LAKE ERIE

LAKEWIDE MANAGEMENT PLAN

Lake Erie Lakewide Management Plan (LaMP) Technical Report Series

Impairment Assessment of Beneficial Uses: Restrictions on Dredging Activity

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Technical Report 9

Restrictions on Dredging Activities

Prepared for the Lake Erie LaMP
Preliminary Beneficial Use Impairment Assessment

by
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NOTE TO THE READER:

This technical report was prepared as one component of Stage 1, or "Problem Definition," for the Lake Erie LaMP. This report provides detailed technical and background information that provides the basis for the impairment conclusions recorded in the Lake Erie LaMP *Status Report*.

This document has been extensively reviewed by the government agencies that are partnering to produce the LaMP, outside experts, and the Lake Erie LaMP Public Forum, a group of approximately of 80 citizen volunteers. This review was designed to answer two questions:

- Is the document technically sound and defensible?
- Do the reviewers agree with the document conclusions and format?

In its present form, this report has been revised to address the comments received during that review process, and there is consensus agreement with the impairment conclusions presented.

9.1 Listing Criteria

According to the International Joint Commission (IJC), an impairment occurs when contaminants in sediments exceed standards, criteria, or guidelines such that there are restrictions on dredging or disposal activities (IJC, 1989). The Lake Erie LaMP has adopted the IJC listing criteria for evaluating restrictions on dredging activities in Lake Erie.

9.2 Scope of the Assessment

The scope of the Lake Erie LaMP beneficial use impairment assessment (BUIA) includes open lake waters, nearshore areas, river mouths and embayments, and the lake effect zone of Lake Erie tributaries. The lake effect zone is defined as that zone where the waters of the lake and the river are mixed. The Detroit River will be included in this assessment because of the impact disposal of dredged material may have on Lake Erie.

This report examines all the areas where dredging occurs on a regular basis, considering dredging to be the use that is impaired. This report also notes areas where dredging has been considered, but has been deferred or postponed due to various circumstances. Any conditions that prevent dredging or restrict the disposal of the sediments removed constitute an impairment. The main reason dredging is done is to maintain navigation. Consequently, almost all of the sites assessed for this report are also navigation channels. This assessment does not consider the potential negative impacts of dredging itself such as habitat destruction or sediment resuspension. Nor does it address the processes which contribute to accumulation of sediment in the areas where dredging occurs.

The intent of this report is not to identify all the areas within the geographic scope of the Lake Erie LaMP which may have contaminated sediments. Rather, it is to identify all areas where contaminated sediments are restricting dredging. It is recognized that contaminated sediments exist in areas other than navigation channels and can cause aquatic life impacts in Lake Erie and its tributaries. The impact of contaminated sediments on aquatic life will be evaluated in other assessments, particularly the "Degradation of Benthos" section of the Beneficial Use Impairment Assessment Report.

9.3 Jurisdictional Criteria Governing Dredging and Disposal of Dredged Materials

Canada

There are no Canadian Federal regulations/criteria or guidelines restricting dredging activities or restricting the disposal of dredged material for the Great Lakes. When provincial guidelines exist, Public Works Canada follows the provincial guidelines, as is the case for Ontario (Kahn, 1996).

United States

Section 404 of the Clean Water Act designates the U.S. Army Corps of Engineers as the lead federal agency in the regulation and enforcement of dredge and fill discharge activities in all navigable waters of the U.S. The Corps is also responsible for maintenance of federal navigation channels. Guidelines and criteria developed jointly by the Corps and U.S. EPA are used to administer this program.

For years, bulk sediment contaminant concentrations were used as the criteria governing where sediments could be disposed (U.S. EPA, 1977). A Great Lakes Testing Manual developed by U.S. EPA and the Corps, that should be finalized within the next year, will provide updated guidance on the evaluation of dredged materials for disposal (U.S.EPA and Corps, in press). The manual utilizes biotesting as the primary approach for assessment. Section 404 Permits for dredge and fill activities must be obtained from the Corps of Engineers.

Section 401 of the Clean Water Act provides States the authority to issue certifications for dredge and fill activities. This certification indicates the proposed fill or dredged material disposal activity will not violate State water quality standards. 401 certification must be obtained before a 404 permit will be issued. Water quality standards as well as criteria for disposal of sediments vary among jurisdictions, and are discussed in the text which follows.

Michigan

Michigan addresses dredging and disposal of contaminated sediments on a case by case basis. A variety of guideline documents are utilized by the Michigan Department of Environmental Quality (MDEQ) to determine what restrictions should be applied in order to ensure compliance with Michigan's water quality standards. They include: MDEQ reports on the background levels of chemicals in lake and stream sediments; "Technical Guidance for Screening Contaminated Sediment" (NYDEC, 1994a); "Development of Sediment Quality Objective Concentrations in Deposit A, Little Lake Butte des Morts" (WDNR, 1993); the International Joint Commission's Dredging Subcommittee guidelines regarding the evaluation of Great Lakes dredging projects (IJC, 1982); "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario" (Persaud, et.al, 1992); "Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments" (U.S.EPA, 1977); and 1994 draft sediment quality criteria proposed by U.S.EPA .

The disposal method for dredged sediment is determined following an evaluation of the sediment type, contaminant type and concentration, potential beneficial reuse of the material to be dredged, and availability of disposal sites. If sediments are determined to be unsuitable for open water or in-water CDF disposal, upland disposal may be possible depending on the presence of leachable substances that may pose a hazard to the

environment. Michigan Public Act 451, Parts 115 and 201, the Solid Waste Management Act, 1978 PA 641, as amended, and the Michigan Environmental Response Act, 1982 Act 307, as amended, and the administrative rules adopted pursuant to these acts, govern many upland disposal options.

The Michigan Hazardous Waste Regulations, under the Hazardous Waste Management Act (1979 PA 64, as amended), and 40 CFR 261 (1986) may also be applied to sediments when upland disposal is proposed. Under these regulations, the person(s) doing the dredging may be requested to conduct an extraction procedure toxicity test (EP tox) and/or the toxicity character leaching procedure (TCLP) test to determine if the material is hazardous. If the material is classified as "hazardous," under Act 64 and the Federal Resource Conservation and Recovery Act (RCRA), disposal in a licensed hazardous waste landfill is required. Sediments determined to be toxic (i.e. for PCBs) must be disposed of in compliance with the Federal Toxic Substances Control Act (TSCA) (Jones, 1996).

New York

In 1989, the New York Department of Environmental Conservation (NYDEC) proposed sediment criteria as an appendix to a Cleanup Standards Task Force Report. The final guidelines established by NYDEC are explained in detail in the "Technical Guidance for Screening Contaminated Sediments", (NYDEC, 1994a). This document identifies screening criteria concentrations for several contaminants to classify areas of sediment contamination and evaluate the potential risk to human health and the environment. New York defines a contaminated sediment as one in which the concentration of a contaminant in the sediment exceeds **any** of the sediment criteria established for that contaminant.

New York based their sediment criteria for metals on work completed for Ontario's "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario" (Persaud, et. al., 1992). In addition to the Ontario guidelines, New York used the methods and data collected by the National Oceanic and Atmospheric Agency (NOAA) (Long and Morgan, 1990).

Two levels of screening criteria were established for New York which followed the definitions provided in the Ontario guidelines. The two levels are Lowest Effect Level and Severe Effect Level. The Lowest Effect Level indicates a contaminant level that can be tolerated by the majority of benthic organisms, but still causes toxicity to a few species. The Severe Effect Level is the concentration at which disturbance of the sediment benthic community can be expected.

The New York State Department of Environmental Conservation has also developed a document entitled "Interim Guidance, Fresh Water Navigational Dredging" (NYDEC, 1994b). The document outlines an approach to screening sediments that are under consideration for dredging activities for navigational maintenance. The document was developed as interim guidance not law or regulation. It is intended to be used in

conjunction with professional judgement in making decisions on the choice of specific screening parameters and Best Management Practices. For a number of reasons identified in the document, the Guidance differentiates between the pollutant thresholds for navigational dredged material and those used for cleanup standards at inactive hazardous waste disposal sites or Federal Resource Conservation and Recovery Act (RCRA) Subtitle C corrective action standards.

The Guidance includes:

A summary of the basic steps necessary for a technical review of dredging projects.

General dredging guidelines that include environmental objectives for the planning and conduct of dredging activities, and requirements of an applicant relating to the description of dredging projects. The description must include all the necessary physical, chemical and biological characteristics of the proposed dredging and disposal sites so that impacts can be evaluated and appropriate conditions placed on the project.

Sampling requirements for site characterization, including:

- Sampling methodologies and number of samples.
- Identification of situations that should be exempted from sampling requirements because of the size of the project or the existence of information related to the condition of the sediments.
- Methods for estimating costs for sampling.

Identification of sediment screening parameters including chemical selection.

Guidance on the evaluation of results. Three classes of sediment quality thresholds have been established by NYSDEC: No appreciable contamination, moderate contamination and high contamination. Management recommendations are identified based upon comparison of the sampling results to the thresholds.

Guidance on the disposal of dredged material, including environmental objectives, disposal facility design considerations for suspended solids removal, upland management of navigational dredge material, and dredging/disposal monitoring recommendations.

The Guidance is intended to be used by NYSDEC staff to make decisions related to dredging projects so that a reasonably consistent, cost effective and environmentally protective approach is taken throughout the State.

Ohio

The U.S. EPA and the Buffalo District of the Corps together determine whether Lake Erie harbor and federal navigation channel sediments in Ohio are acceptable for disposal in previously established open lake disposal areas, or in a confined disposal facility. Suitable sands dredged from some areas, such as Fairport Harbor, are discharged in the littoral area to provide material for beach nourishment (building). The Corps and U.S.EPA recommendations are always included with the Public Notice announcing the Corps' annual maintenance dredging projects.

Dredging projects, CDF discharges, and runoff from upland disposal areas are reviewed by Ohio EPA for Section 401 Water Quality Certification to determine whether the project will comply with Ohio water quality standards, and whether the project will result in an adverse long-term or short-term impact on water quality. Projects are addressed on a case by case basis. Ohio EPA evaluates the impacts to the physical, chemical, and biological integrity of the surface water (Merchant, 1996).

Ohio EPA evaluates data from bulk sediment sampling and compares the results to U.S. EPA's "Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments" (U.S. EPA, 1977) which classifies sediments into the following three categories; heavily polluted, moderately polluted, or nonpolluted. These categories are based on individual parameters, for example COD, ammonia, and mercury. The overall classification of a sediment by Ohio EPA is based on best professional judgement depending on how many of the individual parameters fall into the heavily polluted or nonpolluted ranges. Ohio EPA also uses criteria from Kelly and Hite (1984) to determine appropriate disposal methods.

The Director of Ohio EPA may deny a Section 401 Certification if the project will degrade the designated aquatic life use, violate a chemical water quality standard, or result in an adverse long-term or short-term impact to water quality. If a Section 401 Water Quality Certification is granted, there are usually conditions added to ensure maximum water quality protection.

In certain instances, Ohio EPA requires sediment testing to the depth of the proposed excavation before dredging begins. If there is any possibility that hazardous substances may be present, the applicant is required to conduct TCLP testing. Ohio EPA has also required monitoring of CDF discharges for suspended solids. The higher the suspended solids concentration, the greater the potential for impact on water quality due to contaminants associated with the suspended sediment. Post-dredging monitoring in the dredging area has been required in the Ashtabula River. Ohio EPA has also conditioned the Section 401 Certification for the Corps' Cuyahoga River maintenance dredging project, requiring the Corps to participate in meetings to address the low dissolved oxygen problem. Low dissolved oxygen levels are caused in part by dredging the river to a deep narrow ship channel (Merchant, 1996).

Pennsylvania

Pennsylvania's Solid Waste Management Act of 1980 covers the disposal of all solid wastes in the State. Pursuant to the Act, Chapter 75 of the regulations define dredged material as "construction/demolition" waste and requires a permit for disposal of solid waste on the ground or into the waters of the state. In the past, because an in-water confined disposal facility such as the Erie Harbor facility, did not meet the requirements of a suitable landfill, solid waste permits would not be granted and subsequent Section 401 certification could not be obtained. As a result, the Erie CDF that was constructed in 1979, is only filled to 15% of the total capacity of 420,000 cubic yards (Burch, 1996).

The City of Erie's Harbor, the only dredged site in Pennsylvania's Lake Erie waters, has traditionally required minimal dredging to maintain sufficient depth for deep-draft commercial vessels. Only the entrance channel has required periodic dredging and these sediments have consistently met U.S. EPA's criteria for open-lake disposal (U.S. EPA, 1977). Pennsylvania is currently reviewing the regulations involving dredged materials to determine if any changes or revisions should be made. A decision regarding the future use of the CDF and the classification of dredged material as a solid waste is expected in the near future. A one-time 401 certification was issued to the Corps in late 1996 for sediments dredged from the slip for the flagship Niagara. These sediments will be disposed in the Erie CDF (Burch, 1996).

Ontario

The guidelines for disposal of dredged sediment are outlined in Persaud, et. al., 1992. Most sediment dredged from Canadian waters is open lake disposed. The Ontario Ministry of Environment & Energy (OMEE) requires analysis of both the material to be dredged and the existing sediments at the proposed open lake disposal site. Each parameter is compared to the Provincial Sediment Quality Guidelines (PSQG) levels. The dredged material is matched to the disposal area which is classified into one of the following three groups.

Group 1

a. The concentrations of contaminants in sediments in the disposal area are below the No Effect Level. If the concentrations in the dredged material are also below the No Effect Level, the material is suitable for disposal at this site.

b. If the concentrations in the dredged sediments are above the No Effect Level then this material is not suitable for disposal at the above described site, since this would result in contamination of a clean site with sediment of a lesser quality. However, if the concentrations in the dredged materials are below the Lowest Effect Level, it may be suitable for disposal at another site where existing sediment concentrations are above the No Effect Level.

c. Material that exceeds the Lowest Effect Level for any parameter is not suitable for open water disposal at this site.

Group 2

a. The sediments in the disposal area are above the No Effect Level but still below the Lowest Effect Level. If the concentrations in the dredged material are below the No Effect Level then the material is suitable for open water disposal at this site.

b. Similarly, if the dredged material is above the No Effect Level but below the Lowest Effect Level, the material is also suitable for disposal at this site. Material that exceeds the Lowest Effect Level is not suitable for open water disposal at this site.

Group 3

a. If the sediments in the disposal area are contaminated to a level above the Lowest Effect Level, material that is below the Lowest Effect Level is suitable for open water disposal at this site.

b. Material that exceeds the Lowest Effect Level for organic compounds and mercury is not suitable for open water disposal. Material that exceeds the Lowest Effect Level for metals other than mercury is suitable for open water disposal under certain conditions. If the material is at or below the Great Lakes background and does not exceed ambient sediment levels then the material is suitable for open water disposal at this site.

9.4 Summary of Current Dredging Activity

Table 9.1 provides a summary of the routine dredging done for navigational channel maintenance in Lake Erie over the last ten years. It includes the total volume of material dredged from Lake Erie and the associated costs for the five jurisdictions. The total number of dredging locations within the jurisdiction is provided, as well as the number of dredged locations which are also AOCs. Table 9.2 provides a detailed summary of the dredging at each site.

Table 9.1 Summary of Lake Erie Dredging Activity 1984-1995, By Jurisdiction (Volumes are in cubic yards)

Jurisdiction	Michigan	New York	Ohio	Ontario	Pennsylvania

# of Locations	4 locations 3 AOCs	1 location 0 AOCs	12 locations 4 AOCS	7 locations 1 AOC	1 location 1 AOC
Volume (cu. yd.)	3,585,200	101,400	20,928,600	788,135	177,800
Cost	$25,642,900	$382,800	$71,007,700	$4,801,400	$502,300

Table 9.2 **Dredging Locations & Volumes Disposed, 1985-1994, for Navigational Maintenance Dredging by Lake Erie Jurisdiction (U.S. Army Corps of Engineers, 1996; Public Works Canada, 1996) (All volumes are in cubic yards)**

Michigan

Bolles Harbor — Confined Disposal and Beach Nourishment — Total Volume 96,300 — *Total Cost $732,400*

Year	Volume	Cost
1988	43,000	$310,300
1989	13,800	$138,100
1991	37,300	$273,600
1992	2,200	$10,400

Detroit River — Confined Disposal — Total Volume 1,830,900 — *Total Cost $12,780,200*

Year	Volume	Cost
1985	722,300	$5,810,000
1986	40,300	$390,000
1987	65,000	$603,500
1989	49,000	$1,017,300
1990	234,000	$1,879,000
1991	31,100	$209,400
1992	476,000	$2,479,000
1993	138,600	$1,274,000
1994	74,600	$392,000

Rouge River — Confined Disposal — Total Volume 326,900 — *Total Cost $3,160,400*

Year	Volume	Cost
1985	46,600	$719,000
1986	59,400	$565,000
1987	22,400	$388,600
1989	63,000	$76,000
1991	72,900	$801,200
1992	5,700	$74,500
1993	56,900	$536,100

Monroe — Confined Disposal — Total Volume 1,331,100 — *Total Cost $8,969,900*

Year	Volume	Cost
1985	454,400	$1,824,000
1986	85,500	$1,891,000
1987	129,800	$1,284,000
1988	27,600	$522,900
1989	126,700	$657,000
1990	172,000	$993,000
1991	1,000	$27,900
1992	222,000	$1,063,400
1993	1,200	$28,700
1994	110,900	$677,700

Table 9.2 (Continued)

New York

Dunkirk	Open Lake Disposal	Total Volume 101,400	*Total Cost $382,800*
Year	Volume	Cost	
1993	101,400	$382,800	

Ohio

Ashtabula	Open Lake Disposal	Total Volume 412,200	*Total Cost $1,958,000*
Year	Volume	Cost	
1987	84,600	$343,800	
1989	87,000	$607,800	
1990	126,000	$512,700	
1994	105,300	$493,000	

Ashtabula	Confined Disposal	Total Volume 28,000	*Total Cost $750,000*
Year	Volume	Cost	
1993	28,000	$750,000	

Cleveland	Confined Disposal	Total Volume 2,647,600	*Total Cost $18,267,000*
Year	Volume	Cost	
1985	215,000	$2,361,000	
1986	344,000	$1,829,000	
1987	325,400	$1,634,000	
1988	277,000	$2,078,000	
1989	81,800	$708,100	
1990	385,000	$2,897,000	
1991	257,000	$2,177,000	
1992	191,100	$1,185,000	
1993	283,800	$1,328,000	
1994	287,300	$2,069,000	

Cleveland	Beach Nourishment	Total Volume 215,900	*Total Cost $1,070,200*
Year	Volume	Cost	
1988	17,000	$105,000	
1989	50,600	$600,000	
1990	32,400	$233,300	
1992	27,900	$131,900	

Conneaut	Open Lake Disposal	Total Volume 358,900	*Total Cost $1,367,700*
Year	Volume	Cost	
1986	68,000	$241,000	
1988	101,000	$428,000	
1989	20,000	$136,700	
1991	71,400	$252,000	
1993	98,500	$310,000	

Table 9.2 (Continued)

Fairport Harbor	Open Lake Disposal	Total Volume 1,061,800	*Total Cost $4,152,400*
Year	Volume	Cost	
1985	152,000	$712,000	
1988	199,000	$607,000	
1989	132,000	$777,200	
1991	262,700	$873,400	
1992	99,700	$415,800	
1994	216,400	$767,000	
Huron	Confined Disposal	Total Volume 487,300	*Total Cost $2,522,200*
Year	Volume	Cost	
1985	46,000	$428,000	
1987	124,300	$702,400	
1988	128,000	$609,000	
1990	189,000	$782,800	
Huron	Open Lake Disposal	Total Volume 537,500	*Total Cost $1,840,400*
1992	227,900	$813,400	
1994	309,600	$1,027,000	
Lorain	Confined Disposal	Total Volume 812,100	*Total Cost $3,237,000*
Year	Volume	Cost	
1985	164,000	$729,000	
1986	201,000	$776,000	
1987	141,300	$537,900	
1989	133,000	$615,800	
1992	172,800	$578,300	
Rocky River	Open Lake Disposal	Total Volume 89,700	Total Cost $589,400
Year	Volume	Cost	
1985	48,000	$385,000	
1991	41,700	$204,400	
Sandusky	Open Lake Disposal	Total Volume 1,779,200	Total Cost $6,052,600
Year	Volume	Cost	
1985	204,000	$918,000	
1986	223,000	$1,048,000	
1987	84,100	$470,700	
1989	47,000	$436,400	
1990	294,000	$997,900	
1991	243,100	$742,200	
1992	255,100	$769,100	
1993	228,600	$619,300	
1994	200,000	$51,000	

Table 9.2 (Continued)

Toledo	Confined Disposal	Total Volume 6,612,700	*Total Cost $10,159,200*
Year	Volume	Cost	
1988	274,000	$1,561,000	
1989	183,000	$1,274,000	
1990	485,000	$1,712,000	
1991	211,300	$2,606,700	
1992	242,300	$477,300	
1993	617,500	$1,411,600	
1994	600,000	$1,117,000	

Toledo	Open Lake Disposal	Total Volume 6,095,500	*Total Cost $17,444,500*
Year	Volume	Cost	
1985	876,000	$3,802,000	
1986	1,238,000	$2,911,000	
1987	1,072,100	$2,613,000	
1988	503,600	$2,900,000	
1989	298,100	$1,274,000	
1990	289,000	$1,022,000	
1992	643,500	$1,651,300	
1993	231,900	$648,600	
1994	234,200	$622,000	

Vermilion	Open Lake Disposal	Total Volume 84,300	*Total Cost $701,500*
Year	Volume	Cost	
1985	37,000	$485,000	
1991	47,300	$216,500	

West Harbor	Open Lake Disposal	Total Volume 118,100	*Total Cost $681,500*
Year	Volume	Cost	
1988	66,000	$427,000	
1993	52,100	$254,500	

Toussaint	Open Lake Disposal	Total Volume 47,000	*Total Cost $214,300*
Year	Volume	Cost	
1991	47,000	$214,300	

Ontario

Colchester	Open Lake Disposal	Total Volume 10,464	*Total Cost $103,400*
Year	Volume	Cost	
1988	10,464	$103,400	

Kingsville	Open Lake Disposal	Total Volume 154,875	*Total Cost $1,079,200*
Year	Volume	Cost	
1986	59,280	$214,100	
1988	40,757	$312,200	
1991	36,854	$229,100	
1993	33,222	$323,800 (open lake and upland disposal)	

Table 9.2 (Continued)

Pelee Island	Open Lake Disposal	Total Volume 1,308	*Total Cost $23,200*
Year	Volume	Cost	
1988	1,308	$23,200	

Port Colbourne	Confined and Upland Disposal	Total Volume 31,928	*Total Cost $321,100*
Year	Volume	Cost	
1989	31,928	$321,100	

Port Dover	Confined Disposal	Total Volume 28,953	*Total Cost $141,900*
Year	Volume	Cost	
1985	28,953	$141,900	

Port Stanley	Beach Nourishment	Total Volume 542,491	*Total Cost $3,093,900*
Year	Volume	Cost	
1985	205,022	$744,400	
1987	139,834	$800,800	
1991	52,399	$630,200	
1992	127,729	$749,000	
1994	17,507	$169,500	

Wheatley	Open Lake Disposal	Total Volume 2,878	*Total Cost $38,700*
Year	Volume	Cost	
1993	2,878	$38,700	

Pennsylvania

Erie	Open Lake Disposal	Total Volume 177,800	*Total Cost $502,300*
Year	Volume	Cost	
1986	75,000	$238,000	
1987	103,000	$264,300	

9.5 **Status**

Michigan

All of the material that is dredged from the Detroit, Rouge and Monroe AOCs must be placed in confined disposal facilities. Material from the Detroit River has been placed in CDF's for years as a result of high metals, PCBs, and mercury content. Those concentrations have been reduced significantly over time, but hot spots are still of concern. Dredged materials from the Rouge River have an average PCB content of 10 ppm.

Sediments dredged from the River Raisin navigation channel in Monroe have been placed in the adjacent CDF. During the course of investigative studies for the River Raisin RAP, several PCB hotspots were discovered with one site near the outfall of the former Ford Motor Company as high as 40,000 ppm. Cleanup efforts are underway to further delineate any sources and remove the PCB contaminated sediments for treatment and disposal in special facilities. At least five other sites along the river are being investigated under the Southeast Michigan Initiative as potential sources of contaminants to the river.

New York

Dunkirk Harbor is the only site along New York's Lake Erie shoreline that requires dredging. Buffalo Harbor is dredged but is not included in the geographic scope of the Lake Erie LaMP as the Buffalo River empties almost directly into the Niagara River and has no significant impact on Lake Erie. All sediments dredged from the Buffalo River are disposed of in the Buffalo Harbor CDF (Dike 4) that is located near the harbor. Again, any runoff associated with the CDF would flow to the Niagara River. When Dunkirk Harbor is dredged, the material is open lake disposed.

Ohio

Ohio has 12 sites along Lake Erie that are dredged. Of those sites, Toledo, Lorain, and Cleveland require at least some dredged material to be placed in CDFs. The most common contaminants of concern are heavy metals and PCBs. Phosphorus has been a pollutant of concern in the Toledo Harbor as associated with the historically highly eutrophic western basin. Sediments dredged from the Huron River were formerly placed in a CDF, but have been clean enough for open lake disposal since 1992.

The Black River in Lorain has had a historic problem with PAHs near the outfall of an old steel mill coking facility. In 1990, the USX/KOBE Steel Company removed about 40,000 cubic yards of PAH-contaminated sediments from an area upstream of the routinely dredged navigation channel. The sediments were placed in an existing RCRA facility on

USX property. Follow up monitoring has indicated low to non-detected levels of PAHS. The high incidence of tumors in brown bullhead that was associated with the elevated levels of PAHs in sediment has declined considerably after an initial rise when contaminants were resuspended during dredging. Further monitoring continues.

Sediments in the Ashtabula River navigation channel are highly contaminated at depth. This portion of the river had not been dredged for many years because the sediments were contaminated, and also because a deep draft commercial navigation channel was no longer needed. An interim dredging project in 1993 removed 28,000 cubic yards of moderately contaminated sediments and deposited them in a small CDF adjacent to the river. The Ashtabula River RAP, with the support of the Ashtabula River Partnership, is now working to remove the contaminated sediments remaining in the river. A portion of these sediments are classified as TSCA material with PCB concentrations greater than 50ppm.

Sediments dredged from the Ashtabula Harbor have historically been clean enough for open lake disposal. However, contaminated sediments moving down the river have impacted the harbor to the extent that open lake disposal may no longer be allowed. This issue is being considered along with the full scale sediment remediation of the lower two miles of the Ashtabula River through the RAP process.

There are several other dredging projects underway or being considered in the Maumee AOC that are outside of the Maumee River navigation channel. Sediments dredged near the mouth of Swan Creek in 1996 needed to be placed in a CDF. A remediation project is underway on the Ottawa River which is addressing remediation of TSCA classified sediments. Dredging near the mouth of the Ottawa River to maintain recreational navigation is also being considered, but the contaminated sediments and a local cost share requirement may delay this effort for some time.

Ontario

From 1985 to 1995 seven locations in Ontario within the Lake Erie Basin have been dredged a total of sixteen times. Dredging activities in 1989 at Port Colbourne and in 1993 in Kingsville required a combination of open lake and upland/confined disposal. The Port Colbourne disposal in a confined disposal facility resulted from the presence of nickel in high concentrations. Nickel was found in concentrations of 121.83 ppm and the Severe Effect Level for nickel is 75 ppm.

In general, there is no impairment to dredging activity in Lake Erie waters of the Province of Ontario. There is very little industrial activity along the Ontario Lake Erie shoreline, nor the need for maintenance of deep draft shipping channels. Instances of the need for confined disposal are few and very localized. There are no consistent contaminants.

Pennsylvania

The City of Erie's Harbor is the only site in Pennsylvania's Lake Erie waters that requires dredging. Currently, the dredged material from Erie is open-lake disposed. Analysis of the dredged material has shown that the sediments have consistently fallen below U.S. EPA's criteria for open-lake disposal (Burch, 1996). As a result, the activity of dredging and the disposal of dredged material are not impaired in Pennsylvania's Erie Harbor.

9.6 Impairment Conclusions

Over the past ten years, 25 navigational areas around Lake Erie have been dredged a combined 120 times. Twelve of the 25 areas that are dredged have required the dredged material to be disposed in a confined disposal facility at some time during this period. Seven of these sites currently require confined disposal for most of the sediment dredged from those areas. PCBs and heavy metals are the most commonly identified contaminants that dictate confined disposal.

Because there are restrictions on disposal of dredged materials, this use is considered impaired. The occurrence of restrictions on the disposal of dredged material is typically located in industrial areas.

The trend of disposing of dredged materials into confined disposal facilities is changing. As concentrations of contaminants in sediment continue to fall and CDFs reach their maximum capacity, there is a greater likelihood that other alternatives such as open-lake disposal, beach nourishment, upland disposal, or other beneficial reuse will occur. Both Canada and the U.S. have funded programs to investigate and demonstrate the use of remedial technologies to treat contaminated sediments and reduce the amounts that need to be placed in disposal facilities. Although the major point sources of pollutants to sediments have decreased, methods and criteria for assessing the effects of contaminated sediments have become more stringent and could conversely contribute to a greater amount of contaminated sediments to handle.

A PAH-contaminated site on the Black River (Ohio) was remediated by dredging and remedial dredging is planned at least three other sites around the basin.

9.7 References

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