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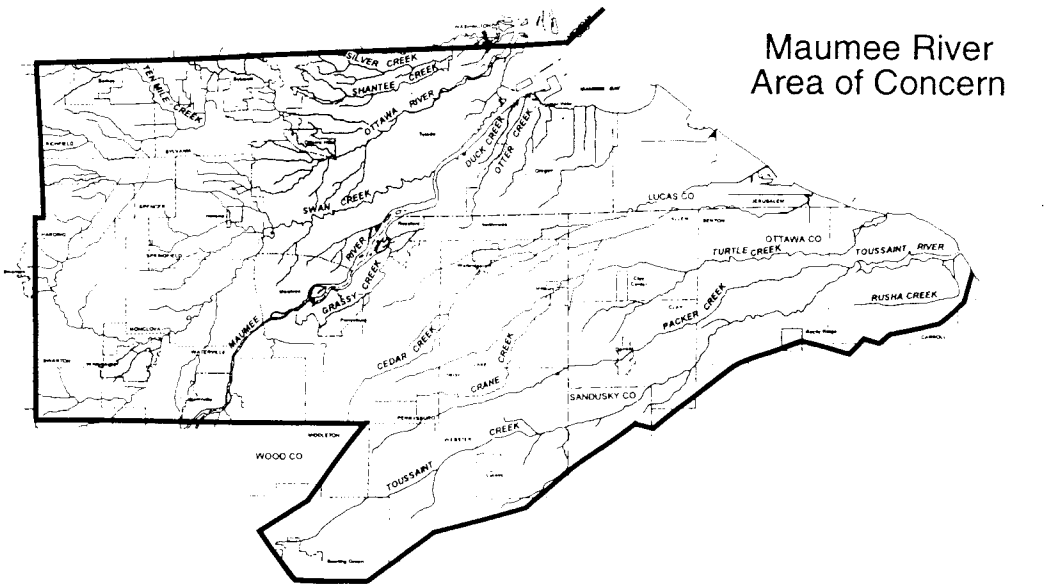
Sponsored by the
Maumee Remedial Action Plan (RAP) Implementation Committee
Ottawa River Action Group

Overview of the Maumee RAP

John Kusnier
Vice-Chair Maumee RAP Implementation Committee

The Maumee Remedial Action Plan, or RAP, began over ten years ago as a community effort to restore the area's waters to "fishable and swimmable" condition. The Maumee "Area of Concern" includes: the Lower Maumee River from the Bowling Green water intake near Waterville to Maumee Bay, as well as other tributaries to Maumee Bay and Lake Erie such as Swan Creek, Ottawa River, Duck Creek, Otter Creek, Crane Creek, and the Toussaint River. The Maumee River RAP covers most of Lucas County, the northern third of Wood County, and the northwest half of Ottawa County.



The Maumee RAP is striving for abundant open space and a high quality natural environment; adequate floodwater storage capacities and flourishing wildlife; citizens who take local ownership in their resources, and river, streams, and lakes that are clean, clear, and safe for recreational use. This will stimulate economic growth, secure jobs, and assure quality of life.

The Maumee RAP is a cooperative effort of citizens, businesses, and industry as well as local, state, and federal governments. This joint venture stems from an agreement between the United States and Canada to clean up our Great Lakes basin. The agreement identified 42 specific Areas of Concern, or AOCs, where there were significant problems. The Maumee Area of Concern was one of the areas identified along with the three others areas in Ohio: Black River, Cuyahoga River, and Ashtabula River.

The early years of the Maumee RAP were spent identifying and inventorying the problems in our Area of Concern. Since then strategies have been developed to clean up the problems and they are being implemented by various partners of the Maumee RAP including, governmental agencies, active citizens, and the private sector. The Maumee RAP is addressing the pollution

sources and millions of dollars have been spent to correct the problems that have caused our contaminated sediment and poor water quality.

The Maumee RAP Implementation Committee (MRIC) makes the official decisions of the RAP and provides general oversight with regards to policy. Under MRIC is eight action groups which are integral to the progress of the Maumee RAP. These groups are identified as Issue Action Groups - which deal with specific issues that affect the AOC; Watershed Action Groups - which focus on a comprehensive watershed approach to cleaning up a specific watershed; and Support Action Groups - which assistance the other action groups to more effectively accomplish their goals in a manner consistent with RAP guideline and objectives.

The Issue Action Groups focus on agricultural runoff, dumps and landfills, open space and wetlands, and urban runoff. The Support Action Groups deal with finance and fund raising, and public outreach and education. The Watershed Action Groups address the concerns of the Swan Creek and Ottawa River watersheds. *Profiling the Ottawa River III* has been sponsored by the Ottawa River Action Group.

According to the *Maumee RAP Strategic Plan (1997)*, the purpose of the Ottawa River Action Group is to return the Ottawa River to "fishable and swimmable" condition with ecological and recreational value. The Ottawa River Action Group is working to restore the river to previous conditions by stopping and preventing the pollution that has contributed to its demise. The group in partnership with the Swan Creek Action Group conducted the Second Annual Clean Your Streams Day, which was held this year on Saturday, September 12. It was a day for volunteers to pick up trash from the streambanks of the Ottawa River and Swan Creek, and perhaps learn more about the importance of improving water quality. Another activity being done this fall by the Ottawa River Action Group, in conjunction with Ohio Sea Grant and The Ohio State University, is a series of three surveys to determine the economic value of dredging the Ottawa River. The results of these surveys are expect by the end of the year. The results will be shared through the monthly Maumee RAP newsletter.

You are invited to get involved in the effort to restore the waters of our Area of Concern. Join the Maumee RAP Ottawa River Action Group or perhaps one of the other action groups. More information on the Maumee RAP as well as information on each action group, their activities, and meeting times are available on the Internet at *http://chagrin.epa.state.oh.us/programs/rap/maumee.html*

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Chrysler Expansion Project

William J. Burkett
Senior Project Manager
Hull & Associates Inc.

In 1996, Chrysler Corporation announced that it had plans to replace its Toledo Assembly Plant, the oldest automobile assembly plant in operation. Chrysler pledged to retain the work force currently employed in Toledo by building the new plant within 50 miles of the old facility. In an effort to retain Chrysler, the City of Toledo offered an aggressive incentive package which included the resolution of environmental issues.

Mayor Carleton Finkbeiner's Jeep Team, which was organized to coordinate the City's efforts, drafted budgets and schedules six months before Chrysler made any formal contact about site selection. The City of Toledo had to show Chrysler that it had a plan for meeting Chrysler's production schedule. Each work activity was outlined in a project schedule to indicate to Chrysler that the Jeep Team was ready for action. The emphasis on budget helped identify potential sources of funding. Expenses included real estate acquisition, environmental characterization and cleanup, and infrastructure improvements. In order to refine both the budget and the schedule, the City produced draft layouts based on concepts of what would be needed to support construction of a new automobile assembly plant. State and federal regulatory agencies, such as Ohio EPA, U.S. Army Corp of Engineers, and Ohio Department of Development, were consulted early in the project to help navigate the City through applicable regulations and permitting requirements, and to assist with funding.

The Stickney Avenue site was the only site offered by the Jeep Team. There were two strong attributes that the site offered. First, Chrysler would be able to use a current operating facility from which to expand. The City correctly valued this to be worth hundreds of millions of dollars. Secondly, an adjacent operational rail yard could provide equal access by two major railroads and save millions of dollars each year.

On July 16, 1997, Chrysler Corporation contacted the City to express interest in the Stickney Avenue site and to begin negotiations to more clearly define the incentive package. Environmental assurances needed to be made. It was clear that if Chrysler was going to stay in Toledo, that unresolved issues like the Dura and North Cove landfills would have to be addressed. In addition, Chrysler made it clear that it needed to be able to manage any property acquired with the confidence that environmental issues would not impact construction activities now or into the future.

The City's environmental offer to Chrysler regarding the expansion of the Stickney Avenue site had to address outstanding litigation and liabilities associated with neighboring landfills. The offer also had to provide a site that met some agreed upon level of clean. The final negotiation involved the City's accepting $750,000 and Chrysler's liabilities for the Dura landfill, and in return, Chrysler accepting $250,000 and the City's liabilities for the North Cove landfill. As simple as this agreement sounds, the issue was a sticking point in negotiations into the last days of negotiations.

It was agreed that the cleanup parameters proposed for the site would be the risk-based standard for industrial use as described under the State of Ohio, Voluntary Action Program. The City of Toledo had successfully used such an approach on other major projects including the Front Street expansion project and the State Correctional Facility. There was to be one exception. Engineering controls to prevent exposure routes would not be acceptable to Chrysler. The City and Chrysler worked for many days to try to structure a clean up plan that would utilize Ohio's Voluntary Action Program and include the Ohio EPA. However, it was determined that many of the future liability issues and other benefits that are afforded by Ohio's Voluntary Action Program were already resolved through the agreement between Chrysler and the City. It was determined, in this case, that Ohio's Voluntary Action Program would not provide additional benefit to either party.

There were a myriad of environmental issues associated with development of the Stickney Avenue site. Property history included railroad operations, aluminum smelting, brass foundry operations, carton manufacturing, coal storage, auto repair, medical supply assembly and truck maintenance. Based on the agreed upon cleanup standards, the City was responsible for removing nearly 200,000 cubic yards of soil. A decision was made to beneficially re-use the soil by providing base for a cap for the nearby Manhattan and Treasure Island landfills. Again, working with the Ohio EPA, the City was able to efficiently and cost effectively address the issue. Millions of dollars were saved and two more landfill issues were addressed.

The project site included approximately 47 acres of wetlands, for which the City agreed to obtain the necessary permits for development. The U.S. Army Corp of Engineers and the Ohio EPA were consulted before Chrysler indicated an open interest in the site. This early action allowed for the completion of a wetland delineation and a mitigation plan in less than two months after Chrysler's announcement to accept the site. Of the 47 acres of wetland present, 26 acres were used for development. Although controversial, the City purchased property in Sandusky County to complete wetland mitigation activities.

The final portion of the environmental commitment to Chrysler dealt with indemnification. The City agreed that certain future events would trigger City responsibility. These included identification of soils that exceeded agreed upon standards and response to actions required under State or Federal agency direction. In addition, it was recognized by the City and Chrysler that groundwater was contaminated but that no action would be taken unless it posed a direct risk to human health or the environment or it had to be handled as a result of construction activities.

The Jeep Team's efforts paid off. Chrysler agreed to commit $1.2 billion dollars and expand operations by approximately 1.1 million square feet. The City of Toledo, by having a plan and being able to address environmental issues, was able to save thousands of jobs and maintain millions in tax revenues.

The Unnamed Tributary to the Ottawa River From Beginning to End

Ralph D. McGinnis, III
Ohio Environmental Protection Agency
Division of Emergency and Remedial Response

The site of what was once called the "Unnamed Tributary to the Ottawa River," is located north of Interstate 75 and Expressway Drive North between LaGrange Street and Stickney Avenue within the city of Toledo, Ohio. The site is owned by the city of Toledo and was considered to be one of the worst polychlorinated biphenyl (PCB) contaminated waterways in Ohio. The tributary was approximately 975 feet wide and 90 feet wide at the entrance of the Ottawa River at river mile 5.97. Approximately 50 years ago, the tributary was historically part of the main channel of the Ottawa River before the river was straightened and rechannelized in this area. Part of the abandoned river was filled in during the construction of Interstate 75 leaving what remained as the Unnamed Tributary. Four (4) storm sewers discharged into the tributary. One of the storm sewers served the Textileather plant which is located east of the site. The site is bordered by a wetland to the west and high banks on the south and east. The site is located across the river from the Tyler Street landfill and upstream from the Stickney Avenue and Dura Avenue landfills. It was considered to be the primary source of PCB contamination to the Ottawa River, a major tributary to Maumee Bay.

Severe industrial pollution within the Maumee River Basin resulted in the Maumee Bay being listed as an Area of Concern (AOC) in 1985 by the International Joint Commission (IJC). The IJC identified PCBs as a "Toxic of Concern" in *A Strategy for Virtual Elimination of Persistent Toxic Substances* (1993). The Ottawa River from I-475 North of Wildwood Preserve to Lake Erie was placed under a fish and contact advisory in April 1991. During that time, the highest recorded level for PCBs detected in fish tissue in Ohio was 84 ppm, found in the Ottawa River in the vicinity of the Unnamed Tributary. During the fall of 1996, the highest recorded level of 510 ppm PCBs was detected in fish tissue. This highest recorded level was again detected from a fish tissue sample acquired near the vicinity of the Unnamed Tributary.

The Unnamed Tributary had been assessed several times since 1988. In December of 1988, sediment grab samples were taken in the Unnamed Tributary by Ohio EPA's PCB Unit. Samples from the mouth of the tributary, the middle of the tributary and the vicinity of the largest storm sewer outfall tested at 56, 1,200 and 66 ppm PCBs, respectively. Sediment grab samples taken again in August of 1994 revealed PCB levels at 200 ppm at the confluence, 420 ppm at the middle and 61 ppm at the largest outfall of the tributary. Ohio EPA's Division of Emergency and Remedial Response Maumee Site Assessment Team took sediment samples in the Unnamed Tributary during September 1994. A core sample taken from the tributary near the confluence of the Ottawa River detected PCBs at 1300 ppm at 0-6", 190 ppm at 6-30" and 2000 ppm at 30-57". The highest level of PCBs, 2500 ppm, was detected near the area of the largest storm sewer outfall.

GenCorp Inc. formerly owned a 40-acre industrial site bordering the Unnamed Tributary on the east. The site included a three-story office building and a 400,000 square foot manufacturing plant. Vinyl upholstery and plastic coated fabrics used for furniture covers and vehicle interiors were manufactured at the plant. Textileather now operates the facility which is owned by Canadian General Tower.

GenCorp used Monsanto Therminol, an oil containing PCBs, as an internal heat exchange fluid is their calender system from 1967 to 1972. The oil was stored in above ground tanks located at the northwest corner of the plant building. It is believed that the oil leaked from the systems containing oil and entered the storm sewer through sump pumps in the basement and sub basement. Wipe samples revealed levels as high as 35,100 ug/100 cm^2 PCBs on solid surfaces in the basement. The storm sewer which flows from the plant property connects with a city storm sewer that empties into the Unnamed Tributary.

Due to the release of PCBs from GenCorp's plant, the Ohio EPA placed GenCorp under Orders in March 1992. At that time, attempts to include the Unnamed Tributary were unsuccessful due to allegations that there were a number of other potentially responsible parties (PRPs) for the site. Based on the data generated on the Unnamed Tributary from a sampling event conducted by the Maumee Site Assessment Team, Ohio EPA approached GenCorp Inc. about remediating the site during the Spring of 1995. GenCorp agreed to do a more thorough site assessment at about the same time a grant to remediate a site impacting the Great Lakes became available from the U.S. EPA's Great Lakes National Program Office (GLNPO). Ohio EPA applied for, and was given notification of the intent to award $500,000 in June 1996.

In September 1996, U.S. EPA's GLNPO provided Ohio EPA with grant funding for the Unnamed Tributary remediation project. A condition of the grant was to form partnerships with local governments and PRPs to remediate the Unnamed Tributary. Ohio EPA met frequently with officials from the City of Toledo, GenCorp, Blasland, Bouck and Lee (GenCorp's contractor), U.S. EPA/GLNPO and the U.S. Fish and Wildlife Service, to discuss and plan remedial strategies necessary to complete the project.

On November 14, 1997, the Ohio EPA issued an Administrative Order on Consent to GenCorp for the remediation of PCB contamination in the Unnamed Tributary. As part of the Order, a Disbursement Agreement was approved by the State Controlling Board on November 17, 1997. This agreement allowed Ohio EPA to disburse grant funds to GenCorp for certain remediation activities.

During the spring of 1997, GenCorp's contractor Blasland, Bouck and Lee (BB&L), completed the site assessment report for the Unnamed Tributary. BB&L completed the Remedial Options Evaluation (ROE) Report during the summer of the same year. This ROE was distributed to the partnership for comment. The proposed option was accepted by the partnership with some modifications requested by the partnership.

A Memorandum of Agreement (MOA) between the City of Toledo and Ohio EPA for the Unnamed Tributary remediation project was signed by both parties in July 1997. This MOA

outlines roles and responsibilities between each party for purposes of the project. As part of the MOA, the city agreed to negotiate a site access agreement for the property adjacent to the Unnamed Tributary, that is currently owned by Textileather. The city also agreed to provide site security and engineering plans for the rerouting of the sewer outfalls that discharged to the tributary. Under a separate action, the city paid a $140,000 penalty under an Ohio EPA Solid Waste Order which was directed to this remediation project. Section 404 of the Clean Water Act requires a permit for any hazardous or toxic waste cleanup activity that may impact aquatic sites or wetlands. Because of this, the city of Toledo included the Unnamed Tributary project as part of their Nationwide 38 Permit Application submittal to the Army Corps of Engineers (ACOE) for the Jeep project. ACOE requested comments on the permit application from the U.S. Fish and Wildlife Service (USFWS). Following this, the USFWS was invited to participate in the remediation project as a result of their interest.

Blasland, Bouck and Lee (BB&L), the project's overnight contractor, and Sevenson Environmental, the project's primary excavation contractor, were mobilized to the Unnamed Tributary site in January 1998. At that time, site preparatory activities commenced that consisted of site clearing and grubbing; staging pad construction; and the construction of a haul road. Other activities completed during January included; the finalization of the access agreement between the city of Toledo and Textileather, a curb cut permit was obtained from the city, a Permit to Install (PTI) application for a wastewater treatment unit and remediation work plan were submitted to Ohio EPA for approval.

On February 5, 1998 a "media day" was sponsored by the partnership of the remediation project. Speeches were made by U.S. EPA Region 5 Acting Administrator David Ullrich, Toledo Mayor Carleton Finkbeiner and Ohio EPA Director Don Schregardus. Stu Messur with BB&L presented an overview of the proposed remediation plan for the Unnamed Tributary. All local media groups, including major television networks, were present.

During February, Ohio EPA approved the remediation work plan and the PTI. The city of Toledo approved the discharge of treated wastewater generated during site remediation to their sanitary sewer system. Site activities consisted of the installation of office trailers, the wastewater treatment system was set up and tested, pugmill construction was initiated, and a temporary bridge was installed for tributary crossings.

During the following months the sewer outfalls were rerouted to a newly constructed drainage swale concurrently with the excavation of contaminated sediments. This consisted of installing sheet piling at various transects along the tributary to facilitate removal of sediment by sectors with limited disruptions on other areas. The excavated sediment was dewatered before being mix with a stabilization agent in the pug mill. The generated wastewater was treated to levels required by the city before being discharge to their sanitary sewer. And, the stabilized sediments were transported off site to a permitted TSCA disposal facility. After the sediments were excavated, composite sediment samples were taken to confirm cleanup levels. These areas were then backfilled with clean full material.

Permanent steel piling was installed at the confluence of the Unnamed Tributary with the Ottawa River. Restoration of the remediated area consisted of planting a wetland mix of seeds for appropriate vegetation. This type of seed mix will promote a healthy sustainable ecosystem.

In conclusion, on-site remediation activities were completed in June 1998. By the end of the project 16,000 tons of contaminated sediment were excavated and sent to a TSCA-approved landfill for disposal. A media event took place on June 2, 1998; the local media were present, including all of the major local television stations. Speeches were made by David Ullrich (Acting Administrator, U.S. EPA, Region 5), Carleton Finkbeiner (Mayor of Toledo), U.S. Congresswoman Marcy Kaptur and Donald Schregardus (Director of Ohio EPA). John Finn, with GenCorp, presented the remediation activities that had been completed at the site. Mr. Ullrich was quoted in the Toledo Blade as saying, "Dollar for dollar, pound for pound, this is the best cleanup I have ever seen." Demobilization and site restoration are expected to be completed by August 1998.

Capping The Stickney and Tyler Landfills: The Changing Landscape Along the Ottawa River

Mike Gifford
Superfund Division
U.S. EPA Region 5, Chicago, IL

The Stickney Avenue Landfill and Tyler Street Dump (Stickney and Tyler Sites or Sites) are just two of a number of sources of contamination along the Ottawa River that have degraded water quality and the surrounding environment over recent decades. The adverse impact of past waste disposal practices along this important waterway, including those at the Stickney and Tyler Sites, are well documented. The Sites are located on opposite sides of the Ottawa River about 5.5 miles upstream from the point where the Ottawa River enters Lake Erie. Both Sites were "co-disposal" landfills that accepted mixed municipal, industrial and commercial wastes. The Tyler Site operated from the 1950s until approximately 1968 and began as an operation to fill in an old river channel. The Stickney Site is believed to have been a former clay borrow area for the manufacture of bricks that was later used as a landfill from the late 1950s to about 1966. Following closure, each of the Sites was covered with a "non-engineered" soil layer and seeded to establish a vegetative cover. The uneven landfill surfaces and thin layer of cover soil have permitted precipitation to rapidly enter the waste materials over the years generating large volumes of "leachate" that subsequently migrated toward, and discharged into, the Ottawa River.

A few short years ago, in 1994 to be exact, the U.S. Environmental Protection Agency (U.S. EPA) signed an agreement with a number of potentially responsible parties (PRPs) to conduct an investigation to determine the nature and extent of contamination at the Sites. PRPs typically comprise businesses and local governments that U.S. EPA believe are responsible for the contamination at a Superfund site. Between September 1994 and February 1995, monitoring wells were installed and samples of surface soil, riverbank soil, groundwater, leachate and landfill gas were collected from the two Sites and analyzed for a variety of contaminants. The investigations were completed in 1995 with the preparation of a document called an Engineering Evaluation and Cost Analysis (EE/CA) which summarized the findings of the field investigation and evaluated a number of measures to control or reduce the release of contaminants at the Sites. In addition, another document called a Streamlined Risk Evaluation (SRE) was prepared which identified and evaluated potential risks posed by contamination at the Sites.

To briefly summarize, the analytical results showed the presence of elevated metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs) at each Site. The SRE evaluated a number of potential "exposure" pathways including: 1) uptake of contaminants by fish; 2) direct contact with contaminants in surface soil and leachate; 3) ingestion of contaminants in surface soil and leachate; and 4) ingestion of contaminated fish by humans or animals.

Based on the findings of the EE/CA and the results of the SRE, U.S. EPA issued a cleanup decision for each site in January 1996 in the form of an "Enforcement Action Memorandum." The cleanups include selected elements of U.S. EPA's "presumptive remedy" for municipal landfills. A presumptive remedy is a standard set of control measures that, based upon historical knowledge and experience, U.S. EPA has determined will effectively address the risks posed by these types of sites. The components of the presumptive remedy for municipal landfills are; 1) landfill cap; 2) ground-water control; 3) leachate collection and treatment; 4) landfill gas collection and treatment; and/or 5) institutional controls. Those components selected for the Stickney and Tyler Sites include a multi-layer cover system, landfill gas collection and venting to the atmosphere, periodic monitoring of leachate and landfill gas, and institutional controls to restrict future land use. U.S. EPA believes that implementation of these components will effectively eliminate exposure to surface soils and significantly reduce the volume of landfill leachate to acceptable levels within a reasonable time frame of 3 to 5 years. For this reason, leachate collection and treatment was not considered to be a necessary or cost-effective component of the cleanup plan. Following cap placement, an extensive monitoring program will be implemented to monitor the performance of the cap and corresponding reduction in leachate that is generated. In addition, leachate quality will be monitored to insure that the Sites no longer pose a significant threat to human health and the environment.

Although the agreement with the PRPs was not effective until February 1998, construction work began in the Fall of 1997. The PRPs initially removed all vegetation from each of the Sites and rough graded the landfill wastes to create the proper slopes and a smooth surface for placement of the various layers of the cap. The landfill cap itself is an "engineered" multi-layer cover system comprising natural and synthetic materials. Each layer serves a specific function that is designed to maximize the overall effectiveness of the cap once fully constructed. The slopes initially created during rough grading will be maintained throughout the placement of each individual layer and are designed to provide proper drainage and create a final surface that is easy to maintain and is capable of providing limited future reuse of the Sites.

The initial layer on top of the regraded waste is a 12-inch engineered base layer consisting of natural soils on which the synthetic layers will be placed. The first synthetic layer consists of a material called bentonite, sandwiched between two thin polyester layers. Bentonite is a clay that expands when wet creating a barrier layer that resists water movement through it. On top of this synthetic clay layer is a single layer of black plastic sheeting that is welded together at the seams to create a continuous and unbroken cover over the landfill surface. Over the plastic sheeting, a plastic honeycomb net or drainage layer is installed to carry infiltrating water along the created slope and away from the underlying barrier layers. A fabric material is placed immediately over the drainage layer to maintain its effectiveness by preventing fine-grained soil particles from entering the honeycomb net and blocking or slowing water movement. Over the drainage layer, 2 feet of soil, including 6 inches of topsoil, will be placed and grasses established to protect the soil surface from erosion. All materials used for the various layers must meet approved project specifications and are subjected to extensive in-field and laboratory testing to insure material quality and effectiveness.

During the construction of the landfill caps an extensive monitoring well network will be

installed at each Site. This will include a series of equally spaced monitoring wells near the perimeter of each Site directly adjacent to the Ottawa River. In addition, monitoring wells will be installed at locations throughout the interior portions of each Site. Following cap placement, these wells will be an integral part of the performance monitoring and long-term operation and maintenance phases. During the anticipated 3-5 year performance monitoring period immediately following cap placement, leachate elevations within the landfills will be measured on a regular basis to document the anticipated reduction in leachate levels. In addition, leachate samples will be collected at determined intervals and analyzed to monitor the quality of the leachate. This data will be used to verify that the cap is performing as designed and to document that the Sites no longer pose a significant threat to human health and the environment. Once the reduction in Site risks are achieved, the frequency of leachate monitoring will be reduced and continued throughout the remainder of the long-term operation and maintenance phase.

Long-term operation and maintenance begins immediately following construction completion and includes regularly scheduled site inspections to monitor for signs of cap erosion or settlement and to ensure integrity of site drainage patterns, the multi-layer cover system and riverbank stabilization. In addition, the landfill gas collection and venting system, leachate monitoring system, and perimeter fencing will be regularly inspected. Repairs will be made to any part of the cover system as necessary, or as required by U.S. EPA.

Another site that is itself a source of contamination and part of the overall cleanup plan for the Stickney and Tyler Sites is the XXKem Site. The XXKem Site is a 13-acre parcel immediately south of the Stickney Site and is the location of a former industrial waste disposal lagoon that was used for the disposal of waste oils, solvents and other liquid wastes between the late 1960s and 1981. Although the lagoon was closed, post-closure sampling revealed high concentrations of VOCs, SVOCs, PCBs, pesticides and heavy metals in soils and groundwater beneath the lagoon. Contaminants have moved in groundwater from the XXKem Site beneath the Stickney Site and toward the Ottawa River. The landfill cap at the Stickney Site will extend over the portion of the XXKem Site where the lagoon was located (approximately 7 acres) eliminating the direct contact threat posed by contaminated surface soils. In addition, leachate will be pumped from an extraction trench installed earlier this year to prevent the flow of leachate from the XXKem Site to the Stickney Site. This pumping will enhance the natural dewatering process once the landfill cap is completed and will continue until water levels have decreased to the point that it is no longer feasible to continue pumping. An extensive monitoring system of wells will be installed to ensure that the extraction system is providing an adequate barrier to leachate movement between the XXKem and Stickney Sites.

Even though the bulk of investigative and cleanup activities at these sites has been performed by PRPs under formal agreements with U.S. EPA, the Ohio Environmental Protection Agency (OEPA) has been an integral part of the "team" since work began on these Sites in the early 1990s. OEPA has provided invaluable technical and legal assistance in its oversight capacity. At the XXKem Site, U.S. EPA has provided funds through a cooperative agreement with OEPA to review the design of the leachate extraction system, and oversee construction and future implementation of the extraction system. U.S. EPA is appreciative of OEPA's value-added assistance and anticipates this positive working relationship to continue.

Profiling the Ottawa River III:
Toledo's Plans for Combined and Sanitary Sewer Overflows (CSOs/SSOs)

Donald M. Moline, Director
Department of Public Utilities
City of Toledo

Combined Sewer Overflows (CSOs):

The City of Toledo currently has 31 CSO Regulators, which during wet weather, discharge a little over 300 million gallons of combined sewage into area streams on an annual basis.

Of the 31 overflows, 6 discharge into the Ottawa River at the following locations:

- Lagrange Street at Manhattan Boulevard,
- Windermere Boulevard at Manhattan Boulevard,
- North Detroit Avenue at Phillips Avenue,
- Lockwood Avenue at Hillcrest Avenue,
- Ayers Avenue at South Cove Boulevard, and
- Monroe Street on east side of Ottawa River bridge.

Current USEPA Policy and Ohio EPA Strategy require major control measures and construction commitments of all CSO communities. Toledo, however, started its CSO abatement program with the passage of the Clean Water Act in 1972. After completion of an extensive CSO Impact Study in 1978, the City proceeded to construction on projects that would reduce or eliminate combined sewer discharges into area streams. These projects included:

- The Ten Mile Creek relief sewers that reduced overflows to the Ottawa River;
- CSO Regulator renovations to maximize treatment of wet weather flows;
- Tide gate installation to eliminate extraneous flows to the CSO system;
- Construction of the Downtown and Swan Creek storage/treatment tunnels to reduce overflows and increase treatment capability; and
- Elimination of four (4) CSO outfalls from system.

This work was accomplished over a 15 year period at a cost of over $75 million.

Toledo is continuing to be proactive in reducing the impact of CSOs by systematically eliminating sources of flow that discharge into the combined sewer system. One such project was completed earlier this year on the Ottawa River, and another is currently underway on the Maumee River. Three more projects are scheduled for design later this year. These projects are cost beneficial, and usually in the range of $500,000 to $2 million each.

Starting in the year 2001, design will commence on a $36 million storage/treatment facility for the Ottawa River combined sewer system. The facility will intercept the flows from the

combined sewers prior to discharge to the river and store them until capacity is available at the BayView Wastewater Treatment Plant. The proposed system will not completely eliminate overflows from the combined sewers, but will be designed to capture flows from all but the largest storm events. Construction of this facility is scheduled for completion in 2004.

It should be noted that the elimination of CSOs will provide little improvement toward compliance with applicable water quality standards. There will be slight increases in dissolved oxygen concentrations and decreased levels in peak fecal coliform concentrations, but nothing of major significance. A 12 month CSO impact study completed in 1997 concluded that the major reasons for noncompliance with water quality standards in the Ottawa River are upstream and downstream pollutant loadings, the river channel characteristics, sediment oxygen demand, and storm water runoff. Although this study indicated little improvement in water quality due to elimination of CSO discharges, the City of Toledo will continue its program of CSO Abatement.

Sanitary Sewer Overflows (SSOs):

Sanitary sewer overflows are also a source of stream pollution, but differ from combined sewer overflows in that SSOs are the result of sanitary sewers that become surcharged or overloaded during wet weather due to inflow and infiltration of rain water. The most obvious result of overloaded sanitary sewers is flooded basements. To alleviate this flooding, pumps are used to remove the water from the sanitary sewers and discharge it into adjacent storm sewers or streams. Usually these pumps are portable and are transported to areas of the City that flood only during very heavy rainstorms. Point Place is the exception. It is estimated that 98% of all SSOs in the City of Toledo occur in Point Place. Because of its location and low flat terrain, it experiences surcharged sanitary sewers not only during lesser rain events, but also from high lake levels. In addition, during wet weather, the flow from the Point Place sanitary sewer system is restricted by high levels in the Manhattan interceptor into which it discharges. This causes a backwater effect that prevents flows from leaving the Point. To counteract the above wet weather problems, three permanent pump stations were constructed – one at 129th Street and Edgewater Drive, one at 145th Street and Edgewater Drive, and the last at 290th Street and Ottawa River Road. The 129th Street station discharges to Maumee Bay, and the other two discharge to the Ottawa River.

Because of the magnitude of the problem (approximately 1,000 acres and 200,000 feet of sanitary sewers), an extensive study of the Point Place sewer system was commenced in 1994. The study included flow monitoring to locate areas of excessive inflow and infiltration (I/I), followed by smoke and dye testing, and televising of selected sewers to determine sources of the I/I. The study was completed in July 1997, and a two phased improvement program was recommended as follows:

Phase 1:

- Construct a relief pump station at Manhattan Boulevard to isolate the Point Place sewer system from the Manhattan interceptor;
- Eliminate 33 inflow connections to the sanitary sewers that are currently the source of high inflow to the Point Place sewer system;
- Replace 2,000 feet of sanitary sewer that is undersized; and

- Clean 100,000 feet of sanitary sewer that has heavy root intrusion and solids deposition.

Design contracts have been awarded for this work with an expected construction start in early 1999 with a completion date in late 2000. Total estimated cost for this work is $11.8 million.

Upon completion of the Phase 1 projects, the City will have one year to submit a general plan to Ohio EPA that must include an analysis of the Phase I results and an outline of the Phase 2 alternatives. Based on the sewer system evaluation conducted as part of the earlier study, it was estimated that the Phase 2 work could cost almost $20 million assuming that the following projects were required:

Phase 2:

- Eliminating the 145th Street Pump Station;
- Upgrading the 129th Street Pump Station with discharge directly to treatment plant;
- Eliminating the 290th Street Pump Station, or pump directly to Manhattan interceptor;
- Provide relief sewers in Edgewater Drive; and
- Construct an equalization basin to capture peak wet weather flows.

Design for the Phase 2 work would commence in 2002 with construction starting in 2003, and project completion in 2006. Upon completion of this work, there will be no sanitary sewer overflows from the pump stations, and basement flooding will be substantially reduced.

Summary and Conclusion:

As discussed, between the CSO work on the Ottawa River, and the SSO work in Point Place, the City anticipates spending almost $70 million from the sanitary sewer fund. Unfortunately these projects will do little to improve the appearance or water quality of the Ottawa River. As stated previously, upstream and downstream pollutant loadings, river channel characteristics, sediment oxygen demand, and storm water runoff play a more significant role in the current and future condition of that stream.

In addition, once the City removes many of the storm water inflow sources to the sanitary system, we may find that the drainage system is inadequate and additional work in the form of more storm sewers and storm water pump stations will be required. These projects cannot be financed from sanitary sewer revenues, but must be funded by the City's Capital Improvement Program, which has limited monies. Since there are many costly drainage problems throughout the City of Toledo, the Utility Department has recently taken proposals to establish a storm water utility that would assess each residential property two or three dollars per month to address these critical drainage issues. Public support of such a utility would be greatly appreciated, since the City has a backlog of over $150 million in storm drainage improvements.

AquaBlok™ Project

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Over the last several years we have gained a much better understanding and appreciation of the Ottawa River. Its flow patterns have been characterized and its problems better understood. Much has been initiated to correct discharges to the river that have negatively impacted the ability of the Ottawa River to function as a healthy component of the ecosystem.

While we have made significant progress in reducing continued discharges of toxic contaminants to the river, the legacy of previous discharges remains in the form of contaminated sediments, which, if not addressed, will provide a continued source of toxics to the immediate ecosystem and to the food chain throughout the western end of Lake Erie.

Contaminated sediments will need to be addressed, in one form or another, over several miles of the river. Current information suggests that sediment contamination from approximately River Mile 6 to River Mile 3 warrants primary consideration because levels of PCB's, several heavy metals and PAH's have been found at relatively high elevations in samples taken from this reach of the river. Sediments in other portions of the river, down and upstream of this area, have been found to contain lower levels of the same components.

Although additional characterization of the river is warranted to better identify problem areas and determine the extent of the problem, it is not too soon to contemplate the means to address contaminated sediments.

Removal of the sediments by dredging with subsequent treatment or upland disposal is certainly an option and one that should be considered where the economies of doing so are justified, and where the resuspension of sediments can be controlled in the process.

Capping of contaminated sediments is a second alternative that can serve as an interim or long-term component of an overall plan to address sediment contamination. Capping sediments using conventional techniques can require dewatering, be disruptive to the environment, and be very expensive. Sand has traditionally been used for in-situ capping, but it is highly erodable and not very effective in preventing the spread of contaminants into the overlying water column by way of diffusion.

The Lake Erie Office provided a grant to the City of Toledo to begin to address the residual contaminated sediments and to demonstrate the applicability of a new remedial technology, AquaBlok™, to apply as an in-situ cap material that is not highly erodable and that forms a low-permeability barrier between the water column and the underlying contaminated sediments.

AquaBlok™ is an essentially inert, bio-friendly material comprised of clay minerals, stone and biodegradable polymers. The placement of AquaBlok™ can be accomplished using conventional technology with minimal disturbance to the existing floral and faunal habitats of the Ottawa River. Once placed, the surface of the sediment cap can then be colonized by, and support a healthy benthic population – the bottom of the food chain.

AquaBlok™ has been successfully demonstrated as effective over a four-year period at a pilot project on an Alaskan Superfund Site. Sediment contaminated with white phosphorus proved to be very toxic to ducks dabbling in the area, and eagles feeding on duck carcasses. A three to four-inch layer of hydrated AquaBlok™ placed over the sediments immediately and significantly reduced the mortality of the duck test population. After one year, the treated area became revegetated and supported benthic life. After four years of exposure to extreme temperatures and tidal influences, the treated area remains capped.

Prior to applying AquaBlok™ in the Ottawa River, extensive field investigations of the approximately three-acre capping area (at River Mile 6 – near the old Unnamed Tributary) have been conducted to characterize the sediment stratigraphy of the demonstration area, and to provide baseline data for future monitoring efforts. Following completion of the field investigations, laboratory erosion and settling-column studies were conducted to model a proposed design application route. Computer simulations were then completed to estimate 100-year flood events (post-application) and design scour velocities calculated.

AquaBlok™ samples were exposed to design scour velocities in a laboratory flume for extended periods of time to permit observation of AquaBlok™ response. Similarly, a large-scale (12') settling column was used to observe the dynamics of the application of the design load of AquaBlok™ through a standing water column to approximate actual conditions of the planned capping area. Three different applications scenarios will be applied on one-acre portions of the demonstration capping area.

Actual field application of the material will be completed early fall of 1998 and the resulting barrier will be monitored for a year to track its effectiveness.

As the affected biota in the Ottawa River are mobile, it will not be feasible to assess the effectiveness of limiting cumulative contaminant body-burden on affected species as significant other adjacent areas of the river will not yet be capped. Consequently, efforts at determining the effectiveness will be limited to geotechnical/hydraulic characteristics. Additional information will be gained regarding the relative cost of application so that this technology can be better evaluated against more conventional contaminated sediment remedies.

One of the strong points supporting remediation approaches like the AquaBlok™-based technology is that problems can be addressed incrementally, if funds are unattainable for overall fixes. Also, the AquaBlok™ approach can compliment other existing or planned remediation efforts – both as a short-term means of containing contamination (and keeping it concentrated in one area) or as a final cap over dredged areas to help minimize the level of effort and cost of sediment removal projects.

Elements of the Proposed Remediation Solutions for the Dura Avenue Landfill and the North Cove Landfill

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Dura Avenue Landfill

The Dura Avenue Landfill is approximately 70 acres in size. Located in the northeast section of the City of Toledo, Ohio in a primarily industrial area, it rises approximately 60 feet above the adjacent landscape. The site is bordered on its east by the Ottawa River and south by Sibley Creek. The landfill surface is generally barren and moderately sloping, except along the adjacent streams, where vegetation has become more established over parts of the very steep banks. The landfill cover varies in thickness from a few inches (protruding waste) to over five feet. Erosion is common over the landfill surface and along the steep stream banks.

The landfill commenced operation in 1952 and no longer accepted refuse after 1980. Throughout this period it received municipal wastes, and substantial quantities of commercial and industrial waste. The site has been filled partially by trenching, in the central and west sections, and partly by area filling. The eastern third of the site consists of fill pushed into, and built upon, a former channel and marsh adjacent to the Ottawa River. The average depth of fill across the site is approximately 40 feet and the total estimated in-place volume of on-site fill is approximately 4.65 million cubic yards. Municipal waste overlies combined municipal/commercial/industrial wastes throughout most of the site, except in the newer western section of the landfill, where municipal waste occurs almost exclusively. Based upon eyewitness accounts and aerial photographs, the industrial wastes included a wide variety of potentially hazardous materials, delivered in both bulk and containerized form, which were disposed at various locations throughout the site.

A remedial investigation (RI), performed by the City of Toledo without the oversight of Ohio EPA, included a number of tasks designated to identify the nature and extent of chemical contaminants in environmental media, on and within the vicinity of the landfill. These tasks included sampling of soil, sediment, surface water, and ground water. The data obtained from the investigation were used to conduct a baseline risk assessment and to determine the need to pursue remedial alternatives. Sampling conducted for the investigation has documented that chemical contaminants from source areas have migrated to the surrounding media (i.e., soil). Addressing these contaminated media in a manner which ensures the long-term protection of human health and the environment is the objective of the proposed remedy.

In a southeastern area of the landfill where industrial disposal reportedly took place, leachate characteristics are much different than over the rest of the site. This area, hereafter referred to as the "Southeast Chemical Disposal Area" or SECDA, is characterized by the presence of a nonaqueous layer floating on the water table surface. The light nonaqueous phase

layer (LNAPL) in the SECDA is highly contaminated by a wide range of organic contaminants, most notably benzene, toluene, ethylbenzene and xylene, more commonly referred to as BTEX; polynuclear aromatic hydrocarbons, also referred to as PAHs; phthalates, pesticides and polychlorinated biphenyls or PCBs. Some of these organic chemicals (e.g., bis[2--ethylhexyl]phthalate) occur as high as 10,000 parts per million (ppm). The aqueous phase layer in the SECDA is also contaminated by the same type of chemicals found in the LNAPL, though the concentrations of these contaminants are typically ten (10) to fifty (50) times less than in the LNAPL. Leachate occurring across the main body of the landfill contains similar chemicals, but at concentrations one hundred (100) to one thousand (1,000) times less than found in the SECDA.

Based upon degradation of environmental media and the potential threat to human health, an Immediate Remediation Measure (IRM) was installed at the Dura Avenue Landfill. The objective of this measure was to collect and treat the most serious discharge from the SECDA. This system consists of a lined sheetpile barrier along approximately 750 feet of Sibley Creek and the Ottawa River, a drainage system to collect the shallow ground water (HSCL), a pumping system to convey the collected leachate to the treatment plant and a treatment system to render the leachate suitable for discharge to the Toledo wastewater treatment plan.

The potential human health risks associated with the Dura Avenue Landfill stem from the ingestion of fish from the Ottawa River, dermal contact with leachate, and inhalation of vapors generated via the volitalization of leachate. Potential health risks were characterized in terms of both non-carcinogenic effects and carcinogenic risk. In its present condition, which assumes operation of the IRM systems, the Dura Avenue Landfill poses carcinogenic risks to individuals through the ingestion of fish from the Ottawa River or extensive exposure to condition present on the site. In addition, chemical releases from the landfill pose serious noncarcinogenic health risks to individuals present on the site.

Upon extensive evaluation of the analytical data afforded via the RI as well as the IRM operations, Ohio EPA determined that the major elements of a remedial solution for the Dura Avenue Landfill should include: implementation of a multi-layered cap system to reduce infiltration; continued operation of the current IRM treatment plant; installation of a dedicated extraction well to collect the contaminated ground water from the main gate chemical disposal area; stabilization of the riverbanks along the landfill; and installation of a gas collection system to control the emission of hazardous gases produced within the landfill.

It is anticipated that implementation of the Ohio EPA proposed remedial solution shall achieve the following goals: reduction of human health risks to within acceptable limits; significant reduction of leachate discharges to the Ottawa River and the underlying aquifers; treatment to the extent practical to mitigate threats posed by hazardous substances which leave the landfill; provision of short and long-term protection of the public and of sensitive environmental receptors; and finally attainment of a cost-effective remedial solution which, based on field evaluations, limits expenses to those which are necessary to achieve the goals previously stated.

North Cove Landfill

The Site was used as a landfill from prior to 1941 through late 1970. The City of Toledo owned a portion of the Site and leased it to Willy's Motor Company, Kaiser Jeep Corporation and American Motors Corporation, who formerly used the assembly plant now owned and operated by Chrysler Corporation. The Site was used as a landfill for waste generated at the assembly plant. Part of Willy's Test Track area, which was owned by Kaiser Jeep Corporation, was used as a disposal area. The former landfill is estimated to cover an approximate area of 16.6 acres.

There have been several investigations of contamination at the North Cove Landfill including most recently a remedial investigation/feasibility study (RI/FS) under the oversight of Ohio EPA. The purpose of the RI/FS was to investigate the nature and extent of releases of hazardous wastes or constituents, pollutants, wastes, industrial wastes or contaminants in such a manner as to assess the potential risk to human health and the environment, and develop and evaluate potential remedial alternatives.

The analytical results of the North Cove Landfill RI/FS demonstrated a lack of extensive contamination throughout the site (i.e., no single parameter was pervasive across the environmental media analyzed). Soil contamination associated with the landfill is limited to the "footprint" of the former landfill and along the current or former channels of the Ottawa River. Contaminants determined to present in the "footprint" of the landfill include aromatic hydrocarbons (e.g., xylenes), semi-volatile organic compounds or SVOCs (e.g., pyrene, benzo(b,K)fluoranthene) and pesticides (e.g.,4-DDD). Contaminants determined to be present along the former or current channels of the Ottawa River include aromatic hydrocarbons, SVOCs, pesticides and polychlorinated biphenyls or PCBs (e.g., PCB-1232). Sediment contamination, based upon samples in the Ottawa River and Bowen Ditch potentially attributable to the North Cove Landfill, demonstrated the presence of SVOCs and pesticides.

As part of the RI/FS process, remedial action objectives were developed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and Ohio EPA guidance. The intent of the remedial action objectives is to set goals to ensure the protection of human health and the environment. The goals are designed specifically to mitigate the potential adverse effects of site contaminants present in environmental media. Because the North Cove Landfill's existing environmental risks are only slightly outside of the range of acceptable risk levels, remedial action at this site is mainly evaluated to assess the benefit in reducing risk to increase the margin of safety.

Therefore, upon evaluation of the appropriate and/or applicable requirements, Ohio EPA's has proposed the following strategy for abating pollution at, and preventing migration of wastes from the North Cove Landfill: placement of additional soil cover in the Willy's Test Track Area; placement of revetment on the banks of the Ottawa River and Bowen Ditch; utilization of bioremediation (e.g., phytoremediation) along the banks of the Ottawa River; and restriction of future use of the Willy's Test Track Area.

Cleanup of Contaminated Sediment and Risk Reduction: Issues and Options

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Sediments become contaminated because persistent organic and heavy metal contaminants bind strongly to particles that settle and form sediments. The binding occurs because of the chemical characteristics of the contaminants and the sediments. Persistent organic contaminants are poorly water soluble, have high lipid solubility and are not easily degraded; thus, the binding occurs primarily to natural organic matter that coats fine particles or exists as fine particles, e.g. settled algae, fecal material from aquatic organisms and decaying plant matter. For heavy metals, while they are water soluble they bind strongly to clays and some fractions of organic matter. The binding for both types of contaminants is generally the greatest for fine particles with high surface areas that settle very slowly. Particle settling is not a homogeneous process. Particles that settle slowly, those with the highest concentrations of contaminants can be move a long distance from the initial source and become deposited in low energy depositional areas, e.g. pools in streams, deep holes in lakes. This deposition does not occur evenly and materials get may moved over time and clean material may overlay the contaminated material in an uneven fashion.

Assessing the risk of contaminated sediment involves quantitative evaluation of exposure to elements of interest in the ecosystem. All exposure routes must be considered to get the best evaluation of risk. The exposure evaluation is combined with a toxicology evaluation for the contaminants of interest. Generally, risks are evaluated on an individual compound basis as there is not good understanding of the toxicological interactions of mixtures of contaminants.

To perform remediation of contaminated sediment for risk reduction two major issues must be determined prior to selecting a remediation process. First, the source of the contaminant must be eliminated. Failure to eliminate the source would result in recontamination after remediation was completed. Thus, to remediate before eliminating sources can result in a waste of funding. Second the character of the contaminant, sediment and the three dimensional distribution of the contaminants is needed so the appropriate process and design can be developed to obtain the best risk reduction for the cost.

Assuming the above two steps are taken, there are a myriad of options available to address the contaminated sites and the final approach depends on tradeoffs generally between costs and risks. It is impossible to give specific risks for a process without a complete study of the site. However, some general examples of some options and their tradeoffs will demonstrate the overall complexity of the problem. The simplest solution is to stop the sources and allow natural sedimentation to cap the contaminants. Such caps can be augmented by the deposition of clean fill material which reduces the time required for burial of the contaminants. This is generally the lowest cost alternative, for natural remediation and requires the longest time period to eliminate the toxic hazard. If the natural (or artificial) sedimentation cap is eroded away as a result of a

strong storm then the system could be re-exposed to the contaminant and the problem has returned. This approach also does the least additional damage to the overall habitat and current ecosystem structure. If the system is extremely large, say the contaminated sediments in Lake Michigan , this may be the only option that is available because of cost and ecosystem destruction.

At the other extreme, the sediment could be dredged from the system and disposed of in a secure upland landfill. Dredging and disposal in secure landfills are expensive (disposal costs of $\$600/m^3$). This option removes all the contaminant and reduces the risk of future problems to essentially zero but at high costs. However, all dredging processes result in some loss of material, so a small amount of contaminants will remain but the concentrations should be low and readily buried with new sedimentation so as not to cause additional problems. In addition, such dredging produces additional problems by destroying habitat and existing infauna, thus recovery of the system may take a long time. This is generally a balance between some short-term disturbance and a long-term chronic problem. However, placing material, even in a hazardous waste landfill, is no guarantee that no loss will occur in the future but it does reduce the risk substantially.

Combinations of dredging with other approaches can reduce costs while minimizing risks. These approaches are designed to balance the costs and risks to attempt to return the system to a productive environment. One useful approach is to remove the sediment, separate the fines from course material. The coarse material would be returned to the system and the fines would be treated. This approach has the advantage of reducing the amount of material that must be placed in a secure landfill or treated by thermal or chemical methods. If large areas are dredged, the habitat and ecosystem damage would still be substantial. Another option would be to remove sediments from the hot spots greatly reducing the risks in the ecosystem but not eliminating them completely and allow natural sedimentation to take care of the rest. This is a balance of costs both in terms of dollars and habitat disturbance. This has the advantage of not totally destroying the whole habitat and rapidly reducing risk at a more reasonable cost.

In situ biological or chemical remediation may work in some cases but these can be slow and costly but have the advantage of not having to remove the sediment preventing the spread of contaminant during a dredging operation. They may eliminate or limit the destruction of the existing ecosystem depending on the method and application employed. However, bioremediation does not work in all cases and does not necessarily work uniformly throughout the sediment depth.

All remediation options are a balance between the risks including the destruction of habitat and infauna and the costs of the project.

Summary of the Accomplishments and Plans for the Future of the Ottawa River

Ed Hammett, District Chief
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Northwest District Office

ACCOMPLISHMENTS

The *Maumee RAP Recommendations Report* was finalized in 1991. Since that time there has been a substantial effort expended by federal, state and local agencies as well as private entities to remove or remediate sources of pollution throughout the Maumee Area of Concern. Many significant projects are completed, in progress or scheduled. General assessment of water quality conditions has been completed and major sources of pollutants identified and targeted for clean up. The *Profiling the Ottawa River* sessions have focused on many of these activities. This past year has demonstrated that many activities are underway. The clean up of the Unnamed Tributary, combined and sanitary sewer overflow improvement projects, federal SACM activity on Stickney and Tyler landfills, US EPA clean up of the Toledo Tie site, Ohio led projects on Dura, North Cove and King Road landfills are all significant improvement projects. The seeds for all these projects were sown in the past 5-7 years through studies of water quality, sediment, fish and other biota, and the investigation of pollution sources. Projects such as the Maumee Area of Concern Project funded by US EPA and conducted by Ohio EPA have built the data base needed to identify and prioritize problems. Data collection efforts are shifting from screening efforts to hot spot delineation for sediment remediation and will be including monitoring for aquatic restoration. Planning and data collection for the next steps of improvement are currently underway.

OTTAWA RIVER REMEDIATION TEAM

The Ottawa River Action Group of the Maumee RAP asked that the federal, state and local agencies get together to outline what can be done to continue the progress on the Ottawa River and to identify strategies and funding sources for the Ottawa River Watershed. This group of Agencies has formed the Ottawa River Remediation Team in an effort to stimulate interagency collaboration and participation.

The Ottawa River Remediation Team has developed goals to clarify what it is that the team wants to accomplish on the Ottawa River. The Team has also defined 4 basic concerns to be addressed and then a series of tasks and subtasks.

GOALS:

- Elimination of all major sources of contamination to the Ottawa River including point and nonpoint as well as chemical and bacterial.

- Remediation/cleanup of all contaminated sediments in the Ottawa River as appropriate.

- Dredge the lower Ottawa River for navigation/recreational use.
- Restoration of the upland and aquatic ecosystem in the Ottawa River.
- Identification of all funding sources and authorizations available to assist with implementing the goals of the Ottawa River Remediation Team and the Maumee RAP Ottawa River Action Group.
- Identification of all stakeholders and partners available to assist with implementing the goals of Ottawa River Remediation Team.
- Removal of the contact and consumption advisories on the Ottawa River.
- Achieve full attainment of the Ohio EPA's Water Quality Standards.

The four basic concerns identified by the Ottawa River Remediation Team are: Water Quality, Contaminate Sources, Sediment Quality, and the Upland and Aquatic Ecosystem. The team has identified tasks and subtasks for each of these four concerns.

WATER QUALITY ASSESSMENT

Ongoing evaluation of the water quality of the Ottawa River has been conducted by Ohio EPA and other agencies for several years. The Maumee RAP highlighted the Ottawa River conditions based upon an intensive survey conducted in 1986. Additional studies were conducted in the 1990s. The Maumee Area of Concern Project conducted by Ohio EPA focused first on the Ottawa River providing information needed to develop priorities for clean up. A fish tissue study released in 1991 was the basis for fish consumption advisories and helped highlight the Ottawa River as one of the most degraded rivers in Ohio. Biological quality, chemical and physical quality, and bacteriological quality have all been studied. Sampling programs will continue to demonstrate progress in meeting water quality standards and ecological improvement.

CONTAMINATE SOURCES

An ongoing identification of sources and pathways of contamination has resulted in the identification of several sources which in turn have been identified for removal or reduction. Removing sources is an important step to allowing natural recovery of the Ottawa River and should precede remedial efforts for areas of contaminated sediment. Sources that have been identified in the Ottawa River include: uncontrolled waste sites (eg. old landfills), combined sewer overflows, failed septic systems/package plants, stormwater runoff, agricultural runoff, and construction site runoff. While it is always possible that there are unidentified source of contaminates, we believe that most if not all of the significant sources have been identified, studied, and are in a stage of removal/reduction. Additional work remains on agricultural runoff, urban runoff, and failed septic tanks.

SEDIMENT ASSESSMENT

The quality of the Ottawa River sediment is important because it is a historical sink or storage site for the longer lasting contaminates that have entered the river during its years of neglect. It is

important to know more about this sediment. A river constantly rearranges its bottom and there are areas where sediment accumulates. There is a need to chemically and biologically evaluate these sediment areas; and a need to characterize the sediment, map the areas of accumulation, identify hot spots of contamination, and then evaluate these areas to determine what risk they pose to the environment, what alternatives may exist for remediating the sediment, and then implementing any selected alternatives. This data is needed in order to determine what will best assure environmental restoration and what precautions are needed before a decision to dredge the lower portions of the Ottawa River for navigation is made. It is important to the physical transport of any new sediment into the lower river in order to predict impact on the clean up of the river or navigation also needs to be studied.

UPLAND & AQUATIC ECOSYSTEM

A river system is dependent upon both land and water resources. The Ottawa River estuary is a significant wetland area. The entire river system is impacted by the quantity and quality of the runoff which in turn is heavily influenced by development of the watershed. The first step needs to be a study and evaluation of the Ottawa River Ecosystem. This should be followed by recommendations on the preservation of critical remaining elements, the restoration of wetlands, upland and benthic habitat as well as an identification of opportunities to mitigate previous damage to the ecosystem.

THE FUTURE

The clean up of the Ottawa River is off to a good start. Federal, state, and local agencies have worked with citizens to collect data, develop sound plans, and implement projects that are removing sources of pollutants to the river. We all must continue to carefully study, plan, and implement the remaining projects that will see the Ottawa River restored as the natural asset to the Toledo Area.