.0002	0.0000	0.0000	0.9200	0.0002
Combination Short-haul Truck	Diesel	Rural Restricted	76.1527	0.1989	0.0000	0.0000	76.1527	0.1989
Combination Short-haul Truck	Diesel	Rural Unrestricted	84.1762	0.2199	0.0000	0.0000	84.1762	0.2199
Combination Short-haul Truck	Diesel	Urban Restricted	30.8179	0.0806	0.0000	0.0000	30.8179	0.0806
Combination Short-haul Truck	Diesel	Urban Unrestricted	31.0736	0.0812	0.0000	0.0000	31.0736	0.0812
Combination Long-haul Truck	Diesel	Off-Network	89.8985	0.2028	0.0000	0.0000	89.8985	0.2028
Combination Long-haul Truck	Diesel	Rural Restricted	113.0512	0.2953	0.0000	0.0000	113.0512	0.2953
Combination Long-haul Truck	Diesel	Rural Unrestricted	125.2039	0.3271	0.0000	0.0000	125.2039	0.3271
Combination Long-haul Truck	Diesel	Urban Restricted	45.7797	0.1197	0.0000	0.0000	45.7797	0.1197
Combination Long-haul Truck	Diesel	Urban Unrestricted	46.2033	0.1208	0.0000	0.0000	46.2033	0.1208
ALL	ALL	ALL	1846.3500	5.1752	0.0000	0.0000	1846.3500	5.1752
Motorcycle	ALL	ALL	7.7128	0.0177	0.0000	0.0000	7.7128	0.0177
Passenger Car	ALL	ALL	377.9580	1.1339	0.0000	0.0000	377.9580	1.1339
Passenger Truck	ALL	ALL	394.8047	1.1888	0.0000	0.0000	394.8047	1.1888
Light Commercial Truck	ALL	ALL	232.7368	0.7107	0.0000	0.0000	232.7368	0.7107
Intercity Bus	ALL	ALL	12.7161	0.0331	0.0000	0.0000	12.7161	0.0331
Transit Bus	ALL	ALL	3.0168	0.0078	0.0000	0.0000	3.0168	0.0078
School Bus	ALL	ALL	6.0631	0.0144	0.0000	0.0000	6.0631	0.0144
Refuse Truck	ALL	ALL	5.9267	0.0153	0.0000	0.0000	5.9267	0.0153
Single Unit Short-haul Truck	ALL	ALL	135.6885	0.3411	0.0000	0.0000	135.6885	0.3411
Single Unit Long-haul Truck	ALL	ALL	16.9144	0.0426	0.0000	0.0000	16.9144	0.0426
Motor Home	ALL	ALL	9.3115	0.0229	0.0000	0.0000	9.3115	0.0229
Combination Short-haul Truck	ALL	ALL	223.3639	0.5813	0.0000	0.0000	223.3639	0.5813
Combination Long-haul Truck	ALL	ALL	420.1366	1.0657	0.0000	0.0000	420.1366	1.0657
ALL	ALL	ALL	1846.3500	5.1752	0.0000	0.0000	1846.3500	5.1752
ALL	Gasoline	ALL	980.4024	2.9034	0.0000	0.0000	980.4024	2.9034
ALL	Diesel	ALL	865.8746	2.2715	0.0000	0.0000	865.8746	2.2715
ALL	CNG	ALL	0.0729	0.0002	0.0000	0.0000	0.0729	0.0002
ALL	ALL	ALL	1846.3500	5.1752	0.0000	0.0000	1846.3500	5.1752
ALL	ALL	Off-Network	382.1576	0.9218	0.0000	0.0000	382.1576	0.9218
ALL	ALL	Rural Restricted	374.7353	1.0069	0.0000	0.0000	374.7353	1.0069
ALL	ALL	Rural Unrestricted	542.4378	1.5424	0.0000	0.0000	542.4378	1.5424
ALL	ALL	Urban Restricted	189.9072	0.5141	0.0000	0.0000	189.9072	0.5141
ALL	ALL	Urban Unrestricted	357.1121	1.1901	0.0000	0.0000	357.1121	1.1901
ALL	ALL	ALL	1846.3500	5.1752	0.0000	0.0000	1846.3500	5.1752

Table 3-d: Sheboygan County Nonattainment Area;  
VOC Emissions: tons per year (tpy) and tons per summer weekday (tpswd)

Source Type	Fuel Type	Road Type	Sheboygan VOC Exhaust Emissions		Sheboygan VOC Evaporative Emissions		Sheboygan Total VOC Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
Motorcycle	Gasoline	Off-Network	1.9491	0.0009	22.9533	0.2063	24.9024	0.2072
Motorcycle	Gasoline	Rural Restricted	0.4961	0.0016	0.1815	0.0006	0.6776	0.0022
Motorcycle	Gasoline	Rural Unrestricted	2.9240	0.0093	1.5854	0.0050	4.5094	0.0144
Motorcycle	Gasoline	Urban Restricted	1.0082	0.0032	0.4196	0.0013	1.4278	0.0045
Motorcycle	Gasoline	Urban Unrestricted	5.1532	0.0164	3.4763	0.0111	8.6296	0.0275
Passenger Car	Gasoline	Off-Network	197.3383	0.2825	43.2036	0.3178	240.5419	0.6003
Passenger Car	Gasoline	Rural Restricted	9.3397	0.0330	2.8459	0.0094	12.1856	0.0424
Passenger Car	Gasoline	Rural Unrestricted	21.0172	0.0731	11.1326	0.0368	32.1498	0.1098
Passenger Car	Gasoline	Urban Restricted	6.3823	0.0224	2.5188	0.0083	8.9011	0.0307
Passenger Car	Gasoline	Urban Unrestricted	23.3638	0.0807	14.9266	0.0493	38.2905	0.1300
Passenger Car	Diesel	Off-Network	0.2686	0.0002	0.0000	0.0000	0.2686	0.0002
Passenger Car	Diesel	Rural Restricted	0.0149	0.0001	0.0000	0.0000	0.0149	0.0001
Passenger Car	Diesel	Rural Unrestricted	0.0467	0.0002	0.0000	0.0000	0.0467	0.0002
Passenger Car	Diesel	Urban Restricted	0.0125	0.0000	0.0000	0.0000	0.0125	0.0000
Passenger Car	Diesel	Urban Unrestricted	0.0530	0.0002	0.0000	0.0000	0.0530	0.0002
Passenger Truck	Gasoline	Off-Network	195.6708	0.3412	19.1121	0.1494	214.7829	0.4907
Passenger Truck	Gasoline	Rural Restricted	7.1446	0.0253	0.9766	0.0033	8.1212	0.0286
Passenger Truck	Gasoline	Rural Unrestricted	15.3941	0.0537	3.8260	0.0127	19.2201	0.0665
Passenger Truck	Gasoline	Urban Restricted	4.6156	0.0163	0.8644	0.0029	5.4800	0.0192
Passenger Truck	Gasoline	Urban Unrestricted	16.8682	0.0585	5.1321	0.0171	22.0003	0.0756
Passenger Truck	Diesel	Off-Network	0.7277	0.0003	0.0000	0.0000	0.7277	0.0003
Passenger Truck	Diesel	Rural Restricted	0.2601	0.0009	0.0000	0.0000	0.2601	0.0009
Passenger Truck	Diesel	Rural Unrestricted	0.8571	0.0030	0.0000	0.0000	0.8571	0.0030
Passenger Truck	Diesel	Urban Restricted	0.2234	0.0008	0.0000	0.0000	0.2234	0.0008
Passenger Truck	Diesel	Urban Unrestricted	0.9964	0.0035	0.0000	0.0000	0.9964	0.0035
Light Commercial Truck	Gasoline	Off-Network	90.1026	0.1751	12.2816	0.0979	102.3842	0.2730
Light Commercial Truck	Gasoline	Rural Restricted	3.7749	0.0132	0.5824	0.0019	4.3574	0.0152
Light Commercial Truck	Gasoline	Rural Unrestricted	9.5306	0.0330	2.2818	0.0075	11.8124	0.0405
Light Commercial Truck	Gasoline	Urban Restricted	2.6014	0.0091	0.5155	0.0017	3.1169	0.0108
Light Commercial Truck	Gasoline	Urban Unrestricted	10.8207	0.0372	3.0608	0.0101	13.8815	0.0473
Light Commercial Truck	Diesel	Off-Network	1.9492	0.0009	0.0000	0.0000	1.9492	0.0009
Light Commercial Truck	Diesel	Rural Restricted	0.7928	0.0028	0.0000	0.0000	0.7928	0.0028
Light Commercial Truck	Diesel	Rural Unrestricted	2.6134	0.0091	0.0000	0.0000	2.6134	0.0091
Light Commercial Truck	Diesel	Urban Restricted	0.6809	0.0024	0.0000	0.0000	0.6809	0.0024
Light Commercial Truck	Diesel	Urban Unrestricted	3.0366	0.0105	0.0000	0.0000	3.0366	0.0105
Intercity Bus	Diesel	Off-Network	0.0198	0.0000	0.0000	0.0000	0.0198	0.0000
Intercity Bus	Diesel	Rural Restricted	0.1359	0.0004	0.0000	0.0000	0.1359	0.0004
Intercity Bus	Diesel	Rural Unrestricted	0.1983	0.0006	0.0000	0.0000	0.1983	0.0006
Intercity Bus	Diesel	Urban Restricted	0.0630	0.0002	0.0000	0.0000	0.0630	0.0002
Intercity Bus	Diesel	Urban Unrestricted	0.0892	0.0003	0.0000	0.0000	0.0892	0.0003
Transit Bus	Gasoline	Off-Network	0.0015	0.0000	0.0002	0.0000	0.0017	0.0000
Transit Bus	Gasoline	Rural Restricted	0.0006	0.0000	0.0000	0.0000	0.0006	0.0000
Transit Bus	Gasoline	Rural Unrestricted	0.0010	0.0000	0.0000	0.0000	0.0011	0.0000
Transit Bus	Gasoline	Urban Restricted	0.0003	0.0000	0.0000	0.0000	0.0003	0.0000
Transit Bus	Gasoline	Urban Unrestricted	0.0004	0.0000	0.0000	0.0000	0.0005	0.0000
Transit Bus	Diesel	Off-Network	0.0165	0.0000	0.0000	0.0000	0.0165	0.0000
Transit Bus	Diesel	Rural Restricted	0.0456	0.0001	0.0000	0.0000	0.0456	0.0001
Transit Bus	Diesel	Rural Unrestricted	0.0478	0.0002	0.0000	0.0000	0.0478	0.0002
Transit Bus	Diesel	Urban Restricted	0.0212	0.0001	0.0000	0.0000	0.0212	0.0001
Transit Bus	Diesel	Urban Unrestricted	0.0223	0.0001	0.0000	0.0000	0.0223	0.0001
Transit Bus	CNG	Off-Network	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Restricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Rural Unrestricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Restricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Transit Bus	CNG	Urban Unrestricted	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
School Bus	Gasoline	Off-Network	0.0926	0.0003	0.0068	0.0000	0.0994	0.0003
School Bus	Gasoline	Rural Restricted	0.0072	0.0000	0.0004	0.0000	0.0076	0.0000
School Bus	Gasoline	Rural Unrestricted	0.0116	0.0000	0.0007	0.0000	0.0123	0.0000
School Bus	Gasoline	Urban Restricted	0.0035	0.0000	0.0002	0.0000	0.0037	0.0000

Source Type	Fuel Type	Road Type	Sheboygan VOC Exhaust Emissions		Sheboygan VOC Evaporative Emissions		Sheboygan Total VOC Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
School Bus	Gasoline	Urban Unrestricted	0.0051	0.0000	0.0004	0.0000	0.0054	0.0000
School Bus	Diesel	Off-Network	0.1901	0.0000	0.0000	0.0000	0.1901	0.0000
School Bus	Diesel	Rural Restricted	0.1159	0.0004	0.0000	0.0000	0.1159	0.0004
School Bus	Diesel	Rural Unrestricted	0.1436	0.0005	0.0000	0.0000	0.1436	0.0005
School Bus	Diesel	Urban Restricted	0.0570	0.0002	0.0000	0.0000	0.0570	0.0002
School Bus	Diesel	Urban Unrestricted	0.0660	0.0002	0.0000	0.0000	0.0660	0.0002
Refuse Truck	Gasoline	Off-Network	0.0091	0.0000	0.0032	0.0000	0.0123	0.0000
Refuse Truck	Gasoline	Rural Restricted	0.0044	0.0000	0.0002	0.0000	0.0046	0.0000
Refuse Truck	Gasoline	Rural Unrestricted	0.0108	0.0000	0.0006	0.0000	0.0114	0.0000
Refuse Truck	Gasoline	Urban Restricted	0.0024	0.0000	0.0001	0.0000	0.0025	0.0000
Refuse Truck	Gasoline	Urban Unrestricted	0.0074	0.0000	0.0005	0.0000	0.0079	0.0000
Refuse Truck	Diesel	Off-Network	0.0183	0.0000	0.0000	0.0000	0.0183	0.0000
Refuse Truck	Diesel	Rural Restricted	0.0495	0.0002	0.0000	0.0000	0.0495	0.0002
Refuse Truck	Diesel	Rural Unrestricted	0.1121	0.0004	0.0000	0.0000	0.1121	0.0004
Refuse Truck	Diesel	Urban Restricted	0.0272	0.0001	0.0000	0.0000	0.0272	0.0001
Refuse Truck	Diesel	Urban Unrestricted	0.0726	0.0002	0.0000	0.0000	0.0726	0.0002
Single Unit Short-haul Truck	Gasoline	Off-Network	6.0997	0.0176	2.0200	0.0124	8.1197	0.0300
Single Unit Short-haul Truck	Gasoline	Rural Restricted	0.9747	0.0031	0.0700	0.0002	1.0448	0.0033
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted	2.2581	0.0072	0.1940	0.0007	2.4521	0.0079
Single Unit Short-haul Truck	Gasoline	Urban Restricted	0.5737	0.0018	0.0407	0.0001	0.6143	0.0020
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted	1.7268	0.0055	0.1473	0.0005	1.8740	0.0060
Single Unit Short-haul Truck	Diesel	Off-Network	1.2931	0.0001	0.0000	0.0000	1.2931	0.0001
Single Unit Short-haul Truck	Diesel	Rural Restricted	1.5564	0.0049	0.0000	0.0000	1.5564	0.0049
Single Unit Short-haul Truck	Diesel	Rural Unrestricted	3.8695	0.0123	0.0000	0.0000	3.8695	0.0123
Single Unit Short-haul Truck	Diesel	Urban Restricted	0.8854	0.0028	0.0000	0.0000	0.8854	0.0028
Single Unit Short-haul Truck	Diesel	Urban Unrestricted	2.5942	0.0082	0.0000	0.0000	2.5942	0.0082
Single Unit Long-haul Truck	Gasoline	Off-Network	0.5418	0.0015	0.1173	0.0008	0.6591	0.0022
Single Unit Long-haul Truck	Gasoline	Rural Restricted	0.1122	0.0004	0.0068	0.0000	0.1190	0.0004
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted	0.2578	0.0008	0.0189	0.0001	0.2767	0.0009
Single Unit Long-haul Truck	Gasoline	Urban Restricted	0.0679	0.0002	0.0039	0.0000	0.0719	0.0002
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted	0.1989	0.0006	0.0143	0.0001	0.2132	0.0007
Single Unit Long-haul Truck	Diesel	Off-Network	0.1259	0.0000	0.0000	0.0000	0.1259	0.0000
Single Unit Long-haul Truck	Diesel	Rural Restricted	0.2204	0.0007	0.0000	0.0000	0.2204	0.0007
Single Unit Long-haul Truck	Diesel	Rural Unrestricted	0.5472	0.0017	0.0000	0.0000	0.5472	0.0017
Single Unit Long-haul Truck	Diesel	Urban Restricted	0.1253	0.0004	0.0000	0.0000	0.1253	0.0004
Single Unit Long-haul Truck	Diesel	Urban Unrestricted	0.3660	0.0012	0.0000	0.0000	0.3660	0.0012
Motor Home	Gasoline	Off-Network	0.6342	0.0014	0.5253	0.0044	1.1595	0.0059
Motor Home	Gasoline	Rural Restricted	0.2353	0.0007	0.0216	0.0001	0.2568	0.0008
Motor Home	Gasoline	Rural Unrestricted	0.4504	0.0014	0.0597	0.0002	0.5101	0.0016
Motor Home	Gasoline	Urban Restricted	0.1246	0.0004	0.0125	0.0000	0.1371	0.0004
Motor Home	Gasoline	Urban Unrestricted	0.3290	0.0010	0.0453	0.0002	0.3743	0.0012
Motor Home	Diesel	Off-Network	0.0215	0.0000	0.0000	0.0000	0.0215	0.0000
Motor Home	Diesel	Rural Restricted	0.0636	0.0002	0.0000	0.0000	0.0636	0.0002
Motor Home	Diesel	Rural Unrestricted	0.1616	0.0005	0.0000	0.0000	0.1616	0.0005
Motor Home	Diesel	Urban Restricted	0.0364	0.0001	0.0000	0.0000	0.0364	0.0001
Motor Home	Diesel	Urban Unrestricted	0.1083	0.0003	0.0000	0.0000	0.1083	0.0003
Combination Short-haul Truck	Gasoline	Off-Network	0.0210	0.0000	0.0167	0.0001	0.0376	0.0002
Combination Short-haul Truck	Gasoline	Rural Restricted	0.0158	0.0001	0.0012	0.0000	0.0170	0.0001
Combination Short-haul Truck	Gasoline	Rural Unrestricted	0.0260	0.0001	0.0023	0.0000	0.0283	0.0001
Combination Short-haul Truck	Gasoline	Urban Restricted	0.0071	0.0000	0.0006	0.0000	0.0077	0.0000
Combination Short-haul Truck	Gasoline	Urban Unrestricted	0.0118	0.0000	0.0012	0.0000	0.0130	0.0000
Combination Short-haul Truck	Diesel	Off-Network	0.3620	0.0001	0.0000	0.0000	0.3620	0.0001
Combination Short-haul Truck	Diesel	Rural Restricted	2.4301	0.0077	0.0000	0.0000	2.4301	0.0077
Combination Short-haul Truck	Diesel	Rural Unrestricted	3.7266	0.0118	0.0000	0.0000	3.7266	0.0118
Combination Short-haul Truck	Diesel	Urban Restricted	1.1449	0.0036	0.0000	0.0000	1.1449	0.0036
Combination Short-haul Truck	Diesel	Urban Unrestricted	1.6688	0.0053	0.0000	0.0000	1.6688	0.0053
Combination Long-haul Truck	Diesel	Off-Network	15.8062	0.0491	0.0000	0.0000	15.8062	0.0491
Combination Long-haul Truck	Diesel	Rural Restricted	3.6006	0.0114	0.0000	0.0000	3.6006	0.0114
Combination Long-haul Truck	Diesel	Rural Unrestricted	5.2843	0.0168	0.0000	0.0000	5.2843	0.0168
Combination Long-haul Truck	Diesel	Urban Restricted	1.6658	0.0053	0.0000	0.0000	1.6658	0.0053
Combination Long-haul Truck	Diesel	Urban Unrestricted	2.3433	0.0074	0.0000	0.0000	2.3433	0.0074

Source Type	Fuel Type	Road Type	Sheboygan VOC Exhaust Emissions		Sheboygan VOC Evaporative Emissions		Sheboygan Total VOC Emissions	
			tpy	tpswd	tpy	tpswd	tpy	tpswd
ALL	ALL	ALL	704.3727	1.5212	155.2099	0.9704	859.5826	2.4917
Motorcycle	ALL	ALL	11.5306	0.0314	28.6162	0.2243	40.1468	0.2557
Passenger Car	ALL	ALL	257.8372	0.4923	74.6275	0.4216	332.4647	0.9139
Passenger Truck	ALL	ALL	242.7580	0.5035	29.9111	0.1854	272.6691	0.6889
Light Commercial Truck	ALL	ALL	125.9031	0.2934	18.7221	0.1192	144.6252	0.4126
Intercity Bus	ALL	ALL	0.5062	0.0015	0.0000	0.0000	0.5062	0.0015
Transit Bus	ALL	ALL	0.1573	0.0004	0.0003	0.0000	0.1576	0.0004
School Bus	ALL	ALL	0.6925	0.0016	0.0084	0.0001	0.7009	0.0016
Refuse Truck	ALL	ALL	0.3138	0.0009	0.0047	0.0000	0.3185	0.0010
Single Unit Short-haul Truck	ALL	ALL	21.8314	0.0635	2.4720	0.0140	24.3034	0.0775
Single Unit Long-haul Truck	ALL	ALL	2.5636	0.0075	0.1612	0.0009	2.7247	0.0084
Motor Home	ALL	ALL	2.1648	0.0062	0.6643	0.0049	2.8292	0.0111
Combination Short-haul Truck	ALL	ALL	9.4140	0.0288	0.0221	0.0001	9.4360	0.0289
Combination Long-haul Truck	ALL	ALL	28.7002	0.0900	0.0000	0.0000	28.7002	0.0900
ALL	ALL	ALL	704.3727	1.5212	155.2099	0.9704	859.5826	2.4917
ALL	Gasoline	ALL	640.3199	1.3302	155.2099	0.9704	795.5299	2.3006
ALL	Diesel	ALL	64.0528	0.1910	0.0000	0.0000	64.0528	0.1910
ALL	CNG	ALL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALL	ALL	ALL	704.3727	1.5212	155.2099	0.9704	859.5826	2.4917
ALL	ALL	Off-Network	513.2593	0.8714	100.2402	0.7892	613.4995	1.6606
ALL	ALL	Rural Restricted	31.3913	0.1072	4.6866	0.0155	36.0780	0.1227
ALL	ALL	Rural Unrestricted	69.4898	0.2356	19.1020	0.0630	88.5918	0.2987
ALL	ALL	Urban Restricted	20.3302	0.0695	4.3763	0.0144	24.7065	0.0839
ALL	ALL	Urban Unrestricted	69.9021	0.2375	26.8048	0.0882	96.7069	0.3257
ALL	ALL	ALL	704.3727	1.5212	155.2099	0.9704	859.5826	2.4917

Table3-e: Kenosha Sub-County Nonattainment Area (I-94 and to the East);  
Vehicle Activity Data Output by the MOVES2010b Model

Source Type	Fuel Type	Road Type	Vehicle Population	Vehicle Starts		Vehicle-Miles of Travel	
				Annual	Summer Weekday	Annual	Summer Weekday
Motorcycle	Gasoline	Off-Network	3,556	967,780	1,582		
Motorcycle	Gasoline	Rural Restricted				625,602	1,984
Motorcycle	Gasoline	Rural Unrestricted				1,597,630	5,066
Motorcycle	Gasoline	Urban Restricted				80,075	254
Motorcycle	Gasoline	Urban Unrestricted				3,744,630	11,874
Passenger Car	Gasoline	Off-Network	29,265	60,169,400	171,814		
Passenger Car	Gasoline	Rural Restricted				109,057,000	345,799
Passenger Car	Gasoline	Rural Unrestricted				85,549,600	271,262
Passenger Car	Gasoline	Urban Restricted				13,959,700	44,263
Passenger Car	Gasoline	Urban Unrestricted				200,330,000	635,206
Passenger Car	Diesel	Off-Network	142	292,175	834		
Passenger Car	Diesel	Rural Restricted				421,992	1,338
Passenger Car	Diesel	Rural Unrestricted				331,030	1,050
Passenger Car	Diesel	Urban Restricted				54,016	171
Passenger Car	Diesel	Urban Unrestricted				775,167	2,458
Passenger Truck	Gasoline	Off-Network	31,171	62,175,200	179,869		
Passenger Truck	Gasoline	Rural Restricted				84,234,300	267,091
Passenger Truck	Gasoline	Rural Unrestricted				66,080,600	209,529
Passenger Truck	Gasoline	Urban Restricted				10,782,300	34,188
Passenger Truck	Gasoline	Urban Unrestricted				154,729,000	490,615
Passenger Truck	Diesel	Off-Network	585	1,167,610	3,378		
Passenger Truck	Diesel	Rural Restricted				1,610,030	5,105
Passenger Truck	Diesel	Rural Unrestricted				1,263,040	4,005
Passenger Truck	Diesel	Urban Restricted				206,089	653
Passenger Truck	Diesel	Urban Unrestricted				2,957,440	9,377
Light Commercial Truck	Gasoline	Off-Network	9,349	19,594,400	56,252		
Light Commercial Truck	Gasoline	Rural Restricted				23,081,700	73,188
Light Commercial Truck	Gasoline	Rural Unrestricted				18,107,300	57,415
Light Commercial Truck	Gasoline	Urban Restricted				2,954,530	9,368
Light Commercial Truck	Gasoline	Urban Unrestricted				42,398,500	134,437
Light Commercial Truck	Diesel	Off-Network	1,260	2,640,420	7,580		
Light Commercial Truck	Diesel	Rural Restricted				3,132,920	9,934
Light Commercial Truck	Diesel	Rural Unrestricted				2,457,730	7,793
Light Commercial Truck	Diesel	Urban Restricted				401,024	1,272
Light Commercial Truck	Diesel	Urban Unrestricted				5,754,820	18,247
Intercity Bus	Diesel	Off-Network	44	35,759	122		
Intercity Bus	Diesel	Rural Restricted				216,748	687
Intercity Bus	Diesel	Rural Unrestricted				226,815	719
Intercity Bus	Diesel	Urban Restricted				27,738	88
Intercity Bus	Diesel	Urban Unrestricted				510,920	1,620
Transit Bus	Gasoline	Off-Network	0	318	1		
Transit Bus	Gasoline	Rural Restricted				597	2
Transit Bus	Gasoline	Rural Unrestricted				624	2
Transit Bus	Gasoline	Urban Restricted				76	0
Transit Bus	Gasoline	Urban Unrestricted				1,407	4
Transit Bus	Diesel	Off-Network	22	34,500	102		
Transit Bus	Diesel	Rural Restricted				60,822	193
Transit Bus	Diesel	Rural Unrestricted				63,647	202
Transit Bus	Diesel	Urban Restricted				7,784	25
Transit Bus	Diesel	Urban Unrestricted				143,369	455
Transit Bus	CNG	Off-Network	2	2,492	7		
Transit Bus	CNG	Rural Restricted				4,461	14
Transit Bus	CNG	Rural Unrestricted				4,668	15
Transit Bus	CNG	Urban Restricted				571	2
Transit Bus	CNG	Urban Unrestricted				10,515	33
School Bus	Gasoline	Off-Network	13	20,953	74		
School Bus	Gasoline	Rural Restricted				10,512	33
School Bus	Gasoline	Rural Unrestricted				11,001	35
School Bus	Gasoline	Urban Restricted				1,345	4
School Bus	Gasoline	Urban Unrestricted				24,780	79

Appendix 3

Source Type	Fuel Type	Road Type	Vehicle Population	Vehicle Starts		Vehicle-Miles of Travel	
				Annual	Summer Weekday	Annual	Summer Weekday
School Bus	Diesel	Off-Network	284	463,121	1,633		
School Bus	Diesel	Rural Restricted				232,353	737
School Bus	Diesel	Rural Unrestricted				243,146	771
School Bus	Diesel	Urban Restricted				29,735	94
School Bus	Diesel	Urban Unrestricted				547,706	1,737
Refuse Truck	Gasoline	Off-Network	1	1,460	5		
Refuse Truck	Gasoline	Rural Restricted				6,743	21
Refuse Truck	Gasoline	Rural Unrestricted				4,977	16
Refuse Truck	Gasoline	Urban Restricted				863	3
Refuse Truck	Gasoline	Urban Unrestricted				11,227	36
Refuse Truck	Diesel	Off-Network	33	35,049	122		
Refuse Truck	Diesel	Rural Restricted				161,831	513
Refuse Truck	Diesel	Rural Unrestricted				119,436	379
Refuse Truck	Diesel	Urban Restricted				20,714	66
Refuse Truck	Diesel	Urban Unrestricted				269,453	854
Single Unit Short-haul Truck	Gasoline	Off-Network	840	1,643,780	5,874		
Single Unit Short-haul Truck	Gasoline	Rural Restricted				2,946,980	9,344
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted				2,174,960	6,896
Single Unit Short-haul Truck	Gasoline	Urban Restricted				377,215	1,196
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted				4,906,810	15,559
Single Unit Short-haul Truck	Diesel	Off-Network	1,606	3,141,120	11,226		
Single Unit Short-haul Truck	Diesel	Rural Restricted				6,503,530	20,622
Single Unit Short-haul Truck	Diesel	Rural Unrestricted				4,799,800	15,219
Single Unit Short-haul Truck	Diesel	Urban Restricted				832,455	2,640
Single Unit Short-haul Truck	Diesel	Urban Unrestricted				10,828,600	34,335
Single Unit Long-haul Truck	Gasoline	Off-Network	103	128,857	441		
Single Unit Long-haul Truck	Gasoline	Rural Restricted				400,478	1,270
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted				295,564	937
Single Unit Long-haul Truck	Gasoline	Urban Restricted				51,261	163
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted				666,807	2,114
Single Unit Long-haul Truck	Diesel	Off-Network	222	277,957	952		
Single Unit Long-haul Truck	Diesel	Rural Restricted				900,544	2,855
Single Unit Long-haul Truck	Diesel	Rural Unrestricted				664,628	2,107
Single Unit Long-haul Truck	Diesel	Urban Restricted				115,270	365
Single Unit Long-haul Truck	Diesel	Urban Unrestricted				1,499,430	4,754
Motor Home	Gasoline	Off-Network	361	74,422	204		
Motor Home	Gasoline	Rural Restricted				342,450	1,086
Motor Home	Gasoline	Rural Unrestricted				252,738	801
Motor Home	Gasoline	Urban Restricted				43,834	139
Motor Home	Gasoline	Urban Unrestricted				570,189	1,808
Motor Home	Diesel	Off-Network	209	43,087	118		
Motor Home	Diesel	Rural Restricted				198,265	629
Motor Home	Diesel	Rural Unrestricted				146,326	464
Motor Home	Diesel	Urban Restricted				25,378	80
Motor Home	Diesel	Urban Unrestricted				330,118	1,047
Combination Short-haul Truck	Gasoline	Off-Network	1	2,142	8		
Combination Short-haul Truck	Gasoline	Rural Restricted				4,425	14
Combination Short-haul Truck	Gasoline	Rural Unrestricted				867	3
Combination Short-haul Truck	Gasoline	Urban Restricted				566	2
Combination Short-haul Truck	Gasoline	Urban Unrestricted				1,953	6
Combination Short-haul Truck	Diesel	Off-Network	248	412,877	1,469		
Combination Short-haul Truck	Diesel	Rural Restricted				6,619,620	20,990
Combination Short-haul Truck	Diesel	Rural Unrestricted				1,297,140	4,113
Combination Short-haul Truck	Diesel	Urban Restricted				847,225	2,686
Combination Short-haul Truck	Diesel	Urban Unrestricted				2,921,930	9,265
Combination Long-haul Truck	Diesel	Off-Network	305	381,779	1,308		
Combination Long-haul Truck	Diesel	Rural Restricted				9,466,190	30,016
Combination Long-haul Truck	Diesel	Rural Unrestricted				1,854,940	5,882
Combination Long-haul Truck	Diesel	Urban Restricted				1,211,550	3,842
Combination Long-haul Truck	Diesel	Urban Unrestricted				4,178,420	13,249
ALL	ALL	ALL	79,622	153,706,657	444,976	907,932,805	2,878,878

Source Type	Fuel Type	Road Type	Vehicle Population	Vehicle Starts		Vehicle-Miles of Travel	
				Annual	Summer Weekday	Annual	Summer Weekday
Motorcycle	ALL	ALL	3,556	967,780	1,582	6,047,937	19,177
Passenger Car	ALL	ALL	29,407	60,461,575	172,648	410,478,505	1,301,547
Passenger Truck	ALL	ALL	31,756	63,342,810	183,247	321,862,799	1,020,564
Light Commercial Truck	ALL	ALL	10,609	22,234,820	63,832	98,288,524	311,653
Intercity Bus	ALL	ALL	44	35,759	122	982,221	3,114
Transit Bus	ALL	ALL	24	37,309	110	298,540	947
School Bus	ALL	ALL	297	484,074	1,707	1,100,578	3,490
Refuse Truck	ALL	ALL	34	36,510	128	595,244	1,887
Single Unit Short-haul Truck	ALL	ALL	2,446	4,784,900	17,100	33,370,350	105,811
Single Unit Long-haul Truck	ALL	ALL	325	406,814	1,393	4,593,982	14,567
Motor Home	ALL	ALL	570	117,509	323	1,909,298	6,054
Combination Short-haul Truck	ALL	ALL	249	415,019	1,477	11,693,727	37,079
Combination Long-haul Truck	ALL	ALL	305	381,779	1,308	16,711,100	52,988
ALL	ALL	ALL	79,622	153,706,657	444,976	907,932,805	2,878,878
ALL	Gasoline	ALL	74,661	144,778,711	416,125	830,423,717	2,633,111
ALL	Diesel	ALL	4,960	8,925,454	28,844	77,488,873	245,702
ALL	CNG	ALL	2	2,492	7	20,215	64
ALL	ALL	ALL	79,622	153,706,657	444,976	907,932,805	2,878,878
ALL	ALL	Off-Network	79,622	153,706,657	444,976	0	0
ALL	ALL	Rural Restricted	0	0	0	250,240,093	793,464
ALL	ALL	Rural Unrestricted	0	0	0	187,548,207	594,680
ALL	ALL	Urban Restricted	0	0	0	32,031,314	101,565
ALL	ALL	Urban Unrestricted	0	0	0	438,113,191	1,389,169
ALL	ALL	ALL	79,622	153,706,657	444,976	907,932,805	2,878,878

Table 3-f: Sheboygan County Nonattainment Area;  
Vehicle Activity Data Output by the MOVES2010b Model

Source Type	Fuel Type	Road Type	Vehicle Population	Vehicle Starts		Vehicle-Miles of Travel	
				Annual	Summer Weekday	Annual	Summer Weekday
Motorcycle	Gasoline	Off-Network	5,290	1,439,750	2,354		
Motorcycle	Gasoline	Rural Restricted				609,467	1,933
Motorcycle	Gasoline	Rural Unrestricted				3,017,700	9,569
Motorcycle	Gasoline	Urban Restricted				1,154,760	3,662
Motorcycle	Gasoline	Urban Unrestricted				4,216,700	13,370
Passenger Car	Gasoline	Off-Network	30,131	61,950,500	176,900		
Passenger Car	Gasoline	Rural Restricted				72,124,400	228,693
Passenger Car	Gasoline	Rural Unrestricted				159,898,000	507,007
Passenger Car	Gasoline	Urban Restricted				52,315,700	165,883
Passenger Car	Gasoline	Urban Unrestricted				136,646,000	433,279
Passenger Car	Diesel	Off-Network	146	300,824	859		
Passenger Car	Diesel	Rural Restricted				279,082	885
Passenger Car	Diesel	Rural Unrestricted				618,719	1,962
Passenger Car	Diesel	Urban Restricted				202,433	642
Passenger Car	Diesel	Urban Unrestricted				528,746	1,677
Passenger Truck	Gasoline	Off-Network	31,027	61,888,700	179,041		
Passenger Truck	Gasoline	Rural Restricted				53,796,500	170,578
Passenger Truck	Gasoline	Rural Unrestricted				119,446,000	378,741
Passenger Truck	Gasoline	Urban Restricted				39,024,900	123,741
Passenger Truck	Gasoline	Urban Unrestricted				102,121,000	323,808
Passenger Truck	Diesel	Off-Network	583	1,162,230	3,362		
Passenger Truck	Diesel	Rural Restricted				1,028,250	3,260
Passenger Truck	Diesel	Rural Unrestricted				2,283,050	7,239
Passenger Truck	Diesel	Urban Restricted				745,909	2,365
Passenger Truck	Diesel	Urban Unrestricted				1,951,920	6,189
Light Commercial Truck	Gasoline	Off-Network	9,305	19,502,100	55,987		
Light Commercial Truck	Gasoline	Rural Restricted				14,739,700	46,737
Light Commercial Truck	Gasoline	Rural Unrestricted				32,727,100	103,771
Light Commercial Truck	Gasoline	Urban Restricted				10,692,400	33,904
Light Commercial Truck	Gasoline	Urban Unrestricted				27,980,300	88,720
Light Commercial Truck	Diesel	Off-Network	1,254	2,627,980	7,545		
Light Commercial Truck	Diesel	Rural Restricted				2,000,650	6,344
Light Commercial Truck	Diesel	Rural Unrestricted				4,442,100	14,085
Light Commercial Truck	Diesel	Urban Restricted				1,451,300	4,602
Light Commercial Truck	Diesel	Urban Unrestricted				3,797,810	12,042
Intercity Bus	Diesel	Off-Network	35	28,533	97		
Intercity Bus	Diesel	Rural Restricted				271,664	861
Intercity Bus	Diesel	Rural Unrestricted				297,972	945
Intercity Bus	Diesel	Urban Restricted				113,185	359
Intercity Bus	Diesel	Urban Unrestricted				100,537	319
Transit Bus	Gasoline	Off-Network	0	257	1		
Transit Bus	Gasoline	Rural Restricted				758	2
Transit Bus	Gasoline	Rural Unrestricted				832	3
Transit Bus	Gasoline	Urban Restricted				316	1
Transit Bus	Gasoline	Urban Unrestricted				281	1
Transit Bus	Diesel	Off-Network	18	27,915	82		
Transit Bus	Diesel	Rural Restricted				77,301	245
Transit Bus	Diesel	Rural Unrestricted				84,787	269
Transit Bus	Diesel	Urban Restricted				32,206	102
Transit Bus	Diesel	Urban Unrestricted				28,608	91
Transit Bus	CNG	Off-Network	1	2,016	6		
Transit Bus	CNG	Rural Restricted				5,669	18
Transit Bus	CNG	Rural Unrestricted				6,218	20
Transit Bus	CNG	Urban Restricted				2,362	7
Transit Bus	CNG	Urban Unrestricted				2,098	7
School Bus	Gasoline	Off-Network	10	16,774	59		
School Bus	Gasoline	Rural Restricted				13,219	42
School Bus	Gasoline	Rural Unrestricted				14,499	46
School Bus	Gasoline	Urban Restricted				5,508	17
School Bus	Gasoline	Urban Unrestricted				4,892	16

Source Type	Fuel Type	Road Type	Vehicle Population	Vehicle Starts		Vehicle-Miles of Travel	
				Annual	Summer Weekday	Annual	Summer Weekday
School Bus	Diesel	Off-Network	227	370,759	1,308		
School Bus	Diesel	Rural Restricted				292,182	926
School Bus	Diesel	Rural Unrestricted				320,477	1,016
School Bus	Diesel	Urban Restricted				121,734	386
School Bus	Diesel	Urban Unrestricted				108,131	343
Refuse Truck	Gasoline	Off-Network	1	1,156	4		
Refuse Truck	Gasoline	Rural Restricted				4,954	16
Refuse Truck	Gasoline	Rural Unrestricted				7,777	25
Refuse Truck	Gasoline	Urban Restricted				2,354	7
Refuse Truck	Gasoline	Urban Unrestricted				3,759	12
Refuse Truck	Diesel	Off-Network	26	27,742	97		
Refuse Truck	Diesel	Rural Restricted				118,887	377
Refuse Truck	Diesel	Rural Unrestricted				186,637	592
Refuse Truck	Diesel	Urban Restricted				56,503	179
Refuse Truck	Diesel	Urban Unrestricted				90,205	286
Single Unit Short-haul Truck	Gasoline	Off-Network	665	1,301,840	4,652		
Single Unit Short-haul Truck	Gasoline	Rural Restricted				2,166,280	6,869
Single Unit Short-haul Truck	Gasoline	Rural Unrestricted				3,400,770	10,783
Single Unit Short-haul Truck	Gasoline	Urban Restricted				1,029,560	3,265
Single Unit Short-haul Truck	Gasoline	Urban Unrestricted				1,643,650	5,212
Single Unit Short-haul Truck	Diesel	Off-Network	1,272	2,487,710	8,890		
Single Unit Short-haul Truck	Diesel	Rural Restricted				4,780,640	15,159
Single Unit Short-haul Truck	Diesel	Rural Unrestricted				7,504,970	23,797
Single Unit Short-haul Truck	Diesel	Urban Restricted				2,272,070	7,204
Single Unit Short-haul Truck	Diesel	Urban Unrestricted				3,627,280	11,501
Single Unit Long-haul Truck	Gasoline	Off-Network	82	102,031	349		
Single Unit Long-haul Truck	Gasoline	Rural Restricted				294,321	933
Single Unit Long-haul Truck	Gasoline	Rural Unrestricted				462,046	1,465
Single Unit Long-haul Truck	Gasoline	Urban Restricted				139,881	444
Single Unit Long-haul Truck	Gasoline	Urban Unrestricted				223,315	708
Single Unit Long-haul Truck	Diesel	Off-Network	176	220,090	754		
Single Unit Long-haul Truck	Diesel	Rural Restricted				661,833	2,099
Single Unit Long-haul Truck	Diesel	Rural Unrestricted				1,038,990	3,294
Single Unit Long-haul Truck	Diesel	Urban Restricted				314,546	997
Single Unit Long-haul Truck	Diesel	Urban Unrestricted				502,162	1,592
Motor Home	Gasoline	Off-Network	286	58,969	162		
Motor Home	Gasoline	Rural Restricted				251,852	799
Motor Home	Gasoline	Rural Unrestricted				395,374	1,254
Motor Home	Gasoline	Urban Restricted				119,696	380
Motor Home	Gasoline	Urban Unrestricted				191,091	606
Motor Home	Diesel	Off-Network	166	34,141	94		
Motor Home	Diesel	Rural Restricted				145,812	462
Motor Home	Diesel	Rural Unrestricted				228,907	726
Motor Home	Diesel	Urban Restricted				69,300	220
Motor Home	Diesel	Urban Unrestricted				110,634	351
Combination Short-haul Truck	Gasoline	Off-Network	2	3,157	11		
Combination Short-haul Truck	Gasoline	Rural Restricted				4,081	13
Combination Short-haul Truck	Gasoline	Rural Unrestricted				4,346	14
Combination Short-haul Truck	Gasoline	Urban Restricted				1,684	5
Combination Short-haul Truck	Gasoline	Urban Unrestricted				1,404	4
Combination Short-haul Truck	Diesel	Off-Network	365	608,598	2,165		
Combination Short-haul Truck	Diesel	Rural Restricted				6,105,250	19,359
Combination Short-haul Truck	Diesel	Rural Unrestricted				6,501,780	20,616
Combination Short-haul Truck	Diesel	Urban Restricted				2,519,540	7,989
Combination Short-haul Truck	Diesel	Urban Unrestricted				2,099,450	6,657
Combination Long-haul Truck	Diesel	Off-Network	449	562,017	1,925		
Combination Long-haul Truck	Diesel	Rural Restricted				8,719,130	27,647
Combination Long-haul Truck	Diesel	Rural Unrestricted				9,285,430	29,442
Combination Long-haul Truck	Diesel	Urban Restricted				3,598,250	11,409
Combination Long-haul Truck	Diesel	Urban Unrestricted				2,998,300	9,507
ALL	ALL	ALL	81,518	154,725,789	446,705	925,630,733	2,935,002

Source Type	Fuel Type	Road Type	Vehicle Population	Vehicle Starts		Vehicle-Miles of Travel	
				Annual	Summer Weekday	Annual	Summer Weekday
Motorcycle	ALL	ALL	5,290	1,439,750	2,354	8,998,627	28,533
Passenger Car	ALL	ALL	30,278	62,251,324	177,759	422,613,080	1,340,027
Passenger Truck	ALL	ALL	31,610	63,050,930	182,403	320,397,529	1,015,922
Light Commercial Truck	ALL	ALL	10,559	22,130,080	63,532	97,831,360	310,204
Intercity Bus	ALL	ALL	35	28,533	97	783,358	2,484
Transit Bus	ALL	ALL	19	30,188	89	241,436	766
School Bus	ALL	ALL	238	387,533	1,367	880,643	2,792
Refuse Truck	ALL	ALL	27	28,898	101	471,074	1,494
Single Unit Short-haul Truck	ALL	ALL	1,937	3,789,550	13,543	26,425,220	83,789
Single Unit Long-haul Truck	ALL	ALL	257	322,121	1,103	3,637,094	11,533
Motor Home	ALL	ALL	452	93,110	256	1,512,666	4,796
Combination Short-haul Truck	ALL	ALL	367	611,755	2,177	17,237,536	54,657
Combination Long-haul Truck	ALL	ALL	449	562,017	1,925	24,601,110	78,005
ALL	ALL	ALL	81,518	154,725,789	446,705	925,630,733	2,935,002
ALL	Gasoline	ALL	76,800	146,265,234	419,521	840,899,127	2,666,335
ALL	Diesel	ALL	4,717	8,458,539	27,178	84,715,257	268,616
ALL	CNG	ALL	1	2,016	6	16,348	52
ALL	ALL	ALL	81,518	154,725,789	446,705	925,630,733	2,935,002
ALL	ALL	Off-Network	81,518	154,725,789	446,705	0	0
ALL	ALL	Rural Restricted	0	0	0	168,491,883	534,255
ALL	ALL	Rural Unrestricted	0	0	0	352,174,481	1,116,679
ALL	ALL	Urban Restricted	0	0	0	115,986,097	367,770
ALL	ALL	Urban Unrestricted	0	0	0	288,978,271	916,297
ALL	ALL	ALL	81,518	154,725,789	446,705	925,630,733	2,935,002

**Appendix 4**  
**2011 Nonroad Mobile Emissions**

Prepared By:  
Wisconsin Department of Natural Resources

Table 4-a: Kenosha Sub-County Nonattainment Area (I-94 and to the East);  
NO<sub>x</sub> Emissions: tons per year (tpy) and tons per summer day (tpsd)

SCC	Segment Description	SCC Description	Emis. from	Kenosha County NO <sub>x</sub> Emissions		% in NAA	Allocate by	Sub-County NAA NO <sub>x</sub> Emissions	
				tpy	tpsd			tpy	tpsd
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	NMIM	0.1404	0.0007	30.9%	land area	0.0434	0.0002
2260001020	Recreational	2-Stroke Snowmobiles	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2260001030	Recreational	2-Stroke All Terrain Vehicles	NMIM	0.1920	0.0010	30.9%	land area	0.0593	0.0003
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	NMIM	0.0716	0.0004	30.9%	land area	0.0221	0.0001
2260002006	Construction	2-Stroke Tampers/Rammers	NMIM	0.0263	0.0001	76.1%	population	0.0200	0.0001
2260002009	Construction	2-Stroke Plate Compactors	NMIM	0.0041	0.0000	76.1%	population	0.0031	0.0000
2260002021	Construction	2-Stroke Paving Equipment	NMIM	0.0003	0.0000	76.1%	population	0.0002	0.0000
2260002027	Construction	2-Stroke Signal Boards	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	NMIM	0.1691	0.0005	76.1%	population	0.1287	0.0004
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	NMIM	0.0002	0.0000	76.1%	population	0.0002	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	NMIM	0.0013	0.0000	76.1%	population	0.0010	0.0000
2260003040	Industrial	2-Stroke Other General Industrial	NMIM	0.0001	0.0000	76.1%	population	0.0001	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP	NMIM	0.0127	0.0001	76.1%	population	0.0097	0.0001
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP	NMIM	0.0277	0.0002	76.1%	population	0.0211	0.0001
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP	NMIM	0.1783	0.0005	76.1%	population	0.1357	0.0004
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP	NMIM	0.3077	0.0008	76.1%	population	0.2342	0.0006
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush	NMIM	0.2500	0.0014	76.1%	population	0.1902	0.0010
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush	NMIM	0.2702	0.0015	76.1%	population	0.2056	0.0011
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums	NMIM	0.1598	0.0009	76.1%	population	0.1216	0.0007
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums	NMIM	0.2505	0.0014	76.1%	population	0.1906	0.0010
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	NMIM	0.0576	0.0000	76.1%	population	0.0438	0.0000
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	NMIM	0.0593	0.0000	76.1%	population	0.0451	0.0000
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment	NMIM	0.0001	0.0000	76.1%	population	0.0001	0.0000
2260005035	Agriculture	2-Stroke Sprayers	NMIM	0.0029	0.0000	24.2%	land area (1)	0.0007	0.0000
2260006005	Commercial	2-Stroke Light Commercial	NMIM	0.0148	0.0000	76.1%	population	0.0112	0.0000
2260006010	Commercial	2-Stroke Light Commercial Pumps	NMIM	0.1008	0.0003	76.1%	population	0.0767	0.0002
2260006015	Commercial	2-Stroke Light Commercial Air	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	NMIM	0.0006	0.0000	76.1%	population	0.0005	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain	NMIM	0.0028	0.0000	30.9%	land area	0.0009	0.0000
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	NMIM	0.1430	0.0006	30.9%	land area	0.0442	0.0002
2265001030	Recreational	4-Stroke All Terrain Vehicles	NMIM	1.3631	0.0060	30.9%	land area	0.4212	0.0019
2265001050	Recreational	4-Stroke Golf Carts	NMIM	1.1873	0.0052	30.9%	land area	0.3669	0.0016
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	NMIM	0.0875	0.0004	30.9%	land area	0.0270	0.0001
2265002003	Construction	4-Stroke Asphalt Pavers	NMIM	0.0132	0.0000	76.1%	population	0.0100	0.0000
2265002006	Construction	4-Stroke Tampers/Rammers	NMIM	0.0004	0.0000	76.1%	population	0.0003	0.0000
2265002009	Construction	4-Stroke Plate Compactors	NMIM	0.1728	0.0006	76.1%	population	0.1315	0.0005
2265002015	Construction	4-Stroke Rollers	NMIM	0.1295	0.0005	76.1%	population	0.0986	0.0004
2265002021	Construction	4-Stroke Paving Equipment	NMIM	0.0226	0.0001	76.1%	population	0.0172	0.0001
2265002024	Construction	4-Stroke Surfacing Equipment	NMIM	0.0845	0.0003	76.1%	population	0.0643	0.0002
2265002027	Construction	4-Stroke Signal Boards	NMIM	0.0111	0.0000	76.1%	population	0.0084	0.0000
2265002030	Construction	4-Stroke Trenchers	NMIM	0.8306	0.0019	76.1%	population	0.6321	0.0015
2265002033	Construction	4-Stroke Bore/Drill Rigs	NMIM	0.0022	0.0000	76.1%	population	0.0017	0.0000
2265002039	Construction	4-Stroke Concrete/Industrial Saws	NMIM	0.5108	0.0012	76.1%	population	0.3887	0.0009
2265002042	Construction	4-Stroke Cement & Mortar Mixers	NMIM	0.0285	0.0001	76.1%	population	0.0217	0.0001
2265002045	Construction	4-Stroke Cranes	NMIM	0.0242	0.0001	76.1%	population	0.0184	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	NMIM	0.0106	0.0000	76.1%	population	0.0081	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	NMIM	0.0350	0.0001	76.1%	population	0.0266	0.0001
2265002060	Construction	4-Stroke Rubber Tire Loaders	NMIM	0.8828	0.0021	76.1%	population	0.6718	0.0016
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	NMIM	0.6100	0.0014	76.1%	population	0.4642	0.0011
2265002072	Construction	4-Stroke Skid Steer Loaders	NMIM	0.1490	0.0003	76.1%	population	0.1134	0.0003
2265002078	Construction	4-Stroke Dumpers/Tenders	NMIM	0.0066	0.0000	76.1%	population	0.0050	0.0000
2265002081	Construction	4-Stroke Other Construction	NMIM	0.0680	0.0002	76.1%	population	0.0517	0.0001
2265003010	Industrial	4-Stroke Aerial Lifts	NMIM	0.7979	0.0022	76.1%	population	0.6072	0.0016
2265003020	Industrial	4-Stroke Forklifts	NMIM	1.7426	0.0047	76.1%	population	1.3261	0.0036
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	NMIM	0.2382	0.0006	76.1%	population	0.1813	0.0005
2265003040	Industrial	4-Stroke Other General Industrial	NMIM	0.3817	0.0010	76.1%	population	0.2905	0.0008
2265003050	Industrial	4-Stroke Other Material Handling	NMIM	0.0509	0.0001	76.1%	population	0.0388	0.0001
2265003060	Industrial	4-Stroke Industrial ACRefrigeration	NMIM	0.0060	0.0000	76.1%	population	0.0046	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	NMIM	0.0603	0.0002	76.1%	population	0.0459	0.0001
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	NMIM	3.7672	0.0184	76.1%	population	2.8668	0.0140
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	NMIM	1.1799	0.0058	76.1%	population	0.8979	0.0044

SCC	Segment Description	SCC Description	Emis. from	Kenosha County NOX Emissions		% in NAA	Allocate by	Sub-County NAA NOX Emissions	
				tpy	tpsd			tpy	tpsd
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP	NMIM	0.3167	0.0015	76.1%	population	0.2410	0.0012
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP	NMIM	0.6378	0.0031	76.1%	population	0.4854	0.0024
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush	NMIM	0.0198	0.0001	76.1%	population	0.0151	0.0001
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush	NMIM	0.0283	0.0001	76.1%	population	0.0216	0.0001
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums	NMIM	0.0378	0.0002	76.1%	population	0.0287	0.0001
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums	NMIM	1.5266	0.0075	76.1%	population	1.1617	0.0057
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	NMIM	0.4549	0.0000	76.1%	population	0.3462	0.0000
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	NMIM	0.4683	0.0000	76.1%	population	0.3564	0.0000
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers	NMIM	0.8125	0.0040	76.1%	population	0.6183	0.0030
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers	NMIM	0.1447	0.0007	76.1%	population	0.1101	0.0005
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	NMIM	0.1950	0.0010	76.1%	population	0.1484	0.0007
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP	NMIM	0.0753	0.0004	76.1%	population	0.0573	0.0003
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors	NMIM	10.9040	0.0532	76.1%	population	8.2979	0.0405
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors	NMIM	1.9661	0.0096	76.1%	population	1.4962	0.0073
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders	NMIM	0.3569	0.0017	76.1%	population	0.2716	0.0013
2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment	NMIM	5.9142	0.0289	76.1%	population	4.5007	0.0220
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden	NMIM	0.3921	0.0019	76.1%	population	0.2984	0.0015
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden	NMIM	0.2168	0.0011	76.1%	population	0.1650	0.0008
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	NMIM	0.0116	0.0000	24.2%	land area (1)	0.0028	0.0000
2265005015	Agriculture	4-Stroke Agricultural Tractors	NMIM	0.0710	0.0002	24.2%	land area (1)	0.0172	0.0000
2265005020	Agriculture	4-Stroke Combines	NMIM	0.0011	0.0000	24.2%	land area (1)	0.0003	0.0000
2265005025	Agriculture	4-Stroke Balers	NMIM	0.1068	0.0002	24.2%	land area (1)	0.0259	0.0001
2265005030	Agriculture	4-Stroke Agricultural Mowers	NMIM	0.0108	0.0000	24.2%	land area (1)	0.0026	0.0000
2265005035	Agriculture	4-Stroke Sprayers	NMIM	0.1855	0.0004	24.2%	land area (1)	0.0449	0.0001
2265005040	Agriculture	4-Stroke Tillers > 5 HP	NMIM	0.2470	0.0006	24.2%	land area (1)	0.0598	0.0001
2265005045	Agriculture	4-Stroke Swathers	NMIM	0.1693	0.0004	24.2%	land area (1)	0.0410	0.0001
2265005055	Agriculture	4-Stroke Other Agricultural	NMIM	0.2031	0.0005	24.2%	land area (1)	0.0492	0.0001
2265005060	Agriculture	4-Stroke Irrigation Sets	NMIM	0.0928	0.0002	24.2%	land area (1)	0.0225	0.0001
2265006005	Commercial	4-Stroke Light Commercial	NMIM	6.0762	0.0134	76.1%	population	4.6240	0.0102
2265006010	Commercial	4-Stroke Light Commercial Pumps	NMIM	1.5931	0.0035	76.1%	population	1.2124	0.0027
2265006015	Commercial	4-Stroke Light Commercial Air	NMIM	0.9150	0.0020	76.1%	population	0.6963	0.0015
2265006025	Commercial	4-Stroke Light Commercial Welders	NMIM	1.7518	0.0039	76.1%	population	1.3331	0.0029
2265006030	Commercial	4-Stroke Light Commercial Pressure	NMIM	2.4884	0.0055	76.1%	population	1.8937	0.0042
2265006035	Commercial	4-Stroke Hydro Power Units	NMIM	0.1131	0.0003	76.1%	population	0.0861	0.0002
2265007010	Logging	4-Stroke Logging Equipment	NMIM	0.0140	0.0000	30.9%	land area	0.0043	0.0000
2265007015	Logging	4-Stroke Logging Equipment	NMIM	0.0001	0.0000	30.9%	land area	0.0000	0.0000
2265008005	Airport	4-Stroke Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2265010010	Oil Field	4-Stroke Other Oil Field Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	NMIM	0.0168	0.0001	30.9%	land area	0.0052	0.0000
2267002003	Construction	LPG Asphalt Pavers	NMIM	0.0205	0.0001	76.1%	population	0.0156	0.0001
2267002015	Construction	LPG Rollers	NMIM	0.0171	0.0001	76.1%	population	0.0130	0.0001
2267002021	Construction	LPG Paving Equipment	NMIM	0.0102	0.0000	76.1%	population	0.0078	0.0000
2267002024	Construction	LPG Surfacing Equipment	NMIM	0.0086	0.0000	76.1%	population	0.0066	0.0000
2267002030	Construction	LPG Trenchers	NMIM	0.0622	0.0002	76.1%	population	0.0473	0.0001
2267002033	Construction	LPG Bore/Drill Rigs	NMIM	0.0215	0.0001	76.1%	population	0.0164	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	NMIM	0.1736	0.0005	76.1%	population	0.1321	0.0004
2267002045	Construction	LPG Cranes	NMIM	0.0351	0.0001	76.1%	population	0.0267	0.0001
2267002054	Construction	LPG Crushing/Proc. Equipment	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	NMIM	0.1021	0.0003	76.1%	population	0.0777	0.0002
2267002060	Construction	LPG Rubber Tire Loaders	NMIM	0.0743	0.0002	76.1%	population	0.0565	0.0002
2267002066	Construction	LPG Tractors/Loaders/Backhoes	NMIM	0.0067	0.0000	76.1%	population	0.0051	0.0000
2267002072	Construction	LPG Skid Steer Loaders	NMIM	0.0198	0.0001	76.1%	population	0.0151	0.0000
2267002081	Construction	LPG Other Construction Equipment	NMIM	0.0592	0.0002	76.1%	population	0.0450	0.0001
2267003010	Industrial	LPG Aerial Lifts	NMIM	1.2449	0.0041	76.1%	population	0.9474	0.0031
2267003020	Industrial	LPG Forklifts	NMIM	59.8686	0.1954	76.1%	population	45.5600	0.1487
2267003030	Industrial	LPG Sweepers/Scrubbers	NMIM	0.2862	0.0009	76.1%	population	0.2178	0.0007
2267003040	Industrial	LPG Other General Industrial	NMIM	0.1077	0.0004	76.1%	population	0.0820	0.0003
2267003050	Industrial	LPG Other Material Handling	NMIM	0.0651	0.0002	76.1%	population	0.0496	0.0002
2267003070	Industrial	LPG Terminal Tractors	NMIM	0.1004	0.0003	76.1%	population	0.0764	0.0002
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders	NMIM	0.1565	0.0009	76.1%	population	0.1191	0.0006
2267005055	Agriculture	LPG Other Agricultural Equipment	NMIM	0.0020	0.0000	24.2%	land area (1)	0.0005	0.0000
2267005060	Agriculture	LPG Irrigation Sets	NMIM	0.0005	0.0000	24.2%	land area (1)	0.0001	0.0000
2267006005	Commercial	LPG Light Commercial Generator	NMIM	2.2493	0.0061	76.1%	population	1.7117	0.0047
2267006010	Commercial	LPG Light Commercial Pumps	NMIM	0.3931	0.0011	76.1%	population	0.2991	0.0008

SCC	Segment Description	SCC Description	Emis. from	Kenosha County NOX Emissions		% in NAA	Allocate by	Sub-County NAA NOX Emissions	
				tpy	tpsd			tpy	tpsd
2267006015	Commercial	LPG Light Commercial Air	NMIM	0.3806	0.0010	76.1%	population	0.2896	0.0008
2267006025	Commercial	LPG Light Commercial Welders	NMIM	0.5041	0.0014	76.1%	population	0.3836	0.0010
2267006030	Commercial	LPG Light Commercial Pressure	NMIM	0.0090	0.0000	76.1%	population	0.0069	0.0000
2267006035	Commercial	LPG Hydro Power Units	NMIM	0.0048	0.0000	76.1%	population	0.0036	0.0000
2267008005	Airport	LPG Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	NMIM	4.5084	0.0147	76.1%	population	3.4309	0.0112
2268003030	Industrial	CNG Sweepers/Scrubbers	NMIM	0.0052	0.0000	76.1%	population	0.0040	0.0000
2268003040	Industrial	CNG Other General Industrial	NMIM	0.0029	0.0000	76.1%	population	0.0022	0.0000
2268003060	Industrial	CNG ARefrigeration	NMIM	0.0057	0.0000	76.1%	population	0.0044	0.0000
2268003070	Industrial	CNG Terminal Tractors	NMIM	0.0081	0.0000	76.1%	population	0.0062	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	NMIM	0.0012	0.0000	24.2%	land area (1)	0.0003	0.0000
2268005060	Agriculture	CNG Irrigation Sets	NMIM	0.0055	0.0000	24.2%	land area (1)	0.0013	0.0000
2268006005	Commercial	CNG Light Commercial Generator	NMIM	0.6828	0.0019	76.1%	population	0.5196	0.0014
2268006010	Commercial	CNG Light Commercial Pumps	NMIM	0.0285	0.0001	76.1%	population	0.0217	0.0001
2268006015	Commercial	CNG Light Commercial Air	NMIM	0.0297	0.0001	76.1%	population	0.0226	0.0001
2268006020	Commercial	CNG Light Commercial Gas	NMIM	0.2144	0.0006	76.1%	population	0.1632	0.0004
2268006035	Commercial	CNG Hydro Power Units	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2268008005	Airport	CNG Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2268010010	Oil Field	CNG Other Oil Field Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2270001060	Recreational	Diesel Specialty Vehicle Carts	NMIM	0.2229	0.0011	30.9%	land area	0.0689	0.0003
2270002003	Construction	Diesel Pavers	NMIM	1.2441	0.0052	76.1%	population	0.9468	0.0040
2270002006	Construction	Diesel Tampers/Rammers (unused)	NMIM	0.0190	0.0001	76.1%	population	0.0145	0.0001
2270002009	Construction	Diesel Plate Compactors	NMIM	0.0997	0.0004	76.1%	population	0.0758	0.0003
2270002015	Construction	Diesel Rollers	NMIM	5.2093	0.0218	76.1%	population	3.9642	0.0166
2270002018	Construction	Diesel Scrapers	NMIM	18.8569	0.0788	76.1%	population	14.3501	0.0600
2270002021	Construction	Diesel Paving Equipment	NMIM	0.6439	0.0027	76.1%	population	0.4900	0.0020
2270002024	Construction	Diesel Surfacing Equipment	NMIM	0.8016	0.0033	76.1%	population	0.6101	0.0025
2270002027	Construction	Diesel Signal Boards	NMIM	0.3625	0.0010	76.1%	population	0.2758	0.0008
2270002030	Construction	Diesel Trenchers	NMIM	3.5361	0.0099	76.1%	population	2.6910	0.0076
2270002033	Construction	Diesel Bore/Drill Rigs	NMIM	6.9830	0.0196	76.1%	population	5.3141	0.0149
2270002036	Construction	Diesel Excavators	NMIM	39.1000	0.1098	76.1%	population	29.7551	0.0835
2270002039	Construction	Diesel Concrete/Industrial Saws	NMIM	0.5865	0.0016	76.1%	population	0.4463	0.0013
2270002042	Construction	Diesel Cement & Mortar Mixers	NMIM	0.0104	0.0000	76.1%	population	0.0079	0.0000
2270002045	Construction	Diesel Cranes	NMIM	5.3401	0.0150	76.1%	population	4.0638	0.0114
2270002048	Construction	Diesel Graders	NMIM	9.5624	0.0268	76.1%	population	7.2770	0.0204
2270002051	Construction	Diesel Off-highway Trucks	NMIM	35.7722	0.1004	76.1%	population	27.2226	0.0764
2270002054	Construction	Diesel Crushing/Proc. Equipment	NMIM	3.9066	0.0110	76.1%	population	2.9729	0.0083
2270002057	Construction	Diesel Rough Terrain Forklifts	NMIM	4.9067	0.0138	76.1%	population	3.7340	0.0105
2270002060	Construction	Diesel Rubber Tire Loaders	NMIM	42.9196	0.1205	76.1%	population	32.6618	0.0917
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	NMIM	16.1684	0.0454	76.1%	population	12.3042	0.0345
2270002069	Construction	Diesel Crawler Tractors	NMIM	44.2966	0.1243	76.1%	population	33.7097	0.0946
2270002072	Construction	Diesel Skid Steer Loaders	NMIM	6.3093	0.0177	76.1%	population	4.8014	0.0135
2270002075	Construction	Diesel Off-Highway Tractors	NMIM	5.3131	0.0149	76.1%	population	4.0432	0.0113
2270002078	Construction	Diesel Dumpers/Tenders	NMIM	0.3684	0.0010	76.1%	population	0.2803	0.0008
2270002081	Construction	Diesel Other Construction Equipment	NMIM	5.0798	0.0143	76.1%	population	3.8657	0.0109
2270003010	Industrial	Diesel Aerial Lifts	NMIM	1.6416	0.0054	76.1%	population	1.2493	0.0041
2270003020	Industrial	Diesel Forklifts	NMIM	13.3845	0.0437	76.1%	population	10.1856	0.0332
2270003030	Industrial	Diesel Sweepers/Scrubbers	NMIM	7.2052	0.0235	76.1%	population	5.4832	0.0179
2270003040	Industrial	Diesel Other General Industrial	NMIM	8.4809	0.0277	76.1%	population	6.4540	0.0211
2270003050	Industrial	Diesel Other Material Handling	NMIM	0.4532	0.0015	76.1%	population	0.3449	0.0011
2270003060	Industrial	Diesel ARefrigeration	NMIM	17.1368	0.0559	76.1%	population	13.0411	0.0426
2270003070	Industrial	Diesel Terminal Tractors	NMIM	8.3236	0.0272	76.1%	population	6.3342	0.0207
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums	NMIM	0.0004	0.0000	76.1%	population	0.0003	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	NMIM	0.1061	0.0000	76.1%	population	0.0807	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	NMIM	2.3944	0.0131	76.1%	population	1.8221	0.0099
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors	NMIM	0.4725	0.0026	76.1%	population	0.3596	0.0020
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders	NMIM	3.7280	0.0203	76.1%	population	2.8370	0.0155
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment	NMIM	0.3329	0.0018	76.1%	population	0.2533	0.0014
2270004076	Lawn/Garden	Diesel Other Lawn & Garden	NMIM	0.0097	0.0001	76.1%	population	0.0074	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	NMIM	0.0017	0.0000	24.2%	land area (1)	0.0004	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	NMIM	86.4489	0.2265	24.2%	land area (1)	20.9206	0.0548
2270005020	Agriculture	Diesel Combines	NMIM	9.0961	0.0238	24.2%	land area (1)	2.2013	0.0058
2270005025	Agriculture	Diesel Balers	NMIM	0.0451	0.0001	24.2%	land area (1)	0.0109	0.0000

SCC	Segment Description	SCC Description	Emis. from	Kenosha County NOX Emissions		% in NAA	Allocate by	Sub-County NAA NOX Emissions	
				tpy	tpsd			tpy	tpsd
2270005030	Agriculture	Diesel Agricultural Mowers	NMIM	0.0088	0.0000	24.2%	land area (1)	0.0021	0.0000
2270005035	Agriculture	Diesel Sprayers	NMIM	0.7114	0.0019	24.2%	land area (1)	0.1722	0.0005
2270005040	Agriculture	Diesel Tillers > 6 HP	NMIM	0.0012	0.0000	24.2%	land area (1)	0.0003	0.0000
2270005045	Agriculture	Diesel Swathers	NMIM	0.6717	0.0018	24.2%	land area (1)	0.1625	0.0004
2270005055	Agriculture	Diesel Other Agricultural Equipment	NMIM	1.8349	0.0048	24.2%	land area (1)	0.4441	0.0012
2270005060	Agriculture	Diesel Irrigation Sets	NMIM	1.1569	0.0030	24.2%	land area (1)	0.2800	0.0007
2270006005	Commercial	Diesel Light Commercial Generator	NMIM	10.4623	0.0284	76.1%	population	7.9618	0.0216
2270006010	Commercial	Diesel Light Commercial Pumps	NMIM	2.4727	0.0067	76.1%	population	1.8818	0.0051
2270006015	Commercial	Diesel Light Commercial Air	NMIM	5.6243	0.0153	76.1%	population	4.2801	0.0116
2270006020	Commercial	Diesel Light Commercial Gas	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2270006025	Commercial	Diesel Light Commercial Welders	NMIM	3.1272	0.0085	76.1%	population	2.3798	0.0065
2270006030	Commercial	Diesel Light Commercial Pressure	NMIM	0.3495	0.0009	76.1%	population	0.2660	0.0007
2270006035	Commercial	Diesel Hydro Power Units	NMIM	0.2437	0.0007	76.1%	population	0.1855	0.0005
2270007010	Logging	Diesel Logging Equipment Shredders	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2270007015	Logging	Diesel Logging Equip	NMIM	0.2830	0.0008	30.9%	land area	0.0874	0.0002
2270008005	Airport	Diesel Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2270009010	Ungd. Mining	Diesel Other Underground Mining	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2270010010	Oil Field	Diesel Other Oil Field Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2275001000	Aircraft	Military Aircraft	Apx. 8	0.0071	0.0000	100.0%	airport location (2)	0.0071	0.0000
2275000011	Aircraft	General Aviation, Piston	Apx. 8	0.8820	0.0024	59.6%	airport location (2)	0.5256	0.0015
2275000012	Aircraft	General Aviation, Turbine	Apx. 8	1.6776	0.0046	61.2%	airport location (2)	1.0272	0.0028
2275060011	Aircraft	Air Taxi, Piston	Apx. 8	0.0185	0.0001	100.0%	airport location (2)	0.0185	0.0001
2275060012	Aircraft	Air Taxi, Turbine	Apx. 8	0.3256	0.0009	100.0%	airport location (2)	0.3256	0.0009
2275070000	Aircraft	Aircraft Auxiliary Power Units	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2280000000	Comm. Marine	All Commercial Marine Vessels	Apx. 6	56.2496	0.2098	100.0%	Lk. Mich.	56.2496	0.2098
2282005010	Pleasure Craft	2-Stroke Outboards	NMIM	22.4969	0.1492	30.4%	water area (3)	6.8391	0.0453
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	NMIM	4.1428	0.0275	30.4%	water area (3)	1.2594	0.0084
2282010005	Pleasure Craft	4-Stroke Inboards	NMIM	49.7067	0.3157	78.9%	water area (3)	39.2186	0.2491
2282020005	Pleasure Craft	Diesel Inboards	NMIM	41.3249	0.2740	78.9%	water area (3)	32.6053	0.2162
2282020010	Pleasure Craft	Diesel Outboards	NMIM	0.0792	0.0005	30.4%	water area (3)	0.0241	0.0002
2285002006	Railroad	Diesel Locomotives, Line Haul, Class	Apx. 9	249.5005	0.6892	60.0%	rail links (4)	149.6567	0.4134
2285002007	Railroad	Diesel Locomotives, Line Haul, Class II/III	Apx. 9	0.0000	0.0000	-	rail links (4)	0.0000	0.0000
2285002015	Railroad	Diesel Railway Maintenance	NMIM	0.8119	0.0022	60.0%	rail links (4)	0.4870	0.0013
2285004015	Railroad	4-Stroke Gasoline Railway	NMIM	0.0162	0.0000	60.0%	rail links (4)	0.0097	0.0000
2285006015	Railroad	LPG Railway Maintenance	NMIM	0.0013	0.0000	60.0%	rail links (4)	0.0008	0.0000
ALL	ALL	ALL		997.9798	3.4234			668.4387	2.3340

(1) City of Kenosha excluded

(2) Obtained from USEPA 2011 Modeling Platform, ver. 6. See: [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point_by_state/)

(3) Allocation based on surface water area (81 sq. km. for county and 56 sq. km., 69.1%, for nonattainment area, from the NMIM2009 files WI\_WIB.ALO and WI\_WOB.ALO), with the additional adjustment of factoring the nonattainment area emissions by the inboard/outboard emissions split for Ozaukee County (a Lake Michigan shoreline county with few inland lakes, similar to eastern Kenosha County) and factoring the attainment area emissions by the inboard/outboard emissions split for Washington County (an inland county with lakes similar to those in western Kenosha County).

(4) Obtained from USEPA 2011 Modeling Platform, ver. 6. See: [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint_by_state/)

Table 4-b: Kenosha Sub-County Nonattainment Area (I-94 and to the East);  
VOC Emissions: tons per year (tpy) and tons per summer day (tpsd)

SCC	Segment Description	SCC Description	Emis. from	Kenosha County VOC Emissions		% in NAA	Allocate by	Sub-County NAA VOC Emissions	
				tpy	tpsd			tpy	tpsd
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	NMIM	23.8905	0.1189	30.9%	land area	7.3821	0.0367
2260001020	Recreational	2-Stroke Snowmobiles	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2260001030	Recreational	2-Stroke All Terrain Vehicles	NMIM	29.0831	0.1447	30.9%	land area	8.9867	0.0447
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	NMIM	0.2449	0.0012	30.9%	land area	0.0757	0.0004
2260002006	Construction	2-Stroke Tampers/Rammers	NMIM	1.0778	0.0045	76.1%	population	0.8202	0.0034
2260002009	Construction	2-Stroke Plate Compactors	NMIM	0.0919	0.0004	76.1%	population	0.0699	0.0003
2260002021	Construction	2-Stroke Paving Equipment	NMIM	0.0071	0.0000	76.1%	population	0.0054	0.0000
2260002027	Construction	2-Stroke Signal Boards	NMIM	0.0010	0.0000	76.1%	population	0.0008	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	NMIM	6.7023	0.0188	76.1%	population	5.1005	0.0143
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	NMIM	0.0045	0.0000	76.1%	population	0.0034	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	NMIM	0.0310	0.0001	76.1%	population	0.0236	0.0001
2260003040	Industrial	2-Stroke Other General Industrial	NMIM	0.0024	0.0000	76.1%	population	0.0018	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP	NMIM	0.3776	0.0020	76.1%	population	0.2873	0.0015
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP	NMIM	0.6279	0.0034	76.1%	population	0.4778	0.0026
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP	NMIM	5.8188	0.0165	76.1%	population	4.4281	0.0125
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP	NMIM	14.0227	0.0382	76.1%	population	10.6713	0.0290
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush	NMIM	7.0379	0.0378	76.1%	population	5.3558	0.0287
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush	NMIM	7.1746	0.0391	76.1%	population	5.4599	0.0297
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums	NMIM	4.3539	0.0230	76.1%	population	3.3133	0.0175
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums	NMIM	7.0998	0.0387	76.1%	population	5.4029	0.0294
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	NMIM	7.1552	0.0025	76.1%	population	5.4451	0.0019
2260004036	Lawn/Garden	2-Stroke Snowblowers	NMIM	6.8355	0.0002	76.1%	population	5.2018	0.0001
2260004071	Lawn/Garden	2-Stroke Commercial Turf	NMIM	0.0023	0.0000	76.1%	population	0.0018	0.0000
2260005035	Agriculture	2-Stroke Sprayers	NMIM	0.0582	0.0002	24.2%	land area (1)	0.0141	0.0000
2260006005	Commercial	2-Stroke Light Commercial	NMIM	0.3991	0.0011	76.1%	population	0.3037	0.0008
2260006010	Commercial	2-Stroke Light Commercial Pumps	NMIM	2.8442	0.0078	76.1%	population	2.1644	0.0059
2260006015	Commercial	2-Stroke Light Commercial Air	NMIM	0.0011	0.0000	76.1%	population	0.0009	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	NMIM	0.0176	0.0000	76.1%	population	0.0134	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain	NMIM	0.1259	0.0003	30.9%	land area	0.0389	0.0001
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	NMIM	0.8648	0.0042	30.9%	land area	0.2672	0.0013
2265001030	Recreational	4-Stroke All Terrain Vehicles	NMIM	10.2447	0.0500	30.9%	land area	3.1656	0.0154
2265001050	Recreational	4-Stroke Golf Carts	NMIM	3.0556	0.0148	30.9%	land area	0.9442	0.0046
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	NMIM	0.2527	0.0012	30.9%	land area	0.0781	0.0004
2265002003	Construction	4-Stroke Asphalt Pavers	NMIM	0.0234	0.0001	76.1%	population	0.0178	0.0001
2265002006	Construction	4-Stroke Tampers/Rammers	NMIM	0.0008	0.0000	76.1%	population	0.0006	0.0000
2265002009	Construction	4-Stroke Plate Compactors	NMIM	0.6278	0.0026	76.1%	population	0.4777	0.0019
2265002015	Construction	4-Stroke Rollers	NMIM	0.2419	0.0010	76.1%	population	0.1841	0.0007
2265002021	Construction	4-Stroke Paving Equipment	NMIM	0.0574	0.0002	76.1%	population	0.0437	0.0002
2265002024	Construction	4-Stroke Surfacing Equipment	NMIM	0.2343	0.0009	76.1%	population	0.1783	0.0007
2265002027	Construction	4-Stroke Signal Boards	NMIM	0.0342	0.0001	76.1%	population	0.0260	0.0001
2265002030	Construction	4-Stroke Trenchers	NMIM	1.6960	0.0046	76.1%	population	1.2907	0.0035
2265002033	Construction	4-Stroke Bore/Drill Rigs	NMIM	0.0089	0.0000	76.1%	population	0.0068	0.0000
2265002039	Construction	4-Stroke Concrete/Industrial Saws	NMIM	1.0940	0.0030	76.1%	population	0.8325	0.0023
2265002042	Construction	4-Stroke Cement & Mortar Mixers	NMIM	0.0830	0.0002	76.1%	population	0.0631	0.0002
2265002045	Construction	4-Stroke Cranes	NMIM	0.0140	0.0000	76.1%	population	0.0107	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	NMIM	0.0202	0.0001	76.1%	population	0.0154	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	NMIM	0.0169	0.0000	76.1%	population	0.0128	0.0000
2265002060	Construction	4-Stroke Rubber Tire Loaders	NMIM	0.4021	0.0011	76.1%	population	0.3060	0.0008
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	NMIM	1.1871	0.0032	76.1%	population	0.9034	0.0025
2265002072	Construction	4-Stroke Skid Steer Loaders	NMIM	0.1299	0.0004	76.1%	population	0.0989	0.0003
2265002078	Construction	4-Stroke Dumpers/Tenders	NMIM	0.0172	0.0001	76.1%	population	0.0131	0.0000
2265002081	Construction	4-Stroke Other Construction	NMIM	0.0333	0.0001	76.1%	population	0.0253	0.0001
2265003010	Industrial	4-Stroke Aerial Lifts	NMIM	0.5261	0.0017	76.1%	population	0.4003	0.0013
2265003020	Industrial	4-Stroke Forklifts	NMIM	0.8338	0.0026	76.1%	population	0.6345	0.0020
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	NMIM	0.2757	0.0009	76.1%	population	0.2098	0.0007
2265003040	Industrial	4-Stroke Other General Industrial	NMIM	1.2812	0.0041	76.1%	population	0.9750	0.0031
2265003050	Industrial	4-Stroke Other Material Handling	NMIM	0.0360	0.0001	76.1%	population	0.0274	0.0001
2265003060	Industrial	4-Stroke Industrial ACREfrigeration	NMIM	0.0128	0.0000	76.1%	population	0.0098	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	NMIM	0.0262	0.0001	76.1%	population	0.0199	0.0001
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	NMIM	31.9309	0.1681	76.1%	population	24.2994	0.1279
2265004011	Lawn/Garden	4-Stroke Lawn mowers	NMIM	7.3149	0.0391	76.1%	population	5.5666	0.0298

SCC	Segment Description	SCC Description	Emis. from	Kenosha County VOC Emissions		% in NAA	Allocate by	Sub-County NAA VOC Emissions	
				tpy	tpsd			tpy	tpsd
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP	NMIM	2.7301	0.0144	76.1%	population	2.0776	0.0110
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP	NMIM	4.4026	0.0236	76.1%	population	3.3503	0.0179
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush	NMIM	0.1712	0.0009	76.1%	population	0.1302	0.0007
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush	NMIM	0.1495	0.0008	76.1%	population	0.1138	0.0006
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums	NMIM	0.2836	0.0015	76.1%	population	0.2158	0.0011
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums	NMIM	3.1837	0.0170	76.1%	population	2.4228	0.0130
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	NMIM	2.7810	0.0047	76.1%	population	2.1164	0.0036
2265004036	Lawn/Garden	4-Stroke Snowblowers	NMIM	1.8834	0.0003	76.1%	population	1.4333	0.0002
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding	NMIM	2.7052	0.0138	76.1%	population	2.0586	0.0105
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding	NMIM	0.3135	0.0017	76.1%	population	0.2385	0.0013
2265004046	Lawn/Garden	4-Stroke Front Mowers	NMIM	0.4488	0.0024	76.1%	population	0.3416	0.0018
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP	NMIM	0.5251	0.0028	76.1%	population	0.3996	0.0021
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors	NMIM	29.8706	0.1545	76.1%	population	22.7315	0.1176
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors	NMIM	4.0318	0.0214	76.1%	population	3.0682	0.0163
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders	NMIM	0.4530	0.0024	76.1%	population	0.3447	0.0018
2265004071	Lawn/Garden	4-Stroke Commercial Turf	NMIM	13.9939	0.0743	76.1%	population	10.6494	0.0565
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden	NMIM	1.8232	0.0094	76.1%	population	1.3874	0.0072
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden	NMIM	0.9840	0.0051	76.1%	population	0.7488	0.0039
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	NMIM	0.0232	0.0001	24.2%	land area (1)	0.0056	0.0000
2265005015	Agriculture	4-Stroke Agricultural Tractors	NMIM	0.0476	0.0001	24.2%	land area (1)	0.0115	0.0000
2265005020	Agriculture	4-Stroke Combines	NMIM	0.0006	0.0000	24.2%	land area (1)	0.0002	0.0000
2265005025	Agriculture	4-Stroke Balers	NMIM	0.0660	0.0002	24.2%	land area (1)	0.0160	0.0000
2265005030	Agriculture	4-Stroke Agricultural Mowers	NMIM	0.0223	0.0001	24.2%	land area (1)	0.0054	0.0000
2265005035	Agriculture	4-Stroke Sprayers	NMIM	0.3322	0.0010	24.2%	land area (1)	0.0804	0.0002
2265005040	Agriculture	4-Stroke Tillers > 5 HP	NMIM	0.8787	0.0025	24.2%	land area (1)	0.2127	0.0006
2265005045	Agriculture	4-Stroke Swathers	NMIM	0.0968	0.0003	24.2%	land area (1)	0.0234	0.0001
2265005055	Agriculture	4-Stroke Other Agricultural	NMIM	0.1421	0.0004	24.2%	land area (1)	0.0344	0.0001
2265005060	Agriculture	4-Stroke Irrigation Sets	NMIM	0.0581	0.0001	24.2%	land area (1)	0.0140	0.0000
2265006005	Commercial	4-Stroke Light Commercial	NMIM	15.5630	0.0452	76.1%	population	11.8434	0.0344
2265006010	Commercial	4-Stroke Light Commercial Pumps	NMIM	4.5330	0.0122	76.1%	population	3.4496	0.0093
2265006015	Commercial	4-Stroke Light Commercial Air	NMIM	1.8769	0.0050	76.1%	population	1.4284	0.0038
2265006025	Commercial	4-Stroke Light Commercial	NMIM	3.1731	0.0084	76.1%	population	2.4147	0.0064
2265006030	Commercial	4-Stroke Light Commercial	NMIM	8.1042	0.0222	76.1%	population	6.1673	0.0169
2265006035	Commercial	4-Stroke Hydro Power Units	NMIM	0.2854	0.0008	76.1%	population	0.2172	0.0006
2265007010	Logging	4-Stroke Logging Equipment	NMIM	0.0334	0.0001	30.9%	land area	0.0103	0.0000
2265007015	Logging	4-Stroke Logging Equipment	NMIM	0.0005	0.0000	30.9%	land area	0.0001	0.0000
2265008005	Airport	4-Stroke Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2265010010	Oil Field	4-Stroke Other Oil Field Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	NMIM	0.0046	0.0000	30.9%	land area	0.0014	0.0000
2267002003	Construction	LPG Asphalt Pavers	NMIM	0.0055	0.0000	76.1%	population	0.0042	0.0000
2267002015	Construction	LPG Rollers	NMIM	0.0043	0.0000	76.1%	population	0.0032	0.0000
2267002021	Construction	LPG Paving Equipment	NMIM	0.0028	0.0000	76.1%	population	0.0022	0.0000
2267002024	Construction	LPG Surfacing Equipment	NMIM	0.0023	0.0000	76.1%	population	0.0018	0.0000
2267002030	Construction	LPG Trenchers	NMIM	0.0170	0.0000	76.1%	population	0.0130	0.0000
2267002033	Construction	LPG Bore/Drill Rigs	NMIM	0.0059	0.0000	76.1%	population	0.0045	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	NMIM	0.0370	0.0001	76.1%	population	0.0282	0.0001
2267002045	Construction	LPG Cranes	NMIM	0.0098	0.0000	76.1%	population	0.0074	0.0000
2267002054	Construction	LPG Crushing/Proc. Equipment	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	NMIM	0.0284	0.0001	76.1%	population	0.0216	0.0001
2267002060	Construction	LPG Rubber Tire Loaders	NMIM	0.0199	0.0001	76.1%	population	0.0151	0.0000
2267002066	Construction	LPG Tractors/Loaders/Backhoes	NMIM	0.0017	0.0000	76.1%	population	0.0013	0.0000
2267002072	Construction	LPG Skid Steer Loaders	NMIM	0.0055	0.0000	76.1%	population	0.0042	0.0000
2267002081	Construction	LPG Other Construction Equipment	NMIM	0.0165	0.0000	76.1%	population	0.0125	0.0000
2267003010	Industrial	LPG Aerial Lifts	NMIM	0.3469	0.0011	76.1%	population	0.2640	0.0009
2267003020	Industrial	LPG Forklifts	NMIM	16.7675	0.0547	76.1%	population	12.7601	0.0417
2267003030	Industrial	LPG Sweepers/Scrubbers	NMIM	0.0741	0.0002	76.1%	population	0.0564	0.0002
2267003040	Industrial	LPG Other General Industrial	NMIM	0.0294	0.0001	76.1%	population	0.0223	0.0001
2267003050	Industrial	LPG Other Material Handling	NMIM	0.0182	0.0001	76.1%	population	0.0139	0.0000
2267003070	Industrial	LPG Terminal Tractors	NMIM	0.0219	0.0001	76.1%	population	0.0166	0.0001
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders	NMIM	0.0425	0.0002	76.1%	population	0.0324	0.0002
2267005055	Agriculture	LPG Other Agricultural Equipment	NMIM	0.0006	0.0000	24.2%	land area (1)	0.0001	0.0000
2267005060	Agriculture	LPG Irrigation Sets	NMIM	0.0001	0.0000	24.2%	land area (1)	0.0000	0.0000
2267006005	Commercial	LPG Light Commercial Generator	NMIM	0.4649	0.0013	76.1%	population	0.3538	0.0010
2267006010	Commercial	LPG Light Commercial Pumps	NMIM	0.0812	0.0002	76.1%	population	0.0618	0.0002

SCC	Segment Description	SCC Description	Emis. from	Kenosha County VOC Emissions		% in NAA	Allocate by	Sub-County NAA VOC Emissions	
				tpy	tpsd			tpy	tpsd
2267006015	Commercial	LPG Light Commercial Air	NMIM	0.0786	0.0002	76.1%	population	0.0598	0.0002
2267006025	Commercial	LPG Light Commercial Welders	NMIM	0.1397	0.0004	76.1%	population	0.1063	0.0003
2267006030	Commercial	LPG Light Commercial Pressure	NMIM	0.0025	0.0000	76.1%	population	0.0019	0.0000
2267006035	Commercial	LPG Hydro Power Units	NMIM	0.0010	0.0000	76.1%	population	0.0007	0.0000
2267008005	Airport	LPG Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	NMIM	0.0736	0.0002	76.1%	population	0.0560	0.0002
2268003030	Industrial	CNG Sweepers/Scrubbers	NMIM	0.0001	0.0000	76.1%	population	0.0001	0.0000
2268003040	Industrial	CNG Other General Industrial	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2268003060	Industrial	CNG ACRefrigeration	NMIM	0.0001	0.0000	76.1%	population	0.0001	0.0000
2268003070	Industrial	CNG Terminal Tractors	NMIM	0.0001	0.0000	76.1%	population	0.0001	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	NMIM	0.0000	0.0000	24.2%	land area (1)	0.0000	0.0000
2268005060	Agriculture	CNG Irrigation Sets	NMIM	0.0001	0.0000	24.2%	land area (1)	0.0000	0.0000
2268006005	Commercial	CNG Light Commercial Generator	NMIM	0.0084	0.0000	76.1%	population	0.0064	0.0000
2268006010	Commercial	CNG Light Commercial Pumps	NMIM	0.0004	0.0000	76.1%	population	0.0003	0.0000
2268006015	Commercial	CNG Light Commercial Air	NMIM	0.0004	0.0000	76.1%	population	0.0003	0.0000
2268006020	Commercial	CNG Light Commercial Gas	NMIM	0.0022	0.0000	76.1%	population	0.0016	0.0000
2268006035	Commercial	CNG Hydro Power Units	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2268008005	Airport	CNG Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2268010010	Oil Field	CNG Other Oil Field Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2270001060	Recreational	Diesel Specialty Vehicle Carts	NMIM	0.0572	0.0003	30.9%	land area	0.0177	0.0001
2270002003	Construction	Diesel Pavers	NMIM	0.1003	0.0004	76.1%	population	0.0764	0.0003
2270002006	Construction	Diesel Tampers/Rammers (unused)	NMIM	0.0028	0.0000	76.1%	population	0.0022	0.0000
2270002009	Construction	Diesel Plate Compactors	NMIM	0.0141	0.0001	76.1%	population	0.0107	0.0000
2270002015	Construction	Diesel Rollers	NMIM	0.4258	0.0018	76.1%	population	0.3240	0.0014
2270002018	Construction	Diesel Scrapers	NMIM	1.1387	0.0048	76.1%	population	0.8665	0.0036
2270002021	Construction	Diesel Paving Equipment	NMIM	0.0558	0.0002	76.1%	population	0.0424	0.0002
2270002024	Construction	Diesel Surfacing Equipment	NMIM	0.0608	0.0003	76.1%	population	0.0463	0.0002
2270002027	Construction	Diesel Signal Boards	NMIM	0.0401	0.0001	76.1%	population	0.0305	0.0001
2270002030	Construction	Diesel Trenchers	NMIM	0.3027	0.0008	76.1%	population	0.2304	0.0006
2270002033	Construction	Diesel Bore/Drill Rigs	NMIM	0.5565	0.0016	76.1%	population	0.4235	0.0012
2270002036	Construction	Diesel Excavators	NMIM	2.9742	0.0083	76.1%	population	2.2634	0.0064
2270002039	Construction	Diesel Concrete/Industrial Saws	NMIM	0.0522	0.0001	76.1%	population	0.0397	0.0001
2270002042	Construction	Diesel Cement & Mortar Mixers	NMIM	0.0012	0.0000	76.1%	population	0.0009	0.0000
2270002045	Construction	Diesel Cranes	NMIM	0.3586	0.0010	76.1%	population	0.2729	0.0008
2270002048	Construction	Diesel Graders	NMIM	0.7457	0.0021	76.1%	population	0.5675	0.0016
2270002051	Construction	Diesel Off-highway Trucks	NMIM	2.1657	0.0061	76.1%	population	1.6481	0.0046
2270002054	Construction	Diesel Crushing/Proc. Equipment	NMIM	0.2658	0.0007	76.1%	population	0.2023	0.0006
2270002057	Construction	Diesel Rough Terrain Forklifts	NMIM	0.4294	0.0012	76.1%	population	0.3267	0.0009
2270002060	Construction	Diesel Rubber Tire Loaders	NMIM	2.9774	0.0084	76.1%	population	2.2658	0.0064
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	NMIM	3.1228	0.0088	76.1%	population	2.3764	0.0067
2270002069	Construction	Diesel Crawler Tractors	NMIM	3.0322	0.0085	76.1%	population	2.3075	0.0065
2270002072	Construction	Diesel Skid Steer Loaders	NMIM	1.5279	0.0043	76.1%	population	1.1628	0.0033
2270002075	Construction	Diesel Off-Highway Tractors	NMIM	0.3170	0.0009	76.1%	population	0.2413	0.0007
2270002078	Construction	Diesel Dumpers/Tenders	NMIM	0.0952	0.0003	76.1%	population	0.0725	0.0002
2270002081	Construction	Diesel Other Construction	NMIM	0.3320	0.0009	76.1%	population	0.2526	0.0007
2270003010	Industrial	Diesel Aerial Lifts	NMIM	0.4582	0.0015	76.1%	population	0.3487	0.0011
2270003020	Industrial	Diesel Forklifts	NMIM	1.0345	0.0034	76.1%	population	0.7872	0.0026
2270003030	Industrial	Diesel Sweepers/Scrubbers	NMIM	0.5762	0.0019	76.1%	population	0.4385	0.0014
2270003040	Industrial	Diesel Other General Industrial	NMIM	0.6806	0.0022	76.1%	population	0.5180	0.0017
2270003050	Industrial	Diesel Other Material Handling	NMIM	0.0823	0.0003	76.1%	population	0.0626	0.0002
2270003060	Industrial	Diesel ACRefrigeration	NMIM	1.4255	0.0047	76.1%	population	1.0848	0.0035
2270003070	Industrial	Diesel Terminal Tractors	NMIM	0.6755	0.0022	76.1%	population	0.5141	0.0017
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums	NMIM	0.0001	0.0000	76.1%	population	0.0001	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	NMIM	0.0084	0.0000	76.1%	population	0.0064	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	NMIM	0.2954	0.0016	76.1%	population	0.2248	0.0012
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors	NMIM	0.0611	0.0003	76.1%	population	0.0465	0.0003
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders	NMIM	0.3515	0.0019	76.1%	population	0.2675	0.0015
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment	NMIM	0.0266	0.0001	76.1%	population	0.0203	0.0001
2270004076	Lawn/Garden	Diesel Other Lawn & Garden	NMIM	0.0013	0.0000	76.1%	population	0.0010	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	NMIM	0.0003	0.0000	24.2%	land area (1)	0.0001	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	NMIM	7.9834	0.0209	24.2%	land area (1)	1.9320	0.0051
2270005020	Agriculture	Diesel Combines	NMIM	0.7853	0.0021	24.2%	land area (1)	0.1900	0.0005
2270005025	Agriculture	Diesel Balers	NMIM	0.0067	0.0000	24.2%	land area (1)	0.0016	0.0000

SCC	Segment Description	SCC Description	Emis. from	Kenosha County VOC Emissions		% in NAA	Allocate by	Sub-County NAA VOC Emissions	
				tpy	tpsd			tpy	tpsd
2270005030	Agriculture	Diesel Agricultural Mowers	NMIM	0.0012	0.0000	24.2%	land area (1)	0.0003	0.0000
2270005035	Agriculture	Diesel Sprayers	NMIM	0.0892	0.0002	24.2%	land area (1)	0.0216	0.0001
2270005040	Agriculture	Diesel Tillers > 6 HP	NMIM	0.0001	0.0000	24.2%	land area (1)	0.0000	0.0000
2270005045	Agriculture	Diesel Swathers	NMIM	0.0758	0.0002	24.2%	land area (1)	0.0183	0.0000
2270005055	Agriculture	Diesel Other Agricultural Equipment	NMIM	0.1836	0.0005	24.2%	land area (1)	0.0444	0.0001
2270005060	Agriculture	Diesel Irrigation Sets	NMIM	0.1059	0.0003	24.2%	land area (1)	0.0256	0.0001
2270006005	Commercial	Diesel Light Commercial Generator	NMIM	1.2628	0.0034	76.1%	population	0.9610	0.0026
2270006010	Commercial	Diesel Light Commercial Pumps	NMIM	0.2838	0.0008	76.1%	population	0.2160	0.0006
2270006015	Commercial	Diesel Light Commercial Air	NMIM	0.5088	0.0014	76.1%	population	0.3872	0.0011
2270006020	Commercial	Diesel Light Commercial Gas	NMIM	0.0000	0.0000	76.1%	population	0.0000	0.0000
2270006025	Commercial	Diesel Light Commercial Welders	NMIM	0.9145	0.0025	76.1%	population	0.6959	0.0019
2270006030	Commercial	Diesel Light Commercial Pressure	NMIM	0.0422	0.0001	76.1%	population	0.0321	0.0001
2270006035	Commercial	Diesel Hydro Power Units	NMIM	0.0225	0.0001	76.1%	population	0.0171	0.0000
2270007010	Logging	Diesel Logging Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2270007015	Logging	Diesel Logging Equip	NMIM	0.0218	0.0001	30.9%	land area	0.0067	0.0000
2270008005	Airport	Diesel Airport Support Equipment	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2270009010	Ungd. Mining	Diesel Other Underground Mining	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2270010010	Oil Field	Diesel Other Oil Field Equipment	NMIM	0.0000	0.0000	30.9%	land area	0.0000	0.0000
2275001000	Aircraft	Military Aircraft	Apx. 8	0.0642	0.0002	100.0%	airport location (2)	0.0642	0.0002
227500011	Aircraft	General Aviation, Piston	Apx. 8	2.0407	0.0057	59.6%	airport location (2)	1.2168	0.0034
227500012	Aircraft	General Aviation, Turbine	Apx. 8	3.5550	0.0099	61.5%	airport location (2)	2.1876	0.0061
227500011	Aircraft	Air Taxi, Piston	Apx. 8	0.0204	0.0001	97.5%	airport location (2)	0.0199	0.0001
227500012	Aircraft	Air Taxi, Turbine	Apx. 8	0.4333	0.0012	97.5%	airport location (2)	0.4224	0.0012
2275070000	Aircraft	Aircraft Auxiliary Power Units	Apx. 8	0.0000	0.0000	-	airport location (2)	0.0000	0.0000
2280000000	Comm. Marine	All Commercial Marine Vessels	Apx. 6	1.9142	0.0073	100.0%	Lk. Mich.	1.9142	0.0073
2282005010	Pleasure Craft	2-Stroke Outboards	NMIM	273.1219	1.7446	62.9%	water area (3)	171.7937	1.0973
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	NMIM	33.6540	0.2213	62.9%	water area (3)	21.1683	0.1392
2282010005	Pleasure Craft	4-Stroke Inboards	NMIM	38.4680	0.2243	93.5%	water area (3)	35.9676	0.2097
2282020005	Pleasure Craft	Diesel Inboards	NMIM	1.8638	0.0124	93.5%	water area (3)	1.7426	0.0116
2282020010	Pleasure Craft	Diesel Outboards	NMIM	0.0158	0.0001	62.9%	water area (3)	0.0100	0.0001
2285002006	Railroad	Diesel Locomotives, Line Haul,	Apx. 9	12.2587	0.0339	60.0%	rail links (4)	7.3531	0.0203
2285002007	Railroad	Diesel Locomotives, Line Haul, Class	Apx. 9	0.0000	0.0000	-	rail links (4)	0.0000	0.0000
2285002015	Railroad	Diesel Railway Maintenance	NMIM	0.1400	0.0004	60.0%	rail links (4)	0.0840	0.0002
2285004015	Railroad	4-Stroke Gasoline Railway	NMIM	0.0340	0.0001	60.0%	rail links (4)	0.0204	0.0001
2285006015	Railroad	LPG Railway Maintenance	NMIM	0.0004	0.0000	60.0%	rail links (4)	0.0002	0.0000
ALL	ALL	ALL		718.6545	3.6888			474.7606	2.4161

- (1) City of Kenosha excluded
- (2) Obtained from USEPA 2011 Modeling Platform, ver. 6. See: [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point_by_state/)
- (3) Allocation based on surface water area (81 sq. km. for county and 56 sq. km., 69.1%, for nonattainment area, from the NMIM2009 files WI\_WIB.ALO and WI\_WOB.ALO), with the additional adjustment of factoring the nonattainment area emissions by the inboard/outboard emissions split for Ozaukee County (a Lake Michigan shoreline county with few inland lakes, similar to eastern Kenosha County) and factoring the attainment area emissions by the inboard/outboard emissions split for Washington County (an inland county with lakes similar to those in western Kenosha County).
- (4) Obtained from USEPA 2011 Modeling Platform, ver. 6. See: [ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint_by_state/)

Table 4-c: Sheboygan County Nonattainment Area;  
NO<sub>x</sub> Emissions: tons per year (tpy) and tons per summer day (tpsd)

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County NO <sub>x</sub> Emissions	
				tpy	tpsd
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	NMIM	0.4144	0.0021
2260001020	Recreational	2-Stroke Snowmobiles	NMIM	2.3695	0.0000
2260001030	Recreational	2-Stroke All Terrain Vehicles	NMIM	0.5669	0.0028
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	NMIM	0.2115	0.0011
2260002006	Construction	2-Stroke Tampers/Rammers	NMIM	0.0214	0.0001
2260002009	Construction	2-Stroke Plate Compactors	NMIM	0.0034	0.0000
2260002021	Construction	2-Stroke Paving Equipment	NMIM	0.0003	0.0000
2260002027	Construction	2-Stroke Signal Boards	NMIM	0.0000	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	NMIM	0.1377	0.0004
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	NMIM	0.0002	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	NMIM	0.0025	0.0000
2260003040	Industrial	2-Stroke Other General Industrial Equipm	NMIM	0.0002	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Resident	NMIM	0.0095	0.0001
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Commerci	NMIM	0.0208	0.0001
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Residential)	NMIM	0.1332	0.0004
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Commercial)	NMIM	0.2309	0.0006
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters	NMIM	0.1868	0.0010
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters	NMIM	0.2027	0.0011
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Residentia	NMIM	0.1194	0.0007
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Commercial	NMIM	0.1879	0.0010
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	NMIM	0.0430	0.0000
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	NMIM	0.0445	0.0000
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment (Comm	NMIM	0.0001	0.0000
2260005035	Agriculture	2-Stroke Sprayers	NMIM	0.0061	0.0000
2260006005	Commercial	2-Stroke Light Commercial Generator Set	NMIM	0.0130	0.0000
2260006010	Commercial	2-Stroke Light Commercial Pumps	NMIM	0.0883	0.0002
2260006015	Commercial	2-Stroke Light Commercial Air Compresso	NMIM	0.0000	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	NMIM	0.0005	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain Saws >	NMIM	0.0061	0.0000
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	NMIM	0.4313	0.0019
2265001030	Recreational	4-Stroke All Terrain Vehicles	NMIM	4.1106	0.0180
2265001050	Recreational	4-Stroke Golf Carts	NMIM	2.6258	0.0115
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	NMIM	0.2640	0.0012
2265002003	Construction	4-Stroke Asphalt Pavers	NMIM	0.0110	0.0000
2265002006	Construction	4-Stroke Tampers/Rammers	NMIM	0.0003	0.0000
2265002009	Construction	4-Stroke Plate Compactors	NMIM	0.1439	0.0005
2265002015	Construction	4-Stroke Rollers	NMIM	0.1078	0.0004
2265002021	Construction	4-Stroke Paving Equipment	NMIM	0.0188	0.0001
2265002024	Construction	4-Stroke Surfacing Equipment	NMIM	0.0704	0.0003
2265002027	Construction	4-Stroke Signal Boards	NMIM	0.0092	0.0000
2265002030	Construction	4-Stroke Trenchers	NMIM	0.6925	0.0016
2265002033	Construction	4-Stroke Bore/Drill Rigs	NMIM	0.0019	0.0000
2265002039	Construction	4-Stroke Concrete/Industrial Saws	NMIM	0.4259	0.0010
2265002042	Construction	4-Stroke Cement & Mortar Mixers	NMIM	0.0238	0.0001
2265002045	Construction	4-Stroke Cranes	NMIM	0.0202	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	NMIM	0.0088	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	NMIM	0.0292	0.0001
2265002060	Construction	4-Stroke Rubber Tire Loaders	NMIM	0.7360	0.0017
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	NMIM	0.5086	0.0012
2265002072	Construction	4-Stroke Skid Steer Loaders	NMIM	0.1243	0.0003
2265002078	Construction	4-Stroke Dumpers/Tenders	NMIM	0.0055	0.0000
2265002081	Construction	4-Stroke Other Construction Equipment	NMIM	0.0567	0.0001
2265003010	Industrial	4-Stroke Aerial Lifts	NMIM	1.6184	0.0043
2265003020	Industrial	4-Stroke Forklifts	NMIM	3.5346	0.0095
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	NMIM	0.4832	0.0013
2265003040	Industrial	4-Stroke Other General Industrial Equipm	NMIM	0.7742	0.0021
2265003050	Industrial	4-Stroke Other Material Handling Equipme	NMIM	0.1033	0.0003
2265003060	Industrial	4-Stroke Industrial ACRefrigeration	NMIM	0.0045	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	NMIM	0.1224	0.0003
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	NMIM	2.8734	0.0139
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	NMIM	0.9037	0.0044
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Resident	NMIM	0.2415	0.0012
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Commerci	NMIM	0.4885	0.0024

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County NOX Emissions	
				tpy	tpsd
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters	NMIM	0.0151	0.0001
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters	NMIM	0.0217	0.0001
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Residentia	NMIM	0.0288	0.0001
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Commercial	NMIM	1.1691	0.0057
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	NMIM	0.3506	0.0000
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	NMIM	0.3624	0.0000
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Res.	NMIM	0.6197	0.0030
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Comm	NMIM	0.1108	0.0005
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	NMIM	0.1494	0.0007
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP (Commercial)	NMIM	0.0576	0.0003
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Residen	NMIM	8.3169	0.0404
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Commerc	NMIM	1.5057	0.0073
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders (Comm.)	NMIM	0.2733	0.0013
2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment (Comm	NMIM	4.5295	0.0220
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden Equipment	NMIM	0.2991	0.0015
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden Equipment	NMIM	0.1660	0.0008
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	NMIM	0.0248	0.0001
2265005015	Agriculture	4-Stroke Agricultural Tractors	NMIM	0.1521	0.0003
2265005020	Agriculture	4-Stroke Combines	NMIM	0.0024	0.0000
2265005025	Agriculture	4-Stroke Balers	NMIM	0.2290	0.0005
2265005030	Agriculture	4-Stroke Agricultural Mowers	NMIM	0.0232	0.0001
2265005035	Agriculture	4-Stroke Sprayers	NMIM	0.3976	0.0009
2265005040	Agriculture	4-Stroke Tillers > 5 HP	NMIM	0.5294	0.0012
2265005045	Agriculture	4-Stroke Swathers	NMIM	0.3629	0.0008
2265005055	Agriculture	4-Stroke Other Agricultural Equipment	NMIM	0.4354	0.0010
2265005060	Agriculture	4-Stroke Irrigation Sets	NMIM	0.1989	0.0004
2265006005	Commercial	4-Stroke Light Commercial Generator Set	NMIM	5.4577	0.0119
2265006010	Commercial	4-Stroke Light Commercial Pumps	NMIM	1.4309	0.0031
2265006015	Commercial	4-Stroke Light Commercial Air Compresso	NMIM	0.8219	0.0018
2265006025	Commercial	4-Stroke Light Commercial Welders	NMIM	1.5735	0.0034
2265006030	Commercial	4-Stroke Light Commercial Pressure Wash	NMIM	2.2351	0.0049
2265006035	Commercial	4-Stroke Hydro Power Units	NMIM	0.1016	0.0002
2265007010	Logging	4-Stroke Logging Equipment Shredders >	NMIM	0.0318	0.0001
2265007015	Logging	4-Stroke Logging Equipment Skidders	NMIM	0.0003	0.0000
2265008005	Airport Support	4-Stroke Airport Support Equipment	Apx. 8	0.0002	0.0000
2265010010	Oil Field	4-Stroke Other Oil Field Equipment	NMIM	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	NMIM	0.0504	0.0003
2267002003	Construction	LPG Asphalt Pavers	NMIM	0.0169	0.0001
2267002015	Construction	LPG Rollers	NMIM	0.0141	0.0001
2267002021	Construction	LPG Paving Equipment	NMIM	0.0084	0.0000
2267002024	Construction	LPG Surfacing Equipment	NMIM	0.0071	0.0000
2267002030	Construction	LPG Trenchers	NMIM	0.0514	0.0001
2267002033	Construction	LPG Bore/Drill Rigs	NMIM	0.0178	0.0001
2267002039	Construction	LPG Concrete/Industrial Saws	NMIM	0.1436	0.0004
2267002045	Construction	LPG Cranes	NMIM	0.0290	0.0001
2267002054	Construction	LPG Crushing/Proc. Equipment	NMIM	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	NMIM	0.0845	0.0002
2267002060	Construction	LPG Rubber Tire Loaders	NMIM	0.0615	0.0002
2267002066	Construction	LPG Tractors/Loaders/Backhoes	NMIM	0.0055	0.0000
2267002072	Construction	LPG Skid Steer Loaders	NMIM	0.0164	0.0000
2267002081	Construction	LPG Other Construction Equipment	NMIM	0.0490	0.0001
2267003010	Industrial	LPG Aerial Lifts	NMIM	2.5055	0.0082
2267003020	Industrial	LPG Forklifts	NMIM	120.4915	0.3933
2267003030	Industrial	LPG Sweepers/Scrubbers	NMIM	0.5761	0.0019
2267003040	Industrial	LPG Other General Industrial Equipment	NMIM	0.2168	0.0007
2267003050	Industrial	LPG Other Material Handling Equipment	NMIM	0.1311	0.0004
2267003070	Industrial	LPG Terminal Tractors	NMIM	0.2020	0.0007
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders (Commercial	NMIM	0.1193	0.0007
2267005055	Agriculture	LPG Other Agricultural Equipment	NMIM	0.0043	0.0000
2267005060	Agriculture	LPG Irrigation Sets	NMIM	0.0010	0.0000
2267006005	Commercial	LPG Light Commercial Generator Sets	NMIM	2.0031	0.0054
2267006010	Commercial	LPG Light Commercial Pumps	NMIM	0.3501	0.0010
2267006015	Commercial	LPG Light Commercial Air Compressors	NMIM	0.3389	0.0009
2267006025	Commercial	LPG Light Commercial Welders	NMIM	0.4489	0.0012
2267006030	Commercial	LPG Light Commercial Pressure Washers	NMIM	0.0081	0.0000
2267006035	Commercial	LPG Hydro Power Units	NMIM	0.0043	0.0000

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County NOX Emissions	
				tpy	tpsd
2267008005	Airport Support	LPG Airport Support Equipment	Apx. 8	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	NMIM	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	NMIM	9.0737	0.0296
2268003030	Industrial	CNG Sweepers/Scrubbers	NMIM	0.0105	0.0000
2268003040	Industrial	CNG Other General Industrial Equipment	NMIM	0.0057	0.0000
2268003060	Industrial	CNG ACRefrigeration	NMIM	0.0042	0.0000
2268003070	Industrial	CNG Terminal Tractors	NMIM	0.0163	0.0001
2268005055	Agriculture	CNG Other Agricultural Equipment	NMIM	0.0025	0.0000
2268005060	Agriculture	CNG Irrigation Sets	NMIM	0.0116	0.0000
2268006005	Commercial	CNG Light Commercial Generator Sets	NMIM	0.6081	0.0017
2268006010	Commercial	CNG Light Commercial Pumps	NMIM	0.0254	0.0001
2268006015	Commercial	CNG Light Commercial Air Compressors	NMIM	0.0264	0.0001
2268006020	Commercial	CNG Light Commercial Gas Compressors	NMIM	0.1910	0.0005
2268006035	Commercial	CNG Hydro Power Units	NMIM	0.0000	0.0000
2268008005	Airport Support	CNG Airport Support Equipment	Apx. 8	0.0000	0.0000
2268010010	Oil Field	CNG Other Oil Field Equipment	NMIM	0.0000	0.0000
2270001060	Recreational	Diesel Specialty Vehicle Carts	NMIM	0.6686	0.0033
2270002003	Construction	Diesel Pavers	NMIM	1.0294	0.0043
2270002006	Construction	Diesel Tampers/Rammers (unused)	NMIM	0.0157	0.0001
2270002009	Construction	Diesel Plate Compactors	NMIM	0.0825	0.0003
2270002015	Construction	Diesel Rollers	NMIM	4.3103	0.0180
2270002018	Construction	Diesel Scrapers	NMIM	15.6029	0.0652
2270002021	Construction	Diesel Paving Equipment	NMIM	0.5328	0.0022
2270002024	Construction	Diesel Surfacing Equipment	NMIM	0.6633	0.0028
2270002027	Construction	Diesel Signal Boards	NMIM	0.2999	0.0008
2270002030	Construction	Diesel Trenchers	NMIM	2.9259	0.0082
2270002033	Construction	Diesel Bore/Drill Rigs	NMIM	5.7780	0.0162
2270002036	Construction	Diesel Excavators	NMIM	32.3527	0.0908
2270002039	Construction	Diesel Concrete/Industrial Saws	NMIM	0.4853	0.0014
2270002042	Construction	Diesel Cement & Mortar Mixers	NMIM	0.0086	0.0000
2270002045	Construction	Diesel Cranes	NMIM	4.4185	0.0124
2270002048	Construction	Diesel Graders	NMIM	7.9123	0.0222
2270002051	Construction	Diesel Off-highway Trucks	NMIM	29.5991	0.0831
2270002054	Construction	Diesel Crushing/Proc. Equipment	NMIM	3.2325	0.0091
2270002057	Construction	Diesel Rough Terrain Forklifts	NMIM	4.0599	0.0114
2270002060	Construction	Diesel Rubber Tire Loaders	NMIM	35.5132	0.0997
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	NMIM	13.3783	0.0376
2270002069	Construction	Diesel Crawler Tractors	NMIM	36.6525	0.1029
2270002072	Construction	Diesel Skid Steer Loaders	NMIM	5.2205	0.0147
2270002075	Construction	Diesel Off-Highway Tractors	NMIM	4.3962	0.0123
2270002078	Construction	Diesel Dumpers/Tenders	NMIM	0.3048	0.0009
2270002081	Construction	Diesel Other Construction Equipment	NMIM	4.2032	0.0118
2270003010	Industrial	Diesel Aerial Lifts	NMIM	3.3039	0.0108
2270003020	Industrial	Diesel Forklifts	NMIM	26.9376	0.0879
2270003030	Industrial	Diesel Sweepers/Scrubbers	NMIM	14.5013	0.0473
2270003040	Industrial	Diesel Other General Industrial Equipmen	NMIM	17.0687	0.0557
2270003050	Industrial	Diesel Other Material Handling Equipment	NMIM	0.9121	0.0030
2270003060	Industrial	Diesel ACRefrigeration	NMIM	12.6104	0.0412
2270003070	Industrial	Diesel Terminal Tractors	NMIM	16.7520	0.0547
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums (Commercial)	NMIM	0.0003	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	NMIM	0.0809	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	NMIM	1.8254	0.0100
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors (Commercia	NMIM	0.3603	0.0020
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders (Commerci	NMIM	2.8421	0.0155
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment (Comm.)	NMIM	0.2538	0.0014
2270004076	Lawn/Garden	Diesel Other Lawn & Garden Equipment (Co	NMIM	0.0074	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	NMIM	0.0036	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	NMIM	184.0892	0.4822
2270005020	Agriculture	Diesel Combines	NMIM	19.3698	0.0507
2270005025	Agriculture	Diesel Balers	NMIM	0.0960	0.0003
2270005030	Agriculture	Diesel Agricultural Mowers	NMIM	0.0187	0.0000
2270005035	Agriculture	Diesel Sprayers	NMIM	1.5150	0.0040
2270005040	Agriculture	Diesel Tillers > 6 HP	NMIM	0.0026	0.0000
2270005045	Agriculture	Diesel Swathers	NMIM	1.4303	0.0037
2270005055	Agriculture	Diesel Other Agricultural Equipment	NMIM	3.9074	0.0102
2270005060	Agriculture	Diesel Irrigation Sets	NMIM	2.4635	0.0065

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County NOX Emissions	
				tpy	tpsd
2270006005	Commercial	Diesel Light Commercial Generator Sets	NMIM	9.3168	0.0253
2270006010	Commercial	Diesel Light Commercial Pumps	NMIM	2.2020	0.0060
2270006015	Commercial	Diesel Light Commercial Air Compressors	NMIM	5.0085	0.0136
2270006020	Commercial	Diesel Light Commercial Gas Compressors	NMIM	0.0000	0.0000
2270006025	Commercial	Diesel Light Commercial Welders	NMIM	2.7849	0.0076
2270006030	Commercial	Diesel Light Commercial Pressure Washer	NMIM	0.3112	0.0008
2270006035	Commercial	Diesel Hydro Power Units	NMIM	0.2170	0.0006
2270007010	Logging	Diesel Logging Equipment Shredders > 6	NMIM	0.0000	0.0000
2270007015	Logging	Diesel Logging Equip Fell/Bunch/Skidlers	NMIM	0.6362	0.0017
2270008005	Aircraft Support	Diesel Airport Support Equipment	Apx. 8	0.0012	0.0000
2270009010	Underground Mining	Diesel Other Underground Mining Equipmen	NMIM	0.0000	0.0000
2270010010	Oil Field	Diesel Other Oil Field Equipment	NMIM	0.0000	0.0000
2275001000	Aircraft	Military Aircraft	Apx. 8	0.0198	0.0001
2275001011	Aircraft	General Aviation, Piston	Apx. 8	0.6755	0.0019
2275001012	Aircraft	General Aviation, Turbine	Apx. 8	1.3403	0.0037
2275060011	Aircraft	Air Taxi, Piston	Apx. 8	0.0000	0.0000
2275060012	Aircraft	Air Taxi, Turbine	Apx. 8	0.7604	0.0021
2275070000	Aircraft	Aircraft Auxiliary Power Units	Apx. 8	0.0001	0.0000
2280000000	Commercial Marine	All Commercial Marine Vessels	Apx. 6	36.6737	0.1379
2282005010	Pleasure Craft	2-Stroke Outboards	NMIM	22.4964	0.1492
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	NMIM	4.1427	0.0275
2282010005	Pleasure Craft	4-Stroke Inboards	NMIM	52.4450	0.3323
2282020005	Pleasure Craft	Diesel Inboards	NMIM	43.5626	0.2888
2282020010	Pleasure Craft	Diesel Outboards	NMIM	0.0805	0.0005
2285002006	Railroad	Diesel Locomotives, Line Haul, Class I Operations	Apx. 9	12.6692	0.0350
2285002007	Railroad	Diesel Locomotives, Line Haul, Class II/III Ops	Apx. 9	19.6961	0.0544
2285002015	Railroad	Diesel Railway Maintenance	NMIM	0.1672	0.0005
2285004015	Railroad	4-Stroke Gasoline Railway Maintenance	NMIM	0.0034	0.0000
2285006015	Railroad	LPG Railway Maintenance	NMIM	0.0003	0.0000
ALL	ALL	ALL		935.7216	3.2622

Table 4-d: Sheboygan County Nonattainment Area;  
VOC Emissions: tons per year (tpy) and tons per summer day (tpsd)

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County VOC Emissions	
				tpy	tpsd
2260001010	Recreational	2-Stroke Motorcycles: Off-Road	NMIM	71.8478	0.3579
2260001020	Recreational	2-Stroke Snowmobiles	NMIM	106.1162	0.0172
2260001030	Recreational	2-Stroke All Terrain Vehicles	NMIM	87.5211	0.4360
2260001060	Recreational	2-Stroke Specialty Vehicle Carts	NMIM	0.7699	0.0039
2260002006	Construction	2-Stroke Tampers/Rammers	NMIM	0.8950	0.0037
2260002009	Construction	2-Stroke Plate Compactors	NMIM	0.0765	0.0003
2260002021	Construction	2-Stroke Paving Equipment	NMIM	0.0059	0.0000
2260002027	Construction	2-Stroke Signal Boards	NMIM	0.0008	0.0000
2260002039	Construction	2-Stroke Concrete/Industrial Saws	NMIM	5.5619	0.0156
2260002054	Construction	2-Stroke Crushing/Proc. Equipment	NMIM	0.0037	0.0000
2260003030	Industrial	2-Stroke Sweepers/Scrubbers	NMIM	0.0627	0.0002
2260003040	Industrial	2-Stroke Other General Industrial Equipm	NMIM	0.0048	0.0000
2260004015	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Resident	NMIM	0.2885	0.0016
2260004016	Lawn/Garden	2-Stroke Rotary Tillers < 6 HP (Commerci	NMIM	0.4803	0.0026
2260004020	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Residential)	NMIM	4.4213	0.0125
2260004021	Lawn/Garden	2-Stroke Chain Saws < 6 HP (Commercial)	NMIM	10.7107	0.0292
2260004025	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters	NMIM	5.3747	0.0290
2260004026	Lawn/Garden	2-Stroke Trimmers/Edgers/Brush Cutters	NMIM	5.4865	0.0299
2260004030	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Residentia	NMIM	3.3904	0.0182
2260004031	Lawn/Garden	2-Stroke Leafblowers/Vacuums (Commercial	NMIM	5.4322	0.0296
2260004035	Lawn/Garden	2-Stroke Snowblowers (Residential)	NMIM	5.4630	0.0021
2260004036	Lawn/Garden	2-Stroke Snowblowers (Commercial)	NMIM	5.2191	0.0001
2260004071	Lawn/Garden	2-Stroke Commercial Turf Equipment (Comm	NMIM	0.0018	0.0000
2260005035	Agriculture	2-Stroke Sprayers	NMIM	0.1260	0.0004
2260006005	Commercial	2-Stroke Light Commercial Generator Set	NMIM	0.3574	0.0010
2260006010	Commercial	2-Stroke Light Commercial Pumps	NMIM	2.5429	0.0070
2260006015	Commercial	2-Stroke Light Commercial Air Compresso	NMIM	0.0010	0.0000
2260006035	Commercial	2-Stroke Hydro Power Units	NMIM	0.0157	0.0000
2260007005	Logging	2-Stroke Logging Equipment Chain Saws >	NMIM	0.2836	0.0008
2265001010	Recreational	4-Stroke Motorcycles: Off-Road	NMIM	2.6589	0.0131
2265001030	Recreational	4-Stroke All Terrain Vehicles	NMIM	31.6153	0.1561
2265001050	Recreational	4-Stroke Golf Carts	NMIM	6.9259	0.0336
2265001060	Recreational	4-Stroke Specialty Vehicle Carts	NMIM	0.7738	0.0038
2265002003	Construction	4-Stroke Asphalt Pavers	NMIM	0.0200	0.0001
2265002006	Construction	4-Stroke Tampers/Rammers	NMIM	0.0007	0.0000
2265002009	Construction	4-Stroke Plate Compactors	NMIM	0.5310	0.0022
2265002015	Construction	4-Stroke Rollers	NMIM	0.2073	0.0008
2265002021	Construction	4-Stroke Paving Equipment	NMIM	0.0492	0.0002
2265002024	Construction	4-Stroke Surfacing Equipment	NMIM	0.1993	0.0008
2265002027	Construction	4-Stroke Signal Boards	NMIM	0.0290	0.0001
2265002030	Construction	4-Stroke Trenchers	NMIM	1.4451	0.0040
2265002033	Construction	4-Stroke Bore/Drill Rigs	NMIM	0.0076	0.0000
2265002039	Construction	4-Stroke Concrete/Industrial Saws	NMIM	0.9346	0.0026
2265002042	Construction	4-Stroke Cement & Mortar Mixers	NMIM	0.0720	0.0002
2265002045	Construction	4-Stroke Cranes	NMIM	0.0122	0.0000
2265002054	Construction	4-Stroke Crushing/Proc. Equipment	NMIM	0.0173	0.0000
2265002057	Construction	4-Stroke Rough Terrain Forklifts	NMIM	0.0148	0.0000
2265002060	Construction	4-Stroke Rubber Tire Loaders	NMIM	0.3584	0.0010
2265002066	Construction	4-Stroke Tractors/Loaders/Backhoes	NMIM	1.0138	0.0028
2265002072	Construction	4-Stroke Skid Steer Loaders	NMIM	0.1125	0.0003
2265002078	Construction	4-Stroke Dumpers/Tenders	NMIM	0.0149	0.0000
2265002081	Construction	4-Stroke Other Construction Equipment	NMIM	0.0290	0.0001
2265003010	Industrial	4-Stroke Aerial Lifts	NMIM	1.1072	0.0037
2265003020	Industrial	4-Stroke Forklifts	NMIM	1.7484	0.0056
2265003030	Industrial	4-Stroke Sweepers/Scrubbers	NMIM	0.5765	0.0019
2265003040	Industrial	4-Stroke Other General Industrial Equipm	NMIM	2.6350	0.0084
2265003050	Industrial	4-Stroke Other Material Handling Equipme	NMIM	0.0757	0.0002
2265003060	Industrial	4-Stroke Industrial ACRefrigeration	NMIM	0.0097	0.0000
2265003070	Industrial	4-Stroke Terminal Tractors	NMIM	0.0581	0.0002
2265004010	Lawn/Garden	4-Stroke Lawn mowers (Residential)	NMIM	24.7451	0.1314
2265004011	Lawn/Garden	4-Stroke Lawn mowers (Commercial)	NMIM	5.6540	0.0303
2265004015	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Resident	NMIM	2.1077	0.0112
2265004016	Lawn/Garden	4-Stroke Rotary Tillers < 6 HP (Commerci	NMIM	3.3980	0.0182

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County VOC Emissions	
				tpy	tpsd
2265004025	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters	NMIM	0.1320	0.0007
2265004026	Lawn/Garden	4-Stroke Trimmers/Edgers/Brush Cutters	NMIM	0.1155	0.0006
2265004030	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Residentia	NMIM	0.2242	0.0012
2265004031	Lawn/Garden	4-Stroke Leafblowers/Vacuums (Commercial	NMIM	2.4754	0.0133
2265004035	Lawn/Garden	4-Stroke Snowblowers (Residential)	NMIM	2.1970	0.0041
2265004036	Lawn/Garden	4-Stroke Snowblowers (Commercial)	NMIM	1.4595	0.0003
2265004040	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Res.	NMIM	2.1888	0.0115
2265004041	Lawn/Garden	4-Stroke Rear Engine Riding Mowers (Comm	NMIM	0.2457	0.0013
2265004046	Lawn/Garden	4-Stroke Front Mowers (Commercial)	NMIM	0.3509	0.0019
2265004051	Lawn/Garden	4-Stroke Shredders < 6 HP (Commercial)	NMIM	0.4059	0.0022
2265004055	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Residen	NMIM	23.7597	0.1254
2265004056	Lawn/Garden	4-Stroke Lawn & Garden Tractors (Commerc	NMIM	3.1559	0.0168
2265004066	Lawn/Garden	4-Stroke Chippers/Stump Grinders (Comm.)	NMIM	0.3596	0.0019
2265004071	Lawn/Garden	4-Stroke Commercial Turf Equipment (Comm	NMIM	10.9743	0.0584
2265004075	Lawn/Garden	4-Stroke Other Lawn & Garden Equipment	NMIM	1.4598	0.0077
2265004076	Lawn/Garden	4-Stroke Other Lawn & Garden Equipment	NMIM	0.7913	0.0042
2265005010	Agriculture	4-Stroke 2-Wheel Tractors	NMIM	0.0512	0.0001
2265005015	Agriculture	4-Stroke Agricultural Tractors	NMIM	0.1062	0.0003
2265005020	Agriculture	4-Stroke Combines	NMIM	0.0015	0.0000
2265005025	Agriculture	4-Stroke Balers	NMIM	0.1598	0.0005
2265005030	Agriculture	4-Stroke Agricultural Mowers	NMIM	0.0491	0.0001
2265005035	Agriculture	4-Stroke Sprayers	NMIM	0.7450	0.0023
2265005040	Agriculture	4-Stroke Tillers > 5 HP	NMIM	1.9027	0.0054
2265005045	Agriculture	4-Stroke Swathers	NMIM	0.2284	0.0007
2265005055	Agriculture	4-Stroke Other Agricultural Equipment	NMIM	0.3200	0.0009
2265005060	Agriculture	4-Stroke Irrigation Sets	NMIM	0.1314	0.0003
2265006005	Commercial	4-Stroke Light Commercial Generator Set	NMIM	14.4109	0.0434
2265006010	Commercial	4-Stroke Light Commercial Pumps	NMIM	4.1340	0.0113
2265006015	Commercial	4-Stroke Light Commercial Air Compresso	NMIM	1.7126	0.0046
2265006025	Commercial	4-Stroke Light Commercial Welders	NMIM	2.9013	0.0078
2265006030	Commercial	4-Stroke Light Commercial Pressure Wash	NMIM	7.4127	0.0207
2265006035	Commercial	4-Stroke Hydro Power Units	NMIM	0.2610	0.0007
2265007010	Logging	4-Stroke Logging Equipment Shredders >	NMIM	0.0767	0.0002
2265007015	Logging	4-Stroke Logging Equipment Skidders	NMIM	0.0011	0.0000
2265008005	Airport Support	4-Stroke Airport Support Equipment	Apx. 8	0.0001	0.0000
2265010010	Oil Field	4-Stroke Other Oil Field Equipment	NMIM	0.0000	0.0000
2267001060	Recreational	LPG Specialty Vehicle Carts	NMIM	0.0139	0.0001
2267002003	Construction	LPG Asphalt Pavers	NMIM	0.0046	0.0000
2267002015	Construction	LPG Rollers	NMIM	0.0035	0.0000
2267002021	Construction	LPG Paving Equipment	NMIM	0.0024	0.0000
2267002024	Construction	LPG Surfacing Equipment	NMIM	0.0019	0.0000
2267002030	Construction	LPG Trenchers	NMIM	0.0141	0.0000
2267002033	Construction	LPG Bore/Drill Rigs	NMIM	0.0049	0.0000
2267002039	Construction	LPG Concrete/Industrial Saws	NMIM	0.0306	0.0001
2267002045	Construction	LPG Cranes	NMIM	0.0081	0.0000
2267002054	Construction	LPG Crushing/Proc. Equipment	NMIM	0.0000	0.0000
2267002057	Construction	LPG Rough Terrain Forklifts	NMIM	0.0235	0.0001
2267002060	Construction	LPG Rubber Tire Loaders	NMIM	0.0164	0.0000
2267002066	Construction	LPG Tractors/Loaders/Backhoes	NMIM	0.0014	0.0000
2267002072	Construction	LPG Skid Steer Loaders	NMIM	0.0045	0.0000
2267002081	Construction	LPG Other Construction Equipment	NMIM	0.0136	0.0000
2267003010	Industrial	LPG Aerial Lifts	NMIM	0.6981	0.0023
2267003020	Industrial	LPG Forklifts	NMIM	33.7463	0.1102
2267003030	Industrial	LPG Sweepers/Scrubbers	NMIM	0.1492	0.0005
2267003040	Industrial	LPG Other General Industrial Equipment	NMIM	0.0591	0.0002
2267003050	Industrial	LPG Other Material Handling Equipment	NMIM	0.0367	0.0001
2267003070	Industrial	LPG Terminal Tractors	NMIM	0.0440	0.0001
2267004066	Lawn/Garden	LPG Chippers/Stump Grinders (Commercial	NMIM	0.0324	0.0002
2267005055	Agriculture	LPG Other Agricultural Equipment	NMIM	0.0012	0.0000
2267005060	Agriculture	LPG Irrigation Sets	NMIM	0.0003	0.0000
2267006005	Commercial	LPG Light Commercial Generator Sets	NMIM	0.4140	0.0011
2267006010	Commercial	LPG Light Commercial Pumps	NMIM	0.0723	0.0002
2267006015	Commercial	LPG Light Commercial Air Compressors	NMIM	0.0700	0.0002
2267006025	Commercial	LPG Light Commercial Welders	NMIM	0.1244	0.0003
2267006030	Commercial	LPG Light Commercial Pressure Washers	NMIM	0.0022	0.0000
2267006035	Commercial	LPG Hydro Power Units	NMIM	0.0009	0.0000

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County VOC Emissions	
				tpy	tpsd
2267008005	Airport Support	LPG Airport Support Equipment	Apx. 8	0.0000	0.0000
2268002081	Construction	CNG Other Construction Equipment	NMIM	0.0000	0.0000
2268003020	Industrial	CNG Forklifts	NMIM	0.1481	0.0005
2268003030	Industrial	CNG Sweepers/Scrubbers	NMIM	0.0002	0.0000
2268003040	Industrial	CNG Other General Industrial Equipment	NMIM	0.0001	0.0000
2268003060	Industrial	CNG ACRefrigeration	NMIM	0.0001	0.0000
2268003070	Industrial	CNG Terminal Tractors	NMIM	0.0002	0.0000
2268005055	Agriculture	CNG Other Agricultural Equipment	NMIM	0.0000	0.0000
2268005060	Agriculture	CNG Irrigation Sets	NMIM	0.0002	0.0000
2268006005	Commercial	CNG Light Commercial Generator Sets	NMIM	0.0075	0.0000
2268006010	Commercial	CNG Light Commercial Pumps	NMIM	0.0003	0.0000
2268006015	Commercial	CNG Light Commercial Air Compressors	NMIM	0.0003	0.0000
2268006020	Commercial	CNG Light Commercial Gas Compressors	NMIM	0.0019	0.0000
2268006035	Commercial	CNG Hydro Power Units	NMIM	0.0000	0.0000
2268008005	Airport Support	CNG Airport Support Equipment	Apx. 8	0.0000	0.0000
2268010010	Oil Field	CNG Other Oil Field Equipment	NMIM	0.0000	0.0000
2270001060	Recreational	Diesel Specialty Vehicle Carts	NMIM	0.1717	0.0009
2270002003	Construction	Diesel Pavers	NMIM	0.0830	0.0003
2270002006	Construction	Diesel Tampers/Rammers (unused)	NMIM	0.0023	0.0000
2270002009	Construction	Diesel Plate Compactors	NMIM	0.0117	0.0000
2270002015	Construction	Diesel Rollers	NMIM	0.3523	0.0015
2270002018	Construction	Diesel Scrapers	NMIM	0.9422	0.0039
2270002021	Construction	Diesel Paving Equipment	NMIM	0.0461	0.0002
2270002024	Construction	Diesel Surfacing Equipment	NMIM	0.0503	0.0002
2270002027	Construction	Diesel Signal Boards	NMIM	0.0332	0.0001
2270002030	Construction	Diesel Trenchers	NMIM	0.2505	0.0007
2270002033	Construction	Diesel Bore/Drill Rigs	NMIM	0.4605	0.0013
2270002036	Construction	Diesel Excavators	NMIM	2.4610	0.0069
2270002039	Construction	Diesel Concrete/Industrial Saws	NMIM	0.0432	0.0001
2270002042	Construction	Diesel Cement & Mortar Mixers	NMIM	0.0010	0.0000
2270002045	Construction	Diesel Cranes	NMIM	0.2967	0.0008
2270002048	Construction	Diesel Graders	NMIM	0.6170	0.0017
2270002051	Construction	Diesel Off-highway Trucks	NMIM	1.7920	0.0050
2270002054	Construction	Diesel Crushing/Proc. Equipment	NMIM	0.2199	0.0006
2270002057	Construction	Diesel Rough Terrain Forklifts	NMIM	0.3553	0.0010
2270002060	Construction	Diesel Rubber Tire Loaders	NMIM	2.4636	0.0069
2270002066	Construction	Diesel Tractors/Loaders/Backhoes	NMIM	2.5839	0.0073
2270002069	Construction	Diesel Crawler Tractors	NMIM	2.5090	0.0070
2270002072	Construction	Diesel Skid Steer Loaders	NMIM	1.2643	0.0035
2270002075	Construction	Diesel Off-Highway Tractors	NMIM	0.2623	0.0007
2270002078	Construction	Diesel Dumpers/Tenders	NMIM	0.0788	0.0002
2270002081	Construction	Diesel Other Construction Equipment	NMIM	0.2747	0.0008
2270003010	Industrial	Diesel Aerial Lifts	NMIM	0.9221	0.0030
2270003020	Industrial	Diesel Forklifts	NMIM	2.0820	0.0068
2270003030	Industrial	Diesel Sweepers/Scrubbers	NMIM	1.1597	0.0038
2270003040	Industrial	Diesel Other General Industrial Equipmen	NMIM	1.3699	0.0045
2270003050	Industrial	Diesel Other Material Handling Equipment	NMIM	0.1656	0.0005
2270003060	Industrial	Diesel ACRefrigeration	NMIM	1.0490	0.0034
2270003070	Industrial	Diesel Terminal Tractors	NMIM	1.3596	0.0044
2270004031	Lawn/Garden	Diesel Leafblowers/Vacuums (Commercial)	NMIM	0.0001	0.0000
2270004036	Lawn/Garden	Diesel Snowblowers (Commercial)	NMIM	0.0064	0.0000
2270004046	Lawn/Garden	Diesel Front Mowers (Commercial)	NMIM	0.2252	0.0012
2270004056	Lawn/Garden	Diesel Lawn & Garden Tractors (Commercia	NMIM	0.0466	0.0003
2270004066	Lawn/Garden	Diesel Chippers/Stump Grinders (Commerci	NMIM	0.2680	0.0015
2270004071	Lawn/Garden	Diesel Commercial Turf Equipment (Comm.)	NMIM	0.0203	0.0001
2270004076	Lawn/Garden	Diesel Other Lawn & Garden Equipment (Co	NMIM	0.0010	0.0000
2270005010	Agriculture	Diesel 2-Wheel Tractors	NMIM	0.0005	0.0000
2270005015	Agriculture	Diesel Agricultural Tractors	NMIM	17.0002	0.0445
2270005020	Agriculture	Diesel Combines	NMIM	1.6722	0.0044
2270005025	Agriculture	Diesel Balers	NMIM	0.0143	0.0000
2270005030	Agriculture	Diesel Agricultural Mowers	NMIM	0.0025	0.0000
2270005035	Agriculture	Diesel Sprayers	NMIM	0.1900	0.0005
2270005040	Agriculture	Diesel Tillers > 6 HP	NMIM	0.0002	0.0000
2270005045	Agriculture	Diesel Swathers	NMIM	0.1615	0.0004
2270005055	Agriculture	Diesel Other Agricultural Equipment	NMIM	0.3909	0.0010
2270005060	Agriculture	Diesel Irrigation Sets	NMIM	0.2255	0.0006

SCC	Segment Description	SCC Description	Emissions from	Sheboygan County VOC Emissions	
				tpy	tpsd
2270006005	Commercial	Diesel Light Commercial Generator Sets	NMIM	1.1245	0.0031
2270006010	Commercial	Diesel Light Commercial Pumps	NMIM	0.2528	0.0007
2270006015	Commercial	Diesel Light Commercial Air Compressors	NMIM	0.4531	0.0012
2270006020	Commercial	Diesel Light Commercial Gas Compressors	NMIM	0.0000	0.0000
2270006025	Commercial	Diesel Light Commercial Welders	NMIM	0.8143	0.0022
2270006030	Commercial	Diesel Light Commercial Pressure Washer	NMIM	0.0376	0.0001
2270006035	Commercial	Diesel Hydro Power Units	NMIM	0.0201	0.0001
2270007010	Logging	Diesel Logging Equipment Shredders > 6	NMIM	0.0000	0.0000
2270007015	Logging	Diesel Logging Equip Fell/Bunch/Skidlers	NMIM	0.0490	0.0001
2270008005	Aircraft Support	Diesel Airport Support Equipment	Apx. 8	0.0003	0.0000
2270009010	Underground Mining	Diesel Other Underground Mining Equipmen	NMIM	0.0000	0.0000
2270010010	Oil Field	Diesel Other Oil Field Equipment	NMIM	0.0000	0.0000
2275001000	Aircraft	Military Aircraft	Apx. 8	0.1774	0.0005
2275001011	Aircraft	General Aviation, Piston	Apx. 8	1.5639	0.0044
2275001012	Aircraft	General Aviation, Turbine	Apx. 8	2.7573	0.0077
2275060011	Aircraft	Air Taxi, Piston	Apx. 8	0.0463	0.0001
2275060012	Aircraft	Air Taxi, Turbine	Apx. 8	0.9839	0.0028
2275070000	Aircraft	Aircraft Auxiliary Power Units	Apx. 8	0.0000	0.0000
2280000000	Commercial Marine	All Commercial Marine Vessels	Apx. 6	1.2006	0.0053
2282005010	Pleasure Craft	2-Stroke Outboards	NMIM	280.0825	1.7975
2282005015	Pleasure Craft	2-Stroke Personal Watercraft	NMIM	34.3012	0.2258
2282010005	Pleasure Craft	4-Stroke Inboards	NMIM	43.1927	0.2572
2282020005	Pleasure Craft	Diesel Inboards	NMIM	1.9647	0.0130
2282020010	Pleasure Craft	Diesel Outboards	NMIM	0.0161	0.0001
2285002006	Railroad	Diesel Locomotives, Line Haul, Class I Operations	Apx. 9	0.6504	0.0018
2285002007	Railroad	Diesel Locomotives, Line Haul, Class II/III Ops	Apx. 9	0.7658	0.0021
2285002015	Railroad	Diesel Railway Maintenance	NMIM	0.0288	0.0001
2285004015	Railroad	4-Stroke Gasoline Railway Maintenance	NMIM	0.0073	0.0000
2285006015	Railroad	LPG Railway Maintenance	NMIM	0.0001	0.0000
ALL	ALL	ALL		948.7240	4.3580

## **Appendix 5**

### **Area Source Emissions Estimation Methods by Category**

2011 Base Year SIP Emissions Inventory Methodologies

Prepared By:

Wisconsin Department of Natural Resources

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**ABBREVIATIONS**

AI	Active Ingredient
BTU	British Thermal Unit
CLF	Crop Life Foundation
DOE	Department of Energy
EIA	Energy Information Administration
EIIP	Emission Inventory Improvement Program
EP	Emission Potential
ERTAC	Eastern Regional Technical Advisory Committee
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
IC	Internal Combustion
LPG	Liquid Petroleum Gas
MACT	Maximum Achievable Control Technology
MOVES	Motor Vehicle Emission Simulator
NAICS	North American Industry Classification System
NEC	Not Elsewhere Classified
NEI	National Emissions Inventory
OSHA	Occupational Safety and Health Administration
PAD	Petroleum Administration for Defense
PM	Particulate Matter
POTW	Publicly Owned Treatment Work
RIA	Regulatory Impact Analysis
SAF	Spatial Apportioning Factor
SCC	Source Classification Code
SED	State Energy Data
SEDS	State Energy Data System
SIP	State Implementation Plan

## 1.0 Stationary Source Fuel Combustion

### 1.1 Industrial Source Fuel Combustion

The fuel combustion at stationary nonpoint sources within the industrial sector is presented in this section. This component is not reported in the point source inventory as the emissions are too small. For Sheboygan and Kenosha counties, industrial fuel combustion emissions were computed for the following fuel types: distillate oil, residual oil, liquid petroleum gas (LPG), natural gas, kerosene, and wood. As carried over from 2008 National Emissions Inventory (NEI), it was assumed that coal has not been consumed in Sheboygan and Kenosha Counties under industrial source fuel combustion category.

**Pollutants Calculated:** NO<sub>x</sub>, VOC

#### Activity Data:

Total sales statistics for the industrial sector energy consumption in the State of Wisconsin were obtained from the U.S. Department of Energy (DOE)'s Energy Information Administration (EIA). Their annual publication, titled the State Energy Data (SED) report provides total consumption for most of the fuel oils and kerosene.<sup>1</sup> A separate EIA data source was used for distillate oil. Year 2009 SED were used to estimate 2011 emissions because these were the latest year consumption data available at the time this work was performed in 2012.

#### Emission Factors:

The EPA has compiled criteria and hazardous air pollutant emission factors for nonpoint source industrial fuel combustion categories.<sup>2</sup> Since only VOC and NO<sub>x</sub> were considered in developing this State Implementation Plan (SIP) emissions estimates, the emission factors for these two pollutants are listed in the table 1.

Table 1: Emission Factors for Industrial Source Fuel Combustion (lb / unit of fuel throughput)

Pollutant	EIS Pollutant code	(TON) Coal Bit/ Subbit	(1000 gal) Distillate Oil - blr	(1000 gal) Diesel - eng	(1000 gal) Residual Oil	(1000 gal) Liquid Petroleum Gas	(MMCF) Natural Gas	(1000 gal) Kerosene	(TON) Wood
Nitrogen Oxides	NOx	11.000	20.000	604.000	55.000	14.230	100.000	19.290	0.220
Volatile Organic Compounds	VOC	0.050	0.200	-	0.280	0.520	5.500	0.190	0.017

#### Fuel Consumption Adjustments:

Fuel consumption associated with non-energy purposes in the industrial sector were adjusted by subtracting the volume of fuel consumption for non-energy uses from the volume of total fuel combustion.

<sup>1</sup> U.S. Energy Information Administration, <http://www.eia.gov>

<sup>2</sup> Emission factors from EPA: [ici\\_fuel\\_combustion\\_by\\_state](ftp://ftp.epa.gov/EmisInventory/2011nei/doc/) directory at <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>, accessed on 10-23-2012

### Emission Calculation:

In calculating emissions for industrial fuel combustion, state-level fuel consumption estimates were first developed, which represent the relevant activity. These were then allocated to the county-level, and then the resulting county-level consumption estimates were multiplied by appropriate emission factors.

General equation for emissions calculation is:

$$Emissions = (Fuel\ Use\ in\ Wisconsin) \times (Emission\ Factor\ per\ Pollutant)$$

To avoid double counting, point source estimates were subtracted from total emissions:

$$Emissions_{Area} = (Emissions_{Total\ Stationary}) - (Emission_{Point})$$

#### 1.1.1 Coal

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102001000	Stationary Source Fuel Combustion	Industrial	Anthracite Coal	Total: All Boiler Types
2102002000	Stationary Source Fuel Combustion	Industrial	Bituminous/Subbituminous Coal	Total: All Boiler Types

For the industrial sector coal consumption in the state of Wisconsin, it was assumed that 100% contribution is from bituminous/subbituminous coal. Anthracite coal consumption was assumed to be zero percent. EPA provided state-level industrial coal distribution data for 2009 to allocate coal consumption between anthracite and bituminous coal. Each type of coal consumption to total coal consumption was used for this allocation procedure.<sup>3</sup>

#### 1.1.2 Distillate Oil

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102004000	Stationary Source Fuel Combustion	Industrial	Distillate Oil	Total: Boilers and IC Engines

This industrial sector category included the total of boilers and internal combustion (IC) engines that use distillate oil as the fuel type. The activity is estimated in thousand barrels of distillate oil consumed using the EIA's fuel oil and kerosene sales as the data source. To avoid double-counting of distillate oil consumption between the nonpoint and nonroad sector emission inventories, EPA has used more detailed distillate oil consumption estimates reported in EIA's Fuel Oil and Kerosene Sales, and assumptions used in the regulatory impact analysis (RIA) for EPA's nonroad diesel emissions rulemaking.<sup>4,5</sup>

<sup>3</sup> Emission factors from EPA: *ici\_fuel\_combustion\_by\_state* directory at <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>, accessed on 10-23-2012

<sup>4</sup> Energy Information Administration, U.S. Department of Energy, *Fuel Oil and Kerosene Sales*, data available from [http://www.eia.gov/dnav/pet/pet\\_cons\\_821use\\_dcu\\_nus\\_a.htm](http://www.eia.gov/dnav/pet/pet_cons_821use_dcu_nus_a.htm).

<sup>5</sup> U.S. Environmental Protection Agency, "Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines," EPA420-R-03-008, Office of Transportation and Air Quality, April 2003.

For fuels where boiler and engine emission factors are considered and only one emission factor was available, that single energy factor was applied to both the boiler and engine types. The Eastern Regional Technical Advisory Committee (ERTAC) approved emission factors based on nonpoint compilation performed by EPA were used for emissions estimation. In developing the 2011 NEI, distillate fuel oil types No.1, No.2 and No.4 were combined for emissions calculation since the fraction of fuel oil No.4 is relatively small.

### 1.1.3 Residual Oil

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102005000	Stationary Source Fuel Combustion	Industrial	Residual Oil	Total: All Boiler Types

This industrial sector category included the total of all boilers that use residual oil as the fuel type. The activity is estimated in thousand barrels of residual oil consumed using the EIA's State Energy Data System (SEDS) as the data source.

### 1.1.4 Natural Gas

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102006000	Stationary Source Fuel Combustion	Industrial	Natural Gas	Total: Boilers and IC Engines

This industrial sector category included the total of all boilers and IC engines that use natural gas as the fuel type. The activity is estimated in million cubic feet of natural gas consumed using EIA's SEDS as the data source.

### 1.1.5 Liquid Petroleum Oil (LPG)

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102007000	Stationary Source Fuel Combustion	Industrial	Liquefied Petroleum Gas (LPG)	Total: All Combustor Types

This industrial sector category included the total of all boilers that use LPG as the fuel type. The activity is estimated in thousand barrels of LPG consumed using EIA's SEDS as the data source.

### 1.1.6 Wood

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102008000	Stationary Source Fuel Combustion	Industrial	Wood	Total: All Boiler Types

This industrial sector category included the total of all boilers that use wood as the fuel type. The activity is estimated in tons of wood consumed. The emission factors are from webFIRE.

### 1.1.7 Kerosene

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2102011000	Stationary Source Fuel Combustion	Industrial	Kerosene	Total: All Boiler Types

This industrial sector category included the total of all boilers that use kerosene as the fuel type. The activity is estimated in thousand barrels of kerosene consumed using EIA's SEDS as the data source.

## 1.2 Commercial/Institutional Fuel Combustion

The emission estimates for fuel combustion at stationary nonpoint sources within the commercial/institutional sector is presented in this section for Sheboygan and Kenosha counties. Emissions were computed for the following fuel types: coal, distillate oil, residual oil, LPG, natural gas, and kerosene.

**Pollutants:** NO<sub>x</sub>, VOC

### Activity Data:

EIA survey data developed by the DOE is the source for activity data. However, such survey information included in SEDS reports requires certain adjustments to identify the commercial/institutional coal consumption. One potential approach to distinguish such consumption is contacting a small number of local distributors to obtain estimates for the commercial/institutional deliveries. To estimate 2011 emissions, year 2009 data were used as these were the latest year consumption data available at the time this work was performed in 2012.

### Emission Factors:

ERTAC approved emission factors based on nonpoint compilation performed by EPA were used for emissions estimation of most of the categories except wood. The EPA has compiled criteria and hazardous air pollutant emission factors for nonpoint source commercial/institutional fuel combustion categories<sup>6</sup>. The emissions factor for commercial/institutional wood combustion was downloaded from WebFIRE, the U.S. EPA's online emissions factor repository, retrieval and development tool (Table 2).

Table 2: Emission Factors for Commercial/Institutional Fuel Combustion (lb / unit of fuel throughput)

Pollutant	EIS Pollutant code	(TON) Coal Bit/ Subbit	(1000 gal) Distillate Oil - blr	(1000 gal) Diesel- eng	(1000 gal) Residual Oil	(1000 gal) Liquid Petroleum Gas	(MMCF) Natural Gas	(1000 gal) Kerosene	(TON) Wood
Nitrogen Oxides	NOx	11.000	20.000	604.000	55.000	8.698	100.000	19.290	2.860
Volatile Organic Compounds	VOC	0.050	0.340	-	1.130	0.478	5.500	0.190	0.221

<sup>6</sup> Emission factors from EPA: ici\_fuel\_combustion\_by\_state directory at <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>, accessed on 10-23-2012

### Point Source Adjustments

Emissions assigned for point sources were subtracted from the total emissions to estimate the adjusted area source emissions. Another approach for making such adjustments is to subtract the activity assigned for point sources from the total activity to estimate the adjusted area source activity.

Usually, a portion of the activity data may represent deliveries to larger commercial/institutional facilities that may be inventoried as point sources. Due to differences in emissions estimation methods and/or emissions factors, it is more appropriate to use activity data in point source adjustments. However, the usage of activity data is preferred for the convenience of comparison, for the scenarios that only emission estimates are available, it would be more appropriate to subtract pre-controlled emissions representing point sources from total stationary emission estimates in order to make adjustments.

#### 1.2.1 Coal

This category covers air emissions from coal combustion in the commercial/institutional sector for space and water heating. The category includes small boilers, furnaces, heaters, and other heating units that are not inventoried as point sources. This sector represents the coal combustion in wholesale and retail businesses, health institutions, social and educational institutions, and Federal, state and local government institutions.

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2103001000	Stationary Source Fuel Combustion	Commercial/Institutional	Anthracite Coal	Total: All Boiler Types
2103002000	Stationary Source Fuel Combustion	Commercial/Institutional	Bituminous/Subbituminous Coal	Total: All Boiler Types

**Pollutants:** NO<sub>x</sub>

Activity data for commercial/institutional coal combustion in Wisconsin were obtained from the EIA's SED Report.<sup>7</sup> The space heating and water heating equipment that consume bituminous/subbituminous coal were considered in developing the inventory for this category with the assumption of 100% coal consumption comes from bituminous/subbituminous coal.

#### Control Adjustments

Regulations for coal combustion are generally applicable to point sources and do not apply to the area sources in this category.

#### County Allocation of State Activity Data

State-level commercial/institutional fuel combustion by fuel type was allocated to each County using the ratio of the number of commercial/institutional sector employees in each county to the total number of commercial/institutional sector employees in the state. Initially prepared state-

<sup>7</sup> U.S. Energy Information Administration, <http://www.eia.gov/state/?sid=WI>

wide emission estimations were allocated into county-level using adjustments based employment data and heating degree days. The employment information was obtained from the State Department of Labor. The significance of this category during the time of the inventory period for a certain geographic region is also an important factor for apportioning emissions from state-level to county-level. Commercial use may be temporally apportioned based on information from local distributors. Monthly deliveries should be obtained from a small sample of commercial/institutional coal distributors. The monthly percentages of annual deliveries found for the sampled distributors may be used to apportion consumption for the inventory area.<sup>8</sup>

Commercial/Institutional Spatial Apportioning Factor (*SAF*) for Inventory County:

$$SAF_{Coal,Inventory\ County} = \frac{HDD_{Inventory\ County} * SE_{Coal,Inventory\ County}}{\sum_{All\ Counties\ in\ State} (HDD_{County} * SE_{Coal,County})}$$

Where:

*HDD Inventory County* = annual heating degree days for inventory County

*SE Coal, Inventory County* = Standard Industrial Classification (SIC) 50-99 employment numbers for Inventory County

*HDD County* = annual heating degree days for each County in the state

*SE Coal, County* = SIC 50-99 employment for each County in the state

The spatial apportioning factor is used to allocate the state coal total to the County-level using the following equation:

$$Fuel_{Coal,Inventory\ County} = SAF_{Coal,Inventory\ County} \times Fuel_{Coal,Total\ State}$$

Where:

*Fuel Coal,Inventory County* =total coal consumed annually in the Inventory County

*Fuel Coal,Total State* =total coal consumed annually in the state

*SAF Coal,Inventory County* = spatial Apportioning Factor for coal in Inventory County

Annual commercial/institutional emissions for coal was calculated using following equation:

$$Emissions_{coal,commercial/Institutional} = (Fuel_{Coal,Inventory\ County} \times EF_{Coal,Commercial/Institutional})/2000$$

Where:

*Fuel Coal,Inventory County* =total fuel type *x* consumed annually in the Inventory County

*EF Coal,Commercial/Institutional* =commercial/institutional emission factor for coal

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<sup>8</sup> Emissions Inventory Improvement Program (EIIP) Area Source Method Abstract – Residential and Commercial/Institutional Fuel Oil and Kerosene Combustion: <http://www.epa.gov/ttn/chief/eiip/techreport/volume03>

### 1.2.2 Fuel Oil: Distillate Oil, Residual Oil, and Kerosene

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2103004000	Stationary Source Fuel Combustion	Commercial/Institutional	Distillate Oil	Total: Boilers and IC Engines
2103005000	Stationary Source Fuel Combustion	Commercial/Institutional	Residual Oil	Total: All Boiler Types
2103011000	Stationary Source Fuel Combustion	Commercial/Institutional	Kerosene	Total: All Combustor Types

This category includes small boilers, furnaces, heaters, and other heating units that use distillate oil, residual oil or kerosene as the fuel source and are not inventoried as point sources. Such combustions occur at wholesale and retail businesses, health institutions, social and educational institutions, and federal, state and local government institutions are considered in developing the inventory for this category. Distillate oil grades No.1, No.2 and No.4 are combined for emissions calculation.

**Pollutants:** NO<sub>x</sub>, VOC

The activity is estimated in thousand barrels of fuel oil type consumed. This value represents the number of barrels of distillate oil consumed in this sector during fuel combustion. Fuel oil sales were obtained from the DOE's EIA.<sup>9</sup> Their annual SED report provides total consumption by fuel type for distillate oil, residual oil, and kerosene. Another useful resource would be contacting a small number of local fuel oil distributors to obtain estimates for the commercial portion of deliveries. Only if very few households consume a certain fuel oil, then deliveries could be assumed entirely to the commercial sector.

Commercial/Institutional Spatial Apportioning Factor (*SAF*) for Inventory County:

$$SAF_{Inventory\ County} = \frac{HDD_{Inventory\ County} * SE_{Inventory\ County}}{\sum_{All\ Counties\ in\ State} (HDD_{County} * SE_{County})}$$

Where:

*HDD Inventory County* = annual heating degree days for Inventory County

*SE Inventory County* = Standard Industrial Classification (SIC) 50-99 employment numbers for Inventory County

*HDD County* = annual heating degree days for each County in the state

*SE County* = SIC 50-99 employment for each County in the state

The spatial apportioning factor is used to allocate the state fuel total to the county level using the following equation:

<sup>9</sup> U.S Department of Energy, Energy Information Administration, Office of Oil and Gas, Petroleum Marketing Monthly, "Annual Report on Sales of Fuel Oil and Kerosene, 2011".

$$Fuel_{x,Inventory\ County} = SAF_{x,Inventory\ County} \times Fuel_{x,Total\ State}$$

Where:

$Fuel_{x,Inventory\ County}$  =total fuel type  $x$  consumed annually in the Inventory County

$Fuel_{x,Total\ State}$  =total fuel type  $x$  consumed annually in the state

$SAF_{x,Inventory\ County}$  = Spatial Apportioning Factor for fuel type  $x$  in Inventory County

(Note: Fuel type  $x$  could be distillate oil, residual oil, or kerosene.)

Annual commercial/institutional emissions were calculated using following equation:

$$Emissions_{Commercial/Institutional} = (Fuel_{x,Inventory\ County} \times EF_{x,Commercial/Institutional})/2000$$

Where:

$Fuel_{x,Inventory\ County}$  =Total Fuel type  $x$  consumed annually in the Inventory County

$EF_{x,Commercial/Institutional}$  =Commercial/institutional emission factor for fuel type  $x$

### 1.2.3 LPG

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2103007000	Stationary Source Fuel Combustion	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Total: All Combustor Types
2103006000	Stationary Source Fuel Combustion	Commercial/Institutional	Natural Gas	Total: Boilers and IC Engines

This source category covers air emissions from LPG combustion in the commercial/institutional sector. This category includes small boilers, furnaces, heaters, and other heating units that use LPG as the fuel source and are not inventoried as point sources. Such combustions occur at wholesale and retail businesses, health institutions, social and educational institutions, and federal, state and local government institutions are considered in developing the inventory for this category.<sup>10</sup>

**Pollutants:** NO<sub>x</sub>, VOC

The activity is estimated in thousand barrels of LPG consumed. The activity data source is the EIA's SEDS.

Annual commercial/institutional LPG combustion related emissions were calculated using following equation:

<sup>10</sup> Emissions Inventory Improvement Program (EIIP) Area Source Method Abstract – Natural Gas and LPG Combustion: <http://www.epa.gov/ttn/chief/eiip/techreport/volume03>

$$Emissions_{LPG,Commercial/Institutional} = (LPG_{Inventory\ County} \times EF_{LPG,commercial/Institutional})/2000$$

Where:

$LPG_{Inventory\ County}$  = Total annual LPG consumption in the Inventory County

$EF_{LPG,commercial/Institutional}$  = Commercial/institutional emission factor for LPG

#### 1.2.4. Natural Gas

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2103006000	Stationary Source Fuel Combustion	Commercial/Institutional	Natural Gas	Total: Boilers and IC Engines

This source category covers air emissions from natural gas (NG) combustion in the commercial/institutional sector. This category includes small boilers, furnaces, heaters, and other heating units that use natural gas as the fuel source and are not inventoried as point sources. Such combustions occur at wholesale and retail businesses, health institutions, social and educational institutions, and federal, state and local government institutions are considered in developing the inventory for this category.

**Pollutants:** NO<sub>x</sub>, VOC

The activity is estimated in million cubic feet of natural gas consumed. The activity data source is the EIA's SEDS.

Annual commercial/institutional natural gas combustion related emissions were calculated using following equation:

$$Emissions_{NG,Commercial/Institutional} = (NG_{Inventory\ County} \times EF_{NG,commercial/Institutional})/2000$$

Where:

$NG_{Inventory\ County}$  = Total annual natural gas consumption in the Inventory County

$EF_{NG,commercial/Institutional}$  = Commercial/institutional emission factor for natural gas

#### 1.3 Residential Fuel Combustion

This category covers air emissions from fuel combustion in the residential sector for space and water heating. The category includes small boilers, furnaces, heaters, and other heating units that are not inventoried as point sources. For coal, distillate oil, natural gas, LPG, wood, and kerosene sources listed below, WDNR adopted EPA estimates for 2011 NEI. However, for the completeness of this document, appropriate methods are described in the sections 1.3.1 through 1.3.6.

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2104001000	Stationary Source Fuel Combustion	Residential	Anthracite Coal	All Boiler Types
2104002000	Stationary Source Fuel Combustion	Residential	Bituminous/Subbituminous Coal	All Boiler Types
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total Boilers and IC Engines
2104006000	Stationary Source Fuel Combustion	Residential	Natural Gas	Total: Boilers and IC Engines
2104007000	Stationary Source Fuel Combustion	Residential	Liquid Petroleum Gas (LPG)	Total: All Combustion Types
2104011000	Stationary Source Fuel Combustion	Residential	Kerosene	Total: All Combustor Types

Activity data for residential fuel combustion may be obtained from the DOE's EIA's SED Report.<sup>11</sup> The number of households at county-level that use certain fuel type for heating purposes could be accessed from U.S. Census Bureau data. Residential and commercial fuel deliveries may separate out by obtaining samples of sales data from local fuel distributors. Emission factors for NO<sub>x</sub> and VOC are from AP-42.<sup>12</sup>

### 1.3.1 Coal

This sector represents the emission estimations for coal combustion in residential units.

Pollutants: NO<sub>x</sub>

For coal combustion, emission factors are from AP-42. It was assumed that the residential coal combustion units consume 100% of bituminous/subbituminous coal. Anthracite coal consumption was assumed to be zero percent.

Point source adjustments for area sources could be estimated by subtracting the activity data for point sources from total activity values. Regulations for coal combustion are generally applicable to point sources and do not apply to the area sources in this category.<sup>13</sup>

### Emissions Calculation<sup>14</sup>

Annual emissions are calculated for each County using emission factors and activity as:

$$E_{x,p} = FC_x \times (1 - CE_{x,p}) \times EF_{x,p}$$

where:

$E_{x,p}$  = annual emissions for fuel type  $x$  and pollutant  $p$  (lb/year),

$FC_x$  = annual County-level fuel consumption for fuel type  $x$ ,

<sup>11</sup> U.S. Energy Information Administration, <http://www.eia.gov/state/?sid=WI>

<sup>12</sup> U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

<sup>13</sup> Residential and Commercial/Institutional Coal Combustion, <http://www.epa.gov/ttn/chief/eiip/techreport/volume03/coal.pdf>

<sup>14</sup> U.S.EPA, residential\_coal\_2104001000\_2104002000\_documentation\_2011, accessed from <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>

$CE_{x,p}$  = control efficiency for fuel type  $x$  and pollutant  $p$ , and  
 $EF_{x,p}$  = emission factor for fuel type  $x$  and pollutant  $p$ .

County level fuel consumption is calculated using:

$$FC_x = A_{\text{State}} \times \text{Ratio}_{\text{Anth, Bit}} \times \text{Ratio}_{\text{County houses}}$$

where:

$A_{\text{State}}$  = total tons of coal reported by the EIA,

$\text{Ratio}_{\text{Anth, Bit}}$  = ratio of anthracite and bituminous coal distribution for the residential sector

$\text{Ratio}_{\text{County houses}}$  = county allocation ratio based on number of houses burning coal.

### 1.3.2 Distillate Oil

The distillate oil burned in residential units is covered in this category. For this category, Wisconsin DNR adopted the EPA estimates for NEI 2011.

Pollutants:  $\text{NO}_x$ , VOC

Activity data is available in the State Energy Data consumption tables published by the EIA.<sup>15</sup> In developing 2011 NEI, year 2009 consumption data were used. To allocate the state-wide distillate oil consumption data to county-level, U.S. Census Bureau's house heating fuel type data were used.<sup>16</sup> In developing 2011 NEI, no control factors were assumed for this category.

#### Emission factors

Criteria pollutant emission factors for distillate oil are from AP-42.<sup>17</sup> For all counties in the United States, the distillate oil consumed by residential combustion is assumed to be No. 2 fuel oil with a heating value of 140,000 Btu per gallon.

#### Emissions Calculation

To calculate emissions, state-level distillate oil consumption is obtained from the EIA and allocates it out to the county level using the activity data and emissions factors. The county-level oil consumption is multiplied by the emission factors to calculate emissions as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$  = annual emissions for fuel type  $x$  and pollutant  $p$

$FC_x$  = annual fuel consumption for fuel type  $x$

<sup>15</sup> U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2009 Consumption. Washington, DC 2012. Internet Address: [http://www.eia.doe.gov/emeu/states/sep\\_use/total/csv/use\\_all\\_phy.csv](http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv), accessed February 2012.

<sup>16</sup> <https://www.census.gov/hhes/www/housing/census/historic/fuels.html>

<sup>17</sup> U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

$EF_{x,p}$  = emission factor for fuel type  $x$  and pollutant  $p$

And  $FC_x = A_{State} \times (H_{county} / H_{State})$

where:

$A_{State}$  = State activity data from EIA

$H_{County}$  = number of houses in the county using distillate oil as the primary heating fuel

$H_{State}$  = number of houses in the state using distillate oil as the primary heating fuel

### 1.3.3 Natural Gas

The natural gas that is burned in residential units is covered in this category.

**Pollutants:**  $NO_x$ , VOC

Activity data is available in the SED consumption tables published by the EIA.<sup>18</sup> Year 2009 consumption data were used to develop 2011 NEI. To allocate the state-wide distillate oil consumption data to county-level, U.S. Census Bureau's house heating fuel type data were used.<sup>19</sup> State natural gas consumption was allocated to each county using the ratio of the number of houses burning natural gas in each county to the total number of houses burning natural gas in the State. In developing 2011 NEI, no control factors were assumed for this category.

Criteria pollutant emission factors for natural gas are from AP-42.<sup>20</sup> According to AP-42, natural gas has a heat content of 1,050 million BTU per million cubic feet.

### Emissions Calculation

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$  = annual emissions for fuel type  $x$  and pollutant  $p$ ,

$FC_x$  = annual fuel consumption for fuel type  $x$ ,

$EF_{x,p}$  = emission factor for fuel type  $x$  and pollutant  $p$ ,

And  $FC_x = A_{State} \times (H_{county} / H_{State})$

where :

<sup>18</sup> U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2009 Consumption. Washington, DC 2012. Internet Address: [http://www.eia.doe.gov/emeu/states/sep\\_use/total/csv/use\\_all\\_phy.csv](http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv), accessed February 2012.

<sup>19</sup> <https://www.census.gov/hhes/www/housing/census/historic/fuels.html>

<sup>20</sup> U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

$A_{\text{State}}$  = State activity data from EIA

$H_{\text{County}}$  = number of houses in the county using natural gas as the primary heating fuel

$H_{\text{State}}$  = number of houses in the state using natural gas as the primary heating fuel

### 1.3.4 LPG

The LPG that is burned in residential units is covered in this category.

**Pollutants:**  $\text{NO}_x$ , VOC

Activity data is available in the SED consumption tables published by the EIA.<sup>21</sup> In developing 2011 NEI, year 2009 volume of LPG consumed was used. To allocate the state-wide LPG consumption data to county-level, U.S. Census Bureau's house heating fuel type data were used.<sup>22</sup> State LPG consumption was allocated to each county using the ratio of the number of houses burning LPG in each county to the total number of houses burning LPG in the state. In developing 2011 NEI, no control factors were assumed for this category.

Criteria pollutant emission factors for LPG are from AP-42.<sup>23</sup> The natural gas consumed by residential combustion is assumed to have a heating value of 1,020 Btu per cubic foot. Some emission factors were revised based on recommendations by an ERTAC advisory panel composed of state and EPA personnel.<sup>24</sup>

### Emissions Calculation

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$  = annual emissions for fuel type  $x$  and pollutant  $p$ ,

$FC_x$  = annual fuel consumption for fuel type  $x$ ,

$EF_{x,p}$  = emission factor for fuel type  $x$  and pollutant  $p$ ,

And  $FC_x = A_{\text{State}} \times (H_{\text{County}} / H_{\text{State}})$

where :

$A_{\text{State}}$  = State activity data from EIA

$H_{\text{County}}$  = number of houses in the county using LPG as the primary heating fuel

<sup>21</sup> U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2009 Consumption. Washington, DC 2012. Internet Address: [http://www.eia.doe.gov/emeu/states/sep\\_use/total/csv/use\\_all\\_phy.csv](http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv), accessed February 2012.

<sup>22</sup> <https://www.census.gov/hhes/www/housing/census/historic/fuels.html>

<sup>23</sup> U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

<sup>24</sup> <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>

$H_{\text{State}}$  = number of houses in the state using LPG as the primary heating fuel.

### 1.3.5 Wood

Residential wood combustion primarily includes wood burning in different types of woodstoves and fireplaces. To develop activity data for residential wood burning, there are two main methods; residential wood survey and Census Bureau and EIA data approach. Since WDNR adopted EPA estimates for residential wood burning category, the data presented were generated using Census Bureau's EIA approach.

**Pollutants:** NO<sub>x</sub>, VOC

The wood burned at the state level is apportioned to the county level using U.S. Census data on households that use wood as a primary fuel. The equation is:

$$\text{Wood Consumption}_{\text{Inventory County}} = \text{Wood Consumption}_{\text{State}} \times \frac{\text{Wood Burning Households}_{\text{Inventory County}}}{\text{Wood Burning Households}_{\text{State}}}$$

State level wood use (in cords) is available in the EIA's SED Report. State and county statistics on wood-burning households are available from the U.S. Census Bureau. Cords of wood are converted to pounds of wood using factors provided in AP-42 Appendix A.<sup>25</sup>

### Emissions Calculation

Emissions are calculated for each county using emission factors and activity data:

$$E_{\text{Wood},p} = \text{Wood Consumption}_{\text{Inventory County}} \times \text{EF}_{\text{Wood},p}$$

where:

$E_{\text{Wood},p}$  = annual emissions for wood for pollutant  $p$

$\text{Wood Consumption}_{\text{Inventory County}}$  = annual wood consumption in Inventory County

$\text{EF}_{\text{Wood},p}$  = emission factor for wood for pollutant  $p$

### 1.3.6 Kerosene

Kerosene, burned in residential units, is covered in this category. Residential heating, cooking, and other equipment operations using kerosene are included in emissions estimations.

Activity data is available in the State Energy Data consumption tables published by the EIA.<sup>26</sup> In developing 2011 NEI, year 2009 volume of Kerosene consumed was used. To allocate the state-

<sup>25</sup> [http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii02\\_apr2001.pdf](http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii02_apr2001.pdf)

wide Kerosene consumption data to county-level, U.S. Census Bureau's house heating fuel type data were used.<sup>27</sup> State kerosene consumption was allocated to each county using the ratio of the number of houses burning kerosene in each county to the total number of houses burning kerosene in the State. In developing 2011 NEI, no control factors were assumed for this category.

Criteria pollutant emission factors for Kerosene are from AP-42. Emission factors for distillate oil were used for kerosene, but the distillate oil emission factors were multiplied by a factor of 135/140 to convert them for this use. This factor is based on the ratio of the heat content of kerosene (135,000 Btu/gallon) to the heat content of distillate oil (140,000 Btu/gallon).<sup>28</sup>

### Emissions Calculation

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

- $E_{x,p}$  = annual emissions for fuel type  $x$  and pollutant  $p$ ,
- $FC_x$  = annual fuel consumption for fuel type  $x$ ,
- $EF_{x,p}$  = emission factor for fuel type  $x$  and pollutant  $p$ ,

And  $FC_x = A_{\text{State}} \times (H_{\text{county}} / H_{\text{State}})$

where:

- $A_{\text{State}}$  = State activity data from EIA
- $H_{\text{County}}$  = number of houses in the county using kerosene as the primary heating fuel
- $H_{\text{State}}$  = number of houses in the state using kerosene as the primary heating fuel

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<sup>26</sup> U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2009 Consumption. Washington, DC 2012. Internet Address: [http://www.eia.doe.gov/emeu/states/sep\\_use/total/csv/use\\_all\\_phy.csv](http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv), accessed February 2012.

<sup>27</sup> <https://www.census.gov/hhes/www/housing/census/historic/fuels.html>

<sup>28</sup> U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

## 2. Industrial Processes: Food and Kindred Products-Commercial Cooking

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2302002100	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking- Charbroiling	Conveyorized Charbroiling
2302002200	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking- Charbroiling	Under-fired Charbroiling
2302003000	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking-Frying	Deep Fat Frying
2302003100	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking-Frying	Flat Griddle Frying
2302003200	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking-Frying	Clamshell Griddle Frying

In developing 2011 NEI, Wisconsin DNR adopted EPA estimates for commercial cooking categories. This source category covers air emissions from all types of commercial meat cooking based on five equipment types listed above.

Chain-driven (conveyorized) charbroilers have conveyor belts to carry the meat, broiling the top and the bottom of the food simultaneously, through the flame area mostly using natural gas. This appliance normally produces lower particulate matter (PM) and VOC emissions than under-fired charbroilers.

Under-fired charbroilers contribute the bulk of emissions for the commercial cooking sector. The equipment consists of three main components - a heating source mostly burning natural gas, a high-temperature radiant surface to hold the food, and a slotted grill. When grease from the meat falls onto the high-temperature radiant surface, both PM and VOC emissions occur.

Deep Fat Fryers use an exposed hot metal surfaces, filled with cooking oil that is continuously heating. When the raw food is cooked in deep fat fryers, most of the water at the surface of the product vaporizes during the cooking process generating oil mist and oil distillation, resulting VOC and PM emissions.

Griddles consist of an exposed metal plate used to cook food quickly with a small quantity of oil. The emissions include light oil particulates causing PM and VOC emissions. In this process of cooking, the food is not immersed in heated oil. Most griddles are gas fired, but fuel type does not affect emissions of PM or VOC.

Clam Shell Griddles employs a two-sided cooking configuration, lowering an upper hot plate on top of the food product to cook that side while a lower plate cooks the bottom of the product. The cooking time and the emissions are relatively low for this method.

### Activity

County-level population data, obtained from the US Census Bureau's county-level population estimates for the 2010 Census were used as the activity.<sup>29</sup>

<sup>29</sup> DOC, 2011: U.S. Department of Commerce, Bureau of the Census, *County Intercensal Estimates (2000-2010)*, Washington, DC.  
<http://www.census.gov/popest/data/intercensal/county/county2010.html>

**Emission factors**

Per capita emission factors for each Source Classification Code (SCC) and pollutant were developed and reviewed by ERTAC advisory panel composed of state and EPA representatives.

**Control Factors**

No control factors were directly applied to develop the commercial cooking categories in 2011 NEI.

**Emission Estimation**

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = A_x \times EF_{x,p}$$

where:

- $E_{x,p}$  = annual emissions for category  $x$  and pollutant  $p$ ;
- $A_x$  = 2010 county-level population data associated with category  $x$ ;
- $EF_{x,p}$  = emission factor for category  $x$  and pollutant  $p$  (lb/person).

### 3. Solvent Utilization

#### 3.1 Surface Coating

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2401001000	Solvent Utilization	Surface Coating	Architectural Surface Coating	Total: All Solvent Types
2401005000	Solvent Utilization	Surface Coating	Automobile Refinishing: SIC 7532	Total: All Solvent Types
2401065000	Solvent Utilization	Surface Coating	Electronic and Other Electrical: SIC 36 - 363	Total: All Solvent Types
2401015000	Solvent Utilization	Surface Coating	Factory Finished Wood: SIC 2426 thru 242	Total: All Solvent Types
2401100000	Solvent Utilization	Surface Coating	Industrial Maintenance Coatings	Total: All Solvent Types
2401055000	Solvent Utilization	Surface Coating	Machinery and Equipment: SIC 35	Total: All Solvent Types
2401080000	Solvent Utilization	Surface Coating	Marine: SIC 373	Total: All Solvent Types
2401025000	Solvent Utilization	Surface Coating	Metal Furniture: SIC 25	Total: All Solvent Types
2401090000	Solvent Utilization	Surface Coating	Miscellaneous Manufacturing	Total: All Solvent Types
2401070000	Solvent Utilization	Surface Coating	Motor Vehicles: SIC 371	Total: All Solvent Types
2401200000	Solvent Utilization	Surface Coating	Other Special Purpose Coatings	Total: All Solvent Types
2401030000	Solvent Utilization	Surface Coating	Paper, Film, Foil: SIC 26	Total: All Solvent Types
2401020000	Solvent Utilization	Surface Coating	Wood Furniture: SIC 25	Total: All Solvent Types
2401008000	Solvent Utilization	Surface Coating	Traffic Markings	Total: All Solvent Types

For most of the surface coatings, VOCs are used as the solvent if the coatings are not water-based. During the application as well as the coating dries, VOCs emit into the atmosphere. To estimate the emissions by primary sources from surface coating operations, the amount of coating used and the VOC content of the coating have been considered. While the coating dries and hardens, VOCs emit as reaction byproducts. To estimate the emissions by secondary sources the amount of solvents used to clean such application equipment is used.

To control the amount of primary emissions, product reformulation, product substitution and/or recycling of unused coating may be practiced. Water-based coatings, powder coatings, and low-organic solvent coatings could be substituted as a control approach. However, since Occupational Safety and Health Administration (OSHA) regulations limit worker exposure to solvents, OSHA rules can indirectly affect the VOC content of coatings and the solvents used in them. The OSHA exposure limits vary with compound toxicity and as a result, manufacturers must consider the composition of coatings during product development to minimize the exposure hazards.

### 3.1.1 Non-Industrial Surface Coating: Architectural Coating

In developing 2011 NEI, Wisconsin DNR adopted EPA estimates for architectural surface coating category. Architectural surface coating is an area source that occurs from home owners and contractors painting homes, buildings, and signs. These operations consist of applying a thin layer of coating such as paint, paint primer, varnish, or lacquer to architectural surfaces, and the use of solvents as thinners and for cleanup.<sup>30</sup>

#### **Pollutant: VOC**

The activity is determined as the per capita usage factor by dividing the national total architectural surface coating quantities for organic solvent and water based coatings by the U.S. population for that year. The population date is available from U.S. Census Bureau.<sup>31</sup>

To estimate the VOC emitted by this source category, the amount of VOC in surface coatings should be determined using one of the two methods listed here. The first approach is the surveying architectural surface coating use in the inventory area. The survey may include product type, product amount distributed by type, product density, and VOC content of the product. The second method uses a population-based estimation. Again, there are two population-based approaches: (1) National average per-gallon emission factors applied to national per capita usage rates, or; (2) Regulatory state or local per-gallon emission limits applied to national per capita usage rates.<sup>30</sup>

#### **Spatial Allocation**

Spatial allocation may be needed in two possible cases during the preparation of an inventory: (1) allocation of state or regional activity to a county-level, and (2) allocation of county-level emission estimates to a modeling grid cell. In each case, a surrogate for activity should be found that can approximate spatial variation for this category.

Since this source category is almost always used in and on buildings where people live or work, considering the square footage is a preferred method for spatial allocation. Such databases are available in the tax assessor's office and accessible for use in a state inventory. Some spatial approaches use land use data from county planning departments, or population distributions, available from the Census Bureau. Using population to allocate estimated emissions or activity by county or within a grid cell is also a fairly straight forward. Land use data can be used to generalize building size and type.

#### **Temporal Resolution**

Seasonal influence on architectural surface coating temporally apportions the emissions estimates into different quarters for a particular year. Since temperatures below 50°F are not suitable for painting, the first and fourth quarters limit the activity by decreasing the surface

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<sup>30</sup> Emission Inventory Improvement Program, Technical Report Series Volume 3: Area Sources, Chapter 3: Architectural Surface Coating

<sup>31</sup> U.S. Census Bureau, "Population Estimates," at <http://www.census.gov/popest/estimates.html>.

coating usage in most areas. Majority of the activity occurs during the second and third quarters which cover the months of April through September. During this active season, it is assumed that Coating usage may take place 7 days a week.

### Emissions Calculation:

The following equation can be used to estimate the total amount of VOC emitted in the inventory area from architectural surface coating operations.<sup>32</sup>

$$ASE_{VOC} = \sum_{c=1}^C \sum_{s=1}^S TAC_{c,s} \times SC_{c,s} \times F_{VOC,s}$$

where:

$ASE_{VOC}$  = Total emissions of VOC from architectural surface coating operations, for all coatings (C) with all solvents (S)

$TAC_{s,c}$  = Total architectural surface coating consumed in the inventory area for each coating (c) with each solvent (s) containing VOC

$SC_{c,s}$  = Amount of solvent (s) in each coating (c)

$F_{VOC,s}$  = Fraction of VOC in each solvent (s)

### Point Source Adjustments

Usually, the application of architectural surface coating is generally defined as an area source, it is not required to subtract point source emission estimates from the total. Uncertainty may apply on the variability of per capita paint usage. For example, per capita usage may be lower than the national average in urban areas of high-density housing, in milder climates, or where wooden buildings are not common. Also, paint usage may be higher in corrosive environments or in areas where wooden structures predominate. The solvent content of the same paint is also variable. The total quantities of paint used or the type of paints used are very different from the national average.

#### 3.1.2 Industrial Surface Coating

Industrial surface coating includes paints, enamels, varnishes, lacquers, and other product finishes. Some of those coatings contain a solvent-based liquid carrier; others use a water-based liquid carrier but still contain a small portion of solvents. Solvents are also used to clean up painting equipment.

#### Pollutant: VOC

In developing 2011 NEI, WDNR updated the EPA provided emissions estimates for most of the surface coating categories using total employment data for each county and adopted EPA estimates for industrial maintenance, traffic markings, and other special purposes categories as listed in table 3.

<sup>32</sup> Emission Inventory Improvement Program, Technical Report Series Volume 3: Area Sources, Chapter 3: Architectural Surface Coating

Table 3: List of Industrial Surface Coating Categories as updated or adopted by WDNR

SCC	SCC Level 3	WDNR updated EPA estimates	WDNR adopted EPA estimates
2401005000	Automobile refinishing	Yes	-
2401065000	Electronic and other electrical coatings	Yes	-
2401015000	Factory finished wood	Yes	-
2401100000	Industrial maintenance	-	Yes
2401055000	Machinery and equipment	Yes	-
2401080000	Marine manufacturing	Yes	-
2401025000	Metal furniture	Yes	-
2401090000	Miscellaneous manufacturing	Yes	-
2401070000	Motor vehicles	Yes	-
2401200000	Other Special Purposes	-	Yes
2401030000	Paper, Film and Foil	Yes	-
2401020000	Wood Furniture	Yes	-
2401008000	Traffic Markings	-	Yes

2010 county level employment data, state-level employment data and County business pattern data were downloaded from U.S. Census Bureau. Activity data is defined the pounds of solvent sold divided by the county employment for a specific category. Emissions Factors, developed by ERTAC solvent working group were used for the calculations. Emission factors define the pounds of VOC per employee per year. Final emissions were calculated from adjusted County Employment values and emission factors. Adjusted County Employment indicates the total employment in each county for a surface coating category based on the county business patterns.

### Emissions Calculation

2010 county level employment data, state-level employment data and County business pattern data were downloaded from U.S. Census Bureau. Emissions Factors, developed by ERTAC solvent working group, define the pounds of VOC per employee per year and were used for the calculations. Final emissions were calculated from adjusted County Employment values and emission factors. Adjusted County Employment indicates the total employment in each county for automobile refinishing category based on county business patterns.

The emissions for categories listed in Table 3 except industrial maintenance, traffic markings, and other special purposes categories could be calculated using following equations.

The basic calculation is:

$$Emissions = (Adjusted\ County\ Employment) \times (Emission\ Factor)$$

The calculation in detail is:

$$Emissions_s = \frac{Emp_{i,s} \times EF_s \times [1 - (RE \times RP \times EC)]}{2000} - Emissions_{Point\ Sources,s}$$

Where:

$Emissions_s$ =VOC emissions in tons per year from surface coating category  $s$

$Emp_{i,s}$ =Number of employees in Inventory County for surface coating category  $s$

$EF_s$ =VOC emission factor for surface coating category  $s$

$CE$ =Control Efficiency

$RE$ =Rule Effectiveness

$RP$ =Rule Penetration

$Emissions_{Point\ Sources,s}$ =Point source emissions from surface coating category  $s$

For calculating VOC emissions from industrial maintenance and other special purpose categories, following basic equation was used.

$$Emissions = (Population) \times (Per\ Capita\ Emission\ Factor)$$

County-level population estimates were downloaded from the US Census Bureau. Emission factors used for the calculation were developed by ERTAC solvent working group.

For calculating VOC emissions from traffic markings, following basic equation was used.

$$Emissions = (Number\ of\ Road\ Miles\ Paved) \times (Emission\ Factor\ per\ Road\ Mile)$$

The activity data was determined using the road miles paved, obtained from the Department of Transportation. Emission factors were developed by ERTAC solvent working group.

### 3.2 Degreasing

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2415000000	Solvent Utilization	Degreasing	All Processes/All Industries	Total: All Solvent Types

**Pollutant:** VOC

In developing 2011 NEI for this category, WDNR Updated the EPA estimated emissions using adjusted total employment data for each county. The state-wide employment data was allocated to county-level using County Business Patterns for the counties of Wisconsin.<sup>33</sup> EPA provided emission factor for VOC.<sup>34</sup>

The basic calculation is:

$$Emissions = (Adjusted\ County\ Employment) \times (Emission\ Factor)$$

<sup>33</sup> U.S. Census Bureau, 2010 County Business Patterns accessed from <http://www.census.gov/econ/cbp/download/index.htm> and/or <http://censtats.census.gov/cgi-bin/cbpnaic/cbpsel.pl>

<sup>34</sup> <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>

To adjust point source emissions, the degreasing emissions from facilities identified as point sources were subtracted from the area source inventory to avoid double counting.

The calculation in detail is:

$$Emissions_d = \left[ \frac{Emp_i \times EF_d}{2000} \times [1 - (CE_d \times RE_d \times RP_d)] \right] - Emissions_{Point\ Sources,d}$$

Where:

$Emissions_d$  = Emissions of VOC in tons/day from degreasing

$Emp_i$  = 2010 employment of County  $i$

$EF_d$  = VOC emissions factor for degreasing

$CE_d$  = Control Efficiency for degreasing

$RE_d$  = Rule Effectiveness for degreasing

$RP_d$  = Rule Penetration for degreasing

$Emissions_{Point\ Sources,d}$  = Point Source Emissions from degreasing

### 3.3 Dry Cleaning

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
242000000	Solvent Utilization	Dry Cleaning	All Processes	Total: All Solvent Types

Dry-Cleaning facilities utilize solvents in their cleaning process which causes the emission of VOCs into the ambient air. WDNR Updated the EPA estimated emissions using the adjusted total employment data for each county.

#### Pollutants: VOC

The basic calculation is:

$$Emissions = (Adjusted\ County\ Employment) \times (Emission\ Factor)$$

Activity data included the employee estimates allocated to counties based on county business patterns in Wisconsin.<sup>33</sup> The EPA provided emission factors were developed by ERTAC.

Emissions are calculated for each county using emission factors and activity data:

$$Emissions_{i,p} = (Emp_i) \times (Emission\ Factor_p)$$

Where:

$Emissions_{i,p}$  = annual emissions for inventory county  $i$  and pollutant  $p$

$Emp_i$  = Adjusted employment data associated with county  $i$

Emission Factor  $p$  = emission factor for pollutant  $y$

### 3.4 Graphic Arts

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2425000000	Solvent Utilization	Graphic Arts	All Processes	Total: All Solvent Types

Graphic arts include operations that are involved in the printing of newspapers, magazines, books and other printed materials. There are six basic operations used in graphic arts: lithography, gravure, letterpress, flexography, screen printing and metal decorating called plateless. WDNR Updated the EPA provided emissions estimates using the adjusted total employment data for each county.

Activity data includes the specific type of printing operation and total number of employees involve in each of those operation type.<sup>35</sup> Emission factors define the pounds of VOC per capita per year as developed by ERTAC. Type of printing ink and the type of product and the production volume are also important in estimating emissions.

It is assumed that emissions from graphic arts industry are distributed uniformly throughout the year as no significant seasonal fluctuations in the production of this category were observed. To determine seasonal emissions, the fraction of the year that corresponds to the season of interest can be multiplied by annual emissions to obtain seasonal emissions.<sup>36</sup>

#### Emission calculation

The basic calculation is:

$$\text{Emissions}_{i,p} = (\text{Emp}_i) \times (\text{Emission Factor}_p)$$

Where:

Emissions  $_{i,p}$  = annual emissions for inventory county  $i$  and pollutant  $p$

Emp  $_i$  = Adjusted employment data associated with county  $i$

Emission Factor  $_p$  = emission factor for pollutant  $y$

Adjustment for point sources:

$$\text{Emissions}_{\text{Area Sources}} = \text{Emissions}_{\text{All Stationary Sources}} - \text{Emissions}_{\text{Point Sources}}$$

<sup>35</sup> U.S. Department of Labor, Bureau of Labor Statistics, "Occupational Employment Statistics", found at [http://www.bls.gov/oes/current/oes\\_dc.htm](http://www.bls.gov/oes/current/oes_dc.htm)

<sup>36</sup> <http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii07.pdf>

### 3.5 Miscellaneous Non-industrial: Consumer and Commercial

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2460600000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	All Adhesives and Sealants	Total: All Solvent Types
2460400000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	All Automotive Aftermarket Products	Total: All Solvent Types
2460200000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	All Household Cleaning Products	Total: All Solvent Types
2460500000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	All Coatings and Related Products	Total: All Solvent Types
2460800000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	All FIFRA Related Products	Total: All Solvent Types
2460900000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	Miscellaneous Products (Not Otherwise Covered)	Total: All Solvent Types
2460100000	Solvent Utilization	Miscellaneous Non-industrial: Consumer and Commercial	Personal Care Products	Total: All Solvent Types

#### Pollutant: VOC

In developing 2011 NEI, WDNR adopted EPA estimated emissions.

#### Emissions Calculation

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = A \times EF_{x,p}$$

where:

$E_{x,p}$  = annual emissions for category  $x$  and pollutant  $p$ ;

$A$  = 2010 county-level population;

$EF_{x,p}$  = emission factor for category  $x$  and pollutant  $p$  (lb/person).

The emission factors used in emission estimates were developed by ERTAC.

Non-industrial solvents that are used in commercial or consumer applications and may emit VOCs are estimated under several different categories: adhesives and sealants, automotive aftermarket products, household cleaning products, coatings and related products, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) related products, personal care products, and other related miscellaneous products. Adhesives and sealants category includes cements, glues, and pastes. These compounds form a bond between one or more substrates. For auto aftermarket category, two main types of products involve: detailing products and maintenance and repair products. The detailing products sub-category include the products used for cosmetic

purposes on cleaning, polishing, and waxing while products used as engine and part cleaners, carburetor fuel injector cleaners, lubricants, antifreeze, radiator cleaners, and brake fluids are considered as maintenance and repair sub-category.

Household products include hard surface cleaners, laundry products, fabric and carpet care products, dishwashing products, waxes and polishes, air fresheners, shoe and leather care products, and other miscellaneous household products. Coatings and related products category includes aerosol spray paint and other coating-related products. FIFRA regulated products include consumer pesticides that are used in home, garden, and other commercial disinfectant and antimicrobial applications. Personal care products include hair care products, deodorants, antiperspirants, perfumes, colognes, and nail care products.

Uncertainties may encounter for the emission estimations in these categories due to fluctuations in per capita usage for different geographical locations with seasonal variations. The changes associated with product formulations may also influence the estimates.

### 3.6 Miscellaneous Non-industrial: Commercial

#### 3.6.1 Agricultural pesticide Application

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2461850000	Solvent Utilization	Miscellaneous Non-industrial: Commercial	Pesticide Application: Agricultural	All processes

Pesticides are substances used to control nuisance species and can be classified by targeted pest group: weeds (herbicides), insects (insecticides), fungi (fungicides), and rodents (rodenticides). They can be further described by their chemical characteristics: synthetics, non-synthetics (petroleum products), and inorganics. Different pesticides are made through various combinations of the pest-killing material, also called the active ingredient (AI), and various solvents. The solvents act as carriers for AI. Both types of ingredients contain VOC that may be emitted to the air during application or after application as a result of evaporation. In estimating potential VOC emissions, the crop-specific and regional specific pesticide application rates should be considered.<sup>37</sup>

Emissions could be estimated by summing the product of the activity data and the emissions factor for each pesticide and crop type at the county-level:

$$\text{Total VOC Emissions}_{\text{County}} = \sum (A_{\text{Pesticide,Crop}} \times \text{EF})$$

The default emission factor is expressed as the pounds of VOC that evaporate per pound of pesticide AI applied and was calculated using the following equation:

$$\text{EF} = \text{ER} \times \text{VOC}$$

where: EF = emission factor (lb VOC / lb AI)

ER = evaporation rate of applied pesticide (expressed as a fraction)

VOC = weighted pesticide VOC content (lb VOC / lb AI)

<sup>37</sup> Agricultural\_Pesticides\_2461850000\_Documentation downloaded from <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>

The equations discussed here are based on EPA recommendations provided in the Emissions Inventory Improvement Program guidance.<sup>38</sup>

The pesticide specific VOC emission potential (EP) of reactive organic gases (i.e., the weight percentage of product that contributes to VOC emissions) and the weight percent of active ingredient from the DPR database were used to calculate the weighted average VOC content.

$$\text{VOC} = \sum_{\text{pesticides}} [((\text{AI}/(\% \text{AI}/100)) * (\text{EP}/100)) / \text{AI}] * [(\text{AI}/(\% \text{AI}/100)) / \text{T}]$$

where: VOC = weighted pesticide VOC content (lb VOC / lb AI)

AI = active ingredient applied (lb)

%AI = weight percent of AI in pesticide mixture

EP = emissions potential of reactive organic gases (expressed as % of pesticide weight)

T = total weight of all pesticides applied (lb)

The AI applied was calculated from the AI application rates reported in the Crop Life Foundation (CLF) database and the harvested acres reported in the Department of Agriculture's Census of Agriculture. The national pesticide usage (T), reported as pounds of pesticides applied, was calculated using the following equation:

$$\text{T} = \sum_{\text{Pesticides}} \text{AI}/(\% \text{AI}/100)$$

The activity for pesticide application is the pounds of active ingredient applied and is calculated using the following equation:

$$\text{A} = \text{HA} \times \text{R} \times \text{I} \times \text{AT}$$

where: A = pounds of active ingredient applied by pesticide by county

HA = crop-specific harvested acres in county

R = crop-specific pounds of pesticide applied per year per harvested acre

I = pounds of active ingredient per pound of pesticide

AT = percent of crop acres in the state treated with the active ingredient

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<sup>38</sup> United States Environmental Protection Agency, "*Pesticides - Agricultural and Nonagricultural*", Vol. 3, Ch. 9, Section 5.1, p. 9.5-4, Emissions Inventory Improvement Program, June 2001.

## 4. Storage and Transport

### 4.1 Portable Fuel Containers: Residential

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501011011	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Permeation
2501011012	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Evaporation
2501011013	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Spillage During Transport
2501011014	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Refilling at the Pump-Vapor Displacement
2501011015	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Refilling at the Pump-Spillage
2501011016	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Refueling Equipment-Vapor Displacement
2501011017	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Fuel Containers	Refueling Equipment-Spillage

WDNR adopted the EPA estimated emissions for residential portable fuel containers. For the completeness of this document, the emission estimation method based on a survey is listed below. These categories associated with the emissions from the fuel containers commonly known as “gas cans” and contribute VOC emissions to the ambient air in different ways. The methods and equations listed for both residential and commercial portable fuel container emission estimates are from the California Air Resources Board’s Mail-out MSC 99-25.<sup>39</sup>

**Pollutant:** VOC

#### Emissions Calculation:

The general formula to estimate emissions:

$$E = EF * A$$

Where,

E = emissions

EF = VOC emission factor

A = activity level

A survey could be used to evaluate the number of gas cans per household. According to this methodology, the population of residential gas cans in a state is estimated as:

$$Pop_R = N_h \times P_h \times A_R$$

Where

$Pop_R$  = population of gas cans

$N_h$  = number of household units

$P_h$  = percentage of households with gas cans

$A_R$  = average number of gas cans per household

<sup>39</sup> Mail-Out MSC 99-25: Notice of Public Meeting to Consider the Approval of California’s Portable Gasoline-Container Emissions Inventory. Mobile Source Control Division. Downloaded from <http://www.arb.ca.gov/msei/offroad/pubs/msc9925.pdf>

#### 4.1.1. Portable Fuel Containers, Residential Permeation

After fuel has been stored in a container for a long period, permeation emissions may produce.

The following formula calculates the emissions for this category:

$$E_p = \sum (Pop_R \times S \times EF_p \times B_R \times Size_R \times Level)$$

where:

$E_p$  = Permeation emissions in tons per day

$Pop_R$  = Statewide residential gas can population

$S$  = Percentage of gas cans stored with fuel

$EF_p$  = Appropriate permeation emission factor (g/galday)

$B_R$  = Percentage of cans stored in closed condition with respect to material

$Size_R$  = Weighted average capacity of residential gas cans

$Level$  = Weighted average amount of stored fuel

#### 4.1.2 Portable Fuel Containers, Residential Spillage During Transport

This category included fuel spillage emissions from gas cans when they are transporting from one place to another.

The following formula calculates the emissions for this category:

$$E_{TR} = \sum (Pop_R \times S \times Refill_{TR} \times EF_{TR} \times B_R)$$

where:

$E_{TR}$  = Transportation spillage emissions in tons per day

$Pop_R$  = Statewide residential gas can population

$S$  = Percentage of gas cans stored with fuel

$EF_{TR}$  = Transport emission factor (g/galday)

$B_R$  = Percentage of cans with respect to storage condition and material

## 4.2 Portable Fuel Containers: Commercial

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501012011	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Permeation
2501012012	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Evaporation
2501012013	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Spillage During Transport
2501012014	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Refilling at the Pump-Vapor Displacement
2501012015	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Refilling at the Pump-Spillage
2501012016	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Refueling Equipment-Vapor Displacement
2501012017	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Fuel Containers	Refueling Equipment-Spillage

The commercial gas can population in the state can be calculated as follows:

$$Pop_c = N_c \times A_c$$

where:

$Pop_c$  = State-wide commercial population of gas cans

$N_c$  = number of occupied business units in the state

$A_c$  = average number of gas cans per business

### 4.2.1 Portable Fuel Containers, Commercial Permeation

Permeation emission rates for commercial gas cans are assumed to be the same as those for residential gas cans. Statewide commercial gas can permeation emissions can be computed as follows:

$$E_{pc} = \sum (Pop_c \times S \times EF_{pc} \times B_c \times Size_c \times Level)$$

where:

$E_{pc}$  = Permeation emissions in tons per day

$Pop_c$  = Statewide commercial gas can population

$S$  = Percentage of gas cans stored with fuel

$EF_{pc}$  = Permeation emission factor (g/galday)

$B_c$  = Percentage of cans stored in closed condition

$Size_c$  = Weighted average capacity of commercial gas cans

$Level$  = Weighted average amount of stored fuel

### 4.2.2 Portable Fuel Containers, Commercial Spillage During Transport

Transport spillage emission rates for commercial gas cans are assumed to be the same as those for residential gas cans. Statewide commercial gas can transport spillage emissions can be computed as follows:

$$E_{TC} = \sum (Pop_C \times S \times Refill_{TC} \times EF_{TC} \times B_C)$$

where:

$E_{TC}$  = Transportation spillage emissions in tons per day

$Pop_C$  = Statewide commercial gas can population

$S$  = Percentage of gas cans stored with fuel

$Refill_{TC}$  = Average number of gas cans pump refills per day per can

$EF_{TC}$  = Transport emission factor (g/gal/day)

$B_C$  = Percentage of cans with respect to storage condition and material

### 4.2.3 Portable Fuel Containers, Commercial/Residential Refiling at the Pump, Vapor Displacement

The refueling-displacement-vapor emissions result when fuel vapor is displaced from equipment and vehicle fuel tanks, gas cans, etc., by fuel dispensed from gas cans.

The amount of daily vapor displacement emissions from all applicable residential and commercial gas cans can be calculated as follows:

$$E_D = \{(Disp) \times (Fuel) \times (F)\}$$

Where:

$E_D$  = Total refueling vapor displacement from all gas cans

$Disp$  = Refueling vapor displacement emission rate

$Fuel$  = Applicable equipment/vehicle type fuel consumptions

$F$  = Frequency of refuels (per day) with respect to equipment/vehicle

### 4.2.4 Portable Fuel Containers, Commercial/Residential Refiling at the Pump, Spillage

Spillage emissions are produced when fuel is dispensed from a gas can to an equipment or vehicle fuel tank, another gas can and fails to either be delivered into the intended reservoir or to remain inside the reservoir.

The amount of daily spillage emissions from all applicable residential and commercial gas cans can be calculated as follows:

$$E_s = \sum \left\{ \left[ \frac{(Fuel) \times (Spill)}{(Tank)} \right] \times F \right\}$$

Where:

$E_s$  = Daily spillage emissions from all gas cans (tpd)

$Fuel$  = Applicable equipment/vehicle type fuel consumption (gal/day)

$Spill$  = Spillage emission rate per refill of gas can refueled equipment/vehicles

*Tank*=Applicable equipment/vehicle fuel tank capacity (gal/refill)  
*F*= Frequency of refuels (per day) with respect to equipment/vehicle

### 4.3 Petroleum and Petroleum Product Storage

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501050120	Storage and Transport	Petroleum and Petroleum Product Storage	Bulk Terminals: All Evaporative Losses	Gasoline
2501055120	Storage and Transport	Petroleum and Petroleum Product Storage	Bulk Plants: All Evaporative Losses	Gasoline
2501060051	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 1: Submerged Filling
2501060052	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 1: Splash Filling
2501060053	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 1: Balanced Submerged Filling
2501060201	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Underground Tank: Breathing and Emptying
2501060100	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 2: Total Refueling
2501070100	Storage and Transport	Petroleum and Petroleum Product Storage	Diesel Service Stations	Stage 2: Total Refueling
2505030120	Storage and Transport	Petroleum and Petroleum Product Storage	Truck	Gasoline
2505040120	Storage and Transport	Petroleum and Petroleum Product Storage	Pipeline	Gasoline

For 2011 NEI, WDNR adopted the EPA estimated data for emissions from petroleum and petroleum product storage categories. For the completeness of this document, the emission estimation approaches to determine VOC content in each category is discussed below. The information discussed for these categories are directly from EIIP's Gasoline Marketing document and EPA's Gasoline Distribution Stage I Documentation.<sup>40,41</sup>

#### Pollutants: VOC

These emissions occur as gasoline vapors are released into the atmosphere. Stage I emissions are produced by displacement of gasoline vapors from the storage tanks during the transfer of gasoline from tank trucks to storage tanks at the service station and released into the atmosphere. These Stage I processes are subject to EPA's maximum available control technology (MACT) standards for gasoline distribution. Emissions from gasoline distribution at bulk terminals and bulk plants take place when gasoline is loaded into a storage tank or tank truck, from working losses (for fixed roof tanks), and from working losses and roof seals (for floating roof tanks). Working losses consist of both breathing and emptying losses. The procedures and equations discussed for the categories of bulk gasoline terminals listed above are based on EIIP.<sup>40</sup>

Total gasoline distribution is used as the activity. The Federal Highway Administration (FHWA) annually publishes Highway Statistics, which contains gasoline consumption data for each state.

<sup>40</sup> EIIP, Chapter 11, Gasoline Marketing (Stage I & Stage II):

[http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii11\\_apr2001.pdf](http://www.epa.gov/ttn/chief/eiip/techreport/volume03/iii11_apr2001.pdf)

<sup>41</sup> Gasoline\_Distribution\_Stage I\_Documentation\_2011: <ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>

County-wide estimates can be made by apportioning these statewide totals by the percentage of state gasoline station sales occurring within each county. County-wide service station gasoline sales data (dollars of sales, not gasoline volume) are available from the Bureau of the Census's Census of Retail Trade.<sup>41</sup>

Emissions from tank trucks in transit occur when gasoline vapor evaporates from (1) loaded tank trucks during transportation of gasoline from bulk terminals/plants to service stations, and (2) empty tank trucks returning from service stations to bulk terminals/plants. Pipeline emissions result from the valves and pumps found at pipeline pumping stations and from the valves, pumps, and storage tanks at pipeline breakout stations. Stage I gasoline distribution emissions also occur when gasoline vapors are displaced from storage tanks during unloading of gasoline from tank trucks at service stations (Gasoline Service Station Unloading) and from gasoline vapors evaporating from service station storage tanks and from the lines going to the pumps (Underground Storage Tank Breathing and Emptying).<sup>41</sup>

There are no generally accepted activity-based VOC emission factors for the pipelines and bulk terminals sectors because they are generally treated as point sources whose emissions are estimated using site-specific information. For both categories, EPA allocated national VOC emissions in a two-step manner. First, EPA allocated emissions based on 2008 gasoline supply data reported by the U.S. DOE. Next, EPA allocated emissions based on employment data reported in the 2007 County Business Patterns.<sup>41</sup>

The basic equation for emission estimation is:

$$Emissions = Emission\ Factor \times Activity\ Level$$

Detailed equations for category-wise emission estimations are listed below.

#### 4.3.1 Gasoline Distribution Stage I, Bulk plant

Emissions from gasoline distribution at bulk plants take place when gasoline is loaded into a storage tank or tank truck, from working losses (for fixed roof tanks), and from working losses and roof seals (for floating roof tanks). Working losses consist of both breathing and emptying losses.

$$E_{voc} = C_g \times P \times EF_{voc}$$

where:

$E_{voc}$ =National VOC emissions

$C_g$ =National Gasoline consumption

$P$ =proportion passing through bulk plants

$EF_{voc}$ =VOC emission factor

#### 4.3.2 Gasoline Distribution Stage I, Submerged Filling and Balanced Submerged Filling

This category estimates the VOC emissions from displacement of gasoline vapors from the storage tanks during the transfer of gasoline from tank trucks to storage tanks at the service station.

$$E_i = \frac{(G_i \times F_{i,method} \times EF_{method}) + (G_i \times F_{i,method} \times EF_{method})}{2000}$$

where:

$E_i$  = Emissions of VOC in tons per day from tank truck unloading per county  $i$

$G_i$  = Gallons of gasoline sold in county  $i$  during 2011

$F_{i,method}$  = Fraction of gasoline dispensed per county  $i$  per filling method (balanced submerged or submerged) during 2011

$EF_{method}$  = Emission factor per filling method for tank truck unloading

#### 4.3.3 Gasoline Distribution Stage I, Pipeline (SCC: 2505040120) and Bulk Terminal

Pipeline emissions result from the valves and pumps found at pipeline pumping stations and from the valves, pumps, and storage tanks at pipeline breakout stations. Emissions from gasoline distribution at bulk terminals take place when gasoline is loaded into a storage tank or tank truck, from working losses (for fixed roof tanks), and from working losses and roof seals (for floating roof tanks). Working losses consist of both breathing and emptying losses. There are no generally accepted activity based VOC emission factors for the pipelines and bulk terminals sectors because they are generally treated as point sources whose emissions are estimated using site-specific information. For pipelines, EPA allocated emissions to Petroleum Administration for Defense (PAD) Districts based on the total amount of finished motor gasoline moved by pipeline in each PAD in the inventory year. EPA allocated pipeline emissions in each PAD District to counties based on County Business Patterns employment data. Because employment data for NAICS code 48691 (Pipeline Transportation of Refined Petroleum Products) are often withheld due to confidentiality reasons, EPA used the number of employees in NAICS code 42471 (Petroleum Bulk Stations and Terminals) for this allocation.<sup>41</sup>

#### 4.3.4 Gasoline Distribution Stage I, Tank Trucks in Transit

Emissions from gasoline tank trucks in transit include the evaporation of petroleum vapor from loaded tank trucks during transportation of gasoline from bulk plants/terminals to the service stations or other dispensing outlets and from empty tank trucks. These losses are caused by leaking delivery trucks, pressure in the tank, and thermal effects on the vapor and on the liquid.

$$E_{TT} = \frac{(Fuel_i \times A \times EF_{TT})}{2000}$$

$E_{TT}$  = Emissions of VOC in tons per day from tank trucks in transit

$Fuel_i$  = Thousand gallons of fuel sold in County  $i$

$A$  = Throughput adjustment factor

$EF_{TT}$  = Emission factor for tank trucks in transit

### 4.3.5 Gasoline Service Station, Underground Tank Breathing and Emptying

Underground tank breathing occurs when gasoline is drawn out of the tanks and into the pump lines. During this process air moves into the tank evaporating gasoline and emitting vapors.

Emission factor is the amount of VOC per thousand gallons of fuel throughput.

Point source adjustments: No subtraction of point sources from total emissions is necessary for this category.

Emission calculation:

$$E_{utb} = \frac{(E_i \times EF_{utb})}{2000}$$

Where:

$E_{utb}$  = Emissions of VOC in tons per day from underground tank breathing and emptying

$F_i$  = Thousand gallons of fuel sold in County  $i$

$EF_{utb}$  = Emission factor for underground tank breathing and emptying

### 4.3.6 Gasoline Service Stations, Stage II: Total Refueling

Stage II displacement of gasoline vapors from vehicle gasoline tanks during vehicle refueling is discussed in this category. It may include spillage of gasoline (and subsequent evaporation) during either delivery activity above. Refueling emissions have two mechanisms of introducing emissions to the environment: (1) vapor displacement from the vehicle fuel tank during refilling; and (2) gasoline spillage during refueling. For this category, point source adjustment is not necessary.

Activity is provided by MOVES model by estimating of refueling emissions in units of grams per mile. These values are multiplied by fuel economy (in units of miles per gallon) and total gasoline sales (in units of gallons purchased/sold) in the study area resulting in refueling emissions in terms of grams.

$$E_{StII} = \frac{(G_i \times EF_{StII} \times MPG \times SAF)}{2000}$$

Where:

$E_{StII}$  = Emissions of VOC in tons per day from stage I refueling

$G_i$  = gallons of gasoline sold in county  $i$  during 2011

$EF_{StII}$  = Emission factor for stage II refueling

$MPG$  = Average fuel economy (miles/gallon)

$SAF$  =seasonal adjustment factor to reflect summer weekday emissions

## 5. Waste Disposal

### 5.1 Publicly Owned Treatment Work (POTW)

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2630020000	Waste Disposal, Treatment, and Recovery	Wastewater Treatment	Public Owned	Total Processed

For 2011 NEI, WDNR adopted the EPA estimated data for emissions from publicly owned treatment work category. POTW includes intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment used to treat wastewater generated by multiple sources from industrial, commercial, and domestic sectors.

#### Pollutants: VOC

Flow rate, measured in million gallons per day, is considered as the activity. Emission factor for VOC in pounds of VOC per million gallons of waste water discharged were provided by ERTAC.

#### Adjustment for point sources

It is important to note that the emission estimates for this category represent total emissions. It may be necessary to determine whether there are point source emissions in SCCs 50100701 through 50100781 and 50100791 through 50182599 that need to be subtracted to yield the nonpoint source emission estimates for this category.

#### Emission Calculations:

Annual VOC emissions can be calculated using the following equation:

$$E_{POTW} = \frac{F_{i,j} \times EF_{POTW} \times 365}{2000}$$

where:

$E_{POTW}$  = VOC emissions in tons per year

$F_{i,j}$  = Daily flow into POTW  $j$  in county  $i$

$EF_{POTW}$  = VOC emission factor for POTW

State-wide emissions can be allocated to county-level using county proportion of population data.<sup>42</sup>

<sup>42</sup> U.S. Census Bureau, "Population Estimates," at <http://www.census.gov/popest/estimates.html>.

## 6. Miscellaneous Non-Industrial not elsewhere classified (NEC)

### 6.1 Other Combustion: Cremation

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2810060100	Miscellaneous Area Sources	Other Combustion	Cremation	Humans

The Wisconsin DNR adopted EPA's estimates for this category. The EPA estimates may be adjusted by updating the number of bodies cremated in year 2008 in provided spread sheets. The Cremation Association of North America's estimate of the percentage of bodies cremated in the United States in 2008 and the average body weight of bodies cremated during an emission test evaluation of a crematory at Woodlawn Cemetery in Bronx, New York is available for online access.<sup>43, 44</sup> Emission factors are available in WebFIRE. The estimated number of deaths in each state in the United States for a specific year could be obtained from the National Center for Health Statistic's Report.

#### Emission Calculation

$$E_C = \frac{N_C \times W_{Avg} \times EF_C}{2000}$$

Where:

$E_C$  = Emissions from crematories

$N_C$  = Number of bodies cremated in a specific year in a County

$W_{Avg}$  = Average body weight in pounds

$EF_C$  = Emission factor per pollutant for cremation

<sup>43</sup> Cremation Association of North America, *2007 Statistics and Projections to the Year 2025: 2008 Preliminary Data*, August 2009, available at <http://www.cremationassociation.org/>

<sup>44</sup> U.S. Environmental Protection Agency, *Emission Test Evaluation of a Crematory at Woodlawn Cemetery in the Bronx, NY*, Final Test Report, Vol. 1. Office of Air Quality Planning and Standard Emission Measurement Center, Research Triangle Park, NC, September 1999.

**Appendix 6**  
**Emissions from Commercial Marine Vessels**

## Emissions from Commercial Marine Vessels

Neither Kenosha nor Sheboygan Counties have ports, inland lakes or inland rivers with commercial marine activity. Thus, all commercial marine emissions attributable to those two counties come from vessels traveling on Lake Michigan past those counties.

The commercial marine emissions in the U.S. EPA's 2011 National Emissions Inventory (NEI) were updated for the U.S. EPA's 2011 Modeling Platform, version 6 (Modeling Platform). The updated emissions were provided by the Lake Michigan Air Directors Consortium (LADCO). The LADCO-provided emissions are derived from the report: Commercial Marine Emissions in the LADCO Region Final Report, by Energy and Environmental Research Associates, LLC, and Alpine Geophysics, September 16, 2011 (Consultants' Report). Appendix 7 in this document presents this report. The Consultants' Report provides emissions for the year 2010, but not the year 2011. U.S. EPA for the Modeling Platform and WDNR for this inventory effort assumed no change in emissions from 2010 to 2011.

Annual commercial marine emissions in the 2011 NEI are available at:

<http://www.epa.gov/ttnchie1/net/2011inventory.html>. Annual commercial marine emissions in the 2011 Modeling Platform are available at:

[ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint_by_state/)

(For example, Wisconsin commercial marine data are in the file:

**WI\_2010LADCO\_CMV\_19sep2013\_v1.csv**, found in the folder: **WI\_nonpoint\_2011.zip**)

Appendix A of the Consultants' Report provides estimates of 2010 commercial marine emissions by county. However, it should be noted that the estimates in Appendix A include only the four vessel types: Bulk, Tanker, General Cargo and Carferry. Excluded are Tug, Excursion Vessel, Support Vessel, Dredge, Commercial Fishing and Military Vessel. (This can be ascertained by comparing the data in Appendix A with the summary of 2010 emissions, by each vessel types, in Table 9 of the main report.) The emissions by county in the Modeling Platform, however, include all of the vessel types. Thus, the emissions by county in the Modeling Platform are greater than those in Appendix A of the Consultants' Report. Furthermore, in comparing the emissions in the Consultants' Report with those in the Modeling Platform, it should be noted that the emission unit in the Consultants' Report is metric tons while the unit in the Modeling Platform is short tons (1 metric ton = approximately 1.1023 short tons).

The emissions by county in Appendix A of the Consultants' Report on commercial marine emissions, and by extension, the emissions by county in the Modeling Platform do not include all counties bordering Lake Michigan. In particular, no emissions are allocated to Sheboygan County. Instead all of the emissions from commercial marine traffic passing Sheboygan County are allocated to Oceana County, Michigan, on the other side of Lake Michigan, across from

Sheboygan County. Conversely, all of the emissions from commercial marine traffic passing Kenosha County are allocated to Kenosha County. No emissions are allocated to Allegan County, Michigan, on the other side of Lake Michigan, across from Kenosha County. By contrast, the 2011 NEI has commercial marine emissions for all counties bordering Lake Michigan. Therefore, the WDNR judged the distribution of commercial marine emissions in Lake Michigan by county in the 2011 NEI to be preferable to the distribution in the 2011 Modeling Platform. Thus, the distribution of cruise emissions in Lake Michigan by county in the 2011 NEI was used to allocate the Modeling Platform cruise emissions for all of Lake Michigan to Kenosha and Sheboygan Counties.

Annual emission were converted to summer day emissions using the annual to summer day ratios for commercial marine emissions found in the LADCO modeling inventory for the year 2007. The following two tables summarize the estimation of commercial marine emissions for Kenosha and Sheboygan Counties. The emission totals are also presented in the tables of nonroad emissions from all source subcategories in Appendix 4.

Table 6-a: Estimation of Commercial Marine Emissions for the Kenosha Sub-County Nonattainment Area (NAA) and Sheboygan County;  
NOx Emissions: tons per year and tons per summer day

	2011 Annual NOx Emissions (tons)			Emissions: Annual/(Summer Day)		2011 Summer Day NOx Emissions (tons)	
	All 33 Lake Michigan Counties	Kenosha NAA	Sheboygan County	Kenosha NAA	Sheboygan County	Kenosha NAA	Sheboygan County
(a) USEPA 2011 NEIv1	25830.13	637.00	415.31	268.16	266.01	2.3754	1.5613
(b) USEPA 2011 Emissions Modeling Platform, ver. 6	2203.48	69.04	0.00	268.16	266.01	0.2575	0.0000
(c) USEPA 2011 NEIv1 - Cruise Emissions	24204.07	637.00	415.31				
(d) USEPA 2011 NEIv1 - Percent Cruise Emissions	100.00%	2.63%	1.72%				
(e) USEPA 2011 Emissions Modeling Platform, ver. 6 - Cruise Emissions	2137.32						
(f) WDNR Estimated Emissions, (d)*2137.32	2137.32	<b>56.25</b>	<b>36.67</b>	268.16	266.01	<b>0.2098</b>	<b>0.1379</b>

NOTE: The Lake Michigan Counties consist of the following 33 counties:

Illinois (2): Cook and Lake

Indiana (3): Lake, LaPorte and Porter

Michigan (18): Allegan, Antrim, Barrien, Benzie, Charlevoix, Delta, Emmet, Grand Traverse, Leelanau, Mackinaw, Manistee, Mason,  
Memominee, Muskegon, Oceana, Ottawa, Schoolcraft and Van Buren

Wisconsin (10): Brown, Door, Kenosha, Kewaunee, Manitowoc, Marinette, Milwaukee, Ozaukee, Racine and Sheboygan

Table 6-b: Estimation of Commercial Marine Emissions for the Kenosha Sub-County Nonattainment Area (NAA) and Sheboygan County;  
VOC Emissions: tons per year and tons per summer day

	2011 Annual VOC Emissions (tons)			Emissions: Annual/(Summer Day)		2011 Summer Day VOC Emissions (tons)	
	All 33 Lake Michigan Counties	Kenosha NAA	Sheboygan County	Kenosha NAA	Sheboygan County	Kenosha NAA	Sheboygan County
(a) USEPA 2011 NEIv1	619.63	15.15	9.50	263.90	225.91	0.0574	0.0421
(b) USEPA 2011 Emissions Modeling Platform, ver. 6	75.62	2.41	0.00	263.90	225.91	0.0091	0.0000
(c) USEPA 2011 NEIv1 - Cruise Emissions	580.62	15.15	9.50				
(d) USEPA 2011 NEIv1 - Percent Cruise Emissions	100.00%	2.61%	1.64%				
(e) USEPA 2011 Emissions Modeling Platform, ver. 6 - Cruise Emissions	73.37						
(f) WDNR Estimated Emissions, (d)*73.37	73.37	<b>1.91</b>	<b>1.20</b>	263.90	225.91	<b>0.0073</b>	<b>0.0053</b>

NOTE: The Lake Michigan Counties consist of the following 33 counties:

Illinois (2): Cook and Lake

Indiana (3): Lake, LaPorte and Porter

Michigan (18): Allegan, Antrim, Barrien, Benzie, Charlevoix, Delta, Emmet, Grand Traverse, Leelanau, Mackinaw, Manistee, Mason, Memominee, Muskegon, Oceana, Ottawa, Schoolcraft and Van Buren

Wisconsin (10): Brown, Door, Kenosha, Kewaunee, Manitowoc, Marinette, Milwaukee, Ozaukee, Racine and Sheboygan

## **Appendix 7**

### **Consultants' Report on Commercial Marine Emissions**

Commercial Marine Emissions in the LADCO Region Final Report,  
by Energy and Environmental Research Associates, LLC, and Alpine Geophysics,  
September 16, 2011

# Commercial Marine Emissions in the LADCO Region Final Report

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2010 Base Year with Projections to 2020 and 2030

16 September 2011

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## Abstract

This report estimates emissions from commercial marine vessels within a geographic region that includes the Great Lakes and portions of the US Inland Waterway (IWW) system. This report updates and improves upon a 2007 report, titled *LADCO 2005 Commercial Marine Emissions*. This study has been designed to facilitate periodic updates to emissions rates, pollutant types, and changes in waterborne commerce activity. Furthermore, this study applies geographic information systems to create maps that help visualize emissions distribution at the county level within the region. Emissions of carbon dioxide (CO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), oxides of sulfur (SO<sub>x</sub>), hydrocarbons (HC), carbon monoxide (CO), and particulate matter (PM), including black carbon (BC) and particulate organic matter (POM), are estimated for a 2010 base year. These estimates are projected out to 2020 and 2030 as well. Improvements from the previous report include the addition of estimates for CO<sub>2</sub>, BC, and POM as well as the inclusion of county-level emissions-distribution maps. The results of the analysis suggest that the IWW system is the major contributor of emissions in the region, accounting for 68% of CO<sub>2</sub> emissions. When considering only the Great Lakes, tugs and bulk vessels are the largest emissions sources, accounting for 91% of CO<sub>2</sub> emissions. This report will be used by the Lake Michigan Air Directors Consortium (LADCO) to update emissions inventories used in regional photochemical modeling for ozone, fine particulates, and regional haze.

## Introduction

This report has been prepared by Energy and Environmental Research Associates (EERA) and Alpine Geophysics for the Lake Michigan Air Directors Consortium (LADCO) as an update to the *LADCO 2005 Commercial Marine Emissions* report prepared by ENVIRON and ICF International (2007) (henceforth referred to as the “previous report”). This report estimates emissions from commercial marine vessels within a geographic region defined by LADCO (henceforth referred to as the “LADCO region”). The LADCO region includes Ohio, Michigan, Indiana, Illinois, Wisconsin, and Minnesota (LADCO member states plus Minnesota) as well as counties in other states and Canadian provinces that border LADCO states as shown in Figure 1; this region is collectively referred to as the “LADCO region” in this report.

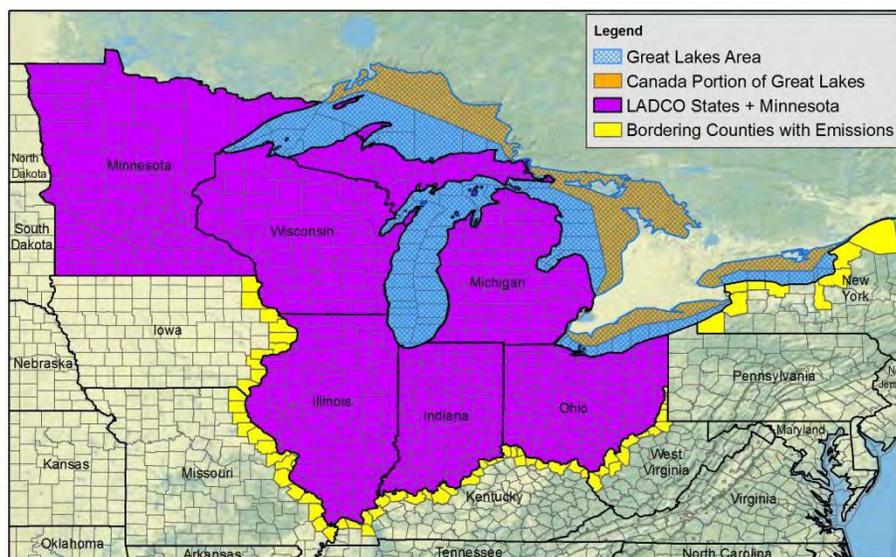


Figure 1. The LADCO Region as defined in this report includes all colored areas.

This report uses a 2010 base year and provides projected emissions for 2020 and 2030. The previous report used a 2005 base year and did not include growth projections. Emissions within the LADCO region are estimated for each vessel type identified in Table 1. Each vessel is assigned a source category code (SCC). This report uses the same SCCs as the previous report with one exception: we create separate SCCs for bulk, tanker, and general cargo vessels rather than grouping them all together under the 2280003200 SCC. In this report, we use 2280003201 for bulk vessels, 2280003202 for tankers, and 2280003203 for general cargo vessels. For commercial fishing and military vessels, the previous report included a second SCC for those vessels operating on gasoline. It is not clear that having a second SCC for gasoline-fueled commercial fishing and military vessels is of value to LADCO since the emissions are not reported by fuel-type; thus, we use only one SCC for commercial fishing and military vessels as shown in Table 1.

**Table 1: Vessel types included in emissions estimates within the LADCO region.**

Source Category Code (SCC)	Vessel Type	Main Activity	Great Lakes (GL) or Inland Waterways (IWW)?
2280003201	Bulk	Bulk Freight Transport	GL
2280003202	Tanker	Liquid Freight Transport	GL
2280003203	General Cargo	General Cargo Transport (Includes Crane Vessels)	GL
2280002021	Tug	Integrated Tug-Barge Operations and Vessel Assist	GL
2280002022	Car ferry	Passenger and Vehicle Transport	GL
2280002024	Excursion Vessel	Passenger Cruises	GL
2280002029	Support Vessel	General Work Boats	GL
2280002025	Dredges	Port and Channel Dredging Operations	GL
2280002030	Commercial Fishing	Commercial Fishing	GL
2280002040	Military Vessels	US Coast Guard	GL
2280002023	Push Boats	Barge Freight Transport	IWW

Commercial marine vessel activity on the Great Lakes and Inland Waterway (IWW) system result in emissions of greenhouse gases (GHGs) and other pollutants. Emissions of the following pollutants are considered in this report:

carbon dioxide (CO<sub>2</sub>)\*;

oxides of nitrogen (NO<sub>x</sub>);

oxides of sulfur (SO<sub>x</sub>);

hydrocarbons (HC);

particulate matter (PM) including black carbon (BC)\*; particulate organic matter (POM)\*; and carbon monoxide (CO).

Note: pollutants with an asterisk were added to this study and were not found in the previous report. In addition to estimating total emissions for the above pollutants, we apply geospatial information system (GIS) technology to develop maps that help visualize the distribution of these emissions across the LADCO region. Estimating emissions of these pollutants will enable LADCO to update their emissions inventories used in regional photochemical modeling for ozone, fine particulates, and regional haze. In the following sections, we discuss improvements in the activity-based methodology, present the results of the analysis, and include discussions and conclusions drawn from the results. We end with suggestions for further improvements and for periodic updates.

## **Five Improvements from the Previous Report**

One purpose of this report, included in the scope of work, is to improve upon the methodology applied in the previous report. This section describes five improvements from the previous study.

### **1. Addition of Estimates for Carbon Dioxide, Black Carbon, and Particulate Organic Matter**

This report includes estimates for CO<sub>2</sub> and species of PM like BC and POM that were not included in the previous report. Providing estimates for CO<sub>2</sub> is a significant improvement given the scientific and political focus on mitigating GHG emissions. Including estimated emissions for species of PM is important since BC and POM have high global warming potential (GWP) despite being short-lived pollutants. Each pollutant has a different climate-forcing impact: BC has a warming effect and POM has a cooling effect. However, research suggests that the warming effect of BC is nine-times greater than the cooling effect of POM as discussed in Green, Silberman, Comer, Winebrake, and Corbett (2011). Including estimates for BC and POM positions LADCO well for discussions on policies that affect these pollutants. Moreover, BC and POM emissions are shown to have negative human-health impacts including increased premature mortality (Green, et al., 2011).

### **2. Addition of Spatially-Allocated Emissions Estimates**

One of the most significant improvements over the previous report is the inclusion of spatially allocated emissions estimates. Maps and attribute tables have been generated in ArcGIS that help describe the distribution of emissions across the LADCO region. The inclusion of maps allows for a quick understanding of how emissions are distributed throughout the region and can help guide policy decisions on areas needing further analysis and scrutiny.

### **3. A 2010 Base Year and growth estimates**

The previous report used a 2005 base year for emissions estimates; this report uses a 2010 base year. Choosing a 2010 base year better represents current activity and emissions on the Great Lakes and IWW system. Additionally, this report projects emissions out to 2020 and 2030; the previous report did not include growth estimates.

### **4. Updated Emissions Factors for Great Lakes Vessels**

The previous report used emissions factors from a 1999 US Environmental Protection Agency (EPA) Regulatory Impact Analysis (RIA) and a 2002 Entec report. For this report, we have used emissions factors developed for the North American Ship Traffic, Energy, and Environmental Model (STEEM) inventory sponsored by the California Air Resources Board (CARB) and provided to EPA (Corbett & Wang, 2006, 2007; USEPA, 2009). These emissions factors have been scaled to reflect the various vessel-types that operate on the Great Lakes.

For the IWW system, the previous report provides good estimates for emissions factors from push-boats that we have applied in this report.

## 5. Updatable Report Format

We have made a concerted effort to organize this report in an easy-to-follow format by providing detailed descriptions of our methods and presenting the results, discussions, and conclusions in a useful and clear manner. Importantly, we have focused on creating a report that will be easy and straightforward to update in the future.

## Methodology

This section describes the methodology used in the analysis in order to create an emissions inventory for the Great Lakes and the IWW system.

### Estimating Great Lakes Vessel Emissions

Activity data related to power along each segment of the Great Lakes portion of the STEEM network were available for bulk, tanker, general cargo, and car ferry vessels. To calculate the amount of emissions along each segment, the following equation is applied:

$$E_{i,j} = (P_{i,ME} * [1 - r_i] * L_{i,ME} * EF_{j,HFO} + P_{ME} * r_i * L_{ME} * EF_{j,MDO} + P_{AE} * L_{AE} * EF_{j,MDO}) \div v_i * d$$

Where:

$i$  = the vessel type (bulk, tanker, general cargo, or car ferry);

$j$  = the pollutant type (CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, HC, PM, or CO)

$E_{i,j}$  = the amount of pollutant  $j$  emitted by vessel type  $i$  along each segment in grams;

$P_{i,ME}$  = the main engine power of vessel type  $i$  along the segment in kilowatts;

$P_{i,AE}$  = the auxiliary engine power of vessel type  $i$  along the segment in kilowatts which is equal to a percentage of  $P_{i,ME}$ ;

$r_i$  = the ratio of the sum of main engine power from vessels operating on marine diesel oil (MDO) to the sum of main engine power from vessels operating on heavy fuel oil (HFO) for vessel type  $i$ ;

$L_{ME}$  = the average main engine load factor for Great Lakes vessels;

$L_{AE}$  = the average auxiliary engine load factor for Great Lakes vessels;

$EF_{j,HFO}$  = the emissions factor for pollutant  $j$  for vessels operating on HFO fuel in grams per kilowatt-hour;

$EF_{j,MDO}$  = the emissions factor for pollutant  $j$  for vessels operating on MDO fuel in grams per kilowatt-hour;

$v_i$  = the service speed of vessel type  $i$ ; and  $d$  = the distance of the segment in miles.

The sum of  $E_{i,j}$  is equal to the total emissions of pollutant  $j$  for vessel type  $i$  in the year 2010.

For tugs, this report relies on annual activity estimates from the previous report. The report claims that tugs operate an average of 1830 hours per year on the Great Lakes. All Great Lakes tugs operate on MDO fuel. Calculating emissions from tugs is achieved by applying the following equation:

$$E_{j,tug} = (P_{ME} * L_{ME} * EF_{j,MDO} + P_{AE} * L_{AE} * EF_{j,MDO}) * t$$

Where:

$E_{j,tug}$  = the amount of pollutant  $j$  emitted by the Great Lakes tug vessel fleet in grams;

$j$  = the pollutant type (CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, HC, PM, or CO)

$P_{ME}$  = the total main engine power of the Great Lakes tug fleet in kilowatts;  
 $P_{i,GE}$  = the auxiliary engine power of vessel type  $i$  along the segment in kilowatts which represents a percentage of  $P_{i,ME}$ ;  
 $L_{ME}$  = the average main engine load factor for Great Lakes vessels;  
 $L_{AE}$  = the average auxiliary engine load factor for Great Lakes vessels;  
 $EF_{j,MDO}$  = the emissions factor for pollutant  $j$  for vessels operating on MDO fuel in grams per kilowatt-hour; and  
 $t$  = the average annual operational time of a Great Lakes tug in hours.

For all other vessel types including excursion, support, dredges, commercial fishing, and military vessels, we relied on the previous report and assumed that no growth had occurred for these vessel types.

### Estimating Inland Waterway Emissions

There are a number of waterways within the LADCO region that are used for waterborne commerce.

Inland waterways within the LADCO region include all or portions of the following:

Calumet River (including the Calumet-Saganashkee [Cal-Sag] Channel);

Chicago River;

Chicago Sanitary and Ship Canal;

Cumberland River;

Green River;

Illinois River;

Kanawha River;

Lower Mississippi River;

Middle Mississippi River;

Missouri River;

Ohio River;

Tennessee River; and 13. Upper Mississippi River.

Fuel use data in terms of gallons of fuel used were available for 2009 from USACE for each of these waterways; we assume the same fuel consumption for the year 2010 in the analysis. Also available were the number of trips taken along each river segment as well as the distance of those segments in miles; multiplying these two values together results in *trip-miles*. Dividing the amount of fuel used in gallons by the total number of trip-miles for each waterway results in *gallons per trip-mile*. Multiplying the trip-miles of each segment by gallons per trip-mile yields an estimate for the amount of fuel consumed along that particular waterway segment. As the previous report lists emission factors in grams per gallon for  $NO_x$ ,  $SO_x$ , PM, HC, and CO, the fuel consumption estimates are multiplied by these emissions factors for each segment. To estimate emissions along the IWW system, the following equation is applied:

$$E_j = gal \div \Sigma x \div \Sigma d * x * d * EF_j$$

Where:

$E_j$  = the emissions of pollutant  $j$  along the each waterway segment;

$gal$  = the amount of fuel consumed along the waterway in gallons;

$\Sigma x$  = the total number of trips along the waterway;

$\Sigma d$  = the total distance of the waterway in miles;

$x$  = the number of trips along the segment;

$d$  = the distance of the segment in miles; and

$EF_j$  = the emissions factor for pollutant  $j$  in grams per gallon.

The sum of  $E_j$  along each waterway represents the total emissions of pollutant  $j$  in 2010.

To estimate CO<sub>2</sub> emissions along each segment, *gallons per trip-mile* is calculated and then multiplied by the trip-miles of the segment, yielding *gallons per segment*. When fuel consumption for each segment is known, the following equation is applied to calculate CO<sub>2</sub> emissions for each segment of each waterway:

$$E_{CO_2} = gal * D * \frac{gC}{gF} * \frac{CO_2}{C} \div \Sigma x \div \Sigma d * x * d$$

Where:

$E_{CO_2}$  = the emissions of CO<sub>2</sub> along the each waterway segment;

$gal$  = the amount of fuel consumed along the waterway in gallons;

$D$  = the mass density of MDO fuel in grams per gallon;

$gC/gF$  = the carbon content of MDO fuel in grams of carbon per gram of fuel (3331 g/gal) ;

$CO_2/C$  = is a constant with a value of 3.67 and represents the ratio of the atomic weight of CO<sub>2</sub> to carbon;

$\Sigma x$  = the total number of trips along the waterway;

$\Sigma d$  = the total distance of the waterway in miles;

$x$  = the number of trips along the segment; and

$d$  = the distance of the segment in miles.

The sum of  $E_{CO_2}$  along each waterway represents the total emissions CO<sub>2</sub> in 2010.

## Estimating Growth Rates

For the Great Lakes, data exists describing when each vessel currently operating on the Great Lakes was built for bulk, general cargo, car ferry, tanker, and tug vessels. We chose to consider growth in the Great Lakes fleet of vessels from 1980 to 2010. We assume no growth for excursion, support, dredge, commercial fishing, and military vessels. To calculate annual growth rates for bulk, general cargo, car ferry, tanker, and tug vessels, the following equation is applied:

$$AGR_i = \frac{x_2 - x_1}{n * x_1}$$

Where:

$i$  = the vessel type (bulk, general cargo, car ferry, tanker, or tug)

$AGR$  = the annual growth rate for vessel type  $i$  as a percentage;

$x_1$  = the number of vessels in the fleet in 1980;

$x_2$  = the number of vessels in the fleet in 2010; and

$n$  = the number of years between the  $x_1$  and  $x_2$  values (30 years in this case).

For the IWW system, fuel consumption by waterway is available from 1997 to 2009. To calculate the annual growth rate for the IWW system within the LADCO region, the amount of fuel consumed along each waterway (or segment thereof) within the LADCO region is summed for each year from 1997 to 2009. Then, these values are used to estimate annual growth by applying the same equation used for Great Lakes growth except that now:

$x_1$  = the amount of fuel consumed along the portions of the IWW system within the LADCO region in 1997;

$x_2$  = the amount of fuel consumed along the portions of the IWW system within the LADCO region in 2009; and

$n$  = the number of years between the  $x_1$  and  $x_2$  values (12 years in this case).

## Data and Assumptions

This section describes the data and assumptions used in the analysis to estimate 2010 emissions for the Great Lakes and IWW system. Additionally, growth rate assumptions are defined.

### Great Lakes

Commercial marine vessels operating on the Great Lakes are found in Table 2 along with their average power, average speed, average age, ratio of auxiliary engine power to main engine power, and the percent of total power represented by vessels operating on MDO within each vessel type. For those vessels not found in Table 2 including excursion, support, dredge, commercial fishing and military vessels, we have assumed that their emissions were the same as those stated in the previous report since no new activity data were available for this analysis.

**Table 2: Characteristics of Great Lakes commercial marine vessels used in the analysis.**

Vessel Type	Count (# of vessels)	Avg. Power (kW)	Avg. Speed (mph) or Annual Hours of Operation for Tugs	Avg. Build Date (year)	AE Power (% of ME Power) <sup>1</sup>	Vessels using MDO (% of total ME power)
<b>Bulk</b>	105	6,500	16	1970	22%	26%
<b>General Cargo</b>	10	6,000	15	1983	19%	20%
<b>Carferry</b>	45	800	14	1975	28%	100%
<b>Tanker</b>	18	3,800	15	1972	21%	17%
<b>Tug</b>	293	1,300	1830	1970	27%	100%

AE = auxiliary engine and ME = main engine; the source of the values in this column is (Lindhjem & Browning, 2007)

Not all vessels in the Great Lakes fleet operate on the same fuel and there are different emissions factors for engines operating on HFO compared with those operating on MDO as shown in Table 3. Notice also that there are no emissions factors for BC and POM; this is because we assume that 7% of PM emissions are BC and 34% are POM. The fraction of PM represented by BC and POM were calculated by averaging values found in the literature as shown in Table 4.

**Table 3: Emissions factors used in the analysis in grams per kilowatt-hour (g/kWh)**

Pollutant	Emissions Factor when Operating on HFO Fuel (g/kWh)	Emissions Factor when Operating on MDO Fuel (g/kWh)
CO <sub>2</sub>	620	690
NO <sub>x</sub>	18.1	13.9
SO <sub>x</sub>	10.5	4.3
HC	0.6	0.5
PM	1.5	0.3
CO	1.4	1.1

Source: (Corbett & Wang, 2007)

**Table 4: Black carbon (BC) and particulate organic matter (POM) as a fraction of particulate matter (PM).**

Fraction of PM	Agrawal	Molonova	Petzold	Simple Average
BC	4%	5%	11%	7%
POM	25%	48%	29%	34%

Source: (Agrawal, Malloy, Welch, Miller, & Cocker, 2008; Moldanova et al., 2009; Petzold et al., 2008)

Finally, values for the average load factor of the main engines and auxiliary engines are necessary to calculate emissions. The previous report estimated an average load factor of 69% for main engines and 34% for auxiliary engines operating on the Great Lakes, as seen in Table 5. We have used these same values in the current analysis.

**Table 5: Main engine and auxiliary engine load factors used in the analysis.**

	Load Factor (% of total installed power)
Main Engine	69%
Auxiliary Engine	34%

Source: (Lindhjem & Browning, 2007)

## Inland Waterway System

To calculate the emissions along the IWW system within the LADCO region, it was necessary to determine the amount of fuel consumed in *gallons per trip-mile* along each waterway. The characteristics of the waterways within the LADCO region (including gallons of fuel per trip-mile) are presented in Table 6. The fuel consumption data were used in conjunction with the emissions factors found in Table 7 to estimate emissions along the IWW system.

Table 6: Inland Waterway system assumptions used in the analysis.

Waterway	Approx. Fuel Consumption (gallons)	Trip-miles	Gallons/trip-mile
Calumet-Sag Channel	263,200	1,580	170
Chicago River	38,300	420	90
Chicago Sanitary and Ship Canal	485,000	1,050	460
Cumberland River	4,030,000	114,920	35
Green River	1,440,000	56,770	25
Illinois River	15,770,000	16,590	950
Kanawha River	4,670,000	3,730	1,250
Missouri River	720,000	118,590	6
Ohio River	83,470,000	36,600	2,280
Tennessee River	9,680,000	47,930	200
Lower Mississippi River	132,240,000	52,650	2,510
Middle Mississippi River	21,610,000	16,780	1,290
Upper Mississippi River	23,930,000	29,980	800

Source: USACE for fuel consumption; trip-miles and gallons/trip-mile were calculated by EERA from USACE data.

Table 7: Emissions factors for the Inland Waterway (IWW) system used in the analysis in grams per gallon (g/gal) of fuel.

Pollutant	Emissions Factor (g/gal)
NO <sub>x</sub>	190.2
SO <sub>x</sub>	16.7
HC	4.14
PM	4.6
CO	35.3

Source: (Lindhjem & Browning, 2007)

## Growth Rates

Average growth rates for vessels within the Great Lakes as well as the average growth rate for the IWW system within the LADCO region, are found in Table 8. These data were derived from Greenwood's Guide to Great Lakes Shipping (2010) for the Great Lakes and USACE for the IWW system. Opportunities for improving these growth rate estimations are discussed later.

**Table 8: Data used to calculate annual growth rates for Great Lakes vessels and the Inland Waterway system in the LADCO region.**

Vessel Type	1980 (# of vessels for GL and # of gallons for IWW)	2010 (# of vessels for GL and # of gallons for IWW)	Annual Growth Rate (%)
Bulk	83	103*	0.80%
General Cargo	5	10	3.33%
Carferry	22	41	2.88%
Tanker	12	18	1.67%
Tug	209	291**	1.31%
Excursion	Unknown	Unknown	0%
Support	Unknown	Unknown	0%
Dredge	Unknown	Unknown	0%
Commercial Fishing	Unknown	Unknown	0%
Military	Unknown	Unknown	0%
Inland Waterways (gallons)	227,000,000	163,000,000	-2.35%

Source: (Harbor House Publishers, 2010) and USACE

\*The total bulk fleet consists of 108 vessels; however, five vessels were missing “build year” data, preventing their use in the annual growth rate analysis.

\*\*The total tug fleet consists of 293 vessels; however, two vessels were missing “build year” data, preventing their use in the annual growth rate analysis.

## Results

This section presents the results of the analysis including emissions estimates for 2010, 2020, and 2030 and includes maps to help visualize the distribution of emissions within the LADCO region.

### Distribution of Emissions within the LADCO Region

This section presents how emissions are distributed throughout the LADCO region. Results indicate that emissions concentrations change depending on geographic location within the region. The distribution of CO<sub>2</sub> emissions by county for the Great Lakes and IWW system within the LADCO region can be found in Figure 2 and Figure 3; these figures also map emissions within the Canadian portions of the Great Lakes. In Figure 3, notice that for Indiana and Ohio, there are counties that border the Ohio River where no CO<sub>2</sub> emissions are allocated despite heavy emissions concentrations on the opposite side of the river in Kentucky and West Virginia. The reason for the discrepancy is illustrated in Figure 4.

Figure 4 shows how geopolitical boundaries (county boundaries, specifically) can cause problems with the spatial allocation of emissions. The blue line represents the river, the purple area is the Kentucky county boundary, and the green area is the Indiana boundary. Whenever a county boundary covers the blue line representing the river, emissions are allocated to that county. In the situation presented in Figure 4, almost all of the emissions are allocated to the county in Kentucky rather than being split with the Indiana county across the river. Figure 3 shows that emissions for Indiana and Ohio are underestimated; thus it is important to report emissions from counties bordering these states to better understand actual emissions along the waterway between those states. We have included these estimates in this section as well as in Appendix A.

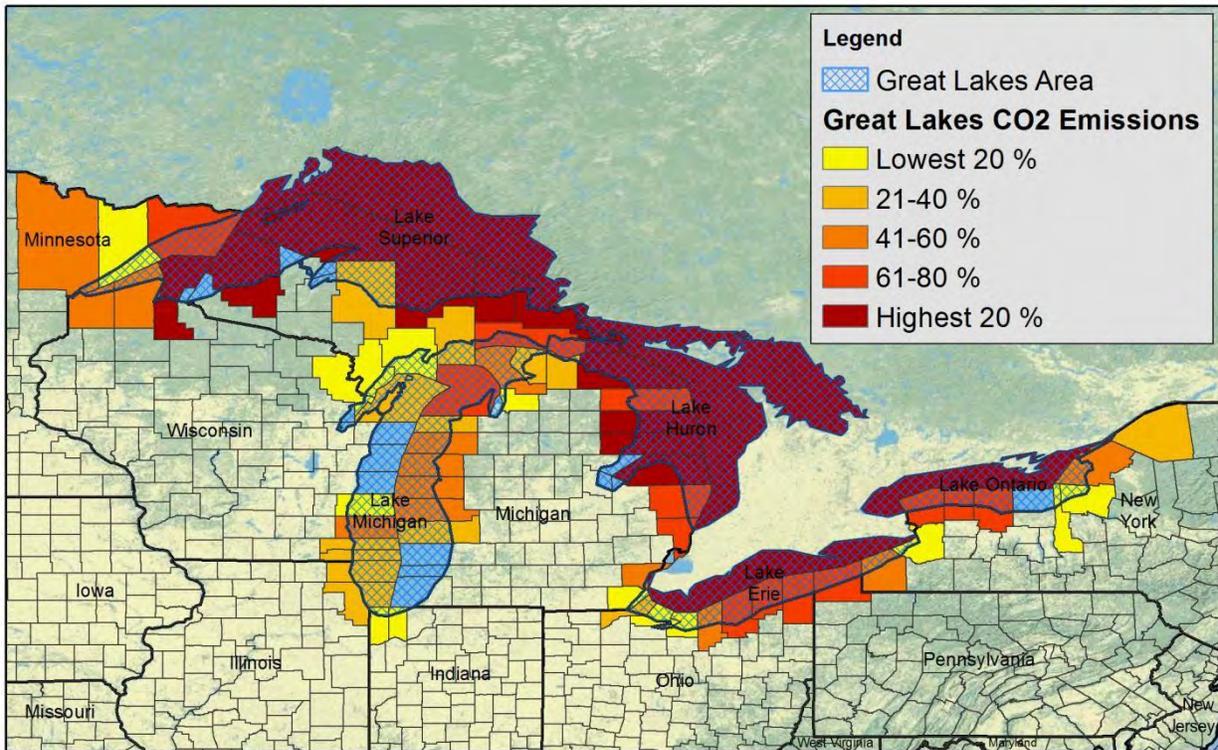


Figure 2: Geospatial distribution of Great Lakes CO<sub>2</sub> emissions within the LADCO region.

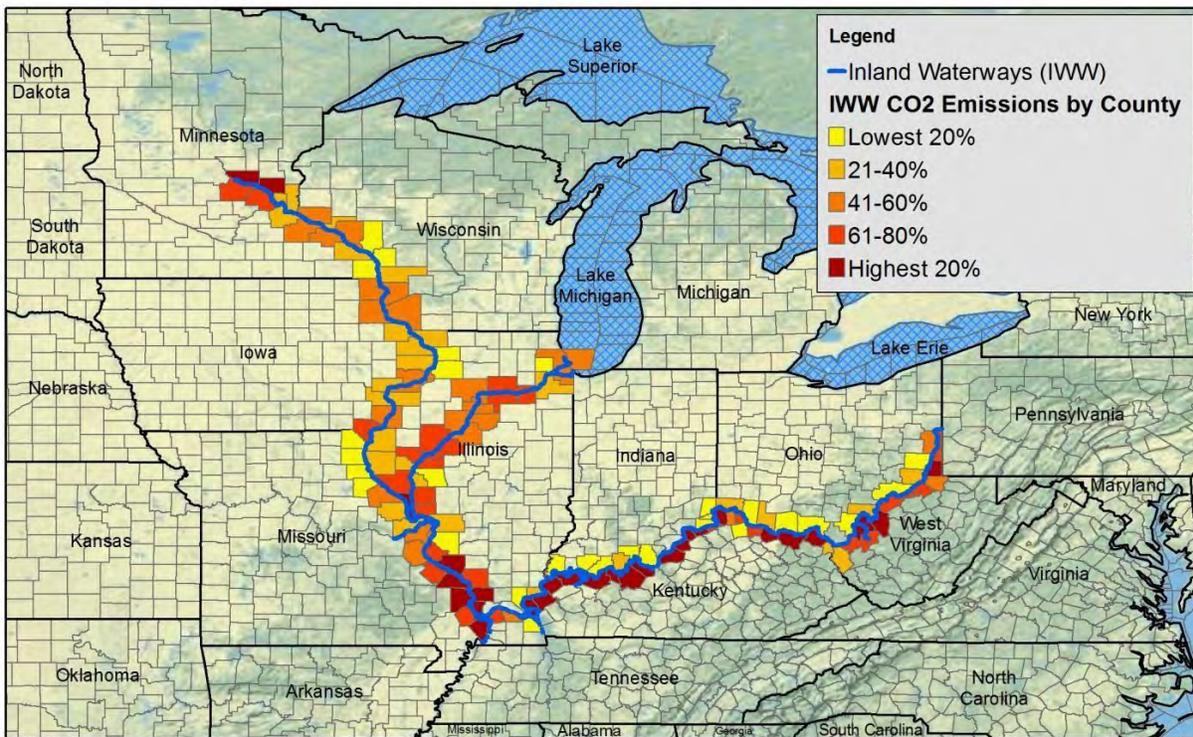


Figure 3: Geospatial distribution of Inland Waterway system CO<sub>2</sub> emissions within the LADCO region.



Figure 4: How county boundaries impact emissions distribution along Inland Waterway segments.

### Emissions Estimates for the 2010 Base Year

A summary of 2010 emissions for the Great Lakes and IWW system is found in Table 9; grayshaded cells capture estimates from the previous report, all others were calculated by EERA using STEEM, USACE data, and Greenwood's Guide to Great Lakes Shipping (2010). As a supplement to Table 9, Figure 6 helps develop a better understanding of the fraction of emissions represented by the Great Lakes compared with the IWW system.

Figure 6 shows that CO<sub>2</sub> emissions captured by only the LADCO member states plus Minnesota along the IWW exceed those found on the Great Lakes. When the entire IWW system within the LADCO region is considered, the Great Lakes account for 32% of CO<sub>2</sub> emissions. Additionally, Figure 6 shows that the non-LADCO portion of the IWW system is the dominant source of CO<sub>2</sub> emissions (45%). Again, the way county boundaries are geospatially defined has impacted the allocation of emissions and it is likely that the emissions reported in LADCO counties are being underestimated.

Additional results regarding Great Lakes and IWW system emissions by county, state, and source can be found in Appendix A and Appendix B. Appendix A contains emissions estimates for the Great Lakes and IWW system by state and county and Appendix B includes graphs of emissions by each source within the LADCO region for each pollutant analyzed in this report.

Table 9: Summary of 2010 Emissions for the Great Lakes and Inland Waterway system.

	Vessel Type	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC (MT)	PM (MT)	BC (MT)	POM (MT)	CO (MT)
	Bulk	321,515	8,352	4,221	283	551	39	187	650
	Tug	365,999	7,373	2,281	265	159	11	54	583
	Tanker	16,498	441	232	15	31	2	11	34
	Gen Cargo	13,226	352	183	12	24	2	8	27
	Carferry	6,875	138	43	5	3	0	1	11
From Previous Report	Excursion Vessels	14,346	289	23	7	6	0	2	41
	Support Vessels	2,680	54	5	1	1	0	0	10
	Dredges	6,056	122	66	2	3	0	1	22
	Commercial Fishing	347	7	1	29	2	0	1	110
	Military vessels	6,850	138	15	77	3	0	1	264
	IWW (LADCO + MN)	525,997	9,524	836	207	230	15	78	1,768
	IWW (Non-LADCO)	1,045,044	18,923	1,661	412	458	30	155	3,512
	<b>Total IWW</b>	<b>1,571,041</b>	<b>28,447</b>	<b>2,498</b>	<b>619</b>	<b>688</b>	<b>45</b>	<b>233</b>	<b>5,280</b>
	<b>Total Lake</b>	<b>754,394</b>	<b>17,267</b>	<b>7,070</b>	<b>696</b>	<b>784</b>	<b>55</b>	<b>266</b>	<b>1,753</b>
	<b>Grand Total</b>	<b><u>2,325,435</u></b>	<b><u>45,713</u></b>	<b><u>9,568</u></b>	<b><u>1,316</u></b>	<b><u>1,472</u></b>	<b><u>100</u></b>	<b><u>499</u></b>	<b><u>7,033</u></b>

Table 10: Inland Waterway system fuel consumption and emissions by river within the LADCO region.

Waterway	Fuel Consumption (gallons)	% of total fuel consumption	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC (MT)	PM (MT)	BC (MT)	POM (MT)	CO (MT)
Ohio River	81,791,540	54.73%	859,899	15,570	1,367	339	377	25	127	2,890
Upper Mississippi River	23,905,833	16.00%	251,329	4,551	400	99	110	7	37	845
Middle Mississippi River	21,592,078	14.45%	227,004	4,110	361	89	99	7	34	763
Illinois River	15,758,748	10.55%	165,676	3,000	263	65	73	5	25	557
Kanawha River	3,276,732	2.19%	34,449	624	55	14	15	1	5	116
Lower Mississippi River	1,972,858	1.32%	20,741	376	33	8	9	1	3	70
Chicago Ship Canal	484,510	0.32%	5,094	92	8	2	2	0	1	17
Calumet-Sag Channel	235,720	0.16%	2,478	45	4	1	1	0	0	8
Tennessee River	149,769	0.10%	1,575	29	3	1	1	0	0	5
Green River	117,692	0.08%	1,237	22	2	0	1	0	0	4
Missouri River	43,951	0.03%	462	8	1	0	0	0	0	2
Cumberland River	38,736	0.03%	407	7	1	0	0	0	0	1
Chicago River	37,960	0.03%	399	7	1	0	0	0	0	1
Calumet River	27,207	0.02%	286	5	0	0	0	0	0	1
Chicago River Entrance Channel	260	0.00%	3	0	0	0	0	0	0	0

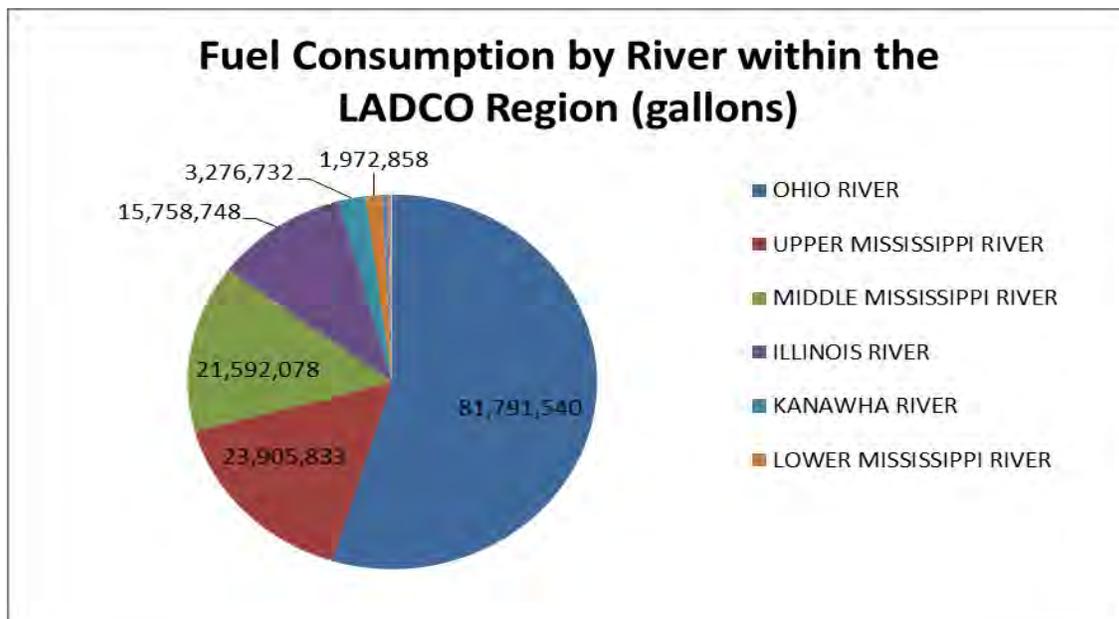


Figure 5: Inland waterway fuel consumption by river within the LADCO region.

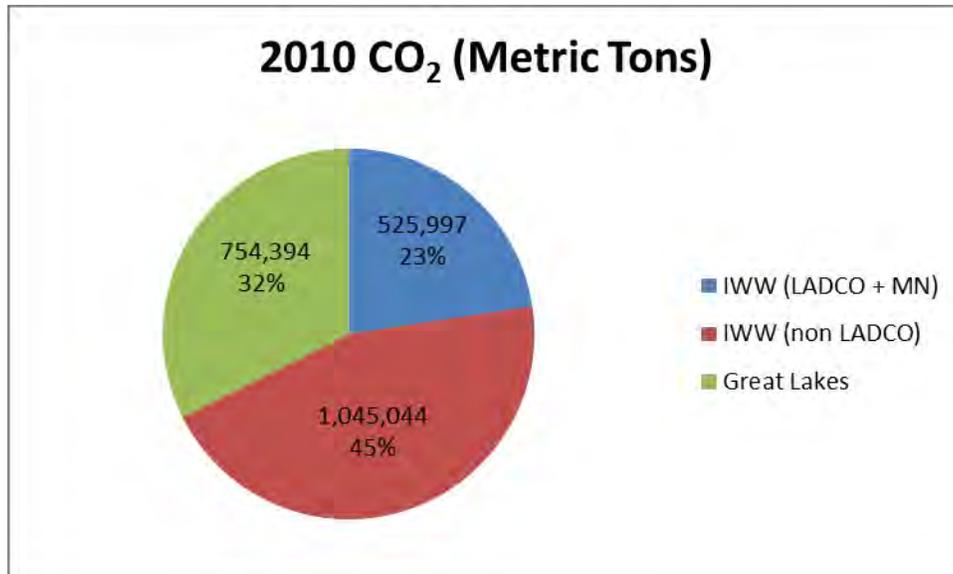


Figure 6: Distribution of CO<sub>2</sub> emissions between the Great Lakes and Inland Waterway system.

When considering Great Lakes CO<sub>2</sub> emissions, Figure 7 shows that the two main sources are tugs and bulk vessels, which account for 48% and 43% of Great Lakes CO<sub>2</sub> emissions respectively. Clearly, these two vessel types have the greatest potential to impact Great Lakes air quality. As shown in Figure 8 and Figure 9, tugs and bulk vessels are also the two largest contributors to NO<sub>x</sub> (an ozone precursor) and PM (including BC and POM), both of which contribute to regional haze and have negative human health impacts.

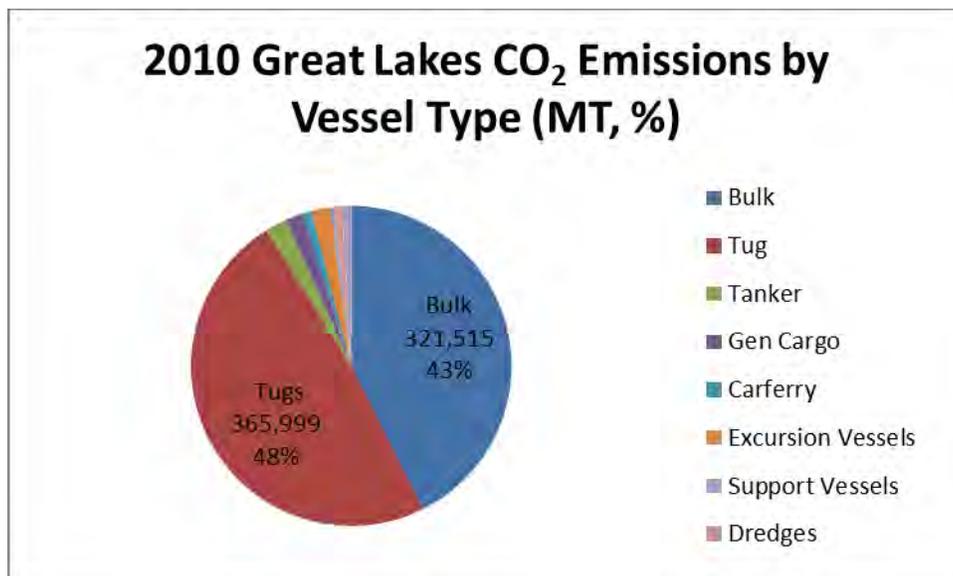


Figure 7: 2010 Great Lakes CO<sub>2</sub> emissions by vessel type.

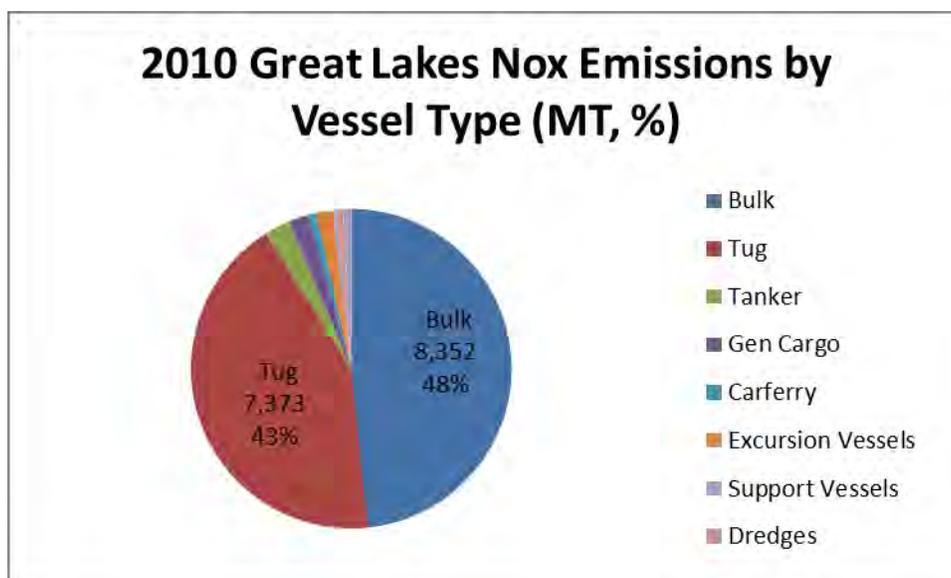


Figure 8: 2010 Great Lakes NOx emissions by vessel type.

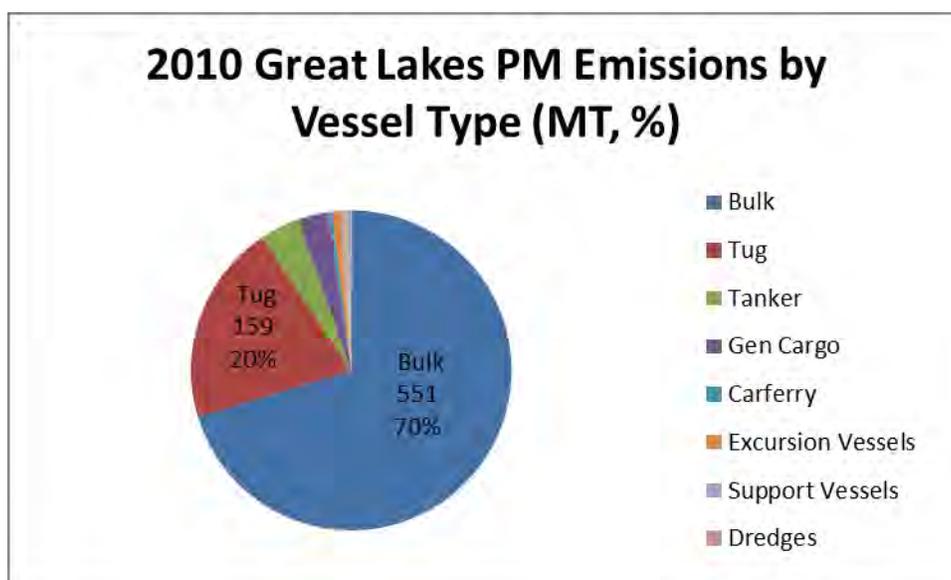


Figure 9: 2010 Great Lakes PM emissions by vessel type.

## Projected Emissions for 2020 and 2030

This section presents estimated emissions projected out to 2020 and 2030 for the Great Lakes and IWW system within the LADCO region. Table 11 shows projected emissions for 2020 and Table 12 shows projected emissions for 2030; the shaded regions of both tables include vessel types for which we assume no growth since growth rate data were not available for those vessels. On the Great Lakes, emissions grow annually; however, emissions tend to decrease along the IWW system over time (see Figure 10 showing decreasing fuel consumption over time, leading to decreased emissions). Since the IWW system accounts for the largest proportion of emissions within the LADCO region, all emissions within the region tend to decrease over time, with the exception of SO<sub>x</sub> emissions as shown in the final two shaded rows of Table 11 and Table 12.

Table 11: Projected 2020 emissions for the Great Lakes and Inland Waterway system.

Vessel Type	Annual Growth Rate (%)	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC (MT)	PM (MT)	BC (MT)	POM (MT)	CO (MT)
Bulk	0.80%	348,293	9,047	4,573	307	597	42	203	704
Tug	1.31%	416,783	8,396	2,597	302	181	13	62	664
Tanker	1.67%	19,463	521	274	18	37	3	12	40
Gen Cargo	3.33%	18,359	488	255	16	34	2	12	38
Carferry	2.88%	9,131	184	57	7	4	0	1	15
Excursion Vessels	0.00%	14,346	289	23	7	6	0	2	41
Support Vessels	0.00%	2,681	54	5	1	1	0	0	10
Dredges	0.00%	6,056	122	66	2	3	0	1	22
Commercial Fishing	0.00%	347	7	1	29	2	0	1	110
Military vessels	0.00%	6,850	138	15	77	3	0	1	264
IWW (LADCO States + MN)	-2.35%	414,806	7,511	659	163	182	12	61	1,394
IWW (Non-LADCO States)	-2.35%	824,131	14,922	1,310	325	361	24	122	2,770
<b>Total IWW</b>	-2.35%	<b>1,238,937</b>	<b>22,433</b>	<b>1,970</b>	<b>488</b>	<b>543</b>	<b>36</b>	<b>183</b>	<b>4,163</b>
<b>Total Lake</b>		<b>842,310</b>	<b>19,246</b>	<b>7,865</b>	<b>766</b>	<b>868</b>	<b>61</b>	<b>295</b>	<b>1,909</b>
<b>Grand Total</b>		<b>2,081,247</b>	<b>41,680</b>	<b>9,835</b>	<b>1,254</b>	<b>1,410</b>	<b>96</b>	<b>479</b>	<b>6,072</b>
Avg. Annual Growth Rates for Emissions (2010-2020)	<b>Total Lake</b>	1.17%	1.15%	1.12%	1.00%	1.07%	1.07%	1.07%	0.89%
	<b>Grand Total</b>	-1.05%	-0.88%	0.28%	-0.47%	-0.42%	-0.37%	-0.41%	-1.37%

Table 12: Projected 2030 emissions for the Great Lakes and Inland Waterway system.

Vessel Type	Annual Growth Rate (%)	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC (MT)	PM (MT)	BC (MT)	POM (MT)	CO (MT)
Bulk	0.80%	377,302	9,801	4,954	333	647	45	220	763
Tug	1.31%	474,612	9,561	2,958	344	206	14	70	757
Tanker	1.67%	22,962	614	323	21	43	3	15	48
Gen Cargo	3.33%	25,483	678	353	23	47	3	16	53
Carferry	2.88%	12,128	244	76	9	5	0	2	19
Excursion Vessels	0.00%	14,346	289	23	7	6	0	2	41
Support Vessels	0.00%	2,681	54	5	1	1	0	0	10
Dredges	0.00%	6,056	122	66	2	3	0	1	22
Commercial Fishing	0.00%	347	7	1	29	2	0	1	110
Military vessels	0.00%	6,850	138	15	77	3	0	1	264
IWW (LADCO States + MN)	-2.35%	327,120	5,923	520	129	143	9	48	1,099
IWW (Non-LADCO States)	-2.35%	649,917	11,768	1,033	256	285	19	96	2,184
<b>Total IWW</b>	-2.35%	<b>977,037</b>	<b>17,691</b>	<b>1,553</b>	<b>385</b>	<b>428</b>	<b>28</b>	<b>145</b>	<b>3,283</b>
<b>Total Lake</b>		<b>942,767</b>	<b>21,508</b>	<b>8,773</b>	<b>845</b>	<b>964</b>	<b>67</b>	<b>328</b>	<b>2,086</b>
<b>Grand Total</b>		<b>1,919,804</b>	<b>39,200</b>	<b>10,327</b>	<b>1,230</b>	<b>1,392</b>	<b>96</b>	<b>472</b>	<b>5,370</b>
Avg. Annual Growth Rates for Emissions (2010-2030)	<b>Total Lake</b>	1.25%	1.23%	1.20%	1.07%	1.15%	1.15%	1.15%	0.95%
	<b>Grand Total</b>	-0.87%	-0.71%	0.40%	-0.33%	-0.27%	-0.22%	-0.27%	-1.18%

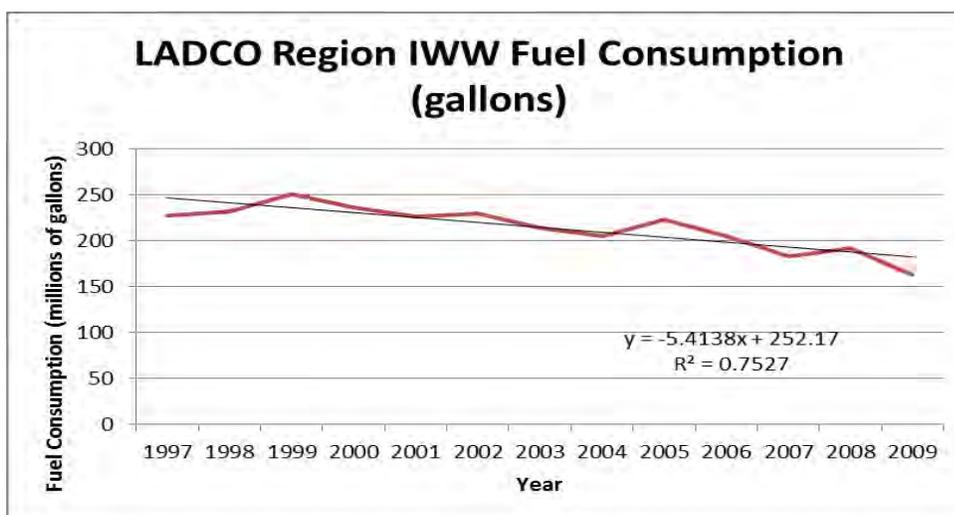


Figure 10: LADCO region Inland Waterway fuel consumption decreases over time.

## Discussion of Potential Non-Combustion Emissions Impacts

This report estimates Great Lakes and IWW system combustion emissions within the LADCO region. In the *Task 2* report delivered to LADCO, we recommended evaluating the potential impact of non-combustion emissions on the Great Lakes. Non-combustion emissions would include fugitive volatile organic compounds (VOCs) from petroleum cargoes. On the Great Lakes, petroleum cargoes are transported by tanker vessels; since there are only 18 tanker vessels operating on the Great Lakes (compared to 293 tugs and 103 bulk cargo vessels) and petroleum cargoes represent only three percent (3%) of Great Lakes waterborne commerce by weight (USACE, 2009), we do not anticipate significant fugitive VOC emissions for the Great Lakes.

On the other hand, petroleum and petroleum products are the top commodity transported along the IWW system. However, most of the petroleum traffic is concentrated outside the LADCO region, and instead is found along the Gulf Intracoastal Waterway. Within the LADCO region, the Ohio River transports the most petroleum; however, petroleum only represents approximately seven percent (7%) of all waterborne commerce by weight on the river (compared to 54% for coal) (USACE, 2005). Thus, we conclude that fugitive VOC emissions likely represent a negligible portion of overall emissions on the Great Lakes and IWW system within the LADCO region.

## Potential for Future Improvements

This section discusses potential improvements that could be made to future reports. Pursuing any of these suggested improvements would enhance the accuracy of future work, leading to better informed analysis and conclusions. Four suggested improvements are listed here.

First, estimated growth rates for Great Lakes vessels could be improved. Growth rates for the various vessel types operating on the Great Lakes are based on increases in the number of vessels in the fleet over time. Ideally, one would estimate projected growth in Great Lakes goods-movement and distribute that growth across the vessel types depending on their typical activities. For example, if bulk goods were estimated to increase by two percent annually, one might apply that growth rate to the bulk carrier fleet. This report uses the rate at which new vessels enter the Great Lakes fleet as a proxy for growth in activity and emissions. Future work could focus on synthesizing growth in each fleet of vessels with growth in waterborne commerce.

Second, growth rates for vessels that comprise a smaller percentage of the Great Lakes fleet could be estimated. The analysis assumed no growth for excursion, support, dredges, commercial fishing, and military vessels due to lack of data. Research that results in a better estimation of activity as well as growth rates could be useful. However, we have shown that these vessels are smaller contributors to overall emissions within the LADCO region.

Third, some near-port estimates in this study may be improved using location-specific time-in-mode calculation methods. The previous study of commercial marine emissions for the LADCO region evaluated two ports (Duluth and Cleveland); that study then made similarity assumptions through an approach described as “port matching” to apply the same time-in-mode distribution between cruise, reduced speed zone, maneuvering to/from port, and hotelling (Lindhjem & Browning, 2007). The previous study did not use a time-in-mode approach for river traffic emissions. This study does not make any adjustments for in-port or near-port reduced emissions, but applies a single average load for

main engines and auxiliary engines (see Table 2 and Table 5). This may lead to conservatively high estimated emissions for the short distances around ports, although nearly all emissions in US waters occur in shipping channels outside of port regions (Corbett, 2002; Corbett & Fischbeck, 2000). The fraction of LADCO regional activity by marine vessels on the Great Lakes and IWW can be evaluated in future work and adjustments can be made based on local data. Estimating near-port emissions may be worthwhile if new data suggest more than a few percent of emissions adjustment for port activity, or where emissions at sub-grid scale have relevance to LADCO members.

Finally, a method for distributing emissions for cross-river counties should be developed. Allocating emissions to each county within the LADCO region can produce errors that result from geopolitical county boundaries that extend across an entire waterway rather than to its center. When these boundaries are used in a geospatial environment, confusion on the correct allocation of emissions can occur. The analysis identified that counties on opposite sides of a waterway had vastly different emissions totals. Future work could focus on validating geopolitical boundaries and investigate ways to properly assign emissions values to counties bordering the IWW system.

## Conclusions

Spatially-allocated emissions of greenhouse gases, ozone precursors, contributors to regional haze, and species of PM including BC and POM from commercial marine vessels have been estimated for the Great Lakes and the IWW system within the LADCO region using a 2010 base year. Furthermore, emissions within the region have been projected out to 2020 and 2030 and results suggest that if recent trends persist, emissions are expected to decline (with the exception of SO<sub>x</sub>) due to decreased IWW fuel consumption over time. Yet, emissions on the Great Lakes are expected to increase at a rate between 0.89% and 1.25% per year, depending on the pollutant.

The IWW system contributes most to emissions within the LADCO region for all pollutants except SO<sub>x</sub> and produces about 25% more CO<sub>2</sub> emissions within the region compared to vessel activity on the Great Lakes. Additionally, results show that on the Great Lakes, tugs and bulk vessels contribute most to CO<sub>2</sub> emissions as well as NO<sub>x</sub> and PM, which contribute to regional haze and have negative human-health impacts.

This report improves upon the previous report by including activity data from the STEEM model and adding maps highlighting instances where geospatial allocation of emissions needs to be further investigated in order to fairly distribute emissions to counties bordering the IWW within the LADCO region. Additionally, this report (1) includes emissions estimates for CO<sub>2</sub>, BC, and POM, which the previous report omitted, (2) estimates future emissions, which was not done previously, and (3) allows for straight-forward updating of future reports.

Finally, four opportunities to improve the emissions inventory further are described. One opportunity is to investigate ways to improve the accuracy of growth rates for Great Lakes vessels. A second opportunity is to develop growth estimates for smaller Great Lakes vessels. A third opportunity is to include near-port emissions estimates using local data for particular cases. A fourth opportunity is to determine new methods to allocate emissions at the county level. This report is an improvement from the previous report and any methodological updates will further enhance the usefulness and accuracy of LADCO models in the future.

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## Appendix A: State Staging Tables

Table A1: Great Lakes staging table with emissions by state and county.

State and County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC (MT)	PM (MT)	BC (MT)	POM(MT)	CO (MT)
<b>IL Total</b>	<b>2,858</b>	<b>73</b>	<b>36</b>	<b>2</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>6</b>
Cook County, IL	1,071	27	13	1	2	0	1	2
Lake County, IL	1,786	46	22	2	3	0	1	4
<b>IN Total</b>	<b>579</b>	<b>15</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
Lake County, IN	234	6	3	0	0	0	0	0
Porter County, IN	345	9	5	0	1	0	0	1
<b>MI Total</b>	<b>181,347</b>	<b>4,696</b>	<b>2,364</b>	<b>159</b>	<b>308</b>	<b>22</b>	<b>105</b>	<b>366</b>
Alcona County, MI	8,675	225	114	8	15	1	5	18
Alger County, MI	9,005	233	118	8	15	1	5	18
Alpena County, MI	11,612	301	152	10	20	1	7	23
Antrim County, MI	103	2	1	0	0	0	0	0
Benzie County, MI	964	25	12	1	2	0	1	2
Charlevoix County, MI	6,917	178	89	6	11	1	4	14
Cheboygan County, MI	1,918	50	25	2	3	0	1	4
Chippewa County, MI	26,141	676	340	23	44	3	15	53
Delta County, MI	173	5	2	0	0	0	0	0
Emmet County, MI	2,348	61	30	2	4	0	1	5
Huron County, MI	11,617	301	152	10	20	1	7	23
Iosco County, MI	8,522	221	112	8	15	1	5	17
Keweenaw County, MI	14,054	365	184	12	24	2	8	28
Leelanau County, MI	3,577	92	46	3	6	0	2	7
Luce County, MI	14,424	374	188	13	24	2	8	29
Mackinac County, MI	5,908	153	77	5	10	1	3	12
Manistee County, MI	1,652	42	21	1	3	0	1	3
Marquette County, MI	906	23	11	1	1	0	0	2
Mason County, MI	1,858	48	24	2	3	0	1	4
Menominee County, MI	102	3	1	0	0	0	0	0
Monroe County, MI	222	6	3	0	0	0	0	0
Muskegon County, MI	2,943	75	37	3	5	0	2	6
Oceana County, MI	1,165	30	15	1	2	0	1	2
Ontonagon County, MI	8,189	213	107	7	14	1	5	17
Ottawa County, MI	1,247	32	16	1	2	0	1	2
Presque Isle County, MI	10,206	264	133	9	17	1	6	21
Saint Clair County, MI	10,176	264	134	9	17	1	6	21
Sanilac County, MI	7,123	185	93	6	12	1	4	14
Schoolcraft County, MI	130	3	2	0	0	0	0	0
Wayne County, MI	9,470	246	124	8	16	1	6	19
<b>MN Total</b>	<b>9,829</b>	<b>255</b>	<b>129</b>	<b>9</b>	<b>17</b>	<b>1</b>	<b>6</b>	<b>20</b>
Cook County, MN	8,456	219	111	7	14	1	5	17
Lake County, MN	7	0	0	0	0	0	0	0

State and County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC (MT)	PM (MT)	BC (MT)	POM(MT)	CO (MT)
Saint Louis County, MN	1,366	35	18	1	2	0	1	3
<b>NY Total</b>	<b>37,433</b>	<b>975</b>	<b>494</b>	<b>33</b>	<b>65</b>	<b>5</b>	<b>22</b>	<b>76</b>
Cayuga County, NY	78	2	1	0	0	0	0	0
Chautauqua County, NY	3,733	97	49	3	6	0	2	8
Erie County, NY	62	2	1	0	0	0	0	0
Jefferson County, NY	6,861	179	91	6	12	1	4	14
Monroe County, NY	9,854	257	130	9	17	1	6	20
Niagara County, NY	8,045	210	106	7	14	1	5	16
Orleans County, NY	4,163	108	55	4	7	1	2	8
Oswego County, NY	156	4	2	0	0	0	0	0
Saint Lawrence County, NY	4,480	117	59	4	8	1	3	9
<b>OH Total</b>	<b>29,288</b>	<b>760</b>	<b>384</b>	<b>26</b>	<b>50</b>	<b>4</b>	<b>17</b>	<b>59</b>
Ashtabula County, OH	10,435	271	137	9	18	1	6	21
Cuyahoga County, OH	6,911	180	91	6	12	1	4	14
Erie County, OH	253	6	3	0	0	0	0	0
Lake County, OH	6,518	169	86	6	11	1	4	13
Lorain County, OH	3,248	84	43	3	6	0	2	7
Lucas County, OH	1,133	29	15	1	2	0	1	2
Ottawa County, OH	790	20	10	1	1	0	0	2
<b>PA Total</b>	<b>10,566</b>	<b>275</b>	<b>139</b>	<b>9</b>	<b>18</b>	<b>1</b>	<b>6</b>	<b>21</b>
Erie County, PA	10,566	275	139	9	18	1	6	21
<b>WI Total</b>	<b>21,172</b>	<b>548</b>	<b>275</b>	<b>19</b>	<b>36</b>	<b>3</b>	<b>12</b>	<b>43</b>
Ashland County, WI	9,882	256	129	9	17	1	6	20
Bayfield County, WI	2,770	72	36	2	5	0	2	6
Door County, WI	439	12	6	0	1	0	0	1
Douglas County, WI	2,713	70	35	2	5	0	2	5
Kenosha County, WI	1,247	32	16	1	2	0	1	2
Marinette County, WI	204	5	3	0	0	0	0	0
Milwaukee County, WI	2,196	56	28	2	4	0	1	4
Ozaukee County, WI	475	12	6	0	1	0	0	1
Racine County, WI	1,247	32	16	1	2	0	1	2
<b>Canadian Total</b>	<b>65,044</b>	<b>1,687</b>	<b>851</b>	<b>57</b>	<b>111</b>	<b>8</b>	<b>38</b>	<b>131</b>
Canadian Portion of Lake Erie (ON)	18,315	476	240	16	31	2	11	37
Canadian Portion of Lake Huron (ON)	16,777	433	217	15	28	2	10	34
Canadian Portion of Lake Ontario (ON)	19,768	514	261	17	34	2	12	40
Canadian Portion of Lake Superior (ON)	10,184	264	133	9	17	1	6	21
<b>Grand Total</b>	<b>358,115</b>	<b>9,284</b>	<b>4,680</b>	<b>315</b>	<b>610</b>	<b>43</b>	<b>207</b>	<b>723</b>

Table A2: Inland Waterway system staging table with emissions by state and county.

State	County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC(MT)	PM(MT)	BC (MT)	POM (MT)	CO (MT)
<b>LADCO COUNTIES PLUS MINNESOTA COUNTIES</b>									
IL	Adams County	2,363	43	4	1	1	0	0	8
IL	Alexander County	52,581	952	84	21	23	2	8	177
IL	Brown County	1,676	30	3	1	1	0	0	6
IL	Bureau County	6,918	125	11	3	3	0	1	23
IL	Calhoun County	21,557	390	34	8	9	1	3	72
IL	Carroll County	1,380	25	2	1	1	0	0	5
IL	Cass County	10,604	192	17	4	5	0	2	36
IL	Cook County	6,691	121	11	3	3	0	1	22
IL	DuPage County	381	7	1	0	0	0	0	1
IL	Fulton County	11,778	213	19	5	5	0	2	40
IL	Greene County	12,912	234	21	5	6	0	2	43
IL	Grundy County	8,629	156	14	3	4	0	1	29
IL	Hancock County	3,462	63	6	1	2	0	1	12
IL	Hardin County	3,632	66	6	1	2	0	1	12
IL	Henderson County	4,951	90	8	2	2	0	1	17
IL	Jackson County	14,447	262	23	6	6	0	2	49
IL	Jersey County	9,952	180	16	4	4	0	1	33
IL	Jo Daviess County	3,112	56	5	1	1	0	0	10
IL	La Salle County	13,738	249	22	5	6	0	2	46
IL	Madison County	2,807	51	4	1	1	0	0	9
IL	Marshall County	6,960	126	11	3	3	0	1	23
IL	Mason County	18,611	337	30	7	8	1	3	63
IL	Mercer County	1,881	34	3	1	1	0	0	6
IL	Monroe County	16,977	307	27	7	7	0	3	57
IL	Morgan County	713	13	1	0	0	0	0	2
IL	Peoria County	6,626	120	11	3	3	0	1	22
IL	Pike County	16,457	298	26	6	7	0	2	55
IL	Pope County	1,597	29	3	1	1	0	0	5
IL	Putnam County	7,517	136	12	3	3	0	1	25
IL	Randolph County	21,174	383	34	8	9	1	3	71
IL	Rock Island County	4,963	90	8	2	2	0	1	17
IL	Saint Clair County	1,613	29	3	1	1	0	0	5
IL	Schuyler County	11,497	208	18	5	5	0	2	39
IL	Scott County	3,234	59	5	1	1	0	0	11
IL	Tazewell County	5,434	98	9	2	2	0	1	18
IL	Union County	21,469	389	34	8	9	1	3	72

State	County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC(MT)	PM(MT)	BC (MT)	POM (MT)	CO (MT)
IL	Whiteside County	1,313	24	2	1	1	0	0	4
IL	Will County	3,356	61	5	1	1	0	0	11
IL	Woodford County	3,765	68	6	1	2	0	1	13
IN	Crawford County	14	0	0	0	0	0	0	0
IN	Dearborn County	14	0	0	0	0	0	0	0
IN	Harrison County	1,181	21	2	0	1	0	0	4
IN	Ohio County	123	2	0	0	0	0	0	0
IN	Perry County	3,057	55	5	1	1	0	0	10
IN	Posey County	1,058	19	2	0	0	0	0	4
IN	Spencer County	993	18	2	0	0	0	0	3
IN	Switzerland County	249	5	0	0	0	0	0	1
IN	Warrick County	747	14	1	0	0	0	0	3
MN	Anoka County	26,677	483	42	11	12	1	4	90
MN	Dakota County	3,427	62	5	1	2	0	1	12
MN	Goodhue County	8,313	151	13	3	4	0	1	28
MN	Hennepin County	17,407	315	28	7	8	1	3	58
MN	Houston County	1,067	19	2	0	0	0	0	4
MN	Ramsey County	2,085	38	3	1	1	0	0	7
MN	Sherburne County	39,371	713	63	16	17	1	6	132
MN	Wabasha County	7,345	133	12	3	3	0	1	25
MN	Washington County	2,165	39	3	1	1	0	0	7
MN	Winona County	1,917	35	3	1	1	0	0	6
MN	Wright County	17,921	324	28	7	8	1	3	60
OH	Adams County	263	5	0	0	0	0	0	1
OH	Belmont County	1,060	19	2	0	0	0	0	4
OH	Brown County	2,054	37	3	1	1	0	0	7
OH	Clermont County	39	1	0	0	0	0	0	0
OH	Gallia County	856	16	1	0	0	0	0	3
OH	Hamilton County	1,827	33	3	1	1	0	0	6
OH	Jefferson County	4,508	82	7	2	2	0	1	15
OH	Meigs County	2,350	43	4	1	1	0	0	8
OH	Monroe County	2,651	48	4	1	1	0	0	9
OH	Scioto County	355	6	1	0	0	0	0	1
OH	Washington County	847	15	1	0	0	0	0	3
WI	Buffalo County	4,656	84	7	2	2	0	1	16
WI	Crawford County	4,190	76	7	2	2	0	1	14
WI	Grant County	4,077	74	6	2	2	0	1	14
WI	La Crosse County	1,243	23	2	0	1	0	0	4

State	County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC(MT)	PM(MT)	BC (MT)	POM (MT)	CO (MT)
WI	Pepin County	2,651	48	4	1	1	0	0	9
WI	Pierce County	4,913	89	8	2	2	0	1	17
WI	Trempealeau County	847	15	1	0	0	0	0	3
WI	Vernon County	2,748	50	4	1	1	0	0	9
Non LADCO Counties									
State	County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC(MT)	PM(MT)	BC (MT)	POM (MT)	CO (MT)
IA	Allamakee County	3,650	66	6	1	2	0	1	12
IA	Clayton County	4,058	73	6	2	2	0	1	14
IA	Clinton County	2,671	48	4	1	1	0	0	9
IA	Des Moines County	5,134	93	8	2	2	0	1	17
IA	Dubuque County	3,595	65	6	1	2	0	1	12
IA	Jackson County	2,921	53	5	1	1	0	0	10
IA	Lee County	12,183	221	19	5	5	0	2	41
IA	Louisa County	2,551	46	4	1	1	0	0	9
IA	Muscatine County	2,785	50	4	1	1	0	0	9
IA	Scott County	4,775	86	8	2	2	0	1	16
KY	Ballard County	13,443	243	21	5	6	0	2	45
KY	Boone County	22,636	410	36	9	10	1	3	76
KY	Boyd County	2,586	47	4	1	1	0	0	9
KY	Bracken County	20,487	371	33	8	9	1	3	69
KY	Breckinridge County	35,946	651	57	14	16	1	5	121
KY	Campbell County	10,184	184	16	4	4	0	2	34
KY	Carroll County	21,244	385	34	8	9	1	3	71
KY	Crittenden County	23,818	431	38	9	10	1	4	80
KY	Daviess County	29,763	539	47	12	13	1	4	100
KY	Gallatin County	10,707	194	17	4	5	0	2	36
KY	Greenup County	28,383	514	45	11	12	1	4	95
KY	Hancock County	25,745	466	41	10	11	1	4	87
KY	Henderson County	43,217	783	69	17	19	1	6	145
KY	Jefferson County	48,610	880	77	19	21	1	7	163
KY	Kenton County	4,175	76	7	2	2	0	1	14
KY	Lewis County	60,266	1,091	96	24	26	2	9	203

State	County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC(MT)	PM(MT)	BC (MT)	POM (MT)	CO (MT)
KY	Livingston County	33,139	600	53	13	15	1	5	111
KY	Marshall County	835	15	1	0	0	0	0	3
KY	Mason County	23,835	432	38	9	10	1	4	80
KY	McCracken County	7,638	138	12	3	3	0	1	26
KY	Meade County	92,316	1,672	147	36	40	3	14	310
KY	Oldham County	26,769	485	43	11	12	1	4	90
KY	Pendleton County	1,103	20	2	0	0	0	0	4
KY	Trimble County	33,296	603	53	13	15	1	5	112
KY	Union County	24,033	435	38	9	11	1	4	81
MO	Cape Girardeau County	21,474	389	34	8	9	1	3	72
MO	Clark County	676	12	1	0	0	0	0	2
MO	Jefferson County	6,140	111	10	2	3	0	1	21
MO	Lewis County	1,247	23	2	0	1	0	0	4
MO	Lincoln County	3,126	57	5	1	1	0	0	11
MO	Marion County	1,271	23	2	1	1	0	0	4
MO	Mississippi County	30,010	543	48	12	13	1	4	101
MO	Perry County	23,416	424	37	9	10	1	3	79
MO	Pike County	3,841	70	6	2	2	0	1	13
MO	Ralls County	654	12	1	0	0	0	0	2
MO	Saint Charles County	3,454	63	5	1	2	0	1	12
MO	Saint Louis City	3,787	69	6	1	2	0	1	13
MO	Saint Louis County	6,402	116	10	3	3	0	1	22
MO	Sainte Genevieve County	10,112	183	16	4	4	0	1	34
MO	Scott County	15,008	272	24	6	7	0	2	50
WV	Brooke County	11,599	210	18	5	5	0	2	39
WV	Cabell County	13,322	241	21	5	6	0	2	45
WV	Hancock County	10,098	183	16	4	4	0	1	34
WV	Jackson County	23,755	430	38	9	10	1	4	80
WV	Marshall County	27,113	491	43	11	12	1	4	91

State	County	CO <sub>2</sub> (MT)	NO <sub>x</sub> (MT)	SO <sub>x</sub> (MT)	HC(MT)	PM(MT)	BC (MT)	POM (MT)	CO (MT)
WV	Mason County	52,452	950	83	21	23	2	8	176
WV	Ohio County	11,060	200	18	4	5	0	2	37
WV	Pleasants County	17,341	314	28	7	8	0	3	58
WV	Putnam County	13,449	244	21	5	6	0	2	45
WV	Tyler County	15,621	283	25	6	7	0	2	52
WV	Wayne County	1,884	34	3	1	1	0	0	6
WV	Wetzel County	8,357	151	13	3	4	0	1	28
WV	Wood County	19,879	360	32	8	9	1	3	67
<b>LADCO States Plus MN Totals (MT)</b>		<b>525,997</b>	<b>9,524</b>	<b>836</b>	<b>207</b>	<b>230</b>	<b>15</b>	<b>78</b>	<b>1,768</b>
<b>Non-LADCO States Totals (MT)</b>		<b>1,045,044</b>	<b>18,923</b>	<b>1,661</b>	<b>412</b>	<b>458</b>	<b>30</b>	<b>155</b>	<b>3,512</b>
<b>Grand Total (MT)</b>		<b><u>1,571,041</u></b>	<b><u>28,447</u></b>	<b><u>2,498</u></b>	<b><u>619</u></b>	<b><u>688</u></b>	<b><u>45</u></b>	<b><u>233</u></b>	<b><u>5,280</u></b>

### Appendix B: Graphs of Emissions by Source Using a Logarithmic Scale

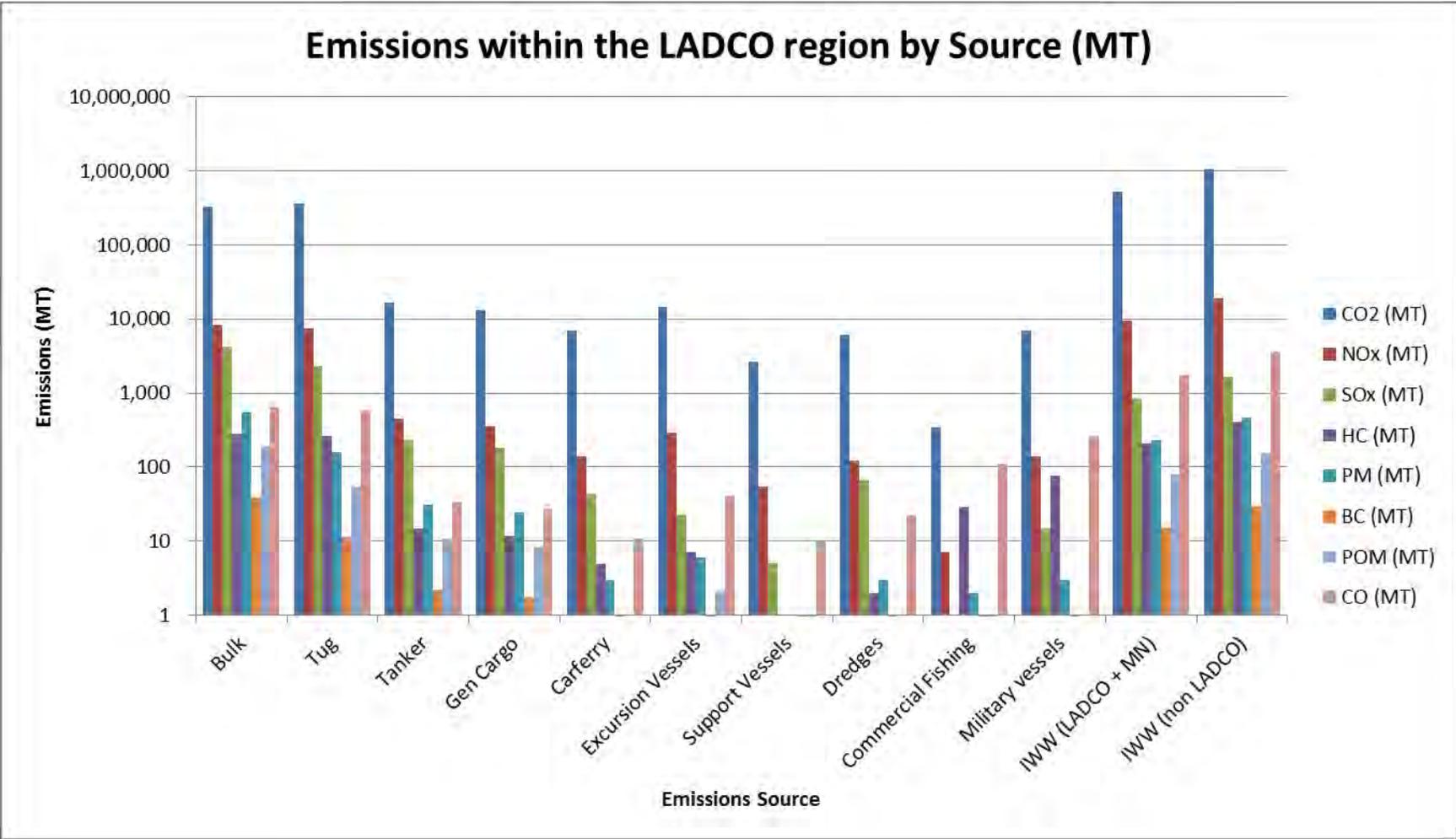


Figure B1: Emissions within the LADCO region by source in metric tons on a logarithmic scale.

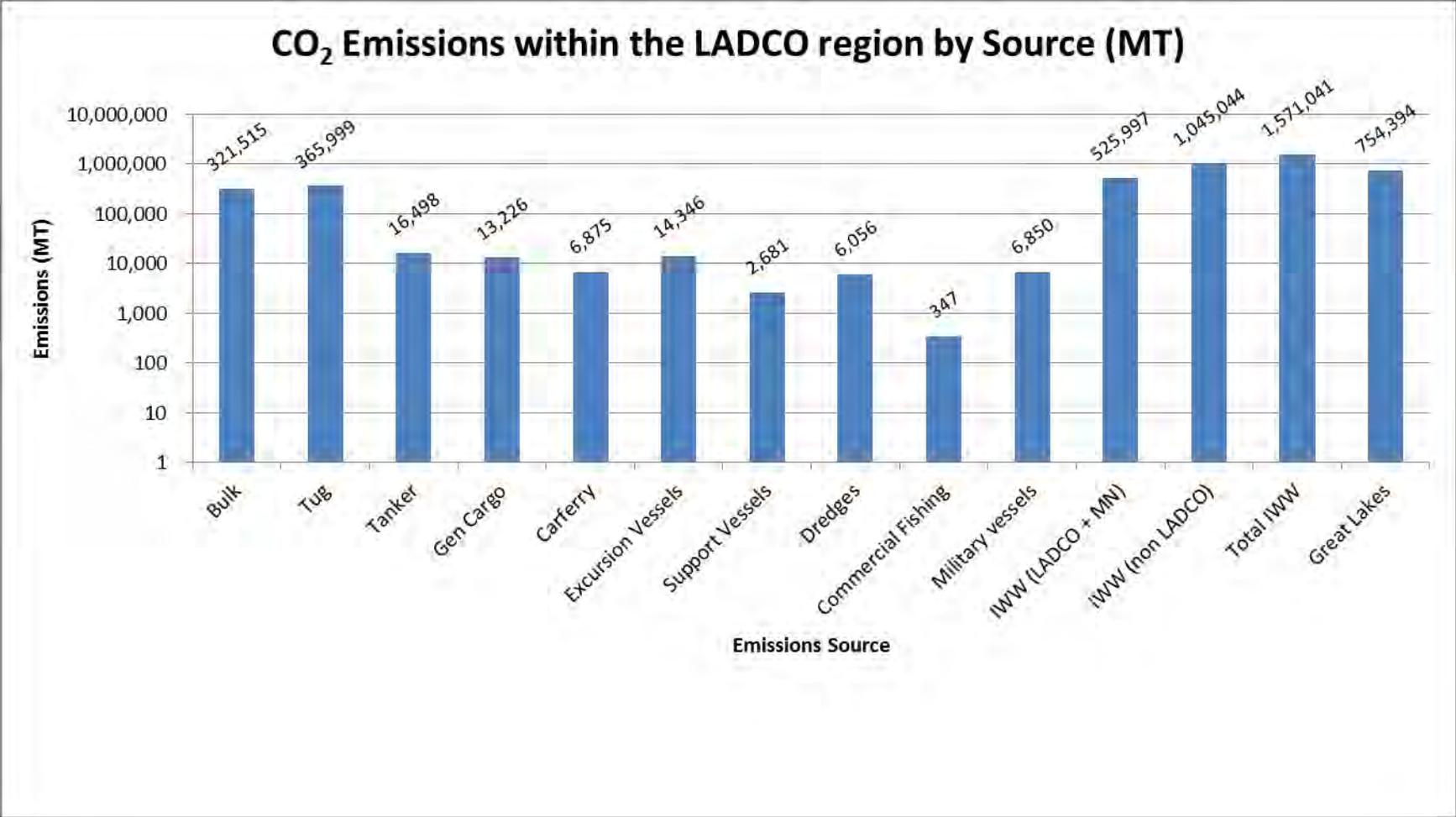


Figure B2: CO<sub>2</sub> emissions within the LADCO region by source in metric tons on a logarithmic scale.

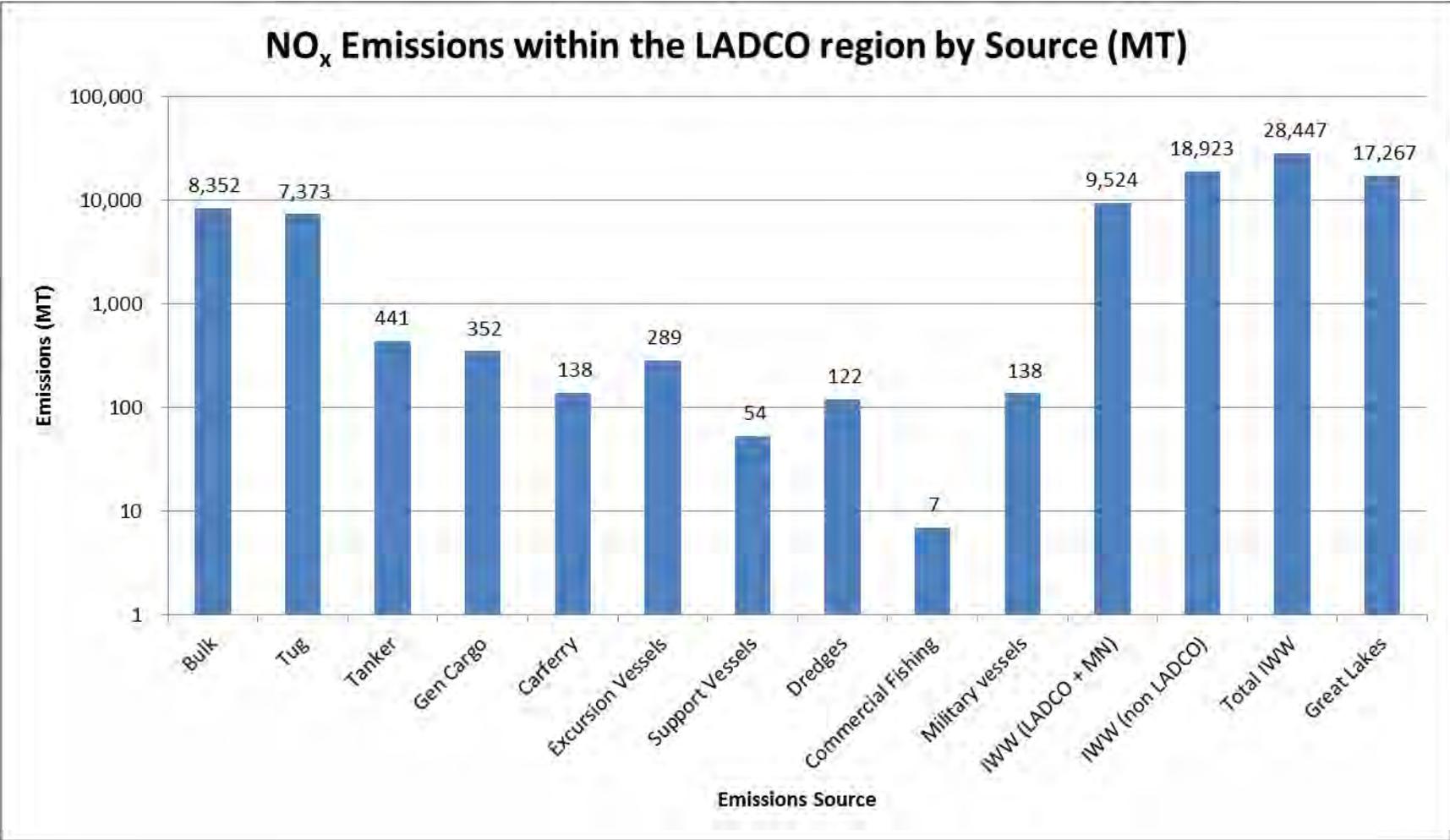


Figure B3: NO<sub>x</sub> emissions within the LADCO region by source in metric tons on a logarithmic scale.

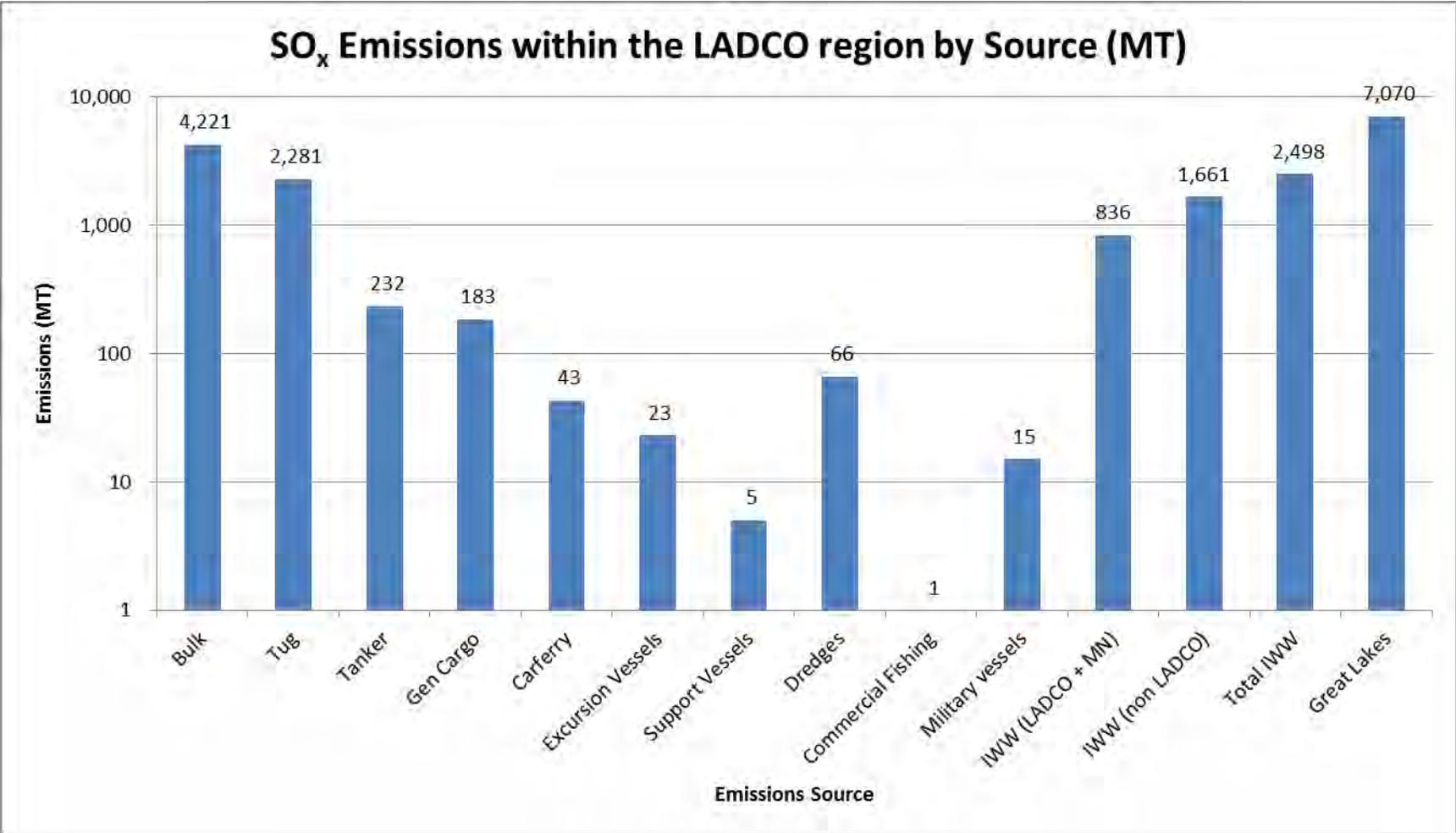


Figure B4: SO<sub>x</sub> emissions within the LADCO region by source in metric tons on a logarithmic scale.

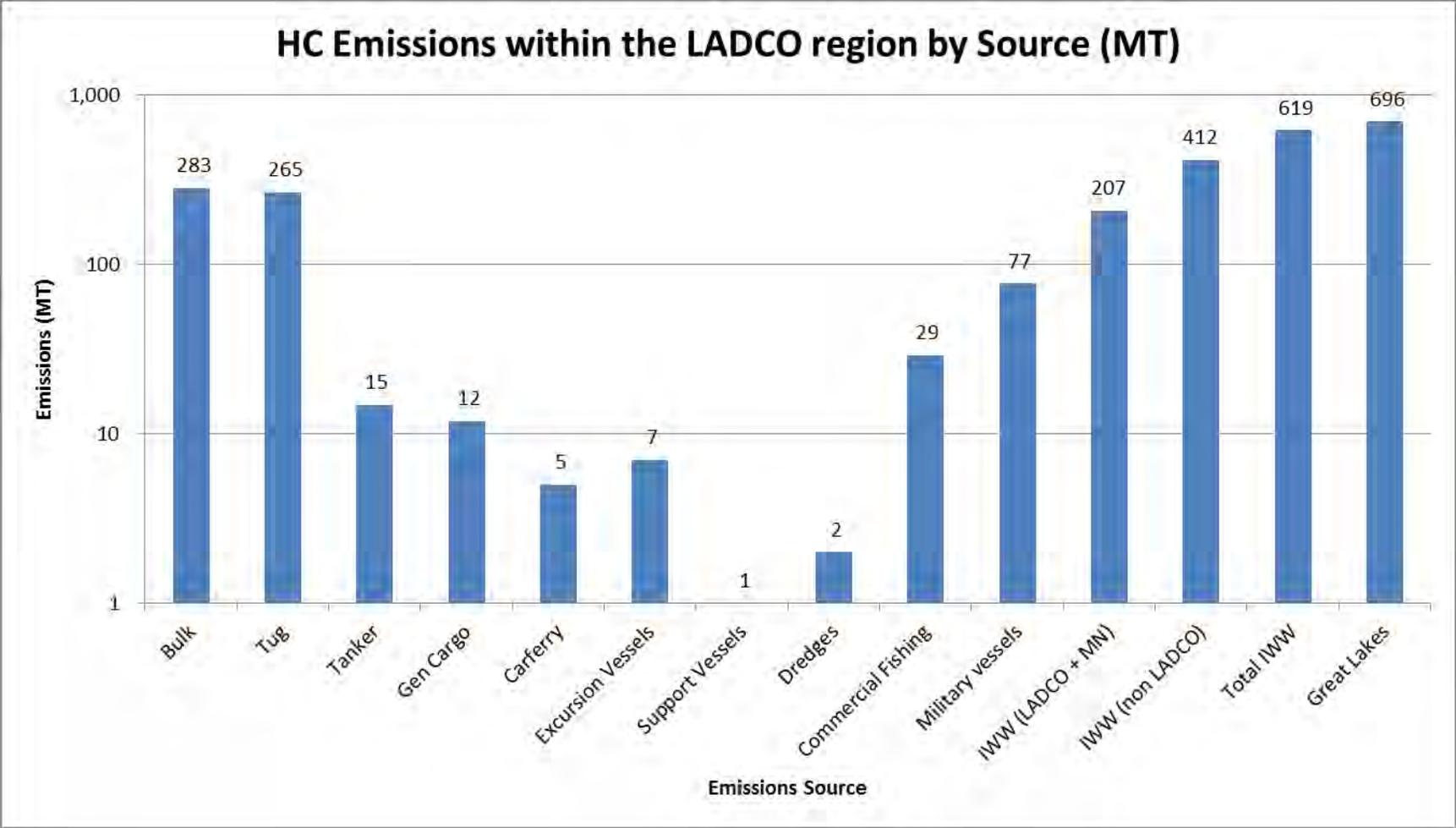


Figure B5: HC emissions within the LADCO region by source in metric tons on a logarithmic scale.

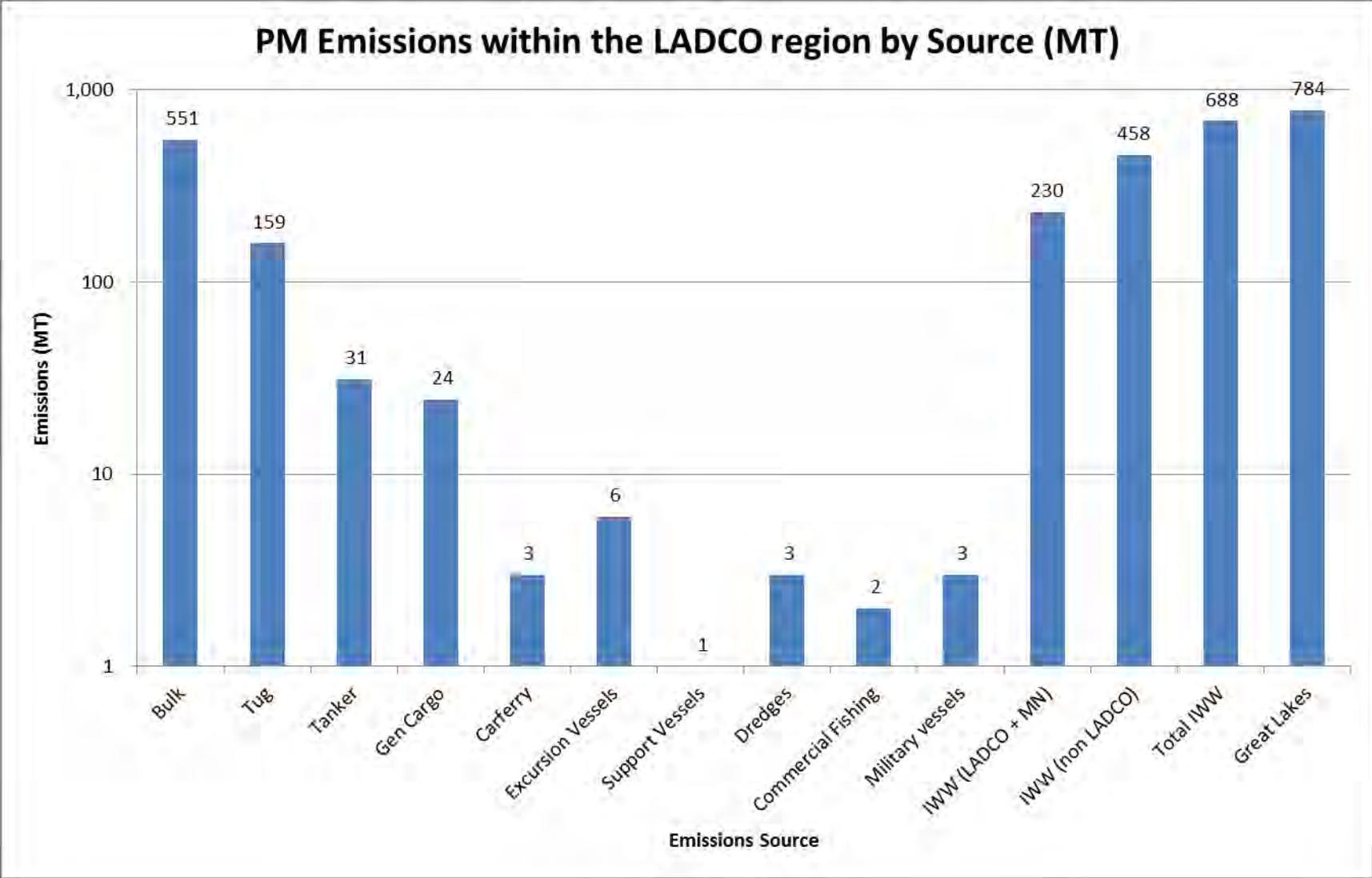


Figure B6: PM emissions within the LADCO region by source in metric tons on a logarithmic scale.

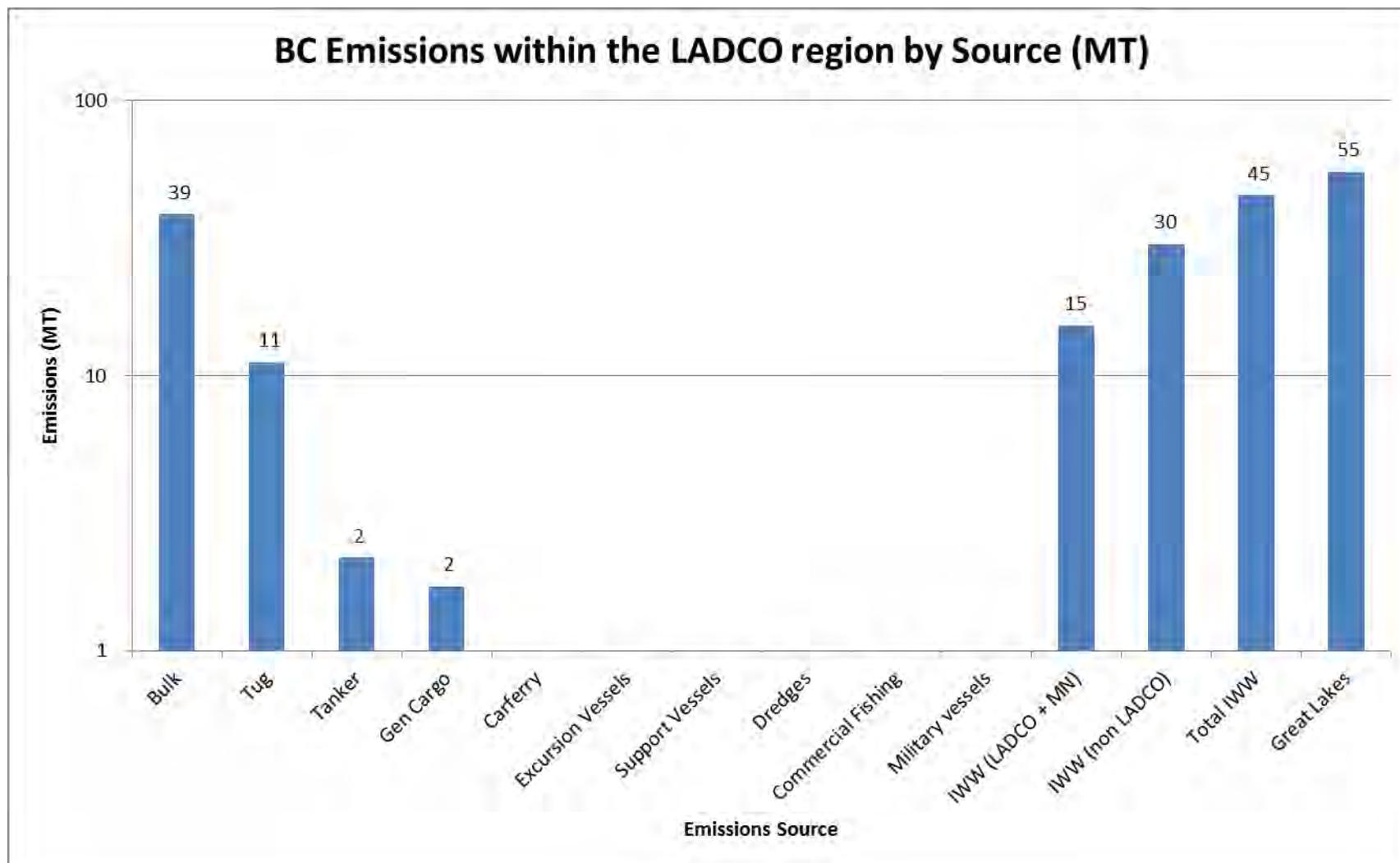


Figure B7: BC emissions within the LADCO region by source in metric tons on a logarithmic scale.

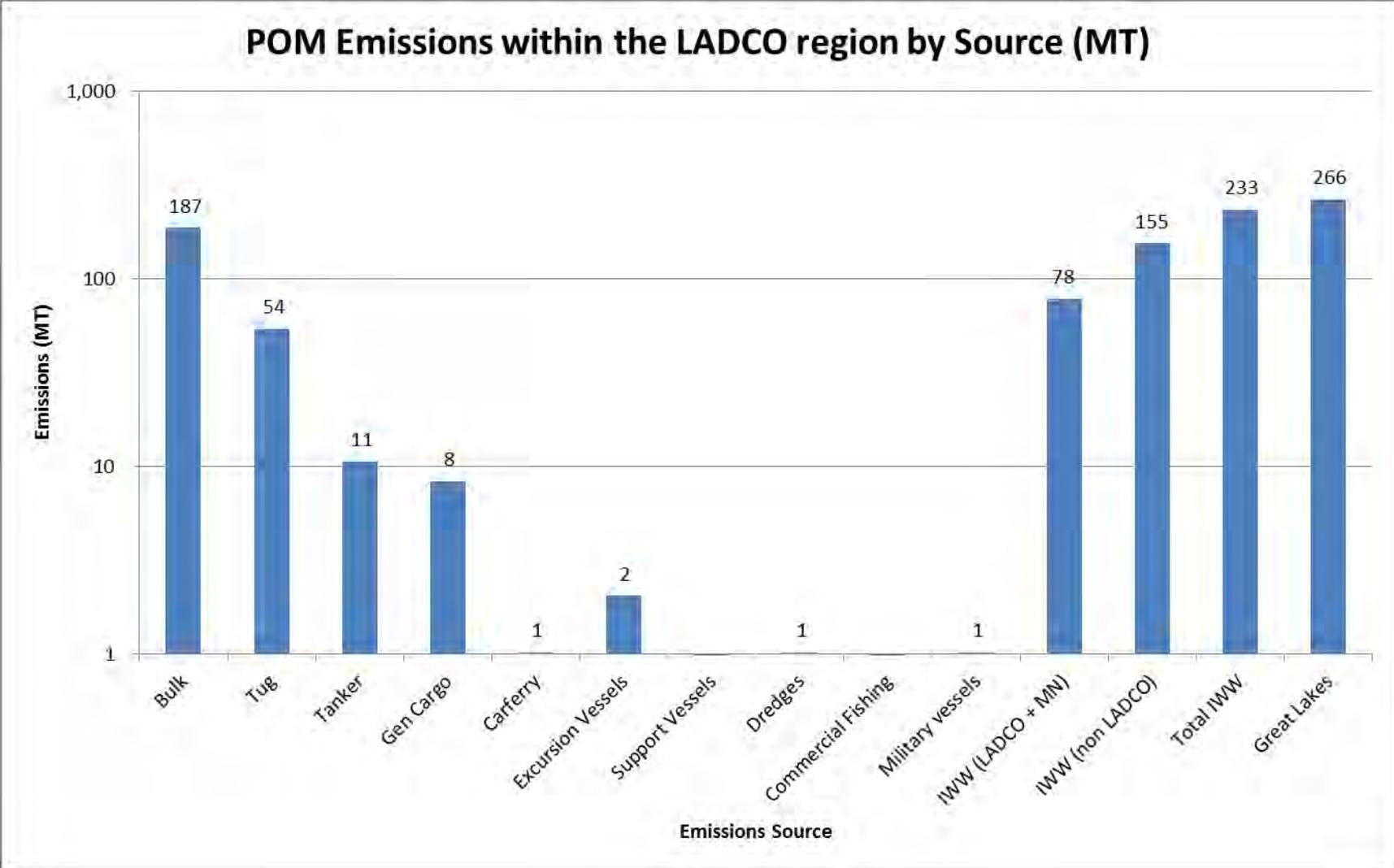


Figure B8: POM emissions within the LADCO region by source in metric tons on a logarithmic scale.

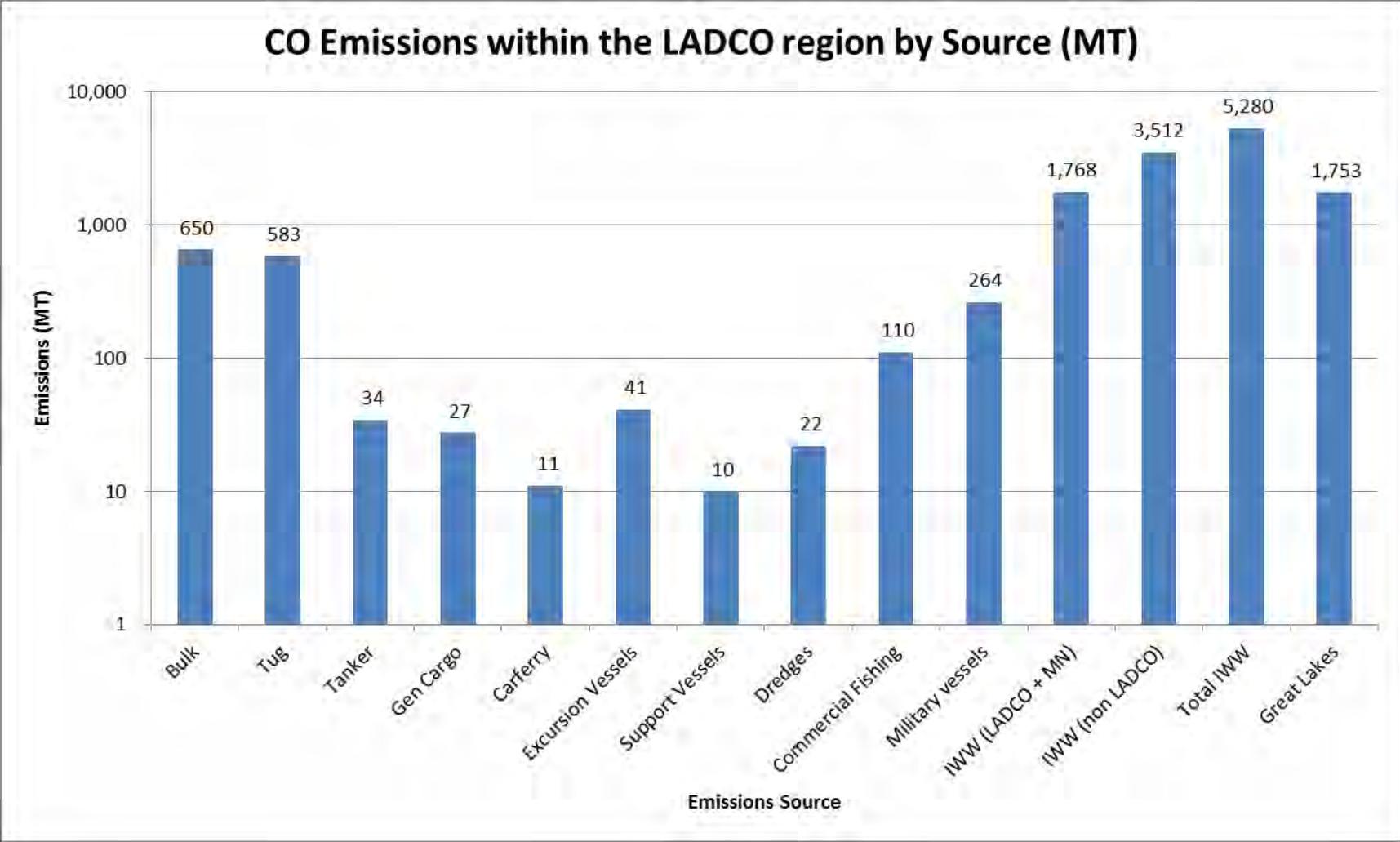


Figure B9: CO emissions within the LADCO region by source in metric tons on a logarithmic scale.

## **Appendix 8**

### **Emissions from Aircrafts**

## Emissions from Aircrafts

The annual aircraft emissions were obtained from the U.S. EPA's 2011 National Emissions Inventory (NEI) and the U.S. EPA's 2011 Modeling Platform, version 6 (Modeling Platform). These two inventories provide identical county-wide emission values for aircraft emissions. Data presented in this Appendix come from the Modeling Platform, since that inventory provides readily accessible data by source classification code (SCC) and airport location.

Annual aircraft emissions in the 2011 NEI are available at:

<http://www.epa.gov/ttnchie1/net/2011inventory.html>

Annual aircraft emissions in the 2011 Modeling Platform are available at:

[ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/point_by_state/)

(For example, Wisconsin aircraft data are in the file:

**WI\_2011NEIv1\_POINT\_20130723\_revised\_ptnonipm\_15aug2013\_v3.csv**, found in the folder: **WI\_point\_2011.zip**)

U.S. EPA provided state, local and tribal air agencies the opportunity to update the U.S. EPA's aircraft activity data for the U.S. EPA's emissions calculations. WDNR did provide an update on October 12, 2012, but that update only added an airport to Pierce County, Wisconsin. The WDNR did not make any additions or changes to the U.S. EPA aircraft activity data for Kenosha or Sheboygan Counties.

In addition to emissions from aircraft, emissions from airport support equipment are also included in this Appendix. Airport support emissions could also be generated using the U.S. EPA's National Mobile Inventory Model (NMIM). However, WDNR selected the more recent estimates from the 2011 Modeling Platform. The tables of nonroad emissions from all source subcategories in Appendix 4 present both the aircraft emissions and the airport support equipment emissions contained in this Appendix.

Annual emission were converted to summer day emissions using the annual to summer day ratios for aircraft emissions found in the LADCO modeling inventory for the year 2007. The following four tables present the aircraft and airport support emissions for Kenosha County (both the entire county and the nonattainment area part) and Sheboygan County.

Table 8-a: Aircraft Emissions in Kenosha County and the Kenosha Sub-County Nonattainment Area (NAA)  
 NOx Emissions: tons per year and tons per summer day

Facility ID	Facility Name	Longitude	Latitude	In NAA ?	Source Classification Code (SCC)	2011 Annual NOx Emissions (tons)		Emissions: Annual/(Summer Day)	2011 Summer Day NOx Emissions (tons)	
						Kenosha County	Kenosha NAA		Kenosha County	Kenosha NAA
10949811	DUTCH GAP AIRSTRIP	-88.0167	42.5234	no	2275050011	0.00318	0.00000	361.11	0.00001	0.00000
11142311	KENOSHA COUNTY	-88.0456	42.5702	no	2275050011	0.00060	0.00000	361.11	0.00000	0.00000
11142311	KENOSHA COUNTY	-88.0456	42.5702	no	2275050012	0.00535	0.00000	361.11	0.00001	0.00000
11158111	CAMP LAKE	-88.1584	42.5334	no	2275050011	0.02578	0.00000	361.11	0.00007	0.00000
11158111	CAMP LAKE	-88.1584	42.5334	no	2275050012	0.04973	0.00000	361.11	0.00014	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050011	0.26171	0.00000	361.11	0.00072	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050012	0.50478	0.00000	361.11	0.00140	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050011	0.00047	0.00000	361.11	0.00000	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050012	0.00834	0.00000	361.11	0.00002	0.00000
11579911	VINCENT	-88.3004	42.5184	no	2275050011	0.04058	0.00000	361.11	0.00011	0.00000
11579911	VINCENT	-88.3004	42.5184	no	2275050012	0.07686	0.00000	361.11	0.00021	0.00000
11957811	DIGGER DOUGS	-88.1464	42.5975	no	2275050011	0.00318	0.00000	361.11	0.00001	0.00000
12032711	OLSON'S	-88.0876	42.657	no	2275050011	0.00318	0.00000	361.11	0.00001	0.00000
12179011	AURORA MEDICAL	-87.9361	42.5706	yes	2275050011	0.00060	0.00060	361.11	0.00000	0.00000
12179011	AURORA MEDICAL	-87.9361	42.5706	yes	2275050012	0.00535	0.00535	361.11	0.00001	0.00001
12195911	WINFIELD	-88.0279	42.5222	no	2275050011	0.00730	0.00000	361.11	0.00002	0.00000
12212011	KENOSHA HOSPITAL	-87.8195	42.5786	yes	2275050011	0.00060	0.00060	361.11	0.00000	0.00000
12212011	KENOSHA HOSPITAL	-87.8195	42.5786	yes	2275050012	0.00535	0.00535	361.11	0.00001	0.00001
12212411	FLAGLOR	-88.1359	42.6609	no	2275050011	0.00296	0.00000	361.11	0.00001	0.00000
12213211	CHILCOTT FARMS	-88.0154	42.5778	no	2275050011	0.00296	0.00000	361.11	0.00001	0.00000
12230511	BRISTOL	-88.004	42.5367	no	2275050011	0.00383	0.00000	361.11	0.00001	0.00000
12231111	LEACH FARMS	-88.1868	42.6489	no	2275050011	0.00060	0.00000	361.11	0.00000	0.00000
12231111	LEACH FARMS	-88.1868	42.6489	no	2275050012	0.00535	0.00000	361.11	0.00001	0.00000
12232911	ST CATHERINE'S	-87.9236	42.5636	yes	2275050011	0.00060	0.00060	361.11	0.00000	0.00000
12232911	ST CATHERINE'S	-87.9236	42.5636	yes	2275050012	0.00535	0.00535	361.11	0.00001	0.00001
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275060011	0.01853	0.01853	361.11	0.00005	0.00005
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275060012	0.32563	0.32563	361.11	0.00090	0.00090
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275001000	0.00715	0.00715	361.11	0.00002	0.00002
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275050011	0.52384	0.52384	361.11	0.00145	0.00145
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275050012	1.01112	1.01112	361.11	0.00280	0.00280

Facility ID	Facility Name	Longitude	Latitude	In NAA ?	Source Classification Code (SCC)	2011 Annual NOx Emissions (tons)		Emissions: Annual/(Summer Day)	2011 Summer Day NOx Emissions (tons)	
						Kenosha County	Kenosha NAA		Kenosha County	Kenosha NAA
ALL	ALL				2265008005	0.0000	0.0000	361.11	0.0000	0.0000
ALL	ALL				2267008005	0.0000	0.0000	361.11	0.0000	0.0000
ALL	ALL				2268008005	0.0000	0.0000	361.11	0.0000	0.0000
ALL	ALL				2270008005	0.0000	0.0000	361.11	0.0000	0.0000
ALL	ALL				2275001000	0.0071	0.0071	361.11	0.0000	0.0000
ALL	ALL				2275050011	0.8820	0.5256	361.11	0.0024	0.0015
ALL	ALL				2275050012	1.6776	1.0272	361.11	0.0046	0.0028
ALL	ALL				2275060011	0.0185	0.0185	361.11	0.0001	0.0001
ALL	ALL				2275060012	0.3256	0.3256	361.11	0.0009	0.0009
ALL	ALL				2275070000	0.0000	0.0000	361.11	0.0000	0.0000
ALL	ALL				ALL	2.9109	1.9041	361.11	0.0081	0.0053

NOTE: SCC 2265008005 = 4-Stroke Airport Support Equipment  
 SCC 2267008005 = LPG Airport Support Equipment  
 SCC 2268008005 = CNG Airport Support Equipment  
 SCC 2270008005 = Diesel Airport Support Equipment  
 SCC 2275001000 = Military Aircraft  
 SCC 2275050011 = General Aviation, Piston  
 SCC 2275050012 = General Aviation, Turbine  
 SCC 2275060011 = Air Taxi, Piston  
 SCC 2275060012 = Air Taxi, Turbine  
 SCC 2275070000 = Aircraft Auxiliary Power Units

Table 8-b: Aircraft Emissions in Kenosha County and the Kenosha Sub-County Nonattainment Area (NAA)  
 VOC Emissions: tons per year and tons per summer day

Facility ID	Facility Name	Longitude	Latitude	In NAA ?	Source Classification Code (SCC)	2011 Annual VOC Emissions (tons)		Emissions: Annual/(Summer Day)	2011 Summer Day VOC Emissions (tons)	
						Kenosha County	Kenosha NAA		Kenosha County	Kenosha NAA
10949811	DUTCH GAP AIRSTRIP	-88.0167	42.5234	no	2275050011	0.00736	0.00000	357.35	0.00002	0.00000
11142311	KENOSHA COUNTY	-88.0456	42.5702	no	2275050011	0.00139	0.00000	357.35	0.00000	0.00000
11142311	KENOSHA COUNTY	-88.0456	42.5702	no	2275050012	0.01139	0.00000	357.35	0.00003	0.00000
11158111	CAMP LAKE	-88.1584	42.5334	no	2275050011	0.05969	0.00000	357.35	0.00017	0.00000
11158111	CAMP LAKE	-88.1584	42.5334	no	2275050012	0.10592	0.00000	357.35	0.00030	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050011	0.60586	0.00000	357.35	0.00170	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050012	1.07504	0.00000	357.35	0.00301	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050011	0.00051	0.00000	357.35	0.00000	0.00000
11205211	WESTOSHA	-88.2052	42.5141	no	2275050012	0.01081	0.00000	357.35	0.00003	0.00000
11579911	VINCENT	-88.3004	42.5184	no	2275050011	0.09395	0.00000	357.35	0.00026	0.00000
11579911	VINCENT	-88.3004	42.5184	no	2275050012	0.16369	0.00000	357.35	0.00046	0.00000
11957811	DIGGER DOUGS	-88.1464	42.5975	no	2275050011	0.00736	0.00000	357.35	0.00002	0.00000
12032711	OLSON'S	-88.0876	42.657	no	2275050011	0.00736	0.00000	357.35	0.00002	0.00000
12179011	AURORA MEDICAL	-87.9361	42.5706	yes	2275050011	0.00139	0.00139	357.35	0.00000	0.00000
12179011	AURORA MEDICAL	-87.9361	42.5706	yes	2275050012	0.01139	0.01139	357.35	0.00003	0.00003
12195911	WINFIELD	-88.0279	42.5222	no	2275050011	0.01690	0.00000	357.35	0.00005	0.00000
12212011	KENOSHA HOSPITAL	-87.8195	42.5786	yes	2275050011	0.00139	0.00139	357.35	0.00000	0.00000
12212011	KENOSHA HOSPITAL	-87.8195	42.5786	yes	2275050012	0.01139	0.01139	357.35	0.00003	0.00003
12212411	FLAGLOR	-88.1359	42.6609	no	2275050011	0.00686	0.00000	357.35	0.00002	0.00000
12213211	CHILCOTT FARMS	-88.0154	42.5778	no	2275050011	0.00686	0.00000	357.35	0.00002	0.00000
12230511	BRISTOL	-88.004	42.5367	no	2275050011	0.00887	0.00000	357.35	0.00002	0.00000
12231111	LEACH FARMS	-88.1868	42.6489	no	2275050011	0.00139	0.00000	357.35	0.00000	0.00000
12231111	LEACH FARMS	-88.1868	42.6489	no	2275050012	0.01139	0.00000	357.35	0.00003	0.00000
12232911	ST CATHERINE'S	-87.9236	42.5636	yes	2275050011	0.00139	0.00139	357.35	0.00000	0.00000
12232911	ST CATHERINE'S	-87.9236	42.5636	yes	2275050012	0.01139	0.01139	357.35	0.00003	0.00003
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275060011	0.01990	0.01990	357.35	0.00006	0.00006
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275060012	0.42244	0.42244	357.35	0.00118	0.00118
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275001000	0.06421	0.06421	357.35	0.00018	0.00018
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275050011	1.21268	1.21268	357.35	0.00339	0.00339
9028311	Kenosha Regional	-87.9308	42.6018	yes	2275050012	2.15341	2.15341	357.35	0.00603	0.00603

Facility ID	Facility Name	Longitude	Latitude	In NAA ?	Source Classification Code (SCC)	2011 Annual VOC Emissions (tons)		Emissions: Annual/(Summer Day)	2011 Summer Day VOC Emissions (tons)	
						Kenosha County	Kenosha NAA		Kenosha County	Kenosha NAA
ALL	ALL				2265008005	0.0000	0.0000	357.35	0.0000	0.0000
ALL	ALL				2267008005	0.0000	0.0000	357.35	0.0000	0.0000
ALL	ALL				2268008005	0.0000	0.0000	357.35	0.0000	0.0000
ALL	ALL				2270008005	0.0000	0.0000	357.35	0.0000	0.0000
ALL	ALL				2275001000	0.0642	0.0642	357.35	0.0002	0.0002
ALL	ALL				2275050011	2.0407	1.2168	357.35	0.0057	0.0034
ALL	ALL				2275050012	3.5550	2.1876	357.35	0.0099	0.0061
ALL	ALL				2275060011	0.0204	0.0199	357.35	0.0001	0.0001
ALL	ALL				2275060012	0.4333	0.4224	357.35	0.0012	0.0012
ALL	ALL				2275070000	0.0000	0.0000	357.35	0.0000	0.0000
ALL	ALL				ALL	6.1136	3.9110	357.35	0.0171	0.0109

NOTE: SCC 2265008005 = 4-Stroke Airport Support Equipment  
 SCC 2267008005 = LPG Airport Support Equipment  
 SCC 2268008005 = CNG Airport Support Equipment  
 SCC 2270008005 = Diesel Airport Support Equipment  
 SCC 2275001000 = Military Aircraft  
 SCC 2275050011 = General Aviation, Piston  
 SCC 2275050012 = General Aviation, Turbine  
 SCC 2275060011 = Air Taxi, Piston  
 SCC 2275060012 = Air Taxi, Turbine  
 SCC 2275070000 = Aircraft Auxiliary Power Units

Table 8-c: Aircraft Emissions in Sheboygan County  
 NOx Emissions: tons per year and tons per summer day

Facility ID	Facility Name	Longitude	Latitude	Source Classification Code (SCC)	2011 Annual NOx Emissions (tons)	Emissions: Annual/(Summer Day)	2011 Summer Day NOx Emissions (tons)
					Sheboygan County		Sheboygan County
11104711	DAVIES	-87.779	43.5975	2275050011	0.00312	361.11	0.00001
11177511	FELDMANN FIELD	-87.8973	43.8042	2275050011	0.00312	361.11	0.00001
11189811	AURORA VALLEY	-87.9678	43.7444	2275050011	0.00060	361.11	0.00000
11189811	AURORA VALLEY	-87.9678	43.7444	2275050012	0.00535	361.11	0.00001
11249011	SMIES	-87.7843	43.5889	2275050011	0.00290	361.11	0.00001
11458911	VAN DER VAART	-87.7256	43.6786	2275050011	0.00290	361.11	0.00001
12244511	AURORA	-87.7103	43.7719	2275050011	0.00060	361.11	0.00000
12244511	AURORA	-87.7103	43.7719	2275050012	0.00535	361.11	0.00001
12247411	ST NICHOLAS	-87.749	43.7614	2275050011	0.00060	361.11	0.00000
12247411	ST NICHOLAS	-87.749	43.7614	2275050012	0.00535	361.11	0.00001
9009911	Sheboygan County	-87.85159	43.7694	2275070000	0.00015	361.11	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2265008005	0.00024	361.11	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2267008005	0.00002	361.11	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2268008005	0.00002	361.11	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2270008005	0.00116	361.11	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2275050012	0.04311	361.11	0.00012
9009911	Sheboygan County	-87.85159	43.7694	2275060012	0.75724	361.11	0.00210
9009911	Sheboygan County	-87.85159	43.7694	2275060012	0.00312	361.11	0.00001
9009911	Sheboygan County	-87.85159	43.7694	2275050011	0.66169	361.11	0.00183
9009911	Sheboygan County	-87.85159	43.7694	2275050012	1.27721	361.11	0.00354
9009911	Sheboygan County	-87.85159	43.7694	2275050012	0.00230	361.11	0.00001
9009911	Sheboygan County	-87.85159	43.7694	2275050012	0.00164	361.11	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2275001000	0.01975	361.11	0.00005
ALL	ALL			2265008005	<b>0.0002</b>	<b>361.11</b>	<b>0.0000</b>
ALL	ALL			2267008005	<b>0.0000</b>	<b>361.11</b>	<b>0.0000</b>
ALL	ALL			2268008005	<b>0.0000</b>	<b>361.11</b>	<b>0.0000</b>
ALL	ALL			2270008005	<b>0.0012</b>	<b>361.11</b>	<b>0.0000</b>
ALL	ALL			2275001000	<b>0.0198</b>	<b>361.11</b>	<b>0.0001</b>
ALL	ALL			2275050011	<b>0.6755</b>	<b>361.11</b>	<b>0.0019</b>
ALL	ALL			2275050012	<b>1.3403</b>	<b>361.11</b>	<b>0.0037</b>
ALL	ALL			2275060011	-	<b>361.11</b>	-
ALL	ALL			2275060012	<b>0.7604</b>	<b>361.11</b>	<b>0.0021</b>
ALL	ALL			2275070000	<b>0.0001</b>	<b>361.11</b>	<b>0.0000</b>

Facility ID	Facility Name	Longitude	Latitude	Source Classification Code (SCC)	2011 Annual NOx Emissions (tons)	Emissions: Annual/(Summer Day)	2011 Summer Day NOx Emissions (tons)
					Sheboygan County		Sheboygan County
ALL	ALL			ALL	<b>2.7976</b>	<b>361.11</b>	<b>0.0077</b>

NOTE: SCC 2265008005 = 4-Stroke Airport Support Equipment  
 SCC 2267008005 = LPG Airport Support Equipment  
 SCC 2268008005 = CNG Airport Support Equipment  
 SCC 2270008005 = Diesel Airport Support Equipment  
 SCC 2275001000 = Military Aircraft  
 SCC 2275050011 = General Aviation, Piston  
 SCC 2275050012 = General Aviation, Turbine  
 SCC 2275060011 = Air Taxi, Piston  
 SCC 2275060012 = Air Taxi, Turbine  
 SCC 2275070000 = Aircraft Auxiliary Power Units

Table 8-d: Aircraft Emissions in Sheboygan County  
 VOC Emissions: tons per year and tons per summer day

Facility ID	Facility Name	Longitude	Latitude	Source Classification Code (SCC)	2011 Annual VOC Emissions (tons)	Emissions: Annual/(Summer Day)	2011 Summer Day VOC Emissions (tons)
					Sheboygan County		Sheboygan County
11104711	DAVIES	-87.779	43.5975	2275050011	0.00723	357.35	0.00002
11177511	FELDMANN FIELD	-87.8973	43.8042	2275050011	0.00723	357.35	0.00002
11189811	AURORA VALLEY	-87.9678	43.7444	2275050011	0.00139	357.35	0.00000
11189811	AURORA VALLEY	-87.9678	43.7444	2275050012	0.01139	357.35	0.00003
11249011	SMIES	-87.7843	43.5889	2275050011	0.00672	357.35	0.00002
11458911	VAN DER VAART	-87.7256	43.6786	2275050011	0.00672	357.35	0.00002
12244511	AURORA	-87.7103	43.7719	2275050011	0.00139	357.35	0.00000
12244511	AURORA	-87.7103	43.7719	2275050012	0.01139	357.35	0.00003
12247411	ST NICHOLAS	-87.749	43.7614	2275050011	0.00139	357.35	0.00000
12247411	ST NICHOLAS	-87.749	43.7614	2275050012	0.01139	357.35	0.00003
9009911	Sheboygan County	-87.85159	43.7694	2275070000	0.00002	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2265008005	0.00007	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2267008005	0.00001	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2268008005	0.00001	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2270008005	0.00032	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2275050012	0.04630	357.35	0.00013
9009911	Sheboygan County	-87.85159	43.7694	2275060012	0.98237	357.35	0.00275
9009911	Sheboygan County	-87.85159	43.7694	2275060012	0.00152	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2275050011	1.53181	357.35	0.00429
9009911	Sheboygan County	-87.85159	43.7694	2275050012	2.72010	357.35	0.00761
9009911	Sheboygan County	-87.85159	43.7694	2275050012	0.00142	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2275050012	0.00159	357.35	0.00000
9009911	Sheboygan County	-87.85159	43.7694	2275001000	0.17739	357.35	0.00050
ALL	ALL			2265008005	<b>0.0001</b>	<b>357.35</b>	<b>0.0000</b>
ALL	ALL			2267008005	<b>0.0000</b>	<b>357.35</b>	<b>0.0000</b>
ALL	ALL			2268008005	<b>0.0000</b>	<b>357.35</b>	<b>0.0000</b>
ALL	ALL			2270008005	<b>0.0003</b>	<b>357.35</b>	<b>0.0000</b>
ALL	ALL			2275001000	<b>0.1774</b>	<b>357.35</b>	<b>0.0005</b>
ALL	ALL			2275050011	<b>1.5639</b>	<b>357.35</b>	<b>0.0044</b>
ALL	ALL			2275050012	<b>2.7573</b>	<b>357.35</b>	<b>0.0077</b>
ALL	ALL			2275060011	<b>0.0463</b>	<b>357.35</b>	<b>0.0001</b>
ALL	ALL			2275060012	<b>0.9839</b>	<b>357.35</b>	<b>0.0028</b>
ALL	ALL			2275070000	<b>0.0000</b>	<b>357.35</b>	<b>-</b>

Facility ID	Facility Name	Longitude	Latitude	Source Classification Code (SCC)	2011 Annual VOC Emissions (tons)	Emissions: Annual/(Summer Day)	2011 Summer Day VOC Emissions (tons)
					Sheboygan County		Sheboygan County
ALL	ALL			ALL	<b>5.5292</b>	<b>357.35</b>	<b>0.0155</b>

NOTE: SCC 2265008005 = 4-Stroke Airport Support Equipment  
 SCC 2267008005 = LPG Airport Support Equipment  
 SCC 2268008005 = CNG Airport Support Equipment  
 SCC 2270008005 = Diesel Airport Support Equipment  
 SCC 2275001000 = Military Aircraft  
 SCC 2275050011 = General Aviation, Piston  
 SCC 2275050012 = General Aviation, Turbine  
 SCC 2275060011 = Air Taxi, Piston  
 SCC 2275060012 = Air Taxi, Turbine  
 SCC 2275070000 = Aircraft Auxiliary Power Units

## **Appendix 9**

### **Emissions from Railroads (Locomotives)**

## Emissions from Railroads (Locomotives)

The annual locomotive emissions were obtained from the U.S. EPA's 2011 National Emissions Inventory (NEI) and the U.S. EPA's 2011 Modeling Platform, version 6 (Modeling Platform). These two inventories provide identical county-wide emission values for railroad emissions. Data presented in this Appendix come from the Modeling Platform, since that inventory provides readily accessible data by source classification code (SCC) and railway link.

Annual locomotive emissions in the 2011 NEI are available at:

<http://www.epa.gov/ttnchie1/net/2011inventory.html>

Annual locomotive emissions in the 2011 Modeling Platform are available at:

[ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint\\_by\\_state/](ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/2011emissions/nonpoint_by_state/)

(For example, Wisconsin locomotive data are in the file:

**WI\_rail\_2011NEIv1\_nonpoint\_20130911\_20sep2013\_v1.csv**, found in the folder:

**WI\_nonpoint\_2011.zip**)

Emissions from railway maintenance are not included in this Appendix. Railway maintenance emission estimates were generated using the National Mobile Inventory Model (NMIM), version dated May 4, 2009, the U.S. EPA's nonroad emissions estimation model. The tables of nonroad emissions from all source subcategories in Appendix 4 present both the railway maintenance emissions generated by NMIM and the locomotive emissions in this Appendix.

Annual emission were converted to summer day emissions using the annual to summer day ratios for railroad emissions found in the LADCO modeling inventory for the year 2007. The following four tables present the locomotive emissions for Kenosha County (both the entire county and the portion of nonattainment area) and Sheboygan County.

Table 9-a: Locomotive Emissions in Kenosha County and the Kenosha Sub-County Nonattainment Area (NAA)  
 NOx Emissions: tons per year and tons per summer day

Shape ID (Railway Link)	In NAA?	Source Classification Code (SCC)	2011 Annual NOx Emissions (tons)		Emissions: Annual/(Summer Day)	2011 Summer Day NOx Emissions (tons)	
			Kenosha County	Kenosha NAA		Kenosha County	Kenosha NAA
167050	yes	2285002006	9.26654	9.26654	362.00	0.02560	0.02560
167051	yes	2285002006	2.45847	2.45847	362.00	0.00679	0.00679
167052	yes	2285002006	25.38180	25.38180	362.00	0.07012	0.07012
167054	yes	2285002006	12.08130	12.08130	362.00	0.03337	0.03337
167056	yes	2285002006	0.00063	0.00063	362.00	0.00000	0.00000
167058	yes	2285002006	0.00040	0.00040	362.00	0.00000	0.00000
167059	yes	2285002006	0.64089	0.64089	362.00	0.00177	0.00177
167060	yes	2285002006	1.31464	1.31464	362.00	0.00363	0.00363
167061	yes	2285002006	24.90160	24.90160	362.00	0.06879	0.06879
167063	yes	2285002006	0.20951	0.20951	362.00	0.00058	0.00058
167066	yes	2285002006	0.10350	0.10350	362.00	0.00029	0.00029
167067	yes	2285002006	0.18993	0.18993	362.00	0.00052	0.00052
167069	yes	2285002006	0.06555	0.06555	362.00	0.00018	0.00018
167070	yes	2285002006	0.02955	0.02955	362.00	0.00008	0.00008
167071	yes	2285002006	0.24625	0.24625	362.00	0.00068	0.00068
167073	yes	2285002006	0.43789	0.43789	362.00	0.00121	0.00121
167074	yes	2285002006	0.26188	0.26188	362.00	0.00072	0.00072
167075	yes	2285002006	0.24295	0.24295	362.00	0.00067	0.00067
167076	yes	2285002006	0.03229	0.03229	362.00	0.00009	0.00009
167079	yes	2285002006	1.76459	1.76459	362.00	0.00487	0.00487
167083	yes	2285002006	17.36070	17.36070	362.00	0.04796	0.04796
167085	no	2285002006	12.37270	0.00000	362.00	0.03418	0.00000
167086	no	2285002006	40.41120	0.00000	362.00	0.11163	0.00000
167087	no	2285002006	47.05990	0.00000	362.00	0.13000	0.00000
167089	yes	2285002006	11.53340	11.53340	362.00	0.03186	0.03186
167090	yes	2285002006	3.21902	3.21902	362.00	0.00889	0.00889
253269	yes	2285002006	0.62318	0.62318	362.00	0.00172	0.00172
265340	yes	2285002006	5.89896	5.89896	362.00	0.01630	0.01630
271054	yes	2285002006	30.80140	30.80140	362.00	0.08509	0.08509
271055	yes	2285002006	0.58990	0.58990	362.00	0.00163	0.00163
ALL		2285002006	<b>249.5005</b>	<b>149.6567</b>	362.00	<b>0.6892</b>	<b>0.4134</b>
ALL		2285002007	<b>0.0000</b>	<b>0.0000</b>	362.00	<b>0.0000</b>	<b>0.0000</b>
ALL		ALL	<b>249.5005</b>	<b>149.6567</b>	362.00	<b>0.6892</b>	<b>0.4134</b>

NOTE: SCC 2285002006 = Diesel Locomotives, Line Haul, Class I Operations

SCC 2285002007 = Diesel Locomotives, Line Haul, Class II/III Ops

Table 9-b: Locomotive Emissions in Kenosha County and the Kenosha Sub-County Nonattainment Area (NAA)  
 VOC Emissions: tons per year and tons per summer day

Shape ID (Railway Link)	In NAA?	Source Classificatio n Code (SCC)	2011 Annual VOC Emissions (tons)		Emissions: Annual/(Summer Day)	2011 Summer Day VOC Emissions (tons)	
			Kenosha County	Kenosha NAA		Kenosha County	Kenosha NAA
167050	yes	2285002006	0.45529	0.45529	362.00	0.00126	0.00126
167051	yes	2285002006	0.12079	0.12079	362.00	0.00033	0.00033
167052	yes	2285002006	1.24708	1.24708	362.00	0.00344	0.00344
167054	yes	2285002006	0.59359	0.59359	362.00	0.00164	0.00164
167056	yes	2285002006	0.00003	0.00003	362.00	0.00000	0.00000
167058	yes	2285002006	0.00002	0.00002	362.00	0.00000	0.00000
167059	yes	2285002006	0.03149	0.03149	362.00	0.00009	0.00009
167060	yes	2285002006	0.06459	0.06459	362.00	0.00018	0.00018
167061	yes	2285002006	1.22349	1.22349	362.00	0.00338	0.00338
167063	yes	2285002006	0.01029	0.01029	362.00	0.00003	0.00003
167066	yes	2285002006	0.00509	0.00509	362.00	0.00001	0.00001
167067	yes	2285002006	0.00933	0.00933	362.00	0.00003	0.00003
167069	yes	2285002006	0.00322	0.00322	362.00	0.00001	0.00001
167070	yes	2285002006	0.00145	0.00145	362.00	0.00000	0.00000
167071	yes	2285002006	0.01210	0.01210	362.00	0.00003	0.00003
167073	yes	2285002006	0.02151	0.02151	362.00	0.00006	0.00006
167074	yes	2285002006	0.01287	0.01287	362.00	0.00004	0.00004
167075	yes	2285002006	0.01194	0.01194	362.00	0.00003	0.00003
167076	yes	2285002006	0.00159	0.00159	362.00	0.00000	0.00000
167079	yes	2285002006	0.08670	0.08670	362.00	0.00024	0.00024
167083	yes	2285002006	0.85298	0.85298	362.00	0.00236	0.00236
167085	no	2285002006	0.60790	0.00000	362.00	0.00168	0.00000
167086	no	2285002006	1.98552	0.00000	362.00	0.00548	0.00000
167087	no	2285002006	2.31219	0.00000	362.00	0.00639	0.00000
167089	yes	2285002006	0.56667	0.56667	362.00	0.00157	0.00157
167090	yes	2285002006	0.15816	0.15816	362.00	0.00044	0.00044
253269	yes	2285002006	0.03062	0.03062	362.00	0.00008	0.00008
265340	yes	2285002006	0.28983	0.28983	362.00	0.00080	0.00080
271054	yes	2285002006	1.51336	1.51336	362.00	0.00418	0.00418
271055	yes	2285002006	0.02898	0.02898	362.00	0.00008	0.00008
ALL		2285002006	<b>12.2587</b>	<b>7.3531</b>	362.00	<b>0.0339</b>	<b>0.0203</b>
ALL		2285002007	<b>0.0000</b>	<b>0.0000</b>	362.00	<b>0.0000</b>	<b>0.0000</b>
ALL		ALL	<b>12.2587</b>	<b>7.3531</b>	362.00	<b>0.0339</b>	<b>0.0203</b>

NOTE: SCC 2285002006 = Diesel Locomotives, Line Haul, Class I Operations

SCC 2285002007 = Diesel Locomotives, Line Haul, Class II/III Ops

Table 9-c: Locomotive Emissions in Sheboygan County  
 NOx Emissions: tons per year and tons per summer day

Shape ID (Railway Link)	Source Classificatio n Code (SCC)	2011 Annual NOx Emissions (tons)	Emissions: Annual/(Summer Day)	2011 Summer Day NOx Emissions (tons)
		Sheboygan County		Sheboygan County
166901	2285002007	3.39604	362.00	0.00938
166902	2285002006	0.00285	362.00	0.00001
166904	2285002007	1.19331	362.00	0.00330
166907	2285002006	0.00393	362.00	0.00001
166909	2285002006	6.83061	362.00	0.01887
166911	2285002006	0.00188	362.00	0.00001
166912	2285002006	0.00034	362.00	0.00000
166913	2285002006	0.00211	362.00	0.00001
166914	2285002006	0.00007	362.00	0.00000
166915	2285002006	0.00157	362.00	0.00000
166918	2285002006	0.00259	362.00	0.00001
166921	2285002006	0.00070	362.00	0.00000
166923	2285002006	0.00110	362.00	0.00000
166924	2285002006	0.00023	362.00	0.00000
166927	2285002006	0.00062	362.00	0.00000
166931	2285002006	0.00183	362.00	0.00001
166933	2285002006	5.81544	362.00	0.01606
166936	2285002007	0.68581	362.00	0.00189
166939	2285002007	3.22281	362.00	0.00890
166940	2285002006	0.00028	362.00	0.00000
166941	2285002006	0.00305	362.00	0.00001
166942	2285002007	11.19810	362.00	0.03093
ALL	2285002006	<b>12.6692</b>	362.00	<b>0.0350</b>
ALL	2285002007	<b>19.6961</b>	362.00	<b>0.0544</b>
ALL	ALL	<b>32.3653</b>	362.00	<b>0.0894</b>

NOTE: SCC 2285002006 = Diesel Locomotives, Line Haul, Class I Operations

SCC 2285002007 = Diesel Locomotives, Line Haul, Class II/III Ops

Table 9-d: Locomotive Emissions in Sheboygan County  
 VOC Emissions: tons per year and tons per summer day

Shape ID (Railway Link)	Source Classificatio n Code (SCC)	2011 Annual VOC Emissions (tons)	Emissions: Annual/(Summer Day)	2011 Summer Day VOC Emissions (tons)
		Sheboygan County		Sheboygan County
166901	2285002007	0.13204	362.00	0.00036
166902	2285002006	0.00015	362.00	0.00000
166904	2285002007	0.04640	362.00	0.00013
166907	2285002006	0.00020	362.00	0.00000
166909	2285002006	0.35068	362.00	0.00097
166911	2285002006	0.00010	362.00	0.00000
166912	2285002006	0.00002	362.00	0.00000
166913	2285002006	0.00011	362.00	0.00000
166914	2285002006	0.00000	362.00	0.00000
166915	2285002006	0.00008	362.00	0.00000
166918	2285002006	0.00013	362.00	0.00000
166921	2285002006	0.00004	362.00	0.00000
166923	2285002006	0.00006	362.00	0.00000
166924	2285002006	0.00001	362.00	0.00000
166927	2285002006	0.00003	362.00	0.00000
166931	2285002006	0.00009	362.00	0.00000
166933	2285002006	0.29856	362.00	0.00082
166936	2285002007	0.02666	362.00	0.00007
166939	2285002007	0.12530	362.00	0.00035
166940	2285002006	0.00001	362.00	0.00000
166941	2285002006	0.00016	362.00	0.00000
166942	2285002007	0.43538	362.00	0.00120
ALL	2285002006	<b>0.6504</b>	362.00	<b>0.0018</b>
ALL	2285002007	<b>0.7658</b>	362.00	<b>0.0021</b>
ALL	ALL	<b>1.4162</b>	362.00	<b>0.0039</b>

NOTE: SCC 2285002006 = Diesel Locomotives, Line Haul, Class I Operations  
 SCC 2285002007 = Diesel Locomotives, Line Haul, Class II/III Ops