

Solid Waste Disposal*

Indicator #7060

**Proposed name change from Solid Waste Generation*

Overall Assessment

Status: **Not Assessed**
 Trend: **Undetermined**
 Rationale: **This year the indicator report focuses only on disposal data in the U.S. instead of generation or recycling data. Disposal data were the most consistently collected by the counties/states in the United States. Generation and recycling data were available for Ontario. Over time, a change in disposal tonnages can be used as an indicator for solid waste in the Great Lakes. However, more consistent and comparable data would improve the value of this indicator.**

Lake-by-Lake Assessment

Sufficient data were unavailable to make assessments on an individual lake basin scale at this time.

Purpose

- To assess the amount of solid waste disposed of in the Great Lakes basin
- To infer inefficiencies in human economic activity (i.e., wasted resources) and the potential adverse impacts to human and ecosystem health

Ecosystem Objective

Solid waste provides a measure of the inefficiency of human land-based activities and the degree to which resources are wasted. In order to promote sustainable development, the amount of solid waste disposed of in the basin needs to be assessed and ultimately reduced. Because a portion of the waste disposed of in the basin is generated outside of basin counties, efforts to reduce waste generation or increase recycling need to occur regionally. Reducing volumes of solid waste via source reduction or recycling is indicative of a more efficient industrial ecology and a more conserving society. This indicator supports Annex 12 of the Great Lakes Water Quality Agreement (United States and Canada 1987).

State of the Ecosystem

Canada and the United States are working towards improvements in waste management by developing strategies to prevent waste generation and to reuse and recycle more of the generated waste. The data available to support this indicator are limited in some areas of the basin and not consistent from area to area. For example, while most states in the basin track the amount of waste disposed of in a landfill or incinerator located within a county, they may define the wastes differently. Some track all non-hazardous waste disposed of and some only track municipal solid waste. Because the wastes disposed of in each county in the basin were not necessarily generated by the county residents, per capita estimates are not meaningful to individual counties. Not all of the U.S. counties provide generation and recycling rates information. Canada provides estimates of waste generation rate for each of its provinces for residential, industrial/commercial, and construction and demolition sources. The summary statistics report for Canada also provided disposal data. The disposal data, however, included wastes that were disposed of outside the province, some of which is captured in the U.S. county disposal data. For this reason, generation and diversion estimates were used only for Ontario, and disposal data were used for the U.S. counties. Types of waste included in the disposal data are identified below.

Statistics for the generation of waste in Ontario were gathered from the Annual Statistics 2005 report (Statistics Canada 2005). More than 11 million metric tons (12 million tons) of waste were generated in Ontario in 2000 and slightly more than 12 million metric tons (13 million tons) were generated in 2002. These figures include residential wastes, commercial/industrial wastes, and construction and demolition wastes. Diversion information was also provided in the report and can be seen in Figure 1. In 2000, 20.8% of the residential waste generated was diverted to recycling, and in 2002 that figure increased to 21.6%. The industrial/commercial recycling rate was 22.7% in 2000 and 20.2% in 2002. Finally, the construction and demolition recycling rate was 11.6% in 2000 and 12.5% in 2002. Ontario has a goal to divert 60% of its waste from landfill by 2008.

Minnesota Great Lakes basin counties provided data on the amounts of waste disposed of in the county as well as an estimate

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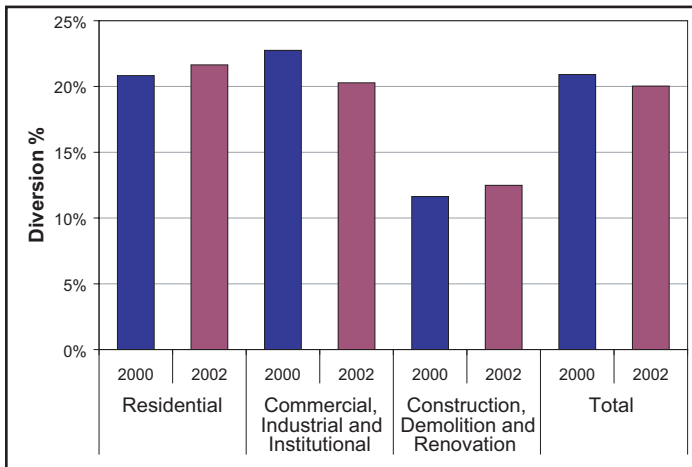


Figure 1. Ontario Waste Diversion Rates.

Source: Statistics Canada, Catalogue number 16-201XIE, *Human Activity and the Environment. Annual Statistics 2005*, Featured Article: Solid Waste in Canada

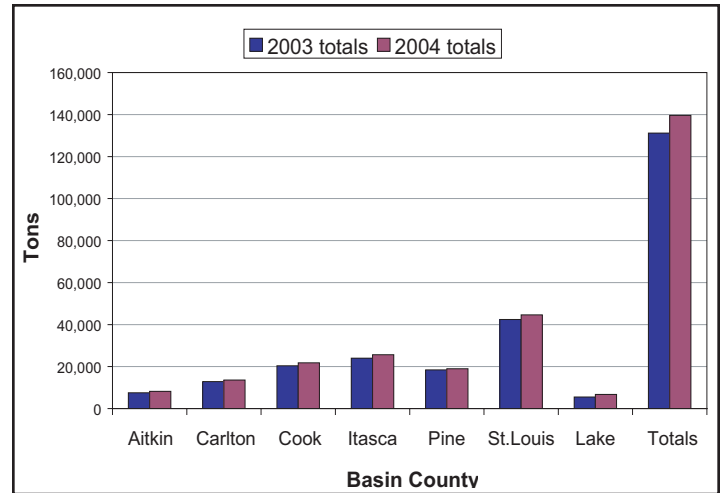


Figure 2. Minnesota Basin County Disposal

Source: Minnesota Pollution Control Agency, Score Report, 2003 and 2004

of the amount of waste buried by residents (on their own property). Data are provided in Figure 2. In 2003, 113,000 metric tons (125,000 tons) of waste were disposed of or buried in the 7 basin counties in Minnesota. In 2004, there was a 5% increase to 120,000 metric tons (132,000 tons) disposed of or buried. Each county showed an increase in waste disposed. These figures only include municipal solid waste (not construction and demolition debris or other industrial wastes).

The Indiana Department of Environmental Management's data regarding amounts disposed of at permitted facilities were used to determine the total amount disposed of in each Indiana Great Lakes basin county. The data are illustrated in Figure 3. The disposal in 2004 was approximately 9% greater than in 2003. The 15 basin counties disposed of 2,240,000 metric tons (2,469,000 tons) of waste in 2004 and 2,018,000 metric tons (2,225,000 tons) in 2003. About 15% was generated outside of the counties where the disposal occurred in 2004. The data include municipal solid waste, construction and demolition wastes, and some industrial byproduct waste.

The Illinois Environmental Protection Agency, Bureau of Land, reported the amounts disposed of in permitted landfills in the two Great Lakes basin counties. Data were compiled for 2004 and 2003 and are shown in Figure 4. There was less than a 2% change in total materials disposed. In 2004, 1,647,000 metric tons (1,815,000 tons) were disposed of, slightly greater than the 1,618,000

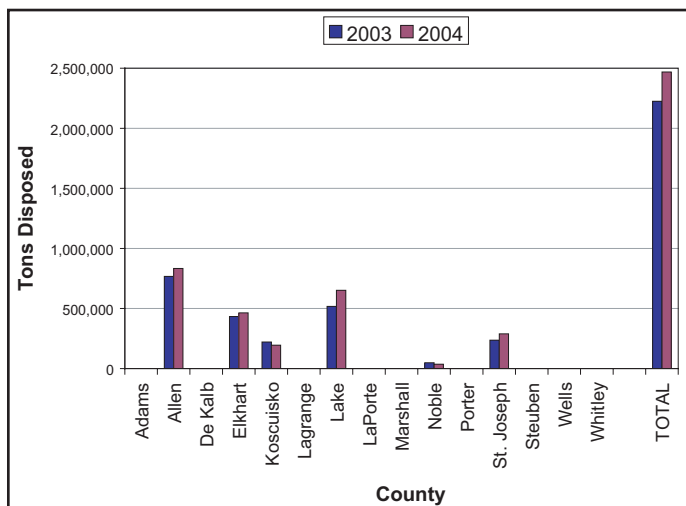


Figure 3. Indiana Basin County Disposal

Source: Indiana Department of Environmental Management, Permitted Solid Waste Facility Report

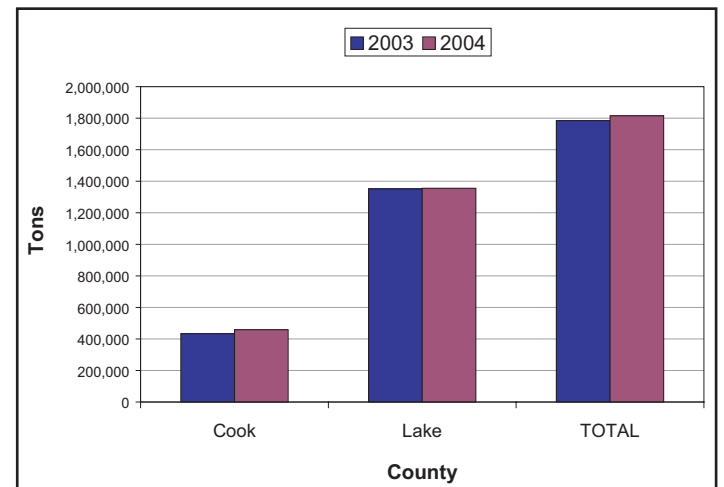


Figure 4. Illinois Basin County Disposal

Source: Illinois Environmental Protection Agency, 2004 Landfill Capacity Report

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metric tons (1,784,000 tons) disposed of in 2003. The data include municipal solid waste, construction and demolition waste, and some industrial waste.

The Michigan Department of Environmental Quality reports on total waste disposed of in Michigan landfills in volume (cubic yards). General conversion factors to translate volume to mass (cubic yards to tons) could not be used because the waste totals include a variety of waste sources (municipal solid waste, construction and demolition debris, and some industrial byproducts). Data for the 83 Great Lakes basin counties were compiled and are presented in Figure 5. There was less than a 1% difference between the total volume (cubic yards) disposed of in 2004 and 2005 in these counties. The total for 2005 was slightly smaller. For both years, approximately 49 million cubic meters (64 million cubic yards) were disposed of in the 83 counties in the Great Lakes Basin.

The New York Department of Environmental Conservation provided municipal solid waste disposal data for facilities located in the 32 Great Lakes basin counties for the years 2004 and 2002. The data are presented in Figure 6. There was an approximate 5% increase in waste disposed. The total waste disposed of was 7,124,000 metric tons (7,853,000 tons) in 2004 and 6,653,000 metric tons (7,334,000 tons) in 2002. These data include municipal solid waste only. More than 65% of the state's waste is managed in the basin counties.

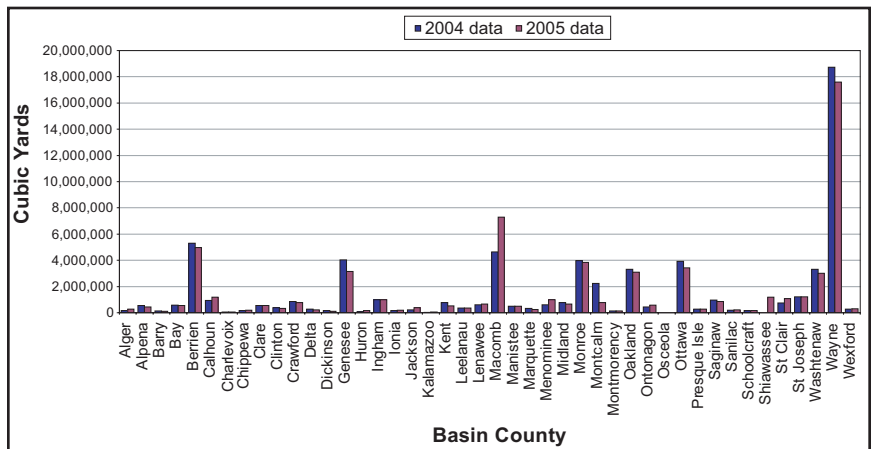


Figure 5. Michigan Basin County Disposal

Source: Michigan Department of Environmental Quality, 2005 and 2004 Annual Report on Solid Waste Landfills

The Pennsylvania Department of Environmental Protection provided disposal data for the three Great Lakes basin counties. Municipal solid waste and construction and demolition debris are combined in these annual totals, which are presented in Figure 7.

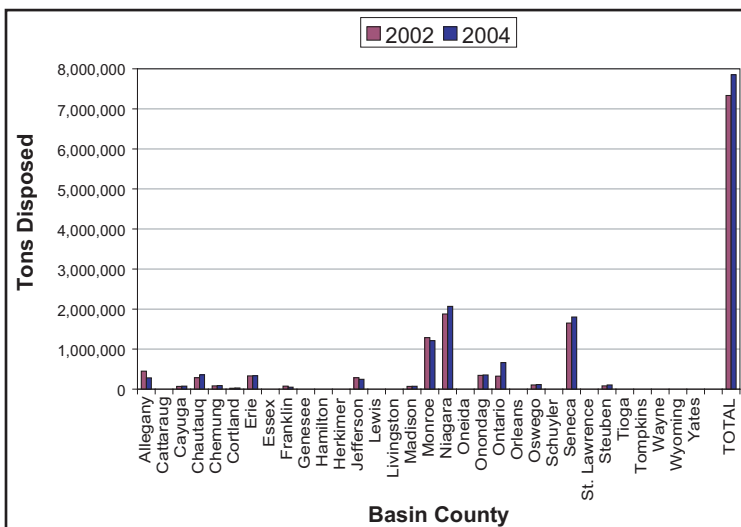


Figure 6. New York Basin County Disposal

Source: New York State Department of Conservation Capacity data for Landfills and Waste to Energy Facilities

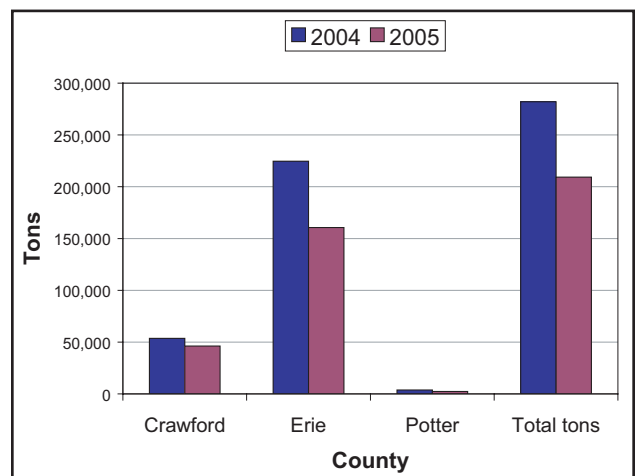


Figure 7. Pennsylvania Basin County Disposal

Source: Pennsylvania Department of Environmental Protection Landfill Disposal Data

7. For 2004, 256,000 metric tons (282,000 tons) were disposed of in the three basin counties. There was a 25% decrease in waste disposed of in the counties in 2005 to 190,000 metric tons (209,000 tons).

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The Wisconsin Department of Natural Resources collects data on the amount disposed of in each facility located in the Great Lakes basin counties. Data were compiled for the 26 basin counties and are presented in Figure 8. In 2005, 6,952,000 metric tons (7,663,000 tons) of waste were disposed of, within 1% of the total disposed of in 2004. Totals include a wide variety of wastes such as municipal solid waste, sludges, and foundry sand.

The Ohio Environmental Protection Agency collects data for waste disposed of in landfills and incinerators. The data for the 36 Great Lakes basin counties was compiled for 2003 and 2004 and are presented in Figure 9. There was an approximate 5% increase in waste disposed. More than 60% of these wastes disposed of in the counties came from outside the counties. The data include municipal solid waste, some industrial wastes, and tires. Construction and demolition debris is not included. In 2004, the 36 basin counties disposed of 7,976,000 metric tons (8,792,000 tons) and in 2003 7,561,000 metric tons (8,335,000 tons) were disposed.

Pressures

The generation and management of solid waste raise important environmental, economic and social issues for North Americans. Waste disposal costs billions of dollars and the entire waste management process uses energy and contributes to land, water, and air pollution. The U.S. Environmental Protection Agency (U.S. EPA) has developed tools and information linking waste management practices to climate change impacts. Waste prevention and recycling reduce greenhouse gases associated with these activities by reducing methane emissions, saving energy, and increasing forest carbon sequestration. Waste prevention and recycling save energy when compared to disposal of materials.

The state of the economy has a strong impact on consumption and waste generation. Municipal solid waste generation in the U.S. and Canada continued to increase through the 1990s, though the increase has been slower since 2000 (U.S. EPA 2003). Generation of other wastes, such as construction and demolition debris and industrial wastes is also strongly linked to the economy. The U.S. EPA is developing a methodology to better estimate the generation, disposal, and recycling of construction and demolition debris in the U.S.

Because waste disposed of in the Great Lakes basin may be generated outside of the basin or moved around within the basin, efforts to reduce waste generation and increase recycling need to focus on a broader area, not just the basin. Continued collaboration of provincial, state, local, and federal efforts on both sides of the border is important for long term success.

Management Implications

The U.S. EPA supports a biennial study that characterizes the municipal solid waste stream and estimates the national recycling rate. The latest study (2003) estimates a 30.6% national recycling rate. The U.S. EPA has established a goal of reaching a 35%

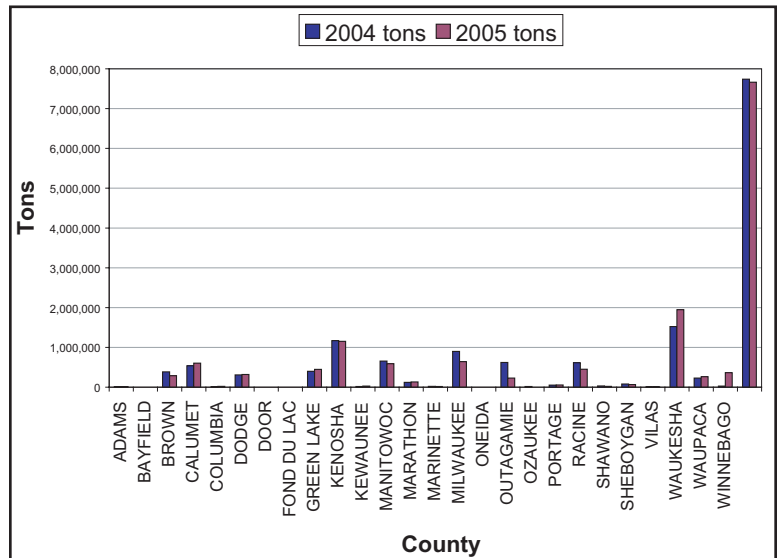


Figure 8. Wisconsin Basin County Disposal

Source: Wisconsin Department of Natural Resources, Landfill Tonnage Report

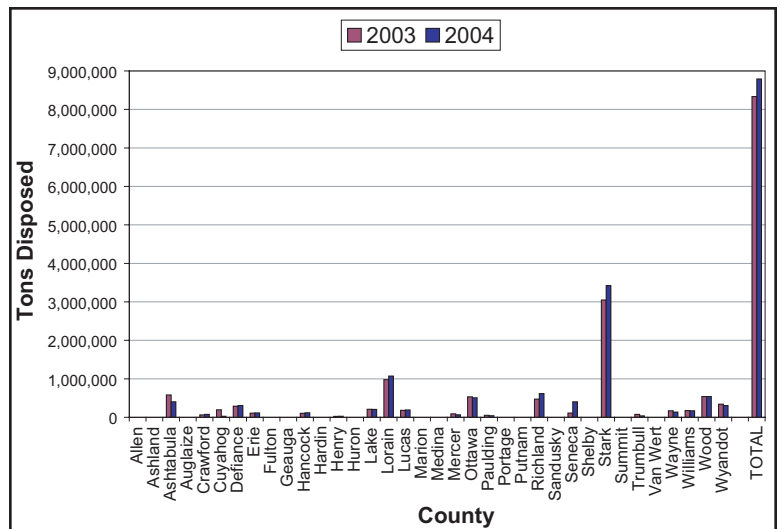


Figure 9. Ohio Basin County Disposal

Source: Ohio Environmental Protection Agency, 2003 and 2004 Facility Data Reports

recycling rate by 2008. The 2003 study indicated that paper, yard and food waste, and packaging represent large portions of the waste stream. The U.S. EPA is concentrating its efforts on these materials and is working with stakeholders to determine activities that may support increased recovery of those materials. The U.S. government is also working to promote strategies that support recycling programs in general, including Pay-As-You-Throw (generators pay per unit of waste rather than a flat fee); innovative contracting mechanisms such as resource management (includes incentives for increased recycling); and supporting demonstration projects and research on various end markets and collection strategies for waste materials. The Great Lakes states and Ontario are also working to increase recycling rates and provide support for local jurisdictions. Each state with counties in the Great Lakes basin provides financial and technical support for local recycling programs. Many provide significant market development support as well.

Canada and the U.S. both support integrated solutions to the waste issue and look for innovative approaches that involve the public and private sectors. Extended Producer Responsibility (EPR), also known as Product Stewardship is one approach that involves manufacturers of products. EPR efforts have focused on many products, including electronics, carpets, paints, thermostats, etc.

Ontario's Waste Diversion Act was passed in 2002 and it created Waste Diversion Ontario (WDO), a permanent, non-crown corporation. The act gave WDO the mandate to develop, implement and operate waste diversion programs to reduce, reuse or recycle waste.

The City of Toronto has set ambitious waste diversion goals and reported a 40% diversion rate in 2005. The development of a green bin system (allowing residents to separate out the organic fraction of the waste stream from traditional recyclables) is credited for the high diversion rate achieved.

Improved and consistent data collection would help to better inform decision makers regarding effectiveness of programs as well as determining where to target efforts.

Comments from the author(s)

During the process of collecting data for this indicator, it was found that U.S. states and Ontario compile and report on solid waste information in different formats. Future work to organize a standardized method of collecting, reporting and accessing data for both the Canadian and U.S. portions of the Great Lakes basin will aid in the future reporting of this indicator and in the interpretation of the data and trends. More consistent data may also support strategic planning.

Acknowledgments

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Sources

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Statistics Canada. 2005. Human Activity and the Environment. Annual Statistics 2005. Featured Article: Solid Waste in Canada. Catalogue number 16-201XIE.

United States and Canada. 1987. *Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987*. Ottawa and Washington.

Other Resources

Illinois waste disposal data for the two basin counties were compiled from the Illinois Environmental Protection Agency, Bureau of Land's 2004 Landfill Capacity report found on their web site at: <http://www.epa.state.il.us/land/landfill-capacity/2004/index.html>. The two Great Lakes Basin counties are located in Illinois EPA's Region 2.

Indiana waste disposal data for the basin counties were compiled from the Indiana Department of Environmental Management's

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permitted solid waste facility reports found at <http://www.in.gov/idem/programs/land/sw/index.html>.

Michigan waste disposal data for the basin counties were compiled from the Michigan Department of Environmental Quality's Annual Report on Solid Waste Landfills. Data from the 2005 and 2004 studies were compiled. The author accessed the data via the Border Center's WasteWatcher web site (<http://www.bordercenter.org/wastewatcher/mi-waste.cfm>) to more easily search for the appropriate county-level data.

Minnesota municipal solid waste disposal data for the basin counties were compiled from the 2004 and 2003 SCORE data available on the Minnesota Pollution Control Agency's web site at: <http://www.moea.state.mn.us/lc/score04.cfm>. The SCORE report is a report to the Legislature. The main components of this report are to identify and target source reduction, recycling, waste management and waste generation collected from all 87 counties in Minnesota.

New York municipal solid waste disposal data for the basin counties were compiled from New York State Department of Environmental Conservation's capacity data for landfills and for "waste to energy" facilities available on their website at: <http://www.dec.ny.gov/chemical/23723.html>.

Ohio waste disposal data for the basin counties were compiled from Ohio Environmental Protection Agency's 2003 and 2004 facility data reports which are available on their web site at: <http://www.epa.state.oh.us/dsiwm/pages/general.html>.

Pennsylvania waste disposal data for the basin counties were compiled from the Pennsylvania Department of Environmental Protection, Bureau of Land Recycling and Waste Management's disposal data located on their web site at: <http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1238&Q=464453&landrecwasteNav=>.

Wisconsin municipal solid waste disposal data for the basin counties were compiled from the Wisconsin Department of Natural Resources, Bureau of Waste Management's Landfill Tonnage Report found on their website at: <http://www.dnr.state.wi.us>.

Last Updated

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