Chapter 5. Lake Michigan

5.1. Muskegon Lake AOC and White Lake AOC Muskegon County, MI

The Muskegon Lake AOC includes the entirety of Muskegon Lake, in Muskegon County, Michigan. Muskegon Lake is a 4,149 acre inland coastal lake. The Muskegon River flows through the lake before emptying into Lake Michigan (see AOC map at end of chapter and in Appendix 1).

The White Lake AOC includes White Lake and a quarter-mile wide zone around the lake, in Muskegon County MI. White Lake is a 2,570 acre coastal, downriver lake (see AOC map at end of Chapter and in Appendix 1).

5.1.1. Hazardous Waste Sites Relevant to the Muskegon Lake and White Lake AOCs

ATSDR has evaluated the data for 11 hazardous waste sites in Muskegon County, MI, and reached conclusions regarding any potential effect to health posed by these sites. These conclusions, together with information regarding the AOC near which the site is located, the type and location of the site, and the date and type of assessment document, are summarized in Table 5.1-A.

Table 5.1 -A Hazardous Waste Sites in Muskegon County, MI

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Bofors Nobel Inc., Muskegon	HA	1990	3	NPL	Complete
MID006030373	HA	1992	3		
	HC	1996	4		
Duell & Gardner Landfill, Dalton Township	HA	1989	3	NPL	Ongoing
MID980504716	HC	1994	4		
E.I. Du Pont De Nemours & Co., Inc., Montague Plant, Montague	HA	1989	3	Deleted from NPL	Ongoing
MID000809640	SRU	1993	3		
Hooker (Montague Plant), Montague	HA	1989	3	Deleted from NPL	Ongoing
MID006014906	SRU	1993	3		
Muskegon Chemical Co., Whitehall MID072569510	HA	1992	3	NPL	Ongoing
	SRU	1995	4		
Ott/Story/Cordova Chemical Co., Dalton Township	HA	1988	3	NPL	Completed
MID060174240	HA	1993	2		

Peerless Plating Co., Muskegon MID006031348	HA SRU HC	1992 1996 2006	3 3 3	NPL	Completed
Ruddiman Drain Area, Muskegon MID980608764	HC	2003	3	Non NPL	Completed
SCA Independent Landfill, Muskegon Heights MID000724930	HA SRU	1989 1994	3 5	NPL	Ongoing
Thermo-Chem, Inc., Muskegon MID044567162	HA HC	1988 1996	3 3	NPL	Completed
Whitehall Municipal Wells, Whitehall MID980701254	HA HA	1989 1992	3 5	Deleted from NPL	Completed

2= Public Health Hazard, 3=Indeterminate Public Health Hazard, 4=No Apparent Public Health Hazard, 5=No Public Health Hazard

HA=Public Assessment, HC=Health Consultation, SRU=Site Review and Update

ATSDR has conducted further evaluation of the site data, which is summarized in the following section.

5.1.1.1 Bofors Nobel Incorporated

Bofors Nobel, Inc. is a 120-acre site 6 miles east of downtown Muskegon, in Muskegon County, MI. It extends to the south bank of Big Black Creek, which flows west-southwest across the site. Since 1960 various owners have operated chemical manufacturing facilities on the site. Before 1976, operators of the plant used several unlined lagoons and settling ponds for wastewater and sludge disposal. In 1965 and in 1975, dikes around some of the lagoons failed, releasing wastewater into Big Black Creek. Beginning in 1976, the plant discharged its waste water to the Muskegon County wastewater treatment system. Purge wells were installed to collect and pump groundwater for treatment. The plant area of the site (35 acres) is still in operation, but the remainder of the site including the lagoon area is fenced and administered by the Michigan Department of Environmental Quality. Information regarding this site is taken from ATSDR's 1990 health assessment, 1992 public health assessment, and 1996 public health assessment. Updated information is taken from the 2003 USEPA NPL fact sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	140
Females aged 15-44	283
Adults 65 and older	140

Public Health Outcome Data: This site manufactured at least two aromatic amine compounds, benzidine and dichlorobenzidine (DCB). In 1981, MDCH (then MDPH) conducted a track-out

study of 11 Bofors workers involved with dichlorobenzidine production. DCB was found in the range of 0.006 to 0.281 ppm in the urine of Bofors employees and some of their family members. MDCH recommended a health study and follow-up activities.

Workers at Bofors-Nobel, their families, and community residents were invited to participate in a cross-sectional study of self-testing for hematuria. Two other communities in Adrian and Kalamazoo (MI) where factories were located that manufactured or used suspected bladder carcinogens were also included.

Of the 2492 individuals who were contacted, 611 participated in screening that required daily testing of their urine for blood during a two week period over six months. Only one participant completed five testing periods. A high prevalence of individuals had hematuria (47.5%). More women than men tested positive (57.4% versus 35.2%). Thirteen individuals diagnosed with bladder cancer were in the cohort, but all had been identified before the self-testing program began. Sixty percent of participants who tested positive for blood in their urine had no identified etiology for their hematuria. Neither number of days participants tested positive on self-testing, degree of positivity, or extensiveness of medical workup (inclusion of cytoscopy) were associated with determining the cause for the hematuria.

This study was limited by a low rate of participation (25% of those contacted tested their urine once), and there was no follow-up of individuals who had moved away from the communities. Therefore, no conclusion on the overall risk of bladder cancer among either workers, family members, or nearby residents was determined.

ATSDR Conclusions: Because human exposure to 3,3' dichlorobenzidine, benzidine, VOCs, and metals may have occurred in the past via worker track-out, surface water, air, soil and sediment pathways, and future exposure to the chemicals may occur via contaminated groundwater, the 1990 and 1992 ATSDR health assessments categorized this site as an *Indeterminate Public Health Hazard* (Category 3). Although the site posed a past public health hazard and could pose a health hazard in the future if new water supply wells are installed before groundwater remediation is complete, ATSDR concluded in the 1996 health assessment that the site "currently" posed *No Apparent Public Health Hazard* (Category 4).

VOCs were present at levels of concern in groundwater. In the past, workers at the plant were exposed to benzidine and 3,3'-dichlorobenzidine and also VOCs from the use of contaminated groundwater as sources of water in the plant. Contaminants were transported offsite in groundwater and also by worker track-out. The contaminants in soil and sediment onsite are to be contained through construction of a barrier wall remedy, completed in September 2004. A groundwater treatment plant was completed in 1998, and is expected to operate for at least 43 years and to remove approximately 25, 0000 pounds of total organic contaminant from approximately 10.2 billion gallons. It is unlikely that this site is still releasing significant contamination into the environment. Health outcome data provide only a slight suggestion that the site-related exposure may have had adverse health effects (slight increase in bladder cancer incidence for 1 year only and in total invasive cancer incidence for 1 year only).

Construction completion was expected in 2007, and the long term RA planned completion is December 30, 2041. An interim containment action for the Operable Unit #2 (OU#2) is ongoing in conjunction with the OU #1 remedy.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC-critical pollutant lead was detected in one onsite monitoring well and at high concentrations in soil at several limited areas with the restricted area of the site. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.2 Duell & Gardner Landfill

This approximately 80-acre landfill in Dalton Township, Muskegon County, MI, operated as an uncontrolled dump for industrial waste and general refuse from the 1940s to 1973. The landfill ceased operations in 1973. During 1986, about 500 deteriorating drums, hundreds of lab bottles, and piled waste were removed from the site, and areas of heavily stained soil were covered with plastic to reduce leaching of contaminants into groundwater. The groundwater flow is to the southeast toward Bear Creek, which is located about 1 mile southeast of the site. The area is rural; residents use private wells for their domestic water supply. Information regarding this site is taken from the 1994 ATSDR public health assessment and the 2003 USEPA NPL fact sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	40
Females aged 15-44	96
Adults 65 and older	38

Public Health Outcome Data: Age-adjusted cancer mortality rates available from the Michigan Death Registry for Dalton Township (where the site is located), and Muskegon, and Fruitland Townships (adjacent to Dalton Township) for the period of 1983–1987 were compared with the 1985 statewide age-specific mortality rates. Population estimates could not be adjusted by sex due to the unavailability of census data by sex for this area. The actual numbers of deaths observed in these townships were fewer (not statistically significantly) than expected based on the statewide cancer mortality rate. Thus no evidence links the site with cancer death rates. (This study was also cited in the public health assessment for the Ott/Story/Cordova Chemical site, reviewed in Section 5.1.1.6 of this document.)

ATSDR Conclusions: In the 1989 health assessment ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In the 1994 health assessment, ATSDR concluded that under conditions at that time the site posed *No Apparent Heath Hazard* (Category 4).

Trace amounts of toluene were found in private well water. PCBs and heavy metals and metabolites and of crystal violet were found in soil samples, but contamination was not remarkably high or widespread and no data indicated offsite migration. Aniline, N,N-dimethylaniline, crystal violet, chloroform and carbon tetrachloride are present in the onsite groundwater at levels that would be of health concern if the water were used for household purposes, but as of the time of the health assessment concentrations were declining and the contamination had not reached nearby residential wells or surface water. According to the 2003 USEPA NPL fact sheet for this site, remediation has included or will include soil excavation with offsite disposal and capping. Groundwater concentrations of contaminants have declined and have not migrated from the site.

The Remedial Action construction was completed in 2001. The Long Term Remedial Action (LTRA) of groundwater extraction and treatment is currently on-going at the site. A Five Year Review was completed in September 2005. On October 30, 2007, a Restrictive Covenant was signed and filed in the Muskegon County Michigan Register of Deeds office.

The site is under remediation, so future exposures to site-related contaminants are unlikely. No evidence associates this site with any increased cancer incidence.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants PCBs and DDT and their metabolites were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.3 E.I. Du Pont De Nemours & Co., Inc., Montague Plant

This site was a petrochemical manufacturing plant, located southwest of the city of Montague, Muskegon County, MI, and about 1 mile from White Lake. Information regarding this site was taken from the 1989 health assessment conducted by ATSDR.

Demographic Data: Demographic profile not reported. The 1989 health assessment described the population within 1 mile of the site as approximately 300 people.

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants at levels that may result in adverse health effects over time, .ATSDR in 1989 categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). A subsequent ATSDR site review and update changed the category to *No Apparent Public Health Hazard* (Category 4).

Contaminants of concern for this site include heavy metals, thiocyanite, carbon tetrachloride and other VOCs (including tetrachlorethylene and trichloroethylene). Thiocyanate entered groundwater and contaminated residential wells. The 1989 assessment indicated that no further contamination of private wells had been reported since 1961. In addition, private wells were 700 feet up gradient of the contaminated site. The source of this chemical was a lime waste impoundment containing approximately 1 million tons of ammonia thiocyanate. Thiocyanate also discharged to Lake Michigan, and groundwater seeps contaminated the sand of White Lake Beach. An interceptor well was installed south of the lime pile and the contaminated sands were removed. VOCs were found in groundwater in 1979 and treated through use of purge wells. VOCs were found to contaminate soils in the bulk storage and unloading area. Contaminated soils have been removed, and the lime waste impoundment was to be removed.

DuPont is currently conducting an investigation and cleanup. Structures, except for one office building, were razed. An enhanced groundwater treatment system is scheduled to be installed in spring 2008.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants thiocyanate and VOCs were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm

5.1.1.4 Hooker (Montague Plant)

The Hooker Chemical & Plastics Corp. is a 900-acre site, the southern portion of which borders on White Lake. Hooker was reported to have disposed of more than 21 million cubic feet of organic, inorganic, heavy metal, and acid wastes onsite. Much of the contaminated soil had been placed in a clay-lined, clay-capped vault constructed onsite. Groundwater purge wells and a treatment system were installed to capture and cleanse contaminated groundwater before it discharged into White Lake. The information on this site is taken from the 1989 ATSDR public health assessment.

Demographic Data: Demographic profile not reported. As of 1989, approximately 500 people lived within 1 mile of the site.

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants at levels that may result in adverse health effects over time, and the lack of monitoring data, in 1989 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard*.(Category 3). A subsequent ATSDR site review and update also categorized the site as an *Indeterminate Public Health Hazard*.

Residential wells downgradient of the site were contaminated with chlorinated VOCs such as carbon tetrachloride and chloroform, but residents have been switched to municipal water. Trichloroethylene and tetrachloroethylene were also found in groundwater. The contaminant plume from this site discharged into White Lake, located about 1 mile south of the site. The NPDES permit for discharge of treated groundwater from the site into White Lake was authorized to contain low levels of chlorinated VOCs, and mirex; this implies that these contaminants were in the groundwater plume. White Lake fish in 1979 contained mirex at levels below health-based screening values.

Site buildings, equipment, and contaminated soil were consolidated and contained on site. A groundwater purge system is operating to intercept TCE. An in-situ treatment system is to be installed. The site has been removed from the NPL (post-SARA).

IJC Critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants were associated with this site. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.5 Muskegon Chemical Company

The Muskegon Chemical Company site is in Whitehall, Muskegon County, MI. In 1975 it produced chemicals for the pharmaceutical industry. By 1977 groundwater contamination was discovered. A contaminant plume containing 1,2-dichloroethane, triglycol dichloride, and bis(2-chloroethyl) ether extended from the site into Mill Pond Creek, which in turn flows into Mill Pond, which feeds White Lake. In each of these surface water bodies site-related contaminants have been detected. The information regarding this site is taken from the 1992 ATSDR public health assessment, and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	152
Females aged 15-44	367

Adults 65 and older	379

ATSDR Conclusions: Although no completed pathways of human exposure were identified, there was a potential for future exposure to hazardous substances in groundwater and surface water at concentrations that may result in adverse health effects. Consequently, in 1992 ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). A subsequent (1995) ATSDR site review and update categorized the site as posing *No Apparent Public Health Hazard* (Category 4).

No contaminants of concern in a completed exposure pathway were identified in the 1992 health assessment. The contaminants of concern, 1,2 dichloroethane, triglycol dichloride, and bis(2-chloroethyl) ether, are present in surface water above health-based screening values, but warnings are posted against wading and swimming in the contaminated water bodies. Private wells are not contaminated.

According to the USEPA NPL fact sheet, the site is under remediation by groundwater extraction, treatment, and re-injection followed by natural attenuation. Soil remediation is by soil vapor extraction and natural attenuation. Construction completion was documented in June 1997. The first five-year review was conducted by the Michigan Department of Environmental Quality (MDEQ) in 1998. The second five-year review was completed by USEPA and MDEQ in April 2003. That review determined that the remedy 1) remained protective of human health and the environments in the short-term and 2) follow-up actions are necessary to address long-term protectiveness. These actions are on-going. The third five-year review is due by March 31, 2008.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants were associated with this site. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.6 Ott/Story/Cordova Chemical Co.

The Ott/Story/Cordova site is 2 miles north of the City of North Muskegon, in Dalton Township, Muskegon County, MI. The plant occupies about 25 acres of the 210-acre parcel. This former chemical manufacturing plant operated under a succession of owners from 1957 until 1985, discharging wastes into unlined, onsite lagoons, discharging purged groundwater into the Little Bear Creek, and, subsequently, discharging purged water along with wastewater, into the Muskegon County Wastewater management system. Purging of groundwater eventually was discontinued, and a contaminant plume containing many organics expanded offsite toward the southeast, partially discharging into a tributary of Little Bear Creek, and contaminating residential wells. A large number of drums of waste material and 8,000 cubic yards of contaminated soils and sludge were removed in 1978. The plant site is securely fenced, but the surrounding areas affected by groundwater contamination are not. Information regarding this site was taken from the 1993 ATSDR public health assessment, and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	131
Females aged 15-44	294
Adults 65 and older	140

Public Health Outcome Data: Age-adjusted cancer mortality rates available from the Michigan Death Registry for Dalton Township (where the site is located), and Muskegon, and Fruitland Townships (adjacent to Dalton Township) for the period of 1983–1987 were compared with the 1985 statewide age-specific mortality rates. Population estimates could not be adjusted by sex due to the unavailability of sex-related census data for this area. The actual number of deaths observed in these townships were fewer (though not statistically significantly so) than expected given the statewide cancer mortality rate. Thus no evidence indicates the site affected cancer death rates. (This study was also cited in the public health assessment for the Duell & Gardner Landfill, reviewed in Section 5.1.1.2 of this document.)

A subsequent survey of the 29 households with the greatest potential for site-related exposures showed no unusual disease or illness pattern that would suggest a site-related health impact.

ATSDR Conclusions: Because of the risk that could result from chronic exposure to hazardous substances through groundwater and air, in the 1993 health assessment ATSDR categorized the site as a *Public Health Hazard* (Category 2).

Exposure through household use of contaminated groundwater, (resulting in ingestion, dermal, and inhalation exposure) was considered a completed exposure pathway to a broad array of organic chemicals including VOCs (1,2-dichloroethane, thrichlorethylene, benzene and chlorinated VOCs including vinyl chloride), aniline, and N-nitrosodiphynyalmine. At least four households used contaminated wells in the past, and although alternative water supplies have been provided, ongoing exposure through use of the well water for watering lawns and gardens, washing cars, and other nonpotable uses is possible. Discharge areas for the groundwater may evaporate volatile chemicals into the air leading to inhalation exposure.

Remediation of the site since the time of ATSDR's assessment has included removal and offsite disposal of contaminated soil and sediment, including from the creek, and groundwater extraction and treatment, which should be completed in 2030. Groundwater remediation is continuing. A partial removal was conducted between 1977 and 1979. Residents received bottled water until the 1982 installation of a municipal water system. The soil cleanup was completed. September 14, 2000. The Long-Term Response Action (LTRA), started on September 14, 2000. The soil RA (Operable Unit #3) was completed on March 21, 2002. The State of Michigan is scheduled to assume 100 percent of the remedy's operation in the year 2010.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC critical pollutants were detected during assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.7 Peerless Plating

The 1-acre Peerless Plating Co. site is an abandoned electroplating facility located on a 1-acre site in Muskegon, Muskegon County, MI. It was in operation from 1937 to 1983. Process wastes with high concentrations of heavy metals and very high and low-pH values were discharged into unlined lagoons. Other wastes were discharged directly to the ground from manholes inside the building. When the plant closed it was abandoned, as were plating solutions, drummed wastes, and raw materials. Hydrocyanic acid gas was even detected inside the abandoned buildings. In 1983 and 1991, USEPA removed acids, cyanide plating solution, chromium plating solution, trichloroethylene, and liquids containing heavy metals, and remediated the waste lagoons.

Asbestos was encapsulated and the site was fenced. Information regarding this site was taken from the 1992 ATSDR public health assessment, and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile, from the 2000 U.S. Census, for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,253
Females aged 15-44	2,151
Adults 65 and older	1,371

Public Health Outcome Data: Local health department records revealed no community health concerns of adverse health effects relating to the site.

ATSDR Conclusions: Because of the potential threat to human health from exposure to potentially contaminated groundwater, surface water, sediments, and soil. In 1992 ATSDR characterized this site as an *Indeterminate Public Health Hazard* (Category 3). A 1996 site review and update determined that in the past, this site should have been classified as a *Public Health Hazard* (Category 2).

The shallow groundwater and soil onsite were contaminated with VOCs (including TCE) and heavy metals, particularly cadmium and chromium. Little Black Creek was a discharge point for the shallow groundwater. Shallow groundwater also was a source of potable water. In 1986 the wells of 18 businesses and residences within a ½-mile radius of the site were contaminated with heavy metals (chromium) and chlorinated VOCs. Residents were provided with bottled drinking water, and eventually residences were connected to a municipal water supply. Heavy metals, (cadmium, lead and mercury), PCBs, pesticides, SVOCs and VOCs were also investigated in sediments.

As described in the USEPA NPL fact sheet, extensive remediation of the site, including ongoing groundwater treatment, should minimize any further migration of contaminants from the site. Since 1992 additional remediation of the site has included treatment or removal of onsite soils. Groundwater treatment, started in 2001, was expected to continue for 10 years. All construction of remedial actions completed in 2001. An on-going groundwater remediation system is in place.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC critical pollutants were associated with this site. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.8 Ruddiman Drain Area (Ruddiman Creek Area)

The west, north, and main branches of Ruddiman Creek watershed flow through areas of dense residential development, and into Ruddiman Pond. Area residents play in and around these creek branches and pond. Sediments of Ruddiman Creek and pond were sampled following passage of the Clean Michigan Initiative, and found to be contaminated. The sources of contamination were not discussed. Information on this site is taken from the 2003 ATSDR health consultation.

ATSDR Conclusions: Because of the limited monitoring data and uncertainties in estimated human doses, in 2003, ATSDR categorized this site as an Indeterminate Public Health Hazard (Category 3). ATSDR concluded that the uncertainties surrounding the estimated dose of PCBs from sediment exposure, the lack of a lead model for the children (age 10-16 years) likely to be

exposed to creek sediments, and the limited number of samples that adequately characterized the contamination precluded a definitive conclusion regarding the hazard.

PCBs and lead were found at concentrations of concern in sediments of the main branch of the Ruddiman Creek. The sediments of the main branch of this creek are contaminated with PCBs and lead at levels of concern for human exposure as well as for ecological effects. The sources of this contamination were not discussed; the conclusion was that additional sampling was needed to define further the extent of contamination—including sampling of fish—and that warning signs were needed.

USEPA (2006) reported that this site has been remediated under the Great Lakes Legacy Act. Between August 2005 and June 2006, 90,000 cubic yards of contaminated sediment were removed from Ruddiman Creek and Pond. The project also removed from the site approximately 126,000 pounds of lead, 320 pounds of PCBs, and 204,000 pounds of chromium.

Remedial Actions completed under the Great Lakes Legacy Act in 2006. Efforts were awarded a ”Success Story“ at the State of the Great Lakes Ecosystem Conference (SOLEC) in 2006.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants PCBs and metals were identified at this site during ATSDR’s assessment of exposure related issues.

5.1.1.9 SCA Independent Landfill

This landfill occupies approximately one-third of a 100-acre site in Muskegon County, MI, in a swampy area near Black Creek, which flows along the north side of the landfill. The site received refuse—probably including industrial as well as domestic waste—starting in the 1950s and continuing through about 1987. The groundwater flow at this site is northward, and appears to empty into wetlands that border Black Creek. Information regarding this site is taken from the 1989 ATSDR health assessment and the 2003 USEPA NPL fact sheet for the site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	598
Females aged 15-44	1,054
Adults 65 and older	505

ATSDR Conclusions: Because of the potential threat to human health from exposure to contaminants and the lack of adequate monitoring data, ATSDR, in 1989 categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In a subsequent site review and update, ATSDR characterized the site as posing *No Apparent Public Health Hazard* (Category 4).

Onsite monitoring wells indicated contamination of groundwater with VOCs including benzene, but as of the 1989 assessment comparisons with health-based screening values were not presented, no downgradient monitoring had been done, and other media were not investigated. The USEPA NPL fact sheet discusses contamination of groundwater, surface water, and wetlands with ammonia and manganese. The landfill has been remediated by improvement of the waste cover, surface water drainage, and leachate management; and by excavation of surface soil from onsite hot spots. Long-term groundwater and surface water monitoring started in 2001, and

deed restrictions were being obtained for nearby residents to prohibit the use of private wells for drinking water.

Long-term groundwater and surface water monitoring began in 2001. MDEQ currently anticipates no additional construction. The May 2005 5-Year Review Report reported that exposure pathways are being controlled.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC-critical pollutants are implicated as contaminants from this site. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.10 Thermo-Chem Incorporated

The Thermo-Chem site includes two properties that together cover approximately 9.5 acres of land in Muskegon County, MI, near the city of Muskegon. The sites were operated as waste solvent reprocessing, storage, and incineration facilities. These operations resulted in extensive contamination of soil and groundwater. Information on this site is taken from the 1996 ATSDR public health assessment and the 2003 USEPA NPL fact sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	420
Females aged 15-44	716
Adults 65 and older	401

Public Health Outcome Data: Cancer incidence data for 1985 through 1989 for the two ZIP code areas (49442, 49444) nearest the Themo-Chem site were compared to the number of cases expected based on age-specific annual rates for the National Cancer Institute Surveillance, Epidemiology, and End Results program. For both areas, the number of observed cases was lower than the number expected.

ATSDR Conclusions: The 1996 public health assessment characterized this site as an *Indeterminate (formerly potential) Public Health Hazard (*Category 3*).* The groundwater is contaminated with VOCs; the groundwater flow is toward Black Creek, and some contamination of the surface water and sediments was detected downstream from the site. No residences are downgradient of the site and no wells have been found to be contaminated. Some contamination of subsurface soils with PCBs was noted at above health-based screening levels, but surface soil data were not available, and the contamination was not high. Concentrations of PCBs in fish in Black Creek were not above FDA action levels.

Although in the past this site may have contributed to environmental contaminant burdens, particularly of VOCs, it has been remediated. Construction design is complete and in place. Site monitoring is on-going in accordance with the O&M Plan.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant PCBs was identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.1.11 Whitehall Municipal Wells

The Whitehall Wells site consists of the City of Whitehall's municipal Production Well #3 and some of the surrounding area. The well was found to be contaminated with VOCs. The source was unknown. Information on this site was taken from the 1992 ATSDR public health assessment and the 2003 USEPA NPL fact sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	228
Females aged 15-44	545
Adults 65 and older	507

ATSDR Conclusions: The 1989 ATSDR public health assessment concluded that the site was an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). Because of an absence of current human exposure to significant levels of hazardous substance, the 1992 ATSDR public health assessment concluded that the site poses *No Apparent Public Health Hazard* (Category 4).

In 1981, wells were found to be contaminated with tetrachloroethylene and trichloroethylene, and other chlorinated VOCs, but levels were low, and exposure was minimized by reducing the pumping rates, and ultimately by taking the wells off-line. Contamination of the monitoring wells is sporadic. Although this municipal supply well contributed to human exposure to VOCs, it was not the source of contamination, which remains unknown. It has been taken off-line. Monitoring of the groundwater continues.

IJC Critical Pollutants Identified within ATSDR Documents: No critical pollutants were identified during ATSDR exposure assessment issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.1.2. TRI Data for the Muskegon AOC and White Lake AOC

The TRI onsite chemical releases for Muskegon County are summarized in Table 5.1-B. Total onsite releases in 2001 were 1,370,434 pounds, the majority of which were released to air, less was released to land, and little released to surface water. The number of TRI release facilities in the vicinity of the Muskegon Lake AOC is large, whereas there are none shown in the vicinity of the White Lake AOC in the maps in Appendix 1.

Of the total onsite releases, 12,488 (0.9%) were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air, surface water, and land), and mercury and mercury compounds (to air and land). The facilities that released these pollutants are listed in Table 5.1-C.

The major release (≥ 500,000 pounds) of a non-IJC chemical was of hydrochloric acid aerosols (to air). The next highest release, in the range of 150,000-299,999 pounds, was barium compounds (primarily to land).

5.1.3. NPDES Data for the Muskegon Lake AOC and White Lake AOC

The NPDES permitted discharges for Muskegon County, MI are summarized in Table 5.1-D. The total average annual permitted discharges in 2004 were 77,971 pounds, the majority of which was ammonia nitrogen and phosphorus.

The IJC-critical pollutants DDD (0.0003 pounds), lead (120 pounds), and mercury (5.84 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.1-F.

5.1.4. Summary and Conclusions for the Muskegon Lake AOC and White Lake AOC

5.1.4.1 Hazardous Waste Sites

The 11 sites in Muskegon Lake AOC and White Lake AOC at some time in their assessment history have been categorized by ATSDR in health hazard categories 2-3. Remediation has been completed or is ongoing at all sites, and the sites are no longer expected to contribute to human or environmental exposure.

5.1.4.2 TRI Data

The TRI onsite chemical releases for Muskegon County in 2001 were 1,370,434 pounds, the majority of which were released to air, followed by releases to land. Very little was released to surface water. Facilities reporting these releases are concentrated in the vicinity of the Muskegon Lake AOC; there are none situated near the White Lake AOC.

Of the total onsite releases, 12,488 (0.9%) were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air, surface water, and land), and mercury and mercury compounds (to air and land).

The major release ($\geq$ 500,000 pounds) of a non-IJC chemical was of hydrochloric acid aerosols (to air).

5.1.4.3 NPDES Data

The NPDES permitted discharges for Muskegon County, MI are summarized in Table 5.1-D. The total average annual permitted discharges in 2004 were 77,971 pounds, the majority of which was ammonia nitrogen and phosphorus.

The IJC-critical pollutants DDD (0.0003 pounds), lead (120 pounds), and mercury (5.84 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.1-F.

5.1.4.4 County Demographic Data

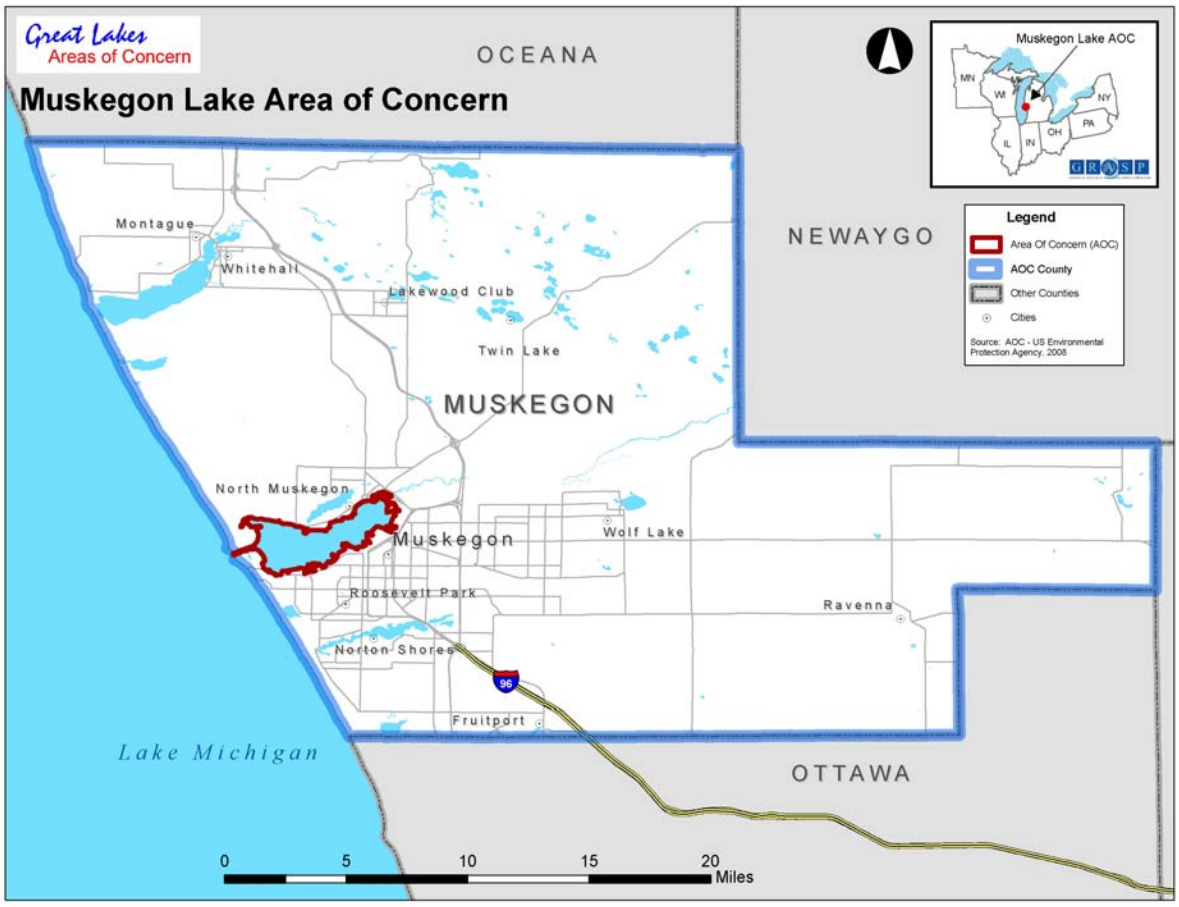
Vulnerable populations in Muskegon County totaled 9,030. The population in Muskegon County is much more concentrated around the Muskegon Lake AOC than the White Lake AOC.

5.1.4.5 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption and restrictions on drinking water are both cited in the summary table listing BUIs for this AOC. Fish consumption restrictions are specific for

Muskegon River and for Muskegon Lake. Consumption restrictions vary by location; fish species (e.g., for carp, largemouth bass, northern pike, walleye, and for vulnerable populations.

The most recent remedial action plan for this AOC is not available on the USEPA Web site and was not obtained for this report. No information regarding the restriction on drinking water consumption and odor or taste was found on the USEPA Web site. Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).


Great Lakes
Areas of Concern
Muskegon Lake Area of Concern
OCEANA
NEWAYGO
OTTAWA
MUSKEGON
Montague
Whitehall
Lakewood Club
Twin Lake
North Muskegon
Muskegon
Wolf Lake
Roosevelt Park
Ravenna
Norton Shores
Fruitport
Lake Michigan
96
0 5 10 15 20
Miles
Muskegon Lake AOC
MN
WI
NY
PA
IL
IN
OH
GRASP
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008

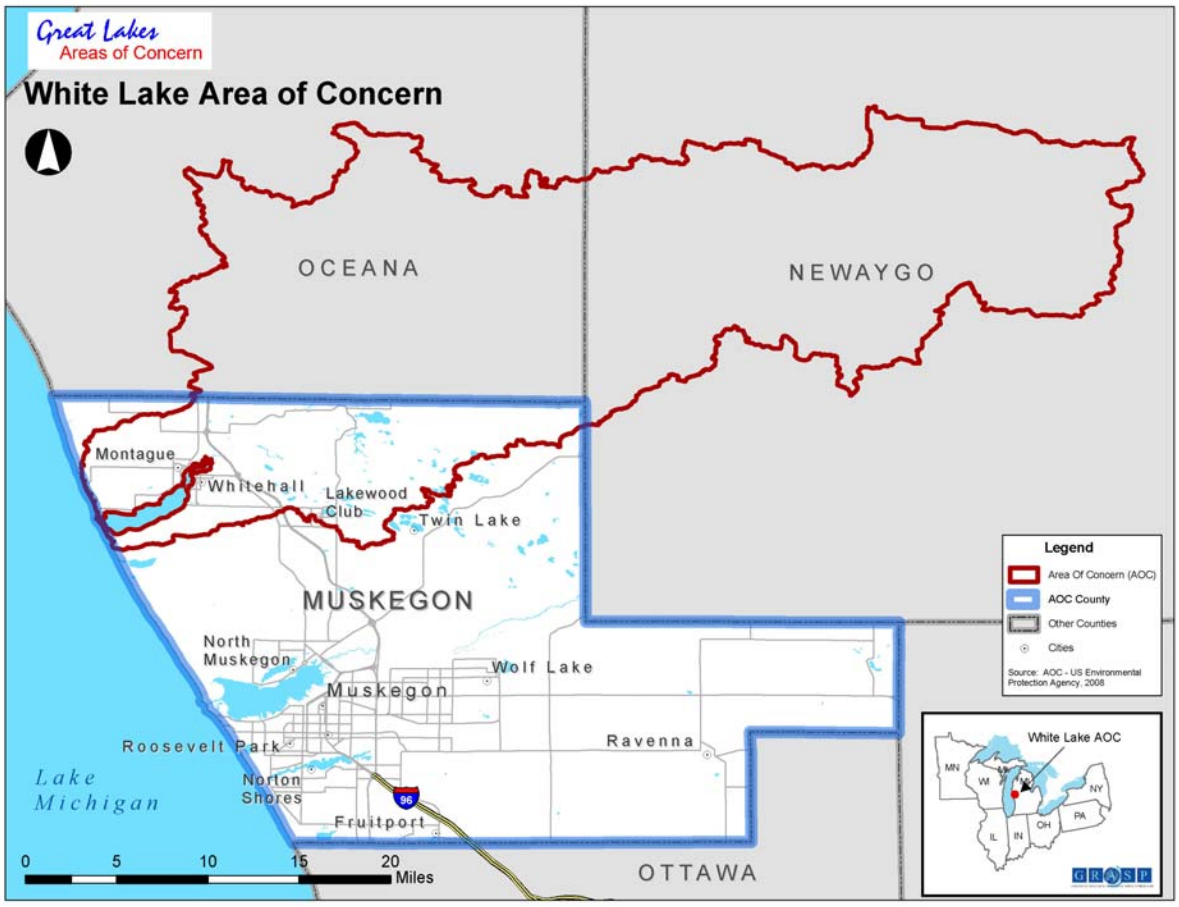

Great Lakes
Areas of Concern
White Lake Area of Concern
OCEANA
NEWAYGO
Montague
Whitehall
Lakewood
Club
Twin Lake
MUSKEGON
North
Muskegon
Muskegon
Wolf Lake
Ravenna
Roosevelt Park
Norton
Shores
Lake
Michigan
Fruitport
96
0 5 10 15 20
Miles
OTTAWA
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
White Lake AOC
MN
WI
NY
PA
IL
IN
OH
GRASP

Table 5.1-B TRI Releases (in pounds, 2001) for Muskegon Lake and White Lake AOCs

DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.00106722	No data	0	0	0.00106722	0	0.00106722
(PCDDs and PDCFs)	3							
LEAD	8	1786	12	0	89	1887	15325.779	17212.779
LEAD COMPOUNDS	8	196.6996	3100.001	0	7100	10396.7006	1684.33037	12081.03097
MERCURY COMPOUNDS	9	153	1	0	50	204	9.23	213.23
	Total IJC	2135.700667	3113.001	0	7239	12487.70167	17019.33937	29507.04104
1,2,4-TRIMETHYLBENZENE		236	No data	0	0	236	0	236
1,2-DICHLOROETHANE		22	No data	0	0	22	0	22
3,3'-DICHLOROBENZIDINE DIHYDROCHLORIDE		5	No data	0	0	5	7200	7205
4,4'-ISOPROPYLIDENE-DIPHENOL		343	No data	0	0	343	74938	75281
ACETONITRILE		2150	No data	0	0	2150	0	2150
ALUMINUM (FUME OR DUST)		15244	No data	0	153	15397	286	15683
AMMONIA		26755	No data	0	0	26755	0	26755
ATRAZINE		10	0	0	0	10	0	10
BARIUM COMPOUNDS		1297	5800	0	170880	177977	153990	331967
BENZENE		1141	No data	0	0	1141	0	1141
CERTAIN GLYCOL ETHERS		18	No data	0	0	18	0	18
CHLORINE		3465	0	0	0	3465	0	3465
CHLORINE DIOXIDE		255	No data	0	0	255	0	255
CHLOROBENZENE		12	No data	0	0	12	0	12
CHLOROFORM		430	No data	0	0	430	0	430
CHLOROMETHANE		6680	No data	0	0	6680	0	6680
CHROMIUM		2354	10	0	5	2369	22407	24776
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		0	No data	0	0	0	20233	20233

COBALT		1644	No data	0	5	1649	12732	14381
COBALT COMPOUNDS		0	No data	0	0	0	5780	5780
COPPER		2305	10	0	11	2326	22746	25072
COPPER COMPOUNDS		70	No data	0	0	70	350	420
DICHLOROMETHANE		49106	No data	0	0	49106	0	49106
DIISOCYANATES		1	No data	0	0	1	0	1
DIMETHYL PHTHALATE		0	No data	0	0	0	16000	16000
ETHYLBENZENE		1331	No data	0	0	1331	0	1331
ETHYLENE GLYCOL		12	No data	0	0	12	0	12
FORMALDEHYDE		6	No data	0	0	6	0	6
FORMIC ACID		4	No data	0	0	4	0	4
FREON 113		5	No data	0	0	5	0	5
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		691508	0	0	0	691508	0	691508
HYDROGEN FLUORIDE		54923	No data	0	0	54923	0	54923
MANGANESE		5911	5	0	0	5916	13424	19340
MANGANESE COMPOUNDS		33418	0	0	39470	72888	17281	90169
M-CRESOL		3	No data	0	0	3	0	3
METHANOL		87887	No data	0	0	87887	0	87887
METHYL ETHYL KETONE		630	No data	0	0	630	0	630
METHYL ISOBUTYL KETONE		81	No data	0	0	81	0	81
N,N-DIMETHYLFORMAMIDE		244	No data	0	0	244	0	244
N-BUTYL ALCOHOL		36	No data	0	0	36	0	36
N-HEXANE		1500	No data	0	0	1500	0	1500
NICKEL		2383	255	0	5	2643	29427	32070
NICKEL COMPOUNDS		0	No data	0	0	0	2680	2680
NITRATE COMPOUNDS		10	No data	0	0	10	5	15
NITRIC ACID		10029	No data	0	0	10029	0	10029
N-METHYL-2-		261	No data	0	0	261	0	261

PYRROLIDONE								
PHENOL		750	No data	0	0	750	0	750
PHTHALIC ANHYDRIDE		4	No data	0	0	4	0	4
POLYCYCLIC AROMATIC COMPOUNDS		0	No data	0	18	18	4	22
PYRIDINE		277	No data	0	0	277	0	277
STYRENE		18346	No data	0	0	18346	7816	26162
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		51588	No data	0	0	51588	0	51588
TETRACHLORO-ETHYLENE		16	No data	0	0	16	0	16
TOLUENE		15235	No data	0	0	15235	0	15235
TRICHLOROETHYLENE		24510	2	0	0	24512	0	24512
TRIETHYLAMINE		148	No data	0	0	148	0	148
VANADIUM COMPOUNDS		3203	No data	0	20000	23203	4400	27603
XYLENE (MIXED ISOMERS)		3471	No data	0	0	3471	0	3471
ZINC COMPOUNDS		22	22	0	0	44	2216	2260
	Total Non-IJC	1121295	6104	0	230547	1357946	413915	1771861
	Total	1123430.701	9217.001	0	237786	1370433.702	430934.3394	1801368.041

Table 5.1-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Muskegon Lake and White Lake AOCs

Critical IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Muskegon County, MI	2	B. C. COBB GENERATING PLANT	49445BCCBB151NC	MUSKEGON
		S. D. WARREN CO.	49443SDWRR2400L	MUSKEGON
Lead and lead compounds	12			
Muskegon County, MI	12	B. C. COBB GENERATING PLANT	49445BCCBB151NC	MUSKEGON
		BEKAERT CORP.	49442BKRTC2121L	MUSKEGON
		DILESCO CORP.	49441DLSCC1806B	MUSKEGON
		EAGLE ALLOY INC.	49442GLLLY5142E	MUSKEGON
		HAYES LEMMERZ INTL. - MONTAGUE INC.	49437HYSLM5353W	MONTAGUE
		MARATHON ASHLAND PETROLEUM L.L.C. NORTH MUSKEGON MI TERMINAL	49445NRTHM3005H	NORTH MUSKEGON
		MUSKEGON CASTINGS CORP.	49442MSKGN2325S	MUSKEGON
		NON FERROUS CAST ALLOYS INC.	49441NNFRR1146N	MUSKEGON
		PORT CITY DIE CAST	49442PRTCT1985E	MUSKEGON
		RAVENNA CASTING CENTER INC.	49451SLDPW3800A	RAVENNA
		TEXTRON INC. CWC DIV.	49441CWCCS2672H	MUSKEGON
		WEST MICHIGAN STEEL FNDY.	49441WSTMC1148W	MUSKEGON
Mercury and mercury compounds	2			
Muskegon County, MI	2	B. C. COBB GENERATING PLANT	49445BCCBB151NC	MUSKEGON
		S. D. WARREN CO.	49443SDWRR2400L	MUSKEGON

Table 5.1-D NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Muskegon Lake and White Lake AOC

Chemical	IJC Tracking Number	Discharge
4,4'-DDD (P,P'-DDD)	5	0.0003
LEAD, TOTAL (AS PB)	8	120.45
MERCURY, TOTAL (AS HG)	9	5.84
	Total IJC	126.29
CADMIUM, TOTAL (AS CD)		9.13
CHROMIUM, HEXAVALENT (AS CR)		10.59
CYANIDE, FREE (AMEN. TO CHLORINATION)		23.36
HEPTACHLOR EPOXIDE		0.003
HYDROGEN PEROXIDE		730
LINDANE		0.33
NICKEL, TOTAL (AS NI)		215.35
NITROGEN, AMMONIA TOTAL (AS N)		44286.67
PHOSPHORUS, TOTAL (AS P)		32057.95
ZINC, TOTAL (AS ZN)		511
	Total Non-IJC	77844.38
	Total	77970.67

5.2. Kalamazoo River AOC, Allegan and Kalamazoo Counties, MI

The Kalamazoo River, located in the southwest portion of the lower peninsula of Michigan, flows in a westerly direction to discharge into Lake Michigan. The Kalamazoo River AOC extends from the Morrow Dam downstream to Lake Michigan, a distance of approximately 80 miles (see AOC map at end of chapter and in Appendix 1).

5.2.1. Hazardous Waste Sites Relevant to the Kalamazoo River AOC

ATSDR has evaluated the data for hazardous waste sites in Allegan and Kalamazoo Counties, MI, and reached conclusions regarding any potential effect to health posed by these sites. These conclusions, along with information regarding the type and location of the site, and the date and type of assessment document, are summarized in Table 5.2-A, for sites that had public health hazard categories of 2-3 at some point during their assessment history.

Table 5.2 -A Hazardous Waste Sites in Allegan and Kalamazoo Counties, MI

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Rockwell International, Allegan MID006028062	HA	1989	3	NPL	Completed
	SRU	1995	3		
Allied Paper/Portage Creek/Kalamazoo River, Kalamazoo MID006007306	HA	1991	2	NPL	Ongoing
	HC	2001	5		
	HC	2002	4		
Auto Ion Chemical, Inc., Kalamazoo MID980794382	HC	1998	3	NPL	Completed
	HA	1992	3		
	SRU	1994	5		
K & L Landfill, Kalamazoo MID980506463	HA	1989	3	NPL	Completed
	HA	1992	2		
	HA	2003	NS		
Michigan Disposal Service, Kalamazoo MID000775957	HA	1989	3	NPL	Completed
	HA	1993	3		
Roto-Finish company, Kalamazoo MID005340088	HA	1989	3	NPL	Ongoing
Former Miro Golf Course MIXCRA01W000	HC	2005	3	NPL	Ongoing

2 =Public Health Hazard, 3 =Indeterminate Public Health Hazard, 4 =No Apparent Public Health Hazard, 5=No Public Health Hazard

HA = Public Health Assessment, HC = Health consultation, SRU=Site Review and Update, NS=Not stated

ATSDR has conducted further evaluation of the site data, which is summarized in the following section

5.2.1.1 Rockwell International Corp.

This 30-acre site is located in Allegan, Allegan County, MI. From the early 1900s through 1991, Rockwell International manufactured universal joints for heavy trucks and construction equipment at this site. Rockwell discharged quenching and cutting fluids to the Kalamazoo River and later to three unlined ponds, which discharged to the river. When the ponds filled with sludge, they were buried and new ponds were constructed. Oil seeps appeared along the river in 1971, and were traced to six leaking underground storage tanks. By the time of the 1989 health assessment, the leaks were eliminated, and oil recovery wells were installed to control the migration of oil. Information regarding this site is taken from the 1989 ATSDR health assessment and subsequent 1995 site review and update, and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	445
Females aged 15-44	890
Adults 65 and older	505

ATSDR Conclusions: In the 1989 health assessment ATSDR classified this site as an *Indeterminate (formerly potential) Public Health Hazard.* In the subsequent site review and update (1995), ATSDR concluded that this site presented an *Indeterminate Public Health Hazard* (Category 3) because although sufficient data were not available, risk to human health could result from potential exposure to levels of hazardous substances (detected at the site) known to be associated with adverse health effects over time.

In 2001–2002, soil contaminated with PCBs in a yard across the street and along the sewer lines was removed. Remediation of the site began in late 2004. Activities have been completed with the exception of implementation of deed notices.

IJC Critical Pollutants Identified with ATSDR Documents: The IJC-critical pollutant PCBs, as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.2 Allied Paper/Portage Creek/Kalamazoo River

This site includes the Allied Paper, Inc., Property in Kalamazoo County, Michigan, covering 75 acres in the city of Kalamazoo, a 3-mile stretch of Portage Creek from Cork Street, Kalamazoo to the confluence of the creek with the Kalamazoo River, and 35 miles of the Kalamazoo River, from Portage Creek downstream to Lake Allegan in Allegan County. The site is contaminated with PCBs from discharges and disposal of waste by the paper industry. Disposal areas are located on the banks of the river. Contaminated sediments have been largely deposited in four impoundment areas. The river sediments are estimated by USEPA (2006) to contain 110,000 pounds of PCBs. Information regarding this site is taken from the 1991 ATSDR public health assessment, and the 2003 USEPA NPL fact sheet. According to the USEPA NPL fact sheet, the site includes the entire Kalamazoo River AOC (i.e., the 80-mile stretch of river from the Morrow Dam downstream to Lake Michigan).

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	7,085
Females aged 15-44	17,055
Adults 65 and older	8,523

Public Health Outcome Data: Because human exposure to PCBs at levels of public health concern may be occurring, the site (as of 1991) was being considered for a study to investigate fish ingestion and serum PCB levels. The conclusion was that if a large number of people were eating fish from the Kalamazoo River and Portage Creek, a fish consumption study was warranted. As of 2000, ATSDR reported that the state was creating a study cohort of anglers, examining their fish consumption patterns, and obtaining medical histories and blood specimens for chemical analysis. The study found that those who ate fish taken from the Kalamazoo River had higher residue levels of total PCB and DDE in blood than did those who did not eat Kalamazoo-River fish. The finding however, was not statistically significant (ATSDR 2000).

USEPA (2006) reported that the Michigan Department of Environmental Quality published the Final (Revised) Baseline Human Health Risk Assessment Report in 2002. The report concluded that significant health risks to people and to fish-eating animals resulted from eating PCB-contaminated fish from Kalamazoo River. The risk assessment also found that contact with PCB-contaminated floodplain soils by dermal exposure presented a health risk to people but that recreational activity such as swimming, boating, and wading in the Kalamazoo River do not pose unacceptable PCB-related risks to the public.

ATSDR Conclusions: Because of the threat to human health from exposure to PCBs in environmental media and biota, in the 1991 public health assessment ATSDR categorized this site as a *Public Health Hazard* (Category 2). USEPA also reported (2006) that the public health threats were associated with dermal contact and incidental ingestion of water and sediments during recreational use of the water. ATSDR health consultations in 2001 and 2002 categorized the site as *No Public Health Hazard* (Category 5, 2001) and *No Apparent Public Health Hazard* (Category 4, 2002).

The site covers a very large geographic area, heavily contaminated with PCBs (the primary contaminant of concern) from the paper industry. Vulnerable populations living near the site are large. The maximum levels of PCBs in fish from the Kalamazoo River and Portage Creek exceeded the FDA limit and the Michigan trigger level for fish consumption advisories (2 ppm). USEPA reported (2006) that the unacceptable risks to public health from fish consumption resulted in fish consumption advisories for the river. Although fish advisories were issued, anglers reportedly had been taking home fish in amounts inconsistent with consumption advisories. Turtles from the river also are used for food and could have been highly contaminated. PCBs were also found in sediment and water of the river and creek.

Remediation is in the early phases and some actions have taken place. Excavation and dredging removal action began in April 2007 and will continue through 2008. A supplemental remedial investigation/feasibility study of the Kalamazoo River and Portage Creek is underway. New data collection began in September 2007 for sediment and floodplain soil that is expected to allow evaluation of clean-up alternatives.

IJC Critical Pollutants Identified with ATSDR Documents: The IJC-critical pollutant PCBs were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.3 Auto Ion Chemicals, Inc.

This 1.5-acre site is located in the city of Kalamazoo, Kalamazoo County, MI, on a bank of the Kalamazoo River. Wastes from chromium plating operations were treated and disposed of at the site. Liquid wastes were deposited in an unlined lagoon onsite or stored in tanks in a basement. Inadequate waste handling, treatment, and storage led to a number of discharges to the soil, storm and sanitary sewers, and directly into the river. In 1985–1986, a cleanup was conducted to remove water and wastes from the site. The building was demolished and the site was fenced. Soil and groundwater remained contaminated. Information regarding this site is taken from the 1992 ATSDR public health assessment, and the 2003 USEPA NPL fact sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	994
Females aged 15-44	708
Adults 65 and older	1,819

ATSDR Conclusions: Because of the potential risk to human health that could result from possible exposure to hazardous substances at levels that may result in adverse health effects over time, in both the 1989 health consultation and the 1992 health assessment ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In 1993 the contaminated soil was excavated and disposed offsite in licensed landfills, and the site was backfilled with clean soil. This removed the source of groundwater contamination. Groundwater is being monitored. A subsequent ATSDR site review and update concluded that this site poses *No Public Health Hazard* (Category 5).

In the past, before ATSDR assessments of the site, the improper handling of chromium plating wastes contaminated the environment and contributed to potential human exposure. Some VOCs, including vinyl chloride, were found in onsite groundwater at levels above health-based screening values, but the water was not used as a source of drinking or industrial process water. Chromium and cyanide was found in the soil.

The site has been remediated, and groundwater is being monitored to ensure that contaminants in groundwater do not pose a risk to the river's ecosystem. Remediation has removed the contaminated soil at the site, eliminating the source of groundwater contamination.

IJC Critical Pollutants Identified with ATSDR Documents: No IJC-critical pollutants were identified at this site during ATSDR's assessment of exposure-related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.4 K & L Landfill

This 87-acre site was used as a sanitary landfill from the early 1960s until 1979. It also accepted liquid and drummed chemical wastes. The landfill was closed in 1979 when VOCs were found in

nearby residential wells. The information regarding this site is taken from the 1992 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographics: Demographic profile, from the 2000 U.S. Census, for vulnerable populations living within one mile of this site:

Children 6 years and younger	53
Females aged 15-44	130
Adults 65 and older	61

ATSDR Conclusions: In 1989, ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In 1992, because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects, ATSDR concluded that the site posed a *Public Health Hazard* (Category 2).

Past completed exposure pathways include ingestion, dermal contact, and inhalation of VOCs (including benzene and vinyl chloride) from groundwater used as household water. To avoid exposure residences have been switched to municipal water or to deeper wells, but the plume may have reached other residential wells, leading to a health hazard concern. PCBs were found in onsite shallow subsurface soil, but levels were not high enough to cause adverse health effects, and the PCB contamination was localized.

Groundwater is being monitored, and construction of a landfill cap was initiated in 2004. All remedial construction activities were completed in 2006.

IJC Critical Pollutants Identified with ATSDR Documents: The IJC critical pollutant lead, PCBs and B(a)P were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.5 Michigan Disposal Service

This 68-acre landfill is located in the city of Kalamazoo, Kalamazoo County, MI. The landfill accepted household and industrial waste from 1925 to 1968. An incinerator also operated on the site for many years during that period, and ash was buried in the landfill. Since 1968, the site has been used as a Type III landfill, accepting only inert materials, such as construction debris. The landfill is adjacent to Davis Creek, which flows into the Kalamazoo River. Information regarding this site is taken from the 1993 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	830
Females aged 15-44	1,827
Adults 65 and older	863

ATSDR Conclusions: In the 1989 and 1993 ATSDR concluded that this site presented an *Indeterminate (formerly potential) Public Health Hazard* (Category 3) because critical data were missing (e. g., adequate characterization of groundwater contamination, surface soil

concentrations of contaminants). People may have been exposed by several pathways at this site, but no evidence showed that significant exposure had occurred.

Onsite groundwater concentrations of lead exceeded health-based screening values, as did concentrations of arsenic and VOCs including TCE and benzene, but no exposure pathway was complete. The high concentrations were found in limited areas or for limited times. Although groundwater flows towards Davis Creek, the creek water and sediments were not contaminated.

Since 1993, the entire landfill has been capped, and groundwater has been pumped, treated, and discharged to a wastewater treatment facility.

IJC Critical Pollutants Identified with ATSDR Documents: The IJC critical pollutant lead, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.6 Roto-Finish Company

This 7.5-acre site is located near Kalamazoo (in Portage), Kalamazoo County, MI. From 1960 to 1979, Roto-Finish pumped manufacturing and processing wastes (estimated at 83,000 gallons) into two onsite unlined lagoons, which often overflowed. Wastes were also reportedly dumped approximately 1 mile south of the site, and in low areas behind the shop. From 1979 to 1983, Roto-Finish excavated the lagoons and stained soils and disposed of them in an offsite landfill. The excavated areas were backfilled with clean material, and no significant soil contamination was detected. Information regarding this site has been taken from the 1989 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	386
Females aged 15-44	852
Adults 65 and older	305

ATSDR Conclusions: In 1989 ATSDR concluded that this site presented an *Indeterminate (formerly potential) Public Health Hazard* (Category 3) because of the risk to human health that could result from possible exposure to hazardous substances at levels that may result in adverse health effects over time.

As reported in the 1989 health assessment, onsite groundwater contained high levels of chromium and 4,4-methylene bis(2-chloroaniline). 1,1,1-trichloroethan and TCE were also found in groundwater. Since that time, a groundwater extraction system has been operated (1995–2001) to transfer the water for treatment at a wastewater treatment plant. The remaining remedy is natural attenuation with institutional controls, expected to take 50–60 years. Monitoring continues. Chlorinated VOCs are the only contaminants remaining in groundwater.

Since 2004, work was completed in 11 locations, and 13 monitoring wells have been installed. All newly installed wells are being sampled on a quarterly basis to determine rates at which the contamination will degrade. The final Remedial Design and Long Term Monitoring Plan was to be completed by September 2007. A second five-year review was to be conducted in 2007.

IJC Critical Pollutants Identified with ATSDR Documents: No IJC-critical pollutants were identified as contaminants of concern at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.2.1.7 Former Miro Golf Course, Village of Douglas, MI

In 2003, The Michigan Department of Community Health (MDCH) released a health consultation for the former Miro Golf Course in Allegan County, MI. The former Miro Golf Course lies west of the former Chase Manufacturing facility (now owned by Haworth Inc.), where monitoring revealed heavy metals in the soil and chlorinated solvents in the groundwater. Part of the contaminated groundwater plume flows under the former golf course, which had been slated for development as residential and light commercial used. In 2002, moving of soil to begin construction was halted when the owner learned of the soil and groundwater contamination. A Remedial Investigation was conducted at the site for the Michigan Department of Environmental Quality (MDEQ). The site was contaminated with metals, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) in surface waters, groundwater, and subsurface soils.

The follow-up 2005 health consultation addresses additional environmental contamination from the Remedial Investigation, which addressed only the soil and groundwater contamination originating from the former Chase Manufacturing facility. It did not address the arsenic contamination of the soil on the former Miro Golf Course, west of the facility. Information on this site is taken from the 2005 ATSDR health consultation.

ATSDR Conclusions: In 2005 ATSDR concluded that in the future, indoor air inhalation could become an *Indeterminate Public Health Hazard* (Category 3). It is likely that due to the depth to groundwater, VOC vapors cannot enter indoor air at the site to an extent that would be harmful. Future construction activities in the area near and above the plume, however, could result in preferential vapor pathways leading toward structures. There is no apparent public health hazard posed by incidental ingestion of local surface waters. Exposure is expected to be infrequent and insignificant. The arsenic in soil at the former Miro Golf Course was not addressed by the Remedial Investigation. Nonetheless, arsenic remains a concern. If this area is developed, the arsenic must be addressed, dependent on the proposed land use. The remedial investigation is complete on this state-led site and remedial activities are ongoing.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants PAHs as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues.

5.2.2. TRI Data for the Kalamazoo River AOC

The TRI onsite chemical releases for Allegan and Kalamazoo Counties (combined) are summarized in Table 5.2-C. Total onsite releases in 2001 were 2,083,449 pounds, the majority of which were released to air, followed by underground injection. Allegan County accounted for 45% and Kalamazoo County accounted for 55% of the total onsite releases.

Only 2,253 pounds (0.1%) of the total onsite releases were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (primarily to air), and mercury compounds (to air). The facilities that released these pollutants are listed in Table 5.2-D.

The largest releases of non-IJC chemicals, in the range of 300,000–499,999 pounds, were of xylenes and of n-hexane (to air). Dichloromethane and methanol (primarily to air) were the next largest releases (150,000-299,999 pounds).

5.2.3. NPDES Data for the Kalamazoo River AOC

The NPDES permitted discharges for Allegan and Kalamazoo Counties, MI are summarized in Table 5.2-E. The total average annual permitted discharges in 2004 were 317,820 pounds, the majority of which was ammonia nitrogen and phosphorus.

The IJC-critical pollutants PCBs (0.00004 pounds), lead (77 pounds) and mercury (3.65 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.2-F.

5.2.4. Summary and Conclusions for the Kalamazoo River AOC

5.2.4.1 Hazardous Waste Sites

ATSDR has categorized seven hazardous waste sites relevant to the Kalamazoo River AOC in health hazard categories 1–3 at some time in their assessment history. Three of the sites have been remediated, and for the remaining four sites, remediation is ongoing.

5.2.4.2 TRI Data

The TRI onsite chemical releases for Allegan and Kalamazoo Counties (combined) in 2001 were 2,083,449 pounds, the majority of which were released to air, followed by underground injection. Allegan County accounted for 45% and Kalamazoo County accounted for 55% of the total onsite releases.

Only 2,253 pounds (0.1%) of the total onsite releases were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (primarily to air), and mercury compounds (to air).

The largest releases of non-IJC chemicals, in the range of 300,000-499,999 pounds, were of xylenes and of n-hexane (to air).

5.2.4.3 NPDES Data

The NPDES permitted discharges for Allegan and Kalamazoo Counties, MI are summarized in Table 5.2-E. The total average annual permitted discharges in 2004 were 317,820 pounds, the majority of which was ammonia nitrogen and phosphorus.

The IJC-critical pollutants PCBs (0.00004 pounds), lead (77 pounds) and mercury (3.65 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.2-F.

5.2.4.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired for this AOC. The Kalamazoo Remedial Action Plan is not available on the internet. It was not obtained for this report. The 1998 Remedial Action Plan is available on the USEPA Web site and was republished in 2000. According to that report restrictions on consuming fish caught in the Kalamazoo River

downstream from Battle Creek have been in place since 1977 because of PCB concentrations in fish tissue. The source of the PCBs is contaminated sediments.

Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

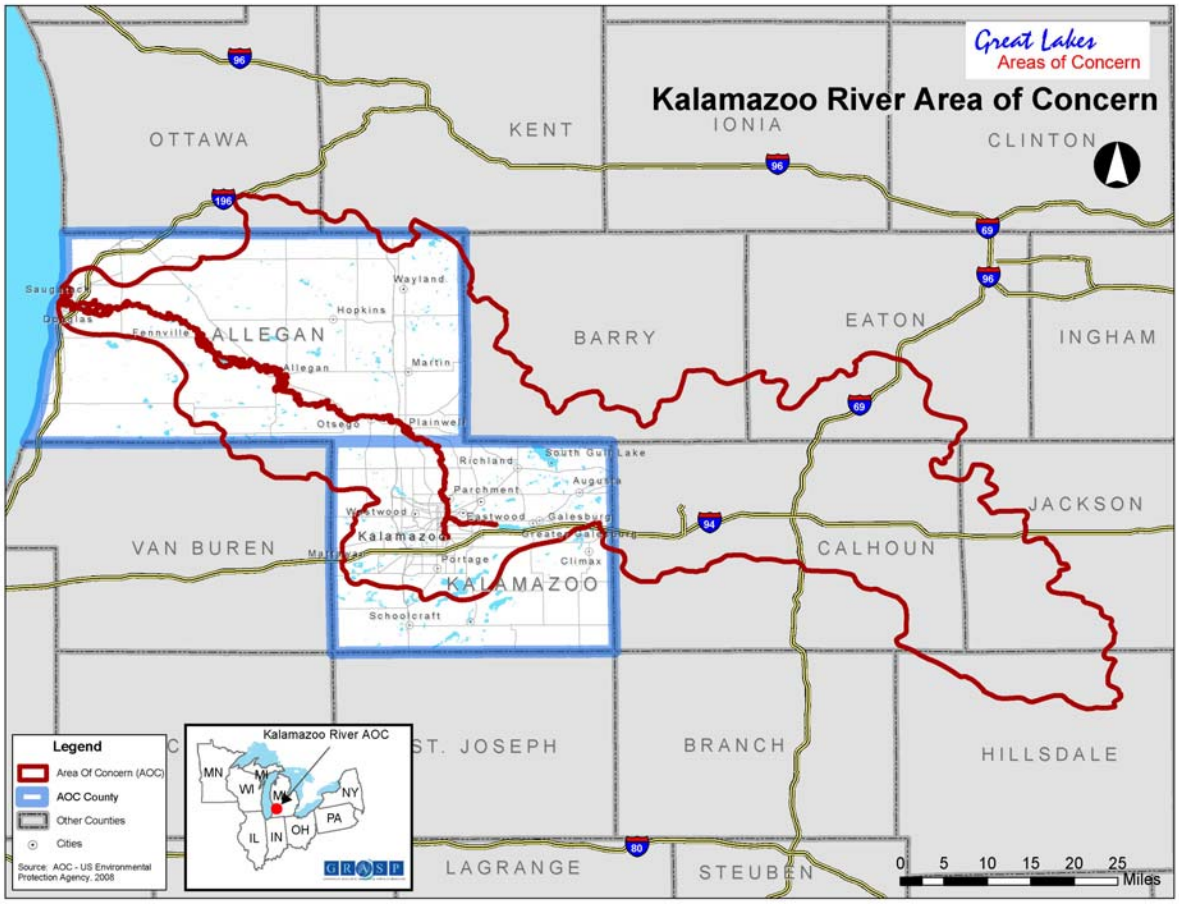

Great Lakes
Areas of Concern
Kalamazoo River Area of Concern
OTTAWA
KENT
IONIA
CLINTON
ALLEGAN
BARRY
EATON
INGHAM
JACKSON
VAN BUREN
CALHOUN
KALAMAZOO
ST. JOSEPH
BRANCH
HILLSDALE
LAGRANGE
STEUBEN
Wayland
Hopkins
Allegan
Martin
Otsego
Plainwell
Richland
Parchment
Kalamazoo
Portage
Climax
Schoolcraft
Galesburg
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
Kalamazoo River AOC
MN
WI
MI
NY
PA
IL
IN
OH
GLSP
0 5 10 15 20 25
Miles

Table 5.2-B TRI Releases (in pounds, 2001) for the Kalamazoo River AOC

DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.000253575	0	0	0	0.000253575	0	0.000253575
(PCDDs and PCDFs)	3							
LEAD	8	24	11.85	0	0	35.85	1815.63	1851.48
LEAD COMPOUNDS	8	1934.67	28.8	2	222	2187.47	491.1	2678.57
MERCURY COMPOUNDS	9	30.13	0	0	0	30.13	39.53	69.66
	Total IJC	1988.800254	40.65	2	222	2253.450254	2346.26	4599.710254
ACETALDEHYDE		20638	250	0	124	21012	0	21012
ACETONITRILE		12700	0	360	0	13060	0	13060
ACRYLAMIDE		18	0	0	0	18	0	18
AMMONIA		27067	1149	80	8029	36325	0	36325
BARIUM COMPOUNDS		0	0	0	0	0	15148	15148
CERTAIN GLYCOL ETHERS		9	0	0	0	9	0	9
CHLORINE		4870	600	0	0	5470	0	5470
CHLORODIFLUORO-METHANE		11350	0	0	0	11350	0	11350
CHLOROMETHANE		2593	0	0	0	2593	0	2593
CHROMIUM		250	0	0	0	250	0	250
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		2150	0	52000	0	54150	3435	57585
COBALT		250	0	0	0	250	0	250
COPPER		0	0	0	0	0	10	10
COPPER COMPOUNDS		10	0	0	0	10	0	10
CUMENE		130	0	0	0	130	0	130
CYANIDE COMPOUNDS		160	0	0	0	160	0	160
CYCLOHEXANE		214	0	0	0	214	0	214
DICHLOROMETHANE		169750	179	87000	0	256929	10	256939

DIISOCYANATES	2	0	0	0	2	0	2
DIMETHYLAMINE	4262	0	0	0	4262	0	4262
EPICHLOROHYDRIN	127	0	0	0	127	0	127
ETHYLBENZENE	109817	0	0	0	109817	0	109817
FORMALDEHYDE	7181	510	1	0	7692	4500	12192
FORMIC ACID	10	0	60	0	70	0	70
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	130100	0	0	0	130100	0	130100
HYDROGEN FLUORIDE	10030	0	0	0	10030	0	10030
MANGANESE	500	0	0	0	500	5	505
MANGANESE COMPOUNDS	3800	0	11000	0	14800	13020	27820
METHANOL	156313	49022	50000	547	255882	1500	257382
METHYL ETHYL KETONE	15845	0	1	0	15846	0	15846
METHYL ISOBUTYL KETONE	9911	0	0	0	9911	0	9911
METHYL TERT-BUTYL ETHER	1260	1	0	0	1261	0	1261
N,N-DIMETHYLFORMAMIDE	1200	0	7100	40	8340	0	8340
N-BUTYL ALCOHOL	116529	0	32	0	116561	0	116561
N-HEXANE	305644	0	0	0	305644	1	305645
NICKEL	250	0	0	0	250	3205	3455
NITRATE COMPOUNDS	0	379	0	725	1104	0	1104
NITRIC ACID	1069	0	0	0	1069	0	1069
OZONE	670	0	0	0	670	0	670
PHENOL	120	0	0	0	120	800	920
POLYCYCLIC AROMATIC COMPOUNDS	0.143	0	0	0	0.143	0	0.143
POTASSIUM DIMETHYLDITHIO-CARBAMATE	13730	0	0	0	13730	0	13730
PYRIDINE	40	0	310	0	350	0	350
STYRENE	110053	0	0	0	110053	0	110053
TERT-BUTYL ALCOHOL	1820	0	3	0	1823	160	1983

TOLUENE		46450	24	41	0	46515	0	46515
TRIETHYLAMINE		150	0	2100	0	2250	0	2250
XYLENE (MIXED ISOMERS)		496886	0	0	0	496886	0	496886
ZINC COMPOUNDS		350	250	13000	0	13600	49113	62713
	Total Non-IJC	1796278.143	52364	223088	9465	2081195.143	90907	2172102.143
	Total	1798266.943	52404.65	223090	9687	2083448.593	93253.26	2176701.853

Table 5.2-C TRI Facilities Releasing Critical Pollutants Onsite for the Kalamazoo River AOC

IJC Critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	1			
Kalamazoo County, MI	1	PHARMACIA & UPJOHN CO.	49001THPJH7171P	KALAMAZOO
Lead and lead compounds	6			
Allegan County, MI	3	ROCK-TENN CO.	49078MDPPR431HE	OTSEGO
		UNIFORM COLOR CO.	49423NFRMC942BR	HOLLAND
		MENASHA CORP.	49078MNSHC320NF	OTSEGO
Kalamazoo County, MI	3	GRAPHIC PACKAGING CORP.	49007JMSRV243EA	KALAMAZOO
		HUMPHREY PRODS. CO.	49003HMPHRKILGO	KALAMAZOO
		PHARMACIA & UPJOHN CO.	49001THPJH7171P	KALAMAZOO
Mercury and mercury compounds	2			
Kalamazoo County, MI	2	GRAPHIC PACKAGING CORP.	49007JMSRV243EA	KALAMAZOO
		PHARMACIA & UPJOHN CO.	49001THPJH7171P	KALAMAZOO

Table 5.2-D NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Kalamazoo River AOC

Chemical	IJC Tracking Number	Discharge
POLYCHLORINATED BIPHENYLS (PCBS)	1	0.00004
LEAD, TOTAL (AS PB)	8	76.65
MERCURY, TOTAL (AS HG)	9	3.65
	Total IJC	80.30
NITROGEN, AMMONIA TOTAL (AS N)		204582.50
PHOSPHOROUS, IN TOTAL ORTHOPHOSPHATE		2920
PHOSPHORUS, TOTAL (AS P)		109835.80
SILVER, TOTAL (AS AG)		401.50
	Total Non-IJC	317739.80
	Total	317820.10

Table 5.2-E NPDES Facilities Permitted to Discharge Critical Pollutants, Kalamazoo AOC

IJC Critical Pollutant	Number of Facilities	Facility Name	NPDES	City
Polychlorinated Biphenyls (PCBs)	1			
Kalamazoo County, MI	1	GEORGIA PACIFIC-KING HWY SF	MIU990018	KALAMAZOO
Lead	1			
Kalamazoo County, MI	1	AERO-MOTIVE CO	MI0055310	KALAMAZOO
Mercury	1			
Kalamazoo County, MI	1	KALAMAZOO WWTP	MI0023299	KALAMAZOO

5.3. Grand Calumet AOC, Lake County, IN, and Cook County, IL

The Grand Calumet River originates in the east end of Gary, IN, and flows 13 miles through Gary, East Chicago, and Hammond. The majority of the river's flow drains into Lake Michigan via the Indiana Harbor and Ship Canal. The AOC begins 15 miles south of downtown Chicago, and includes the east branch and a small segment of the west branch of the river, and also the Indiana Harbor and Ship Canal (see AOC map in the Appendix 1). Ninety percent of the river's flow originates as municipal and industrial effluent, storm water overflows, and cooling and process water(see AOC map at end of chapter and in Appendix 1).

5.3.1. Hazardous Waste Sites Relevant to the Grand Calumet AOC

ATSDR has evaluated the data for 18 hazardous waste sites in Lake County, IN, and Cook County, IL, and reached conclusions regarding the public health threat posed by these sites. These conclusions, along with information regarding the type and location of the site, and the date and type of assessment document, are summarized in Table 5.3-A, for sites that had public health hazard categories of 2-3 at some point during their assessment history.

Table 5.3 -A Hazardous Waste Sites in Lake County, IN, and Cook County, IL

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
American Chemical Services, Inc., Griffith IND016360265	HA	1988	3	NPL	Ongoing
	HA	1994	3		
Lake Sandy Jo Landfill, Gary IND980500524	HA	1985	2	NPL	Completed
	SRU	1992	3		
Midco I, Gary IND980615421	HA	1987	3	NPL	Ongoing
	SRU	1992	2		
Midco II, Gary IND980679559	HA	1989	3	NPL	Ongoing
Ninth Avenue Dump, Gary IND980794432	HA	1989	3	NPL	Completed
	HC	1999	5		
U.S. Smelter and Lead Refinery, Inc. East Chicago IND047030556	HA	1994	2	Proposed to the NPL	To be Determined
Calumet Container, Hammond	HC	2004	2	Non NPL	Completed
IND980500193					
Keil Chemical, Hammond	EI	2001	5	Non NPL	To be Determined
IND005421755	HA	2001	3		
Celotex Corp., Chicago	HC	1999	2	Non NPL	To be Determined
ILD051053692					
Double A Metals, Chicago	HC	1997	2	Non NPL	Completed

ILD025352139	HC	2005	5		
Electro Finishers, Chicago	HC	2001	2	Non NPL	Completed
ILD009437906	HC	2007	5		
Elizabeth Street Foundry, Chicago ILD005086822	HC	1997	2	Non NPL	To be Determined
Estech General Chemical, Calumet City ILD099213498	HC	1999	2	Non NPL	Completed
Hartz Construction, Oak Lawn ILXCARA583000	HC	1999	2	Non NPL	Completed
Stauffer Chemical Co., Chicago Heights ILD005110143	HA	1988	3	Removed from NPL	Completed
West Pullman Iron & Metal, Chicago ILD005428651	HA	1999	3	Non NPL	To be Determined
Acme Steel Coke Plant, Chicago ILN000509241	HC	2007	2	Non NPL	Completed
Lincoln Limited Landfill, Ford Heights ILXCRA0BJ000	HC	2006	3	Non NPL	To be Determined

2 =Public Health Hazard, 3 =Indeterminate Public Health Hazard, 5 =No Public Health Hazard
HA = Public Health Assessment, HC = Health consultation, SRU=Site Review and Update,
EI = Exposure Investigation

ATSDR has conducted further evaluation of the site data, which is summarized in the following section.

5.3.1.1 American Chemical Service, Inc.

This site includes three properties with a total area of about 36 acres in Griffith, Lake County; IN. American Chemical Service was a solvent recovery firm and a chemical manufacturer, starting in 1955. In 1990 it ceased solvent reclamation, and continued chemical manufacturing to date. One of the associated properties was a chemical drum reconditioning operation. From 1955 until at least 1975, American Chemical Service disposed of hazardous wastes onsite, including numerous drums (it has been estimated that 35,000). It also incinerated waste chemicals, and disposed of the ash onsite. Information regarding this site is taken from the 1994 ATSDR public health assessment and the 2003 USEPA NPL fact sheet.

Public Health Outcome Data: ATSDR evaluated heath outcome data to investigate the health concern of community members who believed a high frequency of cancer occurred within an 8-block area north of the American Chemical Service site. An ATSDR review of cancer incidence data showed percentages of site-specific cancers for Griffith to be comparable to those for the United States as a whole. A review of mortality rates showed more deaths than expected in Lake County for all cancer sites combined compared with the state of Indiana, but the relevance of this finding to the 8-block area of concern north of the American Chemical Service site is problematic.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	389
Females aged 15-44	1,002
Adults 65 and older	551

ATSDR Conclusions: Although no evidence indicated current or past residents were exposed to site-related contaminants, the 1994 assessment posed the concern that as long as contaminants remain at the site, contaminants could migrate to residential wells and pose a health hazard for long-term exposure. Consequently, in the 1989 health assessment ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* and in the 1994 health assessment ATSDR also categorized this site as an *Indeterminate Public Health Hazard* (Category 3).

Groundwater contaminants of concern onsite and in offsite monitoring wells included benzene and chlorinated VOCs. No site-related contaminants had migrated to residential wells. Subsurface soil in one area of the site had elevated concentrations of PCBs, and no monitoring data were available for surface soil. Offsite surface water and sediments were not contaminated at levels above background or of public health concern as of the 1994 assessment.

Since that time, a subsurface barrier wall has been installed around the site to help contain groundwater, and a groundwater treatment system was installed in 2004. Intact drums have been removed and soil vapor extraction is underway (to continue through 2005 or longer). Contaminated areas of the adjacent wetlands have been excavated and consolidated onsite. In 2006, USEPA reported that the American Chemical Service site releases volatile organic chemicals to the atmosphere under permit from the Indiana Department of Environmental Management. The permitted discharge limit is 15 pounds/day, which has not been exceeded. The

airborne discharge is from soil vapor extraction units, all of which are part of the American Chemical Service cleanup action.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants PCBs, lead, and mercury, as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.2 Lake Sandy Jo Landfill

This 40 acre landfill is located in a residential area of Gary, Lake County, IN. The health assessment was a review of well water data and a comment on the exposure assessment of a draft Phase I remedial investigation.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	948
Females aged 15-44	1,758
Adults 65 and older	1,644

ATSDR Conclusions: This site was categorized as a *Public Health Hazard* (Category 2) in the 1985 health assessment and in the subsequent site review and update because of inadequate characterization of contamination at the site.

Data, especially groundwater data were lacking. However, shallow wells were found to contain arsenic, cyanide, lead and chromium. Sodium levels in one private well posed a health risk, especially to anyone on a sodium-restricted diet. Overall levels of inorganic compounds (including arsenic) prompted the recommendation that contaminated wells should no longer be used.

In 1994, USEPA reported that the Sandy Jo Landfill site had been successfully remediated through the joint efforts of local, county, and state governments. Remediation included providing alternated sources of drinking water, capping of the site and implementation of deed restrictions.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants lead, and mercury, as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.3 Midco I

From 1974 through 1979 this approximately 4-acre site was used to store and recycle wastes. In 1976 a fire destroyed about 14,000 drums of waste. The site was abandoned in 1979, at which time, in addition to the fire-damaged drums, an estimated 14,000 drums were onsite.

Approximately 1 foot of topsoil was removed from the entire site, and also two tanks containing wastes. The site and the area immediately east of it were covered with a clay cap. Information regarding this site is taken from the 1987 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile, from the 2000 U.S. Census, for vulnerable populations living within one mile of this site:

Children 6 years and younger	926
Females aged 15-44	1,878
Adults 65 and older	989

ATSDR Conclusions: Because contaminants in groundwater constitute a potential public health threat, in the 1987 public health assessment ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). A subsequent ATSDR site review and update concluded that the site was a *Public Health Hazard* (Category 2). The evidence that exposure to site-related chemicals has occurred, is occurring, or is likely to occur.

Off-site surface water contained chromium, lead, sodium and cyanide. Sediments in surface waters contained PAHs and PCBs. The contaminants buried on the site were considered a potential health threat because they could possibly migrate offsite. Chromium and cyanide were found in off-site groundwater, but the groundwater plume had not reached drinking water wells. One residential well was found to contain lead and cadmium.

Some remediation actions have been completed at this site. In 1998, access to the site was restricted, air stripping was completed and a deed restriction was put into place. Currently, groundwater is being remediated and treatment of highly contaminated soil is ongoing.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants mercury, polyaromatic hydrocarbons (PAHs) fluoranthene, phenanthrene, and chrysene, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.4 Midco II

This 7-acre site is located in Gary, Lake County, IN. The company stored and disposed of bulk liquids and wastes including oil sludges, chlorinated solvents, paint solvents and sludges, acids, and spent cyanides. A fire in 1977 destroyed an estimated 60,000 drums. In 1984, USEPA removed some of the waste, including PCB-contaminated soil. Information regarding this site is taken from the 1989 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	11
Females aged 15-44	11
Adults 65 and older	8

ATSDR Conclusions: Because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects, in 1989 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3).

PCBs, TCE and lead were found at levels of concern in sludge pit soil prior to removal actions. Migration of arsenic, lead, and cyanide in groundwater and surface water was of concern. Although a few residential wells were contaminated, the water was not used as drinking water, but rather for dishwashing.

Remediation began in 1996 and some early actions have been completed. Construction is underway and groundwater treatment is expected to continue for many years.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant PCBs as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.5 Ninth Avenue Dump

This 17-acre dump site in Gary, Lake County, IN, is located in an industrialized area and about 700 feet north of the Midco I site. It was operated as an uncontrolled chemical waste disposal facility from 1973 to 1980. In 1975, it was estimated that approximately 500,000 gallons of liquid industrial waste had been dumped and 1,000 drums were buried on site. Since disposal operations were discontinued in 1980, drums of wastes, abandoned tanker trucks, and surface soils have been removed. The site is fenced, but holes have been cut into it. Groundwater is contaminated, and flows north to discharge in Lake Michigan. Information regarding this site is taken from the 1989 ATSDR public health assessment, the 1999 ATSDR health consultation, and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	957
Females aged 15-44	1,893
Adults 65 and older	1,101

ATSDR Conclusions: Because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects, ATSDR in the 1989 health assessment categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In the 1999 health consultation no category was reported.

PCBs, PAHs, VOCs, lead and chromium in on-site soils, food grown in the soil and sediment were of concern. A concern for bioaccumulation into fish (of chemicals such as PCBs) was expressed. If fish in the area were contaminated and eaten, this site may have contributed to environmental burden and human exposure to PCBs, PAHs, and lead.

Remediation was completed in 1995 with maintenance activities, including the installation of a slurry wall and access restriction, initiated in 2004.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants lead, polychlorinated biphenyls (PCBs – including Aroclor 1242 and 1254) and polyaromatic hydrocarbons (PAHs – including benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene), as well as other contaminants previously discussed, were identified during ATSDR's assessment of

exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.6 U.S. Smelter and Lead Refinery, Inc.

This former site of the U.S. Smelter and Lead Refinery is a 79-acre site in East Chicago, Lake County, IN. The east branch of the Calumet River lies to the south and Indiana Harbor Canal to the west. The site lies within the flood plain of the Grand Calumet River. A copper smelter operated on the site from about 1906 to 1920, a primary lead smelter from 1920 to 1970, and a secondary lead smelter from 1973 to 1985. Blast furnace slag and slag water, containing lead, were dumped into a nearby 21-acre wetland. When the facility was in operation, it often exceeded the NPDES permit levels for discharging lead and other metals in cooling water and storm water runoff to the Grand Calumet River. Lead-containing flue dust was trapped in bag filters and stored onsite, covering 3–5 acres, for possible recycling or sale. In 1982, the dust was brought into a building to prevent dispersion, and in 1992, the dust was removed from the site. An additional arsenic production facility may have existed onsite. Information regarding this site is taken from the 1994 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for the site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,511
Females aged 15-44	2,604
Adults 65 and older	1,511

Public Health Outcome Data: The Indiana State Board of Health conducted blood lead screening for children aged 6 months to 6 years in East Chicago over a 2-day period in June 1985, while the lead smelter was still in operation. The locations of the children's residences with regard to the site were not reported, nor were the criteria used in selecting the children. Of 53 children tested by finger stick, only 2 were found to have "class II" blood lead levels, indicating that they were moderately increased (10-20 µg/dL). No conclusive results regarding the source of lead were found. The home of one child had no lead in paint or soil, and the home of the other was an apartment undergoing remodeling (no additional information provided). ATSDR determined that this limited information did not support any conclusions regarding the impact of the site on children in the area.

ATSDR Conclusions: Because chronic exposure to contaminated soils, wastes, and airborne dusts could cause adverse health effects, in its 1994 health assessment ATSDR categorized this site as a *Public Health Hazard* (Category 2).

Lead was the principal contaminant of concern for this site. Soils and air at the E.C. DuPont facility near the site have been heavily contaminated with lead. Soil contamination extends ½ mile offsite. Soils and air in residential neighborhoods also were contaminated with lead, but to a lesser extent. Exposures to airborne lead onsite, and also offsite at the adjacent DuPont facility, were at a level that may be associated with adverse effects during the time the plant was in operation. The highest estimated exposure from incidental ingestion of soil by offsite (DuPont) workers and offsite children was at levels associated with adverse effects in animal and human studies. Chronic exposure to arsenic, cadmium, chromium and antimony in soil and air also occurred at this site.

The site has not been remediated, but is planned to be addressed through a long-term remedial action that involves cleanup of the entire site. USEPA has concluded, in their NPL fact sheet, that the site poses no immediate threat to the health and safety of the nearby population while awaiting remediation.

IJC Critical Pollutants Identified within ATSDR Documents; The IJC critical pollutant lead, as well as other contaminants previously discussed, was identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm..

5.3.1.7 Celotex Corp

From about 1912 to 1970 the Celotex Corporation, located in Chicago, Cook County, IL, was engaged in coal tar distillation, and from 1912 to 1982 in manufacture of asphalt roofing. These activities contaminated the soil with PAHs. In 1994 Celotex covered the site with clean soil to reduce exposure and in 1997 regraded the site and installed a drainage system to reduce flooding. In 1999 USEPA concluded that PAH levels in the soil at the site and in the nearby neighborhood exceeded the typical background level for the Chicago urban area. Information regarding this site is taken from the 1999 ATSDR health consultation for this site.

ATSDR Conclusions: After a review of exposures of children to some PAH-contaminated residential soil near the site, in 1999 ATSDR categorized it as a *Public Health Hazard* (Category 2), The contaminants of concern in completed exposure pathways were B(a)P and other carcinogenic PAHs, estimated as B(a)P equivalents in soil, for the incidental ingestion pathway. Doses were estimated using a site-specific oral absorption factor of 0.2 for B(a)P (20 ppm) equivalents in soil. Four residential properties were affected.

Although the site itself had been covered with clean soil and has undergone measures to reduce flooding, as of March 2008 the residential properties had not been remediated. It is unclear whether the measures taken onsite were adequate to prevent migration of the contamination.

IJC Critical Pollutants Identified within ATSDR Document: During ATSDR's assessment of exposure related issues the IJC critical pollutants polyaromatic hydrocarbons (including benzo[a]pyrene), as well as other contaminants previously discussed, were identified.

5.3.1.8 Double A Metals

During 1964–1993 Double A Metals site was engaged in aluminum dross recycling on an approximately 4-acre site. From 1964 until 1989 the facility only processed aluminum dross and then shipped it offsite for recycling. In 1989 an industrial furnace and a dust collection system for collecting byproduct aluminum oxide were installed, and the dross was heated onsite and cast into ingots. The site was abandoned in 1993. USEPA removed some of the waste piles of dust and slag; drums of waste oils, solvents, and unknown materials; and electrical transformers that had been stripped. The transformer oil had been dumped onto the ground. The site was not secure from trespassers and there was evidence of trespassing. Information on this site was taken from the 1997 ATSDR health consultation on the site.

ATSDR Conclusions: Because of an apparent explosion or fire hazard from combustible drum materials remaining onsite and because of concentrations of contaminants in the remaining waste piles that could cause adverse effects, ATSDR categorized this site as a *Public Health Hazard* (Category 2). Lead was present in the remaining waste piles at concentrations above health-based

screening values for lead in soil readily accessible to children. The pathway is incidental ingestion of soil (waste piles). Chromium in the waste piles, if assumed to be chromium (VI), was also estimated a hazard for direct skin contact. PCBs were not found above health-based screening values at the site, even in the vicinity of the transformers. No contaminants were found in surface water or in onsite or offsite soil at levels of concern.

Although this site was considered a public health hazard, the areas of chemical contamination at levels high enough to be of concern were limited to the remaining waste piles onsite. All chemical contamination and physical hazards have been removed. Evidence of migration offsite was not found.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant lead, as well as other contaminants previously discussed, was identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.9 Electro Finishers

This 0.44-acre site is located in Chicago, Cook County, IL, about 2 miles west of Lake Michigan and 1,000 feet east of the north branch of the Chicago River. The site was a chromium plating and finishing facility for about 40 years, until 1990. Electro Finishers claimed to have cleaned up the facility properly, but some vats or tanks were left in the ground. In 2000, the next door resident complained that green and yellow crystalline material was forming in the house's basement and flood control pit. A building on the property currently used as a classic automobile body shop also had yellow crystals on the wall, floor, and in piles of dirt. Information regarding this site is taken from the 2001 ATSDR health consultation for this site.

ATSDR Conclusions: For persons who may be exposed to chromium (VI) in dust and air inside the building, this site was categorized as a *Public Health Hazard* (Category 2). Chromium (VI) was found at very high concentrations in crumbled concrete and soil inside the building and lead was found at relatively high concentrations in soil inside the building. Although air monitoring was not performed, ATSDR was concerned that airborne levels could have a health impact when the dust was kicked up by activities in the building. Incidental ingestion also could have a health impact for people who work on cars inside the building frequently. Chromium (VI) and lead levels also were high in soil outside the building. High levels of chromium (VI) were found in the sump water and chromium (VI) was detected in wipe samples from the wall of the basement of the house with the yellow and green crystals on the wall, indicating migration of the contamination. Remediation of this site has been completed.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant lead as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.10 Elizabeth Street Foundry

Since 1889 a small iron foundry has occupied this 1.34-acre site. Information regarding it is taken from the 1997 ATSDR health consultation. At the time of ATSDR's investigation the site was abandoned, and access to the site was unrestricted. The property surrounding the site was zoned restricted commercial and restricted manufacturing. A public elementary school was located 250 feet northwest of the site, and the nearest residence was 300 feet north of the site.

Demographic Data: Demographic profiles for vulnerable populations living within 1 mile of this site were not reported. The total population living within a 1-mile radius of the site is approximately 55,177 persons.

ATSDR Conclusions: For as long as drums containing relatively low-flash-point chemicals are onsite, and people have access to the site, this site was categorized as a *Public Health Hazard* (Category 2) The other contamination found onsite was considered not to pose an apparent public health hazard, but sampling of surface soil and air was not adequate to evaluate all possible exposure pathways. The major concern was that transients, who may light fires on the site, have site access, and drums of materials with low flash points could cause an explosion. Also concentrations of VOCs in the drums could pose a threat to the health of individuals who contacted the drums' contents. Foundry sand was usually stored onsite for months before disposal, raising the issue that contaminants may have leached into the soil and groundwater. Further information was not provided. Remedial activities have not begun.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants lead and mercury, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.11 Estech General Chemical Co.

This approximately 54-acre site located in Calumet City, Cook County, IL, operated as an unpermitted landfill. Estech had used the site for prepare fertilizers, pesticides, and sulfuric acid. Some records indicate that drums and pesticides may be buried onsite. The information regarding this site was taken from the 1999 ATSDR health consultation for this site.

Demographic Data: Demographic profiles for vulnerable populations were not reported. The total population living within a 1-mile radius of the site is approximately 13,500.

ATSDR Conclusions: Because of the adult men living on the site and digging for scrap metal who could be exposed to lead in soil at levels that pose a risk of adverse health effects, this site was categorized as a *Public Health Hazard* (Category 2). Exposure to lead from incidental ingestion of, dermal contact with, and inhalation of contaminated soil particles could occur at levels that are of concern for health effects. Some sediment samples from the Grand Calumet River and the wetland area on the site indicated that contaminants might be migrating offsite.

Remediation at the site was completed in 1999. This included clean up and removal activities.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant lead, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.12 Hartz Construction

Hartz construction built several houses on a former landfill in Oak Lawn, Cook County, IL. Homeowners reported that the pilot lights of their water heaters kept going out. Hartz Construction sealed the basements and placed sealed lids on the sump pits. The pilot light problems ceased.

The purpose of the health consultation was to determine whether carbon dioxide or methane in the sealed basements posed a public health hazard, and whether other houses had the potential to

be affected. More than 100 homes are on the Hartz Construction site, but how many of them are on the landfill remains uncertain. Information regarding this site is taken from the 1999 ATSDR health consultation.

ATSDR Conclusions: Although the sealed basements do not currently contain carbon dioxide or methane at levels that would be a health or explosive hazard, basement cracks may develop in the future, allowing gases to infiltrate. Consequently, ATSDR categorized this site as a *Public Health Hazard* (Category 2). What the past levels of airborne contaminants were in the basements is unknown. The major concern was for potential infiltration of carbon dioxide and methane into the basements of houses built on a landfill, but these gases were not detected in basements that were sealed, and were not monitored prior to sealing or in other basements. It was suggested that the source of CO_2 could be a reaction of acidic leachate with limestone fill.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant polychlorinated biphenyls (PCBs), as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.13 Stauffer Chemical Company

The Stauffer Chemical site is a 10-acre site in Chicago Heights, Cook County, IL, where 175,000 cubic feet of hazardous waste was buried in an unlined pile. The pile was clay capped in 1970, and the site is fenced. Information regarding this site is taken from the 1988 ATSDR health assessment. The site was removed from the NPL (post-SARA).

Demographic Data: In 1988 the population within 3 miles of the site was 63, 550.

ATSDR Conclusions: Because of the risk to human health from the potential exposure to hazardous substances via groundwater and surface water, in a 1989 public health assessment, ATSDR characterized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). At the time, few monitoring data were available; only the shallow aquifer had been monitored. The shallow aquifer underlying the site was contaminated with arsenic, antimony, and selenium, but was not used as a drinking water source. Water supply wells for the nearby residences tap the lower aquifer, which was not tested, but the two aquifers are thought to be hydraulically connected.

The site was placed on the state's remedial priorities list in the 1980s. The site was delisted from the NPL in 1989. The 1993 site review and update concluded that "there is no known off-site contaminant migration and no known human exposure to site contaminants." The state issued a notice regarding a large waste pile on site. The company was responsive and did a groundwater investigation. They came up with a remedial plan that included regrading and recapping the waste pile, and creating a leachate management plan. The state issued a letter stating that the issue had been successfully addressed in 2003. .

IJC Critical Pollutants Identified within ATSDR Documents: None of the IJC Critical pollutants were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of hazardous substances that were found at this site, please refer to http://www.epa.gov/superfund/sites/npl/npl.htm.

5.3.1.14 West Pullman Iron & Metal

This site consists of two abandoned, adjacent industrial properties in southeast Chicago, Cook County, commonly known as the Dutch Boy and the International Harvester sites. From 1937 to

1986 the 5-acre Dutch Boy site produced lead-based paints. In 1985, nine persons with the highest blood lead levels were diagnosed as having lead poisoning. ATSDR assumed those diagnosed with lead poisoning included three salvage workers, three children of one salvage worker, two former employees of the Dutch Boy facility, and a female teen living near the site of demolition. Due to the removal of personal identifiers linked to the lead data ATSDR was unable to verify this. The exposure to lead was related to demolition and salvaging activities, which started at the Dutch Boy site in 1983. The source of exposure was airborne lead particles released from building surfaces during the demolition. Once that source was identified demolition was suspended and the site was subsequently secured. The 21-acre International Harvester site manufactured heavy equipment from 1903 to 1983. Operations included onsite power generation; metal forging, machining, heat treating, and painting. Information regarding this site was taken from the 1999 ATSDR public health assessment.

Demographic Data: Demographic profiles for this non-NPL site, as reported in the public health assessment based on the 1990 U.S. Census, for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	3,697
Females aged 15-44	not reported
Adults 65 and older	2,588

Public Health Outcome Data: With reference to the detected blood lead levels, nine people had been reported by the Illinois Department of Health as having lead poisoning linked to the salvaging activities at the Dutch Boy site. ATSDR was not provided the data. In 1986, the Chicago Department of Health performed mass blood lead screening of 599 residents. Identifiers were not provided for these data. ATSDR assumed that the nine highest blood lead levels from the mass screening (31-70 µ/dL) were for the persons exposed onsite. An additional five persons had blood lead levels at or above CDC's level of concern, which was 25 µg/dL at the time. The percentile ranking of all the exposures in the vicinity of the two sites appears to have been intermediate between that of the general population levels in the second and third National Health and Nutrition Examination Survey, which bracket the time of the 1986 mass screening. In 1996, blood lead screening was offered for children in the neighborhood. Only eight children were tested. All had blood lead levels below 10 µg/dL.

ATSDR Conclusions: Because of the potential public health hazard to onsite workers and trespassers who were exposed to elevated levels of lead in onsite soil, this site was categorized as an *Indeterminate Public Health Hazard* (Category 3). For the Dutch Boy property, the only competed exposure pathways to contaminants at levels of concern were onsite and in the past. That is, only onsite workers and trespassers were exposed by inhalation and ingestion of air borne lead particles and inhalation, ingestion, and dermal exposure to lead in soil. Present and future exposure offsite to lead in soil along the roadways along the north/northeast borders of the Dutch Boy site was, however, a potential concern. Exposure to the levels of contaminants found at the International Harvester property were not and are not sufficient to be of concern for adverse health effects. As of March 2008 remedial activities have not begun.

IJC Critical Pollutants Identified with ATSDR Documents: The IJC critical pollutants, PCBs, and lead, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.15 Lincoln Limited Landfill

The Lincoln Limited Landfill site is in Ford Heights which is east of Illinois Route 394 and north of U.S. Route 30 in southern Cook County, Illinois. The landfill is in a rural area which is primarily farmland. Homes and businesses are scattered in the vicinity of the landfill and are served by public water supply and wells. In January 2005, the landfill was active, and several dump trucks were dumping material in the landfill. On-site and off-site groundwater was sampled in January and November 2005, respectively to determine if any contaminants were present which might pose a public health problem. On-site groundwater chemicals of interest were bis-2-ethylhexylphthalate, arsenic, lead, manganese and vanadium. PAHs, lead and asbestos were found in on-site soil samples and are the chemicals of interest. Contaminants found in on-site groundwater have not been detected in off-site wells and no one is currently exposed to them. Elevated sodium levels were found in three of the six private wells near the site, however it may not site related. Information from this site is taken from the 2006 ATSDR health consultation.

ATSDR Conclusions: In 2006 ATSDR concluded that this site currently poses no apparent public health hazard. The site is listed as an *Indeterminate Public Health Hazard* (Category 3) because limited data do not suggest that people near the site are not being exposed to site-related contaminants at levels which would cause adverse health effects. Asbestos containing material on a portion of the site has the potential to release fibers into the air that could be carried by wind on the site. Although possible air or soil contamination is unknown, on-site exposure probably is infrequent and like would result in negligible exposure. Should ground water contamination migrate from the site, area private wells could be affected. As of March 2008 remedial activities had not begun.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant PAHs was identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.16 ACME Steel Coke Plant Site

This ACME Steel Coke Plant site is on about 104 acres of land. Industrial agricultural and residential properties surround the site. The facility is bordered by Torrence Avenue on the east, and a few residences to the south, a rail line and a wetland site know as "Interlake Property" to the west, and a vacant property to the north. More residences are about 1,000 feet north of the site. Lake Calumet is about 0.8 miles west of the site. The Calumet River is about 0.3 miles east of the site and Lake Michigan is about 3 miles east-northeast of the site. Gaseous waste produced in the coking process included hydrogen, methane, carbon monoxide, carbon dioxide, ethane, hydrogen sulfide, ammonia and nitrogen, which were condensed, cooled, and compressed. Liquid wastes included water, tar, and crude light oil. Solid waste included coal dust, heavy hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). Information on this site is taken from the 2007 ATSDR health consultation.

ATSDR Conclusions: The ATSDR concluded that exposure to contaminated surface materials and sediments at the site poses a *Public Health Hazard* (Category 2) to trespassers. Trespassers may be exposed to contaminants in soil, waste material and sediments. Residents may have been exposed to dust blown from the site and to emissions from the coke plant during the years it was in operation. In 2007, USEPA reported that the Acme Steel Coke Plant site had been remediated.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant PAHs was identified at this site during ATSDR's assessment of exposure related issues.

5.3.1.17 Keil Chemical Company (Ferro Corporation), Hammond, IN

The Keil Chemical Company (Ferro Corporation), in Hammond, IN is located within a mixed residential and industrial area. In 1980, Ferro Corporation started the Pyro-Chek process at the Keil Chemical plant in Hammond. In the process, 1,2 dichloroethane (EDC) is used as a solvent to produce brominated polystyrene. Prior to 1995, over 900 tons of EDC were purchased per year by Keil. Most of the EDC and a breakdown product of vinyl chloride (VC) were thought to have volatilization into the air rather than released into the wastewater. In 1999, ATSDR conducted an Exposure Investigation (EI) sampling for VOCs in ambient air within the community and near the plant. The results from the EI did not detect VC in the air and EDC was detected (4.2 ppb and 0.86 ppb) collected at the fence line. Trace amount of other volatile organic compounds typical in urban communities were found at levels below those of health concern. Information on this site is taken from the 2001 ATSDR exposure investigation and public health assessment.

Demographic Data: ATSDR estimated from the 1990 U.S. Census that 1209 people live within one mile of this site and those considered sensitive subpopulations include:

Children 6 years and younger	94
Females aged 15-44	247
Adults 65 and older	260

Public Health Outcome Data: Some community members raised concerns regarding a perceived increase in the number of children diagnosed with brain and central nervous system cancers and living near the Keil site. The Indiana State Department of Health evaluated data obtained from the Indiana Cancer Registry to determine if the rates of cancer in children younger than 20 years living near the Lake County are elevated compared to rates expected for the county or state. Child cancer rates for Lake County were elevated compared to the state and other counties. Specifically, brain and central nervous system cancers (individually and combined) were not elevated in Lake County compared to the state and other countries.

ATSDR Conclusions: In 2001 ATSDR concluded that this site presented an *Indeterminate Public Health Hazard* (Category 3) for past exposures due to lack of air emission data prior to 1988 for EDC and VC. A review of sampling data collected at the air monitoring station from 1988 to 1998 indicates ethylene dichloride, VC and other target chemicals detected over that period, where not at concentrations likely to result in adverse health effect. In 1999, the VC and other target contaminants were not detected while EDC was detected at levels below those of health concerns during the ATSDR Exposure Investigation. Residents are not receiving their drinking water from sources near the Keil facility and would not likely be exposed to contaminated wastewater released by Keil into the municipal sewer for treatment. Cancer rates were not elevated in Lake County and the community surrounding Keil Chemical compared to the state and other counties for 1987 – 1997.

In June 2000, Keil Chemical Company closed its Pyro-Chek operation at this site, and supplies of EDC were removed from the property. As of March 2008 no remedial action has been taken.

IJC Critical Pollutants Identified within ATSDR Documents: None of the IJC critical pollutants were cited in this document.

5.3.1.18 Calumet Container site (also known as The Steel Container Corporation)

The Calumet Container site (also known as The Steel Container Corporation) formerly housed a factory where 5- to 55-gallon drums containing chemicals and paints were emptied, cleaned, repainted, and sold for reuse. This factory began its operations in the 1960s and closed in July 1981. The property spans the Indiana-Illinois state border, with about 90% of the 11-acre site in the jurisdiction of the city of Hammond, Lake County, Indiana, and the remaining 10% in the City of Chicago, Cook County, Illinois. Information on this site is taken from the 2004 ATSDR health consultation.

Demographic Data: According to recent census information approximately 300 people, included 60 children, reside within ¼ mile of the site.

ATSDR Conclusions: In 2004 ATSDR concluded that because of the lead's toxic effects, especially on children, this site presented a *Public Health Hazard* (Category 2) for people who trespass. Also, cadmium, arsenic and chromium levels exceeded comparison values. There was evidence of trespassing and digging activity on the property, indicating that people, possibly children, were coming in direct contact with contaminated soils and likely to carry contaminated soils home on their clothes and shoes. There were also potential future pathways for direct exposure with contaminated soils based on current and proposed future recreational use of the property.

In 2006, USEPA reported that the Calumet Container site had been successfully remediated through joint efforts of local, county, and state governments.

IJC Critical Pollutants Identified within the ATSDR Documents: The IJC critical pollutant lead and other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issue.

5.3.2. TRI Data for the Grand Calumet AOC

The TRI onsite chemical releases for Lake County, IN, and Cook County, IL (combined) are summarized in Table 5.3-B. Total onsite releases in 2001 were 24,461,209 pounds, with the highest releases to air and land, and fairly high releases to surface water as well. Lake County accounted for 71% and Cook County accounted for 29% of the total onsite releases.

Of the total onsite releases, 429,097 pounds (1.8%) were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (mostly to surface water and land), mercury compounds (primarily to air), and hexachlorobenzene (to air). The facilities that released these pollutants are listed in Table 5.3-C.

The major release ($\geq$ 500,000 pounds) of non-IJC chemicals was of zinc compounds (mainly to air and land and also to surface water). The next largest releases of non-IJC chemicals, in the range of 300,000-499,999 pounds, were of manganese compounds and nitrate compounds (primarily to air).

5.3.3. NPDES Data for the Grand Calumet AOC

The NPDES permitted discharges for Lake County, IN, and Cook County, IL are summarized in Table 5.3-D. The total average annual permitted discharges in 2004 were 173,874,061 pounds,

the majority of which was sulfate, chloride, and ammonia nitrogen, followed by fluoride and cyanide.

The IJC critical pollutants benzo(a)pyrene (0.002 pounds), lead (approximately 13,500 pounds), and mercury (76.7 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.3-E.

5.3.4. Summary and Conclusions for the Grand Calumet AOC

5.3.4.1 Hazardous Waste Sites

ATSDR has assessed 18 hazardous waste sites with public health hazard categories 2–3 for the Grand Calumet AOC: eight in Lake County, IN, and ten in Cook County, IL. Five of the sites in Lake County are final NPL sites and the sixth is a proposed NPL site. Four of the 8 sites in Lake County were classified as *Indeterminate Public Health Hazards*. Thus, clear evidence of contaminants at exposure levels of concern in completed exposure pathways was lacking, often due to missing or incomplete data. The five NPL sites have been remediated or are under remediation. For these sites, the possibility of human exposure and environmental migration of contaminants is being mitigated.

One of the remaining sites, U.S. Smelter and Lead Refinery, Inc, is proposed to the NPL and has not yet been remediated. Lead remains in onsite soil, sediment, and wastes. The site is to be addressed through a long-term remedial action that involves cleanup of the entire site. In the meantime, USEPA has concluded that the site poses no immediate threat to the health and safety of the nearby population.

Two sites, Calumet Container and Keil Container, are both non-NPL sites. Remediation has been completed at Calumet Container, but no decision on remediation has been made at Keil Chemical.

Nine of the Cook County sites are non-NPL sites. The tenth site was removed from the NPL. Seven of the nine sites associated with IJC-critical pollutants have been remediated. One (Estech General Chemical Co., contaminated with lead in soil) has not, and one has been removed from the NPL, indicating that it does not pose a health threat.

Issues for Follow-Up

The two sites listed above that have not yet been remediated may need follow up to determine progress toward mitigation of human and environmental exposure: U.S. Smelter and Lead Refinery, Inc., Lake County, IN, and Estech General Chemical Co, Cook County, IL.

5.3.4.2 TRI Data

The TRI onsite chemical releases for Lake County, IN, and Cook County, IL (combined) in 2001 were 24,461,209 pounds, with the highest releases to air and land, and fairly high releases to surface water as well. Lake County accounted for 71% and Cook County accounted for 29% of the total onsite releases.

Of the total onsite releases, 429,097 pounds (1.8%) were IJC-critical pollutants. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (mostly to surface water and land), mercury compounds (primarily to air), and hexachlorobenzene (to air).

The major release ($\geq$ 500,000 pounds) of non-IJC chemicals was of zinc compounds (mainly to air and land and also to surface water). The next largest releases of non-IJC chemicals, in the range of 300,000–499,999 pounds, were of manganese compounds and nitrate compounds (primarily to air).

USEPA (2006) also reported that surface water from the Chicago River system has been diverted to the Mississippi River basin.

5.3.4.3 NPDES Data

The NPDES permitted discharges for Lake County, IN, and Cook County, IL are summarized in Table 5.3-E. The total average annual permitted discharges in 2004 were 173,874,061 pounds, the majority of which was sulfate, chloride, and ammonia nitrogen, followed by fluoride and cyanide.

The IJC-critical pollutants benzo(a)pyrene (0.002 pounds), lead (approximately 13,500 pounds), and mercury (76.7 pounds) were permitted to be discharged. Facilities permitted to release these pollutants are listed in Table 5.3-F.

USEPA (2006) also reported that surface water from the Chicago River system has been diverted to the Mississippi River basin.

5.3.4.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption and drinking water are cited as impaired at this AOC. There is a no fish consumption advisory for fish caught in the Grand Calumet River and the Indiana Harbor and Canal. Partial fish consumption advisories exist for Grand Calumet Lagoons, Wolf Lake, and near shore lake Michigan. These advisories are based on concentrations of PCBs, PAHs, and mercury.

General information is provided that describes how this impairment measure is determined and monitored. However, no specific information is provided that describes why this site is considered impaired.

Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

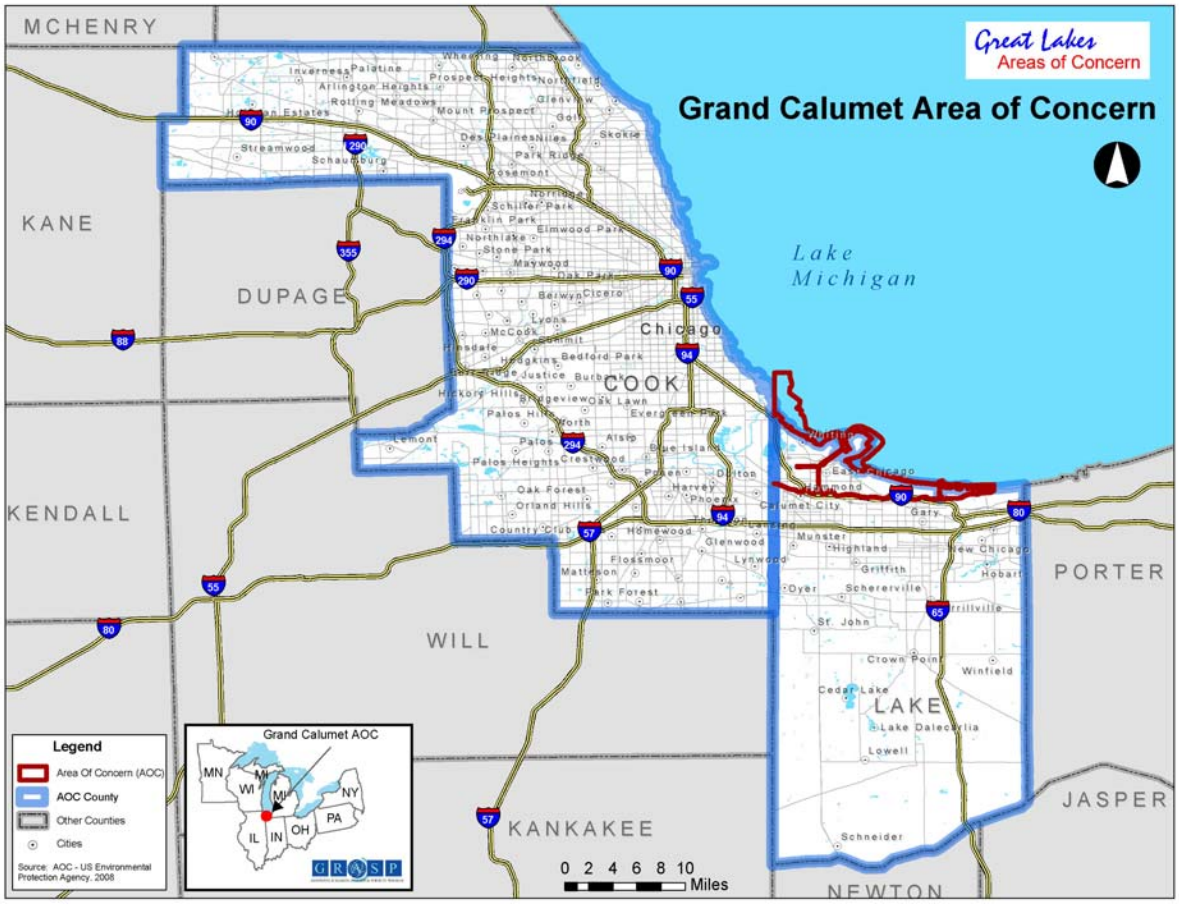

Great Lakes
Areas of Concern
Grand Calumet Area of Concern
Lake Michigan
MCHENRY
KANE
DUPAGE
KENDALL
WILL
COOK
Chicago
LAKE
PORTER
JASPER
NEWTON
KANKAKEE
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
Grand Calumet AOC
MN
WI
MI
NY
PA
IL
IN
OH
GLSP
0 2 4 6 8 10
Miles

Table 5.3-B TRI Releases (in pounds, 2001) for the Grand Calumet AOC

DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.027505039	0	0	0	0.027505039	0.3506391	0.378144139
(PCDDs and PCDFs)	3							
LEAD	8	5994.0842	1	0	15	6010.0842	51657.985	57668.0692
LEAD COMPOUNDS	8	14938.321	254613.3562	0	151737	421288.6772	676231.35	1097520.027
MERCURY	9	29.2	0	0	0	29.2	6.12	35.32
MERCURY COMPOUNDS	9	1617.1	114.2	0	33	1764.3	48503.1	50267.4
HEXACHLOROBENZENE	11	4.85	0	0	0	4.85	0	4.85
	Total IJC	22583.58271	254728.5562	0	151785	429097.1389	776398.9056	1205496.045
1,1-DICHLORO-1-FLUOROETHANE		126804	0	0	0	126804	28293	155097
1,2,4-TRIMETHYLBENZENE		103406	10	0	265	103681	1856	105537
1,3-BUTADIENE		445	0	0	0	445	0	445
2,4-D		2	0	0	0	2	0	2
2-ETHOXYETHANOL		1649	0	0	0	1649	0	1649
3-IODO-2-PROPYNYL BUTYLCARBAMATE		0	0	0	0	0	750	750
4,4'-ISOPROPYLIDENEDIPHENOL		986	0	0	0	986	82078	83064
4,4'-METHYLENEDIANILINE		60	0	0	0	60	330	390
ACETONITRILE		178	0	0	0	178	0	178
ACETOPHENONE		3350	0	0	0	3350	0	3350
ACRYLAMIDE		3	0	0	0	3	0	3
ACRYLIC ACID		1073	0	0	0	1073	0	1073
ACRYLONITRILE		150	0	0	0	150	0	150
ALUMINUM (FUME OR DUST)		22422	0	0	0	22422	506898	529320
AMMONIA		523345	22306	0	7400	553051	1260017	1813068
ANILINE		1006	0	0	0	1006	128275	129281
ANTHRACENE		2144	4900	0	1	7045	5449	12494

ANTIMONY COMPOUNDS		527	584	0	26000	27111	2747	29858
ARSENIC COMPOUNDS		111	571	0	8900	9582	97836	107418
ASBESTOS (FRIABLE)		250	0	0	0	250	116790	117040
BARIUM COMPOUNDS		34654	8060	0	261807	304521	975017	1279538
BENZENE		96686	456	0	3405	100547	1138	101685
BENZO(G,H,I)PERYLENE		716.59	21	0	0	737.59	955.98	1693.57
BENZYL CHLORIDE		6	0	0	0	6	0	6
BIPHENYL		671	0	0	0	671	0	671
BROMINE		59	0	0	0	59	0	59
BUTYL ACRYLATE		883	0	0	0	883	72	955
CADMIUM COMPOUNDS		401	38	0	14000	14439	24260	38699
CARBON DISULFIDE		45	0	0	0	45	0	45
CARBON TETRACHLORIDE		472	0	0	0	472	0	472
CARBONYL SULFIDE		26000	0	0	0	26000	0	26000
CERTAIN GLYCOL ETHERS		1089731	0	0	0	1089731	35786	1125517
CHLORINE		10920	0.06	0	0	10920.06	1900	12820.06
CHLOROBENZENE		92	0	0	0	92	3	95
CHLOROFORM		27	0	0	0	27	0	27
CHLOROMETHANE		28800	0	0	3	28803	3	28806
CHROMIUM		13910	5	0	0	13915	48435	62350
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		9485	4994	0	140250	154729	1293761	1448490
COBALT		5	0	0	0	5	0	5
COBALT COMPOUNDS		45	0	0	0	45	2312	2357
COPPER		11720	0	0	5005	16725	76427	93152
COPPER COMPOUNDS		19810	2327	0	46000	68137	806200	874337
CREOSOTE		44587	0	0	0	44587	0	44587
CRESOL (MIXED ISOMERS)		2397	0	0	0	2397	0	2397
CUMENE		95068	10	0	0	95078	0	95078

CUMENE HYDROPEROXIDE	250	0	0	0	250	0	250
CYANIDE COMPOUNDS	12900	14632	0	5100	32632	2823	35455
CYCLOHEXANE	14725	0	0	1900	16625	27	16652
DI(2-ETHYLHEXYL) PHTHALATE	2596	5	0	0	2601	15984	18585
DIBENZOFURAN	1024	0	0	0	1024	3368	4392
DIBUTYL PHTHALATE	1038	0	0	0	1038	0	1038
DICHLOROMETHANE	31031	0	0	0	31031	89	31120
DIETHANOLAMINE	8707	0	0	0	8707	250	8957
DIISOCYANATES	1010	0	0	0	1010	1683	2693
DIMETHYL PHTHALATE	1500	0	0	0	1500	0	1500
DIMETHYL SULFATE	15	0	0	0	15	0	15
DIMETHYLAMINE	432	0	0	0	432	0	432
EPICHLOROHYDRIN	1	0	0	0	1	0	1
ETHYL ACRYLATE	2076	0	0	0	2076	4	2080
ETHYLBENZENE	79625	157	0	0	79782	891	80673
ETHYLENE	226324	0	0	0	226324	0	226324
ETHYLENE GLYCOL	34999	10	0	250	35259	51568	86827
ETHYLENE OXIDE	555	0	0	0	555	0	555
FORMALDEHYDE	4238	0	0	0	4238	0	4238
FORMIC ACID	55	0	0	0	55	0	55
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	1003176	0	0	0	1003176	0	1003176
HYDROGEN CYANIDE	819	0	0	0	819	0	819
HYDROGEN FLUORIDE	227983	0	0	0	227983	7110	235093
HYDROQUINONE	11	0	0	0	11	0	11
MALEIC ANHYDRIDE	49563	0	0	0	49563	0	49563
MANGANESE	28341	5	0	0	28346	32999	61345
MANGANESE COMPOUNDS	70472	25554	0	4211575	4307601	1893528	6201129
M-CRESOL	10	0	0	0	10	250	260
MECOPROP	5	0	0	0	5	0	5
METHANOL	122239	5	0	0	122244	1551	123795

METHOXONE		1	0	0	0	1	0	1
METHOXYCHLOR		2	0	0	0	2	0	2
METHYL ETHYL KETONE		403610	5	0	2	403617	113779	517396
METHYL ISOBUTYL KETONE		176323	0	0	0	176323	1088	177411
METHYL METHACRYLATE		3583	0	0	0	3583	18	3601
METHYL TERT-BUTYL ETHER		14604	0	0	0	14604	0	14604
MIXTURE		8731	0	0	0	8731	0	8731
MOLYBDENUM TRIOXIDE		1999	965	0	40000	42964	150765	193729
M-XYLENE		6378	0	0	0	6378	0	6378
N,N-DIMETHYLFORMAMIDE		20	0	0	0	20	0	20
NAPHTHALENE		110270	264	0	5	110539	21526	132065
N-BUTYL ALCOHOL		361485	0	0	0	361485	0	361485
N-HEXANE		868096	18	0	220	868334	75	868409
NICKEL		4181	5	0	0	4186	5801	9987
NICKEL COMPOUNDS		5417	2760	0	17000	25177	253018	278195
NICOTINE AND SALTS		70	0	0	0	70	22062	22132
NITRATE COMPOUNDS		2771	3256484	0	18560	3277815	3301	3281116
NITRIC ACID		27764	0	0	0	27764	172173	199937
N-METHYL-2-PYRROLIDONE		24698	0	0	0	24698	1436	26134
O-CRESOL		1300	0	0	0	1300	250	1550
O-XYLENE		8248	0	0	0	8248	0	8248
P-CHLOROANILINE		30	0	0	0	30	0	30
P-CRESOL		1500	0	0	0	1500	10000	11500
PERCHLOROMETHYL MERCAPTAN		42	0	0	0	42	0	42
PHENANTHRENE		3992	81	0	3770	7843	841	8684
PHENOL		59974	5423	0	5	65402	1000	66402
PHTHALIC ANHYDRIDE		46920	0	0	0	46920	934621	981541
POLYCHLORINATED ALKANES		505	0	0	0	505	0	505

POLYCYCLIC AROMATIC COMPOUNDS	5199.94	68	0	2114	7381.94	14968.7494	22350.6894
PROPYLENE	161518	0	0	0	161518	0	161518
PROPYLENE OXIDE	5003	0	0	0	5003	0	5003
PYRIDINE	39	0	0	0	39	0	39
QUINOLINE	275	0	0	0	275	0	275
SEC-BUTYL ALCOHOL	77645	0	0	0	77645	3	77648
SELENIUM COMPOUNDS	45	420	0	630	1095	1157	2252
SILVER	250	0	0	0	250	265	515
SILVER COMPOUNDS	255	0	0	0	255	5	260
SODIUM DIMETHYLDITHIO-CARBAMATE	20	0	0	0	20	12000	12020
SODIUM NITRITE	4125	0	0	0	4125	21300	25425
STYRENE	122567	230	0	0	122797	221269	344066
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	715591	0	0	0	715591	0	715591
TERT-BUTYL ALCOHOL	3510	0	0	0	3510	0	3510
TETRABROMOBIS PHENOL A	178	0	0	0	178	0	178
TETRACHLORO-ETHYLENE	31117	5	0	0	31122	697	31819
THALLIUM COMPOUNDS	538	100	0	59000	59638	1150	60788
TOLUENE	538875	266	0	69	539210	58446	597656
TOLUENE DIISOCYANATE (MIXED ISOMERS)	5	0	0	0	5	0	5
TRICHLOROETHYLENE	297447	0	0	0	297447	4592	302039
TRIETHYLAMINE	9	0	0	0	9	0	9
VANADIUM COMPOUNDS	2997	2	0	112867	115866	67948	183814
VINYL ACETATE	3652	0	0	0	3652	251	3903
XYLENE (MIXED ISOMERS)	655056	15	0	36	655107	18151	673258
ZINC (FUME OR DUST)	77686	0	0	37815	115501	55897	171398
ZINC COMPOUNDS	342126	1067332	0	5200000	6609458	7834523	14443981

	Total Non-IJC	9389064.53	4419093.06	0	10223954	24032111.59	17514090.73	41546202.32
	Total	9411648.113	4673821.616	0	10375739	24461208.73	18290489.64	42751698.36

Table 5.3-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Grand Calumet AOC

Critical IJC-Critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	15			
Cook County, IL	7	CORN PRODS. ARGO PLANT	60501CRNPR6400A	BEDFORD PARK
		CRAWFORD GENERATING STATION	60623CRWFR3501S	CHICAGO
		EDISON INTL. FISK GENERATING STATION	60608FSKGN1111W	CHICAGO
		HORSEHEAD RESOURCE DEVELOPMENT CO. INC.	60617HRSHD2701E	CHICAGO
		IMCO RECYCLING OF ILLINOIS	60411CLMBL400EA	CHICAGO HEIGHTS
		INTAC AUTOMOTIVE PRODS. INC.	60439NTCTM15550	LEMONT
		MARBLEHEAD LIME INC. SOUTH CHICAGO PLANT	60617MRBLH3245E	CHICAGO
Lake County, IN	8	BP PRODS. N.A. WHITING BUSINESS UNIT	46394MCLC 2815I	WHITING
		D. H. MITCHELL GENERATING STATION	46401NRTHRCLARK	GARY
		ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO
		MARBLEHEAD LIME INC. BUFFINGTON PLANT	46402MRBLHCLARK	GARY
		RHODIA INC.	46320STFFR2000M	HAMMOND
		STATE LINE GENERATING L.L.C.	46320STTLN103ST	HAMMOND
		USS GARY WORKS	46402SSGRYONENO	GARY
Lead and lead compounds	91			
Cook County, IL	75	AALLIED DIE CASTING CO. OF IL	60131LLDDC3021C	FRANKLIN PARK
		ACME PACKAGING CORP. RIVERDALE FACILITY	60627CMPCK13500	RIVERDALE

		ACME STEEL CO. FURNACE PLANT	60617CMSTL10730	CHICAGO
		ACME STEEL CO. RIVERDALE PLANT	60627CMSTL13500	RIVERDALE
		ADHERON COATINGS CORP.	60452DHRNC16420	OAK FOREST
		ALLIED HASTINGS BARREL & DRUM SVC.	60609LLDHS915W3	CHICAGO
		ALLIED METAL CO.	60616LLDMT2059S	CHICAGO
		ALLIED METAL CO.	60651LLDMT4528W	CHICAGO
		AMES METAL PRODS. CO.	60609MSMTL4323S	CHICAGO
		AMITRON CORP.	60007MTRNC2001L	ELK GROVE VILLAGE
		AMPEL INC.	60007MPLNC925ES	ELK GROVE VILLAGE
		ANDERSON DIE CASTINGS	60007NDRSN901CH	ELK GROVE VILLAGE
		ANDERSON DIE CASTINGS	60090NDRSN1720S	WHEELING
		CALLEN MFG. CORP.	60164CLLNM13ELA	NORTHLAKE
		CALUMET BRASS FNDY. INC.	60419CLMTB14610	DOLTON
		CALUMET STEEL CO.	60411CLMTS317E1	CHICAGO HEIGHTS
		CASTLE METAL FINISHING	60176CSTLM4631N	SCHILLER PARK
		CHICAGO EXTRUDED METALS CO.	60650CHCGX1601S	CICERO
		CHICAGO FAUCET CO.	60018THCHC2100S	DES PLAINES
		CID RECYCLING & DISPOSAL FACILITY	60409CDRCY138TH	CALUMET CITY
		CORN PRODS. ARGO PLANT	60501CRNPR6400A	BEDFORD PARK
		CRAFTSMAN PLATING & TINNING CORP.	60657CRFTS1239W	CHICAGO
		CRAWFORD GENERATING STATION	60623CRWFR3501S	CHICAGO
		CULLIGAN INTL. CO.	60062CLLGN1CULL	NORTHBROOK
		DU PONT CHICAGO REFINISHING SERVICE CENTER	60053DPNTC7828N	MORTON GROVE
		EASTMAN CHEMICALS	60473MCWHR192W1	SOUTH

		ACCURATE DISPERSIONS DIV.		HOLLAND
		EDISON INTL. FISK GENERATING STATION	60608FSKGN1111W	CHICAGO
		ELECTROMOTIVE LAGRANGE	60525GMCLC9301W	MC COOK
		ENVIRITE OF ILLINOIS INC.	60426NVRTF16435	HARVEY
		EQUILON ENTERPRISES L.L.C. DES PLAINES TERMINAL	60005DSPLN1605A	ARLINGTON HEIGHTS
		FORD MOTOR CO. CHICAGO ASSEMBLY	60633FRDMT12600	CHICAGO
		G & W ELECTRIC CO.	60406GWLCT3500W	BLUE ISLAND
		GKN SINTER METALS	60471GKNSN22501	RICHTON PARK
		GRIFFITH LABS. USA INC.	60658GRFFT12200	ALSIP
		H. KRAMER & CO.	60608HKRMR1359W	CHICAGO
		HOLCIM (US) INC.	60617HLNMN3020E	CHICAGO
		HORSEHEAD RESOURCE DEVELOPMENT CO. INC.	60617HRSHD2701E	CHICAGO
		IMCO RECYCLING OF ILLINOIS	60411CLMBL400EA	CHICAGO HEIGHTS
		IMPERIAL ZINC CORP.	60628MPRLS10316	CHICAGO
		INLAND DIE CASTING	60090NLNDD161CA	WHEELING
		ITT BELL & GOSSETT	60053TTBLL8200N	MORTON GROVE
		JONAS ENTS. INC.	60644JNSNT21NOR	CHICAGO
		JOSLYN MFG. CO.	60609JSLYN3700S	CHICAGO
		KESTER SOLDER	60018KSTRS515EA	DES PLAINES
		LITTELFUSE INC.	60016LTTLF800EA	DES PLAINES
		MANUFACTURERS' SERVICE LTD.	60056MLTGR1800W	MOUNT PROSPECT
		METALDYNE	60648DPGDC6119W	NILES
		MIDWAY WIRE INC.	60632MDWYW4630W	CHICAGO
		MOTOROLA	60196MTRLN1301E	SCHAUMBURG
		MPC PRODS. CORP.	60714MPCPR5600W	NILES
		NATIONAL CASTINGS INC.	60650NTNLC1400S	CICERO
		NATIONAL TECH. INC.	60008NTLTC1101C	ROLLING MEADOWS

		NAZDAR CHICAGO	60622NZDRC1087N	CHICAGO
		NOBERT PLATING	60607NBRTP340NO	CHICAGO
		NOBERT PLATING	60651NBRTP1445N	CHICAGO
		NORTHORP GRUMMAN SYS.	60008NRTHR600HI	ROLLING MEADOWS
		NUART	60638NRT 6247W	BEDFORD PARK
		PERFECTION PLATING INC.	60007PRFCT775MO	ELK GROVE VILLAGE
		PHELPS DODGE CHICAGO ROD INC.	60623MGMCP2324S	CHICAGO
		PLASTICS COLOR CORP. OF IL	60409PLSTC142EA	CALUMET CITY
		PRECISION PLATING CO. INC.	60646PRCSN4123W	CHICAGO
		PRECOAT METALS	60632PRCTM4800S	CHICAGO
		R. S. OWENS & CO.	60630RSWNS55214	CHICAGO
		REPUBLIC TECHS. INTL. HARVEY CFB	60426BLSSL281E1	HARVEY
		S & C ELECTRIC CO.	60626SCLCT6601N	CHICAGO
		SAINT-GOBAIN CONTAINERS	60419BLLGL13850	DOLTON
		SCIENTIFIC PLATING CO. INC.	60614SCNTF2073N	CHICAGO
		SHERWIN-WILLIAMS CO.	60628SHRWN11541	CHICAGO
		SIGNODE	60455SGNDC7701W	BRIDGEVIEW
		SIPI METALS CORP.	60622SPMTL1720E	CHICAGO
		SPRAYLAT CORP.	60633SPRYL1701E	CHICAGO
		TEMPERBENT GLASS L.P.	60803RDCNC12400	ALSIP
		UNITED REFINING & SMELTING CO.	60131NTDRF3700N	FRANKLIN PARK
		UNITY MFG.	60610NTYMF1260N	CHICAGO
		WHEATLAND TUBE CO. CHICAGO DIV.	60609MNLYL4435S	CHICAGO
Lake County, IN	16	BP PRODS. N.A. WHITING BUSINESS UNIT	46394MCLC 2815I	WHITING
		D. H. MITCHELL GENERATING STATION	46401NRTHRCLARK	GARY
		HAMMOND GROUP INC. HALSTAB DIV.	46323HMMND3100M	HAMMOND

		HAMMOND LEAD PRODS. HALOX HAMMOND EXPANDERS DIVI.	46323HMMND23081	HAMMOND
		INDIANA HARBOR COKE CO. L.P.	46312NDNHR3210W	EAST CHICAGO
		ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO
		NATIONAL BRIQUETTE CORP.	46312NTNLB5222I	EAST CHICAGO
		ONE SHOT L.L.C.	46406CNSMR5300W	GARY
		REPUBLIC TECHS. INTL. GARY 7TH AVENUE	46403RPBLC4000E	GARY
		REPUBLIC TECHS. INTL. GARY DUNES	46401GRYCL2800E	GARY
		RHODIA INC.	46320STFFR2000M	HAMMOND
		SAFETY-KLEEN OIL RECOVERY CO.	46312SFTYK601RI	EAST CHICAGO
		STATE LINE GENERATING L.L.C.	46320STTLN103ST	HAMMOND
		U.S. GYPSUM CO.	46312SGYPS3501C	EAST CHICAGO
		USS GARY WORKS	46402SSGRYONENO	GARY
Mercury and mercury compounds	15			
Cook County, IL	5	MARBLEHEAD LIME INC. SOUTH CHICAGO PLANT	60617MRBLH3245E	CHICAGO
		CORN PRODS. ARGO PLANT	60501CRNPR6400A	BEDFORD PARK
		EDISON INTL. FISK GENERATING STATION	60608FSKGN1111W	CHICAGO
		CRAWFORD GENERATING STATION	60623CRWFR3501S	CHICAGO
		HORSEHEAD RESOURCE DEVELOPMENT CO. INC.	60617HRSHD2701E	CHICAGO
Lake County, IN	10	BP PRODS. N.A. WHITING BUSINESS UNIT	46394MCLC 2815I	WHITING
		D. H. MITCHELL GENERATING STATION	46401NRTHRCLARK	GARY
		INDIANA HARBOR COKE CO. L.P.	46312NDNHR3210W	EAST

				CHICAGO
		ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO
		MARBLEHEAD LIME INC. BUFFINGTON PLANT	46402MRBLHCLARK	GARY
		RHODIA INC.	46320STFFR2000M	HAMMOND
		STATE LINE GENERATING L.L.C.	46320STTLN103ST	HAMMOND
		U.S. GYPSUM CO.	46312SGYPS3501C	EAST CHICAGO
		USS GARY WORKS	46402SSGRYONENO	GARY
Hexachlorobenzene	2			
Lake County, IN	2	ISPAT INLAND INC.	46312NLNDS3210W	EAST CHICAGO
		LTV STEEL CO.	46312LTVST3001D	EAST CHICAGO

Table 5.3-D NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Grand Calumet AOC

Chemical	IJC Tracking Number	Discharge
BENZO(A)PYRENE	4	0.002
LEAD TOTAL RECOVERABLE	8	5180.35
LEAD, TOTAL (AS PB)	8	8351.81
MERCURY TOTAL RECOVERABLE	9	76.67
	Total IJC	13608.83
1,1,1-TRICHLOROETHANE		2.19
1,1-DICHLOROETHANE		2.19
ALUMINUM, TOTAL RECOVERABLE		1554.90
BENZENE		10950
CHLORIDE (AS CL)		66740250
CHLORINE, TOTAL RESIDUAL		4305.69
CHROMIUM TOTAL RECOVERABLE		13457.55
CHROMIUM, HEXAVALENT (AS CR)		768.33
CHROMIUM, TOTAL (AS CR)		23841.80
CHROMIUM, TRIVALENT (AS CR)		1494.68
COPPER TOTAL RECOVERABLE		273.75
COPPER, TOTAL (AS CU)		9855
CYANIDE, TOTAL (AS CN)		259033.66
CYANIDE, WEAK ACID, DISSOCIABLE		4650.10
ETHYLBENZENE		3014.90
FLUORIDE, TOTAL (AS F)		694534.17
IRON, DISSOLVED (AS FE)		56575
IRON, TOTAL (AS FE)		88.70
METHYL ETHYL KETONE		9.49
METHYL TERT-BUTYL ETHER		12.78
NITROGEN, AMMONIA TOTAL (AS N)		26975598.20
PHENOLICS, TOTAL RECOVERABLE		19079.72
SELENIUM, TOTAL RECOVERABLE		584
SULFATE, TOTAL (AS SO4)		79008751.67

SULFIDE, TOTAL (AS S)		8431.50
TOLUENE		672.59
TRICHLOROETHYLENE		23.21
XYLENE		711.97
ZINC TOTAL RECOVERABLE		5403.46
ZINC, TOTAL (AS ZN)		16520.60
	Total Non-IJC	173860451.80
	Total	173874060.60

Table 5.3-F NPDES Facilities Permitted to Discharge IJC Critical Pollutants, Grand Calumet

Critical IJC-Critical Pollutant	*Number of Facilities*	*Facility Name*	*NPDES*	*City*
Benzo(a)pyrene	1			
Lake County, IN	1	U.S. STEEL LLC - GARY WORKS	IN0000281	GARY
Lead	5			
Lake County, IN	5	EAST CHICAGO_MUNICIPAL STP	IN0022829	CHICAGO
		HAMMOND MUNICIPAL STP	IN0023060	HAMMOND
		ISG INDIANA HARBOR, INC.	IN0000205	CHICAGO
		ISPAT INLAND, INC.	IN0000094	CHICAGO
		U.S. STEEL LLC - GARY WORKS	IN0000281	GARY
Mercury	4			
	4	EAST CHICAGO_MUNICIPAL STP	IN0022829	CHICAGO
		GARY WASTEWATER TREATMENT PLNT	IN0022977	GARY
		HAMMOND MUNICIPAL STP	IN0023060	HAMMOND
		HOBART WWTP	IN0061344	HOBART

5.4. Waukegan Harbor AOC, Lake County, IL

The Waukegan Harbor AOC is located in Lake County, IL, on the west shore of Lake Michigan. A natural inlet and portions of adjacent wetlands were filled to form the harbor in its present form. Waukegan Harbor includes approximately 1.2 km^2 of industrial, commercial, municipal, and open or vacant lands. An Expanded Study Area was added in order to investigate additional concerns of the citizens. The watershed of the Waukegan expanded study area contains the Waukegan River drainage basin, the North Ditch drainage basin, and other near shore areas that drain to Lake Michigan (see AOC map at end of chapter and in Appendix 1).

5.4.1. Hazardous Waste Sites Relevant to the Waukegan Harbor AOC

ATSDR has evaluated the data for hazardous waste sites in Lake County, IL, and reached conclusions regarding the public health threat posed by these sites. These conclusions, along with information regarding the type and location of the site, and the date and type of assessment document, are summarized in Table 5.4-A for the sites that had public health hazard categories of 1-3 at some point during their assessment history, and all NPL sites.

Table 5.4-A Hazardous Waste Sites in Lake County, IL

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Diamond Scrap Yard, Waukegan	HC	2001	2	Non NPL	To be Determined
IL0001093509					
H.O.D. Landfill, Antioch	HA	1989	3	NPL	Completed
ILD980605836	HA	1998	5		
	HC	1999	4		
Johns-Manville disposal Area, Waukegan	HA	1988	3	NPL	Completed
ILD005443544					
Outboard Marine Corp, Waukegan	HA	1989	2	NPL	Ongoing
	HA	1994	2		
ILD000802827	SRU	1998	2		
	HC	2004	4		
	HC	2004	4		
	HC	2004	2		
	HC	2007	5		
Precision Chrome, Inc., Wauconda ILD89062871	HC	1998	2	Non-NPL	Completed
Yeoman Creek Landfill , Waukegan ILD980500102	HA	1992	3	Non-NPL	Ongoing

	HA	1997	4		
	HC	1998	1		
	HC	2000	4		
	HC	2004	4		
Nicor, Lake, MT. Prospect, ILN000508064	HC	2001	2	Non-NPL	Completed

1 = Urgent Public Health Hazard, 2 = Public Health Hazard, 3 = Indeterminate Public Health Hazard, 4 = No Apparent Public Health Hazard, 5 = No Public Health Hazard

HA = Public Health Assessment, HC = Health Consultation, SR = Site Review and Update

ATSDR has conducted further evaluation of the site data, which is summarized in the following section

5.4.1.1 Diamond Scrap Yard

This site is located about 250 feet from Lake Michigan in the city of Waukegan, Lake County, IL, and measures approximately 250 feet wide by 3,000 feet long. The Waukegan River flows through a culvert beneath the northern portion of the site into Lake Michigan. Operations at the scrap yard started in the 1930s, and included coal storage, car and drum scrapping, petroleum storage, wire and transformer burning, and iron and steel production. The site is no longer in operation. Information regarding this site is taken from the 2001 ATSDR health consultation for the site.

Demographic Data: The demographic profile for vulnerable populations living within one 1 mile of this non-NPL site was not reported. The total population within a 1-mile radius of the site is 15,155 persons.

ATSDR Conclusions: For the trespassers who while on the property were exposed to contaminated soil, this site was categorized as a *Public Health Hazard* (Category 2). Lead was present in onsite surface soil at levels that might cause adverse health effects through incidental ingestion. Because persons are reported to be living in an abandoned foundation on the site, contact with soil is likely. PCBs were found in onsite soil at levels greater than health-based screening values, but not at levels thought to cause adverse health effects. Monitoring of sediment from the Waukegan River did not indicate that chemicals have migrated from the site into the river. Onsite groundwater contained lead above the action level for drinking water, but no one is using groundwater at the site, and private wells are upgradient of the site.

In 2001, IDPH recommended that Illinois EPA (IEPA) restrict access to the site and fill basements of buildings to deter people from living on the site. The IEPA agreed to act on these recommendations.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants lead, polychlorinated biphenyls (PCBs – including Aroclor 1254 and 1260), as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.4.1.2 H.O.D. Landfill

This 51-acre former landfill is located in the village of Antioch, Lake County, IL, and is in a freshwater wetland. The site functioned as a sanitary landfill until 1988, but also accepted special

permitted wastes at about 2% of the total volume of wastes. These wastes included waste oils and chlorinated solvents, paint sludge, and metal-containing wastes. It was estimated that almost 87,000 drums of hazardous wastes had been disposed at the landfill. Liquid organic wastes also were reported to have been dumped there, and other hazardous chemicals were alleged to have been illegally disposed of at the site. A leachate collection system was installed, and the entire landfill was covered with a clay cap in 1984. Information regarding this site is taken from the 1998 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for the site.

Demographic Data: Demographic profile, from the 2000 U.S. Census, for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	611
Females aged 15-44	1,397
Adults 65 and older	649

ATSDR Conclusions: In a 1989 public health assessment ATSDR categorized this site as an Indeterminate (formerly potential) Public Health Hazard (Category 3). In the 1998 public health assessment, ATSDR concluded the site poses No Public Health Hazard (Category 5). A 1999 ATSDR health consultation (not provided for inclusion in this document) reported that the site poses No Apparent Public Health Hazard (Category 4). In the past, contaminants in onsite groundwater included vinyl chloride, thallium, and sodium, which also migrated offsite to an Antioch municipal well. Thallium and sodium migrated to nearby private wells. Although levels in the municipal well were above MCLs or health-based criteria, ATSDR concluded that dilution during distribution would diminish levels delivered to the tap.

Site remediation began in 2001. Remedial activities include replacement of the contaminated municipal well, containment of contaminant migration through leachate and gas extraction, improvements to the cap, and groundwater-monitored natural attenuation. Long-term monitoring is in place. Regular monitoring and routing maintenance of the site will continue.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants lead and polyaromatic hydrocarbons (PAHs – including dibenz[a,h]anthracene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, and benzo[k]fluoranthene), as well as other contaminants previously discussed, were identified during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.4.1.3 Johns-Manville Disposal Area

This site is located within the Waukegan Harbor Extended Study Area, in Waukegan, Lake County, IL. From 1922 through 1998, the Johns-Manville site produced a variety of building and other materials that contained asbestos, lead, pentachlorophenol, bis (2-ethylhexyl) phthalate and chromium. Waste materials containing these substances were dumped onsite. An estimated 3 million cubic yards of off-specification products and wastewater sludge have been disposed of in the eastern area of the 300-acre property. Information regarding this site is taken from the 1988 ATSDR public health assessment and from the 2003 USEPA NPL fact sheet.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	623

Females aged 15-44	1,220
Adults 65 and older	746

ATSDR Conclusions: Because of the potential public health threat from exposure to asbestos and lead—were the public allowed access to the site—in 1988 ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). Asbestos contamination of the site was extensive and particularly when airborne, could pose a threat to onsite workers and trespassers, as well as to recreational users of the nearby state park. Air sampling data, however, were not adequate to determine the potential public health threat. High lead levels in the topsoil could pose a threat to children playing on the site, but it is unclear whether children would access the site from the adjacent beach. Since the time of the 1988 health assessment, extensive clean up activities have occurred, including a 24-inch soil cover with vegetation over all dry waste areas, paving of parking lots contaminated with asbestos. Soil cover maintenance and groundwater monitoring continue at the site.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant lead, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.4.1.4 Residential Mercury Spills from Gas Regulators (a/k/a NICOR)

On July 22, 2000, IDPH and ATSDR were contacted by a resident of a home in Mt. Prospect where a mercury spill occurred at the home during the moving of their older gas meter and regulator by a Nicor contractor. IDPH contacted Nicor and found that they were investigating this spill and three others in neighboring homes. Information on this site is taken from the 2001 ATSDR health consultation.

ATSDR Conclusions: After its review of relevant information, ATSDR concluded that a *Public Health Hazard* (Category 2) existed because of mercury contamination in many homes in the Chicago suburban area. Remedial actions have been completed.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant mercury was identified at this site during ATSDR's assessment of exposure related issues.

5.4.1.5 Outboard Marine Corp.

This site, located around the upper Waukegan Harbor area in Waukegan, Lake County, IL, consists of several areas contaminated by PCBs. From 1959 to 1972, the Outboard Marine Corp. purchased about 8.4 million pounds of PCB-containing hydraulic fluid. Some of this fluid leaked onto the floor, was discharged through floor drains into surface water. During the early 1970s, this facility was one of the major sources of PCBs discharging into Lake Michigan. Information regarding this site is taken from the 1994 ATSDR public health assessment and the 2003 USEPA NPL fact sheet for the site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	2,183
Females aged 15-44	3,754

Adults 65 and older	1,103

Public Health Outcome Data: No health studies of people in the Waukegan Area were available as of ATSDR's 1994 assessment. An epidemiological study of Lake Michigan fish eaters was mentioned as being performed through the ATSDR Great Lakes Human Health Effects Research Program.

ATSDR Conclusions: In its 1989, 1994, 1998, and 2004 public health assessments ATSDR categorized this site as a *Public Health Hazard* (Category 2). The primary concern is that through the consumption of contaminated fish anglers and their families have probably been exposed and may continue to be exposed to PCBs at levels that could result in adverse health effects.

The Operable Units of Outboard Marine Corporation includes the Waukegan Harbor, the Waukegan Manufactured Gas and Coke Plant, Plant 2, and the PCB disposal cells. The ATSDR reports of 2004 (April, May, and June) indicate that clean up of these Operable Units continues and that no apparent public health hazard exists for the Units. This designation was given due to the fact that no human contact with contaminated sediments in water for the Waukegan Harbor exists. Factors that prevent human contact include the sediment's depth in water, limited site access to the Waukegan Manufactured Gas and Coke Plant, a distance of one mile from the nearest residential area for Plant 2, and containment of PCB contaminants in containment cells whose integrity remains intact. Furthermore, the Coke Plant soil remediation began in 2005 and groundwater remediation was scheduled for 2006, as reported by USEPA (June 2004). PCBs were released into the harbor in great quantities from this site, where they reside in sediment and bioaccumulate into fish. The Outboard Marine Corp. was one of the major sources of PCBs discharging into Waukegan Harbor/Lake Michigan. Concentrations of PCBs in fish from Waukegan Harbor are high enough that they could result in adverse health effects in people who regularly eat or ate fish from the harbor. Onsite soil is contaminated with PCBs, and groundwater is contaminated with chlorinated VOCs.

Cleanup actions at the site include dredging of the harbor, onsite treatment of high concentration wastes, construction and operation of three onsite containment cells, consolidation of contaminated soils and sediments within the cells, installation of groundwater extraction wells in the cells to prevent the release of PCBs from the cells, and construction of onsite water treatment systems. Water extraction and treatment from the cells is estimated to be ongoing for an extended period. The Outboard Marine Corp. plant has been abandoned and also needs cleanup.

USEPA reported (2006) that the clean portions of the Outboard Motor Corp. Plant 2 were being demolished and that the Great Lakes Legacy Act project would be used to clean up the harbor. Trespassers to buildings not being demolished may be a problem. Risk assessment investigation of the harbor demonstrated that dredging sediments at PCB levels of 1 ppm or higher would result in a protective cleanup level. Therefore, this level is being used as a guideline for the dredging of PCBs.

USEPA reported (June 2004) that this site had been designated in 2003 by the Federal government as an Environmental Justice Revitalization Project due to the area's low income and minority populations. This designation has enabled the community to receive Federal funds for redevelopment. Under this project, special concern is given to pregnant women, women of child-bearing age, subsistence fishermen, and other at-risk populations who are likely to consume PCB-contaminated fish. The ATSDR Public Health Hazard category for fish consumption

triggered the development of state Advisories for fish consumption. USEPA reported (2006) that the Illinois Department of Natural Resources conducts sampling of Illinois fish to screen for likely contaminants. The Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory is used by Illinois as a standard for PCB contamination of fish and to determine whether fish advisories for PCBs are needed. FDA action levels for substances such as DDT are used to determine if FDA health standards have been exceeded and, therefore, require a fish advisory alert.

IJC Critical Pollutants Identified with ATSDR Documents: The IJC critical pollutants PCBs, as well as other contaminants discussed, previously, were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of hazardous substances that were found at this site, please refer to http://www.epa.gov/superfund/sites/npl/npl.htm.

5.4.1.6 Precision Chrome, Inc.

This approximately 3-acre site is located in the Village of Fox Lake, Lake County IL, 7 miles south of the Illinois-Wisconsin border. Precision Chrome is engaged in the production of steel shafts for hydraulic equipment, which involves cutting, grinding, polishing, induction hardening, and chrome plating. Chromic acid generated by Precision Chrome is sent to a facility meeting requirements for handling hazardous waste that is reused. Spills at the facility have contaminated the environment. Information regarding this site is taken from the 1998 ATSDR health consultation for the site.

ATSDR Conclusions: Because groundwater is contaminated at levels that would be expected to cause adverse health effects in exposed persons, this site was categorized as an *Indeterminate Public Health Hazard* (Category 3).

Lead, manganese, and chromium (VI) have been detected in numerous groundwater monitoring well samples at levels that would be expected to cause adverse health effects. Chromium (VI) was the primary concern. Private and public drinking water wells are on and near the site that have not been adequately monitored to determine whether the site-related contaminants are present in these wells and at what concentrations.

USEPA completed a time-critical removal action at the Site in October 1995. A groundwater extraction and containment system was installed in 1997. The extracted water was piped to the village sanitary sewer, but the system was shut down within about 3 months because the levels of chromium (VI) exceeded the sanitary sewer system permit.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant lead, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.4.1.7 Yeoman Creek Landfill

The Yeoman Creek Landfill covers about 49.2 acres in Waukegan, Lake County, IL. This landfill and the nearby 11.9-acre Edwards Field Landfill are considered together in the ATSDR assessment. The landfill history is not well documented. Apparently, some hazardous wastes, including PCBs, were dumped there, even though the landfills ostensibly were receiving landscape and demolition wastes, domestic garbage, and sludge. Surface runoff from the landfill is towards Yeoman's creek, which discharges into the Waukegan River. Information regarding

this site is taken from the 1992 ATSDR public health assessment, 1997 ATSDR health assessment, 1998 ATSDR health consultation and the 2003 USEPA NPL fact sheet for this site.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	4,745
Females aged 15-44	8,346
Adults 65 and older	3,219

ATSDR Conclusions: Because the available limited information did not indicate that people have been exposed to contaminants at levels of public health concern, but because that information contained significant data gaps, ATSDR has assessed this site four times. The 1992 health assessment concluded that the site posed an *Indeterminate Public Health Hazard*. (Category 3). The 1997 health assessment concluded, on the basis of more complete data, that because of the absence of exposure to contaminants at levels of health concern the site posed *No Apparent Public Health Hazard* (Category 4). The 1998 health consultation concluded that the infiltration of nearby buildings with potentially flammable or confirmed flammable levels of gases poses an *Urgent Public Health Hazard* (Category 1) and the 2000 health consultation concluded that the site poses *No Apparent Public Health Hazard* (Category 4). The 1992 health assessment noted the presence of PCBs and VOCs in groundwater. Whether these contaminants could reach private wells north of the site was not known, and concentrations of contaminants in surface soil were unknown. The 1997 health assessment stated that the homes and businesses near the landfills use municipal water from Lake Michigan, rather than groundwater. Although a number of contaminants, including PCBs, dieldrin, and B(a)P exceeded health-based screening values onsite or in the sediments of Yeoman Creek, access to contaminated areas is restricted. Flammable gases and other chemicals were found in the basement of a building north of the site, but a ventilation system was installed to eliminate the explosive hazard. In 1998, however, ATSDR determined that the frequent presence of flammable levels of gases in the buildings near the northern side of the Yeoman Creek Landfill was an *Urgent Public Health Hazard* (Category 1) because of the possibility of fire or explosion.

Remedial actions began in 2002. A landfill gas collection system was installed in, and has not achieved compliance at all monitoring points. Remedial action at the site includes excavation of sediments, reconstruction of Yeoman Creek, waste consolidation, monitored natural attenuation, and a multi-layer final landfill cover. Remedial activities continued through spring 2004. In 2007 USEPA completed its first five-year review and found that the remedy failed to control migration of landfill gases in the northern portion of the site. Currently, the USEPA and the PRPs are negotiating details of additional remedial actions that are expected to include a separate gas collection system in the northern portion of the site.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs—including acenaphthylene, chrysene, dibenz[a,h]anthracene, phenanthrene, benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, ideno[1,2,3-c,d]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene), as well as other contaminants previously discussed, were identified during ATSDR's assessment of exposure related issues.

5.4.2. TRI Data for the Waukegan Harbor AOC

The TRI onsite chemical releases for Lake County, IL, are summarized in Table 5.4-B. Total onsite releases in 2001 were 724,859 pounds, the majority of which were released to air.

Only 4,624 pounds (0.6%) of the total onsite releases were IJC critical pollutants. The IJC critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air and surface water), and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 5.4-C.

The largest onsite release of non-IJC chemicals, in the range of 150,000-299,999 pounds, was of hydrochloric acid aerosols (to air). All other releases were <150,000 pounds.

5.4.3. NPDES Data for the Waukegan Harbor AOC

The NPDES permitted discharges for Lake County, IL are summarized in Table 5.4-D. The total average annual permitted discharges in 2004 were 1,805,213 pounds, the majority of which was ammonia nitrogen. No IJC critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.4.4. Summary and Conclusions for the Waukegan Harbor AOC

5.4.5. Hazardous Waste Sites

Seven hazardous waste sites in Lake County, IL, were categorized by ATSDR in public health hazard categories 1–3. Four of the 7 sites have completed remediation. Two are under remediation, and, according to the available information, the remediation plan for the remaining site is yet to be determined.

5.4.5.1 TRI Data

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The NPDES permitted discharges for Lake County, IL are summarized in Table 5.4-D. The total average annual permitted discharges in 2004 were 1,805,213 pounds, the majority of which was ammonia nitrogen. No IJC critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.4.5.3 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired at this site. According to the Stage III remedial action plan published in July 1999, restrictions on fish consumption are not specific to this AOC but reflect region wide restrictions for Lake Michigan.

Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

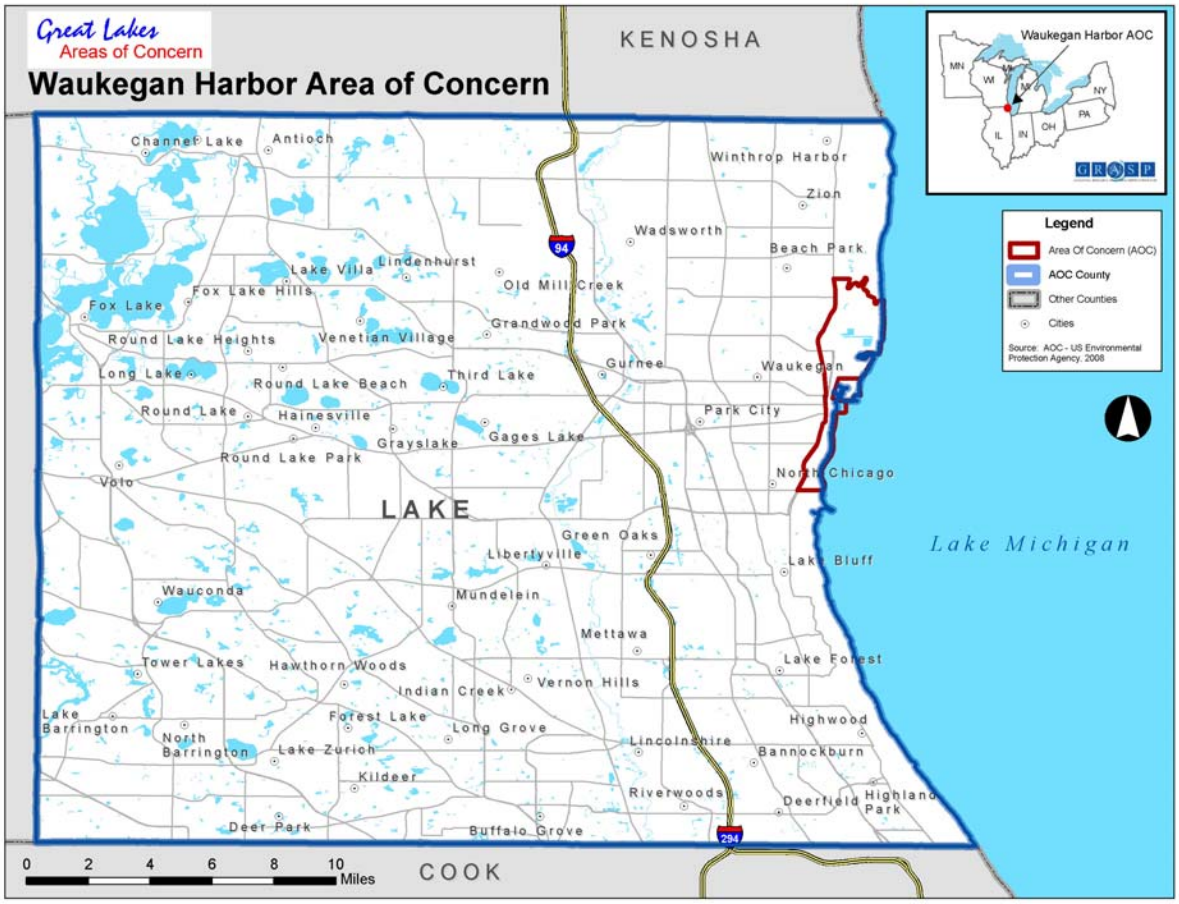

Great Lakes
Areas of Concern
Waukegan Harbor Area of Concern
KENOSHA
LAKE
COOK
Lake Michigan
Channel Lake
Antioch
Lake Villa
Lindenhurst
Fox Lake Hills
Fox Lake
Round Lake Heights
Venetian Village
Long Lake
Round Lake Beach
Third Lake
Round Lake
Hainesville
Grayslake
Gages Lake
Round Lake Park
Volo
Wauconda
Mundelein
Libertyville
Green Oaks
Mettawa
Tower Lakes
Hawthorn Woods
Indian Creek
Vernon Hills
Lake Barrington
North Barrington
Forest Lake
Long Grove
Lake Zurich
Kildeer
Deer Park
Buffalo Grove
Riverwoods
Lincolnshire
Bannockburn
Highwood
Highland Park
Deerfield
Lake Forest
Lake Bluff
North Chicago
Waukegan
Gurnee
Park City
Grandwood Park
Old Mill Creek
Wadsworth
Beach Park
Zion
Winthrop Harbor
94
294
0 2 4 6 8 10 Miles
Waukegan Harbor AOC
MN
WI
MI
NY
PA
IL
IN
OH
GLOSP
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008

Table 5.4-B TRI Releases (in pounds, 2001) for the Waukegan Harbor AOC

DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.002568825	No data	0	0	0.002568825	0	0.002568825
(PCDDs and PCDFs)	3							
LEAD	8	2584.21	No data	0	0	2584.21	966	3550.21
LEAD COMPOUNDS	8	419.85714	1304.3	0	0	1724.15714	2807.29	4531.44714
MERCURY	9	4.73	No data	0	0	4.73	10.45	15.18
MERCURY COMPOUNDS	9	310.011	1	0	0	311.011	0.042	311.053
	Total IJC	3318.810709	1305.3	0	0	4624.110709	3783.782	8407.892709
1,2,4-TRIMETHYLBENZENE		1500	No data	0	0	1500	0	1500
1,4-DIOXANE		250	No data	0	0	250	0	250
2-METHOXYETHANOL		105	No data	0	0	105	0	105
4,4'-ISOPROPYLIDENE-DIPHENOL		694	No data	0	0	694	110	804
ACETONITRILE		9498	No data	0	0	9498	0	9498
ALUMINUM (FUME OR DUST)		2009	No data	0	0	2009	4500	6509
AMMONIA		1595	100	0	0	1695	0	1695
ANTIMONY		0	No data	0	0	0	9	9
BARIUM COMPOUNDS		16993	4400	0	0	21393	38216	59609
BROMOMETHANE		248	No data	0	0	248	0	248
CERTAIN GLYCOL ETHERS		2980	No data	0	0	2980	1075	4055
CHLOROFORM		2986	No data	0	0	2986	12	2998
CHROMIUM		0	No data	0	0	0	37	37
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		28	No data	0	0	28	3897	3925
COPPER		0	No data	0	0	0	15659	15659
COPPER COMPOUNDS		833	110	0	0	943	2655	3598
DICHLOROMETHANE		114565	No data	0	0	114565	29	114594

DIISOCYANATES	10	No data	0	0	10	0	10
ETHYLBENZENE	1231	No data	0	0	1231	0	1231
ETHYLENE GLYCOL	10	No data	0	0	10	0	10
ETHYLENE OXIDE	4800	No data	0	0	4800	0	4800
FORMALDEHYDE	5	No data	0	0	5	0	5
FORMIC ACID	92	No data	0	0	92	0	92
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	229170	No data	0	0	229170	0	229170
HYDROGEN FLUORIDE	120504	No data	0	0	120504	0	120504
MANGANESE COMPOUNDS	1010	110	0	0	1120	0	1120
METHANOL	84784	No data	0	0	84784	96	84880
METHYL ETHYL KETONE	21506	No data	0	250	21756	250	22006
METHYL ISOBUTYL KETONE	1255	No data	0	5	1260	5	1265
METHYL TERT-BUTYL ETHER	91	No data	0	0	91	5	96
N,N-DIMETHYLFORMAMIDE	735	No data	0	0	735	0	735
NAPHTHALENE	10	No data	0	0	10	0	10
N-BUTYL ALCOHOL	5731	No data	0	0	5731	0	5731
N-HEXANE	5282	No data	0	0	5282	158	5440
NICKEL	250	No data	0	0	250	1538	1788
NITRIC ACID	40	No data	0	0	40	0	40
N-METHYL-2-PYRROLIDONE	579	No data	0	0	579	0	579
OZONE	80	No data	0	0	80	0	80
PROPYLENE OXIDE	34	No data	0	0	34	0	34
SEC-BUTYL ALCOHOL	255	No data	0	0	255	0	255
STYRENE	10255	No data	0	0	10255	0	10255
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)	5	No data	0	0	5	0	5
TETRACHLORO-ETHYLENE	1010	No data	0	250	1260	250	1510
THIOUREA	52	No data	0	0	52	0	52

TOLUENE		29128	No data	0	250	29378	501	29879
TRICHLOROETHYLENE		13676	No data	0	0	13676	676	14352
VANADIUM COMPOUNDS		433	0	0	0	433	0	433
XYLENE (MIXED ISOMERS)		26961	No data	0	250	27211	368	27579
ZINC COMPOUNDS		1112	130	0	0	1242	250	1492
	Total Non-IJC	714380	4850	0	1005	720235	70296	790531
	Total	717698.8107	6155.3	0	1005	724859.1107	74079.782	798938.8927

Table 5.4-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Waukegan Harbor AOC

Critical-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds *(PCDDs and PCDFs)*	2			
Lake County, IL	2	ABBOTT LABS. NORTH CHICAGO FACILITY	60064BBTTL1400N	NORTH CHICAGO
		WAUKEGAN GENERATING STATION	60087WKGNG10GRE	WAUKEGAN
Lead and lead compounds	13			
Lake County, IL	13	ABBOTT LABS. ABBOTT PARK FACILITY	60064BBTTLINTER	ABBOTT PARK
		ABBOTT LABS. NORTH CHICAGO FACILITY	60064BBTTL1400N	NORTH CHICAGO
		AKZO NOBEL AEROSPACE COATINGS INC.	60085MDLND17EWA	WAUKEGAN
		BARNANT CO.	60010BRNNT28W09	BARRINGTON
		CIRCUT WORKS CORP.	60044CRCTW110AL	LAKE BLUFF
		CITATION DYCAST	60047DYCST320EA	LAKE ZURICH
		NEW NGC INC.	60085GLDBN515SE	WAUKEGAN
		OSRAM SYLVANIA LAKE ZURICH ECS	60084SRMSY800NC	LAKE ZURICH
		PICKARD INC.	60002PCKRD782PI	ANTIOCH
		PRECISION CHROME INC.	60020PRCSN105PR	FOX LAKE
		SIEMENS BUILDING TECHS. INC.	60089LNDSS1000D	BUFFALO GROVE
		TRIAD CIRCUITS	60073TRDCR703NS	ROUND LAKE
		WAUKEGAN GENERATING STATION	60087WKGNG10GRE	WAUKEGAN
Mercury and mercury compounds	2			
Lake County, IL	2	U.S. NAVY NAVAL TRAINING CENTER	60088SNVYN201DE	GREAT LAKES
		WAUKEGAN GENERATING STATION	60087WKGNG10GRE	WAUKEGAN

Table 5.4-D NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Waukegan Harbor AOC

Chemical	IJC Tracking Number	Discharge
	Total IJC	0
COPPER, TOTAL (AS CU)		744.60
CYANIDE, WEAK ACID, DISSOCIABLE		11.68
ETHYLBENZENE		0.77
NITROGEN, AMMONIA TOTAL (AS N)		1793302.57
PHOSPHORUS, TOTAL (AS P)		11132.50
TOLUENE		14.60
XYLENE		6.57
	Total Non-IJC	1805213.29
	Total	1805213.29

5.5. Milwaukee Estuary AOC, Milwaukee County, WI

The Milwaukee Estuary AOC includes the inner and outer Harbor and the near shore waters of Lake Michigan bounded by a line extending north from Sheridan Park to the city of Milwaukee's Linnwood water intake, as well as the lower 4-5 km of the Milwaukee, Menomonee, and Kinnickinnic Rivers (see AOC map in the Appendix 1). The relatively small immediate drainage area contributes very large amounts of pollutants associated with urban runoff. The AOC is a source of pollution to Lake Michigan and a sink for pollutants generated throughout the entire Milwaukee River drainage (see AOC map at end of chapter and in Appendix 1).

5.5.1. Hazardous Waste Sites Relevant to the Milwaukee Estuary AOC

ATSDR has evaluated the data for hazardous waste sites in Milwaukee, WI, and reached conclusions regarding the public health threat posed by these sites, which is summarized in Table 5.5-A, along with information regarding the type and location of the site, and the date and type of assessment document.

Table 5.5 -A Hazardous Waste Sites in Milwaukee County, WI

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Boerke Property, Milwaukee WID981189632	HC	1998	2	Non NPL	Completed
Fadrowski Drum Disposal, Franklin WID980901227	HA HA	1988 1994	3 4	Deleted from NPL	Completed
Former Tannery, Milwaukee WI0001407717	HC	1996	2	Non NPL	To be Determined
Moss-American Co., Inc. (Kerr McGee Oil Co.), Milwaukee WID039052626	HA HA	1988 1991	3 2	NPL	Completed
Northwestern Barrel Company (Former), S. Milwaukee IED981095995	HC HA HC	1997 1998 2002	1 NS 4	Non NPL	Ongoing
P & G School Bus Co., Milwaukee WISFN0507920	HC	2002	2	Non NPL	To be Determined
Robert Betz Trust Co., Milwaukee WI00001366226	HC HC HC	1998 1999 2001	2 2 2	Non NPL	Completed
St. Francis Auto Wreckers,	HC	2002	2	Non NPL	To be Determined

Milwaukee WID988639068					
Try Chemical Corporation, Milwaukee WID048034300	HC	2001	2	Non NPL	To be Determined
Former Johnson Property Milwaukee	HC	2006	3	Non NPL	To be Determined
Johnson Controls-Badger Facility, Milwaukee WIT560011116	HC HC	2003 2006	3 3	Non NPL	To be Determined
Redi-Quick Dry Cleaners, West Allis WID076169226	HC	2006	2	Non NPL	Completed
Schlitz Park Office Building, Milwaukee WIXCRA04R000	HC	2005	2	Non NPL	Completed
Solvay Coke and Gas Company, Milwaukee WIN000508215	HC	2003	2	Non NPL	Ongoing

1 =Urgent Public Health Hazard, 2 =Public Health Hazard, 3 = Indeterminate Public Health Hazard,

4 =No apparent Public Health Hazard

HA =Public Health Assessment, HC =Health Consultation, NS=Not stated

Further evaluation of the data for these sites was conducted by ATSDR and is summarized in the following section.

5.5.1.1 Boerke Property

This abandoned 70-acre property is bounded on one side by Lake Michigan. It was used primarily as an unlined industrial landfill that received wastes from an adjacent dye manufacturer, which was in operation from about 1915 to 1939. A drainage swale that runs from the disposal area empties into Lake Michigan.

ATSDR Conclusions: Because the arsenic contamination in waste materials and adjacent surface soils posed a public health hazard to people who may enter the property, ATSDR categorized this site as a Public Health Hazard (Category 2).

Arsenic is the primary contaminant. Arsenic levels in the waste material were as high as 290,000 mg/kg, and in soil and in the drainage swale were in the thousands of ppm range, which would cause harmful effects from incidental inhalation of dust or ingestion of soil. Arsenic also had been found in groundwater beneath and down gradient of the waste disposal area. The groundwater probably discharges to Lake Michigan, and does not flow towards any wells.

USEPA reported that the Boerke site was remediated in 2004. Institutional controls are in place for this area to avoid disturbance or exposure to the public from the remaining contaminated sub-surface soils.

IJC Critical Pollutants Identified within ATSDR Document: None of the IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.2 Fadrowski Drum Disposal

This 20-acre site is located in the city of Franklin, Milwaukee County, WI. The site was operated as a landfill for construction debris and fill dirt from 1970 to 1982. In 1983, however, excavation for fill dirt on the property revealed barrels of hazardous wastes. As of 1994, the site had been fenced, and 167 buried drums and associated contamination had been excavated and contained. An onsite pond was drained and back filled.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	856
Females aged 15-44	2,246
Adults 65 and older	1,208

Public Health Outcome Data: A health outcome data assessment, not related to this site but applicable to it, studied age-adjusted cancer rates for all cancer sites for the city of Franklin in comparison with the U.S., Wisconsin, and Milwaukee County for three time periods: 1960–1969, 1970–1979, and 1980–1985. The assessment found no significantly elevated rates for individual cancer sites in Franklin, nor elevated rates for specific cancers with an environmental exposure etiology.

ATSDR Conclusions: In a 1989 health assessment ATSDR categorized this site as an *Indeterminate (formerly potential) Public Health Hazard* (Category 3). In 1994, after some remediation had been performed, ATSDR concluded that the site poses *No Apparent Public Health Hazard* (Category 4). PAHs, DDT, lead, chromium, toluene, and mercury were found in completed exposure pathways related to soil, but concentrations in surface soils were low enough that they did not pose a health risk.

Some contaminated soil has migrated from the disposal area into the adjacent wetland sand stream, but the contamination has been covered with clean soil. Groundwater was not appreciably affected. In 1994, the drums were removed, waste was consolidated and capped, and monitoring wells and a leachate collection system were installed. Monitoring since then has shown the remedy was effective, and the site was deleted from the NPL in 2005.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants DDT, lead, B[a]A, B[b]F, B[k]F, B[a]P, I[123cd]P, and chrysene, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.5.1.3 Former Johnson Property (Vapor Intrusion)

The Former Johnson Property site consists of a city block within the city of Milwaukee. The site includes four residential parcels, each on roughly 0.6 acres. The area has typically been residential but historically has had small commercial properties intermingled including a fur tannery in 1910 and a gasoline station and auto repair/paint business in 1951. During redevelopment of the property in 2000, soil and groundwater sampling indicated high levels of

trichloroethylene (TCE). A combination of source (soil) removal, sub-slab depressurization systems for each home, and an underground plastic cutoff wall were used to mitigate potential migration of vapors into indoor air.

ATSDR Conclusions: In 2006 ATSDR concluded that while there is still low-level TCE in the groundwater and soil beneath two of the homes, the sub-slab depressurization systems are preventing the vapor from moving to indoor air. As a result, ATSDR concluded that the remaining TCE in soil and groundwater poses *No Public Health Hazard (Category 5)*. There is concern that vapor intrusion may impact the indoor air of residents located south of these two homes, therefore ATSDR considers the potential exposure to these residents as an *Indeterminate Public Health Hazard* until the contamination can be evaluated further.

The main contaminant of concern is TCE in the soil and groundwater. The pathway of concern is inhalation of TCE vapors that might migrate into indoor air. While this is currently not a completed pathway for the residents in homes with sub-slab depressurization systems, it is a potential completed pathway for homes south of these homes. Vapor mitigation systems have been placed in affected homes and additional investigation continues. Ingestion of the contaminated groundwater is not a completed exposure pathway since residents obtain their water from municipal sources that are not impacted by this contamination.

IJC Critical Pollutants Identified within ATSDR Documents: None of the IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.4 Former Tannery

The 1.3-acre former Tannery site is located in east central Milwaukee, Milwaukee County, WI, near the Kinnickinnic River. It has been abandoned. At the turn of the century the site had been a stove shop and foundry, a tannery from about 1965 to 1980, and then was used for scrap waste storage and silver recovery from film from 1980 to1987. The film was burned to recover the silver. Transformer fluids and automotive fluids and gasoline were drained on the property when transformers and cars were dismantled. Although the site is fenced, illegal dumping and trespassing still occur. Surface water and shallow groundwater flow towards the river.

Demographic Data: There are over 100 families living within a short walk to the site.

ATSDR Conclusions: PCBs is present in sufficiently high concentrations in soil and wastes on the property to pose, for people entering the site without personal protection, a *Public Health Hazard* (Category 2) from direct dermal contact as well as from incidental ingestion and inhalation. In addition, the site may be contributing to PCB contamination of the Kinnickinnic River, and thus to bioaccumulation in fish. PCB concentrations in fish in this area are sufficiently high that fish consumption advisories have been issued for some species.

Asbestos-containing building materials in the yard, poor condition asbestos insulation on pipes in the building, chunks of insulation on the floor and in garbage bags, and friable asbestos in the layer of debris on the floor of the building also pose a health hazard. The building is open and air flow could transfer asbestos to the outdoors. As of March 2008 the status of remediation was unknown.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant PCBs, as well as metals and other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.5 Johnson Controls Incorporated Badger Facility

The Johnson Controls Incorporated –Badger Facility (JCI) is currently a 2.8 acre vacant lot in a residential neighborhood in Milwaukee, Wisconsin. The previous plant building operated from 1910 through the 1970s. In 1998, all buildings were removed. In 1999, 9,115 tons of soil contaminated with chlorinated solvents were excavated and thermally treated onsite. Vapor intrusion investigations began in 2003.

ATSDR Conclusions: ATSDR concluded that chlorinated solvents were sufficiently concentrated in soil and groundwater to cause vapor migration into nearby buildings. Since indoor air data was not available, the site poses an indeterminate public health hazard. Elevated levels of contaminants exist in subsurface soils, where people do not have direct contact. Surface soils at the sit e are not impacted and do not pose a health concern unless redevelopment of the property brings people in to direct contact. Groundwater is not consumed as drinking water in this area. As of March 2008 ATSDR did not have any information on remedial status.

IJC Critical Pollutants Identified within ATSDR Documents
No IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.6 Moss-American Co., Inc. (Kerr-McGee Oil Co.)

This 88-acre site was a wood preserving plant and an USEPA NPL site on the northwest side of Milwaukee, Milwaukee County, WI. A 5-mile stretch of the little Menomonee River, with associated wetlands, flows through the site. Between 1921 and 1976, creosote was used to treat railroad ties. Liquid wastes were discharged directly to the river until 1941, when settling basins were installed; waste discharged from the ponds to the river. In 1971, the company began pretreating its waste and discharging it to a sanitary sewer. Also in 1971, teenagers wading in sediments more than 3 miles downstream from the site received chemical burns, which were determined to have resulted from exposure to creosote-related chemicals originating from the plant. After this incident, warning signs were posted, the waste ponds were dredged and filled, and contaminated sediment along 1,700 feet of the riverbed adjacent to the site was excavated and buried along the west bank of the river. The settling pond dredgings were land filled in the northeastern portion of the site. In 1973, sediment was dredged for about 1 mile downstream and placed in the landfill area and along the west bank of the river. The facility closed in 1976. The western portion of the site is used for a car loading and storage lot by a railroad company. The remaining 88 acres belong to the Milwaukee County park system.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	1,587
Females aged 15-44	2,910
Adults 65 and older	1,110

ATSDR Conclusions: In its 1988 health assessment, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 2) to anyone entering the property or frequenting a stretch of the Little Menomonee River extending from the site to the river's confluence with the Menomonee River the site poses a *Public Health Hazard* (Category 2).

As of 1991, site-related chemicals present in onsite soil at levels of concern included the PAHs, phenolic compounds, chlorinated dioxins, arsenic, cadmium, chromium, and lead. Completed

exposure pathways were incidental ingestion, dermal absorption, and inhalation of chemicals from soil. The concern was for increased lifetime cancer risk and irritant effects.

Subsequent remedial activities have included removal of free product creosote and related wastewater, treatment of the most highly contaminated soils with thermal desorption, and management of site groundwater with a "funnel and gate" process. USEPA reported that approximately 5 miles of the Little Menomonee River downstream of the former creosote facility were believed to be contaminated. Remediation of stream segment 1 occurred in 2002–2003. In 2004, stream segments 2 and 3 were remediated. From November to December 2005, approximately 3,400 cubic yards of sediment were dredged from Segment 4 and transported to the Peoria Disposal facility in Peoria, Illinois.

Clean-up of the facility is complete, and remediation of the remaining contaminated sediment in the Little Menomonee River is still in progress.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants B[a]A, B[b]F, B[k]F, B[a]P, I[123cd]P, DB[ah], chrysene, dibenzofuran, dioxins, lead, and mercury, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm

5.5.1.7 Northwestern Barrel (Former), (Marina Cliffs)

The Marina Cliffs Condominium property is located on the western portion of the former Northwestern Barrel Company property. From 1940 to 1964, Northwestern Barrel operated a barrel reconditioning facility, which resulted in the eastern portion of the property becoming contaminated with paint wastes, lead, PCBs, and other chemicals. Chemicals were dumped into pits in this area of the property. Contaminated soils and wastes from the eastern portion were excavated and disposed offsite, but there is some concern regarding the soils around and under the condominiums.

Demographic Data: Demographic profiles for vulnerable populations living within 1 mile of this site were not reported for this non-NPL site. In 1998, approximately 1,000 persons lived within 300 yards of the property.

Public Health Outcome Data: Concentrations of three VOCs, ethylbenzene, styrene, and total xylenes, in blood of three nonsmoker residents were compared with those in the third National Health and Nutrition Examination Survey. One of three residents tested had elevated blood concentrations of these chemicals, which appeared to correlate with increases in indoor and outdoor air concentrations at the location of that person's condominium, but the person had no symptoms.

ATSDR Conclusions: ATSDR has performed four assessments dealing with different aspects of this site. In a 1997 health consultation, ATSDR categorized the site as an *Urgent Public Health Hazard* (Category 1). In 1998, because of airborne VOCs blowing from the area of soil remediation to the condominiums, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3). In a 2002 health consultation, ATSDR concluded that the site *poses No Public Health Hazard* (Category 5). In another 2002 health consultation (dated July 8), ATSDR determined that the slightly contaminated soil near the condominiums posed *No Apparent Health Hazard* (Category 4).

In 1997, high levels of lead in surface soil presented an *Urgent Public Health Hazard* to nearby residents. PCBs were also a concern for surface soil. The contaminated soil from the disposal pits was excavated and stockpiled on a prepared clay pad and covered with plastic sheeting. It was then screened to sift out debris prior to mixing with cement. Organic vapors were released by these activities. Condominium residents are living less than 100 yards from these operations complained of noxious odors and of adverse health effects including headaches, sore throats, lethargy, and burning eyes. ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3) because air coming from the property contained VOCs (including xylene and ethylbenzene) and although levels of individual chemicals were below levels known to cause illness, residents complained of illness when the odors were strong, and blood samples showed elevated concentrations of several VOCs in one person. In 2002 ATSDR determined that the concentrations of PCBs and lead in surface and subsurface soils near two of the condominium buildings did not pose a health concern, even for young children who might have daily, long-term contact with the soil.

Most remediation was completed in 1995 and 1996; however, some clean-up is ongoing.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants lead and PCBs, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.8 P&G School Bus Service

This approximately 6-acre site is located in Milwaukee, Milwaukee County, WI. For an undetermined number of years school buses and other large vehicles were serviced at the site. In 1995, debris, solid waste, aboveground storage tanks, containers of waste fluids, oily liquids in storm sewers, burn piles, and stained soils were found. Debris and waste piles remained in 1998. Access to much of the property is restricted by a locked chain-link fence. Monitoring data were collected in 1998 as part of a Brownfields assessment.

ATSDR Conclusions: Because surface soils have elevated concentrations of some contaminants that could pose a health hazard to people who have frequent contact with the soils, ATSDR categorized this site as an *Indeterminate Public Health Hazard* (Category 3) and SVOCs were found at levels of health concern in surface soils onsite. Groundwater at one onsite location contained benzene at levels of concern, but is not used as a source of drinking water. Additional monitoring was recommended to determine the full extent of contamination prior to development of the site.

Currently, exposure does not seem to be occurring because the site is securely fenced; the concern was for future exposure in the event the site is developed. Remediation status is unknown.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants hexachlorobenzene, dibenzofuran, B[b]F, B[a]P, DB[ah]A, I[123cd]P, and chrysene, as well as other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.9 Robert Betz Trust Co. (Betz, Robert G. Property)

This 4.5-acre property operated as a salvage yard from about 1960 to 1994. Asphalt operations also were based on the property during that time, and excess asphalt was spread on the ground at

various locations. Following that period, the property was reportedly used for illegal dumping of waste, including waste oil, and for dismantling of stolen vehicles.

ATSDR Conclusions: Because of physical hazards, ATSDR, in its 1998 health consultation, categorized this site as a Public Health Hazard (Category 2). In 1999 ATSDR concluded that for people who frequented it, soil contaminants rendered the site a Public Health Hazard (Category 2). In 2001, ATSDR concluded on the basis of more recent data that soil contamination requires continuation designation of the site as a Public Health Hazard (Category 2).

Arsenic, PAHs, and lead in surface soil were at levels of health concern. In 1999, the buildings were demolished, and debris and solid wastes were hauled away. In 2001, USEPA initiated a time-critical removal action for the property and fenced the site completing remediation. .

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants PAHs and as well as metals and other contaminants previously discussed, were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.10 St. Francis Auto Wreckers

This site includes a fenced auto salvage yard and an unfenced 1.6-acre wooded vacant lot where children play, adjacent to a residential neighborhood. Before the salvage business, the site comprised a landfill that accepted foundry sand.

Demographic Data: Demographic profiles for vulnerable populations living within 1 mile of this site included approximately 100 persons who live within 300 meters of the property, and about 750 who live within 600 meters.

ATSDR Conclusions: Because of the presence of hazardous materials in the vacant lot where children play and PCB-contaminated soils in the salvage yard. In 2002 ATSDR categorized this site as a *Public Health Hazard* (Category 2)

PCBs and lead were found at elevated levels in soils throughout the salvage yard, but the shallowest samples were 6" deep—too deep to characterize adequately exposure from surface soil. Monitoring of surface soils in the vacant lot was inadequate, but soil samples 6" deep contained elevated levels of lead and mercury above health-based screening values, and samples taken from 2 feet deep contained PCBs at above health-based screening values. Foundry sand, which could be a source of lead and other heavy metals, was present in the vacant lot. Potential groundwater contamination was to be tested. As of March 2008 the remedial status of this site was unknown.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants PCBs and lead were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.11 Schlitz Park Office Building

In December of 2004 the Wisconsin Department of Health and Family Services (DHFS) received odor complaints from occupants of the Bottlehouse B building which is part of the Schlitz Park Office Complex. An investigation of the complaints discovered that the odor was associated with a sewer re-lining project underneath the building that utilized a "cured in place" technology which uses a resin impregnated fabric. Air sampling confirmed that the vapor was entering through cracks in the basement and that the odor was Styrene which is major component of the

resin. By March 2005 an exhaust fan was placed in the basement near the vapor point of entry. Soon thereafter, measured vapor levels and odors in the building declined.

ATSDR Conclusions: Indoor air in the Schlitz Park Office building contained airborne styrene levels above guidelines for long-term exposure as well as other volatile organic compounds. Building occupants reported strong respiratory and mucous membrane effects consistent with elevated VOC levels in the building, therefore; past conditions at the site were classified as a *Public Health Hazard* (Category 2). Ventilation and ground thaw have reduced the residual styrene vapors below the building foundation. Further indoor air sampling indicated that the building air quality currently represents *No Apparent Public Health Hazard* (Category 4).

The main contaminant of concern at this site was Styrene. During the odor event, there was a completed pathway for inhalation of Styrene vapors. Due to the reduction of vapors, this pathway is no longer a completed pathway.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.12 Try Chemical Corp.

This Brownfields site in Milwaukee, Milwaukee County, WI, is just over 1 acre in area. The facility was used for metal finishing, paint stripping, painting, and electroplating from about 1916 to 1985. It was abandoned in 1985, at which time the USEPA removed processing liquids and waste from the site. In 1997, the city of Milwaukee razed the buildings on the site and filled the basement pit.

Contaminants of Concern in Completed Exposure Pathways: The IJC critical pollutants B(a)P and lead are present at concentrations above health-based screening values in subsurface soils, but the site is capped with concrete, so completed exposure pathways do not presently exist. A few contaminants including vinyl chloride (but not lead) exceed groundwater screening values, but no contact or ingestion of groundwater is expected.

ATSDR Conclusions: Because of physical hazards, particularly an unfenced terrace at the top a 15-foot retaining wall, ATSDR categorized this site as a *Public Health Hazard* (Category 2) in 2001. Lead and B(a)P and lead are present in subsurface soils, but the site is capped with concrete, so completed exposure pathways do not presently exist. A few contaminants including vinyl chloride (but not lead) exceed groundwater screening values, but no contact or ingestion of groundwater is expected. Further site characterization and restriction on site access were recommended. As of March 2008 the remedial status of this site was unknown.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants PAHs and lead as well as contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.13 Redi-Quik Dry Cleaners, West Allis, ID

The Redi-Quik Dry Cleaner property is located at 9508 West Greenfield Avenue, West Allis, Milwaukee County in a residential area. A home next to Redi-Quik property was evaluated for vapor migration and intrusion impacts. Environmental investigations at the Redi-Quik property have found groundwater and soils contaminated with elevated levels of tetrachloroethylene (PCE). In 2001, measurements made by consultants found PCE levels up to 3,900 μg/kg (micrograms per kilogram) at the Redi-Quik property and 230,000 μg/kg at the residential

property. PCE levels at 129,000 μg/kg was found in soil form a monitoring well approximately 10 feet from this house. Measurement conducted in 2004 in monitoring wells found that shallow groundwater was contaminated with PCE as high as 45,000 μg/L (micrograms per liter) on the Redi-Quik property, and 708 μg/L on the residential property.

ATSDR Conclusions: In 2006 ATSDR concluded that elevated levels of tetrachloroethylene (PCE) were detected in the outdoor and indoor air of a West Allis household that is located next to a dry cleaner. These levels of PCE pose a public health hazard to residents due to a high increased lifetime excess cancer risk, but such levels are not likely to cause non-cancer health effects associated with much higher PCE exposures. PCE in soil vapors beneath the home demonstrates that vapor migration and intrusion to indoor air is a completed pathway from the dry cleaner. These levels are high enough to pose a future urgent public health hazard to resident if the integrity of the basement floor is compromised and similar PCE levels are found in indoor air. Residents at the home investigated were provided with information to immediately reduce their exposure/ Vapor mitigation system are now in place. WDHFS is providing assistance in answering questions that arise.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues.

5.5.1.14 Solvay Coke Brownfield, Milwaukee, WI AOC

This site covers about 46 acres of former marsh and waterfront property at the confluence of the Kinnickinnic and Milwaukee Rivers. The facility produced coke and manufactured gas from 1902-1983, and at its peak operated 200 coke ovens. The manufacture of coke and gas are linked processes resulting in the production of coke, coal tars, and fuel gas.

Since 1983, Wisconsin Wrecking Company, a concrete recycler, has operated from the property, although most of the abandoned Solvay Coke buildings remain. The 46 acre property lies within a larger industrial corridor, exceeding 700 acres, along the Lake Michigan waterfront. Information on this site is taken from the 2003 ATSDR health consultation.

ATSDR Conclusions: In 2003 ATSDR concluded that this site represented a Public Health Hazard (Category 2) with regard to potential exposure pathways, especially if demolition crews are not experienced in working with hazardous waste. The immediate health threats at the Solvay Coke site are limited because the nearest residential neighborhood is approximately 1800 feet west of the site, the area is served by municipal water, and the property is secured with a chain-link fence. Contaminated groundwater beneath Solvay Coke is not a current source of drinking water to any humans, and is therefore not an immediate threat. Buildings on the property contain asbestos pipe insulation and may be dispersed to the environment during building demolition. Deteriorated buildings on the property may contain imminent structural hazards. The below-surface coal tars are a health threat that will affect future use of the property. The threats include vapor intrusion, direct contact to workers during construction work, and direct contact to users of the adjacent waterway through impacts to sediment.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants PCBs, PAHs, and VOCs, as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues.

5.5.2. TRI Data for the Milwaukee Estuary AOC

The TRI onsite chemical releases for Milwaukee County are summarized in Table 5.5-B. Total onsite releases in 2001 were 2,505,221 pounds, the majority of which were released to air, followed by releases to land.

IJC critical pollutants accounted for 10,520 pounds (1%) of the total onsite releases. The IJC critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air, surface water, and land), and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 5.5-C.

The major release (≥ 500,000 pounds) of non-IJC chemicals was of hydrochloric acid aerosols to air. The next largest releases (300,000-499,999 pounds) were of hydrogen fluoride (to air), followed by (150,000-299,999 pounds) certain glycol ethers (to air).

5.5.3. NPDES Data for the Milwaukee Estuary AOC

As of 2004, no NPDES permits discharges as quantity average limits were in effect for Milwaukee County, WI.

5.5.4. Summary and Conclusions for the Milwaukee Estuary AOC Hazardous Waste Sites

5.5.4.1 Hazardous Waste Sites

ATSDR assessed 14 hazardous waste sites with *Public Health Hazard Categories* of 1-3 in Milwaukee County, WI. Most of these were non-NPL sites in the city of Milwaukee. Six have completed remediation, remedial action for six sites is yet to be determined, and remediation for the remaining two sites is ongoing.

5.5.4.2 TRI Data

The TRI onsite chemical releases for Milwaukee County in 2001 were 2,505,221 pounds, the majority of which were released to air, followed by releases to land.

IJC critical pollutants accounted for 10,520 pounds (1%) of the total onsite releases. The IJC critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (to air, surface water, and land), and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 5.5-C.

The major release (≥ 500,000 pounds) of non-IJC chemicals was of hydrochloric acid aerosols to air. The next largest releases (300,000–499,999 pounds) were of hydrogen fluoride (to air), followed by (150,000-299,999 pounds) certain glycol ethers (to air).

5.5.4.3 NPDES Data

Because as of 2004 quantity average limits were in effect for Milwaukee County, WI, no NPDES discharge permits have been issued.

5.5.4.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired at this AOC. Restrictions include resident and migratory fish and posted by the Wisconsin Department of Natural

Resources. Although a waterfowl advisory also is in effect whether the AOC is contributing to contaminant levels in waterfowl is unclear. Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

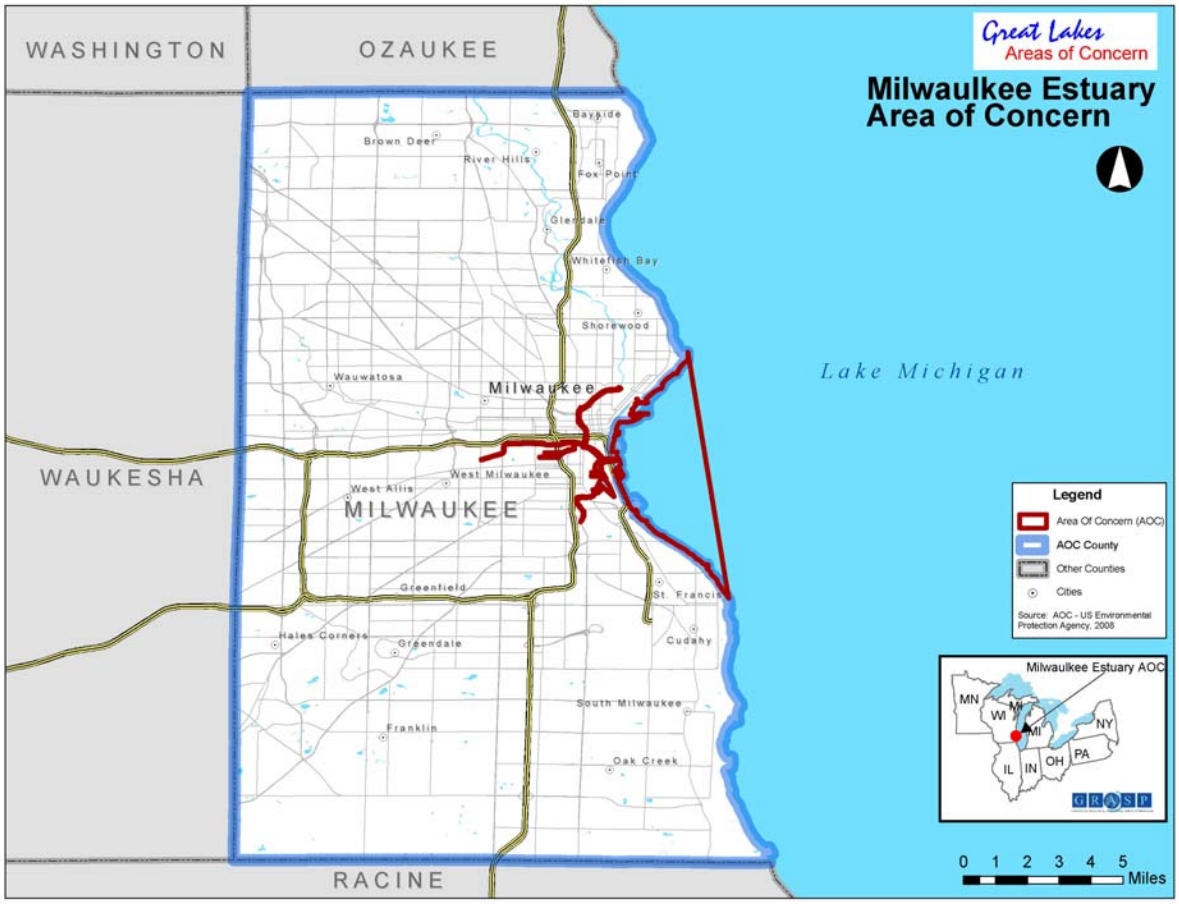

Great Lakes
Areas of Concern
Milwaukee Estuary
Area of Concern
WASHINGTON
OZAUKEE
WAUKESHA
MILWAUKEE
RACINE
Bayside
Brown Deer
River Hills
Fox Point
Glendale
Whitefish Bay
Shorewood
Wauwatosa
Milwaukee
West Milwaukee
West Allis
Greenfield
St. Francis
Hales Corners
Greendale
Cudahy
South Milwaukee
Franklin
Oak Creek
Lake Michigan
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
Milwaukee Estuary AOC
MN
WI
MI
NY
PA
IL
IN
OH
GLASP
0 1 2 3 4 5
Miles

Table 5.5-B TRI Releases (in pounds, 2001) for the Milwaukee Estuary AOC

DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.0046746	No data	0	0	0.0046746	0.0147735	0.0194481
(PCDDs and PCDFs)	3							
LEAD	8	4264.64	15	0	10	4289.64	16968.4377	21258.0777
LEAD COMPOUNDS	8	1434.476	2695.3	0	1954	6083.776	7415.59	13499.366
MERCURY COMPOUNDS	9	139.4	0.014	0	7.1	146.514	45.9468674	192.4608674
	Total IJC	5838.520675	2710.3	0	1971.1	10519.93467	24429.98934	34949.92402
1,2,4-TRIMETHYLBENZENE		8962	0	0	0	8962	0	8962
4,4'-ISOPROPYLIDENE-DIPHENOL		557	No data	0	0	557	4043	4600
ACETALDEHYDE		111694	5	0	0	111699	No data	111699
ACRYLIC ACID		757	No data	0	0	757	0	757
ACRYLONITRILE		5	No data	0	0	5	1308	1313
ALUMINUM (FUME OR DUST)		6026	No data	0	0	6026	102422	108448
AMMONIA		34009	1000	0	14	35023	0	35023
ANTIMONY COMPOUNDS		1	No data	0	0	1	0	1
ARSENIC COMPOUNDS		10	No data	0	0	10	10397	10407
BARIUM		13	No data	0	0	13	1218	1231
BARIUM COMPOUNDS		3500	29	0	140000	143529	921900	1065429
BENZENE		330	0	0	0	330	0	330
BENZO(G,H,I)PERYLENE		10.85	No data	0	0.21	11.06	1.2679	12.3279
BUTYL ACRYLATE		1620	No data	0	0	1620	0	1620
CADMIUM COMPOUNDS		10	No data	0	0	10	6998	7008
CERTAIN GLYCOL ETHERS		224074	No data	0	0	224074	9882	233956
CHLORINE		255	250	0	0	505	0	505
CHLOROFORM		1000	No data	0	0	1000	0	1000
CHLOROMETHANE		6320	No data	0	0	6320	No data	6320

CHROMIUM	2024	5	0	0	2029	171376	173405
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	2958	5	0	0	2963	553545	556508
COBALT	0	No data	0	0	0	250	250
COPPER	5034	28	0	0	5062	33563	38625
COPPER COMPOUNDS	584	4800	0	3850	9234	30414	39648
CUMENE HYDROPEROXIDE	0	No data	0	0	0	272	272
CYANIDE COMPOUNDS	505	No data	0	0	505	0	505
CYCLOHEXANE	1200	No data	0	0	1200	0	1200
DICHLOROMETHANE	25705	No data	0	0	25705	7897	33602
DIETHANOLAMINE	16	No data	0	0	16	257	273
DIISOCYANATES	10	No data	0	0	10	2167	2177
EPICHLOROHYDRIN	526	No data	0	0	526	0	526
ETHYL ACRYLATE	603	No data	0	0	603	0	603
ETHYLBENZENE	5163	0	0	0	5163	7	5170
ETHYLENE GLYCOL	250	No data	0	0	250	0	250
FORMIC ACID	5424	0	0	0	5424	0	5424
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)	924255	No data	0	0	924255	0	924255
HYDROGEN FLUORIDE	401319	No data	0	0	401319	0	401319
MANGANESE	7148	10	0	0	7158	291841	298999
MANGANESE COMPOUNDS	249	11	0	38000	38260	71685	109945
METHANOL	26511	No data	0	0	26511	0	26511
METHYL ETHYL KETONE	24035	No data	0	0	24035	1	24036
METHYL ISOBUTYL KETONE	90108	No data	0	0	90108	0	90108
METHYL METHACRYLATE	6457	No data	0	0	6457	0	6457
METHYL TERT-BUTYL ETHER	755	No data	0	0	755	0	755
NAPHTHALENE	1833	No data	0	0	1833	0	1833
N-BUTYL ALCOHOL	43410	No data	0	0	43410	152	43562

N-HEXANE		3706	0	0	0	3706	0	3706
NICKEL		2223	10	0	0	2233	57949	60182
NICKEL COMPOUNDS		577	1205	0	0	1782	28801	30583
NITRATE COMPOUNDS		571	64	0	17	652	1530	2182
NITRIC ACID		3908	No data	0	250	4158	1000	5158
N-METHYL-2-PYRROLIDONE		21033	No data	0	0	21033	0	21033
OZONE		0.075	0	0	0	0.075	No data	0.075
PHENOL		0	No data	0	0	0	189	189
PHTHALIC ANHYDRIDE		376	No data	0	0	376	2374	2750
POLYCYCLIC AROMATIC COMPOUNDS		893.87	0	0	1.21	895.08	7.146	902.226
SILVER		0	No data	0	0	0	5	5
SODIUM NITRITE		0	No data	0	0	0	5916	5916
STYRENE		47732	No data	0	0	47732	3924	51656
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		45331	No data	0	1500	46831	0	46831
TETRACHLORO-ETHYLENE		12200	No data	0	0	12200	0	12200
TOLUENE		88873	1	0	0	88874	22	88896
TRICHLOROETHYLENE		18684	No data	0	0	18684	0	18684
TRIETHYLAMINE		255	No data	0	0	255	0	255
VANADIUM COMPOUNDS		571	No data	0	5500	6071	35780	41851
XYLENE (MIXED ISOMERS)		68958	1	0	0	68959	37	68996
ZINC COMPOUNDS		2824	1593	0	2600	7017	94166	101183
	Total Non-IJC	2293951.795	9017	0	191732.42	2494701.215	2453296.414	4947997.629
	Total	2299790.316	11727.314	0	193703.52	2505221.15	2477726.403	4982947.553

Table 5.5-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Milwaukee Estuary AOC

Critical IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	3			
Milwaukee County, WI	3	OAK CREEK POWER PLANT	53154KCRKP4801E	OAK CREEK
		VALLEY POWER PLANT	53233VLLYP1035W	MILWAUKEE
		WABASH ALLOYS L.L.C.	53154BSHLL9100S	OAK CREEK
Lead and lead compounds	34			
Milwaukee County, WI	34	ACME GALVANIZING INC.	53215CMGLV2730S	MILWAUKEE
		ALUMINUM CASTING & ENG. CO.	53207LMNMC2039S	MILWAUKEE
		ARTISTIC PLATING	53212RTSTC428WV	MILWAUKEE
		COOPER POWER SYS. KYLE DISTRIBUTION SWITCHGEAR	53172CPRPW2800N	SOUTH MILWAUKEE
		DELPHI DELCO ELECTRONICS SYS. MILWAUKEE	53154DLCLC7929S	OAK CREEK
		DYNASTY DIV. C&D TECHS.	53212JHNSN900EK	MILWAUKEE
		EGS ELECTRICAL GROUP APPLETON	53172PPLTN2105S	SOUTH MILWAUKEE
		EVERBRITE INC.	53172VRBRT315MA	SOUTH MILWAUKEE
		GE CO. MEDICAL SYS.	53219GMDCL4855W	WEST MILWAUKEE
		GE MEDICAL SYS. INFORMATION TECHS.	53223MRQTT8200W	MILWAUKEE
		GREDE FOUNDRIES INC. LIBERTY PLANT	53213GRDFN6432W	WAUWATOSA
		GREDE FOUNDRIES INC. MILWAUKEE STEEL FNDY.	53204GRDFN1320S	MILWAUKEE
		JOHNSON CONTROLS BATTERY GROUP INC.	53209JHNSN5400N	MILWAUKEE
		KRAMER INTL. INC.	53204KZMRN114EP	MILWAUKEE
		KRONES INC.	53132KRNSN9600S	FRANKLIN

		MASTER LOCK CO.	53210MSTRL2600N	MILWAUKEE
		MID-CITY FNDY.	53204MDCTY1521W	MILWAUKEE
		MILWAUKEE COUNTY POWER PLANT	53226MLWKC9250W	WAUWATOSA
		MILWAUKEE DUCTILE IRON INC.	53214BRGGS1706S	WEST ALLIS
		MILWAUKEE ELECTRONICS CORP.	53209PHLPS5855N	GLENDALE
		MILWAUKEE GRAY IRON L.L.C.	53214BRGGS1501S	WEST ALLIS
		OAK CREEK POWER PLANT	53154KCRKP4801E	OAK CREEK
		PHOENIX ENGINEERED PRODS. INC.	53207PHNXN1924S	MILWAUKEE
		PRESSED STEEL TANK CO. INC.	53214PRSSD1445S	WEST ALLIS
		ROCKWELL AUTOMATION INC.	53204LLNBR1201S	MILWAUKEE
		ROCORE INDS. INC.	53132RCRND9845S	FRANKLIN
		STROH DIE CASTING CO. INC.	53222STRHD11123	WAUWATOSA
		STUDIO ONE ART GLASS INC.	53172STDNR1333M	SOUTH MILWAUKEE
		TULIP CORP.	53212TLLCR714EK	MILWAUKEE
		UNIT DROP FORGE CO. INC.	53219NTDRP1903S	MILWAUKEE
		VALLEY POWER PLANT	53233VLLYP1035W	MILWAUKEE
		VULCAN LEAD INC.	53204VLCNL1400W	MILWAUKEE
		WABASH ALLOYS L.L.C.	53154BSHLL9100S	OAK CREEK
		WISCONSIN PAPERBOARD CORP.	53211WSCNS1514E	MILWAUKEE
Mercury and mercury compounds	2			
Milwaukee County, WI	2	OAK CREEK POWER PLANT	53154KCRKP4801E	OAK CREEK
		VALLEY POWER PLANT	53233VLLYP1035W	MILWAUKEE

5.6. Sheboygan River AOC, Sheboygan County, WI

The Sheboygan River AOC consists of the lower Sheboygan River downstream from the Sheboygan Falls Dam, and includes the entire harbor and near shore waters of Lake Michigan (see AOC map at end of chapter and in Appendix 1).

5.6.1. Hazardous Waste Sites Relevant to the Sheboygan River AOC

ATSDR has evaluated the data for two hazardous waste sites in Sheboygan County, WI, and reached conclusions regarding the public health threat posed by these sites, which are summarized in Table 5.6-A, along with information regarding the type and location of the site, and the date and type of assessment document.

Table 5.6 -A Hazardous Waste Sites in Sheboygan County, WI

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Kohler Company Landfill, Kohler WID006073225	HA HA	1989 1995	3 2	NPL	Completed

2 = Public Health Hazard, 3 = Indeterminate Public Health Hazard

HA = Public Health Assessment

Further evaluation of the data for these sites was conducted by ATSDR and is summarized in the following section.

5.6.1.1 Kohler Company Landfill

This 40-acre landfill is a disposal site for the Kohler Company, a manufacturer of bathroom fixtures and small engines. The site lies adjacent to the floodplain of the Sheboygan River. The east half of the landfill was built in the historic floodplain, but now is filled up to 40 feet above its original elevation. The Sheboygan River, which empties into Lake Michigan 4.2 miles downstream of the site, borders the site on the south and east. Past disposal practices (mid 1950s through the 1970s) included pouring liquid slurries containing solvents, hydraulic oils, and metals into pits on the site, and filling the remainder with foundry sand and other solid and hazardous wastes. Starting in 1975, liquid hazardous wastes were no longer disposed at the site, and since 1980, solid hazardous wastes were no longer disposed at the site

Demographic Data: Demographic profile, from the 2000 U.S. Census, for vulnerable populations living within one mile of this site:

Children 6 years and younger	119
Females aged 15-44	310
Adults 65 and older	184

ATSDR Conclusions: In the 1989 public health assessment ATSDR characterized this site as an *Indeterminate Health Hazard* (Category 3). In 1995, ATSDR characterized this site as a *Public Health Hazard* (Category 2) because PCBs in the floodplain and sediments adjacent to the

Kohler Company Landfill posed a health hazard due to bioaccumulation through the food chain. Whether the PCB contamination is site-related is uncertain.

PCBs have been found at high concentrations (above the FDA standard of 2 ppm) in fish from the Sheboygan River and at even higher concentrations in tissues of mallard ducks caught in Sheboygan County. Advisories have been issued not to consume some species of fish and ducks.

PCBs have been found at levels of concern in waste and soil of the landfill. It is not known whether PCBs have migrated to leachate or are present in surface water runoff, because these media have not been monitored for PCBs. Leachate flows toward the river, and surface water runoff drains directly into the Sheboygan River. PCBs were found in unfiltered samples from the shallow aquifer groundwater monitoring wells. Groundwater flow appears to be toward the river. There is a significant source of PCBs upstream from the Kohler Landfill, so the source of PCBs in the floodplain and sediments adjacent to the Kohler Company Landfill is uncertain. VOCs (including vinyl chloride) and lead are present in groundwater at levels of concern, but the groundwater is not used as well water, and its discharge into the river will not result in harmful levels of exposure to people who swim or fish in the river. Remedial activities completed since ATSDR's 1995 assessment include installation of a multi-layer soil cap over the entire landfill, collection of groundwater and leachate within a perimeter drain along the southern and eastern margins of the landfill, and pumping of the collected groundwater and leachate to the city of Sheboygan's publicly-owned treatment works. Thus, future impacts of the site have been minimized.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutants PCBs, as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.6.2. TRI Data for the Sheboygan River AOC

The TRI onsite chemical releases for Sheboygan County are summarized in Table 5.6-B. Total onsite releases in 2001 were 575,909 pounds, the majority of which were released to air.

IJC-critical pollutants accounted for 9,695 pounds (1.7%) of the total onsite releases. The IJC-critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (primarily to air), and mercury (to air). The facilities that released these pollutants are listed in Table 5.6-C.

The highest onsite release of non-IJC chemicals was of hydrochloric acid aerosols (300,548 pounds) to air. No other chemicals were released in quantities ≥ 150,000 pounds.

5.6.3. NPDES Data for the Sheboygan River AOC

The NPDES permitted discharges for Sheboygan County, WI are summarized in Table 5.6-D. The total average annual permitted discharges in 2004 were 7,760 pounds, the majority of which was ammonia nitrogen.

The IJC-critical pollutant lead (65.7 pounds) was permitted to be discharged. The facility permitted to release this pollutant is listed in Table 5.6-E.

5.6.4. Summary and Conclusions for the Sheboygan River AOC Hazardous Waste Sites

5.6.4.1 Hazardous Waste Sites

Only one hazardous waste site in Sheboygan County, WI, was assessed by ATSDR. This site, the Kohler Company Landfill was associated with PCBs. It has been remediated by containment and is no longer expected to contribute to human or environmental exposures.

5.6.4.2 TRI Data

The TRI onsite chemical releases for Sheboygan County in 2001 were 575,909 pounds, the majority of which were released to air.

IJC critical pollutants accounted for 9,695 pounds (1.7 %) of the total onsite releases. The IJC critical pollutants released were PCDDs and PCDFs (to air), lead and lead compounds (primarily to air), and mercury (to air).

The highest onsite release of non-IJC chemicals was of hydrochloric acid aerosols (300,548 pounds) to air. No other chemicals were release in quantities ≥ 150,000 pounds.

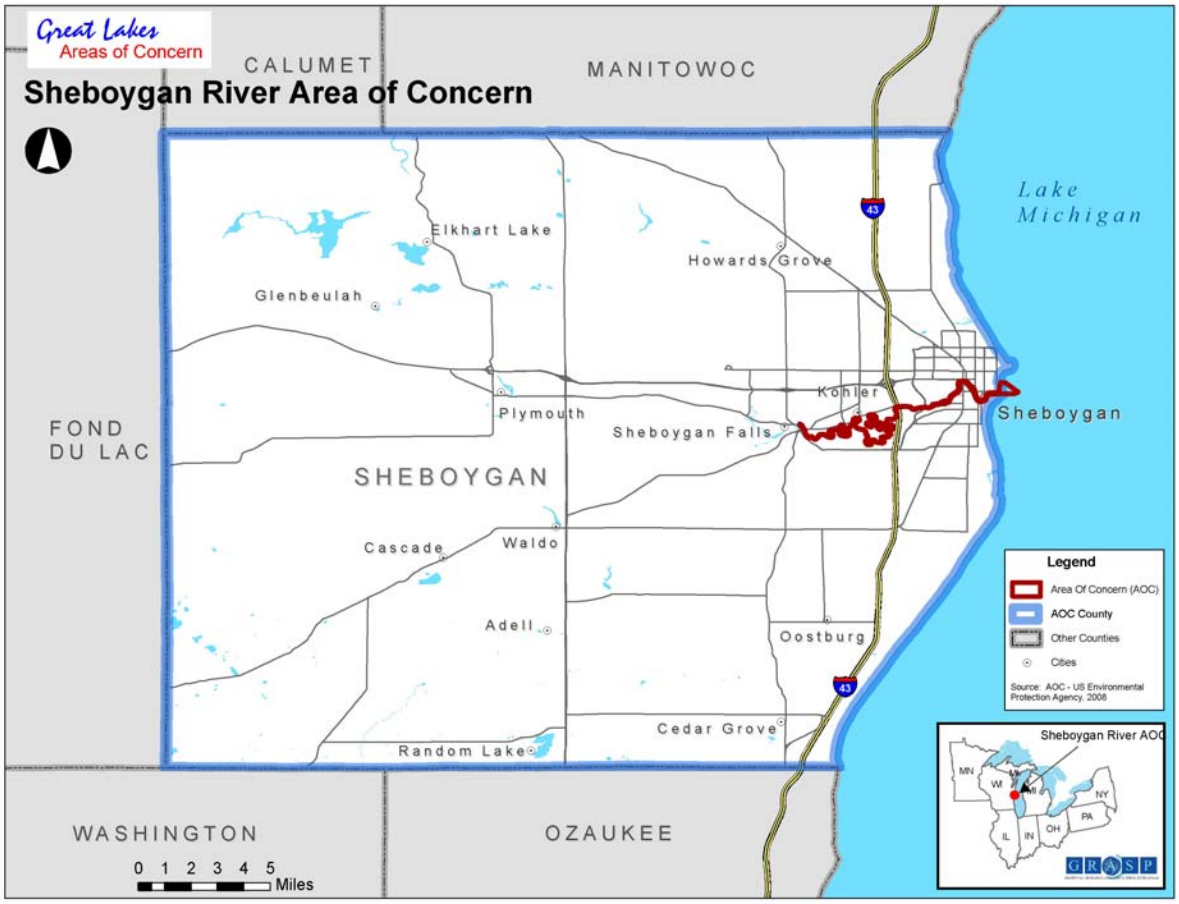
5.6.4.3 NPDES Data

The NPDES permitted discharges for Sheboygan County, WI are summarized in Table 5.6-E. The total average annual permitted discharges in 2004 were 7,760 pounds, the majority of which was ammonia nitrogen.

The IJC critical pollutant lead (65.7 pounds) was permitted to be discharged. The facility permitted to release this pollutant is listed in Table 5.6-F.

5.6.4.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed for this AOC site. PCB concentrations in river sediment are cited as contributing to the problem. A No fish consumption advisory is in effect for resident fish in the Sheboygan River. Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).


Great Lakes
Areas of Concern
Sheboygan River Area of Concern
CALUMET
MANITOWOC
Lake
Michigan
Elkhart Lake
Howards Grove
Glenbeulah
Kohler
Sheboygan
Plymouth
Sheboygan Falls
FOND
DU LAC
SHEBOYGAN
Cascade
Waldo
Adell
Oostburg
Cedar Grove
Random Lake
WASHINGTON
OZAUKEE
0 1 2 3 4 5
Miles
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency. 2008
Sheboygan River AOC
MN
WI
NY
PA
IL
IN
OH
GRASP

5.6-B TRI Releases (in pounds, 2001) for the Sheboygan River AOC

Chemical	IJC Tracking Number	Total Air Emissions	Surface Water Discharges	Under-ground Injection	Releases to Land	Total Onsite Releases	Total Offsite Releases	Total On- and Offsite Releases
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.009368604	No data	0	0	0.009368604	0	0.009368604
(PCDDs and PCDFs)	3							
LEAD	8	9319.238	14.85	0	8.5	9342.588	11332.45	20675.038
LEAD COMPOUNDS	8	124	0	0	0	124	7007	7131
MERCURY	9	228.22	0	0	0	228.22	40.6	268.82
	Total IJC	9671.467369	14.85	0	8.5	9694.817369	18380.05	28074.86737

Table 5.6-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Sheboygan River AOC

Critical IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	1			
Sheboygan County, WI	1	EDGEWATER GENERATING STATION	53082DGWTR3739L	SHEBOYGAN
Lead and lead compounds	13			
Sheboygan County, WI	13	EDGEWATER GENERATING STATION	53082DGWTR3739L	SHEBOYGAN
		J. L. FRENCH CORP. TYLR	53082JLFRN3101S	SHEBOYGAN
		J.L. FRENCH CORP. GTWY	53081JLFRN4243G	SHEBOYGAN
		KOHLER CO. - VITREOUS CHINA & POTTERY	53044KHLRC444HB	KOHLER
		KOHLER CO. BRASS DIV.	53044KHLRC444HC	KOHLER
		KOHLER CO. CAST IRON DIV.	53044KHLRC444HA	KOHLER
		KOHLER POWER SYS. AMERICAS	53083KHLRCCOUNT	SHEBOYGAN
		MILLENNIUM TECHS. L.L.C.	53073MLLNM1404P	PLYMOUTH
		PLASTICS ENG. CO.	53081PLSTC1607G	SHEBOYGAN
		PLASTICS ENG. CO.	53083PLSTC2732N	SHEBOYGAN
		SHEBOYGAN PAINT CO.	53081SHBYG1439N	SHEBOYGAN
		THOMAS COMPRESSORS & VACUUM PUMPS	53081THMSN1419I	SHEBOYGAN
		WILLMAN INDS. INC.	53013WLLMN338SM	CEDAR GROVE
Mercury and mercury compounds	1			
Sheboygan County, WI	1	EDGEWATER GENERATING STATION	53082DGWTR3739L	SHEBOYGAN

Table 5.6-D NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Sheboygan River AOC

Chemical	IJC Tracking Number	Discharge
LEAD, TOTAL (AS PB)	8	65.7
	Total IJC	65.7
CADMIUM, TOTAL (AS CD)		10.95
CHROMIUM, TOTAL (AS CR)		259.15
COPPER, TOTAL (AS CU)		313.90
CYANIDE, TOTAL (AS CN)		98.55
NICKEL, TOTAL (AS NI)		361.35
NITROGEN, AMMONIA TOTAL (AS N)		6387.50
SILVER, TOTAL (AS AG)		36.50
ZINC, TOTAL (AS ZN)		226.30
	Total Non-IJC	7694.20
	Total	7759.90

Table 5.4-E NPDES Facilities Permitted to Discharge IJC Critical Pollutants , Sheboygan River AOC

IJC Critical Pollutant	Number of Facilities	Facility Name	NPDES	City
Lead and lead compounds	1			
Sheboygan County, WI	1	KOHLER CO	WI0000795	KOHLER

5.7. Lower Green Bay and Fox River AOC (Fox River/Southern Green Bay AOC), Brown County, WI

In addition to the names listed in the heading to this section, this AOC also is called the Lower Fox River and Green Bay AOC. The AOC consists of the lower 11.2 km of the Fox River below the De Pere Dam, as well as a 55 km^2 area of southern Green Bay out to Point au Sable and Long Tail Point (see AOC map at end of chapter and in Appendix 1).

5.7.1. Hazardous Waste Sites Relevant to the Sheboygan River AOC

ATSDR has evaluated the data for hazardous waste sites in Brown County, WI, and reached conclusions regarding the public health threat posed by these sites, which is summarized in Table 5.7-A, along with information regarding the type and location of the site, and the date and type of assessment document.

Table 5.7 -A Hazardous Waste Sites in Brown County, WI

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Better Brite Plating Co. Chrome and Zinc, De Pere, WIT560010118	HC SRU	1996 1998	2 2	NPL	Completed
Fox River NRDA/PCB Releases, Green Bay WI0001954841	HA	2006	2	Proposed to the NPL	Ongoing
Econo Care Cleaners, Green Bay WID065453730	HC	2006	3	Non NPL	To be Determined
Scray's Hill, Ledgeview WIN000508277	HC	2002	3	Non NPL	To be Determined
V & L Stripping, Green Bay WID168105591	HC	2003	3	Non NPL	To be Determined

2 =Public Health Hazard 3= Indeterminate Public Health Hazard

HA = Public Health Assessment, HC =Health Consultation, SRU=Site Review and Update

ATSDR has conducted further evaluation of the site data, which is summarized in the following section

5.7.1.1 Better Brite Plating Co.

The two properties, Better Brite Chrome and Better Brite Zinc shops are located about 2,000 feet apart in a mixed industrial and residential neighborhood in the De Pere, Brown County, Wisconsin. Chromium, Cadmium, zinc, cyanide, and chlorinated organic solvents were used in metal plating operations at the shops from 1963 through 1989. Waste disposal practices at the two businesses caused contamination of soil, air, surface water, and groundwater.

The site was the subject of three ATSDR assessments including a 1991 Public Health Assessment, a 1996 Health Consultation that evaluated seepage into a residential basement, and a 1998 Site Review and Update.

Demographic Data: Demographic profile from the 2000 U.S. Census for vulnerable populations living within 1 mile of this site:

Children 6 years and younger	893
Females aged 15-44	3,040
Adults 65 and older	1,338

ATSDR Conclusions: Chromium, and particularly chromium (VI), as well as cyanide, VOCs, and zinc were associated with the site. Chromium (VI) has been detected in groundwater, surface water, and soil offsite.

In its three assessments of the site, ATSDR categorized this site as a *Public Health Hazard* (Category 2). It remains an active ATSDR site with a Category 2 classification, however the 1998 Site Review and Update indicates that the immediate health hazards have been addressed while actions to address future health hazards are being planned

Chromium (VI) remains a problem at this site. ATSDR has recommended that residential and worker contact with chromium (VI) be restricted and handling of contaminated matter (water or soil) be done in a manner to prevent exposure.

As of 1998 contaminants in subsurface soil continued to migrate into the groundwater and therefore posed a possible future health risk to people who may contact water as it comes to the surface, accumulates in sumps of nearby basements, or crystallizes on basement walls near the site. Remediation occurred in 2000. Groundwater monitoring continues annually.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant lead, as well as other contaminants previously discussed, was identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.7.1.2 Econo Care

The Econocare site is a vacant lot in a mixed residential and industrial neighborhood where a former dry cleaning facility operated. Groundwater underneath the site and the nearby residential area is contaminated with tetrachloroethylene (PCE). There is concern that low levels of PCE may migrate and intrude into the indoor air of nearby residences.

ATSDR Conclusions: In 2006 ATSDR concluded that there is an *Indeterminate Health Hazard* (Category 3) for nearby residents. More information is needed to confidently determine the amount of exposure from vapor intrusion into indoor air. PCE contamination underneath the

vacant lot poses a future health hazard via vapor intrusion into indoor air if residences are placed on the property.

The contaminants of concern are tetrachloroethylene (PCE) and trichloroethylene (TCE). The completed exposure pathway at this site is inhalation of PCE via vapor intrusion from contaminated soil and groundwater beneath residential properties south of Econocare into the indoor air of nearby residences. Ingestion of the contaminated groundwater is not a completed exposure pathway since residents obtain their water from municipal sources that are not impacted by this contamination. As of March 2008 no remedial activities had been conducted.

IJC Critical Pollutants Identified within ATSDR Documents: None of the IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues.

5.7.1.3 Fox River NRDA/PCB Releases

The Fox River Natural Resources Damage Assessment (NRDA)/PCB Releases site includes the Lower Fox River from Lake Winnebago downstream to the bay of Green Bay in Lake Michigan. The Lower Fox River has the highest concentration of pulp and paper mills in the world. Sediments in the Lower Fox River are contaminated with PCBs released into the river from seven pulp and paper companies located along its banks. This site is the greatest contributor of PCBs to Lake Michigan. It is estimated that approximately 600,000 pounds of PCBs were released to the river, of which 160,000 pounds have entered Green Bay and Lake Michigan. Although the pulp and paper mills stopped releasing PCBs into the river in the early 1970s, the contamination persists, and has been bioaccumulated in the food chain. Fish consumption advisories were issued in 1976, and are still in effect for many fish species. Approximately 90% of the total PCB mass and a large percentage of the contaminated sediments are located in the final stretch of river from the De Pere Dam downstream to the river's mouth at Green Bay.

Demographic Data: Demographic profiles from the 2000 U.S. Census for vulnerable populations living within 1 mile of the Fox River Paper Company site are as follows:

Children 6 years and younger	57
Females aged 15-44	112
Adults 65 and older	140

Demographic profiles for vulnerable populations for the entire site were not provided. According to the ATSDR health assessment, the total population residing in the communities along the river is approximately 270,000, so the vulnerable populations are likely to be much larger than shown for the Fox River Paper Company.

ATSDR Conclusions: Because of exposure to PCBs at levels of concern from eating contaminated fish from the area, ATSDR categorized this site as a Public Health Hazard (Category 2).

The primary public health hazard for the Fox River NRDA/PCB Releases site is high levels of PCBs in fish, due to bioaccumulation in the food chain from PCB-contaminated sediment. Fish advisories have been issued, but some people may not be aware and may be exposed to PCBs at levels that may cause adverse health effects through eating the fish. Eating other PCB-contaminated wildlife, such as waterfowl and snapping turtles, may also be of health concern, but less is known about consumption frequency. Concentrations of PCBs in sediments were judged not high enough to be a health concern through pathways other than accumulating in fish.

Initial remediation of PCB-contaminated sediment, dredging and capping, began in 2000 and is on-going.

IJC Critical Pollutants Identified within ATSDR Document: The IJC critical pollutant PCBs, as well as other contaminants previously discussed was identified at this site during ATSDR's assessment of exposure related issues. For a more complete listing of the hazardous substances that were found at this site, please refer to www.epa.gov/superfund/sites/npl/npl.htm.

5.7.1.4 Redevelopment of Scray Hill Road Property

The 40-acres Scray Hill Road Property is located in the town of Ledgeview in Brown County, Wisconsin. The Wisconsin Department of Health and Family Services (WDHFS) were requested to evaluate a redevelopment proposal for the Paul Van Dreel Property on Scray Hill Road. The town proposed to use this former salvage yard for a water storage and distribution facility for its planned public water supply system. The property was not sampled, and a review of historic records did not mention any spill on the property. Because the intended future use of the property would not result in exposure opportunities, the redevelopment proposal is expected to be protective of public health.

Demographic Data: Children 6 years old or under in the "Grand Haven" Area from the Zip Code 48212 were tested for elevated Blood Lead Levels (BLLs).

Children 6 years and younger	22132
Females aged 15-44	Not Reported
Adults 65 and older	Not Reported

ATSDR Conclusions: The lack of environmental data makes it difficult to determine potential public health risk, thus for this reason this site is an *Indeterminate Public Health Hazard* (Category 3). In 2002, Wisconsin Department of Health and Family Services (WDHFS) and ATSDR concluded that the proposed redevelopment of this property is not expected to create a public health hazard. WDHFS also advised that locating a public water system reservoir and supporting infrastructure on this property would not compromise the quality or safety of the water supply.

Surface soil contamination in salvage yard (commonly metals and PAHs) can potentially pose a direct contact threat if frequent access to them is not controlled. Because limited mobility of these potential contaminants, direct contact exposures are generally easily prevented. If hot spots of solvent contamination exist on the property, there might be broader implications to off –site protection of groundwater / drinking water without affecting the use of the property itself.

The City of Ledgeview and Wisconsin Department of Natural Resources agree to follow the redevelopment plan and take the appropriate precautions as recommended, and ensure any construction and redevelopment of the property is protective of public health.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutant, heavy metals and PAHs were mentioned at this site during ATSDR's assessment but because no sampling data was available exposure assessments could not be addressed.

5.7.1.5 V & L Stripping (aka Ken Juza property)

This site is a former dry cleaning business with previously confirmed groundwater and soil contamination. The primary contaminants of concern are chlorinated solvents including

tetrachloroethylene, trichloroethylene, and other related contaminants. Based on Wisconsin Department of Natural Resources (DNR) review of the groundwater and soil investigation, some source of remediation will be needed at the site. After reviewing the site investigation data for soil and groundwater at this site, The Wisconsin Department of Health and Family Services and DNR recommended additional sampling to better characterize the vapor intrusion pathway from the site to nearby residences. Information on this site is taken from the 2003 ATSDR health consultation.

ATSDR Conclusions: In 2003, ATSDR concluded tetrachloroethylene from the V&L Stripping site impacts soil vapor on two neighboring residential properties. On-going exposure poses an I*ndeterminate Public Health Hazard* (Category 3). Existing data were collected during summer months. Levels in the indoor air could be higher at levels of concern during winter. Remediation of the source area on the site would likely lower the risk of off-site vapor migration. It is unlikely that additional investigation would allow us to rule out vapor intrusion as a source of human exposure at the nearby residence where low levels of tetrachloroethylene were found. The soil vapor sample collected at the residence across the alley indicates a very low potential for vapor intrusion into the home on that property. Additional sampling may rule out this pathway. Remediation of the source area may also result in eliminating this potential migration pathway. State DNR and responsible party have agreed to implement vapor treatment system recommendation.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC critical pollutants were identified during ATSDR's assessment of exposure related issues.

5.7.2. TRI Data for the Lower Green Bay and Fox River AOC

The TRI onsite chemical releases for Brown County, WI, are summarized in Table 5.7-B. Total onsite releases in 2001 were 2,866,676 pounds, the majority of which were released to air, followed by releases to land and surface water.

IJC critical pollutants accounted for 15,619 pounds (0.5 %) of the total onsite releases. The IJC critical pollutants released were PCBs (to air), PCDDs and PCDFs (primarily to air), lead and lead compounds (primarily to air and land) and mercury compounds (primarily to air). The facilities that released these pollutants are listed in Table 5.7-C.

The major onsite releases (≥ 500,000 pounds) of non-IJC chemicals were of barium compounds (primarily to land), and sulfuric acid aerosols (to air). The next largest releases (300,000-499,999 pounds) were of hydrochloric acid aerosols (to air) and nitrate compounds (primarily to surface water.

5.7.3. NPDES Data for Lower Green Bay and Fox River AOC

The NPDES permitted discharges for Brown County, WI are summarized in Table 5.7-D. The total average annual permitted discharges in 2004 were only 0.12 pounds, for iodine. No IJC critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.7.4. Summary and Conclusions for the Lower Green Bay and Fox River AOC

5.7.4.1 Hazardous Waste Sites

Five hazardous waste sites in the Lower Green Bay & Fox River AOC have been assessed by ATSDR with health hazard categories between 2–3. One has completed remedial activities and is no longer expected to contribute to human or environmental exposure. One site has ongoing remedial activities, and activity for remediation for the remaining three sites has yet to be determined.

5.7.4.2 TRI Data

The TRI onsite chemical releases for Brown County, WI, in 2001 were 2,866,676 pounds, the majority of which were released to air, followed by releases to land and surface water.

IJC critical pollutants accounted for 15,619 pounds (0.5 %) of the total onsite releases. The IJC critical pollutants released were PCBs (to air), PCDDs and PCDFs (primarily to air), lead and lead compounds (primarily to air and land), and mercury compounds (primarily to air).

The major onsite releases (≥ 500,000 pounds) of non-IJC chemicals were of barium compounds (primarily to land) and sulfuric acid aerosols (to air). The next largest releases (300,000–499,999 pounds) were of hydrochloric acid aerosols (to air) and nitrate compounds (primarily to surface water.

5.7.4.3 NPDES Data

The NPDES permitted discharges for Brown County, WI are summarized in Table 5.7-E. The total average annual permitted discharges in 2004 were only 0.12 pounds, for iodine. No IJC critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.7.4.4 Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption and drinking water are listed as impaired at this AOC site. Consumption advisories cover 12 species of fish and mallard ducks. The USEPA site does not provide information about drinking water consumption restrictions. Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

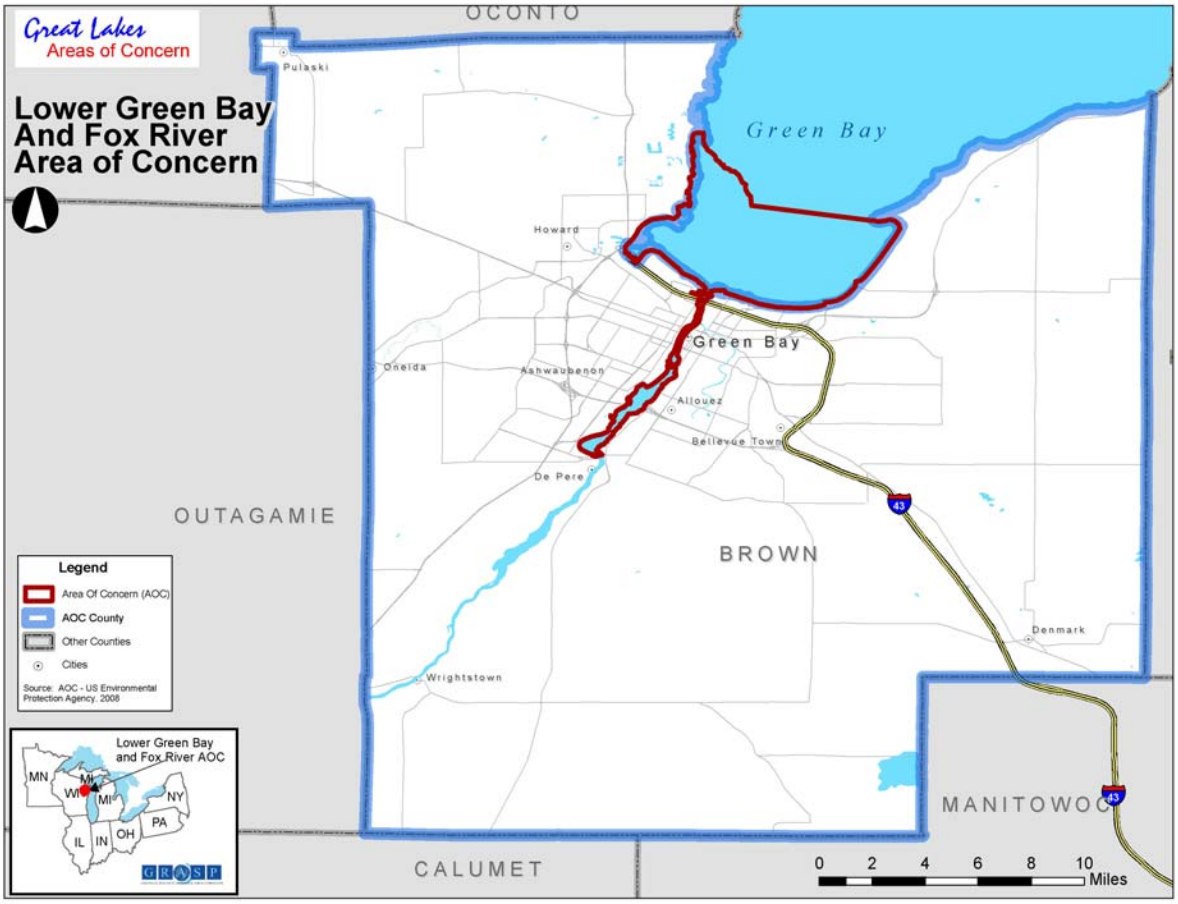

Great Lakes
Areas of Concern
Lower Green Bay
And Fox River
Area of Concern
OCONTO
Pulaski
Green Bay
Howard
Green Bay
Oneida
Ashwaubenon
Allouez
Bellevue Town
De Pere
OUTAGAMIE
BROWN
Denmark
Wrightstown
MANITOWOC
CALUMET
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
Lower Green Bay and Fox River AOC
MN
WI
MI
NY
PA
OH
IN
IL
GLASP
0 2 4 6 8 10
Miles

Table 5.7-B TRI Releases (in pounds, 2001) for the Lower Green Bay and Fox River AOC

POLYCHLORINATED BIPHENYLS	1	2.15	0	0	0	2.15	79	81.15
DIOXIN AND DIOXIN-LIKE COMPOUNDS	2	0.014174622	0.00000154	0	0	0.014176166	0.00034398	0.014520146
(PCDDs and PCDFs)	3							
LEAD	8	64.106	No data	0	1895	1959.106	3304.105	5263.211
LEAD COMPOUNDS	8	6285.346	12.7	0	7194	13492.046	6993.295	20485.341
MERCURY COMPOUNDS	9	128.1	0.7	0	36.7	165.5	11.2	176.7
	Total IJC	6479.716175	13.40000154	0	9125.7	15618.81618	10387.60034	26006.41652
1,2,4-TRIMETHYLBENZENE		186	0	0	0	186	1	187
1,3-BUTADIENE		151	No data	0	0	151	0	151
ACRYLAMIDE		201	No data	0	0	201	0	201
AMMONIA		18906	440	0	805	20151	805	20956
BARIUM COMPOUNDS		6460	59	0	580000	586519	0	586519
BENZENE		622	0	0	0	622	0	622
BIPHENYL		40000	0	0	0	40000	0	40000
CHLORINE		410	0	0	0	410	0	410
CHLOROFORM		79200	112	0	0	79312	490	79802
CHROMIUM		263	No data	0	805	1068	6181	7249
CHROMIUM COMPOUNDS (EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		5	No data	0	24700	24705	49405	74110
COPPER		1	No data	0	6644	6645	13	6658
COPPER COMPOUNDS		262	3	0	28000	28265	0	28265
ETHYLBENZENE		87	0	0	0	87	0	87
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		484708	No data	0	0	484708	0	484708
HYDROGEN		137000	0	0	0	137000	0	137000

FLUORIDE								
MANGANESE		370	No data	0	911	1281	938	2219
METHANOL		48500	0	0	0	48500	0	48500
METHYL ETHYL KETONE		6000	No data	0	0	6000	0	6000
METHYL ISOBUTYL KETONE		500	No data	0	0	500	0	500
METHYL METHACRYLATE		18347	No data	0	0	18347	0	18347
N-HEXANE		1337	0	0	0	1337	1	1338
NICKEL		47	No data	0	14	61	3236	3297
NICKEL COMPOUNDS		810	0	0	0	810	62793	63603
NITRATE COMPOUNDS		5	460213	0	0	460218	29	460247
NITRIC ACID		8795	0	0	0	8795	0	8795
PHENOL		0	No data	0	925	925	925	1850
POLYCYCLIC AROMATIC COMPOUNDS		5.7	0	0	2.5	8.2	0	8.2
PROPYLENE		111	No data	0	0	111	0	111
STYRENE		242093	No data	0	0	242093	103	242196
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		554493	No data	0	0	554493	0	554493
TOLUENE		3304	0	0	0	3304	1	3305
VANADIUM COMPOUNDS		398	2	0	23000	23400	33000	56400
VINYL ACETATE		42473	0	0	0	42473	5	42478
XYLENE (MIXED ISOMERS)		2209	0	0	0	2209	1	2210
ZINC COMPOUNDS		1160	2	0	25000	26162	24505	50667
	Total Non-IJC	1699419.7	460831	0	690806.5	2851057.2	182432	3033489.2
	Total	1705899.416	460844.4	0	699932.2	2866676.016	192819.6003	3059495.617

Table 5.7-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Lower Green Bay and Fox River AOC

Critical IJC-critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Polychlorinated biphenyls	1			
Brown County, WI	1	HALRON EAST TERMINAL	54302HLRNS2220N	GREEN BAY
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	4			
Brown County, WI	4	DEPERE FNDY. INC.	54115DPRFN805SS	DE PERE
		FORT JAMES OPERATING CO.	54307FRTHW1919S	GREEN BAY
		PROCTER & GAMBLE PAPER PRODS. CO.	54308THPRC501EA	GREEN BAY
		PULLIAM POWER PLANT	54303PLLMP1530N	GREEN BAY
Lead and lead compounds	13			
Brown County, WI	13	ASTRO INDS. INC.	54304STRND810PA	GREEN BAY
		BAY ENGINEERED CASTINGS INC.	54115BYNGN1900E	DE PERE
		DEPERE FNDY. INC.	54115DPRFN805SS	DE PERE
		FORT JAMES OPERATING CO.	54307FRTHW1919S	GREEN BAY
		FORT JAMES OPERATING CO.	54305JMSRV500DA	GREEN BAY
		FOX VALLEY METAL-TECH INC.	54304FXVLL1201P	GREEN BAY
		GREEN BAY PACKAGING INC. MILL & SHIPPING CONTAINER DIVS.	54302GRNBY1601N	GREEN BAY
		HALRON EAST TERMINAL	54302HLRNS2220N	GREEN BAY
		INTERNATIONAL PAPER - DE PERE FACILITY	54115NCLTP200MA	DE PERE
		PULLIAM POWER PLANT	54303PLLMP1530N	GREEN BAY
		SONOCO U. S. MILLS INC. DEPERE MILL	54115SNCSM800FO	DE PERE
		ULTRA PLATING	54306LTRPL345SP	GREEN

				BAY
		WESTERN LIME CORP. GREEN BAY FACILITY	54303WSTRN101JA	GREEN BAY
Mercury and mercury compounds	3			
Brown County, WI	3	FORT JAMES OPERATING CO.	54307FRTHW1919S	GREEN BAY
		GREEN BAY PACKAGING INC. MILL & SHIPPING CONTAINER DIVS.	54302GRNBY1601N	GREEN BAY
		PULLIAM POWER PLANT	54303PLLMP1530N	GREEN BAY

Table 5.7-E NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Lower Green Bay and Fox River AOC

Chemical	IJC Tracking Number	Discharge
	Total IJC	0
IODINE TOTAL		0.12
	Total Non-IJC	0.12
	Total	0.12

Chapter 6 Lake Superior

5.8. Menominee River AOC, Menominee County, MI and Marinette County, WI

The Menominee River AOC includes the lower 4.8 km of the Menominee River (from the Upper Scott Paper Company Dam to the river's mouth) and approximately 5 km north and south of the river's mouth along the shoreline of Green Bay. The AOC also includes the cities of Marinette and Menominee (see AOC map at end of chapter and in Appendix 1).

5.8.1. Hazardous Waste Sites Relevant to the Menominee River AOC

ATSDR has evaluated the data for hazardous waste sites in Menominee County, MI and Marinette County, WI, and reached conclusions regarding the public health threat posed by these sites, which is summarized in Table 5.8-A, along with information regarding the type and location of the site, and the date and type of assessment document.

Table 5.8-A Hazardous Waste Sites in Menominee County, MI and Marinette County, WI

Site Name, City, and CERCLIS ID	ATSDR Document Type	Year of Document	ATSDR Hazard Category	Site Type	Remedial Status
Ansul Company Division of Wormald US Inc, Marinette, WI WID006125215	HC	2006	2	Non-NPL	Ongoing
Marinette Sewage Treatment Plant, Marinette, WI WID980703359	HC	2005	2	Non-NPL	Ongoing

2 =Public Health Hazard, HC =Health Consultation

ATSDR has conducted further evaluation of the site data, which is summarized in the following section.

5.8.1.1 Ansul Company Division of Wormald US Inc.

ATSDR evaluated health risks from consuming fish near arsenic contaminated sediment and direct contact with those sediments and overlying surface water in the Menominee River adjacent to the Ansul Chemical property in Marinette. This question arose in the context of WDNR and US USEPA efforts to establish cleanup goals for removing the arsenic contaminated sediments. Two exposure pathways were considered: 1) fish consumption and 2) direct contact with arsenic in sediment and surface water.

ATSDR Conclusions: In 2006, ATSDR concluded that this site presented a *Public Health Hazard* (Category 2) due to the arsenic sediment adjacent to Tyco Safety Products – Ansul ("Ansul") during dredging operations to workers resulting in an acute exposure. Any shoreline changes or other changes that result in increased recreational use of arsenic-contaminated areas of the river represent a future public health hazard. The greater-than-background levels of arsenic

in sediment near the Sixth Street boat ramp are not an apparent health hazard due to the relatively low arsenic concentration and the expectation of infrequent contact. There is no apparent public health hazard with regard to arsenic in fish from the Menominee River due to the low bioavailability, toxicity, and overall concentration of the predominant forms of arsenic in fish. However, there is a current Fish Consumption Advisory based on mercury and PCB contaminants in Menominee River fish will assist in preventing exposure. Contact or accidental ingestion of arsenic in Menominee River water is not an apparent health hazard due to the low concentration. ATSDR concurred with the WDNR recommendation of 10-20 ppm as a cleanup goal for arsenic in sediment, based on the research review developed in the WDNR Consensus Based Sediment Quality Guidelines.

The responsible party confined the site access by installation of fences and installed slurry walls to prevent off site groundwater migration. Sediment remediation is pending.

IJC Critical Pollutants Identified within ATSDR Documents: No IJC critical pollutants were identified at this site during ATSDR's assessment of exposure related issues. The document does mention the Wisconsin Fish Consumption Advisory for the Menominee River based on mercury and PCBs.

5.8.1.2 Marinette Sewage Treatment Plant/Marinette Manufactured Gas Plant Brownfield Remediation.

The former Marinette Manufactured Gas Plant (MGP) operated from about 1920 to 1960. The site is now occupied by Marinette Wastewater Treatment Plant. The area surrounding the site is mixed industrial and residential. Shipping related activities are concentrated along the Menominee River waterfront. Although the area is mostly industrial, several neighborhoods maybe affected by remediation work.

ATSDR Conclusions: In 2005, ATSDR concluded that this site presented a *Public Health Hazard* (Category 2) due to current contact with tar contaminated sediments in the boat landing area. The potential release of semi-volatile organic compounds to air from staging dredge spoils represent an indeterminate health hazard to workers or visitors of adjacent ship building, marina, and wastewater treatment facilities. Dredge spoils removed from the Menominee River near Boom Island Landing are predicted to require management to prevent hydrocarbon release to air. It is unclear whether the senior residential facility and adjacent residences, located approximately 250 yards from the dredge spoils area, are sufficiently distant from the work site if releases of volatile and semi-volatile hydrocarbons are not adequately controlled during excavation and staging of dredge spoils. Therefore, the staging of dredge spoils at Boom Island Landing is an indeterminate health hazard to these residents.

Wisconsin Department of Health and Family Services (WDHFS) reviewed the Remedial Design and agreed that dredge spoils should be removed as described. WDHFS also provided additional precautions that should be taken as remediation is implemented. Upland contamination was cleaned up, but sediment contamination remains in place. As of March 2008, remediation was ongoing.

IJC Critical Pollutants Identified within ATSDR Documents: The IJC critical pollutants B(a)P, and additional PAHs as constituents of coal tar, as well as other contaminants previously discussed were identified at this site during ATSDR's assessment of exposure related issues.

5.8.2. TRI Data for the Menominee River AOC

The TRI onsite chemical releases for Menominee County, MN, and Marinette County, WI (combined) are summarized in Table 5.8-B. Total onsite releases in 2001 were 496,429 pounds, the majority of which were released to air, followed by releases to land.

IJC critical pollutants accounted for 993 pounds (0.2%) of the total onsite releases. The IJC critical pollutants released were PCDDs and PCDFs (to air and land), lead and lead compounds (primarily to air), and mercury compounds (primarily to air and land). The facilities that released these pollutants are listed in Table 5.8-C.

No non-IJC chemicals were released in quantities of at least 150,000 pounds.

5.8.3. NPDES Data for the Menominee River AOC

The NPDES permitted discharges for Menominee County, MI and Marinette County, WI are summarized in Table 5.8-D. The total average annual permitted discharges in 2004 were 34,311 pounds, most of which was phosphorus.

The IJC critical pollutant mercury (1.48 pounds) was permitted to be discharged. The facilities permitted to release this pollutant are listed in Table 5.8-E.

5.8.4. Summary and Conclusions for the Menominee River AOC

5.8.4.1 Hazardous Waste Sites

Two hazardous waste sites in Menominee County, MI, and Marinette County, WI have been categorized by ATSDR in public health hazard categories 1-3. For the Ansul Company site, remediation is under way. As of March 2008, remediation is planned but has not been initiated for the Marinette Manufactured Gas Plant.

5.8.4.2 TRI Data

The TRI onsite chemical releases for Menominee County, MN, and Marinette County, WI, (combined) in 2001 were 496,429 pounds, the majority of which were released to air, followed by releases to land.

IJC critical pollutants accounted for 993 pounds (0.2%) of the total onsite releases. The IJC critical pollutants released were PCDDs and PCDFs (to air and land), lead and lead compounds (primarily to air), and mercury compounds (primarily to air and land). No non-IJC chemicals were released in quantities of at least 150,000 pounds.

5.8.5. NPDES Data

The NPDES permitted discharges for Menominee County, MI and Marinette County, WI are summarized in Table 5.8-C. The total average annual permitted discharges in 2004 were 34,311 pounds, most of which was phosphorus.

The IJC critical pollutant mercury (1.48 pounds) was permitted to be discharged. The facilities permitted to release this pollutant are listed in Table 5.8-D.

5.8.6. Beneficial Use Impairments (BUIs)

Restrictions on fish and wildlife consumption are listed as impaired at this AOC site. No recent information regarding this impairment is provided on the USEPA website.

Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

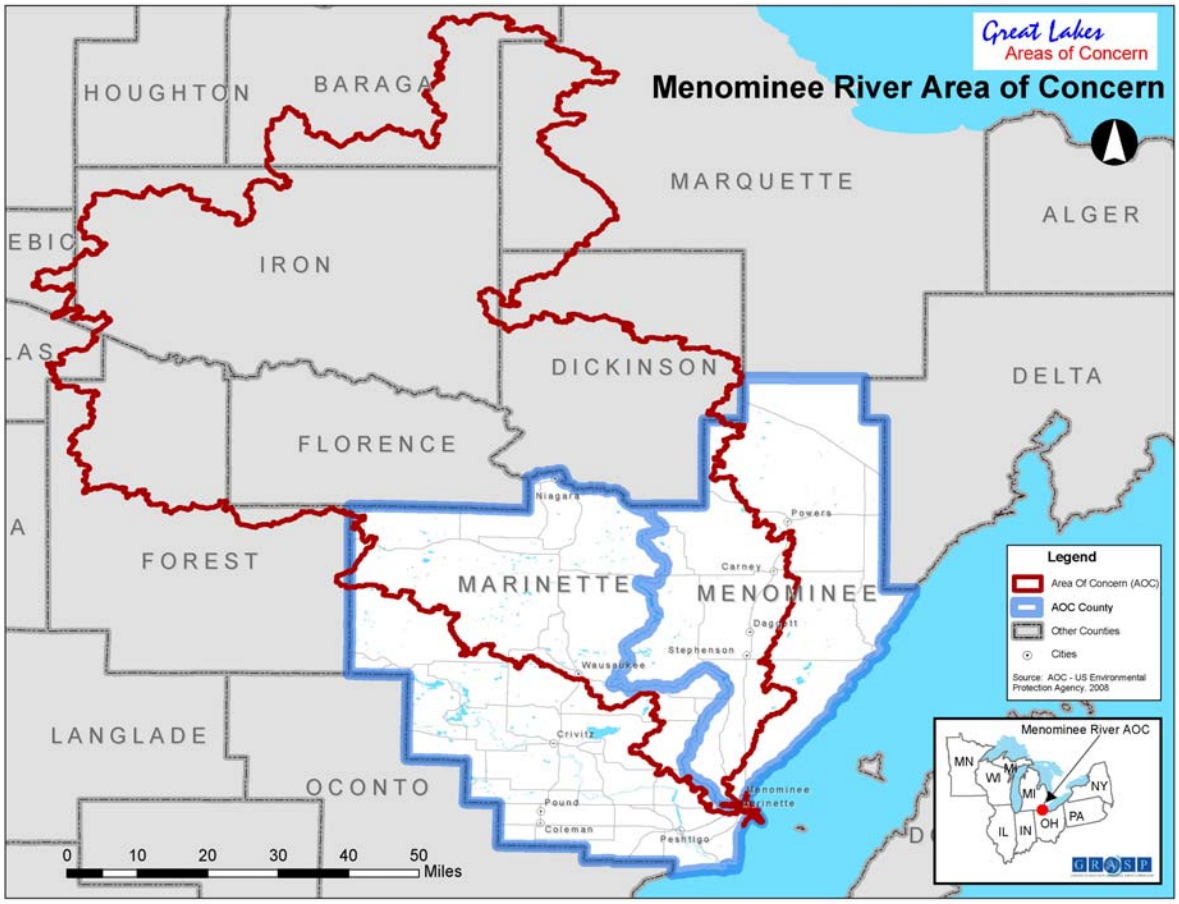

Great Lakes
Areas of Concern
Menominee River Area of Concern
HOUGHTON
BARAGA
MARQUETTE
ALGER
IRON
DICKINSON
DELTA
FLORENCE
FOREST
MARINETTE
MENOMINEE
LANGLADE
OCONTO
Niagara
Powers
Carney
Daggett
Stephenson
Wausaukee
Crivitz
Pound
Coleman
Peshtigo
Menominee
Marinette
0 10 20 30 40 50 Miles
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
Menominee River AOC
MN
WI
MI
NY
PA
OH
IN
IL
GLSP

Table 5.8-B TRI Releases (in pounds, 2001) for the Menominee River AOC

DIOXIN AND DIOXIN-LIKE COMPOUNDS (PCDDs and PCDFs)	2 3	0.000646771	0	0	0.00069506	0.001341831	0	0.001341831
LEAD	8	9.3	0	0	0.01	9.31	312.010723	321.320723
LEAD COMPOUNDS	8	31.92	0	0	929.43	961.35	188	1149.35
MERCURY COMPOUNDS	9	14.2	0.1	0	7.7	22	0	22
	Total IJC	55.42064677	0.1	0	937.1406951	992.6613418	500.010723	1492.672065
ALUMINUM (FUME OR DUST)		8940	0	0	0	8940	14564	23504
ALUMINUM OXIDE (FIBROUS FORMS)		250	0	0	0	250	2700	2950
AMMONIA		27250	6165	0	14	33429	2501	35930
BERYLLIUM COMPOUNDS		10	5	0	0	15	255	270
BORON TRICHLORIDE		16	0	0	0	16	0	16
CERTAIN GLYCOL ETHERS		16198	0	0	0	16198	250	16448
CHLORINE		136	0	0	0	136	0	136
CHLOROBENZENE		32	0	0	0	32	0	32
CHLOROMETHANE		1405	0	0	0	1405	0	1405
CHROMIUM		1125	255	0	3400	4780	6121	10901
CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)		255	5	0	0	260	3255	3515

COBALT		269	250	0	3700	4219	4527	8746
COBALT COMPOUNDS		10	5	0	0	15	255	270
COPPER		1616	250	0	70	1936	2080	4016
COPPER COMPOUNDS		255	250	0	0	505	5	510
DICHLOROMETHANE		2328	0	0	0	2328	0	2328
DIISOCYANATES		10	0	0	0	10	5	15
DIMETHYLAMINE		27	0	0	0	27	0	27
ETHYLBENZENE		10505	0	0	0	10505	0	10505
ETHYLENE GLYCOL		500	0	0	0	500	0	500
HYDROCHLORIC ACID (1995 AND AFTER 'ACID AEROSOLS' ONLY)		76072	0	0	0	76072	0	76072
HYDROQUINONE		10	0	0	0	10	0	10
MANGANESE		201	0	0	0	201	315	516
MANGANESE COMPOUNDS		255	250	0	0	505	196005	196510
METHANOL		20171	3400	0	0	23571	0	23571
METHYL ETHYL KETONE		250	0	0	0	250	0	250
METHYL ISOBUTYL KETONE		1920	0	0	0	1920	0	1920
N,N-DIMETHYLFORMAMIDE		17	0	0	0	17	0	17
N-BUTYL ALCOHOL		50875	0	0	0	50875	1235	52110
NICKEL		1274	255	0	2200	3729	8407	12136
NICKEL COMPOUNDS		500	250	0	0	750	1505	2255
NITRATE COMPOUNDS		0	33000	0	0	33000	5	33005
O-CRESOL		2	0	0	0	2	0	2

PHENOL		6361	250	0	0	6611	250	6861
STYRENE		84311	0	0	0	84311	0	84311
SULFURIC ACID (1994 AND AFTER 'ACID AEROSOLS' ONLY)		500	0	0	0	500	0	500
TOLUENE		33631	0	0	0	33631	9391	43022
TRIETHYLAMINE		5850	0	0	0	5850	0	5850
VINYL ACETATE		20465	0	0	0	20465	0	20465
XYLENE (MIXED ISOMERS)		66660	0	0	0	66660	1235	67895
ZINC COMPOUNDS		750	250	0	0	1000	33505	34505
	Total Non-IJC	441212	44840	0	9384	495436	288371	783807
	Total	441267.4206	44840.1	0	10321.1407	496428.6613	288871.011	785299.6721

Table 5.8-C TRI Facilities Releasing IJC Critical Pollutants Onsite for the Menominee River AOC

IJC Critical Pollutant	Number of Facilities	Facility Name	TRIF ID	City
Dioxin and dioxin-like compounds (PCDDs and PCDFs)	2			
Marinette County, WI	2	KARL SCHMIDT UNISIA INC.	54143KSGND1731I	MARINETTE
		STORA ENSO N.A. NIAGARA MILL	54151NGRFW1101M	NIAGARA
Lead and lead compounds	6			
Marinette County, WI	4	DECRANE AIRCRAFT SEATING CO. INC. - APD	54157DCRNR701MA	PESHTIGO
		MARINETTE CASTING CORP.	54157MRNTT801MA	PESHTIGO
		KARL SCHMIDT UNISIA INC.	54143KSGND1731I	MARINETTE
		STORA ENSO N.A. NIAGARA MILL	54151NGRFW1101M	NIAGARA
Menominee County, WI	2	GIDDINGS & LEWIS CASTINGS	49858DDNGS16101	MENOMINEE
		MENOMINEE ACQUISITION CORP.	49858MNMNP144FI	MENOMINEE
Mercury and mercury compounds	1			
Marinette County, WI	1	STORA ENSO N.A. NIAGARA MILL	54151NGRFW1101M	NIAGARA

Table 5.8-D NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Menominee River AOC

Chemical	IJC Tracking Number	Discharge
MERCURY, TOTAL (AS HG)	9	1.48
	Total IJC	1.48
PHOSPHORUS, TOTAL (AS P)		34310
	Total Non-IJC	34310
	Total	34311.48

Table 5.8-E NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Menominee River AOC, Menominee County, MI and Marinette County, WI

IJC Critical Pollutant	Number of Facilities	Facility Name	NPDES	City
Mercury	2			
Menominee County, MI	2	GREAT LAKES PULP & FIBRE	MI0053601	MENOMINEE
		MENOMINEE WWTP	MI0025631	MENOMINEE

5.9. Manistique River AOC, Schoolcraft County, MI

The Manistique River AOC is the last 1.7 miles of the river, from the dam to the mouth of the harbor at Lake Michigan (see AOC map at end of chapter and in Appendix 1).

5.9.1. Hazardous Waste Sites Relevant to the Manistique River AOC

No hazardous waste sites in Schoolcraft County, MI, have been categorized by ATSDR in public health hazard categories 1-3.

5.9.2. TRI Data for the Manistique River AOC

No releases were reported to the TRI for Schoolcraft County in 2001 (or 2000).

5.9.3. NPDES Data for the Manistique River AOC

The NPDES permitted discharges for Schoolcraft County, MI are summarized in Table 5.9-A. The total average annual permitted discharges in 2004 were 6,935 pounds, all of which was phosphorus. No IJC-critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.9.4. Summary and Conclusions for the Manistique River AOC

5.9.4.1 Hazardous Waste Sites

No hazardous waste sites in Schoolcraft County, MI, have been categorized by ATSDR in public health hazard categories 1-3.

5.9.4.2 TRI Data

No releases were reported to the TRI for Schoolcraft County in 2001 (or 2000).

5.9.4.3 NPDES Data

The NPDES permitted discharges for Schoolcraft County, MI are summarized in Table 5.9-A.

The total average annual permitted discharges in 2004 were 6,935 pounds, all of which was phosphorus. No IJC critical pollutants were the subject of permitted (quantity average limit) discharge amounts.

5.9.4.4 Beneficial Use Impairments (BUIs)

Of the three health-related BUIs, restrictions on fish were BUIs listed as impaired at this AOC site. Further information is available at the USEPA Web site (http://www.epa.gov/glnpo/aoc/).

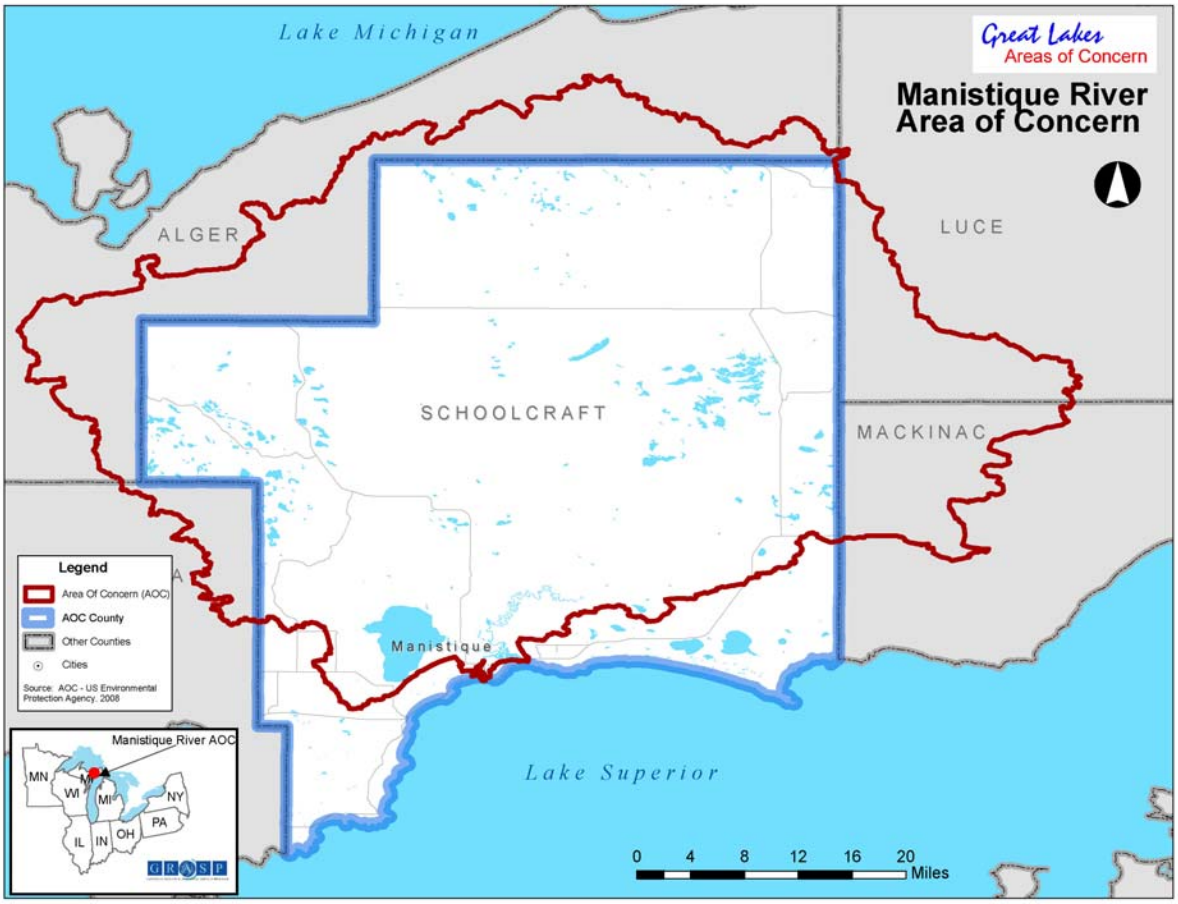

Lake Michigan
Great Lakes
Areas of Concern
Manistique River
Area of Concern
ALGER
LUCE
SCHOOLCRAFT
MACKINAC
Legend
Area Of Concern (AOC)
AOC County
Other Counties
Cities
Source: AOC - US Environmental Protection Agency, 2008
Manistique
Manistique River AOC
MN
WI
MI
NY
PA
IL
IN
OH
Lake Superior
0 4 8 12 16 20
Miles

Table 5.9-A NPDES Permitted Average Annual Discharges (in pounds, 2004) to Surface Water, Manistique River AOC

Chemical	*IJC Tracking Number*	*Discharge*
PHOSPHORUS, TOTAL (AS P)	Total IJC	0
		6935
	Total Non-IJC	6935
	Total	6935