

A Summary of Contaminated Sediment Remediation  
Activities in the Great Lakes Basin



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**REALIZING REMEDIATION: A SUMMARY OF  
CONTAMINATED SEDIMENT REMEDIATION  
ACTIVITIES IN THE GREAT LAKES BASIN**

**by**

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**DISCLAIMER**

The information contained in this report is current as of January 1998. Due to the constantly changing nature of the remediation work at these locations, it is recommended that up-to-date information be obtained from the listed site contacts.

## ACRONYMS

AOC	Area of Concern
ARCS	Assessment and Remediation of Contaminated Sediments
ASRI	Alternative Specific Remedial Investigation
CDF	Confined Disposal Facility
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	Cubic Feet Per Second
CPAH	Carcinogenic Polynuclear Aromatic Hydrocarbons
CSO	Combined Sewer Overflow
CTF	Confined Treatment Facility
CWA	Clean Water Act
DDT	Dichlorodiphenyltrichloroethane
DRO	Diesel Range Organics
HBB	Hexabromobenzene
HCH	Hexachlorocyclohexane
GLNPO	Great Lakes National Program Office
GLWQA	Great Lakes Water Quality Agreement
IAG	Interagency Agreement
IEPA	Illinois Environmental Protection Agency
IJC	International Joint Commission
MCD	Modified Consent Decree
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
OEPA	Ohio Environmental Protection Agency
OMC	Outboard Marine Company
PAH	Polynuclear Aromatic Hydrocarbons
PBB	Polybrominated Biphenyl
PCB	Polychlorinated Biphenyls
PPB	Parts Per Billion
PPM	Parts Per Million
PRP	Potentially Responsible Party(ies)
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RRT	Requisite Remedial Technology
RRWWDP	Rouge River Wet Weather Demonstration Project
TCDD	Tetrachlorodibenzene-P-Dioxin
TCP	Trichlorophenol
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage and Disposal Facility

USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Service
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compound
WDNR	Wisconsin Department of Natural Resources

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## **BACKGROUND**

Contaminated sediments are of great concern to humans and wildlife that live within the Great Lakes Basin. Years of industrial and municipal discharges, combined sewer overflows and urban and agricultural non-point source runoff have contributed to the creation of vast amounts of highly polluted sediments that pose serious human and ecological health risks. Sediments have been collecting on the bottoms of the Great Lakes ever since they were formed by glacial scouring and melting. The loose, unconsolidated particles that make up the sediment may originate in soil worn away by physical or chemical erosion, or they may come from the decomposition of shells or wood chips. In areas of slow moving water, sediments sink and accumulate on the bottom of lakes and rivers.

Before industry came to the Great Lakes Basin, the natural processes of sedimentation only created changes in the shapes of the lakes and their tributaries. However, in the first century of industrial development, the region began adding chemicals to the water, and in turn, the sediments. Often the approach was simply to run a pipe to the nearest river bank or lakeshore and pump the waste directly into the water. Over the decades, heavy metals and toxic organic chemicals mixed with the particles of rock, soil, and decomposing wood and shell in the sediments collecting in rivers and harbors in the Great Lakes Basin.

Even after serious clean-up efforts began in the late 1960's, little attention was paid to the toxics concealed on the bottom. The first priority was to stop the discharge of new contaminants, and little concern was paid to sediments. It was not until the early 1980's that environmental problems caused by sediment contamination began to generate interest. One example was an increase in concentrations of the pesticide DDT and the widely used group of industrial chemicals called PCBs in the tissues of Great Lakes fish. Although both of these chemicals had been banned from use within the Basin in the 1970's, levels were still increasing in fish tissue. This development sparked interest in the possibility of the sediments as sources of the toxics. Overwhelming evidence now supports the theory that toxics trapped in sediment can adversely impact humans and the environment. By a process known as biomagnification the toxics contained in bottom sediments can increase exponentially in concentration at every level of the food chain, starting with the sediment dwelling benthos, continuing to fish and eventually reaching birds of prey, mammals and even humans. This bioaccumulation



of sediment pollutants in fish is one way for humans to become affected by the in place contaminants.

In response to rising concern regarding sediment quality in the Great Lakes, the U.S. Congress authorized a five-year study and demonstration project to identify the best techniques for addressing contaminated sediments. The authorization, contained in the Clean Water Act of 1987, called upon the Great Lakes National Program Office of the USEPA to conduct a study and demonstration project relating to the appropriate treatment of toxic pollutants in sediments. Also in 1987, the U.S. and Canada ratified a second revision of their 1972 Great Lakes Water Quality Agreement which directed the USEPA and its counterpart, Environment Canada, to establish methods to quantify, manage and remediate contaminated sediments.

In response to both policies, USEPA created the ARCS (Assessment and Remediation of Contaminated Sediment) Program. The specific aims of the ARCS Program were to measure concentrations of contaminants at chosen sites on the Great Lakes, to determine ways of gauging the effects of these concentrations on aquatic life, to recommend ways to measure risks to wildlife and to human health posed by the contaminants and to test technologies that might be used to clean up the sediments. Since the onset of the ARCS Program, state and federal agencies, environmental groups, industries and local citizens have worked together to identify contaminated sites, develop remediation plans and restore the sediments to safe levels for the ecosystem at numerous locations around the Basin.

As the process of realizing remediation occurs, it is important to keep all stakeholders apprised of actions that have been accomplished as well as to look ahead to the future. This document presents a summary of the past, current and future sediment remediation projects within the U.S. Great Lakes Basin. While the future will most certainly bring more sites to light, the sites listed here represent the majority of current, significant remediation projects. The summary demonstrates how far sediment remediation in the Great Lakes has progressed since the identification of contaminated sediment problems. It is hoped that this document will serve as a reference and promote information networking among the many people and agencies who work on remediating the Great Lakes sediments.

## **REPORT OVERVIEW**

The information within this report was gathered mainly from direct communication with the project officers for the sites and supplemented with informa-

tion from site publications. The sites are from seven states within the Basin. A total of 33 sites in six states were listed as past and current sediment remediation projects (Figure 1). These cleanups are led by either USEPA or the state environmental agency. The amount of contaminated sediments at these sites ranged from 1,300 to 750,000 yds<sup>3</sup>. The majority of sites chose dredging as the environmentally and economically preferred option to remove the contaminated sediments.

The following information is provided for each of the past and current remediation sites:

- ◆ **Contact:** Name of the main project officer who contributed to the report and his or her affiliation.
- ◆ **Location:** Short summary of the site location and the vicinity that the contaminated sediments affect(ed).
- ◆ **Background:** Describes how the site was contaminated
- ◆ **Administrative History:** Describes the authority and/or statute under which the project remediation work was conducted.
- ◆ **Amount of Contaminated Sediment:** Indicates the volume of contaminated sediments and highest contaminate concentration found in those sediments.
- ◆ **Project Status:** Update on the projects as of January, 1998.
- ◆ **Total Cost:** Estimate of the remediation costs. It is important to note that some of these costs are solely for sediment remediation, whereas some sites only had cost figures available for all remediation work, which often includes land based remediation projects. This difference is indicated within each section.

Other information such as the type of remedy selected, dredging method and landfill siting were also included within each section when available. Another 15 sites in six states are listed at the end of the document as upcoming sites (Figure 1). These sites are all expected to begin remediation work within the next one to three years. Information was presented in a slightly more condensed format for these sites.

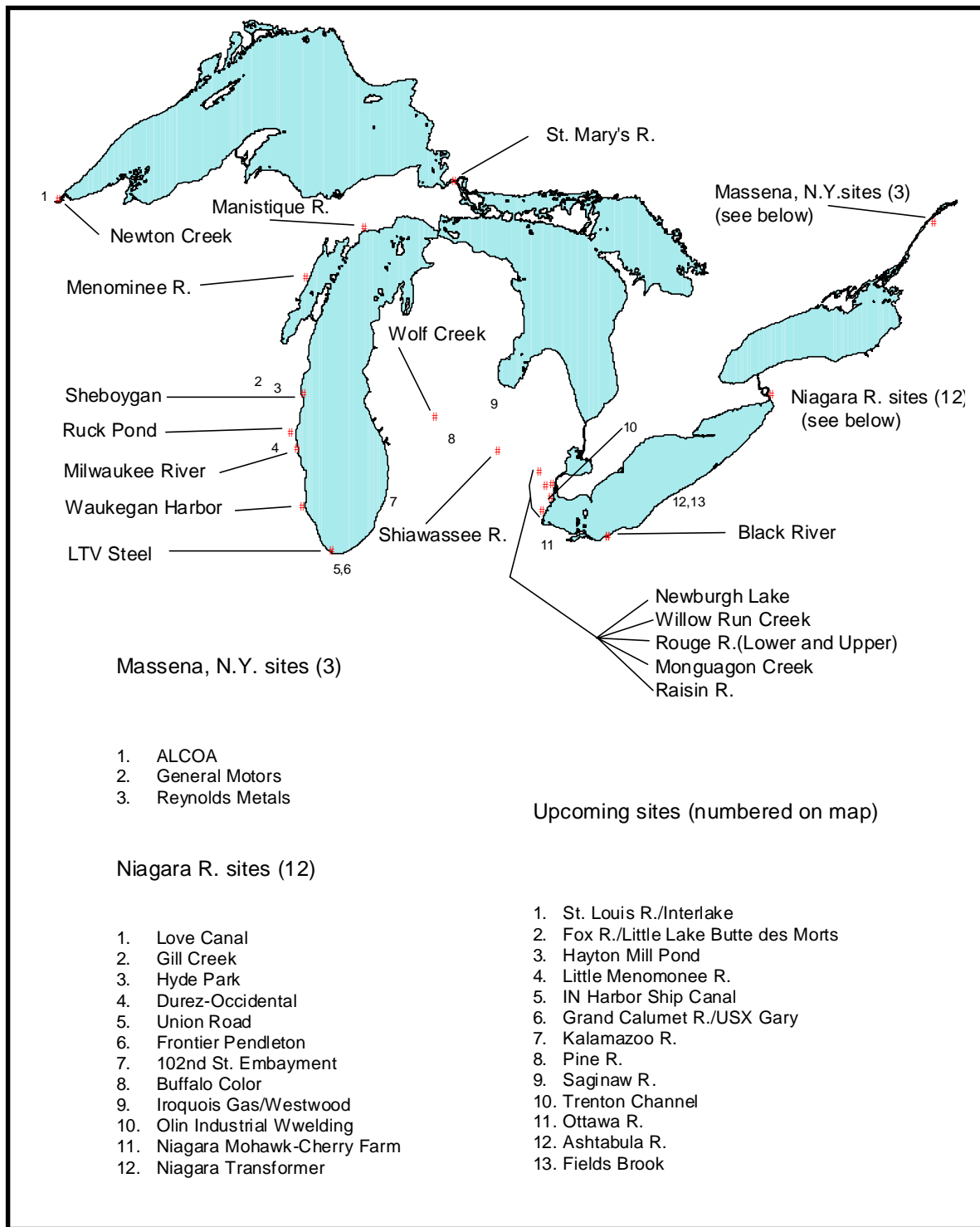


Figure 1: Completed and Upcoming Remediation Sites

## CONTAMINANTS

The sediments described in this report were contaminated by a variety of chemicals. Some of the most common sediment pollutants at these Great Lakes sites include:

### Polychlorinated Biphenyls (PCBs)

PCBs are human-made industrial chemicals that were previously used as coolants, insulating materials and lubricants. The U.S. ended PCB production in 1979, but they still persist in the environment today. PCBs are suspected or known human carcinogens and high exposures to PCBs can damage the skin, eyes, and lungs. USEPA recommends PCB concentrations to be no higher than 0.001 ppb in stream and lake water.

### Polycyclic Aromatic Hydrocarbons (PAHs)

There are over 100 different PAH compounds. This group of chemicals is formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances. PAHs can be human-made or occur naturally. There is no known use for most of these chemicals except for research purposes. A few PAHs are used in medicines and to make dyes, plastics and pesticides. Based on animal testing, PAHs are suspected of being carcinogenic.

### Mercury

Mercury is a naturally occurring element found at background levels in the air, water and land. One form used by industry, methyl mercury, can build up in fish tissue and cause contamination at low levels. Exposure to methyl mercury is more dangerous for young children than for adults because more of it passes into children's brains where it interferes with normal development. Long-term exposure to mercury may lead to brain damage, particularly in fetuses.

### 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)

This is the most toxic dioxin. While a dose-response curve has not been established yet, there is overwhelming evidence that 2,3,7,8-TCDD causes cancer. This and other dioxins have been created as a by-product in the manufacture of certain chlorinated organic products.

### Hexachlorocyclohexane (HCH)

HCH, formerly known as benzene hexachloride (BCH) is another human-made chemical. Gamma-HCH was originally used as an insecticide. U.S. production of this chemical ceased in 1977, however it is still imported into the country. HCH is also a carcinogen.

Lead

A naturally occurring element, lead is also often released from anthropogenic sources. It can damage the nervous system, kidneys and immune system. Children are particularly susceptible to lead poisoning. Lead exposure can result in a variety of detrimental effects to neuropsychological functioning.

Arsenic

Arsenic is naturally found at low levels in ground water and surface water and created by human activities. Arsenic ingestion is linked to skin cancer and arsenic inhalation to lung cancer. In addition, arsenic ingestion seems to be associated with cancers of the kidney, bladder, liver, lung and other organs. Water primarily contains inorganic arsenic species, which tend to be more toxic than organic forms.

**COST**

Cost figures for remediation vary significantly among the projects. The following tables describe the volume of contaminated sediment at each site and the cost figures for the projects as available. Table 1 contains information on current or completed sites and Table 2 contains information on up and coming sites.

**Table 1: Sediment Volumes and Remediation Costs for Current and/or Completed Sites**

Site	Sediment Volume (yds <sup>3</sup> )	Sediment Volume (m <sup>3</sup> )	Sediment Remediation Costs (\$US)	Sediment Total Project Costs (\$US)
1 Waukegan Harbor	32,000	24,320	21,000,000	
2 LTV Steel	116,000	88,160		14-16,000,000
3 Manistique	120,000	91,200	15,809,228	
4 River Raisin	27,000	20,520	6,000,000	
5 Lower Rouge River	34,500	26,220	1,000,000	
6 Upper Rouge River	7,000	5,320	550,000	
7 Newburgh Lake	400,000	304,000	11,800,000	
8 Willow Run Creek	375,000	285,000		70,000,000
9 Monguagon Creek	25,128	19,097	3,000,000	
10 Unnamed Tributary to Wolf Creek	13,000	9,880	1,000,000	
11 Shiawasee River	1,805	1,371		1,302,405
12 Black and Bergholtz Creeks	17,200	13,072	14,000,000	
13 Gill Creek – DuPont	8,020	6,095	10,000,000	40,000,000
14 Gill Creek – Olin	7,500	5,700	1,400,000	
15 Bloody Run Creek	27,000	20,520		58,000,000
16 Pettit Flume	15,070	11,453		23,000,000
17 Union Road	5,600	4,256		8,000,000
18 Frontier Pendleton	56,000	42,560		18,770,000
19 102nd Street Embayment	28,500	21,660		30,000,000
20 Buffalo Color - Area D	35,000	26,600		8,200,000
21 Niagara Mohawk - Cherry Farm	48,000	36,480	4,000,000	12,000,000
22 Niagara Transformer	11,500	8,740		5,600,000
23 Creekside Golf Course	1,300	988	4,500,000	4,500,000
24 Columbus McKinnon	2,349	1,785		5,250,000
25 St. Lawrence River – ALCOA	3,500	2,660	4,800,000	
26 St. Lawrence River – GM	13,800	10,488	7,000,000	78,000,000
27 Black River	50,000	38,000	1,500,000	
28 Ottawa River Tributary	10,000	7,600	5-6,000,000	
29 Menominee River	10,000	7,600	1,500,000	
30 Newton Creek/Hog Island Inlet	2,400	1,824	250,000	
31 North Avenue Dam of the Milwaukee River	750,000	570,000	2,600,000	5,700,000
32 Ruck Pond	7,700	5,852	7,080,000	
33 Sheboygan River and Harbor	3,800	2,888	Unknown	
<b>TOTAL</b>	<b>2,265,672</b>	<b>1,721,910</b>	<b>118,289,228</b>	<b>362,322,405</b>

**Table 1:** Total yds<sup>3</sup> for the current or finished sediment remediation projects in the US Great Lakes Basin. The cost figures are denoted either as the cost for a sediment remediation project, or for a land based cleanup and a sediment remediation project combined.

**Table 2: Estimated Sediment Volumes and Predicted Costs for Upcoming Sites**

	Site Name	Sediment Volume (yds <sup>3</sup> )	Sediment Volume (m <sup>3</sup> )	Sediment Remediation Costs
1	Grand Calumet River/ Indiana Harbor	5,000,000-10,000,000	3,800,000-7,600,000	unknown
2	Kalamazoo River	unknown	unknown	unknown
3	Pine River	250,000	190,000	unknown
4	Saginaw River	300,000	228,000	\$5,000,000
5	S. Branch of the Black River	6,500	4,940	unknown
6	St. Mary's River- Cannelton Industries	unknown	unknown	\$5,500,000
7	Trenton Channel	unknown	unknown	unknown
8	St. Louis River - Interlake Duluth Tar	unknown	unknown	unknown
9	Iroquois Gas and Westwood Pharmaceutical	11,000	8,360	\$7,350,000
10	St. Lawrence River- Reynolds Metals Company	77,000	58,520	\$57,000,000
11	Ashtabula River and Harbor	1,000,000	760,000	unknown
12	Ashtabula Fields Brook Superfund Site	unknown	unknown	unknown
13	Fox River	10,900,000	8,284,000	unknown
14	Manitowoc River Basin - Hayton Mill Pond	10,000	7,600	\$800,000
15	Little Menomonee River- Moss American Site	15,000	11,400	\$25,000

It is important to note that several of these sites have been successfully remediated and the contaminants have been reduced to background levels in the sediments. Many more are currently in the process of remediation. As those who are involved with remediation efforts gain more experience, it is hoped they can use their knowledge to improve the remediation process with increasing expedience and decreasing costs. This document will hopefully allow us to see how far we have come in the past ten years since contaminated sediments were identified by Congress as an issue that needed to be addressed. It also allows us to set our goals for the future, and the future of the Great Lakes.

## **Waukegan Harbor - Outboard Marine Corporation Site**

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### **Location**

The Waukegan Harbor Superfund site in Waukegan, Illinois is within an Area of Concern (AOC) designated by the International Joint Commission (IJC). Waukegan is located approximately 50 miles north of the city of Chicago along the Lake Michigan shoreline.

### **Background**

Outboard Marine Corporation (OMC), a recreational marine products manufacturer, used hydraulic fluid containing PCBs in its die-casting machines from 1959 to 1972. Some of the PCBs escaped from the oil interceptor, diversion and pump system. The PCBs were discharged from two locations, one at the western end of Slip 3 at the northern end of Waukegan Harbor, and one at the north end of OMC property to the North Ditch which runs directly into Lake Michigan. By the time the discharge pipe to the harbor was sealed in 1976, approximately 300,000 pounds of PCBs had been released into Waukegan Harbor and another 700,000 pounds had been discharged on OMC property. PCB concentrations in some areas were over 25,000 ppm. It was also estimated that hundreds of thousands of pounds of PCBs discharged into Lake Michigan.

### **Administrative History**

The Illinois Environmental Protection Agency conducted effluent sampling of outfalls on Lake Michigan to attempt to identify sources of PCB contamination. In January 1976, samples taken during 1975 at outfalls at the Outboard Motor Corporation (OMC) of Waukegan, Illinois were found to be contaminated with PCBs, discharging at a rate of 9 to 10 pounds of PCBs per day.

A remedy was selected in 1984 by the USEPA which authorized \$21 million for the cleanup program. Three main areas of contamination were targeted for remediation: The Upper Harbor and Slip 3; the OMC parking lot; and the North Ditch/Crescent Ditch/Oval Lagoon area. However, components of the remedy were modified and embodied in a 1988 Consent Decree. In March 1989, the Record of Decision (ROD) was correspondingly modified and the Consent Decree was then entered into the United States District Court in April 1989. By terms of the Consent Decree, OMC was to finance a Trust to implement the cleanup and to ensure performance of the requirements of the Consent Decree.

The final remedy required the following:

- A slip was built on the east side of the Upper Harbor to replace Slip 3. Larsen Marine was relocated from Slip 3 to this new slip.
- A double sheet pile cut-off wall was built to isolate Slip 3 from the Upper Harbor. A water-tight clay slurry wall was anchored to the underlying clay till and Slip 3 became a permanent containment cell.



- A total of 8,000 yds<sup>3</sup> of sediment in Slip 3 with PCB concentrations above 500 ppm was removed and isolated for treatment. Approximately 30,000 yds<sup>3</sup> of sediment in the Upper Harbor with PCB concentrations between 50 and 500 ppm was removed and placed in the new Slip 3 containment cell.
- Two other containment cells were built with a similar design as the Slip 3 containment cell. One encompassed the parking lot and the other the Crescent Ditch and Oval Lagoon. Before construction, all areas containing PCB contamination over 10,000 ppm were removed for treatment.
- Material removed from designated hotspots was treated by a low temperature extraction procedure which removed at least 97% of the PCBs by mass to separate the PCB oils from the sediments.
- Extracted PCB oil was removed off site for destruction at a TSCA-approved facility.
- Residual treated soil was placed in the containment cells which were closed and capped.
- All water generated during remedial activities was treated on site.

In the Fall of 1989, during pre-design field investigation, additional contamination in the form of polynuclear aromatic hydrocarbons were discovered in the soil area of the new slip. PAHs reflect coking and wood treating operations. This contamination resulted from a previous land use prior to OMC's ownership of the property. The discovery of PAHs required a limited investigation in the area of the new slip and resulted in the removal of PAH-contaminated soils above 5 ppm.

#### **Amount of Contaminated Sediments**

- Volumes: 32,000 yds<sup>3</sup> removed from Waukegan Harbor  
6,300 yds<sup>3</sup> removed from Slip #3  
5,000 yds<sup>3</sup> removed from the North Ditch  
2,900 yds<sup>3</sup> of sediment and soil removed from Oval Lagoon  
3,800 yds<sup>3</sup> of sediment and soil removed from Crescent Ditch
- Mass: 1,000,000 pounds (estimate)
- Highest PCB Concentration: 500,000 ppm

#### **Project Status**

Physical construction was completed as of February 1992. Operation and maintenance of the site will continue until 1999, per the consent Decree order. Monitoring indicates that fish tissue contaminant concentrations in the harbor continue to decrease. Warning signs from within the harbor have been removed because sampling has recently shown declines in concentrations to the same levels as the greater Lake Michigan area. Compliance monitoring continues to show the remedy is meeting its objectives.

#### **Total Cost**

The clean up cost of the entire remediation effort was estimated to be approximately \$21,000,000.

## **LTV Steel Site - Indiana Harbor**

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### **Location**

The LTV Steel site is located along the south shore of Lake Michigan in the city of East Chicago, Indiana. It is part of a heavily industrialized corridor adjacent to Indiana Harbor and is part of the Grand Calumet River/Indiana Harbor AOC.

### **Background**

Indiana Harbor has long been used for industrial manufacturing and is considered by many to be one of the most seriously polluted AOCs. This particular stretch of the coast was used by LTV Steel which discharged waste oils and heavy metals into Lake Michigan. Historic pollution from numerous other sources have also contributed to the degradation of this site. Sampling of the sediments has found contamination levels greater than 50 ppm PCBs. The majority of the contamination is located within LTV's intake flume.

### **Administrative History**

Actions were taken against LTV Steel for their violations of the Clean Water Act (CWA). The remediation of the LTV site is now being performed under a 1991 CWA Consent Decree. The lead agency on the remediation work is USEPA, Region 5.

### **Amount of Contaminated Sediments**

- Volume: 116,000 yds<sup>3</sup>
- Recovered 40,000 cubic gallons of oil

### **Project Status**

This project has been completed. The contaminated sediment was excavated using a hydraulic dredge and the oil was separated and recovered from the sediment.

### **Total Cost**

The costs are estimated to be between \$14-16 million for the project.

## **Manistique River and Harbor**

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### **Location**

The site is located within the City of Manistique in Schoolcraft County, Michigan. Manistique is in the Upper Peninsula of Michigan, at the point where the Manistique River drains into Lake Michigan. The remediation site is along a 1.7 mile stretch and spans the entire width of the Manistique and is one of the designated AOCs.

### **Background**

Historically, the site received water from sawmills, a paper mill, industry and a municipal wastewater treatment plant. Wastes such as paper, wood, chemicals, de-inking waste and oil from industrial users were discharged into the area. Undecomposed sawdust and woodchips still remain in the sediments from logging over a hundred years ago. The PRPs (Potentially Responsible Parties) involved with this site are Manistique Paper, Inc., Edison Sault Electric and Warshawsky Brothers Iron and Metal.

The site has been monitored and evaluated by state and federal agencies since the 1970's. The principal sediment contaminant identified by these agencies has been PCBs.

### **Administrative History**

The Manistique site is being remediated under a Superfund Emergency Removal Action. USEPA determined it could not wait for remedial action by the companies involved because approximately 100 pounds of PCBs were being washed into Lake Michigan through natural erosion processes annually. USEPA's Decision of response was made within an Action Memorandum which approved dredging as the environmentally preferable option.

In December 1996, USEPA and the PRPs entered into an Administrative Order of Consent. This legally required the PRPs to commit financial resources for the project. The Order also included a covenant not to sue for any further remedial costs for the dredged areas incurred in the future.

The final settlement agreement was signed between the PRPs and USEPA on April 21, 1997. This settlement resolved the PRPs of liability in exchange for \$6.4 million and other services, such as access to land and material during the dredging.

### **Amount of Contaminated Sediments**

- Volume: 120,000 yds<sup>3</sup>
- Mass: 115,000 pounds
- Highest PCB Concentration: 2,510 ppm

**Project Status**

The Manistique River and Harbor site is currently in the remedial process. The contaminated sediments are being removed, primarily through the use of a hydraulic cutterhead dredge as well as some diver assisted hydraulic dredging. The North Bay site (farthest up river from the harbor) was completed in 1996. All sediment exceeding 10 ppm PCBs are being removed and taken off site for disposal. Non-TSCA materials are take to Wood Island Landfill in Munising, Michigan. In 1996, TSCA materials were transported to Idaho for disposal. Currently, TSCA materials are sent to Environmental Quality/Wayne Disposal in Belleville, Michigan.

In 1996 alone, 2,116 tons of sediment and other waste were sent for disposal and 35 million gallons of river water was treated. The second phase of removing contaminated sediments from the downstream area is currently in progress. The harbor clean up will be the last phase of the project, and is scheduled for completion in 1998.

**Total Cost**

A price ceiling of \$14,809,228 has been set by the Superfund Division of Region 5 USEPA.

### **River Raisin - Ford Outfall Site**

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#### **Location**

The River Raisin Area of Concern is located in the southeastern portion of Michigan's lower peninsula in Monroe County. The AOC has been defined as the lower (2.6 miles) portion of the River Raisin, downstream from the low head dam (Dam #6) at Winchester Bridge in the City of Monroe, extending one-half mile out into Lake Erie following the Federal Navigation Channel and along the nearshore zone of Lake Erie, both north and south, for one mile.

The Ford Outfall site is located within the AOC. It is part of the industrial area of Monroe, Michigan on property associated with the Ford Monroe Stamping Plant. The site is bordered along the north by wetlands and Sterling State Park, the east by Lake Erie, the south by the River Raisin and the west by more wetlands.

#### **Background**

The Ford Monroe Plant began manufacturing automotive parts at the site in 1949. Until the 1970's all wastewater from the plant was discharged through several outfalls directly into the River Raisin, which empties into Lake Erie at Monroe Harbor. The majority of the wastewater was generated by cleaning, painting and plating processes containing PCBs. After the early 1970's, the outfalls were closed and new ones were constructed further downstream. The industrial waste from this site has contributed to a loss of fish and wildlife habitat within the AOC.

Since 1973, the site has been investigated by either USEPA or the Michigan Department of Natural Resources (MDNR, now the Michigan Department of Environment Quality –MDEQ). Several studies found PCBs in the wastewater, as well as in fish in the river. In the 1970's and 1980's, PCBs were detected in the river sediments in the 1-25 ppm range. However, another study conducted by Michigan State University in 1991 found PCB levels up to 42,167 ppm in the sediment near the outlet of a former Ford Motor Company wastewater discharge pipe. This pipe is located on the north side of the River Raisin just downstream from the turning basin. USEPA staff (at the request of MDNR) conducted additional sediment sampling in the AOC in September of 1992. Through the use of U.S. EPA's research vessel, the *R/V Mudpuppy*, a number of sediment core profile and grab samples were taken at, above and below the PCB hot spot area. EPA staff also collected samples for PCB analysis on Ford's property. USEPA's study confirmed the results of the study previously conducted by Michigan State.

#### **Administrative History**

This site is being remediated under a Superfund Emergency Removal Action. EPA selected a final remedy plan in August 1996. This remediation included the following:

- Dredging the contaminated sediment using a mechanical closed-bucket clamshell dredge. All sediment of levels 10 ppm or greater will be removed.

- Containing sediment resuspension through the use of a double silt curtain.
- Conducting follow up sampling of residual sediment to ensure the removal goals are met.
- Conducting follow up sampling of residual sediment to ensure the removal goals are met.
- Solidification/stabilization of contaminated sediment at a Toxic Substances Control Act (TSCA) approved on-site disposal facility.
- Sampling of the sewer system to determine PCB levels.
- Remediating sewer materials from in-plant sewers.
- Monitoring air quality for PCBs before and during the dredging process.

**Amount of Contaminated Sediments**

- Volume: 27,000 yds<sup>3</sup>
- Highest PCB Concentration: 49,000 ppm

**Project Status**

The in-plant sewer material was remediated with a combination of hydraulic, mechanical and pneumatic methods during July 1996. The sediment remediation phase began in July 1997 and was completed in October 1997. As previously mentioned, the sediment was removed by mechanical dredging, stabilized/solidified, and then contained in an on-site TSCA certified facility.

**Total Cost**

The sediment remediation cost approximately \$6,000,000.

## **Lower Rouge River - Double Eagle Steel**

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### **Location**

The oldest and most heavily populated and industrialized area in southeast Michigan is located within the Rouge River Watershed. The Rouge River has four main branches totaling 125 miles of waterways primarily flowing through Wayne and Oakland counties, with some headwaters in Washtenaw County. The Rouge drains a 438 square mile area that includes more than 400 lakes and ponds, and more than 50 miles of park land along its banks.

The entire Rouge River basin is designated as an AOC. It flows into another AOC, the Detroit River, which eventually empties into Lake Erie. The Double Eagle Steel Coating Company is located in Dearborn, Michigan on the Lower Rouge River.

### **Background**

From Spring until August 1986, due to a design malfunction in the Double Eagle Steel Coating Company's wastewater treatment plant, levels of zinc far in excess of the company's NPDES permit were discharged into the Rouge River, including quantities of up to three tons per day. Sampling by the MDNR did not find markedly high levels of zinc in the river sediments. However, MDNR later determined that stormy weather caused scouring of the river bed and dispersed the zinc downstream.

### **Administrative History**

The case was referred to the Michigan Attorney General's Office for enforcement action. A Consent Decree was signed in October 1986. By the terms of the Consent Decree, Double Eagle Steel agreed to undertake a dredging program in the Rouge River to remove the excess zinc deposits.

### **Amount of Contaminated Sediments**

- Volume: 34,500 yds<sup>3</sup>
- Mass: 55,080 tons
- Highest Zinc Concentration: 2,500 ppm

### **Project Status**

Per the consent Decree, the sediment was removed from the company's outfall to approximately 200 yards down river. This was done using mechanical dredging to a depth 0.3 meters and across 0.25 kilometers of the Rouge River. The sediment was disposed of at the Army Corps of Engineers' Pointe Mouille Facility on southwestern Lake Erie. The dredging was completed in October 1987. Post-monitoring of effluents have showed no indication of renewed zinc discharge violations.

### **Total Cost**

All dredging and disposal activities had totaled approximately \$1,000,000 by the end of the project.

## **Upper Rouge River - Evan's Products Ditch Site**

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### **Location**

The oldest and most heavily populated and industrialized area in southeast Michigan is located within the Rouge River Watershed. The Rouge River has four main branches totaling 125 miles of waterways primarily flowing through Wayne and Oakland counties, with some headwaters in Washtenaw County. The Rouge drains a 438 square mile area that includes more than 400 lakes and ponds, and more than 50 miles of park land along its banks.

The entire Rouge River basin is designated as one of the IJC's Areas of Concern. The Evan's Products Ditch Site is slightly upstream of Newburgh Lake, which is located on the Middle Rouge River in the City of Livonia, Michigan.

### **Background**

In 1988, a routine fish collection from Newburgh Lake in the Upper Rouge River found PCB levels in the fish tissue as high as 26 ppm. In 1992, the Michigan Department of Environmental Quality (MDEQ) identified the PCB source as a stormwater ditch located on the bankrupt Evan's Products Company property. The current owners, Premier Realty, stopped the PCB discharge by pouring cement into the power house pipes. By this time, however, there has been widespread contamination of the Rouge River and of the sediments in Newburgh Lake, particularly in the western end.

### **Administrative History**

Since the PRP involved had filed for bankruptcy, the burden of remediation fell to the state. The remediation effort was led by MDEQ. This project was completed using State of Michigan Bond Funds.

### **Amount of Contaminated Sediments**

- Volume: 6,989.68 yds<sup>3</sup>
- Mass: 9,505.96 tons
- Highest PCB Concentration: 22,000 ppm

### **Project Status**

Remediation began in January 1997, under management of MDEQ. All of the contaminated sediments were removed by April 7, 1997. The 1,787.36 tons of TSCA level material was sent to Model City, NY for disposal. The rest of the removed sediments (7,718.60 tons) were taken to a Type II landfill in Michigan.

The entire stormwater ditch was excavated to a depth of at least 3 feet and ditch banks were excavated up to 15 feet away from the original channel. Clean sediments were verified and excavations were covered with 3 feet of clean soils. The northern half of the waterway was also diverted to avoid any undetected PCBs in the sediments. Completion of this project also paved the way for remediation to begin at Newburgh Lake.



**Total Cost**

MDEQ was responsible for obtaining funding for the remediation. The preliminary estimated cost for remediating Evan's Products Ditch Site was \$550,000.

## **Newburgh Lake**

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### **Location**

Newburgh Lake is located on the Middle Rouge River in the City of Livonia, Michigan. The lake is approximately 100 acres and was used by Detroit residents for recreation and fishing. It is also a part of the Rouge River basin AOC.

### **Background**

The Rouge River Watershed is the oldest and most heavily populated and industrialized area in southeast Michigan. Newburgh Lake was created in the 1930's as part of Henry Ford's "Village Industries" on the Rouge River. Large amounts of PCBs were discovered in the lake sediments by MDEQ in 1988. These PCBs were released from the Evan's Products Ditch Site, just upstream from Newburgh Lake. Due to the elevated levels of PCBs in the sediments, the Michigan Department of Public Health has issued a fish consumption advisory for Newburgh Lake.

### **Administrative History**

Newburgh Lake's remediation is being coordinated by the Wayne County Department of Environment. It is being remediated as part of the Rouge River Wet Weather Demonstration Project (RRWWDP), which involves the implementation of a water quality model to predict pollutant source loadings on the watershed level. The RRWWDP will take approximately 2 years and \$10,000,000 to complete.

### **Amount of Contaminated Sediments**

- Volume: 400,000 yds<sup>3</sup>
- Mass: 544,000 tons
- Highest PCB Concentration: 51 ppm

### **Project Status**

In the spring of 1997, Environmental Consulting and Technology, Inc. conducted a fish kill to remove the PCB contaminated fish. The remediation project is in the construction phase, which should last between 7 to 10 months. The sediment removal is expected to be completed by May 15, 1998. Approximately 700,000 yds<sup>3</sup> of sediment are expected to be removed. The contaminated sediment totals 400,000 yds<sup>3</sup>. However, in order to control overgrowth of aquatic plants, another 300,000 yds<sup>3</sup> of sediment will be dredged to create a minimum lake depth of eight feet. Following dredging, the contaminated sediment will be taken off site for disposal. However, some excavated clean sediment will be used to re-nourish the shoal areas and an existing island. The final restoration work should be finished by July 15, 1998.

### **Total Cost**

The project was funded through the Rouge River National Wet Weather Demonstration Project. The costs of the entire project are \$10,000,000 for construction and \$1,800,000 for engineering and management.

## **Willow Run Creek**

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### **Location**

The Willow Run Creek is located in Wayne County, Michigan. Willow Run Creek flows into the northwest corner of Belleville Lake and discharges to Lake Erie via the Huron River. It is a natural wetland area consisting of Willow Run Sludge Lagoon, Edison Pond and Tyler Pond.

### **Background**

From 1942 to 1964, the Willow Run Sludge Lagoon, Edison Pond and Tyler Pond were contaminated with PCB laden municipal wastewater treatment plant sludge and was also used a dump site for a bomber plant. The main contaminants which have been identified are PCBs, but there are also heavy metals present in the sediment. The PRPs that have taken responsibility for remediation are Ford Motor Company and General Motors Corporation.

### **Administrative History**

Action was taken by USEPA Region 5 under Superfund to initiate clean up of the site. However, the remediation project is under the lead of the Michigan Department of Environmental Quality.

### **Amount of Contaminated Sediments**

- Volume: 350,000-400,000 yds<sup>3</sup>
- Highest PCB Concentration: 15,000 ppm

### **Project Status**

The remediation process is currently in the operations phase. The contaminated sediments are being removed and being disposed of at a TSCA approved landfill on site. The landfill is located less than a mile from the Wayne County landfill and received its final TSCA approval from USEPA Region 5 on June 19, 1997. The site will be restored as a natural wetland area after the remediation is completed. The project is scheduled to finish during the Fall of 1997.

Concerns were raised regarding the release of PCB air emissions during the remediation process. A letter was sent to the PRPs on July 15, 1997, stating that unless practices to prevent the release of PCB contaminated dust were in place within 48 hours, operations would be ceased. However, the PRPs have taken steps to remedy the situation. They are now using a foam suppression system to control air emissions from the landfill.

### **Total Cost**

The entire project cost estimate is approximately \$70,000,000.

## **Monguagon Creek**

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### **Location**

Monguagon Creek is a tributary to the Detroit River, which is one of the most heavily polluted AOCs. Monguagon Creek joins the Detroit River south of the cities of Detroit and Windsor in Riverview, Michigan.

### **Background**

Sediments in Monguagon Creek were contaminated by historical point and nonpoint source discharges associated with steel and chemical manufacturing activities. Contaminates included polynuclear aromatic hydrocarbons (PAHs), amines, phenols, PCBs, lead and zinc.

### **Administrative History**

The cleanup was done under a December 1996 voluntary agreement between the Michigan Department of Environmental Quality, Elf Atochem North America, Inc., Bridgestone/Firestone, Inc. and Jones Chemicals, Inc. The project was privately financed by the aforementioned companies.

### **Amount of Contaminated Sediments**

- Volume: 25,182 yds<sup>3</sup>
- Highest PCB Concentration: 3.2 ppm

### **Project Status**

The remediation project was completed on June 30, 1997.

### **Total Cost**

The sediment remediation cost about \$3,000,000.

### **Unnamed Tributary to Wolf Creek**

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#### **Location**

This unnamed tributary to Wolf Creek originates in Montcalm County just east of Edmore, Michigan.

#### **Background**

Prior to 1973, as verified by MDNR, a General Electric plant discharged mercury contaminated wastewater to this watershed. The plant was sold to the Hitachi Magnetics Corporation in the mid 1970's.

In 1984, MDNR classified sediments as heavily polluted with mercury for about one mile downstream of the facility's outfall, and also reported high levels of cadmium, chromium, copper, nickel, lead, zinc, and oil and grease within 1,700 to 2,400 feet downstream of the outfall.

#### **Administrative History**

After negotiations between MDNR, Hitachi and General Electric in 1986, General Electric agreed to pay for the investigation and cleanup.

#### **Amount of Contaminated Sediments**

- Volume: 13,000 yds<sup>3</sup>
- Highest Mercury Concentration: 1,960 ppm

#### **Project Status**

Cleanup commenced in August 1986. Sediments contaminated with mercury at levels at or greater than 1 ppm were hydraulically dredged and disposed of at a Michigan licensed landfill. Verification testing indicated mercury at levels at 1.0 to 1.4 ppm in the tributary.

PCB contamination was also encountered in association with mercury levels above 1 ppm. These sediments were dredged and disposed of at a Michigan licensed landfill if at less than 50 ppm or at an out of state federally licenced TSCA disposal if at greater than 50 ppm. Verification testing indicated average PCB concentrations at .13 ppm. The cleanup was completed in April 1987 and was overseen by MDNR.

While this cleanup is considered a success, sediments in this waterbody have again become contaminated with mercury. Negotiations between the MDEQ and Hitachi Magnetics Corporation are currently underway regarding the need to determine the extent of mercury contamination now present.

#### **Total Cost**

The 1986 sediment remediation effort cost \$1,000,000.

### **South Branch Shiawassee River - Cast Forge**

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#### **Location**

The Cast Forge site is located on the east bank of the South Branch of the Shiawassee River west of Howell, Michigan in Livingston County. The Cast Forge plant is currently owned by Hayes Wheel International, Inc.

#### **Background**

The Cast Forge Steel Company manufactured aluminum wheel rims at this plant. The company used oils containing PCBs in their die-casting process from 1969 to 1972. From 1969 through 1976, wastewater and sludges containing PCBs were discharged from on site lagoons to the Shiawassee River.

The PCB contamination problem was identified by the MDNR through surveys conducted in 1974 and 1977. Widespread PCB contamination of the river was found downstream from the plant. Analysis of fish populations downstream of the plant identified the presence of elevated PCB levels in their tissue. High concentrations of PCBs were detected in river sediments from the plant site to approximately 10.5 miles downstream of the plant. The highest concentrations of PCBs were within the first mile downstream. The highest concentration of PCBs identified was 4,800 ppm.

#### **Administrative History**

In June 1981, a Consent Judgment was promulgated between Cast Forge Steel Company and the State of Michigan. This judgment required the removal of contaminated sediment to reduce PCB contamination to less than 10 ppm in sediments eight miles downstream of the Cast Forge plant. Cast Forge was required to pay \$750,000 to the state for cleanup of the river. However, these funds were exhausted after only 1.5 mile of river sediment was remediated. Approximately 2,600 pounds of PCBs were removed in approximately 2,300 yds<sup>3</sup> of river sediment, sand and gravel.

In 1981, Cast Forge sold the property to Kelsy-Hayes/Western Wheel, a manufacturer of aluminum wheel rims for the automotive industry. The Kelsy-Hayes/Western Wheel has sold the operation to a subsidiary, Hayes Wheel International Inc., which now occupies the plant.

#### **Amount of Contaminated Sediments**

- Volume: 1,805 yds<sup>3</sup> of river sediment and 500 yds<sup>3</sup> of sand and gravel
- Mass: 2,531 pounds of PCBs were removed
- Highest PCB Concentration: 4,800 ppm
- An unknown amount of contaminated sediments remain in the river.

**Project Status**

In September, 1983, the South Branch Shiawassee River was determined to be an uncontrolled hazardous waste site and was put on the NPL list of Superfund sites. The MDEQ has acted as the lead agency in managing the CERCLA Remedial Investigation/Feasibility Study (RI/FS). The RI was completed in 1992 and the FS will be completed in 1997. A ROD is expected for the site in 1998.

**Total Cost**

The cooperative agreement total for the project from the RI/FS through the ROD is \$1,302,405.

## **Black and Bergholtz Creeks - Love Canal**

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### **Location**

Love Canal is a 16-acre landfill in the southeast corner of the City of Niagara Falls, New York, about 0.3 mile north of the Niagara River.

### **Background**

In the 1890's, a canal was excavated to provide hydroelectric power. However the project was not completed, and the canal was later used by Hooker Electrochemical for disposal of over 21,000 tons of various chemical wastes, including dioxins. Dumping ceased in 1952, and in 1953 the disposal area was covered and deeded to the Niagara Falls Board of Education. Extensive development occurred near the site, including construction of an elementary school and numerous homes.

First reported at the site during the 1960s, problems with odors and residues increased in the 1970's as the water table rose, bringing contaminated ground water to the surface. Studies indicated that numerous toxic chemicals migrated into surrounding areas. Run-off from the Love Canal area drains into the Niagara River at a point 2.8 miles upstream of the intake tunnels for Niagara Falls' water treatment plant, which served about 77,000 people at the time. The river sediment had also become contaminated at the discharge point.

From 1983, investigations were conducted in order to assess the extent of the contamination in local waterways including: Black, Bergholtz and Cayuga Creeks, and the Niagara River 102nd Street delta.

### **Administrative History**

Love Canal is a Superfund Site and on the National Priorities List (NPL). The PRP involved with the site is Occidental Chemical Corporation (formerly known as Hooker Chemical and Plastics).

### **Amount of Contaminated Sediments**

- Volume: 17,200 yds<sup>3</sup>
- Highest 2,3,7,8 TCDD Concentration: 45.8 ppb

### **Project Status**

The sediment remediation was completed in 1990, after sediment was excavated from the Black and Bergholtz Creeks and stored at Occidental Chemical's Buffalo Avenue Plant. Occidental will incinerate a portion of the wastes and dispose of the rest at a RCRA landfill. No remedial action was found necessary in Cayuga Creek and the 102nd Street delta has been remediated through a separate project (see 102nd Street Embayment).

### **Total Cost**

Between 1977 and 1980, New York State and the Federal government spent about \$45 million at the site: \$30 million for relocation of residents and health testing, \$11 million for environmental studies, and \$4



million for a demonstration grant (under the Resource Conservation and Recovery Act) to build a leachate collection and treatment system.

Since 1979, the following remedial work has been completed: clay cap installed, perimeter leachate collection system and activated carbon treatment plant constructed, cap extended incorporating a synthetic membrane, offsite sewers cleaned and Black and Bergholtz Creeks cleaned.

The sediment remediation of the Black and Bergholtz Creeks cost an estimated \$14 million.

In accordance with settlement agreements reached with New York and the federal government, Occidental paid the state \$98 million and the federal government \$129 million. Occidental also took over operation and maintenance of the collection and treatment system.

### **Gill Creek - DuPont Plant Site**

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#### **Location**

The DuPont facility is located on Buffalo Avenue in the City of Niagara Falls, New York. It consists of 50 acres and is separated from the Niagara River by the Robert Moses Parkway. The site is transected into two halves by Gill Creek. Much of the site is built on filled land. Groundwater discharges into Gill Creek and the Falls Street Tunnel.

#### **Background**

DuPont's plant has been used for chemical manufacturing since 1898. Chemicals disposed of on the site include: chloroform, methylene chloride, trichloroethylene, PCBs, and other organic and inorganic compounds.

During the Niagara River Toxics Investigation, the United States Geological Service (USGS) drilled six monitoring wells along the Robert Moses Parkway in 1982. Well samples indicated high levels of chlorinated organics in the groundwater. This groundwater had also migrated into Gill Creek, causing sediment contamination.

#### **Administrative History**

Gill Creek was partially remediated in 1982 under a State Consent Order, however, contamination from both the DuPont and Olin facilities still remained. The DuPont site ROD was issued in 1989.

#### **Amount of Contaminated Sediments**

- Volume: 8,020 yds<sup>3</sup>
- Highest PCB Concentration: 11,000 ppm

#### **Project Status**

The Gill Creek remediation project was a joint effort with Olin Corporation. The dredged material was disposed off site at a commercial disposal facility. It was completed in December 1992 and the creek has been restored. Annual monitoring of creek sediments is performed by DuPont and Olin.

#### **Total Cost**

DuPont has spent \$40,000,000 for total site remediation. The Gill Creek remediation cost an estimated \$10,000,000, with a portion of that cost shared by Olin Corporation.

### **Gill Creek - Olin Industrial Welding Site**

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#### **Location**

The site is located on Packard Road near 30<sup>th</sup> Street in the City of Niagara Falls, New York. The site is about ¼ mile north of the Niagara River.

#### **Background**

This site facility was used by the High Energy Fuel Division of Olin during the 1940's and early 1950's to operate a research laboratory and pilot process plant. It is a low lying area which has been filled with brine sludge (containing mercury), industrial scrap, fly-ash and possibly waste transformer oil containing PCBs. The buildings on the site have all been demolished. Contamination has been found in the groundwater, the soil and the sediments of Gill Creek.

#### **Administrative History**

Under a State Consent Order, a Remedial Investigation and Feasibility Study was completed in December 1993. In November 1994, a ROD was signed as was an order to dredge the creek's contaminated sediments. The RI reported low levels of mercury, hexachlorocyclohexanes (HCHs) and PAHs in the sediments of Gill Creek.

#### **Amount of Contaminated Sediments**

- Volume: 7,500 yds<sup>3</sup> (estimate)
- Highest Mercury Concentration: 11 ppm

#### **Project Status**

This project is in the remedial design stage. The dredged material will be landfilled on site. Remediation work is expected to be done during the summer or fall of 1998.

#### **Total Cost**

Estimated sediment remediation cost for this section of Gill Creek is \$1.4 million.

## **Bloody Run Creek - Hyde Park Landfill**

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### **Location**

The Hyde Park Landfill is a 15 acre site located less than 1/2 mile from the Niagara River in northwestern Niagara Falls, Niagara County, New York. The site is a few blocks east of a 500 home residential community. The drainage from the landfill formerly flowed through Bloody Run Creek, which flows north along the perimeter of a portion of the residential community and discharges into the Niagara River gorge.

### **Background**

The landfill is owned by Occidental Chemical Corporation (formerly Hooker Chemical and Plastics). Approximately 80,000 tons of hazardous materials were dumped at the site from 1953 to 1974. These materials included: 2,4,5 - trichlorophenol (TCP), dioxins and chlorinated organic wastes. Early investigations of Bloody Run Creek indicated that the creek had high levels of organic chemicals, requiring the installation of a clay cap and shallow leachate collection system around the landfill area in 1979. Since that time, additional work has been completed including a deeper leachate collection system around the existing landfill. Monitoring data showed that surface water and ground water along Bloody Run Creek had been contaminated by wastes leaching from this landfill. Dioxin was found in the sediment taken from Bloody Run Creek.

### **Administrative History**

This site is on the NPL and governed by a pre-CERCLA settlement agreement. On January 19, 1981, the Federal and State Governments and Occidental Chemical Corporation signed a Consent Decree. This agreement, which became effective on July 1, 1982, specified the process by which OCC would remedy the problems at the site, maintain these remedies, and ensure that they remain effective. The agreement also required a 35 year minimum period of remedial maintenance from the date of judgment. Remediation work began after the Agreement on a Requisite Remedial Technology (RRT) was approved in 1986. Numerous mitigation activities have been completed on the site under the agreement, including the excavation of Bloody Run Creek sediments.

### **Amount of Contaminated Sediments**

- Volume: 27,000 yds<sup>3</sup>
- Highest 2,3,7,8-TCDD Concentration: 3.5 ppb

### **Project Status**

Sediment remediation on Bloody Run Creek began in October 1992 was completed in March 1993.

### **Total Cost**

As of May 1997, the entire remediation project (including well installation, a landfill cap, leachate treatment/storage facilities and sediment remediation) has cost \$58,000,000. Of this total, the federal government provided \$11,000,000 and the PRP financed the remainder. It is also estimated that operation and maintenance expenditures for the PRP will be about \$2,000,000/year for the next 30 years.

### **Pettit Flume - Durez-Occidental**

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#### **Location**

This plant site is owned by Occident Chemical Corporation (formerly Hooker Chemical and Plastics). It is on Walck Road in the City of North Tonawanda, Niagara County, New York. The area borders residential and light commercial properties on three sides. The fourth side is adjacent to another manufacturing company. The manufacturing site is no longer active. Storm sewers from the plant site drain to the Pettit Flume, which discharges to the Niagara River.

#### **Background**

The chemical plant located here disposed of its wastes on site, including phenol tar and phenol bearing material. Contaminants from the site migrated via the storm sewer system and contaminated sediments at the Pettit Flume outfall area.

#### **Administrative History**

This site was remediated under a State Consent Order. The selected remedy included containment of the plant site, cleaning of the storm sewers and contaminated sediment excavation from the storm sewer outfall area. These sediments were sent to Occidental's Niagara Falls plant for storage pending final disposal.

#### **Amount of Contaminated Sediments**

- Volume: 15,070 yds<sup>3</sup>
- Highest 2,3,7,8 TCDD Concentration: 15 ppb

#### **Project Status**

The remediation project began in 1989 and was completed in 1995. In the Pettit Storm Sewer Outfall area, the contaminated sediments were dredged. By April 1996, final site restoration was completed.

#### **Total Cost**

The entire project cost approximately \$23,000,000.

## **Union Road**

### **Contact**

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### **Location**

The site is located on Losson Road in the City of Cheektowaga, Erie County, New York.

### **Background**

Prior to 1955, the area was used as a railroad maintenance and classification yard by the New York Central Railroad. Coal ash, grease and oil from locomotive and rail car maintenance were frequently dumped into a marshy pit on site. The existence of the pit was not brought to the attention of state and county environmental agencies until the early 1980's, when it was discovered that some of the wastes had migrated into nearby Deer Lik and Slate Bottom Creeks. Tar samples taken from the pit indicated a leachable lead concentration of 130 ppm.

### **Administrative History**

The remediation project is under State Superfund authority, which completed the RI/FS in the summer of 1991. A ROD was signed in March of 1992. The ROD required the following: waste containment with a subsurface barrier and cap, extraction and groundwater treatment, excavation of soils and sediments in select areas and covering these select areas with clean fill and vegetation.

### **Amount of Contaminated Sediments**

- Volume: 5,600 yds<sup>3</sup>
- Highest Lead Concentration: 84,900 ppm

### **Project Status**

The remediation project was completed in 1996.

### **Total Cost**

The remediation work for the entire site cost about \$8,000,000.

### **Frontier Chemical - Pendleton**

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#### **Location**

The Frontier Chemical site consists of approximately 70 acres of land adjacent to Bull Creek, which is about 4.25 miles from the Niagara River. This site is located in the town of Pendleton on Townline Road, New York.

#### **Background**

From 1958 to 1974, Frontier Chemical Waste Process, Inc. used this facility to treat and dispose of chemical wastes. While in operation, the site processed various wastes including solvents, oils, acids, dyes, paint wastes and heavy metal sludges. Quarry Lake, located on the site, was used to store discharges from these operations. Barrels containing wastes were buried underground on the site. In 1984 and 1985, over 50 barrels containing pyridine were excavated.

#### **Administrative History**

Although Consent Orders were issued in 1984, 1985 and 1988, to remediate Quarry Lake, Frontier did not comply with these orders. Therefore, the New York State Department of Environmental Quality (NYSDEC) proceeded with the clean up under State Superfund.

The RI/FS study was completed in 1991 and determined that the bottom of Quarry Lake was contaminated with heavy metals. The remedy selected included dredging of lake sediments, containment of the process area, groundwater collections and treatment, and control of run-off. Since Frontier Chemical was no longer a viable firm, companies which shipped wastes to the site including Olin, Dow and Allied Signal were identified by the state as PRPs. The ROD was issued in March 1992 and a Consent Order requiring completion of site remediation was signed with the PRPs.

#### **Amount of Contaminated Sediments**

- Volume: 56,000 yds<sup>3</sup>
- Highest Chromium Concentration: 1,100 ppm
- Highest Cadmium Concentration: 87 ppm

#### **Project Status**

Project was completed in 1996 and long term monitoring has begun.

#### **Total Cost**

The total cost of the site remediation project including 30 year operation and maintenance estimates is approximately \$18,770,000.

## **102nd Street Embayment**

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### **Location**

This site is located along the Niagara River banks within the eastern section of the City of Niagara Falls, New York.

### **Background**

The 102nd Street site was used as a landfill from 1943 to 1971 for approximately 159,000 tons of wastes. These wastes included phosphates, HCHs, chemical and demolition wastes, and fly ash. It is owned jointly by Olin Chemical Corporation and Occidental Chemical Corporation.

### **Administrative History**

The site is listed on the National Priorities List. It is administered as a joint EPA/NYSDEC lead Superfund site. In September of 1990, a ROD was issued. The ROD encompassed containment of the landfill including: slurry wall construction, capping, removal of contaminated sediments, removal of off site contaminated soil, storm sewer re-routing, and long term monitoring. In 1991, USEPA issued an Administrative Order for the PRPs to begin implementing the clean up.

### **Amount of Contaminated Sediments**

- Volume: 28,500 yds<sup>3</sup>
- Highest HCHs Concentration: 867 ppm
- Highest 2,3,7,8 TCDD Concentration: 3.3 ppb

### **Current Status**

Sediment removal was completed in 1996. Landfill construction for sediment disposal is currently underway. Monitoring has not indicated any bioaccumulation of site chemicals in the Niagara River fish. However, a state Department of Health fish advisory is in effect for sport fish in the Upper Niagara River, due to elevated levels of PCBs found in the fish tissue. Remediation work is expected to finish in 1998. Operation and maintenance systems will be in place for the ensuing 30 years.

### **Total Cost**

The entire remediation project as specified in the ROD is expected to cost approximately \$30,000,000.



## **Buffalo Color - Area D**

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### **Location**

Area D of the Buffalo Color Plant is in the City of Buffalo, New York. The site is bounded on three sides by the Buffalo River, approximately four miles upstream from the confluence of the Buffalo and Niagara Rivers.

### **Background**

Area D was used for chemical manufacturing, handling and disposal from 1905 to 1974. It was originally owned and operated by Contact Process Company and National Aniline Chemical Company. In 1920, these companies merged into Allied Chemical and Dye Corporation (now Allied Signal). Buffalo Color Corporation purchased the site in 1977 and it has remained idle since. Remedial investigations of the site have found evidence of PAHs, chlorinated benzenes and heavy metals in the site fill layer. Volatile organics, chlorinated benzenes, heavy metals and non-aqueous phase liquid have been found in the groundwater.

The main contamination of the Buffalo River and its sediments has occurred by a migration of shallow ground water and erosion of the shoreline.

### **Administrative History**

This is a NYSDEC lead site. A Consent Agreement was signed in April 1982 to undertake field investigations. Buffalo Color and Allied Signal completed the Remedial Investigation in 1989. A ROD was signed in November 1991, outlining the following actions:

- The shoreline will be protected and adjacent river sediments will be dredged.
- Installation of a soil bentonite slurry wall around the entire perimeter of the site.
- Collection and treatment of shallow groundwater from within the site.
- Installation of a flexible membrane liner covered with soils and vegetated.
- Creation of a wetlands area to promote aquatic and other wildlife in the area.

### **Amount of Contaminated Sediments**

- Volume: 35,000 yds<sup>3</sup> (estimate)
- Highest PAH Concentration: 360 ppm
- Highest Chromium Concentration: 1,990 ppm

### **Project Status**

Remediation work began in July 1996, and is expected to finish by the end of 1998.

### **Total Cost**

The entire remediation project is expected to cost \$8,000,000, which is being borne by the PRPs. The state will also expend about \$200,000 on the project

## **Niagara Mohawk-Cherry Farm / River Road Sites**

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### **Location**

This site is located in Erie County within the Town of Tonawanda, New York. It is a 80 acre area between River Road and the Niagara River.

### **Background**

The Cherry Farm and River Road sites were used for the disposal of waste from steel manufacturing from 1908 to 1963, and were operated as a disposal landfill for industrial waste from facilities in the area from 1963 to 1970. Flyash, foundry sand, sludge, liquid boiler cleaning wastes, concrete rubble and other fill were disposed on these sites.

### **Administrative History**

Under the State Superfund process, a Consent Order was signed by a PRP group in April 1988. The RI/FS was completed and a ROD was issued for the site by NYSDEC in February 1991. After further testing, the ROD was amended in 1993. A ROD for the River Road site was signed in March, 1994. A joint Consent Order was signed on September 27, 1994 to design and implement a remedial program for these sites. In 1996, the project was expanded to include the removal of contaminated sediments.

### **Amount of Contaminated Sediments**

- Volume: 48,000 yds<sup>3</sup> (estimate)
- Highest PAH Concentration: 1,500 ppm

### **Project Status**

Remediation work is currently underway. The project is expected to be finished by December 1998.

### **Total Cost**

The project cost estimate is about \$8,000,000 for the remediation land based work on the Cherry Farm/River Road sites. The removal costs for the contaminated sediments from the Niagara River is approximately \$4,000,000.

## **Niagara Transformer**

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### **Location**

The site is located at 1747 Dale Road in the City of Cheektowaga, Erie County, New York. The drainage ditches at the site flow into the Sloan Sewer Drain. This drain emerges to the surface and travels through a residential district before it eventually discharges into the Buffalo River.

### **Background**

Owned and operated by the Niagara Transformer Corporation, this site houses a facility that manufactures electrical transformers. From 1958 until the late 1970's, transformer oil wastes containing PCBs were discharged on site, in order to control dust in the parking lot and kill weeds.

In April of 1990, an oily leachate in one of Niagara Transformer's drainage ditches was found to contain approximately 80,000 ppm PCBs. High levels of PCBs were also detected in the sediments downstream in the drainage system. In the residential area, stream sediments were found to have PCB contamination in the range of 1-30 ppm.

### **Administrative History**

Under the State Superfund process, Niagara Transformer agreed to complete a RI/FS. The RI Report found that PCB contamination had migrated into the perimeter drainage ditch. Elevated PCB levels were also discovered in the surface soil on a cemetery adjacent to the site. On December 30, 1993, a ROD was signed which called for excavation and off-site disposal of the drainage ditch sediments.

### **Amount of Contaminated Sediments**

Volume: 11,500 yds<sup>3</sup>

Highest PCB Concentration: 3,200 ppm

### **Project Status**

Remediation efforts are essentially complete. The project is expected to be finished by December 1997.

### **Total Cost**

The total remediation project cost approximately \$5,600,000.

## **Creekside Golf Course**

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### **Location**

The Creekside Golf Course (now the Evergreen Golf Course) is located in the Town of Amherst, Erie County, New York. The hazardous waste site is along the northern edge of the former golf course's third hole and adjacent to Tonawanda Creek.

### **Background**

The developer of the golf course was additionally an owner of a scrap business. The scrap business often hauled waste for local facilities, including the Occidental Durez Plant in North Tonawanda. During the early 1950's, numerous drums of waste from the Durez Plant were used as a stream erosion control measure. Occidental was not aware of this activity and no accurate records were kept of the number of barrels used at the golf course. Deterioration of the drums over time resulted in the contamination of Tonawanda Creek bank soils and bottom sediments.

### **Administrative History**

NYSDEC began to investigate the site in 1982 and again in 1985. After sampling the creek sediments, the surface barrels were removed in 1985. NYSDEC and Occidental both conducted several more investigations of the site from 1986 until 1990. In August of 1992, under the State Superfund process, a Consent Order was signed between the State and Occidental Chemical Corporation to implement the ROD issued by the State in 1991.

### **Amount of Contaminated Sediments**

- Volume: 1,300 yds<sup>3</sup>
- Highest 2,3,7,8-TCDD Concentration: 0.33 ppb
- Highest Phenol Concentration: 10 ppm

### **Current Status**

Remediation work on the site was completed in 1993. A total of 631 drums were removed from the creek bank and bottom. Only 5% of these drums were found to be wholly intact. Approximately 1,300 yds<sup>3</sup> of contaminated sediments were also excavated from the creek bottom. All wastes were disposed of at a treatment, storage and disposal facility (TSDF) in Model City, New York.

### **Total Cost**

The Creekside Golf Course sediment remediation project cost approximately \$4,500,000.

## **Columbus McKinnon**

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### **Location**

The Columbus McKinnon Corporation's facility is located at One Fremont Street in the City of Tonawanda, New York. The facility is adjacent to Ellicott Creek.

### **Background**

Prior to 1984, Columbus McKinnon used this facility for manufacturing a variety of chain products. Since that time, site has been used for forging, metal production, heat treatment operation and storage of metal products. In the past, PCBs were released on the site which contaminated site soils and sediments in nearby Ellicott Creek.

### **Administrative History**

This site was listed by NYSDEC on the New York State Registry of Inactive Hazardous Waste Disposal Sites and it was found to present a significant threat to public health and the environment. Under the State Superfund process, Columbus McKinnon entered into an Order on Consent with the NYSDEC to conduct a RI/FS in October of 1989. The RI was completed in June of 1991 and the FS was finished in April 1992. NYSDEC signed a ROD on October 30, 1992, which outlined the final remediation plan.

### **Amount of Contaminated Sediments:**

- Volume: 2,349 yds<sup>3</sup>
- Highest PCB Concentration: 87 ppm

### **Current Status**

The remediation work was completed in 1995. Contaminated sediments were excavated from Ellicott Creek using a horizontal augerhead hydraulic dredge and disposed of in an off site TSCA/RCRA approved landfill in New York.

### **Total Cost**

The entire remediation project for this site cost \$5,250,000.

## **St. Lawrence River - ALCOA Site**

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### **Location**

The Aluminum Company of America (ALCOA) facility is located on 2,800 acres of land within the Town of Massena. The facility is adjacent to the St. Lawrence River to the north, the Town of Massena and a power canal to the west, and the Grasse River to the South. This site is part of the Massena AOC.

### **Background**

ALCOA has used this site since 1903 for the production of aluminum. From the late 1950's until the early 1970's PCBs were used in the facility's hydraulic fluids and electrical equipment. The smelting process also created a waste by-product, spent potliner, which is a listed hazardous waste. Consequently, waste PCBs, potliner, and other hazardous wastes were generated and disposed of at the site.

### **Administrative History**

USEPA issued an Administrative Order under Superfund in 1989 to ALCOA for study and remediation of the St. Lawrence River and the Grasse River sediment. ALCOA is responsible for 8.5 miles of the Grasse River before it joins the St. Lawrence River.

Although this site is not on the National Priorities list, USEPA is responsible for the cleanup of the Grasse River portion of the contamination. NYSDEC is the lead agency on the soil remediation. ALCOA began sediment remediation in 1995. At that time, they excavated approximately 3,500 yds<sup>3</sup> of sediment from a hotspot on the Grasse River near their facility during a demonstration project. However, there is still an unknown amount of contaminated sediment left in the river.

### **Amount of Contaminated Sediments**

- Volume Dredged: 3,500 yds<sup>3</sup> removed
- Volume Remaining: Unknown
- Highest PCB Concentration: 72 ppm

### **Current Status**

The site is still in the Analysis of Alternatives stage. Current studies are investigating the feasibility of dredging approximately 8.5 miles of the Grasse River.

### **Total Cost**

The 1995 Grasse River remediation effort cost \$4,800,000. No estimate for the future remediation work is available at this time.

## **St. Lawrence River - General Motors Site**

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### **Location**

The General Motors (Central Foundry Division) Site is a 165-acre aluminum casting facility on the St. Lawrence River, in Massena, St. Lawrence County, New York. It is part of the Massena AOC. The site is near the St. Lawrence River, Raquette River and the St. Regis Mohawk Nation at Akwaesasne.

### **Background**

The site contains two areas that have received an estimated 30,000 yds<sup>3</sup> of PCB- contaminated sludges generated from hydraulic oil used in the plant's machinery from 1959 until 1973. Several areas on the property are contaminated, including the industrial landfill and east disposal site. Analyses during the RI indicate that ground water and surface water are contaminated on the site. PCB contamination has been detected in the sediments of both the Raquette and St. Lawrence Rivers and a cove attached to the Mohawk reservation.

### **Administrative History**

This project is administered under Superfund and is on the National Priorities List. USEPA issued a ROD in 1990 requiring a \$78 million clean up of the site, except for 2 areas which were covered in a second 1992 ROD. These RODs outlined remediation activities including a combination of excavation, sediment removal and treatment to remove chemicals such as PCBs.

In 1995, GM dredged 13,800 yds<sup>3</sup> of sediments from the St. Lawrence River. The dredging goal was to restore the sediments to 1 ppm PCBs, however this goal was not met. An average of 3 ppm PCBs still remain in the river sediments, with one sample measuring 6,000 ppm PCBs. Hot spots remaining in the dredged area were capped.

### **Amount of Contaminated Sediments**

- Volume Dredged: 13,800 yds<sup>3</sup> dredged in 1995
- Volume Remaining: Unknown
- Highest PCB Concentration: 6,000 ppm (in the sediment still remaining after the 1995 dredge)

### **Project Status**

The project is awaiting ROD amendment regarding the disposal of the 1995 dredged sediments. Currently, the dredged materials are stockpiled on site. Further remediation of the site is also on hold until the final ROD Decision. Dredging of sediments in the cove adjacent to the Akwaesasne lands and the Raquette River still remains to be done.

### **Total Cost**

The 1995 dredging cost approximately \$7,000,000. The total estimated cost for the entire project is \$78,000,000.

## **Black River - USX/Kobe Steel Company**

### **Contact**

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### **Location**

The USX/Kobe Steel Company (formerly USS Lorain) is located in Lorain, Ohio on the banks of the Black River, an IJC Area of Concern. Discharges from this facility have contributed to the degradation of the Black River.

### **Background**

Sampling conducted during the 1970's and 1980's by USEPA and Ohio Environmental Protection Agency (OEPA) indicated significant sediment contamination. The river was identified as having the high concentrations of steelmaking coke plant wastes commonly referred to as polynuclear aromatic hydrocarbons (PAHs). PAHs are of concern because they have been shown to produce tumors and lesions in benthic fish populations. Sediment sampling took place on the river and high concentrations of PAHs were found at levels as high as 390 ppm. Cadmium was also found at levels exceeding 30 ppm and studies found tumors in Black River fish.

### **Administrative History**

In January 1979, a civil action was brought against USS by the USEPA. The action claimed that USS was in violation of the terms of its NPDES permit issued pursuant to the CWA. Negotiations were entered into and led to a Consent Decree issued in June 1980.

By the terms of this Consent Decree, USS agreed to pay a \$4 million penalty. Of this amount, \$1.5 million was to be spent on a dust suppression program at the facility. Because of operation closures at the Lorain Plant, USS did not spend \$1.5 million on dust suppression.

In order to resolve the outstanding \$1.5 million expenditure, USS and the USEPA entered into negotiations which resulted in the 1985 agreement which required USS to remove and dispose of 50,000 yds<sup>3</sup> of sediments from the Black River.

### **Amount of Contaminated Sediments**

- Volume: 50,000 yds<sup>3</sup>
- Highest PAH Concentration: 390 ppm

### **Project Status**

The remediation is completed. Dredging of the river was initiated in the fall of 1989. But due to delays from bad weather conditions and mechanical failures, the project fell behind schedule. Over 50,000 yds<sup>3</sup> of sediments along a 0.8 river mile stretch were finally removed during the summer and fall of 1990. The contaminated sediment was removed and placed in an on site TSCA certified landfill.

### **Total Cost**

The sediment remediation project cost \$1,500,000 and was funded entirely by the PRP.



### **Ottawa River Tributary**

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#### **Location**

The Ottawa River Tributary flows north to the Ottawa River in the city of Toledo. The tributary is located upstream near the Stickney Avenue and Dura Landfills and is across the river from the Tyler Street Landfill. The GenCorp facility was sited approximately 1,000 feet to the east of the tributary.

#### **Background**

GenCorp utilized this 40 acre site for manufacturing plastic coated fabrics such as vinyl upholstery. From 1967 to 1972, PCB-containing oil was used in their manufacturing process as an internal heat exchange fluid. The property was sold to Textileather Corp. in 1990.

#### **Administrative History**

A Consent Agreement was signed between GenCorp and OEPA in March of 1992, which called for only land based remediation. However, further studies in 1988 and 1994 indicated elevated PCB levels in the tributary sediments. GenCorp agreed to conduct further remediation studies of the sediments, although it was not the only PRP involved. This site is now being remediated under a voluntary partnership with GenCorp, Ohio EPA, the City of Toledo and GLNPO.

#### **Amount of Contaminated Sediments**

- Volume: 10,000 yds<sup>3</sup>
- Highest PCB level found: 74,000 ppm

#### **Project Status**

A remedial options evaluation report was completed in June, 1997. Remediation began in January, 1998 and project completion is slated for June, 1998.

## **Menominee River - Ansul Fire and Protection Site**

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### **Location**

The Menominee River AOC is centered in the lower end of the river where it enters the waters of Green Bay, approximately 50 miles north of the city of Green Bay, Wisconsin. It includes the lower three miles of the river from the Upper Scott Paper Company dam to the river's mouth and approximately three miles north and south of the mouth along the adjacent shoreline of Green Bay. It also includes Green Island, which is located in Wisconsin waters approximately five miles southeast of the river mouth. The Menominee River forms the boundary between the northeast corner of Wisconsin and the southern tip of the Upper Peninsula of Michigan. The twin cities of Marinette, Wisconsin and Menominee, Michigan are adjacent to the AOC.

The Ansul facility is located at One Staton Street, Marinette, Marinette County, Wisconsin. Marinette County is in the northeastern part of the state, adjacent to the Menominee River. The river empties into Green Bay approximately 1.2 miles downstream of the Ansul site.

### **Background**

Pollutants such as mercury, PCBs, oil and grease, etc., have also resulted in impaired beneficial uses in the Menominee River AOC. However, one of the primary reasons the Menominee River is classified as an AOC is because of the arsenic contamination in the turning basin and in sediments along the right bank of the river below the Ansul Fire Protection Company, which is located on the Wisconsin side of the river.

Since 1934, the Ansul facility has been the site of fire suppressant products manufacturing. From 1957-1977, Ansul also produced agricultural herbicides. Manufacturing of these herbicides produced a salt by-product that was 2% arsenic by weight and stored in uncovered, unlined waste piles. These salt piles were covered in 1973. By 1977, approximately 95,000 tons of arsenic salt were stored in three locations at the Ansul plant: the salt vault, Building 59 and the dock waste pile.

WDNR became involved with the situation in 1971. In 1973, they issued a Consent Decree requiring Ansul to monitor arsenic discharges into the Menominee River and the soil and ground water conditions. Also, WDNR required Ansul to implement a long term plan for handling and disposing of newly generated arsenic salt piles.

### **Administrative History**

The Federal Resource Conservation and Recovery Act (RCRA) Consent Agreement between Ansul Fire Protection Company, the State of Wisconsin and the U.S. Environmental Protection Agency (USEPA) was initiated in 1990. During the following seven years, Ansul was evaluating old monitoring wells in preparation for the agreement. A total of 15 damaged monitoring wells were closed. On July 1, 1997, USEPA ordered Ansul to remove as much as 15,000 yards of contaminated sediment from a boat slip located adjacent to its facility. The sediment contained levels as high as 22,000 ppm arsenic.

### **Amount of Contaminated Sediments**

Within the Ansul facility, there are four areas which have been identified for sediment remediation. Each has different arsenic concentrations and in general, the higher concentrations were found near the shore.

- Sixth Street Slip: Highest level found was 188 ppm
- Menominee River: Highest level found was 115 ppm
- Turning Basin: Highest level found was 18,200 ppm and the average concentration was 150 ppm
- Eighth Street Slip: Concentration range was between 2,400 and 22,000 ppm
- Total Volume: 10,000 yds<sup>3</sup>

### **Project Status**

USEPA ordered Ansul to remove 10,000 yds<sup>3</sup> of sediment on July 1, 1997. The manner in which Ansul was to remove the sediment is to be proposed by Ansul and approved by USEPA. Ansul has seven months from July 1, 1997 to remove the sediment from the Eighth Street Slip.

### **Total Cost**

USEPA has estimated the remediation cost to be approximately \$1,500,000.

## **Newton Creek/Hog Island Inlet**

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### **Location**

The Newton Creek System includes the Newton Creek Impoundment, Newton Creek, Hog Island Inlet, and Superior Bay at the inlet mouth. The Newton Creek system is located on the Superior Plain within the City of Superior, Wisconsin, and discharges into Lake Superior. This system is one of five areas identified within the St. Louis River AOC as having elevated levels of contaminants in the sediment. The Murphy Oil, USA site is located at the headwaters of Newton Creek.

### **Background**

Murphy Oil, USA, an oil refinery, used the Newton Creek Impoundment to discharge its treated wastewater which is covered under a Wisconsin Pollution Discharge Elimination System (PDES) permit. The impoundment has a water control structure to contain any petroleum spills which may have discharged into the impoundment. Over a period of many years, contaminated sediment accumulated in the impoundment; with possible impact further downstream. Newton Creek has also been impacted by a former municipal CSO. An additional source is known to have impacted the Hog Island Inlet.

Sampling completed by WDNR found high elevated levels of PAHs, oil and grease, a variety of metals (including antimony, arsenic, copper, lead, nickel, selenium, and zinc) and Diesel Range Organics (DRO). High concentrations exceeding 80 ppm PAHs and 10,000 ppm DRO were found in the Newton Creek Impoundment. The sediment of Newton Creek impoundment typically contained between 10 to 20 ppm PAHs. Hog Island Inlet exhibited much lower levels averaging between 5 to 9 ppm PAHs.

### **Administrative History**

The WDNR investigated the Newton Creek System over a two year period, 1993 and 1994, to determine the extent of contamination in the system. Information from these studies was used to negotiate a clean up with Murphy Oil, USA. This remediation project is a result of a negotiated Memorandum of Understanding (MOU) between the WDNR and Murphy Oil, USA regarding clean up of the Newton Creek Impoundment and 780 feet of Newton Creek immediately downstream of the impoundment. The MOU was signed in April of 1996 and the remediation began in August 1997. Additional clean up of the remainder of Newton Creek and Hog Island Inlet will be addressed in the near future.

### **Amount of Contaminated Sediments**

- Volume in Newton Creek Impoundment: 2,400 yds<sup>3</sup>
- Volume in Newton Creek: 1,850-3,150 yds<sup>3</sup>
- Highest PAH Concentration: 80 ppm

### **Project Status**

Murphy Oil, USA has agreed to remove contaminated sediment from the impoundment and the first 780 feet of Newton Creek immediately downstream of the impoundment. Approximately, 2,400 yds<sup>3</sup> of contaminated sediment from the impoundment and 120 yds<sup>3</sup> of contaminated sediment from the first reach of

Newton Creek were removed. This material was combined with cement and disposed of on Murphy Oil's property into two existing waste water lagoons which were converted into the disposal site. This work began in August 1997 and should be completed in November 1997. The remediation of the remainder of Newton Creek and Hog Island Inlet is being pursued by the WDNR.

**Total Cost**

The sediment remediation cost was approximately \$250,000.

## **North Avenue Dam of the Milwaukee River**

### **Contact**

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### **Location**

The North Avenue Dam is located on the Milwaukee River approximately 3.2 miles upstream from the river's confluence with Lake Michigan.

### **Background**

The North Avenue Dam was constructed over 150 years ago and creates an artificial boundary between the 80 acre Milwaukee River Impoundment and the Milwaukee River Estuary.

The impoundment sediments are contaminated with PCBs, PAHs, heavy metals and oxygen demanding substances.

### **Administrative History**

This remediation project is a voluntary action funded by the state, City of Milwaukee and USEPA. Easements are being provided by up to 15 landowners at no cost. The project has had input from the Milwaukee Country Department of Parks, Recreation and Culture, the WDNR, the City of Milwaukee, the Southeastern Wisconsin Regional Planning Commission, the Milwaukee Metropolitan Sewerage District and the Village of Shorewood. Beginning in 1990 and continuing to the present, frequent informational meetings were also held for elected officials and the public.

The decision to cooperate and implement is based on a desire to restore the environment and provide new and enhanced recreating opportunities for the most densely populated area in the state. The City of Milwaukee has invested millions of dollars in constructing public riverwalks along the Milwaukee River Estuary and would like to see the remediation efforts improve the quality of the river.

### **Amount of Contaminated Sediments:**

- Volume: 750,000 yds<sup>3</sup>
- PCB Concentration Range: <0.5 to 29 ppm

### **Project Status**

Site construction started August, 1997. The majority of remediation work, including dam abandonment and mechanical dredging (8,000 yds<sup>3</sup>), are expected to be completed by the end of 1997. The remainder of work consisting of fish habitat restoration, stream bank protection (using a combination of rip rap and bioengineered systems), upland plantings and wetland restoration will finish during the Spring of 1998. The remaining contaminated sediments will be managed in place (742,000 yds<sup>3</sup>).

**Total Cost**

Costs for the first phase of the project are:

- Dam abandonment: \$374,000
- Water intake replacement: \$1,500,000 or less
- Sediment management and habitat restoration activities: \$2,600,000

Approximate total is \$4,600,000.

## **Ruck Pond**

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### **Location**

Ruck Pond, part of the Cedar Creek watershed, is located in Cedarburg, Wisconsin, approximately 25 miles north of Milwaukee. Cedar Creek has a series of five small millponds and dams. Four out of the five impoundments have been impacted by PCB contaminated sediment. Ruck Pond is the furthest upstream contaminated impoundment in the Cedar Creek system.

### **Background**

As Cedar Creek travels through Cedarburg, Wisconsin, its waters are exposed to sediments contaminated by PCBs, a class of chemicals known for their carcinogenic, teratogenic, and mutagenic properties. Within the Cedar Creek system, Ruck Pond contained 80 to 85% of the PCB mass, as well as the highest concentration of PCBs. Ruck Pond is also the farthest upstream contaminated pond in the system. Therefore, it was selected as the priority impoundment for remediation.

### **Administrative History**

An emergency removal action agreement was signed with Mercury Marine, as a result of a Wisconsin Department of Natural Resources (WDNR) enforcement action.

### **Amount of Contaminated Sediments**

- Volume: 5,900 m<sup>3</sup> (7,700 yds<sup>3</sup>)
- Mass: 355 kilograms of PCBs
- Highest PCB Concentration: 150,000 ppm
- Average PCB Concentration: 474 ppm

### **Project Status**

The area was remediated by dry excavation of the contaminated sediments. It was dammed off and the sediment was allowed to dry to a mud consistency. The contaminated sediment was then removed and landfilled. The TSCA material was sent to a chemical waste landfill in Utah and the non-TSCA material was landfilled at a Wisconsin facility.

The project was completed during the Fall of 1994 with 96% of the PCB mass removed. According to the Wisconsin Department of Natural Resources, there has been no evidence of any reoccurring contamination at the site. Fish tissue PCB concentrations dropped 85% (caged minnows 37 day exposure) after remediation. Long term water column PCB concentrations are projected to have decreased by 94% as a result of the cleanup. Negotiations are continuing for additional sediment remediation downstream.

### **Total Cost**

The sediment remediation cost was approximately \$1,200 per m<sup>3</sup> or \$7,080,000.



## **Sheboygan Harbor and River Superfund Site - Tecumseh Products Company**

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### **Location**

The Sheboygan Harbor & River site extends approximately 14 miles through the communities of Sheboygan Falls, Kohler, and Sheboygan. The site area includes Sheboygan Harbor, located on Lake Michigan, and the lower Sheboygan River, which discharges into the Sheboygan Harbor.

### **Background**

In 1977, the State of Wisconsin detected polychlorinated biphenyls (PCBs) during routine sampling of fish. Since then, PCBs have been detected in fish, wildlife, surface water, sediments in the harbor and river and in flood plain soils. The highest concentrations of PCBs have been detected in sediments immediately downstream from a die-casting plant ((named as a Potentially Responsible Party (PRP)) in Sheboygan Falls. Concentrations decline farther downstream from the plant. The PRP excavated PCB contaminated soils from its property along the river and disposed of them off site in 1978. The Sheboygan River drains into Lake Michigan, the source of drinking water for approximately 58,000 people within the Sheboygan/Sheboygan Falls/Kohler metropolitan area. People who come in direct contact with or ingest contaminated soil, sediments, or surface water may be at risk. Because fish and wildlife are contaminated with PCBs, people who eat contaminated fish or waterfowl also may suffer adverse health effects. In 1978, the State advised residents not to eat fish from the Sheboygan River and two tributaries, the Mullet and Onion Rivers, because of PCB contamination. In 1987, the State also issued an advisory not to eat wildlife from the area. The advisories are still in effect.

### **Administrative History**

The site was proposed for the National Priority List (NPL) in September 1985, and was finalized in June 1986. In 1986, the U.S. EPA and the State signed a Consent Order with the PRP, requiring the PRP to conduct an investigation at the site to determine the nature and extent of contamination and to identify and evaluate remedial alternatives to address the problem. Investigative studies were concluded in 1996. The studies concluded that sediments are contaminated with PCBs and a wide variety of heavy metals. In addition, soils near the waters edge (flood plain soils) and surface water are contaminated with PCBs and heavy metals including arsenic, chromium, copper, lead, and zinc. People who come in direct contact with or ingest contaminated soil, sediments, or surface water may be at risk. Because fish and wildlife are contaminated with PCBs, people who eat contaminated fish or waterfowl also may suffer health effects.

From 1989 to 1990, the PRP dredged approximately 3,800 cubic yards of contaminated sediments from the upper Sheboygan River. The PRP has stored the sediments in two containers on site: a confined treatment facility (CTF) and a sediment management facility (SMF). The CTF is being used for biodegradation studies to evaluate the feasibility of biodegradation of PCBs in place.

The SMF is designed for temporary storage of the remaining dredged sediments until they can be disposed of properly. During the period between 1989 and 1990, eight other sediment deposits were "armored" in the

upper Sheboygan River. These areas were covered with several layers a geotextile fabric, run of bank material, cobble and wire cages filled with rock (gabions) in order to prevent the PCB contaminated sediment from moving downstream. These activities were summarized in a report entitled Alternative Specific Remedial Investigation Report (ASRI). The ASRI was prepared by the PRP and finalized in October 1995.

**Amount of Contaminated Sediments**

- Volume: 3,800 yds<sup>3</sup>
- Highest PCB Concentration: 4,300 ppm

**Project Status**

Currently, cleanup options for the entire river are being evaluated by the PRP and will be presented in a Feasibility Study (FS) Report. The FS Report is anticipated to be completed by summer 1998. A final cleanup decision is expected by December 1998.

## **Grand Calumet River/Indiana Harbor**

### **Contact**

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### **Location**

The Grand Calumet River, originating in the east end of Gary, Indiana, flows 13 miles (21 km) through the heavily industrialized cities of Gary, East Chicago and Hammond. The majority of the river's flow drains into Lake Michigan via the Indiana Harbor and Ship Canal, sending about 500 million gallons of water into the lake per day. The AOC begins 15 miles (24 km) south of downtown Chicago and includes the east branch of the river, a small segment of the west branch and the Indiana Harbor and Ship Canal. Today, 90% of the river's flow originates as municipal and industrial effluent, cooling and process water and storm water overflows. Although discharges have been reduced, a number of contaminants continue to impair the AOC.

### **Background**

The Grand Calumet River and Indiana Harbor and Ship Canal contain 5 to 10 million yds<sup>3</sup> of contaminated sediment up to 20 feet (6 m) deep. Contaminants include toxic compounds (e.g., PAHs, PCBs, and heavy metals), and conventional pollutants (e.g., phosphorus, nitrogen, iron, magnesium, volatile solids, oil, and grease).

### **Project Status**

The Indiana Department of Environmental Management (IDEM) and USEPA are actively working on cleanup projects pursuant to these agreements, as well as developing new major agreements through voluntary cooperation and legal action. The major parties to cleanup agreements on the waterway include:

- U.S. Steel Gary Works (USX) – Sediment remediation work is expected to start in the near future. This site will be using a hydraulic dredge to remove the contaminated sediments.
- Inland Steel Corporation – Inland is using a mechanical dredge, as well as an electric magnet to remove iron ore pellets.

Additionally, as part of the phase II RAP development for the Grand Calumet River/Indiana Harbor Canal AOC, the State of Indiana Department of Environmental Management (IDEM) requested assistance from the USACE to develop potential methods of sediment cleanup and habitat restoration in the GCR in Lake County, Indiana.

The report, "Grand Calumet River - Indiana Harbor Canal Sediment Cleanup and Restoration Alternatives Project", is intended to provide stakeholders with the information necessary to begin development of sediment cleanup alternatives. This document presents a methodology for analyzing sediment cleanup and habitat restoration options for the river. The intent is not to recommend a single best approach but rather to make the reader aware of the range of considerations and options available for sediment cleanup and habitat restoration.

Copies of this document are available by contacting:

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Office of Water Management - Water Quality Standards, Room 1255  
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## **Kalamazoo River - Allied Paper**

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### **Location**

The Kalamazoo River flows across the southwestern portion of the lower peninsula of Michigan. The river flows in a westerly direction and discharges into Lake Michigan near the town of Saugatuck. The lower eighty miles of the Kalamazoo River have been identified as an AOC, due to historic releases of PCBs from de-inking operations at local paper mills.

The Allied Paper, Inc./Portage Creek/Kalamazoo River Site involves PCB contamination of: (1) an Allied Paper, Inc., property in Kalamazoo, Kalamazoo County, Michigan, (2) a 3-mile stretch of Portage Creek from Kalamazoo to where the creek meets the Kalamazoo River and (3) a 35-mile stretch of the Kalamazoo River.

### **Background**

Allied Paper, Inc., a subsidiary of SCM Corporation, has operated paper mills on a 80-acre property at 2030 Portage Road in Kalamazoo since 1925. From 1957 to 1971, the company recycled and de-inked paper, including carbonless copy papers, which contained 3.4 percent PCBs by weight.

In 1986, MDNR detected PCBs in several places in the 80-mile stretch of the Kalamazoo River between Kalamazoo and Lake Michigan. Contamination is primarily in the sediments, although the water column and fish are also affected. According to MDNR, the contamination begins at the point where Allied's Bryant Mill Pond discharges to Portage Creek.

### **Administrative History**

Since the PCB contamination was identified as a problem in 1971, several actions have been taken to improve conditions. The discharge of PCBs has been substantially reduced due to the ban on PCB production, and other regulatory point source controls, such as the NPDES permit program. However, contaminated sediments in the upstream areas still serve as a source of PCBs to the Kalamazoo River.

On December 2, 1987, the State filed a complaint under CERCLA Sections 107 and 113, the Resource Conservation and Recovery Act, the Federal Water Pollution Control Act, the Toxic Substances Control Act and three Michigan laws. The complaint called for Allied Paper and SCM Corporation to stop the release of hazardous substances into the environment and pay cleanup costs. In response, the companies have undertaken studies of the extent of the PCB contamination, the quantities of PCBs in Bryant Mill Pond, and possible remedial actions.

In August 1990, the Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund site was included on the National Priority List pursuant to CERCLA. The site includes Portage Creek, from Cork Street just above the Bryant Mill Pond to its confluence with the Kalamazoo River; and the Kalamazoo River from this

confluence downstream to the Allegan City Dam. The area listed includes a three mile stretch of Portage Creek and a 35 mile stretch of the Kalamazoo River. However, because the data indicate the PCBs have migrated downstream, the Superfund remedial investigation includes the area from Morrow Dam to the mouth of the Kalamazoo River.

**Amount of Contaminated Sediments**

- Highest PCB Concentration: 300 ppm

**Project Status**

MDEQ is currently considering various remediation alternatives for the site. The parties involved are working on finalizing the terms of an agreement.

### **Pine River - Velsicol Chemical**

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#### **Location**

This site is located at North Avenue and Watson Street in St. Louis, Michigan. St. Louis is in the central part of the lower peninsula of Michigan. The Pine River flows along the site on both the eastern and northern sections of the site.

#### **Background**

This was the former location of the Vesicol Chemical Company Plant, which manufactured chemicals including DDT, hexabromobenzene (HBB) and polybrominated biphenyl (PBB). DDT was produced on site until 1959. HBBs and PBBs were produced until the mid 1970's. Sampling of the Pine River Reservoir in the early 1980's indicated high levels of these chemicals present in the sediments. Further sampling in 1996 showed that contaminant levels are decreasing, but still very high. In 1974, a no consumption advisory for all species of fish in the Pine River from the St. Louis Impoundment to its confluence with the Chippewa River was issued and continues to remain in effect today.

#### **Administrative History**

This remediation project is being completed under Superfund. There has been no ROD as of yet, as the project is still in the investigation stage.

#### **Amount of Contaminated Sediments**

- Volume: 250,000 yds<sup>3</sup>
- Highest Total DDT Concentration: 1,175 ppm

#### **Project Status**

USEPA and MDEQ are working together in order to collect more data and sediment samples from the St. Louis Impoundment. Sampling using USEPA's R/V *Mudpuppy* was completed on July 25, 1997. A human health risk assessment from fish consumption is currently in draft form. Also, an ecological assessment of estimated impacts to wildlife from contaminated sediments is being developed. USEPA and MDEQ will begin the process of choosing the most cost-effective and timely option for remediation once the data collection is completed.

## **Saginaw River**

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### **Location**

The Saginaw River discharges into Saginaw Bay, which is a southwestern extension of Lake Huron located in the east central portion of Michigan's lower peninsula. This AOC watershed encompasses 8,709 square miles in 22 counties and includes all of Saginaw Bay (1,143 square miles) out to its interface with open Lake Huron at an imaginary line drawn between Au Sable Point and Point Aux Barques.

### **Background**

Environmental problems in the Saginaw AOC are caused by eutrophication (nutrients), toxic substances (PCBs, dioxin and heavy metals), bacterial contamination, sedimentation and commercial/residential development. Much of this ecosystem degradation results from poor land use practices. The sources that continue to contribute contaminants to the Saginaw River and Saginaw Bay include industrial and municipal discharges, combined sewer overflows (CSOs), contaminated sediments in the river and bay bottom, urban stormwater runoff, agricultural nonpoint sources, old waste disposal sites and the atmosphere.

### **Administrative History**

As part of a 1997 natural resource damage settlement, General Motors and the cities of Bay City and Saginaw have agreed to provide funds for the dredging and disposal of PCB contaminated sediments in the lower river.

### **Amount of Contaminated Sediments**

- Volume: 300,000 yds<sup>3</sup>
- Highest PCB Concentration: 87 ppm

### **Project Status**

Dredging is expected to begin during the summer of 1998.

### **Total Cost**

The estimated cost for the remediation project is \$5,000,000.



### **South Branch of the Black River**

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#### **Location**

This site is located at the north end of the village of Bangor. It is a former mill pond which was formed by a dam on the Black River at County Road 681. The dam was removed for safety reasons and has not been replaced to date.

#### **Background**

Sediments in the former mill pond were contaminated by discharges from a nearby facility, Du-Wel, Bangor. The Du-Wel, Bangor facility discharged treated wastewater under a NPDES permit issued by the Surface Water Quality Division (SWQD) of the MDEQ. PCBs and various metals, including chromium, are present in sediments at levels of concern. Historical, non-permitted releases have contributed to the documented fish kills and Fish Consumption Advisories issued for the Black River at the site.

#### **Administrative History**

This is a state lead site. A Remedial Investigation and Feasibility Study have been completed by Du-Wel. Negotiations are currently underway with the potentially liable party to fund an escrow account that would cover at least part of the clean-up. The village of Bangor would like to refill the mill pond to create recreational opportunities at the site. If this action is funded, the site should be remediated by December, 1998.

#### **Amount of Contaminated Sediments**

- Volume: 6,500 yds<sup>3</sup>

#### **Project Status**

Sediment removal will be started and completed within 1998.

#### **Total Cost**

It is unlikely that proposed escrowed funds will cover the cost of remedial activities at the site. \$1,000,000 in state funds may be needed to complete remedial activities, including excavation, transportation, disposal of contaminated sediments and confirmatory sampling for future site closure.

### **St. Mary's River - Cannelton Industries**

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#### **Location**

The St. Mary's River is the 70 mile connecting channel between lakes Superior and Huron. The Area of Concern extends from the head of the river at Whitefish Bay (Point Iroquois) downstream through St. Joseph Channel to Humbug Point on the Ontario side and to the outlet of Lake Munuscong at Point aux Frenes on the Michigan side.

The Cannelton Industries, Inc., site covers 75 acres along the south bank of the St. Mary's River about 1.5 miles west of the downtown area of Sault Sainte Marie, Chippewa County, Michigan.

#### **Background**

Starting in 1900, the Northwestern Leather Company manufactured leather products on the site, dumping tannery wastes on 5 acres located in the 100-year floodplain of the St. Mary's River. The waste was disposed of to a depth of 6 to 8 feet and left uncovered. An estimated 10,000 yds<sup>3</sup> were disposed of, as observed from the depth of wastes along the bank and the area void of vegetation. In 1954-55, Fibron Limestone Co. (a subsidiary of Algoma Steel Corp., Ltd., of Canada) purchased the 75 acres. Subsequently, the property was transferred to Cannelton Industries, Inc., another Algoma subsidiary. The property was intended for construction of a manufacturing plant that was never built. Algoma dismantled various structures that were considered hazardous. The site is now idle.

The Algoma Slip sediments are contaminated mostly with metals and PAHs. In addition, sediments are contaminated with various heavy metals, oil and grease, PCBs, and PAHs in local areas along the Ontario shoreline, the north shore of Sugar Island, in Little Lake George and in Lake George, all downstream of Ontario point source discharges. Communities of benthic organisms are impaired along the Ontario shoreline downstream of industrial and municipal discharges.

#### **Administrative History**

In 1986, Algoma Steel agreed informally with the State to construct (1) a wall along the shore of the St. Mary's River to prevent wave and ice action from removing solid material from the site and (2) an impermeable clay cap to prevent erosion and prohibit rainwater from infiltrating the site. In the spring of 1989, under a Consent Order with U.S. EPA, Algoma Steel installed a sprinkler system as a temporary measure in a 2-acre barren zone with a history of fires. In November 1989, Algoma Steel completed a wall to control erosion along the shoreline of the barren zone.

The remediation efforts are now being conducted under a Superfund Emergency Removal Action. In 1992, a ROD was signed which called for the excavation and dredging of tannery waste, contaminated soils and sediments.

**Project Status**

New information collected in the pre-design studies indicate that the measures called for in the 1992 ROD are not necessary. Soil leaching has been minimized and sediment toxicity and bioaccumulation studies do not show contaminated levels high enough to threaten aquatic organisms. USEPA and MDEQ have agreed that the majority of sediments can be managed in place, which will limit dredging and lower costs.

**Cost**

The entire remediation project for both the land based and sediment activities for the new plan will cost about \$5,500,000.

## **Trenton Channel**

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### **Location**

The Detroit River AOC is part of the international boundary between the United States and Canada. This 32 mile long channel conveys the flow from Lake Saint Clair and the upper Great Lakes to Lake Erie. Over 700 square miles of land in both Michigan and Ontario drains directly to the Detroit River or one of its tributaries. The Rouge River, a Michigan tributary to the Detroit River, is listed as a separate AOC.

### **Background**

The known causes of the impairments to the channel include urban and industrial development in the watershed, which has led to the destruction of over 95% of the Detroit River's wetland habitat since the early 1900's. CSOs and municipal and industrial discharges continue to be point sources of contaminants within the AOC. Storm water run off, the tributaries, and upstream inputs from Lake Saint Clair are also contaminant sources. The magnitude of the contributions from air deposition and the resuspension of contaminated sediments are currently under study.

### **Project Status**

The Trenton Channel Project has been initiated to characterize the sediments in the Trenton Channel, develop a fate and transport model for mercury and PCBs and evaluate remedial technologies for Trenton Channel sediments. The project is funded by the USEPA and MDEQ. Public comment is currently being sought on a proposed remediation of contaminated sediments at the Black Lagoon site along the Trenton Channel. The Black Lagoon project is slated for completion in late 1998.

### **Amount of Contaminated Sediment**

- Estimated Volume of Black Lagoon site: 20,000 yds<sup>3</sup>

**St. Louis River – Interlake Duluth Tar Site**

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**Location**

The Interlake Duluth Tar Site is within the St. Louis River AOC. The St. Louis River flows from Minnesota into Lake Superior, with its last 23 miles forming part of the Minnesota and Wisconsin border.

**Background**

Historically, industrial facilities and development have been located along the river, in particular steel manufacturing, iron manufacturing and coal tar refining. The PRP involved with the site is Beazer East, Inc. Site investigations found VOCs, heavy metals, iron and mercury of concern in the Interlake sediments.

**Project Status**

The Minnesota Pollution Control Agency (MPCA) expects to choose a remedial option during the Spring of 1998 and begin remediation work in 1999.

### **Iroquois Gas and Westwood Pharmaceutical**

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#### **Location**

The Iroquois Gas - Westwood Pharmaceutical Hazardous Waste Site is located in Erie County, in the City of Buffalo, New York. The site is bounded by Dart Street on the east, Buffalo Structural Steel on the north, Scajaquada Creek on the west and a residential area to the south. Scajaquada Creek flows into the Niagara River just north of Lake Erie.

#### **Background**

This site was used for approximately the first half of the century to manufacture gas. Iroquois, which became National Fuel Gas Distribution Corporation, used the site for gas production and storage from 1925 until the 1960's. The area was sold to Westwood Pharmaceuticals, Inc. in 1972.

Westwood began to build a warehouse in the southwest corner of the property in 1985. During construction, water and soil contamination was discovered. The Remedial Investigation determined that the site soil was contaminated with PAHs, BTEX chemicals (benzene, toluene, ethylbenzene and xylene), lead and cyanide. The ground water, which flows towards Scajaquada Creek, is mainly contaminated with PAHs and BTEX. The RI also concluded that 7,350 gallons per day of ground water was discharging into the creek and estimated amount of non-aqueous phase liquids entering the creek was 440 lbs/year. The creek sediments are contaminated with the same pollutants as found in the soil and ground water at the site.

#### **Administrative History**

Under a State Consent Order, the RI was completed in June 1993. In March of 1994, NYSDEC issued a ROD which described the remedial actions. In addition to the remediation of the land based site, the ROD also outlined a plan to excavate the contaminated sediments in Scajaquada Creek and to restore the creek channel to background conditions.

#### **Amount of Contaminated Sediments**

- Volume: 11,000 yds<sup>3</sup> (estimate)
- Highest PAH Concentration: 19,600 ppm

#### **Project Status**

For the remediation process, Westwood is responsible for the main plant area and National Fuel Gas Distribution Corporation is responsible for Scajaquada Creek. The main plant area is expected to be completed by September 1997. The creek remediation is currently in the design stage and should be completed by the end of the calendar year. Dredging will be done in 1998.

#### **Total Cost**

The entire remediation project has cost \$2,100,000 to date and is expected to incur costs of approximately \$5,150,000 in the future. Of the total amount, \$250,000 was or will be provided by the state.

### **St. Lawrence River - Reynolds Metals Site**

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#### **Location**

Reynolds Metals Company (RMC) owns and operates an aluminum reduction plant in the Town of Massena, New York. The facility is located on 112 acres of land near the St. Lawrence River within the Massena AOC.

#### **Background**

The Reynolds facility manufactures aluminum ingots. Waste materials were historically land filled, spilled, leaked, and otherwise released into the area contaminating the soils, sediments, groundwater, surface water and air. The major pollutant of concern has been PCBs, although there were also cyanides, fluorides, and dioxin/di-benzofurans released. Contaminated areas on the site relating to sediments include:

- Black Mud Pond: used to contain slurry from the processing of spent potliners for cryolite recovery.
- Landfill/Former Potliner Storage Area: held spent potliners and is located immediately adjacent to wetlands.
- Wetlands: PCBs have migrated from the landfill into the wetlands.

#### **Administrative History**

Although this site is not on the National Priorities list, USEPA is responsible for the cleanup of the St. Lawrence River portion of the contamination. NYSDEC is the lead agency on the soil remediation. The river cleanup ROD was signed in September of 1993. This ROD calls for excavating 7 acres of sediments from wetlands and 1.5 acres of sediments from potliner storage pad. The contaminated material will be shipped off site for disposal.

#### **Amount of Contaminated Sediments**

- Volume: 77,000 yds<sup>3</sup>
- Highest PCB Concentration: 2000 ppm

#### **Project Status**

Dredging of the contaminated sediments is expected to occur in 1998.

#### **Total Cost**

The estimated cost for the St. Lawrence River sediment remediation is \$57,000,000. This does not include the costs of the land-based portion of the project.

## **Ashtabula River and Harbor**

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### **Location**

The Ashtabula River flows through northeastern Ohio and empties into Lake Erie at Ashtabula Harbor in the city of Ashtabula. Ashtabula is located between Cleveland, Ohio and Erie, Pennsylvania. The Ashtabula River has been declared an AOC by the IJC. The AOC area consists of the lower 2 miles of the river, Fields Brook and the nearshore Lake Erie areas. The Lower River and Harbor are being addressed via a comprehensive public and private partnership with USEPA, OEPA, USACE, USFWS, industry and the public. However, The Fields Brook Site is being remediated separately under a Superfund Action.

### **Background**

Various point and nonpoint industrial sources are believed to have contaminated sediments in the river with a variety of organic and heavy metal pollutants, with the main contaminate of concern being PCBs. Sediment contaminants have transferred to fish, affected habitat quality and restricted lower Ashtabula River commercial and industrial use. A fish advisory is in effect resulting from mercury and PCB contamination.

### **Amount of Contaminated Sediments**

- Volume: 1,000,000 yds<sup>3</sup>
- Mass: 11,000 kg of PCBs, with 1,700 kg having PCB levels greater than 50 ppm
- Highest PCB Concentration: 300 ppm

### **Project Status**

The Partnership's proposed plan and Environmental Impact Statement for lower river and harbor sediment remediation project is currently in draft form and is scheduled for release by the end of 1997. The EIS includes various remediation alternatives, selected sites for the CDF, estimated costs and potential cost distribution between industry and government. Site remediation is expected to begin in 2000 or 2001.



### **Ashtabula Fields Brook Superfund Site**

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#### **Location**

The industrial development on Fields Brook is approximately 1.5 miles upstream of the confluence with the Ashtabula River. The Fields Brook site is part of the Ashtabula Area of Concern. The Fields Brook remediation project is separate from the Ashtabula River and Harbor remediation project.

Fields Brook drains a 6-square-mile area in the city, township and county of Ashtabula, in northeastern Ohio. The main channel is 3.9 miles long and begins at Cook Road, just south of the Penn Central Railroad tracks. From this point, Fields Brook flows northwest to Middle Road, then west to its confluence with the Ashtabula River. From Cook Road downstream to State Highway 11, Fields Brook flows through an industrialized area.

#### **Background**

Analysis of fish tissue caught in Fields Brook and the Ashtabula River prior to 1982 indicated the presence of chlorinated organic compounds. A health advisory was issued on March 1, 1983, recommending that people not eat fish in a 2-mile reach of the Ashtabula River. Due to the possibility of direct contact with the sediment, movement of the contaminated sediment into the Ashtabula River and the possibility of uncontrolled releases of hazardous materials from the sediment entering the water supply of the City of Ashtabula, Fields Brook was added to the NPL by USEPA in August, 1983.

#### **Current Status**

The Fields Brook Superfund remediation project is still in the planning stage. Because the Fields Brook site is so large, USEPA divided the site into four work units, three of which are called "Operable Units."

- Sediment Operable Unit: A ROD was signed for this Operable Unit in 1986. Work is currently in the Remedial Design phase. This Unit is responsible for cleanup of sediment in the Brook and its tributaries.
- Floodplains/Wetlands: A ROD for this Unit, which will remediate the floodplain areas, was signed on June 30, 1997. The Floodplains/Wetlands Operable Unit is currently entering the design phase.
- Source Control Operable Unit: A ROD is expected in the Fall of 1997. This Unit will address source areas that could recontaminate the Brook.

Design remediation work for Fields Brook is expected to continue through 1998. It is anticipated that remediation work and construction of an on site landfill will begin in 1999.

The final unit is the Ashtabula Public/Private Partnership, which is examining remediation work in the Ashtabula AOC, as described in the prior section.

#### **Total Cost**

The tributary remediation project is expected to cost between \$5,000,000 to \$6,000,000.

**Fox River**

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**Location**

The Fox River is one of the IJC designated Areas of Concern. The study area is a 39-mile stretch of the Fox River extending from Lake Winnebago to Green Bay. The flow from the Fox River is a contributing source to the Green Bay Estuary in Lake Michigan, Green Bay, Wisconsin.

**Background**

USEPA, WDNR and other governmental and private agencies conducted studies of the Fox River from 1989 to 1992. These studies concluded that the principal contaminants of concern within the Fox River are PCBs and mercury. Of the potentially 34 contaminated sites along the river, the most detailed sediment sampling and contamination delineation has been conducted at Deposit POG and Deposit N. Additional detailed sampling and contamination delineation is currently underway at a third location, Hot Spot 56/57.

**Administrative History**

The USEPA is considering proposing the Fox River for Superfund NPL listing. The U.S. Fish and Wildlife Service is conducting a Natural Resource Damage Assessment on the river and bay and the WDNR is working to implement a cooperative agreement with the Fox River PRPs.

**Amount of Contaminated Sediments**

- Volume in the entire Fox River: 10,900,000 yds<sup>3</sup>
- Deposit POG:
  - Volume: 300,000 yds<sup>3</sup>
  - Average PCB Concentration: 45.9 ppm (0-2 ft. depth)
  - Average Mercury Concentration: 1.07 ppm (0-2 ft. depth)
- Deposit N:
  - Volume: 8,500 yds<sup>3</sup>
  - Average PCB Concentration: 41.4 ppm (0-2 ft. depth)
  - Average Mercury Concentration: 2.11 ppm (0-2 ft. depth)

**Project Status**

Several industries have agreed to voluntarily conduct a demonstration project in the lower part of the river (Hot Spot 56/57) and Wisconsin has taken the lead on the upper river site (Deposit N). Both remediation projects are expected to be completed in 1998. The Deposit N remediation project is expected to cost between \$2-3,000,000.

### **Manitowoc River Basin - Hayton Mill Pond**

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#### **Location**

Hayton Mill Pond is located in the northeast section of the City of New Holstein, Wisconsin.

#### **Background**

WDNR completed a remedial investigation over the past five years of this site. Results of the investigation indicate that the primary source area is a system of drainage ditches in the Northeast Section of the City of New Holstein. Water flows from the drainage ditches through Pine and Jordan creeks to Hayton Mill Pond, a man-made pond formed by the construction of the Hayton Mill Pond Dam. PCB contamination has migrated from the drainage ditches downstream to Hayton Mill Pond which serves as a sedimentation basin for the contaminated sediments. PCB concentrations in the Mill Pond average approximately 2-3 ppm. Fish tissue PCB concentrations in Mill Pond have exceeded 75 ppm.

Tecumseh Products, Inc., is voluntarily participating in an investigation of the site.

#### **Amount of Contaminated Sediments**

- Volume: 10,000 yds<sup>3</sup> in the drainage ditches and 200,000 yds<sup>3</sup> in the creeks and Hayton Mill Pond
- Average PCB Concentration: 200 ppm
- Highest PCB Concentration: 2,000 ppm

#### **Project Status**

The WDNR is attempting to build relationships between local, state, and federal partners to undertake an estimated \$800,000 remediation of the drainage ditch sediment. Local partners have provided small amounts of funding to date to finance the remedial investigation. GLNPO has agreed to provide \$250,000 in grant funding for the remediation provided that an agreement can be reached the PRPs to provide the additional funding. WDNR is pursuing a cooperative rather than an enforcement-oriented approach in hopes of completing the remediation in a more timely and cost effective manner.

#### **Total Cost**

Total site remediation costs are estimated at \$10,000,000.

**Little Menomonee River - Moss-American Site**

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**Location**

The Moss-American site includes the former location of the Moss-American creosoteing facility, approximately 100-150 yards west of the Little Menomonee River, approximately .5 miles of the Little Menomonee River downstream from the facility, and the adjacent floodplain soils. It is located in the northwestern section of the city of Milwaukee, Wisconsin. The Little Menomonee River is a tributary to the Menomonee River and its waters eventually flow through the Milwaukee AOC.

**Background**

From 1921 until 1967, the wood preserving facility on this site used creosote in their processes. The facility discharged their wastes to settling ponds that ultimately released into the Little Menomonee River. The soils and sediments in the settling ponds and river were contaminated with creosote during this time. The original facility was purchased by Kerr-McGee in 1963 and became Moss-American. The site was renamed in 1974 to Kerr-McGee Chemical Corporation—Forest Products Division.

**Administrative History**

In 1971, Moss-American diverted its process water discharge from the river to the Milwaukee sanitary sewerage system. Also in 1971, WDNR ordered Kerr-McGee to clean eight settling ponds and dredge 1,700 feet of the river after creosote contamination was discovered. The settling ponds were filled with clean soil, the discharge pipe to the river was removed and a twelve foot deep underground clay retaining wall constructed between the ponds and the river.

In 1973, USEPA financed the dredging of approximately 5,000 feet of the river, storing most of the creosote contaminated sediments in an onsite landfill. The facility closed in 1976. Milwaukee County reached a settlement with Kerr-McGee after the facility closed in which the county received a major portion of the property as payment for the dredging of the river. This land was converted into a park corridor along the river.

However, sampling in the 1970's and 1980's by USEPA and other agencies indicated high levels of creosote contamination remaining in the soils and sediments. Contaminants detected in the sediments were primarily carcinogenic polynuclear aromatic hydrocarbons (CPAHs), similar to the contamination found in the soils. Sediment contamination was on average 18 ppm CPAHs. These sediments were found distributed throughout the five mile reach of the river between the site and its confluence with the Menomonee River.

The site was placed on the NPL list pursuant to CERCLA. The RI/FS was therefore funded by the Superfund program and was completed in May 1990. The ROD for the site was signed on September 27, 1990.

**Amount of Contaminated Sediments**

- Volume: 15,000 yds<sup>3</sup>
- Highest CPAH Concentration: 500 ppm
- Highest Total PAH Concentration: 5,900 ppm

**Project Status**

Pre-design study conducted in 1994 indicated the presence of extractable quantities of free-product creosote at a depth of approximately 10 feet below ground surface under one acre of the site. In 1995, following design approval by USEPA, remedial actions began with the start-up of a free-product recovery system. To date, approximately 4,100 gallons of free-product creosote have been recovered. Over the past several months, Kerr-McGee, WDNR and USEPA have engaged in discussions concerning whether it would be desirable to make certain changes in the way the remedy is undertaken. In April 1997, the agencies concurred on an Explanation of Significant Differences that would allow Kerr-McGee a trial period to conduct groundwater remediation by an in-situ funnel and gate approach. The parties have also discussed whether it might be advantageous to allow wet dredging and/or dry excavation approaches to sediment management options which could be selected in addition to the original approach of river reroute. If such an approach may have merit, USEPA would prepare a ROD amendment concerning this topic and solicit public comment beginning in early 1998.

**Total Cost**

Remediation was estimated to exceed \$25,000,000.

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USEPA's Great Lakes National Program Office will make *Realizing Remediation* available on the Internet. See the Sediment Assessment and Remediation Team's section of GLNPO's home page:

URL: <http://www.epa.gov/glnpo/sediment/>

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