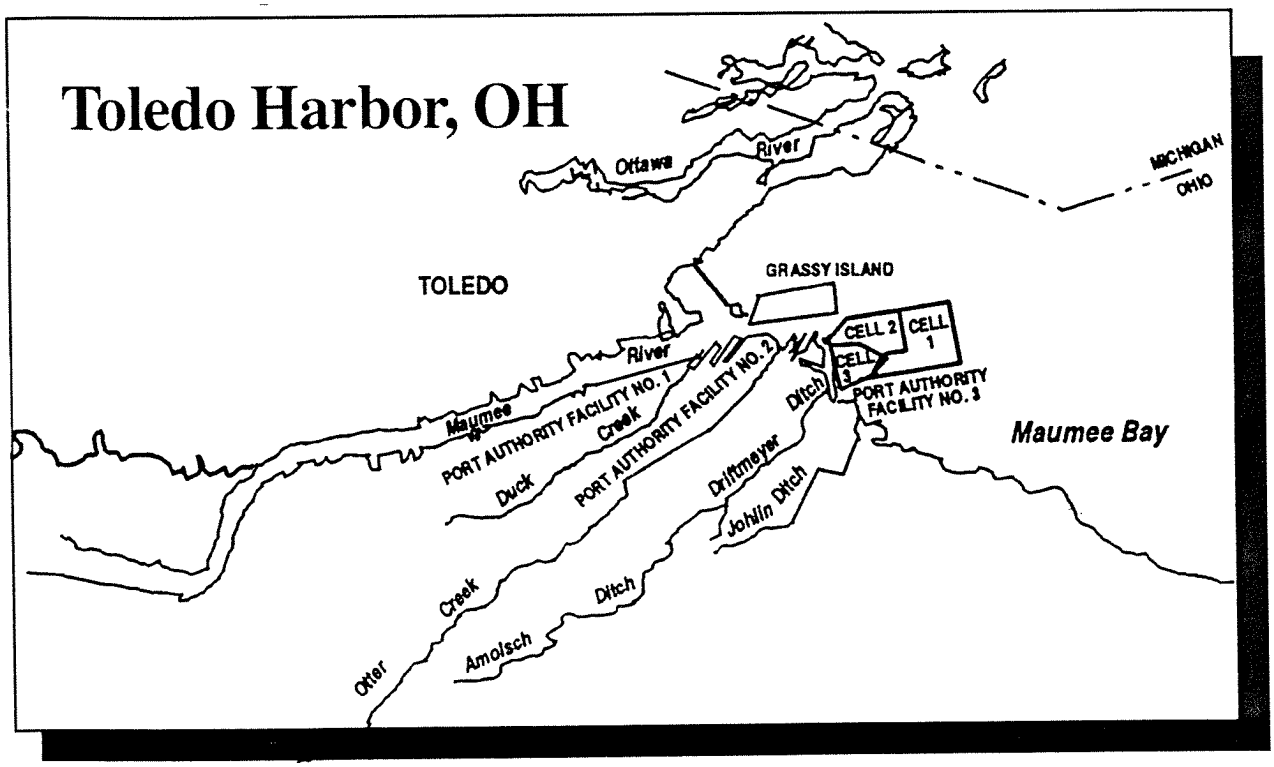
Long-Term Dredged Material Management Plan
within the context of
Maumee River Watershed Sediment Management Strategy

Executive Committee Phase 3 Report with Environmental Assessment



November 1995

TOLEDO HARBOR PLANNING GROUP
LONG-TERM DREDGED MATERIAL MANAGEMENT

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- U.S. Army Corps of Engineers
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- Ohio Environmental Protection Agency
- Ohio Department of Natural Resources
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- Michigan Dept. of Natural Resources
- The City of Toledo
- Remedial Action Plan Committee

ORGANIZATION OF PHASE 3 REPORT

PART I
MAIN REPORT

PART II
ENVIRONMENTAL ASSESSMENT

PHASE 3 REPORT

PART I

MAIN REPORT

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PREFACE

The work described in this Phase 3 Report was performed by the Toledo Harbor Planning Group, an inter-governmental agency group created by a directive from the Assistant Secretary of the Army for Civil Works. The Group is working under the chairmanship of the U.S. Army Corps of Engineers, Buffalo District. Within the context of the development of a sediment management strategy for the Maumee River, the Group stated goals were to promote long-term dredged material management strategies to keep the Port and Harbor open and safe to navigation; and to explore and promote productive use of dredged material as a resource.

The report contains recommendations for a joint "Action Plan" to develop a long-term sediment management Plan (LTMP).

The Planning Group has selected an intermediate plan (2a) as a component of the Action Plan. The Intermediate Plan is a 5-year phase-in program which will provide for the appropriate transition into programs of reuse, sediment reduction, and dewatering and consolidation, while maintaining the operation of the port in a cost-effective and environmentally acceptable manner.

The following individuals, on behalf of the agencies they represented in the inter-governmental Study Team, largely contributed to the development of this report:

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Numerous other technical staff members from the participating agencies, private citizens and groups have also contributed to this study and preparation of this report.

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This Phase 3 study was conducted under the direct supervision of the Executive Committee of the Planning Group chaired by the Corps of Engineers, Buffalo District Commander, Colonel Walter C. Neitzke. Other members of the Executive Committee were:

Mr. Valdas Adamkus, Regional Administrator, USEPA
Mr. Lawrence E. Clark, State Conservationist, USSCS
Ms. Frances Buchholzer, Director ODNR
Mr. Donald Schregardus, Chairman, Ohio EPA
Mr. Wayne Warren, Deputy Director, ODNR
Mr. James Hartung, President, Toledo Lucas County Port Authority
Mr. Carthy Finkbeiner, Mayor, City of Toledo

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

I. INTRODUCTION

The Port of Toledo is a major transportation center located in Northwest Ohio in the industrial and agricultural heart of North America. The port handles an average of 15 million tons of cargo a year, including coal, iron ore, grain and various general cargoes. The activities of the port generate over 500 million dollars in economic activity annually with over 5,000 jobs depending on port operations.

The Corps of Engineers is authorized to perform maintenance dredging of the Federal Channel-necessary to keep the Port of Toledo open. This effort removes on average 850,000 cubic yards of sediment annually.

With the passage of the Clean Water Act in 1972, virtually all dredged sediments were placed in a CDF. Beginning in 1985, in a departure from past practices due to improvements in both sediment and water quality, a majority of the material removed from the lake channel, and considered less contaminated was disposed of in the open lake. Since that time, a number of environmental concerns have been expressed about the practice of open lake disposal. Due to the environmental concerns expressed regarding open lake disposal, a memorandum of agreement [(MOA) City of Toledo, Toledo-Lucas County Port Authority, TMACOG, OEPA, and Corps of Engineers], was established in 1986 that proposed the elimination of this practice by 1990. The MOA failed due to unresolved differences over cost sharing and environmental standards. Then in 1991, the USEPA concurred with OEPA's determination that the current practice of open lake disposal is environmentally unacceptable due to the following: (1) violations to applicable Water Quality Standards, (2) violations to Ohio's Phosphorus Reduction Strategy, and (3) the shallow, erosive nature of the dredged material disposal site results in the resuspension of the dredge material. This position was already supported by the State of Ohio and local agencies.

To resolve the impasse created by environmental standards and cost sharing and provide for continued operation and maintenance of the Port of Toledo, in April, 1992, the Assistant Secretary of the Army for Civil Works directed the Corps of Engineers to form a planning group. The Water Resources Development Act of 1992 required a five and twenty year management strategy for sediment disposal that wold utilize Federal, State, and local agencies to work together toward the development of a **Long-Term Management Strategy (LTMS).** The study group decided to extend the long-term management strategy from 25 years (20 + 5 years) to 30 years.

A Toledo Harbor Planning Group (Executive Committee and Study Team) has been established composed of the agencies listed on the cover of this report. Its focus has been on developing strategies to provide for the long-term management of sediment in the Maumee River Watershed that is cost effective and environmentally acceptable. All reasonable alternatives will be evaluated through an Environmental Assessment (EA).

II. RECOMMENDATIONS OF THE EXECUTIVE COMMITTEE

Acting on directives from the Secretary of the Army and the Water Resources Development Act of 1992 to develop a Long-Term Management Strategy (LTMS) for Toledo Harbor, the Executive Committee concludes:

> **It is the goal of the LTMS to eliminate the practice of open lake disposal. However, the Executive Committee realizes that funding issues and cost sharing cannot be determined at this level, and instead, has devoted its attention to an overall plan. Funding and cost sharing must be taken up as a separate issue in the Phase 4 report.**

To that end, the Executive Committee recommends:

A. Eliminate open-lake disposal. The 30-year **Long-Term Management Strategy (LTMS)** must depend on alternative methods of sediment disposal and sediment management. Those methods that the Executive Committee believes could be successfully implemented in the Toledo Harbor Project include:

1. Vertically expanding present CDFs,
2. Re-use of confined sediments,
3. Implementing erosion control measures in the Maumee River Watershed,
4. Environmental Restoration/Shoreline Protection,
5. Actively managing sediment dewatering in CDFs, and
6. Scientifically and economically validating the environmental unacceptability of open-lake disposal.

B. That a 5-year interim plan (designated Intermediate Plan 2a) be adopted. This plan satisfied the requirements of the 5 year strategy required under the Water Resources Act. The Executive Committee recognized that components of the LTMS could be implemented in the intermediate plan. Others would require additional studies or time to implement. This interim plan will govern the 1994-1998 dredging seasons. Milestones were established to gauge progress towards implementing the LTMS.

C. The construction of new near shore CDF in the Toledo Harbor will be avoided unless other environmental or wildlife benefits can be achieved.

D. That additional authority(ies) and funding sources for implementing the LTMS be explored upon approval of this Executive Summary and this Phase 3 report.

III. RECOMMENDED ACTION PLAN OF THE EXECUTIVE COMMITTEE

Intermediate Plan 2a implements several components, some of which are continued for the life of the LTMS. These are:

A. Ongoing Dredging: This program would build on the existing OEPA 401 certification allowing material dredged from Lake Mile 5 to Lake Mile 19 to be placed in an open water site during the interim period. The remaining Lake and entire river dredging would be placed in the CDF. The Army Corps of Engineers will remain the lead agency on this.

B. Crop Residue Management: This program is also known as conservation tillage which provides that a certain amount of crop residue be left on the farm field to minimize soil erosion into the Maumee River. The Soil Conservation Service (SCS) estimates that this program could reduce the amount of sediment into the river by 15 percent. This would decrease the amount of material dredged from the river from 850,000 cubic yards a year to 710,000 cubic yards. The USDA, Soil Conservation Service will provide the lead in working with local soil and water conservation districts and the State of Ohio to implement the crop residue management plan. Funds for this activity will be requested as part of this plan.

C. Manufactured Soil/Beneficial Reuse: This effort entails the recycling of various waste products into a usable material. Demonstration projects tested to date have mixed dredged material with processed sewage sludge and spent lime sludge to produce a good quality top soil. The Intermediate Plan would expand this effort to Island 18 and other appropriate site(s) in order to produce large quantities of top soil more cost effectively while providing additional dredged disposal space for future use. The Port Authority will take the lead on this recycling effort.

D. CDF Management: Better management of dredge material could substantially extend the life of existing CDFs. To that end existing dewatering and consolidation measures will be implemented to enhance the life of current CDF. The Army Corps of Engineers will take the lead on CDF management techniques.

E. Evaluation: Each component of the intermediate plan will be evaluated annually to measure progress towards achieving the projected reductions, beneficial reuse or CDF management goals. The Executive Committee will review the annual reports from the lead agencies and make recommendations for adjustments in order to account for unforeseen problems that may occur. This oversight activity is designed to review the progress and measure the performance and effectiveness of the intermediate Plan.

During this 5 year period additional studies will be conducted in order to contribute to the LTMS. These additional studies include:

- Vertical Expansion of present CDFs
- Recycling CDF
- Additional Soil Conservation Technologies
- Environmental restoration/shoreline protection
- Institutional studies
- Real estate
- Detailed designs
- Continued open-lake disposal

IV. RESPONSIBILITIES FOR IMPLEMENTATION

In order to achieve the goals of the Toledo Harbor Planning Group, it was necessary to review existing policies and evaluate the need for changes and compromises that would move the project forward. The Executive Committee recognizes that it can not complete authorizing legislatures, council, and boards to commit resources towards the LTMS. The cost allocation for this study is not included in this report. That allocation is dependent upon guidance from each Agency's higher headquarters. However, the following actions are essential to insure the successful implementation of the LTMS:

- The U.S. Army Corps of Engineers will waive current policy and place sediments dredged between River Mile 7 and Lake Mile 5 in the CDF.

- Ohio EPA will agree to issue 401 Water Quality Certifications to allow open lake disposal of sediments dredged lakeward of Lake Mile 5 during the intermediate plan.

- The Corps will evaluate the viability of removing sediments from the CDF under a no cost contract, evaluate CDF management methods to consolidate material in the CDF and increase disposal capacity.

- Toledo-Lucas County Port Authority will remain the local sponsor for Federal navigation projects. This will require the port to provide land, easements, right-of-way, and relocations for the long-term and interim plan.

- The Corps will lease the use of Island 18 to the Port Authority to manage the recycling program for the interim period that will provide additional space for future disposal of sediments.

- The Port Authority will take the lead in developing Island 18 as a recycling facility

which includes the expenditure of funds to upgrade the facility for such operations.

- The Natural Resource Conservation Service will develop an erosion-sediment reduction program and investigate additional soil conservation technologies to decrease the sediment delivered to Toledo Harbor.

- The Corps, States of Michigan and Ohio, and the Port Authority will investigate the feasibility of constructing shoreline protection structures to contain dredged materials.

- The Corps will investigate the feasibility of expanding the capacity of current CDFs.

- Ohio Department of Natural Resources will investigate the use of closed CDFs for parks and wildlife habitat.

- The City of Toledo will be the lead agency for the production of a **P**rocess to **F**urther **R**educe **P**athogens (PFRP), sludge.

- The Corps, OEPA and USEPA will jointly develop and complete a scientific method of evaluating the environmental acceptability of the open-lake disposal option during the interim period.

Table 1 -- Cost Allocation and Apportionment for the Action Plan: Yearly Cost at October 1993 Prices

1. TEST PROJECT Int. Plan 2a	Purpose	Yearly Cost ($)		
		Yearly Cost Over 5 Yrs.	Federal Share	Non. Federal Share
Dredging and Disposal	Operation & Maintenance	3,300,000	3,300,000	0
Conservation Tillage	356 WRDA 92 :Sediment Reduction	1,600,000	1,600,000	0
Dewatering	Operation & Maintenance	219,000	219,000	0
Manufactured Soil[1]	Beneficial Use[1]	800,000	0	800,000
2. OPTIONAL STUDIES/ PROJECTS		Yearly Cost Over 2 Yrs.		
CDF Expansion	Operation & Maintenance	250,000	250,000	0
Recycling CDF	1. O and M 2. Beneficial Use	93,000	47,000	46,000
Ag. Runoff Reservoir	356 WRDA 92 :Sediment Reduction	150,000	150,000	0
Protection/ restoration of shoreline study	1. 204 Environment Restoration 2. 1135 Shoreline Protection	250,000	187,500	62,500

[1] The Corps would provide the CDF site for processing the materials to produce manufactured soils at no cost to non-Federal interests. The confined material would be put up for bid to insure that all interested parties have a chance to participate on equal terms.

SECTION I
INTRODUCTION

I. INTRODUCTION

A. GENERAL:

1. Historical Background:

The Port of Toledo handles an average of 15 million tons of cargo a year, including coal, iron ore, grain, and various general cargoes. The activities of the Port generate over 500 million dollars in economic activity annually with over 5,000 jobs depending on port operations. The dredging operations performed by the Corps of Engineers have been a recurring process since the late 1800's. The Port of Toledo has had to progressively address the ever changing needs of incoming vessels. Increased dependency on waterborne trade in bulk and general cargo will increase the need for dredging the Port of Toledo. The first appropriation for the improvement of Toledo Harbor by the United States Government was made by the River and Harbor Act of June 13, 1866. By successive Acts, the channel depth was increased from a depth of 15 feet in 1875 to a depth of 25 feet in 1936. The straight 17-mile long and 500-foot wide channel in Maumee Bay was completed in 1892. In 1960 the River and Lake channels were deepened to 27 and 28 feet, respectively.

The primary factors influencing the maintenance of these channels had been cost and environmental considerations. Since the early 1960's however, as environmental concerns over open-lake disposal became known, the disposal of dredged material in the open waters of western Lake Erie became more closely scrutinized. In the late 1960's and early 1970's when contamination of bottom sediment and degradation of water quality in the lower Maumee River were identified (sediments classified as polluted and requiring containment), the City of Toledo, the State of Ohio, and the Toledo-Lucas County Port Authority cooperated with the Federal Government to provide facilities for the confinement of the harbor dredged material.

The Federal Government enacted laws regarding the disposal of polluted dredged material. Section 123 of the 1970 River and Flood Control Act (Public Law 91-611) authorized the Corps of Engineers to construct, operate, and maintain contained disposal areas for polluted dredged material in the Great Lakes area. This law provided for the construction of 10-year Confined Disposal Facilities (**CDF**) with local interests providing lands, easements, and rights-of-way and without justification beyond water pollution control. Because the material in the navigation channels was heavily polluted, all the dredged material from these channels were contained in the existing 240-acre CDF constructed in 1976 to meet specific requirements of the Federal Water Pollution Control Act later amended and referred to as the Clean Water Act.

Up to 1976, the preponderance of the material dredged from Toledo Harbor was disposed of in the open waters of the Western Basin of Lake Erie with some material discharged into Confined Disposal Facilities along the banks of the Maumee River, and in **Island 18** also known as Grassy Island. From 1976 to 1984, except for some material placed in open-lake in 1982, all dredged material from Toledo Harbor was confined in a CDF because of elevated contaminant levels. In the latter part of this 1976-84 period, because of significant improvement in both the sediment and water quality due to pollution abatement efforts by the State, the sediment in the **Lake Approach Channel** from **Lake Mile 2** to **Lake Mile 19** was reclassified as being suitable for open-lake disposal. Although some material was placed in the open-lake in 1982, open-lake disposal actually began in 1985. (See *Figure 1.1* for the location of these referenced points and facilities).

From 1985 through 1991, all dredged material lakeward of Lake Mile 2 has been placed at designated **open-lake disposal sites** in the Western Basin. All materials dredged from Lake Mile 2 upstream to River Mile 6 have been placed in the existing 240-acre CDF shown in *Figure 1.1*. However, local officials had not accepted the reestablishment of the practice of open-lake disposal. In 1992, the U.S. Congress passed the Water Resources Act of 1992 (WRDA92) which requires the Secretary of the Army to develop a Long-Term sediment Management Strategy for Maumee River, Toledo Harbor.

Since 1985 there have been a number of concerns expressed by various agencies, individuals, and groups regarding open-lake disposal. Environmental concerns included potential adverse impact on Lake Erie water quality: resuspension and movement of materials from the disposal site, possible impact on water quality at the Toledo water treatment plant, phosphorus input to Lake Erie and eutrophication (algal growth), lake sediment chemistry and biota, and use of nearshore areas for the construction of dredged material Confined Disposal Facilities. The **City of Toledo Water Intake** is shown in *Figure 1.1*.

In an effort to satisfactorily address these environmental concerns, the U.S. Army Corps of Engineers, the Ohio Environmental Protection Agency, the Toledo Metropolitan Area Council of Government, the Toledo-Lucas County Port Authority, and the city of Toledo signed a 5-year Memorandum of Agreement **(MOA)** in 1986 "to explore a mechanism for the maintenance of Toledo Harbor and the protection of the quality of the water in Lake Erie." The MOA was also designed to build a framework for cooperative investigation of alternatives to open-lake disposal which was scheduled to be phased out in 1991. Beneficial use/reuse of sediment dredged from Toledo Harbor navigation channels was to be pursued. Many of the provisions of the MOA were not carried out because of unresolved differences over cost sharing and environmental standards.

2. Current Situation:

In 1992, the Assistant Secretary of the Army for Civil Works, Ms. Nancy Dorn, directed the Corps of Engineers to develop, by October 1993, a jointly supportable dredged material management **Action Plan** for Toledo Harbor. Elements of the plan were to include an evaluation of the relative costs of confined disposal versus open-lake disposal.

The Secretary's directive resulted in the creation of a Planning Group consisting of several local, State, and Federal agencies that agreed to work together to develop the mutually acceptable plan called for by the Secretary's office. The Secretary's directive was later reinforced by the Water Resources Development Act of 1992 (WRDA92). WRDA92 requires a 5 and 20-year management strategy for sediment disposal that would utilize Federal, State, and local agencies working together toward the development of the Long-Term sediment Management Strategy **(LTMS)**. The Planning Group is composed of an Executive Committee and a Study Team.

The Toledo Harbor Planning Group that is in the process of developing the Long-Term sediment Management Strategy **(LTMS)** for the Maumee River Watershed including Toledo Harbor, OH, consists of representatives from the: U.S. Army Corps of Engineers; U.S. Soil Conservation Service; U.S. Environmental Protection Agency; U.S. Fish and Wildlife Service; Ohio Environmental Protection Agency; Ohio Department of Natural Resources; City of Toledo, OH; Toledo-Lucas County Port Authority; Maumee Remedial Action Plan Committee; and Michigan Department of Natural Resources.

The Planning Group is currently utilizing the concept of Long-Term dredged material Management Strategy (LTMS) for addressing the issues at hand. The concept for LTMS development is an orderly, sequential process that: (a) identifies dredging quantities and frequencies, and performs a preliminary assessment of needs versus the available disposal site capacity; (b) formulates alternative plans to offset disposal site or capacity shortfalls; (c) applies detailed screening procedures based on engineering, economic, and environmental considerations to arrive at preferred alternative plan(s); (d) develops procedural, administrative, and strategies for implementation of Long-Term sediment Management Plan(s) **(LTMP)**; and (e) provides for periodic review and updating of the **LTMP** to maintain viable long-term navigation.

The conceptual process for developing the LTMS and implementing the **LTMP** for Toledo Harbor is presented in five phases which are briefly described below. Each phase consists of a series of steps or essential activities that lead to a certain level of decision-making before continuing on to the next phase.

The five phases for developing and implementing the LTMS are:

Phase 1. Evaluate Existing Management Options
Phase 2. Formulate Alternatives plans
Phase 3. Preliminary Analysis of Alternatives, Recommend for Approval and Implementation, an Action Plan having an Interim Plan as a component
Phase 4. Implement the LTMS which includes execution of the Interim Plan, Detailed Studies, Detailed Design, and Recommendation of an LTMP.
Phase 5. Implementation, Periodic Review, and Update of the LTMP.

Detailed descriptions of these phases are presented in the July 1992 signed WORK PLAN which was prepared by the Planning Group and approved by the Secretary's office.

Reports for Phases 1 and 2 of the LTMS were completed in March 1993 and July 1993, respectively. Summaries of the conclusions of Phases 1 and 2 are provided in Appendix A of this Phase 3 Report. This Phase 3 Report documents the Phase 3 effort.

B. PURPOSE:

The purpose of the LTMS is to develop and evaluate long-term plan(s) for the management of sediment throughout the Maumee River Watershed, including Toledo Harbor, OH. The LTMS will provide a consistent, logical procedure by which alternatives can be identified, evaluated, screened, recommended and selected for the management of sediment and/or dredged material in a timely and cost-effective manner.

The purpose of this Phase 3 Report is to document the preliminary analysis of alternative sediment management plans with a view to identifying and recommending the implementation of a jointly-supportable **Action Plan** or **(LTMS)**. The **LTMS** will include an Intermediate Plan as a component. The Intermediate Plan would allow for the continued operation and maintenance of the Port of Toledo during the intermediate period while testing other projects to verify their feasibility as potential components of the Long-Term Sediment Management Plan. The Intermediate Plan considers a 5-year period starting in 1994 through 1998. It would lead to the development and implementation of a long-term plan which would address the next 20-30 years and beyond. This report is to be reviewed and approved by each of the partner agencies.

C. AUTHORITY:

This LTMS study is being conducted under Code of Federal Regulations for navigation and navigable waters, 33 CFR 337.9 (Part 200 to end), revised July 1, 1991, that authorizes the Corps of Engineers to identify and develop dredged material disposal management strategies for long-term needs, and to implement the National Environmental Policy Act 33 CFR 233 and 40 CFR 1501.7, to determine the scope and significance of issues related to a proposed action.

The study is also being conducted under authority provided by Section 356 of the Water Resources Development Act of 1992 (WRDA 92), which directed the development of a comprehensive sediment management strategy for the Maumee River, Toledo, OH. These study authorizations are discussed below:

1. 33 CFR 337.9:

33 CFR 337.9 states: "District Engineers should identify and develop dredged material disposal management strategies that satisfy the long-term needs for Corps projects. Full consideration should be given to all practical alternatives including upland, open water, beach nourishment, within banks disposal, ocean disposal, etc. Within the existing policy, District Engineers should also explore beneficial uses of dredged material such as marsh establishment and dewatering techniques, in order to extend the useful life of existing disposal areas."

2. Section 356 of WRDA 92:

a. Subsection 356(a):

Subsection 356(a) of the Water Resources Development Act (WRDA) of 1992 provided additional authority by directing the Secretary of the Army to coordinate with the Toledo-Lucas County Port Authority and the Ohio Environmental Protection Agency to develop comprehensive 5-year and 20-year Sediment Management Strategies for the Maumee River, Toledo Harbor.

b. Subsection 356(b):

Subsection 356(b) authorized the Secretary to conduct the engineering and construction activities necessary to implement the 5-year Sediment Management Strategy developed pursuant to subsection(a).

3. Additional Authorities from Federal, State, and Local Agencies:

The Planning Group has additional authorities from the other Federal, State, and local agencies involved in the study.

a. Public Law 83-566 - Watershed Protection and Flood Prevention Act of 1954:

This act authorizes the Secretary of Agriculture to cooperate with States and local agencies in the planning and carrying out of works of improvement for soil conservation, and for other purposes.

b. Public Law No. 46, 74th Congress, of the Soil Conservation Act of 1935:

This act authorizes the Soil Conservation Service to conserve basic soil and water resources by extending sound land-use practices to all land vulnerable to soils erosion. It involves demonstrations to illustrate the practical effectiveness of soil-conserving land-use

practices and to prove the techniques of erosion control through actual application of the land.

c. Section 1135 of the Water Resources Act of 1986, as amended, and Section 204 of the Water Resources Act of 1992 for the protection and restoration of environmental resources.

d. Section 145 of the Water Resources Act of 1976, as amended by Section 933 of the Water Resources Act of 1986, and Section 207 of the Water Resources Act of 1992 for the placement of material on beaches.

e. Section 404 of the Clean Water Act, and the coastal Zone Management Act, for environmental consistency and compliance with NEPA.

D. SCOPE AND GOALS/OBJECTIVES:

1. Scope:

The geographic limits for this Long-Term Sediment Management Strategy extends to the boundaries of the Maumee River Watershed *(See Figure 1.2)* which includes the existing Federal Commercial Navigation Project in Toledo, Ohio. The existing Federal Commercial Navigation Project extends from Mile 0.0 to River Mile 7; and from Mile 0.0 to Lake Mile 19.0.

2. Goals/Objectives:

Following are the specific goals and objectives outlined in the approved Work Plan developed by the Planning Group in July 1992:

* Promote dredged material disposal management options that restore and/or enhance the environment, and have inherent acceptability and value to all partners of the Planning Group;

* Continue to keep Toledo's Port and Harbor open and safe for navigation; and

* Explore and promote productive use and/or reuse of dredged materials as a resource through an effective Public Involvement Program which increases citizens' awareness, interest, and cooperation.

E. SUMMARY OF CONCLUSIONS OF PHASES 1 AND 2:

A summary of the conclusions from the Phase 1 and Phase 2 efforts is given below.

1. Economic Justification of Maintenance Dredging:

Current industry needs were determined primarily through review of local industries

(*Figure 1.3 depicts harbor waterfront industries*) commodities transported historically by water, 1989 Waterborne Commerce tonnages, vessel characteristics, and 1989 vessel movement patterns. On the basis of these factors, the cost of transporting existing commodities by water through Toledo, at selected depths, was determined based on 1991 vessel cost data. In addition, the cost of dredging to selected channel depths was also determined. The channel depth analysis determined the economic depth to which the channel should be maintained. All other factors were held constant. The incremental waterborne transportation costs associated with an incremental foot of channel depth are actually benefits in terms of cost savings to industry. Additional channel depth allows vessels to carry more tonnage per trip and requires fewer vessel trips to transport annual tonnage, thus, lowering total transportation costs. The transportation cost savings (benefits) were compared against the incremental dredging costs to determine whether it was economically viable to dredge each channel depth considered. A detailed analysis of the regional transport of anticipated commodities and goods along with projected tonnages over the project life will be performed in Phase 4.

2. LTMS Time Frame:

A 50-year time frame was initially assumed for the LTMS. However, during the Phase 2 development, the Study Team revised the time frame to a 30-year LTMS. Section 356 of WRDA calls for a 5-year and a 20-year Sediment Management Plan for Maumee River, Toledo, Ohio. Overall, the Study Team is considering a 30-year time frame for the long-term plan as a minimum.

3. Source of Material and Pollutants:

During the late 1960's thru early 1970's, the use of agricultural chemicals and row crop rotation accelerated the rate of soil and farmland erosion and pollutants entering the Maumee River. Precipitation, in the form of rain and melting snow, drains the eroded soil off the farmland into the stream.

An average annual suspended sediment load of 1.3 million tons passes the USGS stream gauge at Waterville, Ohio. This material is further polluted by local industries' releases of pollutants, and is largely deposited in the river channel and transported to some degree to the lake channel.

Shoaling of the Lake Approach Channel occurs through resuspension and redistribution of the Maumee Bay bottom sediments due to wind and wave action. Shoaling also occurs as a result of the transport of material from slumping channel sides.

4. Material Characteristics:

Previous physical testing showed that sediment from the Federal Lake Approach Channel and the River Channel consisted primarily of 88-98 percent fine-grained silt or clay,

with the remainder being coarse-grain material (sand and gravel). Inorganic data on the sediment indicated that higher levels of arsenic, barium, cyanide and phosphorous, and iron were measured in most of the sediment samples. Results of organic analyses indicated that neither pesticides nor PolyChlorinated Byphenyls (PCBs), were detected in any of the sediment samples. Bioassay testing classified the lake sediment as "suitable for open-water disposal," and river channel sediment as "contaminated." Appendix B4 of this report provides more information on characteristics of material and water quality in Maumee River and Maumee Bay.

5. Available Disposal Resources:

a. Confined disposal:

Several CDFs (*See Figure 1.1)* that have been in use at Toledo Harbor include:

(1) Island 18 is a 132-acre diked enclosure (150 acres total) built and owned by the Corps of Engineers. Between 1962 and 1974, Island 18 was used for disposal of dredged material from portions of Toledo Harbor Lake Approach Channels. Three other sites along the River were also known to have been used to dispose of material. During the period 1975-1977, material throughout the Toledo Harbor Federal navigation channels was placed in the facility. The most recent 1993 survey indicated a maximum remaining volumetric capacity of 600,000 cubic yards up to elevation +23 Low Water Datum (weir crest). During Phase 1 the site was under consideration as a dredged material recycling area, or for wildlife habitat enhancement. The wildlife habitat enhancement purpose was screened out during Phase 2 analysis.

(2) Port Facility No 3:

(a) Cell 1: comprises an area of 240+ acres. During Phase 1, this cell was considered filled at dike elevation of +22.5 feet LWD in its southwestern portion, and +14 feet LWD in its northwestern portion. The eastern portion had a remaining capacity of less than 1 million cubic yards.

(b) Cell 2: comprises an area of 155 acres. It is under construction and was completed in 1994. Its available capacity at elevation +23.5 was estimated to be 8.1 million cubic yards in-situ volume of sediment over a 20-year period and a placement rate of 400,000 cubic yards per year.

(c) Cell 3: is owned by the Toledo-Lucas County Port Authority with a portion leased to the Toledo Edison Company. It is located adjacent to Cells 1 and 2.

b. Open-Lake Disposal:

From 1985 to 1991, approximately 600,000 cy/yr of material have been placed at the open-lake site located at about Lake Mile 11.0. Starting in 1992 through 1994, 250,000 to 300,000 cy/yr of material will have been placed at the open-lake site.

6. Dredging Requirements:

The dredging requirements were revised to a rate of 850,000 cy/yr over the 30-year life of the LTMS. This required annual dredging quantity would accommodate approximately 25.0 million cy which would exceed the total maximum capacity of 10.0 million cy of the in-situ sediment volume available in 1992. This results in the need to primarily reduce the volume of sediment entering the system and/or beneficially reuse the sediment that is currently confined in CDFs.

7. Environmental Concerns:

Environmental resources of concern identified during Phases 1 and 2 were those associated with fish and wildlife in the Maumee Bay and vicinity, and to a lesser extent the Maumee River. Loss of wetlands, submerged aquatic macrophyte plant beds in the Bay, and shallow water fish habitat were also identified. Environmental concerns most often cited regarding dredging and aquatic disposal of the material are loss or alteration of aquatic fish and wildlife habitat, temporary resuspension of phosphorous-laden sediment, and effects of other pollutants on water quality. On this basis, both the U.S. and Ohio Environmental Protection Agencies have in the past called for elimination of dredged material disposal at the existing open-lake disposal site.

8. Disposal Alternatives:

Two primary disposal alternatives or disposal choices were considered in the formulation of the **ACTION PLAN.** These primary disposal alternatives or choices were as follows:

* Disposal Choice 1: No Open-Lake Disposal Starting in 1995; and
* Disposal Choice 2: Combination of CDF Confinement plus Open-Lake Disposal

9. Action Plan:

As a result of the Phase 2 Study, the Action Plan was generally comprised of two key parts outlined as follows:

a. **Demonstration projects** which include the on-going dredging and other items which were added to form **alternative interim plans** to provide for both the continued maintenance of the Federal project, and for a transition from current to future sediment management. An outline of the Alternative Intermediate Plans is provided in paragraph 10., below.

b. **Additional Studies/Projects** which include Woodtick Peninsula, agricultural runoff retention reservoir; wildlife habitat restoration, wetland creation, institutional studies (funding, cost sharing, sediment test criteria, etc), testing and evaluation of open water disposal and any other studies having potential to contribute to the LTMS process.

10. Alternative Intermediate Plans:

The two disposal choices, briefly described in paragraph 8 above, were developed into the following Alternative Intermediate (interim) Plans:

a. Alternative Intermediate Plan 1a:

All material dredged from the Federal channels would be placed in CDF, starting in 1995.

b. Alternative Intermediate Plan 1b:

* All dredged material in CDF, starting in 1995
* Crop Residue Management
* Manufactured Soils (Beneficial Reuse)
* CDF Management
* Evaluation

c. Alternative Intermediate Plan 2a:

* Material from (Lake Mile 5 - River Mile 7) in CDF and Material from (Lake Mile 5 - Lake Mile 19) in Open Lake
* Crop Residue Management
* Manufactured Soils (Beneficial Reuse)
* CDF Management
* Evaluation

d. Alternative Intermediate Plan 2b:

* Material from (Lake Mile 2 - River Mile 7) in CDF and Material from (Lake Mile 2 - Lake Mile 19) in Open Lake
* Crop Residue Management
* Manufactured Soils (Beneficial Reuse)
* CDF Management
* Evaluation of above components including open-water disposal

e. No-Action (Without-Project Conditions):

* Material from (Lake Mile 2 - River Mile 7) in CDF and
* Material from (Lake Mile 2 - Lake Mile 19) in Open Lake

The Alternative Intermediate Plans are candidates to be a major component of the Action Plan or LTMS. They are assessed later in this Phase 3 Report to identify and select the preferred component.

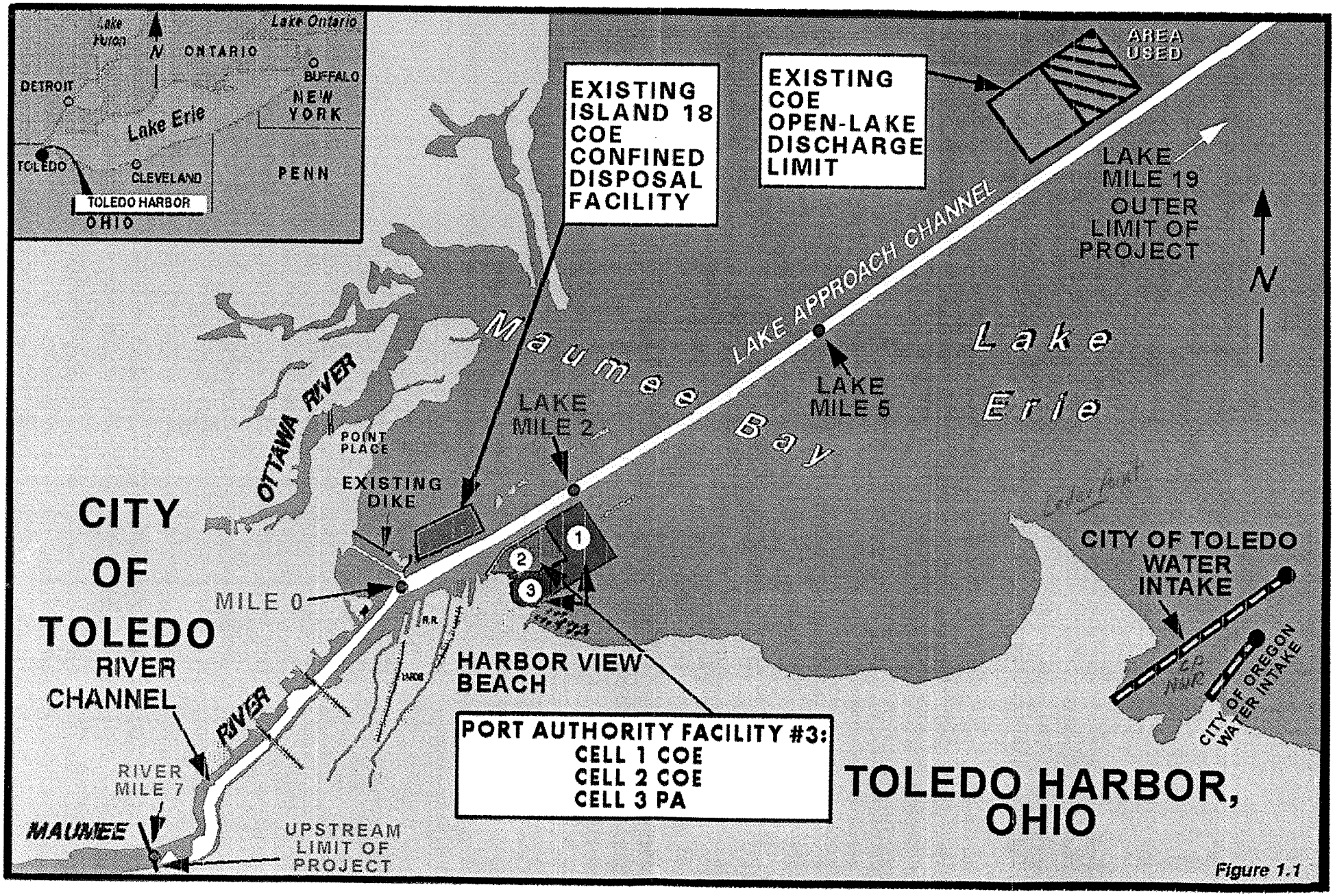
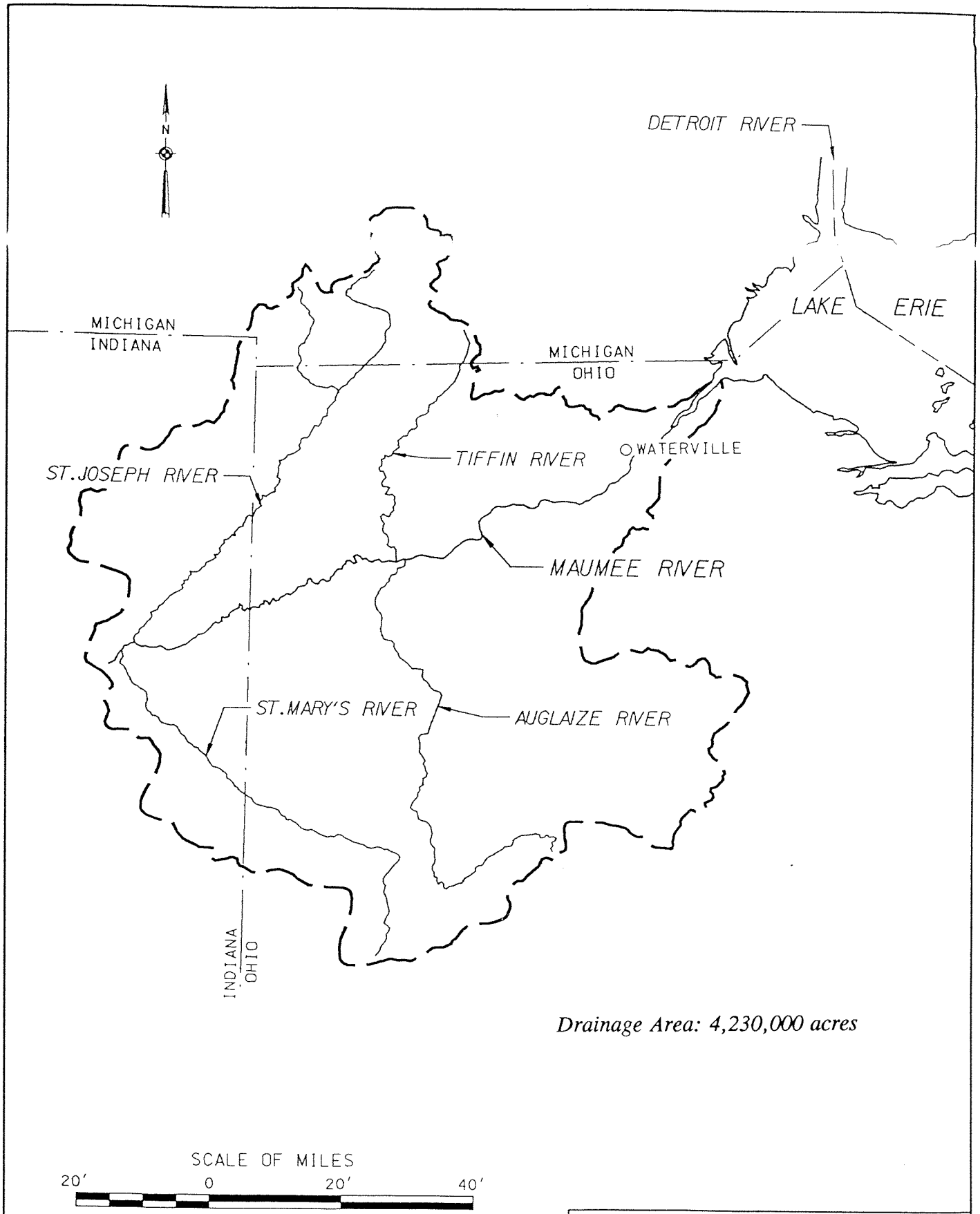

Lake Huron
N
ONTARIO
Lake Ontario
BUFFALO
DETROIT
NEW YORK
Lake Erie
TOLEDO
CLEVELAND
PENN
TOLEDO HARBOR
OHIO
EXISTING ISLAND 18 COE CONFINED DISPOSAL FACILITY
EXISTING COE OPEN-LAKE DISCHARGE LIMIT
AREA USED
LAKE MILE 19 OUTER LIMIT OF PROJECT
N
LAKE APPROACH CHANNEL
Maumee Bay
Lake Erie
LAKE MILE 5
LAKE MILE 2
OTTAWA RIVER
POINT PLACE
EXISTING DIKE
CITY OF TOLEDO
MILE 0
TOLEDO RIVER CHANNEL
RIVER
RIVER MILE 7
MAUMEE
UPSTREAM LIMIT OF PROJECT
HARBOR VIEW BEACH
PORT AUTHORITY FACILITY #3:
CELL 1 COE
CELL 2 COE
CELL 3 PA
CITY OF TOLEDO WATER INTAKE
CITY OF OREGON WATER INTAKE
TOLEDO HARBOR, OHIO

Figure 1.1



TOLEDO HARBOR, TOLEDO, OHIO
LONG-TERM SEDIMENT MANAGEMENT STRATEGY
MAUMEE RIVER BASIN
TOLEDO HARBOR PLANNING GROUP
MARCH 1993

Figure 1.2 - Maumee River Basin

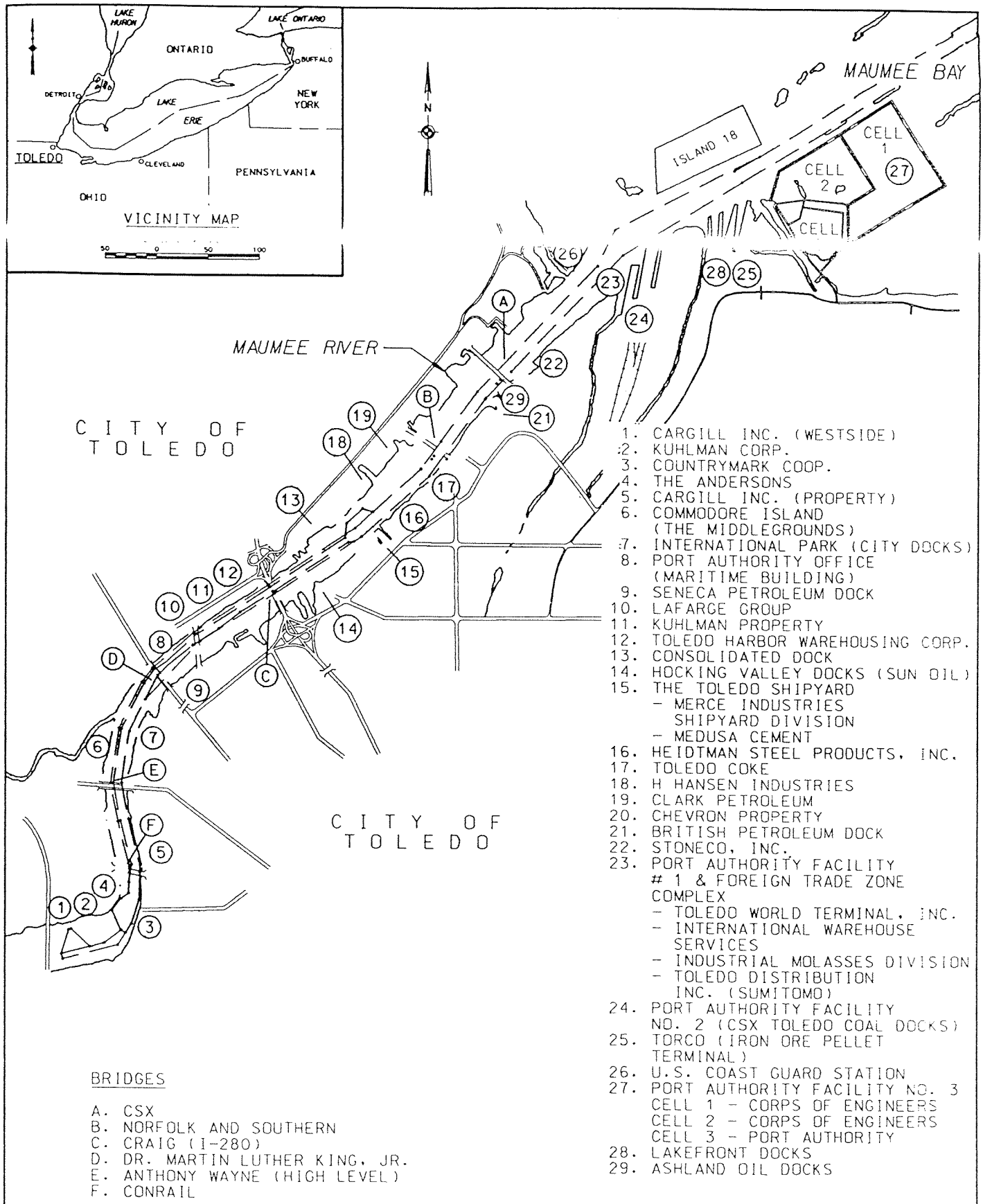


Figure 1.3 - Waterfront Industries

SECTION II
FORMULATION OF ACTION

II. FORMULATION OF ACTION PLAN

A. INTRODUCTION:

This Section of the Phase 3 Report reviews the output of the Phase 2 Study and provides a detailed formulation and development of an Action Plan. This formulation process considers and assesses various study elements to arrive at a comprehensive LTMS. In stating so, this Section II assesses the management of sediment, and related problems, needs, and opportunities that are specific to the Maumee River Basin which includes Toledo Harbor, OH. It defines the no-action (without-project conditions), the Base Plan and expected future conditions. Also, this section provides a summary of preliminary screening; discusses future studies; assesses, and screens the potential alternative intermediate plans carried through Phase 3, taking into consideration the objectives of the Planning Group and the criteria that are consistent with the requirements of the 1969 National Environmental Policy Act (NEPA). Further, the impact of these alternative intermediate plans on the useful life of the new CDF (Cell 2), and on disposal costs as well, are discussed and evaluated to highlight any deviation from the Base Plan.

In formulating the Action Plan, primary consideration was given to formulating a comprehensive component to provide for the continued operation and maintenance of the Port of Toledo, after the 1994 dredging season. This comprehensive component of the Action Plan took the form of Alternative Intermediate Plans which were formulated and screened.

B. FEASIBILITY CRITERIA:

Technical feasibility criteria for screening potential alternative management plans were developed as required by NEPA to assure that possible adverse effects are taken into consideration and that the final decisions are made in the best overall public interest. Environmental, engineering, economic, and other criteria were developed and were used with no preference given to their relative importance in determining technical practicability of a plan or plans. Rather, a plan should meet all of the criteria to be considered technically feasible. A summary of the feasibility criteria is given in *Table 2.1.*

Table 2.1 - Summary of Feasibility Criteria

Management Option	Description of Criteria
OPEN-LAKE DISPOSAL:	**Environment** No commercial fisheries within a mile of the open water site No open-lake disposal site within 3 miles of water intakes site Meet acceptable level of contaminants Benthic toxicity less than 10% above reference site No statistically significant bioaccumulation
	Engineering Operationally feasible with respect to use of conventional equipment and safe operation
	Economic Cost comparable to Federally-accepted disposal cost
CONFINED DISPOSAL FACILITIES:	**Environmental** No impacts to adjacent sensitive resources Effluent meets State Water Quality Standards
	Engineering Operationally feasible with respect to use of conventional hopper/pipeline dredges; and safe operation Site conditions favorable to dike construction using conventional construction techniques Dike vertical expansion not to exceed 15 feet Site location accessible by land for site management
	Economic Cost comparable to Federally-accepted disposal cost

Table 2.1 - Summary of Feasibility Criteria (Cont'd)

Management Option	Description of Criteria
MANUFACTURED SOIL:	**Environmental** Use of acceptable type of material Comply with regulatory requirements Non-exceedence of acceptable level of contaminants **Engineering** Site conditions favorable to conventional construction techniques Operationally feasible with dredging operations **Economic** Sufficient quantities of manufactured soils Minimum market size for patented products **Timeliness** Consistent with frequency and continuity of disposal operations
CROP RESIDUE MANAGEMENT:	**Environmental** Comply with regulatory requirements Non-exceedence of acceptable level of contaminants **Engineering** Meet existing policies and standards Availability of technical resources needed Meet additional resources need **Economics** Comparable to Federally-accepted dredging and disposal facility costs **Timeliness** Consistent with frequency and continuity of material disposal

C. PHASE 3 DETAILED SCREENING:

Appendix A discussed the preliminary Phases 1 and 2 screening process for the considered options. The options carried into Phase 3 for detailed screening are as follows:

- Crop Residue Management
- Grassed Waterway
- Wetland Sediment Ponds
- Runoff Retention Reservoir
- Manufactured Soils and Use of Grassy Island
- Strip-Mine Reclamation
- Protection/Restoration of Shoreline
- Management of CDFs
- Recycling CDFs
- New CDFs
- Open-Lake Disposal
- No-Action

A summary screening of these options for Phases 1 - 3 is presented in *Table 2.2*.

1. "Options" Eliminated Early in Phase 3 - Rationales:

a. Grassed Waterway:

The "Grassed Waterway" was eliminated because the installation of all needed waterways would not materially change the rate of sedimentation.

b. The Use of Dredged Material for Strip-Mine Reclamation:

Beneficial use of dredged material in the vast amount of strip-mine reclamation taking place within the State of Ohio was considered in the late 1980's and again in 1993. It appeared to be an attractive option because one of Toledo's main cargo commodities is coal coming from the Kentucky and Southeastern Ohio coal fields to Toledo, with the dredged material providing a possible backhaul. The options for such movements work with not only CSX Transportation, but also the State of Ohio Strip-Mine Reclamation Authority. Several drawbacks were immediately brought to the surface through these discussions.

The first problem that developed was the handling of dredged material disposed of in the confined disposal facility and then transporting that material to a rail car loading facility. The current dredge disposal facilities have little, if any, infrastructure to provide access for rail loading. Consequently, extensive work would be necessary for roadway construction or to provide access by rail directly to the facility.

This, along with the need to provide between $7-9/ton in transportation costs to return the dredged material to the coal fields, posed a major difficulty for the effort.

To overcome some of these difficulties, discussions were initiated with the State of Ohio's Bureau of Strip-Mine Reclamation to investigate possible funding sources. One of the many drawbacks encountered is a restriction on the use of Federally-supplied Strip Mine Reclamation funds to subsidize other Federal operations. Consequently, the use of the dredged material would have to compete directly with alternative means of Strip-Mine Reclamation. In many cases, the topsoil used in Strip-Mine Reclamation is recovered from areas immediately adjacent to the area damaged through strip mine operations.

As a result, and with the inability to effectively compete with the current strip mine practices, the option of using dredged material for Strip-Mine Reclamation was abandoned.

c. Construction of New Nearshore CDFs:

The construction of new nearshore CDFs in the harbor vicinity for disposal of dredged material was considered. Due to U.S. Fish and Wildlife Service and Ohio Department of Natural Resources concerns for loss of shallow water habitats, as well as scarcity of land in the area, and use of the general harbor vicinity by recreation fishermen and boaters, it was determined that this alternative option would not be further pursued for Toledo Harbor unless other environmental benefits such as shoreline or wildlife protection can be achieved. However, upland CDFs and/or offshore CDFs may be given further consideration as necessary.

Table 2.2 - Summary of Screening (Phases 1 - 3)

Options	Phases			Rationale for Elimination Problem Areas			
	PH-1	PH-2	PH-3	Engrg	Envir	Econ	Time
A. SEDIMENT LOAD REDUCTION:							
1. Crop Residue Management;	C	C	C				
2. Conservation Cropping Sequence;	C	E	-			X	X
3. Alternative Crops;	C	E	-			X	
4. Grassed Waterway;	C	C	E	X		X	
5. Wetland Sediment Ponds;	C	C	C				
6. AgriRunoff Retention Reservoir	C	C	C				
7. Filter Strip;	E	-	-	X	X		
8. Streambank Erosion Control;	E	-	-			X	
9. Market for Canola Crop.	C	E	-	X		X	
B. CONTAMINANT LEVEL REDUCTION:							
1. Nutrient Management;	C	E	-	X			X
2. Animal Waste Management;	C	E	-	X			X
3. Pest Management.	E	-	-		X		
C. BENEFICIAL USES:							
1. Manufactured Soils;	C	C	C				
2. Environ. Restoration / Protection (Woodtick);	C	C	C				
3. Shallow Water Habitat;	C	E	-	X	X	X	
4. Grassy Island;	C	C	C				
5. Recreational Hill	C	E	-			X	X
6. Strip-Mine Reclamation	NC	NC	E			X	
D. CONFINED DISPOSAL FACILITIES:							
1. Expansion of CDFs;	C	C	C				
2. CDF Reuse Management (Dewatering);	C	C	C				
3. Recycling CDFs;	C	C	C				
4. Construction of Nearshore CDFs;	C	C	C				
5. Up-Land and Offshore CDFs.	C	C	C				
E. OPEN-WATER DISPOSAL:							
1. Existing site;	C	C	C				
2. New site.	C	C	C				
F. NO-ACTION:	C	C	C				

C : Carried through
E : Eliminated. This option was considered in this phase, but was eliminated.
NC : Not Considered

2. Alternative "Intermediate Plans" assessed in Phase 3:

Four alternative intermediate plans were assessed in Phase 3. These alternative intermediate plans were composed of either **"no open-lake disposal"** as one of their components, or **"confined and unconfined disposal"** as one of their components. Also, the *No-Action Plan*, as part of the NEPA process, was considered as a basis for comparison. These alternative intermediate plans are listed below:

- No-Action Plan (Without-Project Conditions);
- Alternative Intermediate Plan 1a;
- Alternative Intermediate Plan 1b;
- Alternative Intermediate Plan 2a; and
- Alternative Intermediate Plan 2b.

2. Alternative "Intermediate Plans" Eliminated in Phase 3 - Rationale:

Alternative Intermediate Plan 1a was eliminated early in Phase 3. This plan has only one component: elimination of open-lake disposal in 1995. Under this plan, all material dredged from the Toledo Harbor Federal Navigation Channels from River Mile 7 through to Lake Mile 19 would be confined in the new CDF (Cell 2). This Intermediate Plan was eliminated because:

- It would considerably decrease the useful life of Cell 2, which would create the immediate need for locating or searching for a site to build a new CDF. About 850,000 cy/yr of dredged material would be confined in Cell 2 to meet specific local environmental standard and/or needs. That is, 450,000 cy/yr would be placed in Cell 2 in excess of the design requirement of 400,000 cy/yr for 20 years in the new CDF. If Alternative Intermediate Plan 1a was implemented as the LTMP, and considering the rate of 850,000 cy/yr, Cell 2 would have reached capacity in 9.5 years instead of 20 years. This would have reduced the useful life of Cell 2 by 10.5 years. The cost of restoring 10.5 years of CDF capacity would be an excess cost over the least-cost 20-year plan, and therefore, would be a non-Federal cost responsibility. This excess cost is currently estimated at $35.4 million (450,000 x 10.5 x .75 x $10.00) assuming 25 percent material consolidation and a unit cost of $10.00/cy. The new 10.5-year CDF would be built on a site that is only accessible by marine equipment, because no nearshore CDFs would be environmentally acceptable, unless environmental and wildlife benefits can be achieved.

- It would cause far ranging adverse environmental and economic impact, and would not meet the Planning Group's goals and objectives stated earlier in this report.

4. Description of Alternative Intermediate Plans Carried Further in Phase 3:

Three alternative intermediate plans - 1b, 2a, and 2b - were carried further into Phase 3 for further assessment. Also, the No-Action Plan was carried forward into Phase 3 as a basis for comparison of the alternative intermediate plans. The No-Action Plan and Alternative Intermediate Plans 1b, 2a, 2b, are fully described below.

a. Description of No-Action Plan (Without-Project Conditions) or Base Plan

In planning studies, a No-Action Plan is considered to establish a **baseline** from which all other alternative plans may be measured for their relative contribution to the planning objectives. **For Toledo Harbor the No-Action Plan or Base Plan is defined as:**

(1). continuance of the historical Operation and Maintenance Procedures used by the Corps of Engineers prior to the 1992 dredging season, consistent with Corps Dredging Policies and the current Federal Standard and State Water Quality Standards. This prior maintenance and operation practice called for placement of an average annual amount of 350,000 cubic yards of "contaminated" dredged materials, from the Maumee River channel out to Lake Mile 2, in CDFs. An average annual amount of 550,000 cy of less-contaminated dredged material, from Lake Mile 2 lakeward to Lake Mile 19, would be discharged at the designated disposal area in western Lake Erie. However, considering the current 20-year plan (Base Plan), **400,000 cy would be placed in the recently completed 20-year CDF, and 450,000 cy in the open-lake site.** This Base Plan is subject to current and/or new Federal/State Standards for water quality, if any;

(2). continuance of effort by the State of Ohio Environmental Protection Agency (OEPA) to uphold Water Quality Standards in the State through administration of the Section 401 Water Quality Program, and reduction of the load of contaminated sediment entering the Federal Channels;

(3). continuance of effort by the Toledo-Lucas County Port Authority to identify, develop, and utilize long-term beneficial uses of dredged material from the Toledo Port and Harbor;

(4). the City of Toledo; ODNR, and USFWS will continue to pursue their separate goals of providing quality drinking water for the City of Toledo, and preserving fish and wildlife habitats, respectively.

Having identified the Base Plan, it is also important to recognize that the historical Operation and Maintenance Plan for the dredging of Toledo Harbor has been changed through the development and execution of a 2-year agreement between the partner

agencies to continue open-water discharge of dredged material through 1994, as agreed to: dredged material from the river out to Lake Mile 5 will be placed in a CDF; and dredged material from Lake Mile 5 lakeward will be discharged in the open-lake. This practice will continue through the completion of the 1994 dredging cycle. Since no mechanism or authority currently exists to continue this practice beyond the 1994 dredging cycle, it cannot be considered the Base Plan, but it establishes the beginning of the undetermined time period for the Base Plan.

Reverting back to the Base Plan after current agreements expire in 1994 would cause a major conflict between the partner agencies. A potential consequence of the inability of these agencies to reach consensus would be a reduction in the level of maintenance dredging at Toledo Harbor, which would reduce and eventually preclude its use as a commercial harbor. The task of developing a LTMS is a direct outgrowth of this conflict and the evolution of a general agreement between these agencies to work together toward achieving individual goal(s) through implementation of mutually acceptable plan(s) for the benefit of all. The LTMS effort is not seeking the Base Plan, it rather seeks a more permanent medium to long-term solution(s) to the problem of managing the dredge material at Toledo Harbor.

b. Description of Alternative Intermediate Plan 1b:

Alternative Intermediate Plan 1b consists of five components which would work together as an effective program for managing the Maumee River sediment, and operating and maintaining the Port of Toledo. The components of the transition or Alternative Intermediate Plan 1b are as follows:

(1) Dredged Material Placement: Under Alternative Intermediate Plan 1b, all material dredged from the Federal channels, from Mile 0 riverward to River Mile 7, and from Mile 0 lakeward to Lake Mile 19, would be placed in Confined Disposal Facilities (CDFs). There would be **no open-lake disposal** of dredged material during the transition period. Under this alternative intermediate plan, an **estimated total 5-year average volume of 766,000 cubic yards** (See Sub-Appendix B1) of material dredged from Toledo Harbor during the (1994-1998) intermediate period would be placed in CDFs. The sediment would be periodically sampled and tested to determine contaminant levels and appropriate management of the dredged material. Placement of the material would probably be done by hydraulic dredges where the material would be hydraulically conveyed through pipes to the CDF, and by mechanical dredges where the material would be conveyed from barges into the CDF by clamshell bucket or hydraulically.

(2) Crop Residue Management: The Crop Residue Management component would be implemented to reduce the volume of sediment entering the Maumee River, thus

reducing the load of sediment in the Federal channels. Successful execution of the demonstration project would contribute to the effort underway for effective management of the dredged material at Toledo Harbor. Specifically, the project would be executed by practicing the farming method known as Conservation Tillage to reduce farmland erosion, and sediment runoff from the watershed. The expected net effect of Conservation Tillage is that it would reduce the total annual volume of sediment dredged from the Federal Navigation Channels by about 15 percent; thereby reducing the level of contaminants that would end up in the Western Basin of Lake Erie.

Source reduction would be achieved through both acceleration and intensification of existing sediment control efforts, and introduction of Conservation Tillage (no-till farming), an innovative land treatment measure where no-till farmers would plant seeds directly through the previous harvest's crop residue. This technique would cut wind and water erosion and replenishes the crucial organic content of the top soil as the residue slowly decomposes. However, no-till farming would also introduce a variety of herbicides to kill and/or control weeds. This form of Conservation Tillage, if applied over 75 percent of the acreage planted to corn and soybeans, would in the long run reduce the load of sediment entering the Maumee River by 137,000 cy/yr. Sediment reductions from soil conservation will be proportionally distributed throughout the Federal channels as discussed in Appendix B of this report. During the first 5 years, sediment volume reduction would go from a minimum of 82,000 cubic yards in Year 2 to 137,000 cubic yards in Year 5. Average reduction over the 5-year period is estimated at about 80,000 cy/yr. After Year 5, the reduction level would stay at about 137,000 cy/yr at no additional cost. This farming practice would reduce average annual dredging quantities from the estimated 850,000 cubic yards/year to about 713,000 cy/yr in the long-run.

Sediment reduction goals will be assigned to each county. Each soil and water Conservation District will create a County Sediment Reduction Committee, involving agricultural and environmental groups, agribusiness, private citizens, and other affected organizations. This group will be charged with implementing a sediment reduction strategy at the county level. The specific components of the generalized concept will include:

(a). County Sediment Reduction Committees;
(b). Educational Program Grants;
(c). Innovative/Local Program Grants;
(d). Landowner Incentives; and
(e). Technical Assistance.

(3) Manufactured Soils: Manufactured soils are of great importance in the effort of finding an equitable and effective way of managing less-contaminated dredged

material suitable for open-lake disposal. One aspect of the beneficial use/reuse of the dredged material is the production of manufactured soils for use as landfill cover, topsoil, landscaping, fertilizer, road dressing, etc. The expected result from this beneficial use is that the volume of material mined from existing filled CDFs for the production of manufactured soils should theoretically equal the volume of less-contaminated material suitable for open-lake disposal. Whether equilibrium is reached or not, open-lake disposal of the existing open disposal at the existing open-lake disposal site would eventually be eliminated during or at the end of the intermediate period. When this equilibrium is reached, the volume of the less-contaminated material would be placed in locally-provided disposal facilities. This process of mining filled CDFs would create storage capacity for relatively new dredged material. As discussed above, this would be done by removing dredged material from Island 18 during the intermediate period. The material would be mixed on site with other admixtures to produce a manufactured soil which would then be shipped to a dredged material and/or manufactured soils market center.

During the intermediate period 1994-1998, the dredged material confined in the 132-acre CDF, referred to as Island 18 or Grassy Island, would be processed to produce manufactured soil. Other admixtures such as cement kiln dust, lime, treated bio-solids (Process to Further Reduced Pathogens (PFRP) sludge) etc. would be added to the dredged material, and processed into soil products intended for multiple uses. A maximum of 150,000 cy/yr of soft or wet material would be removed from the CDF. The material would be processed on Island 18 to generate a maximum of 130,000 cubic yards of manufactured soil. Admixtures would be brought to the CDF site by barges, and the final soil product shipped off-site for use as landfill cover, topsoil, fertilizer, etc., as appropriate. Over the 5-year period an estimated average of 50,000 to 90,000 cy/yr of manufactured soils can be assumed depending on the success of this demonstration project. This removal of material from the CDF would eventually restore about 3 million cy of storage space for confining relatively new dredged material that would otherwise go to an open-lake or other locally-provided disposal site.

(4) CDF Management: Managing the existing available disposal resources or CDFs to maximize their use and expand their useful life would also contribute to the effort for actively and effectively managing the sediment. To this end, a dewatering, consolidation, and desiccation test project would be implemented. The expected contribution of this test project to the success of the plan would be to recover/restore storage space in both the existing CDF (Cell 1) during the intermediate 1994-1998 period, and the new CDF (Cell 2) in the long term. Application of the consolidation technique can achieve up to 50 percent consolidation of the in-situ volume placed in a CDF depending on the CDF location and characteristics of the material. The process would decant the water content of the material by drawing the water off the CDF through a weir, thereby causing the material to shrink and

occupy a lesser volume in the CDF. More storage space would then be available in the CDF for disposing of additional dredged material. Also, dewatering and consolidating the material would achieve faster drying of the material for a more effective mining, mixing, and beneficial use of the resulting manufactured soils. Consolidation would also increase the shear strength of the confined material to provide for a firmer foundation for possible vertical expansion of the CDFs.

(a) Dewatering Cell 1. Consolidation of the dredged material confined in the 230-acre Cell 1 would be expedited by the use of surface trenches followed by installation of vertical strip drains. Surface trenches would initially be dug around the perimeter and into the interior of Cell 1 to allow water to drain from material within the cell as a result of gravity flow. These trenches would be interconnected to speed up drainage and consolidation of surface soil. The surface soil would also be increased in strength to provide sufficient support for relatively heavy equipment which would be required for later construction of temporary dikes. These trenches would be typically spaced about 100 feet apart. Vertical strip drains would be spaced 10 to 15 feet apart depending on the desired rate for consolidation to take place. Other techniques such as electro-osmosis can be tested to dewater Cell 1 since the soils involved are mostly fine-grained clays. An approximately 10-acre site on Cell 1 would be used for testing and identifying the most practical and cost-effective technique for Toledo Harbor.

(b) Dewatering Cell 2. As disposal of the dredged material into Cell 2 progresses, measures would be taken to ensure that thick layers of wet dredged material that are difficult to dewater do not build up. Efforts would be made to remove stop logs (boards) from the weirs to allow decant water to drain from the site as self-weight consolidation occurs. Any discharge from the CDF would be controlled by setting the discharge weir(s) to provide for required particulate settling time to meet effluent water quality discharge requirements. As the dredged material dries further and develops shrinkage cracks, the stop logs should be removed to the depth of the bottom of the cracks so that the soil is allowed to drain to the maximum extent possible. This also would allow rainwater to drain from the site. After the decant water drainage, sun and wind would be allowed to dry the soil to the maximum extent possible. Each layer would be aerated by plowing to facilitate drying, then compacting the soil with a sheep foot roller or other compaction equipment. Operating in this manner on each placed layer avoids or minimizes storage and management problems associated with higher water content, high volume, and low strength soils. The CDF dewatering technique described above would not be applied to Cell 2 until after Cell 2 would have been filled to the maximum lake water level of +4.0 feet above LWD.

(5) Evaluation: As described above, implementation of these components of Alternative Intermediate Plan 1b, such as Dredged Material Disposal method, Crop Residue

Management, CDF Management, and Manufactured Soils would be monitored and evaluated to measure the performance and effectiveness of these components. As a result, adjustment and/or recommendations would be made as to their applicability or further use in the formulation of the LTMP. There would be no open-lake disposal under Alternative Intermediate Plan 1b. As indicated above, for Intermediate Plan 1b, the CDF Management component, the Crop Residue Management component, and the Manufactured Soils component would be monitored and evaluated. The monitoring program for Alternative Intermediate Plan 1b would include the following:

(a) Evaluation of CDF Management: The monitoring and evaluation of the CDF management project would be executed using the following methods:

(i) Settlement Plates: Settlement of ground surface with time would be monitored by installing settlement plates in Cell 1 to measure and record settlement that had occurred. Such measurements are necessary to evaluate the effectiveness of the adopted dewatering measures and to quantify storage capacity recovered in the cell, and storage capacity available in the cell. Additionally, data required from settlement plates in Cell 1 may be used as an indication of overall material stability within the cell. Deviations in settlement characteristics from the projected settlements may indicate the onset of instability.

(ii) Global Positioning System (GPS) Ground Survey: GPS ground survey equipment uses the technique of triangulating on satellites in polar orbit to provide rapid and accurate topographical information for a given area. All observations of site topography are made electronically and acquired data are fed into digital processors in real time. A summary report is available immediately upon completion of the survey. Use of such equipment at the Port Authority Facility #3 would greatly facilitate the availability of information from which site management decisions may be based.

(iii) Aerial Photography: Photographs of the site plan are taken from a high altitude aircraft. This monitoring procedure is generally useful in keeping track of the overall site in terms of spotting problems and difficulties not readily seen from ground level.

(b) Evaluation of Crop Residue Management: The Crop Residue Management project would be monitored through maintenance and continued use of the USGS gauge at Waterville, Ohio. The USGS gauge station monitors over 95 percent of the Maumee River Watershed. Historical sedimentation data from the gauge would be compared against new gauge data obtained during the intermediate 1994-1998 period to measure the performance and effectiveness of the sediment reduction effort.

Also, the land treatment portion of the Crop Residue Management effort would be accomplished by a statistical point sampling method. The samples would be taken each

year after the planting season and used to calculate sediment load reductions.

Further, the extent of conservation tillage use to measure the performance of this activity can be tracked through the use of aerial photography.

(c) Evaluation of Manufactured Soils: The Planning Group would keep accurate record of quantities of manufactured soil produced and storage capacity recovered annually. Plant and animal uptake tests would be used to determine the acceptability of dredged material and manufactured soils for beneficial use.

c. Description of Alternative Intermediate Plan 2a:

Except for the dredged material placement component of Alternative Intermediate Plan 2a, all its other components are the same as those for Alternative Intermediate Plan 1b. The dredged material will be confined, as well as open-lake disposed with respect to the designated breakpoint at Lake Mile 5.

(1) Dredged Material Placement: Under Alternative Intermediate Plan 2a, the dredged material would be placed in both the new CDF (Cell 2) and the existing open-lake disposal site. Specifically, material dredged from Lake Mile 5 riverward to River Mile 7 would be placed in the new CDF (Cell 2), while materials dredged from Lake Mile 5 lakeward to Lake Mile 19 would be placed in the existing open-lake disposal site. Considering the impact of the Crop Residue Management Project over the intermediate period 1994-1998, an estimated 5-year average volume of 543,000 cubic yards of material would be placed in CDFs, while an estimated 5-year average volume of 223,000 cubic yards would be placed in the open-lake disposal site (***See Technical Appendix A***. This would result in an **estimated total 5-year average volume of 766,000 cubic yards** of material that would be dredged from Toledo Harbor during this intermediate period 1994-1998. The sediment would be periodically sampled and tested to determine contaminant levels, and compliance with current Federal and State testing requirements. Placement of the material would probably be accomplished by hydraulic dredges where the material would be hydraulically conveyed through pipes to the designated CDF, or by mechanical dredges where the material would be conveyed from barges into the CDF by clamshell bucket or hydraulically.

(2) Crop Residue Management: (Same as that for Intermediate Plan 1b)

(3) Manufactured Soils: (Same as that for Intermediate Plan 1b)

(4) CDF Management: (Same as that for Intermediate Plan 1b)

(5) Evaluation: The evaluation program for all of the components of Alternative Intermediate Plan 2a are the same as those for Alternative Intermediate Plan 1b.

d. Description of Alternative Intermediate Plan 2b:

The components of Alternative Intermediate Plan 2b are the same as those for Alternative Intermediate Plan 2a, except that the breakpoint between zones of sediment suitable for open-lake disposal and zones of sediment which requires confinement is at Lake Mile 2 instead of Lake Mile 5.

(1) Dredged Material Placement: Under this alternative intermediate plan, material dredged from Lake Mile 2 riverward to River Mile 7 would be placed in the new CDF (Cell 2), while material dredged from Lake Mile 2 lakeward to Lake Mile 19 would be placed in the open-lake disposal site. Considering the impact of the Crop Residue Management project over the intermediate period 1994-1998, an estimated 5-year average volume of 360,000 cubic yards of material would be placed in the new CDF (Cell 2), while an estimated 5-year average volume of 406,000 cubic yards would placed in the open-lake disposal site. This would result in an **estimated total 5-year average volume of 766,000 cubic yards** of material which would be dredged from Toledo Harbor during the intermediate period. The sediment would be periodically sampled and tested to determine contaminant levels, and compliance with current Federal and State requirements. Placement of the material would probably be accomplished by hydraulic dredges where the material would be hydraulically conveyed through pipes to the designated CDF, or by mechanical dredges where the material would be conveyed from barges into the CDF by clamshell bucket or hydraulically.

(2) Crop Residue Management: (Same as that for Intermediate Plan 1b)

(3) Manufactured Soils: (Same as that for Intermediate Plan 1b)

(4) CDF Management: (Same as that for Intermediate Plan 1b)

(5) Evaluation: The evaluation program for all of the components of alternative Intermediate Plan 2b are the same as those for Alternative Intermediate Plan 1b.

5. Cost Analysis:

The cost estimate for each test project is discussed below. All costs are based on October 1993 prices. Five-year average cost were used to screen the alternative intermediate plans under consideration for the 5-year intermediate period. The 5-year average cost for each test project includes the cost of the related monitoring program, if any, designed for evaluating the performance and effectiveness of the particular test project. The cost estimates are based on the analysis of recorded historical contractual cost data and recorded data on annual volume of material dredged from Toledo Harbor *(See Figure 2.1)*. The costs for implementing any intermediate or long-term project(s) for meeting specific local and/or State Environmental Standards and requirements that are not provided for by current requirements of Federal laws and regulations are non-Federal costs. Also, any costs in excess of the least Federally-acceptable cost for continued maintenance dredging and disposal of the dredged material would be considered non-Federal costs.

During the recent past, an average annual volume of 850,000 cubic yards of material had been dredged from the Toledo Harbor Federal channels. During the intermediate period 1994-1998, however, and taking into consideration the projected reduction in the volume of sediment due to the implementation of the Crop Residue Management test project, a total 5-year average of 766,000 cubic yards of material would be dredged from the harbor channels. This 5-year average volume would be used in the cost analysis for Plans 1b, 2a, and 2b, with the annual volumes per channel reach varying according to the projected annual reductions ***(See Technical Appendix B)***. For the cost analysis of the Base Plan, the estimated annul volume of 850,000 cubic yards would remain constant over the 5-year period.

Table 2.3 below shows the estimated current volumes being dredged from the river and lake channel reaches as described. Also, *Table 2.4* shows related contractual unit costs for dredging the material, and disposing of the material in confined and unconfined disposal areas. **These unit costs reflect the cost of the containment facility.** They are estimated at October 1993 prices for this short range analysis of costs.

Table 2.3 - Estimated Current Volume

Channel Reach (mile)	Volume/Reach (cy)
Lake Mile 2 - River Mile 7:	400,000
Lake Mile 2 -Lake Mile 5:	200,000
Lake Mile 5 - Lake Mile 19:	250,000

Table 2.4 - Cost of Dredging and Disposal/Channel Reach/Cubic Yard
October 1993 prices

Channel Reach (mile)	Confined ($/cy)	Unconfined ($/cy)
Lake Mile 2 - River Mile 7:	5.40	N/A
Lake Mile 2 - Lake Mile 5:	4.40	3.75
Lake Mile 5 - Lake Mile 19:	6.40	2.25

The unit costs for dredging and disposal include the cost of the containment facility (Cell 2). These unit costs are based on October 1993 prices.

TOLEDO HARBOR
DREDGING QUANTITIES

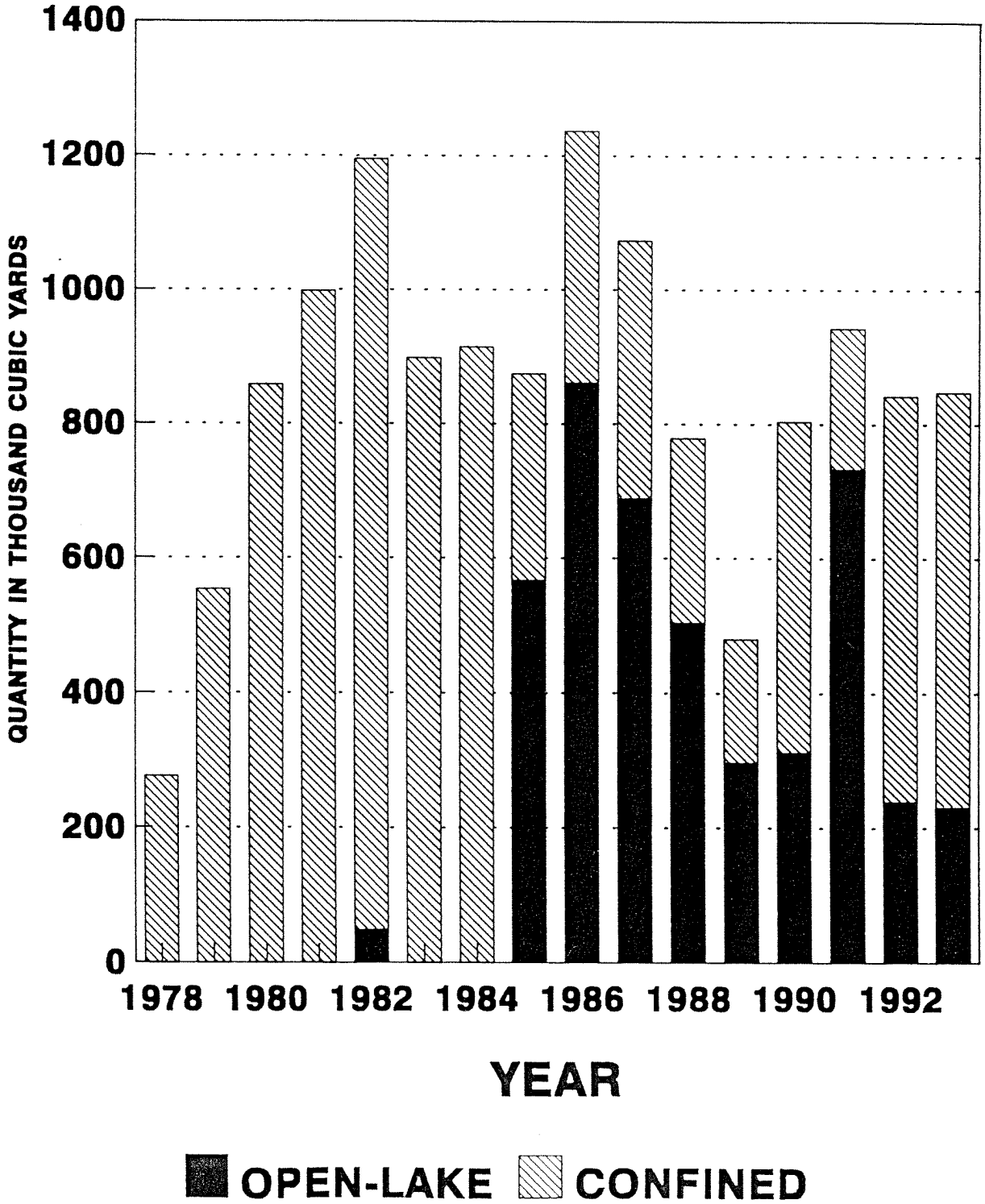


Figure 2.1 - Toledo Harbor Dredging Quantities

a. Cost Analysis for Base Plan:

The No-Action Plan is considered to establish a baseline from which all other alternative sediment management plans are compared for their relative contribution to the planning objective of meeting the current Federal Standard. The current Federal standard requires that the least costly alternative(s) consistent with sound engineering practices and meeting the environmental standards be implemented for continued operation and maintenance of the nation's Ports and Harbors.

The cost estimate for the Base Plan includes the costs for dredging the material, and disposing of the material in confined and/or unconfined areas.

(1) Cost for Dredging/Disposing of the Material - Base Plan:
Under the Base Plan, a combination of confined and unconfined placement of the material dredged from the Toledo Harbor Federal channels, from River Mile 7 through to Lake Mile 2, will be contained in the new CDF (Cell 2); and all material dredged from Lake Mile 2 through to Lake Mile 19 will be placed in the existing open-lake site in western Lake Erie.

The total cost for this and only one component of the Base Plan, at October 1993 prices, is summarized in *Table 2.5* as follows:

Table 2.5 - Five-Year Average Cost for Material Placement - Base Plan
October 1993 prices

Reach	Volume(1) (cy)	Unit Cost ($/cy)	Sub-Total ($)
LM2 - RM7	400,000	5.40 (C)	2,160,000
LM2 - LM5	200,000	3.75 (U)	750,000
LM5 - LM19	250,000	2.25 (U)	563,000
			3,473,000

Total 5-Year Average Cost for the Base Plan: $ 3.5 million

(1): 5-year average volume
C : Confined Disposal
U : Unconfined Disposal (open-lake)

b. Cost Analysis for Alternative Intermediate Plan 1b:

The cost estimate for Alternative Intermediate Plan 1b includes the cost of each one of its components, including the cost for monitoring and evaluating the performance and effectiveness of each component. Details on 5-year cost averages for each component of Alternative Intermediate Plan 1b are provided in ***Technical Appendix B***. A summary of the total 5-year average cost for Plan 1b is presented in *Table 2.6* below.

Table 2.6 - Summary of 5-Year Average Cost for Plan 1b: October 1993 Prices

Component	5-Year Average Cost ($)
Material Placement	4,200,000
Crop Residue Management	1,600,000
CDF Management	219,000
Manufactured Soils	787,000
	6,806,000

Total 5-Year Average Cost Step for Plan 1b: $ 6.8 million

All costs are based on October 1993 prices.

c. Cost Analysis for Alternative Intermediate Plan 2a:

The cost estimate for Alternative Intermediate Plan 2a is the sum of the total cost for each one of the its components, including the cost for monitoring and evaluating the performance and effectiveness of each component. The costs for CDF Management, Crop Residue Management, and Manufactured Soils are the same as those for Alternative Intermediate Plan 1b. A summary of the 5-year average cost for Alternative Intermediate Plan 2a is presented in *Table 2.7* below.

Table 2.7 - Summary of 5-Year Average Cost for Plan 2a: October 1993 Prices

Component	5-Year Average Cost ($)
Material Placement	3,251,000
Crop Residue Management	1,600,000
CDF Management	219,000
Manufactured Soils	787,000
	5,857,000

5-Year Average Cost - Plan 2a: $ 5.9 million

d. Cost Analysis for Alternative Intermediate Plan 2b:

The cost estimate for Alternative Intermediate Plan 2b is the sum of the total cost for each one of the its components, including the cost for monitoring and evaluating the performance and effectiveness of each component. The cost for CDF Management, Crop Residue Management, and Manufactured Soils are the same as those for Plan 1b. These costs along with the cost for disposal of the dredged material for Alternative Plan 2b are provided in ***Technical Appendix B***. *Table 2.8* gives a summary of 5-year average cost for Alternative Intermediate Plan 2b.

Table 2.8 - Summary of 5-Year Average Cost for Plan 2b: October 1993 Prices

Component	5-Year Average Cost ($)
Material Placement	3,132,000
Crop Residue Management	1,600,000
CDF Management	219,000
Manufactured Soils	787,000
	5,738,000

Total 5-Year Average Cost - Plan 2b: $ 5.7 million

6. Impact Assessment:

a. Impact Cost of the Base Plan:

Under the No-Action or Base Plan, and considering current sediment testing requirements, several scenarios may develop: the foremost scenario would be a combination of confined and unconfined disposal of the dredged material. Material dredged from Lake Mile 2 riverward would be disposed of in the new CDF (Cell 2) at the rate of about 400,000 cy/yr. The material would also be disposed of in the existing open-lake site at the rate of about 450,000 cy/yr for 20 years and beyond. The new CDF (Cell 2) would reach capacity in about 20 years. Prior to the end of the 20-year period, a new confined disposal facility would have to be built and ready in time to provide for the continued operation and maintenance of the Port.

A possible adverse economic impact that may arise as a result of this scenario is a major conflict among the partner agencies of the Planning Group. This conflict would lead to a reduction in the level of maintenance dredging, and would eventually preclude the use of the harbor for commercial navigation. More specifically, the non-Federal sponsors, the TLCPA may object among other things, to paying for or sharing in the cost of new confined disposal facilities. The Ohio Environmental Protection Agency may refuse to issue

401 Water Quality Certificates for the placement of material from the lake approach channel in the existing open-lake disposal site as required under the Clean Water Act, which would result in the elimination of open-lake disposal. Therefore, the non-Federal sponsor would bear the excess cost of disposing of this material.

The excess cost is the additional cost above and beyond the cost the Federal Government would bear to dispose of the material dredged from the channels using standard procedures and meeting the criteria established in the 404(b)(1) section of the 404 evaluation process. Otherwise, reaches of the lake approach channel would not be dredged, that is, the annual maintenance dredging of Toledo Harbor would be discontinued because significant loss of water depth would have occurred and prevented waterborne commercial vessels from using the port facilities. Individuals and industries that rely and depend on this mode of transportation would suffer large economic losses. Alternative modes of transportation such as rail transportation would likely be the new means of transportation. For all commodities, there would be alternative routes that users would have to take to continue to move commodities to the market. Coal designated for steel mills and steam generating plants would have to be rerouted by rail to another port. This would likely increase shipping and other costs since the alternate ports would be farther away from the user.

Another scenario would be that the new testing manual and/or State Water Quality Standards may result in the need to place more of the material dredged from the lake approach channel in the new CDF (Cell 2). A resulting adverse impact would be that Cell 2 would reach capacity several years earlier than the projected 20 years.

b. Impact Cost of Alternative Intermediate Plan 1b:

Alternative Intermediate Plan 1b calls for elimination of open-lake disposal of dredged material in 1995, that is, all material dredged from Toledo Harbor would be placed in the new CDF (Cell 2).

Cell 2 would be filled in 20 years if the design in-place volume of 400,000 cubic yards (cy) per year of material were deposited in Cell 2. If Alternative Intermediate Plan 1b were implemented as the LTMP, 850,000 cy/yr of dredged material would be placed in Cell 2, that is, 450,000 cy/yr in excess of the design rate of 400,000 cy/yr. As a result, Cell 2 would be filled in about 9.5 years as opposed to 20 years. However, because Alternative Intermediate Plan 1b would be implemented for only 5 years, and because 200,000 cy/yr of storage capacity is expected to be gained or recovered through the Conservation Tillage, Dewatering, and Manufactured Soil test projects, the surcharge would only be 250,000 cy (450,000 - 200,000) per year over 5 years for a total surcharge of 1.25 million cy (250,000 * 5). Considering the basic rate of 400,000 cy/yr, the 1.25 million cy surcharge would reduce the useful life of Cell 2 by 3 years (1,250,000/400,000). *Thus, Cell*

2 would be filled in about 17 years (20 - 3) as opposed to 20 years. Therefore, 3 years of CDF capacity would need to be restored through the construction of a new CDF. Given the expressed concerns of the U.S. Fish and Wildlife Service, the Ohio Department of Natural Resources, other interested individuals, and groups regarding the loss of shallow water habitats, as well as scarcity of land in the nearshore or general harbor vicinity, it is likely that any new CDF would not be built in the nearshore zone, and thus, would not be accessed by land, but only by marine equipment. The cost of this new CDF of 1.25 million storage capacity, assuming a self-weight consolidation of 25 percent, is estimated at $9.4 million ($ 10/cy * .75 * 1,250,000) yielding a 5-year average cost of about $1.9 million.

Another impact would be the additional disposal cost (transportation cost+CDF costs) that would be incurred for placing additional sediment volumes in the new CDF (Cell 2). That additional disposal cost, be it an additional cost or an avoided cost, has already been included in the disposal cost provided in Table 2.6 for Alternative Intermediate Plan 1b.

c. Impact Cost of Alternative Intermediate Plan 2a:

As previously discussed, Alternative Intermediate Plan 2a calls for disposal of material dredged from Lake Mile 5 lakeward to Lake Mile 19 in the existing open-lake site at a rate of 250,000 cy/yr; and for disposal of material dredged from Lake Mile 5 riverward to River Mile 7 in the new CDF (Cell 2) at a rate of 600,000 cy/yr.

Cell 2 would be filled in 20 years if the projected 400,000 cy/yr of material were deposited in Cell 2. If Alternative Intermediate Plan 2a was implemented as the LTMP, 600,000 cy/yr of dredged material would be placed in Cell 2, that is, 200,000 cy/yr in excess of the projected rate of 400,000 cy/yr. As a result, Cell 2 would be filled in 13.5 years as opposed to 20 years. However, because a 200,000 cy/yr of storage capacity is expected to be gained through the Conservation Tillage, Dewatering, and Manufactured Soil test projects, there would be zero or no annual surcharge (200,000 cy - 200,000 cy) of material placed in Cell 2. Therefore, 400,000 cy (600,000 - 200,000) per year would be placed in Cell 2, the same as the projected rate of 400,000 cy/yr. There would be no net gain or loss of storage capacity. Because there would be no net gain or loss of storage capacity, ***Cell 2 would be filled in 20 years as designed,*** regardless of the implementation time period for Alternative Intermediate Plan 2a. Alternative Intermediate Plan 2a would have no adverse impact on the useful life of Cell 2, and, therefore, would generate no excess cost.

Another impact would be the additional disposal cost (transportation cost+CDF costs) that would be incurred for placing additional sediment volumes in the new CDF (Cell 2). That additional disposal cost, be it an additional cost or an avoided cost, has already been included in the disposal cost provided in Table 2.7 for Alternative Intermediate Plan 2a. For

alternative Intermediate Plan 2a, this additional impact cost would be a CDF (Cell 2) sunk cost estimated at $130,000 per year ($.65 x 200,000). The transportation cost of the material is slightly less when disposing of the material in Cell 2 as opposed to disposing it in the open-lake site.

d. Impact Cost of Alternative Intermediate Plan 2b:

As previously discussed, Alternative Intermediate Plan 2b calls for disposal of material dredged from Lake Mile 2 lakeward to Lake Mile 19 in the existing open-lake disposal site at a rate of 450,000 cy/yr; and disposal of material dredged from Lake Mile 2 riverward to River Mile 7 in the new CDF (Cell 2) at a rate of 400,000 cy/yr.

The new CDF (Cell 2) would be filled in 20 years if the projected volume of 400,000 cy/yr of material were deposited in Cell 2. If Alternative Intermediate Plan 2b were implemented as the LTMP, 400,000 cy/yr of dredged material would be placed in Cell 2, that is, the same as the projected 400,000 cy/yr. As a result, ***Cell 2 would have been filled in about 20 years as designed.*** However, because Alternative Intermediate Plan 2b would be implemented for 5 years, and because an additional 200,000 cy/yr of storage capacity is expected to be gained through the Conservation Tillage, Dewatering, and Manufactured Soil projects, a surplus storage capacity of 200,000 cy/yr over 5 years for a total surcharge of 1.0 million cy (200,000 * 5) would be realized. Considering the basic rate of 400,000 cy/yr, the 1.0 million cy surcharge would provide additional storage capacity or increase the design life of cell 2 by 2.5 years (1,000,000/400,000). ***Thus, Cell 2 would be filled in about 22.5 years (20 + 2.5), say 23 years, as opposed to 20 years.*** This 1.0 million cy of surplus storage capacity would be a benefit. The value of this benefit in terms of dollars would be that of a new CDF with 1.0 million cy storage capacity. This new CDF would be accessed only by marine equipment, because new nearshore CDF would not be environmentally acceptable. The cost of this new CDF, assuming a self-weight consolidation of 25 percent, is estimated at $7.5 million (1,000,000 cy * .75 * $10/cy) for a 5-year average cost of about $1.5 million.

Another impact would be the additional disposal cost (transportation cost+CDF costs) that would be incurred for placing additional sediment volumes in the new CDF (Cell 2). That additional disposal cost, be it an additional cost or an avoided cost, has already been included in the disposal cost provided in Table 2.8 for Alternative Intermediate Plan 2b.

Table 2.9 Summary of Impact Cost for the Alternative Intermediate Plans October 1993 Prices (1)

	Impact Cost(2) ($)
Alternative Intermediate Plan 1b:	1,900,000
Alternative Intermediate Plan2a:	0
Alternative Intermediate Plan 2b:	-1,500,000

(1) These impact costs shown in this table are due to the loss of CDF capacity by placing additional volume of dredged material in the CDF. Additional impact costs due to the cost of transporting the material, and the cost of the CDF are already included in the material disposal cost.

(2) Would be the result of accelerated use of storage space in the CDF. It is considered an adverse impact on the useful life of Cell 2.

7. Comparative Cost Evaluation:

Table 2.9 above summarizes the impact costs for the alternative intermediate plans. *Table 2.10* below presents a comparison of costs for the alternative intermediate plans under consideration, and the magnitude of their deviation from the Base Plan. The cost of the impact of these plans on the 20-year Base Plan are also displayed in *Table 2.11*

The purpose of *Tables 2.10 and 2.11* is to compare the various alternative intermediate plans including the Base Plan using information on cost, and impact cost. *Table 2.11* also offers a perspective on: Where we would be in 1998 regarding available storage capacity, whether or not the short-term goals and objectives of the Planning Group can be met, and whether or not the tested intermediate plans offer potential for meeting these short-term goals and objectives.

Table 2.10 - Summary of Cost Comparison of the Alternative Intermediate Plans 5-Year Average Cost at October 1993 Prices[1/]

Plan	Cost ($Millions) a	Impact Cost ($ Millions) b	Total Cost ($ millions) a + b	Deviation ($ Millions) [2/]
Base Plan	3.5	0.0	3.5	0.0
Plan 1b	6.8	1.9	8.7	+5.2
Plan 2a	5.9	0.0	5.9	+2.4
Plan 2b	5.7	-1.5	4.2	+ .7

[1/] Cost and impact cost are 5-year average costs based on October 1993 prices. These 5-year average costs and impact costs are expressed in millions of dollars. See text for derivation and explanation of these costs.

[2/] Deviation: Total cost of a plan minus the cost of the base plan. It is the excess cost above the cost of the base plan herein estimated at $3.5 million.

Table 2.11 - Overall Summary of Cost and Impact Cost Assessment
October 1993 Prices

PLAN	CDF LIFE	TOTAL COST ($) x 1,000,000					REMAINING LIFE IN '98
		Dredging	CRM	CDFM	MS	Impact	
BASE PLAN	20 YRS	3.5	0	0	0	0	15 YRS
LM2-RM7 (LM):Lake mile LM2-LM19 (RM):River mile		TOTAL COST : 3.5 EXCESS COST : N/A					
ALT. PLAN 1	17 YRS	4.2	1.6	.2	.8	1.9	12 YRS
All material in CDF Crop Residue Mgmt. (CRM) CDF Management (CDFM) Manufactured Soil (MS) Monitoring/Evaluation		TOTAL COST : 8.7 EXCESS COST : 5.2					
ALT. PLAN 2a	20 YRS	3.3	1.6	.2	.8	0	15 YRS
LM5-RM7 ; LM5-LM19 Crop Residue Management CDF Management Manufactured Soil Monitoring/Evaluation		TOTAL COST : 5.9 EXCESS COST : 2.4					
ALT. PLAN 2b	23 YRS	3.1	1.6	.2	.8	-1.5	18 YRS
LM2-RM7 ; LM2-LM19 Crop Residue Management CDF Management Manufactured Soil Monitoring/Evaluation		TOTAL COST : 4.8 EXCESS COST : 0.7					

8. Environmental Assessment:

The final array of considered alternative intermediate plans were fully assessed to the level of detail and information currently available. An Environmental Assessment (EA) has been prepared pertaining to these alternative intermediate plans, pursuant to NEPA requirements. This EA is part II of this Phase 3 Report.

The EA documents assist in the evaluation of the considered alternative intermediate plans. *Table 2.12* briefly summarizes the overall anticipated impacts of these alternative intermediate plans relative to the natural environmental, human environmental, and cultural resource parameters. As indicated in *Table 2.13*, while Alternative Intermediate Plan 1b represents potentially the most favorable situation to the water quality issue, it also represents the least favorable situation to the issue of accelerated use of CDFs storage capacity and proliferation of CDFs. Conversely, Alternative Intermediate Plan 2b potentially represents the least favorable situation to the issue of water quality, and potentially the most favorable situation to the issue of accelerated use of CDF storage capacity, and proliferation of CDFs. Alternative Intermediate Plan 2a represents a middle or compromise plan, relatively the best intermediate plan which could realize some benefits to most interested parties.

Table 2.13 summarizes the environmental compliance for this stage of the study relative to key Statutes and Executive Orders. These Federal Statutes and Executive Orders are discussed in details in the EA.

9. Screening of Alternative Intermediate Plans 1b, 2a, 2b:

Alternative intermediate plans were screened by evaluating their environmental soundness, engineering feasibility, social acceptability, cost effectiveness, and overall performance towards meeting the Planning Group objectives. *Table 2.14* presents a summary overview of the evaluation for the selection of an intermediate plan.

TABLE 2.12 SUMMARY OF COMPARATIVE ASSESSMENT OF INTERMEDIATE PLANS (1994 - 1998)

EVALUATION PARAMETERS	NO ACTION (WITHOUT PROJECT COND)	ALTERNATIVE 1b CDF (SLR&BU)	ALTERNATIVE 2a CDF&OL (LM5) SLR&BU	ALTERNATIVE 2b CDF&OL (LM2) SLR&BU
Economics				
Natural Environmental Resources				
Water/Sediment Quality	ST:Not Significant LT:Not Significant	ST:Moderate Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Minor Beneficial	ST:Not Significant LT:Not Significant
Air Quality	ST:Not Significant LT:Not Significant	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse
Fish, Benthos, & Plankton	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial
Vegetation	ST:Moderate Adverse LT:Minor Adverse	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Adverse
Wildlife	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial
Wetlands	ST:Minor Adverse LT:Moderate Adverse	ST:Minor Adverse LT:Moderate Adverse Moderate Beneficial	ST:Minor Adverse LT:Moderate Adverse Moderate Beneficial	ST:Minor Adverse LT:Moderate Adverse Moderate Beneficial
Threatened/ Endangered Species	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Prime and Unique Farmlands	ST:Not Significant LT:Not Significant	ST:Not Significant LT: Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant

TABLE 2.12 SUMMARY OF COMPARATIVE ASSESSMENT OF INTERMEDIATE PLANS (1994 - 1998)

EVALUATION PARAMETERS	NO ACTION (WITHOUT PROJECT COND)	ALTERNATIVE 1b CDF (SLR&BU)	ALTERNATIVE 2a CDF&OL (LM5) SLR&BU	ALTERNATIVE 2b CDF&OL (LM2) SLR&BU
Human (Man-Made) Resources				
Community and Regional Growth	ST:Minor Adverse LT:Moderate Adverse	ST:Minor Beneficial LT:Moderate Beneficial	ST:Moderate Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Moderate Beneficial
Displacement of People	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Displacement of Farms	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Business/ Employment/ Income	ST:Not Significant LT:Moderate Adverse	ST:Minor Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Moderate Beneficial
Public Facilities and Services	ST:Not Significant LT:Minor Adverse	ST:Minor Beneficial LT:Minor Beneficial	ST:Minor Beneficial LT:Minor Beneficial	ST:Minor Beneficial LT:Minor Beneficial
Property Values & Tax Revenues	ST:Not Significant LT:Minor Adverse	ST:Not Significant LT:Minor Adverse	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Minor Beneficial
Noise and Aesthetics	ST:Not Significant LT:Not Significant	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse
Community Cohesion	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Beneficial	ST:Minor Adverse LT:Moderate Beneficial	ST:Moderate Adverse LT:Moderate Beneficial
Cultural Resources	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant

KEY

ST: Short Term
LT: Long Term
NA: Not Applicable
AA: Average Annual

RANGE OF RELATIVE IMPACTS

Major Beneficial
Moderate Beneficial
Minor Beneficial
Not Significant
Minor Adverse
Moderate Adverse
Major Adverse

SUMMARY TABLE 2.13
RELATIONSHIP OF PLAN TO ENVIRONMENTAL PROTECTION
STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

	PLAN
FEDERAL STATUTES	
Preservation of Historical Archaeological Data Act, as amended, 16 USC 469, et seq.	Full
National Historic Preservation Act, as amended, 16 USC 470, et seq	Full
Clean Air Act, as amended ,42 USC 7401, et seq.	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et seq.	Full
National Environmental Policy Act, as amended, 42 USC 470a, et seq.	Full
River and Harbors Act, 33 USC 401, et. seq.	Full
Fish and Wildlife Coordination Act, as amended, 16 USC 661, et seq.	Full
Endangered Species Act, as amended, 16 USC 1531, et seq.	Full
Wild and Scenic Rivers Act, as amended, 16 USC 1271, et seq.	Full
Federal Water Project Recreation Act, as amended, 16 USC 460-1(12), et seq.	Full
Land and Water Conservation Fund Act, as amended, 16 USC 4601, et seq.	Full
Coastal Zone Management Act, as amended, 16 USC 1451, et seq.	Full
Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.	Full
Farmland Protection Policy Act, (7 USC 4201 et seq.)	Full
EXECUTIVE ORDERS, MEMORANDA, ETC.	
Protection and Enhancement of the Cultural Environment (EO 11593)	Full
Protection of Wetlands (EO 11990)	Full
Flood Plain Management (EO 11988)	Full
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	Full
STATE AND LOCAL	Full

The compliance categories used in this table were assigned based on the following definitions:

a. Full compliance - All requirements of the statute, EO, or other policy and related regulations have been met for this stage of the study.

b. Partial Compliance - Some requirements of the statute, EO, or other policy and related regulations, which are normally met by this stage of planning, remain to be met.

c. Noncompliance - None of the requirements of the statute, EO, or other policy and related regulations have been met

Table 2.14 - Summary Screening of Alternative Intermediate[1] Plans
(October 1993 Price Levels)

	PERFORMANCE															
	Goals/Obj		Engineering				Environ/Social			Economic			Other Factors			Overall/Remarks
	EOD	NDF	IDC	MSR	CCT	ATR	NE	HE	CR	cost x 10^6	total cost x 10^6	excess cost x 10^6	cell 2 life	cell 2 life remain[2]	timeliness	Principal Issues : Water quality Non-proliferation of CDF
Base Plan	NF	NF	NF	NF	F	F	MA	MB	NS	3.5	3.5	N/A	20	15	NP	• No change for water quality • No change for non-proliferation of CDF
Plan 1b	F	NF	NF	F	F	F	MA	MB	NS	6.8	8.7	5.2	17	12	P	• Best for water quality • Worst for non-proliferation of CDF • Excessive cost
Plan 2a	F	F	F	F	F	F	MB	MB	NS	5.9	5.9	2.4	20	15	P	• Best for water quality • Best compromise to resolve both issues • Minor adverse to non-prolif. of CDF
Plan 2b	NF	F	F	F	F	F	MA	MB	NS	5.7	4.2	.7	23	18	P	• Potential water quality improvement • Best for non-proliferation of CDF • No excessive cost • Worst for water quality

All costs are 5-year average costs expressed in millions of dollars.

[1] intermediate period: 1994 - 1998

[2] remaining life of cell #2 in 1998

Notes:
- EOD - Elimination of Open-Lake Disposal
- NDF - Nearshore Disposal Facilities
- IDC - Increased Disposal Capacity
- MSR - Material Suitability for Recycling
- CCT - Conventional Construction Technique
- ATR - Available Technical Resources
- NE - Natural Environment
- HE - Human Environment
- CR - Cultural Resources

Rating:
- F - Favorable
- NF - Not Favorable
- MA - Minor/Moderate Adverse
- MB - Minor/Moderate Beneficial
- NS - Not Significant
- P - Potential
- NP - No Potential

10. Rationale for Selection of Alternative Intermediate Plan(s):

Alternative Intermediate Plan 2a is tentatively selected as the preferred alternative for implementation during the intermediate period 1994-1998. As such, Intermediate Plan 2a would be the primary component and focus of the Action Plan.

This tentative selection was made through an appropriate multi-level screening of all the options and resulting candidate alternative intermediate plans which were considered up to this point in the LTMS process. The alternative intermediate plans were assessed using current technical information available to the Planning Group. Principal engineering, environmental, social, and economic factors, as well as other relevant factors were examined to the extent necessary for the eventual tentative selection of one intermediate plan. As a result, Alternative Intermediate Plan 2a emerged as the implementable plan as evidenced by the performance summary results presented in *Table 2.14* of this Phase 3 Report.

In so doing, "No-Action" was considered the Base Plan against which the other alternative intermediate plans were measured. *Table 2.14* provides an overview of environmental, social, engineering, and economics parameters, as well as goals/objectives, and other factors reflecting both the issue of elimination of open-lake disposal as it relates to water quality; the issue of non-proliferation of CDFs as it relates to shallow water fish habitat and scarcity of land in the nearshore area.

As indicated in *Table 2.14*, the final three candidate Alternative Intermediate Plans 1b, 2a, and 2b have achieved the same ratings for the engineering, environmental, and social factors considered in the assessment. However, considering the parameter of natural environment where alternative Intermediate Plan 2a achieved an MB rating, Alternative Intermediate Plan 2a seems to have the edge over both Plans 1b and 2b for better overall performance. The real trade-off was therefore between best achievers, and/or potential achievers of the goals/objectives and cost-effectiveness factors which pertain to the issues of elimination of open-lake disposal to improve water quality, non-proliferation of CDFs to discontinue the destruction of nearshore fish habitats, and the issue of the Federal Standard least-cost for operation and maintenance (O&M) of Federal Navigation projects.

While Alternative Intermediate Plan 1b would swiftly eliminate open-lake disposal in 1994 by containing all material dredged from the harbor in the new CDF (Cell 2) to aid the water quality issue, it would rapidly fill Cell 2, creating a crisis management for lack of storage capacity in less than 10 years, should the demonstration program fail. More specifically, the difficult need for building new offshore CDFs at considerably excessive costs to the local community would have to be satisfactorily addressed. Alternative Intermediate Plan 1b would not help resolve the issue of non-proliferation of CDFs in the

city of Toledo and vicinity. Alternative Intermediate Plan 1b stands at one extreme end of the spectrum of issues before the Planning Group.

Alternative Intermediate Plan 2b has excelled in the area of cost-effectiveness as indicated in *Table 2.14*. However, it stands at the other extreme end of the spectrum of issues facing the Planning Group, particularly the issue of no open-lake disposal: Alternative Intermediate Plan 2b would place more material in the open-lake site, therefore, making it extremely difficult to reach the goal of no open-lake disposal in a reasonable period of time.

Alternative Intermediate Plan 2a has occupied the middle ground and is reaching out to moderately contribute to both the effort for the elimination of open-lake disposal, and non-proliferation of CDFs as well. Alternative Intermediate Plan 2a would place about 50 percent of the volume of sediment currently classified as non-contaminated to moderately contaminated in each, the open lake site and in Cell 2. Further, it would practically place no additional burden of disposal cost on either of the parties involved (the cost of Cell 2 being a sunk cost). This is predicated, of course, on the success of the sediment conservation techniques. Otherwise, additional CDFs would have to be constructed at greater expense (away from the nearshore) to handle any deficiencies in the conservation program. These additional CDFs, if built in the nearshore area would have greater negative impact on the natural environment. Program monitoring and evaluation will allow for early detection and adjustment of errors in the program that are deemed necessary. This oversight activity would also assist in the review of the progress and measure of the performance and effectiveness of the intermediate plan.

Considering the above, and the potential of these plans for generating timeliness solutions, the Planning Group concluded that ***Alternative Intermediate Plan 2a*** represents the best overall, short-term solution to the problem of managing sediment from the Maumee River Watershed which includes Toledo Harbor. It represents the best overall short-term approach to reaching the goals and objectives of providing continued operation and maintenance to the harbor, and elimination of open-lake disposal. Further, Alternative Intermediate Plan 2a was identified as the best transition mechanism to help move from the practice of disposing of the dredged material to the practice of managing the sediment. Alternative Intermediate Plan 2a is in full harmony with the concept of LTMS which is seeking a timeliness solution to this problem.

D. PREFERRED INTERMEDIATE PLAN 2a

1. General:

The Intermediate Plan is a 5-year phase-in program intended to provide a means to

manage the material through a reuse, reduction, and consolidation program while maintaining the operation of the Port in a cost-effective and environmentally acceptable manner. Through the Intermediate Plan (1994-1998), five actions would be implemented as described below.

2. Description:

The features of the preferred Intermediate Plan 2a are shown on *Figure 2.2.*

a. Material Placement (on-going dredging)

Under Alternative Intermediate Plan 2a, the dredged material would be placed in both the new CDF (Cell 2) and the existing open-lake disposal site. Specifically, material dredged from Lake Mile 5 riverward to River Mile 7 would be placed in the new CDF (Cell 2), while materials dredged from Lake Mile 5 lakeward to Lake Mile 19 would be placed in the existing open-lake disposal site. Considering the impact of the Crop Residue Management Project over the intermediate period 1994-1998, an estimated 5-year average volume of 518,600 cubic yards of material would be placed in CDFs, while an estimated 5-year average volume of 219,400 cubic yards would be placed in the open-lake disposal site (See Technical Appendix B). This would result in a total 5-year average annual volume of 766,000 cubic yards of material that would be dredged from Toledo Harbor during this intermediate period 1994-1998. The sediment would be periodically sampled and tested to determine contaminant levels, and compliance with current Federal and State requirements. Placement of the material would probably be accomplished by hydraulic dredges where the material would be hydraulically conveyed through pipes to the designated CDF, or by mechanical dredges where the material would be conveyed from barges into the CDF by clamshell bucket or hydraulically.

b. Crop Residue Management

The Crop Residue Management test project would be implemented to reduce the volume of sediment entering the Maumee River, thus reducing the load of sediment in the Federal channels. Successful execution of the project would contribute to the effort underway for effective management of the dredged material at Toledo Harbor. Specifically, the project would be executed by practicing the farming method known as Conservation Tillage to reduce farmland erosion, and sediment runoff from the watershed. The expected net effect of Conservation Tillage is that it would reduce the total annual volume of sediment dredged from the Federal Navigation Channels by about 15 percent; thereby reducing the level of contaminants that would end up in the Western Basin of Lake Erie.

Source reduction would be achieved through both acceleration and intensification of existing sediment control efforts, and introduction of Conservation Tillage (no-till farming), an innovative land treatment measure where no-till farmers would plant seeds directly through the previous harvest's crop residue. This technique would cut wind

and water erosion and replenishes the crucial organic content of the top soil as the residue slowly decomposes. However, no-till farming would also introduce a variety of herbicides to kill and/or control weeds. This form of Conservation Tillage, if applied over 75 percent of the watershed, would in the long run reduce the load of sediment entering the Maumee River by 137,000 cy/yr. During the first 5 years, sediment volume reduction would average about 80,000 cy/yr. After Year 5, the reduction level would reach and stay at about 137,000 cy/yr at no additional cost. This farming practice would reduce average annual dredging quantities from the estimated 850,000 cy/yr to about 713,000 cy/yr in the long-run.

Sediment reduction goals will be assigned to each county. Each soil and water Conservation District will create a County Sediment Reduction Committee, involving agricultural and environmental groups, agribusiness, private citizens, and other affected organizations. This group will be charged with implementing a sediment reduction strategy at the county level. The specific components of the generalized concept will include:

(a). County Sediment Reduction Committees;
(b). Educational Program Grants;
(c). Innovative/Local Program Grants;
(d). Landowner Incentives; and
(e). Technical Assistance.

c. Manufactured Soils (Beneficial Reuse):

Manufactured soils are of great importance in the effort of finding an equitable and effective way of eliminating open-lake disposal. One aspect of the beneficial use/reuse of the dredged material is the production of manufactured soils for use as landfill cover, topsoil, landscaping, fertilizer, road dressing, etc. The expected result from this beneficial use is that the volume of material removed from existing filled CDFs for the production of manufactured soils should theoretically equal the volume of less-contaminated material suitable for open-lake disposal. However, open-lake disposal would eventually be eliminated during or at the end of the intermediate period whether equilibrium is reached or not. When this equilibrium is reached, the volume of the less-contaminated material, which would otherwise be disposed of in the existing open-lake disposal site in Lake Erie, would be placed in existing CDFs. This concept would encourage production of increased volume of manufactured soils, thus, decreasing further the volume to be open-lake disposed until a point is reached where no material would be placed in the open-lake of western Lake Erie. Also, this process of mining filled CDFs would restore storage capacities for relatively new dredged material. As discussed above, this would be done by removing dredged material from Island 18 during the intermediate period. The material would be mixed on site with other admixtures to produce a manufactured soil which would then be shipped to the dredged material market center.

During the intermediate period 1994-1998, the dredged material confined in the 132-acre CDF, referred to as Island 18 or Grassy Island, would be processed to produce manufactured soil. Other admixtures such as cement kiln dust, lime, treated bio-solids etc. would be added to the dredged material, and processed into soil products intended for multiple uses. A maximum of 150,000 cy/yr of soft or wet material would be removed from the CDF. The material would be processed on Island 18 to initially generate a maximum of 130,000 cubic yards of manufactured soil. Admixtures would be brought to the CDF site by barges, and the final soil product shipped off-site for use as landfill cover, topsoil, fertilizer, etc., as appropriate. This mining of the CDF would eventually create space for confining relatively new less-contaminated dredged material.

d. CDF Management:

Managing the existing available confined disposal facilities or CDFs to maximize their use and expand their useful life would also contribute to the effort for actively and effectively managing the sediment. To this end, a dewatering, consolidation, and desiccation project would be implemented. The expected contribution of this project to the success of the plan would be to recover/restore storage space in both the existing CDF (Cell 1) during the intermediate 1994-1998 period, and the new CDF (Cell 2) in the long term. The process would decant the water content of the material by drawing the water off the CDF through a weir, thereby causing the material to shrink and occupy a lesser volume in the CDF. More storage space would then be available in the CDF for disposing of additional dredged material. Also, dewatering and consolidating the material would achieve faster drying of the material for a more effective mining, mixing, and beneficial use of the resulting manufactured soils. Consolidation would also increase the shear strength of the confined material to provide for a firmer foundation for possible vertical expansion of the CDFs.

(a) Dewatering Cell 1. Consolidation of the dredged material confined in the 230-acre Cell 1 would be expedited by the use of surface trenches followed by installation of vertical strip drains. Surface trenches would initially be dug around the perimeter and into the interior of Cell 1 to allow water to drain from material within the cell as a result of gravity flow. These trenches would be interconnected to speed up drainage and consolidation of surface soil. The surface soil would also be increased in strength to provide sufficient support for relatively heavy equipment which would be required for later installation of strip drains. These trenches would be typically spaced about 100 feet apart. Vertical strip drains would be spaced 10 to 15 feet apart depending on the desired rate for consolidation to take place. Other techniques such as electro-osmosis can be tested to dewater Cell 1 since the soils involved are mostly fine-grained clays. An approximately 10-acre site on Cell 1 would be used for testing and identifying the most practical and cost-

effective technique for Toledo Harbor.

(b) Dewatering Cell 2. As disposal of the dredged material into Cell 2 progresses, measures would be taken to ensure that thick layers of wet dredged material that are difficult to dewater do not build up. Efforts would be made to remove stop logs (boards) from the weirs to allow decant water to drain from the site as self-weight consolidation occurs. Any discharge from the CDF would be controlled by setting the discharge weir(s) to provide for required particulate settling time to meet effluent water quality discharge requirements. As the dredged material dries further and develops shrinkage cracks, the stop logs should be removed to the depth of the bottom of the cracks so that the soil is allowed to drain to the maximum extent possible. This also would allow rainwater to drain from the site. After the decant water drainage, sun and wind would be allowed to dry the soil to the maximum extent possible. Each layer would be aerated by plowing to facilitate drying, then compacting the soil with a sheep foot roller or other compaction equipment. Operating in this manner on each placed layer avoids or minimizes storage and management problems associated with higher water content, high volume, and low strength soils. The CDF dewatering technique described above would not be applied to Cell 2 until after Cell 2 would have been filled to the maximum lake water level of +4.0 feet above LWD.

e. Evaluation:

As described above, implementation of these components of Intermediate Plan 2a, such as Open-Water Disposal method, Crop Residue Management, CDF Management, and Manufactured Soils would be monitored and evaluated to measure the performance and effectiveness of these components. As a result, adjustment and/or recommendations would be made as to their applicability or further use in the formulation of the LTMP. More specifically, the following testing program is needed to refine contaminant loss estimates and provide potential need for control:

. Develop and implement a sediment sampling plan for providing composite sample representative of materials likely to be disposed during the intermediate program.

. The composite samples should be physically and chemically characterized. Physical characterization should include grain-size distribution, specific gravity, water content, and plastic and liquid limits. Chemical characterization should include analyses of arsenic, cadmium, copper, lead, mercury, total organic carbon concentrations, etc.

. Modified elutriate and column settling tests to provide information on prediction of particulate and dissolved contaminant concentration in effluent.

. Surface runoff tests to provide a basis for predicting runoff quality and potential need for control.

. Leachate tests to provide a basis for predicting the quality of leachate removed by vertical strip drains and potential need for control.

. Plant and animal uptake tests to determine the acceptability of dredged materials and manufactured soils for beneficial use.

. Volatilization tests to estimate the volatile emission for some PAHs and potential need for control.

The monitoring program for Alternative Intermediate Plan 2a would include the following:

(1) Evaluation of CDF Management: The monitoring and evaluation of the CDF management project would be executed using one of the following methods:

(a) Settlement Plates: Settlement of ground surface with time would be monitored by installing settlement plates in Cell 1 to measure and record settlement that had occurred. Such measurements are necessary to evaluate the effectiveness of the adopted dewatering measures and to quantify storage capacity recovered in the cell, and storage capacity available in the cell. Additionally, data required from settlement plates in Cell 1 may be used as an indication of overall material stability within the cell. Deviations in settlement characteristics from the projected settlements may indicate the onset of instability.

(b) GPS Ground Survey: GPS ground survey equipment uses the technique of triangulating on satellites in polar orbit to provide rapid and accurate topographical information for a given area. All observations of site topography are made electronically and acquired data are fed into digital processors in real time. A summary report is available immediately upon completion of the survey. Use of such equipment at the Port Authority Facility #3 would greatly facilitate the availability of information from which site management decisions may be based.

(c) Aerial Photography: Photographs of the site plan are taken from a high altitude aircraft. This monitoring procedure is generally useful in keeping track of the overall site in terms of spotting problems and difficulties not readily seen from ground level.

(2) Evaluation of Crop Residue Management: The Crop Residue Management project would be monitored through maintenance and continued use of the USGS gauge at Waterville, Ohio. The USGS gauge station monitors over 95 percent of the Maumee River Watershed. Historical sedimentation data from the gauge would be compared against new gauge data obtained during the intermediate 1994-1998 period to measure progress and evaluate the performance and effectiveness of the sediment reduction effort.

Also, the land treatment portion of the Crop Residue Management effort would be accomplished by a statistical point sampling method. The samples would be taken each year after the planting season and used to calculate sediment load reductions.

(3) Evaluation of Manufactured Soils: The Planning Group would keep accurate record of storage capacity recovered annually.

3. Five-Year Average Cost for Preferred Intermediate Plan 2a:

Component	5-Year Average Cost ($)
Material Placement	3,250,000
Crop Residue Management	1,600,000
CDF Management	219,000
Manufactured Soils	787,000
	5,856,000

5-Year Average Cost - Plan 2a: $ 5.9 million

E. ASSESSMENT OF OTHER OPTIONAL STUDIES/PROJECTS:

After the submission of this Phase 3 Report for approval, and during the intermediate period 1994-1998, several detailed feasibility studies of the options that show potential for contributing to the development of the long-term plan will be conducted to determine their economic viability. The probable options that would be studied include, but is not limited to, expansion of Cells 1 and 2, recycling CDF, agricultural runoff retention reservoirs, open-water disposal method, and new CDFs associated with the protection and/or restoration of the shoreline. These potentially viable options are discussed below. Summary of plans of studies providing brief descriptions of specific tasks, time schedules, and costs for executing these tasks are provided in Section III, "Implementation of Action Plan."

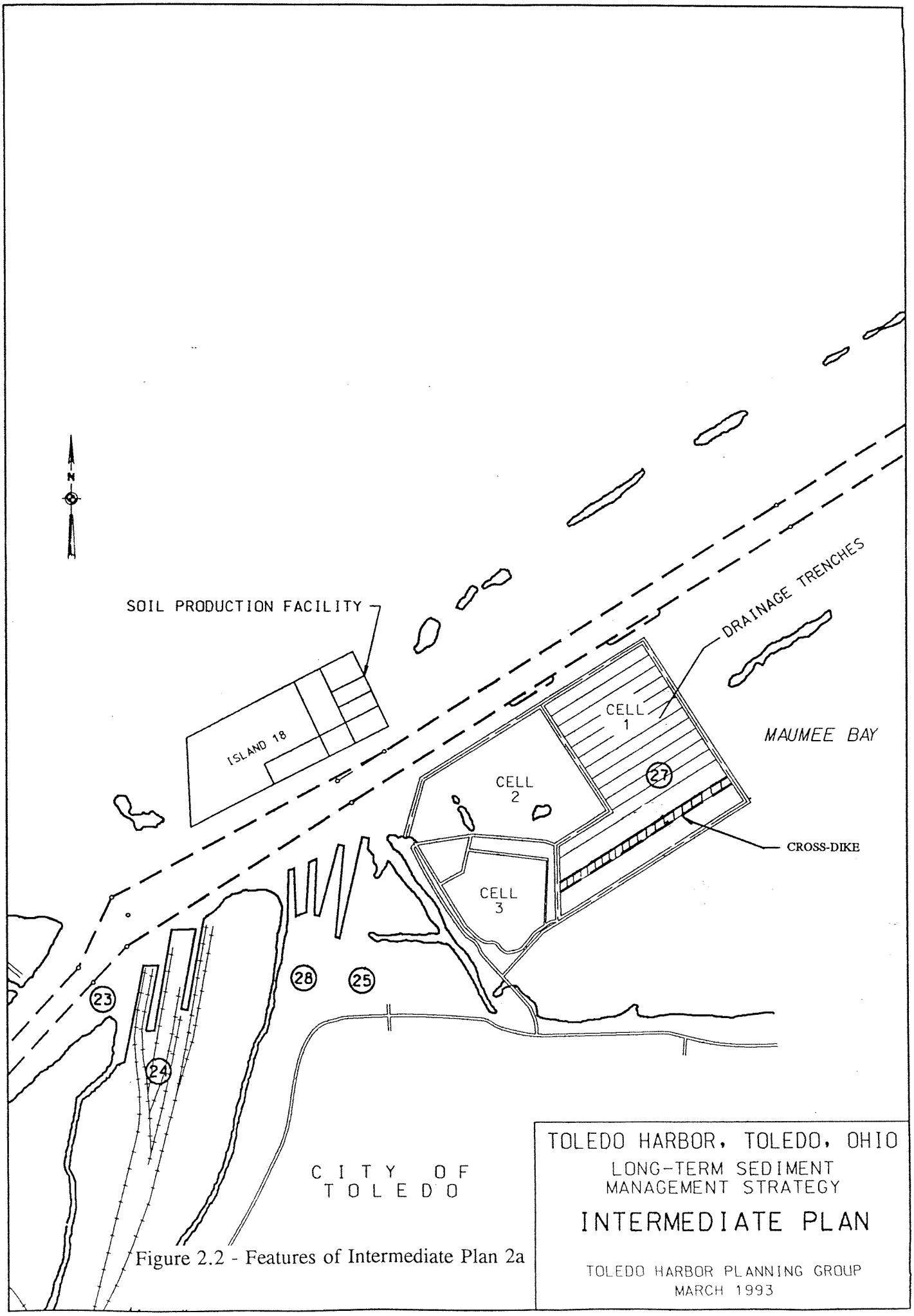


Figure 2.2 - Features of Intermediate Plan 2a

1. Expansion of Cell 1 and Cell 2:

a. Cross-dike:

A cross-dike (See *Figure 2.2*) may be required at Cell 1 to partition the facility. The dike would be designed using conventional methods and materials based on properties determined as a result of a geophysical survey. A geophysical subsurface survey would be conducted to accurately map underwater topology ground contours. Also, a subsurface exploration would be conducted to map underground conditions that exist at the site to determine the extent and the nature of principal soil strata, depth to ground water, and to obtain samples of the various soils for identification. There may be significant economic advantages to be gained from using geotextile reinforcement in the design of the dike, or from using a dredged material filled geotextile tube dike. Vertical Plastic Strip Drains (VPSD) in conjunction with geotextile dikes and tubes may be used to increase foundation stability. Additionally, there may be significant beneficial environmental impacts by containing the dredged material in tubes.

A sound strategy must be devised for economical storage and retrieval of the material from Cell 2 to construct perimeter and subdivision dikes as time progresses. One possible construction strategy is to excavate Cell 2 by dredging. Excavation of Cell 2 by dredging would be cost-effective in that no initial dewatering of the cell would be needed prior to excavating it. This would save time and reduce cost. Also, Cell 1 can be surcharged by depositing the material excavated/dredged from Cell 2 into Cell 1. The surcharge would help speed up consolidation of Cell 1 and increase the storage capacity at the site. Using this strategy, Cell 1 would also serve as a storage area for the material dredged from Cell 2, so that the material may be recovered and used for construction or dike building as needed. However, this construction strategy of excavating material from the bottom of Cell 2 was found unfeasible due to high moisture content of the clay material at the bottom of Cell 2.

Based on properties determined by geotechnical investigation, stability of the existing dikes on the facility will be assessed to determine the maximum height to which the dikes may be raised.

b. Preliminary Plan and Preliminary Design of Dikes:

Figure 2.2 shows a preliminary layout of the plan for compartmentalizing Cell 1. Cell 1 would be divided into two compartments. The southernmost compartment (Compartment "A") would be about 100 acres and the northern compartment (Compartment "B") would be about 140 acres. Compartment "A" can be used for several purposes. One purpose under consideration is a wildlife habitat, a park, etc. If Compartment "B" of Cell 1 were developed as a park or wildlife refuge, 7,200 feet of Cell 2 and Compartment "A's" perimeter dikes would be raised to create additional storage capacity. Another purpose also

under consideration is to use Cell 2 and both compartments of Cell 1 as a system of recycling CDFs.

Preliminary typical cross-sections for single or multiple dike raising are shown in *Figure 2.3*. They illustrate how the raised cross-dikes might be developed for single and multiple increments. Because of the lack of site-specific geotechnical information, the shear strength and compressibility of the confined material are not known. Therefore, for preliminary cost estimating purposes, the cross-dike was assigned a crest elevation of +38.5 feet, that is, 15 feet above the existing dike height of +23.5 feet. The cross-section provides for a 10-foot wide crest at a base elevation of +23.5 feet. Sideslopes are 1 on 2.5. An assumption was made that the structure would be built on a layer of geotextile using off-site impervious fill, end-dumped from trucks, spread by dozer, and compacted.

Initial raising of the existing perimeter dikes provides for a 10-foot wide crest at elevation +33.5 feet LWD, with an average base elevation of +18 feet LWD. This would create additional storage capacity in Cells 1 and 2 to dispose of about 6 million cubic yards of in-situ sediment volume. Incremental raising by 5 feet to elevation +38.5 feet LWD would follow. Construction methods and materials would be the same as those used for estimating the cost for building the cross-dike. About 8,200 linear feet of Cell 2 would be raised using the same construction methods and materials.

The total cost for preparing the plans and specifications for raising the dikes is estimated at $500,000.00 based on October 1993 prices.

c. Preliminary Cost for Dike Expansion:

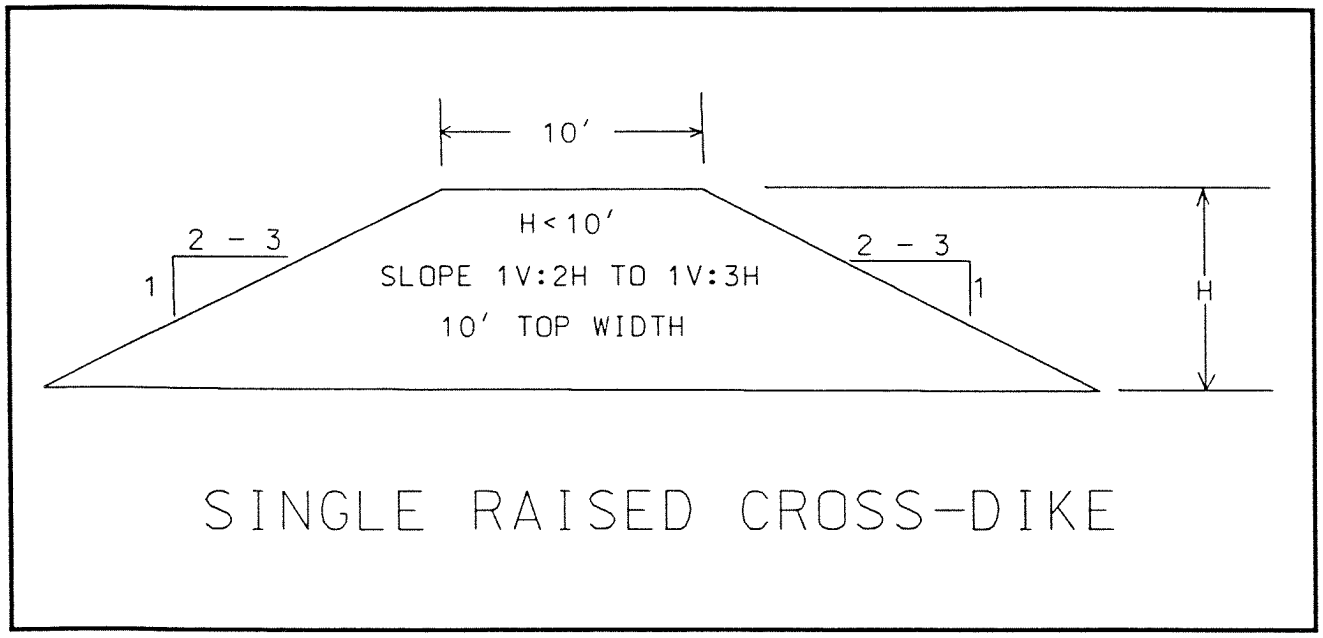
(1) Cost for Building Cross-Dike: The cost for building 2300 linear feet of cross-dike was estimated at $150,000 - 575,000 depending on the construction methods, equipment, and material.

(2) Cost for Raising Compartment "A" of Cell 1: The cost for raising Compartment **"A"** of Cell 1 by 15 feet, using conventional equipment and off-site borrow after construction of the cross-dike, was estimated at $3.3 million including engineering, design and construction management.

Raise Compartment **"A"** an initial 10 feet:	$2,240,000
Raise Compartment **"A"** an additional 5 feet:	$1,090,000

	$3,330,000

Total Cost for raising Compartment "A": $ 3.3 million



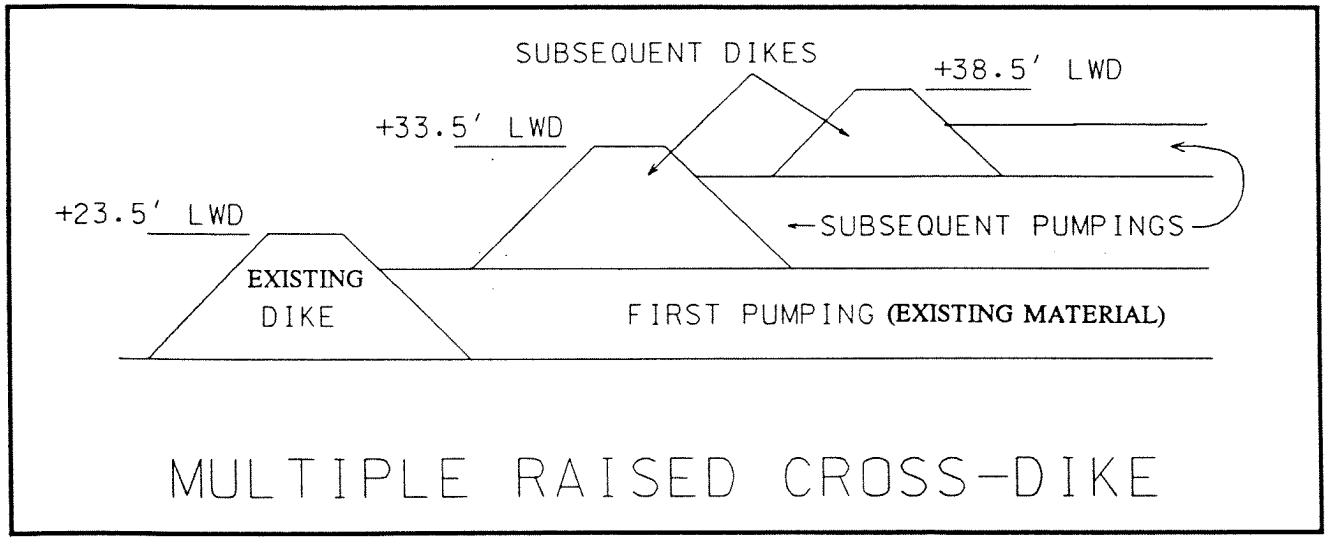


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FIGURE 2.3 TYPICAL SINGLE AND MULTIPLE DIKE RAISING CROSS-SECTIONS

(3) Cost for Raising Cell 2: The cost for raising Cell 2 an additional 15 feet using conventional equipment and offsite borrow, including engineering, design and construction management, was estimated at $2.9 million as follows:

Raise Cell 2 an initial 10 feet:	$ 1,940,000
Raise Cell 2 an additional 5 feet:	$ 960,000
	$ 2,900,000

Total Cost for raising Cell 2: $ 2.9 million

2. Recycling CDF:

As part of the **conceptual Action Plan** described in the Phase 2 Status Report, beneficial use of the dredged material to produce manufactured soil was identified as a potentially viable option. Likewise, the concept of incorporating a facility for completely recycling material from existing CDFs and/or new CDFs was identified, but this concept requires additional detailed evaluations to establish the overall engineering, environmental, and economic feasibility. The primary operations needed to effectively implement such a concept include: dredged material management for dewatering and perhaps separation of materials, storage of the dried dredged material, a cell for stockpiling various additives (e.g., stabilized biosolids, spent lime, kiln dust, etc.), and general blending and mixing or curing cells *(Figure 2.4)*.

a. Dewatering/Management Assessment: Techniques for the management of dredged material being placed in the CDF will be evaluated with the ultimate goal of recycling the material for beneficial uses. Either dewatering through conventional methods or use of mechanical processing equipment like filter belts (centrifuge) should be evaluated to determine the trade-offs in rehandling the material and to establish the potential "through-put capacities" (ton/day) designs of various recycling facilities. Additional physical characterization of the material, including engineering studies to assess dewatering characteristics and an environmental quality assessment of the dewatered material and filtrate will be needed to obtain data for assessing the potential to site-adapt the recycling CDF concept.

b. Site-Specific Manufactured Products Evaluation: The potential for a variety of manufactured uses of the reclaimed dredged material was addressed in the Phase 1 Report and has continued to be evaluated through the Toledo Harbor LTMS study process by the Port of Toledo. Both "Nu-Soil" and "N-Viro" have been identified as a potential topsoil,

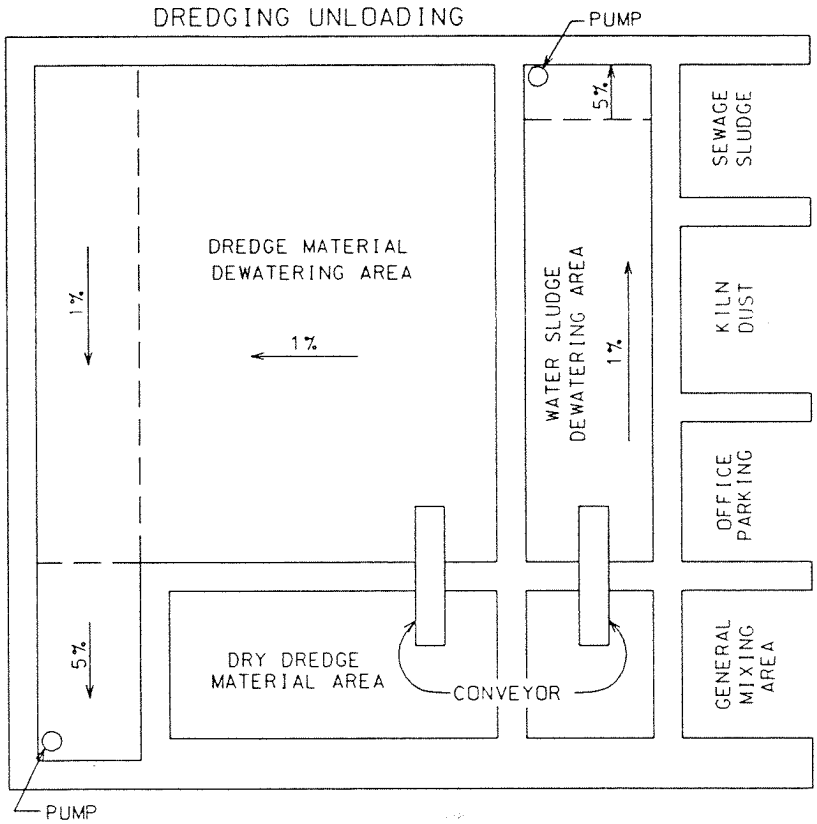
and a potential dredged material amendment, respectively. An evaluation of the site-specific requirements to apply to either or both of these processes to dredged material reconditioning at the existing and new CDFs needs to be completed before the recycling CDF concept can be quantified. Criteria for design of mixtures, including formulations or recipes, will be needed to evaluate the material bulk storage requirements and sustainable "through-put capacities" that are achievable at the CDF sites. This evaluation should be based on the types and characteristics of the material in existing CDFs, as well as material to be dredged and confined in the future. In addition, the evaluation of design requirements for the manufacturing of reusable products should be based on a range of processing rates and physical plant configurations. The results of this evaluation would allow for a localized assessment of the potential to incorporate manufactured soil processing into the concept of recycling CDFs which would be based upon an analysis of the market demand for these products being projected over the timeframe of the study.

c. Refinement of Market Analysis of Manufactured Products: Current estimates of the market demand for processing material from Island 18, and producing manufactured topsoil can sustain a production rate of approximately 110,000 - 150,000 cy/yr during the intermediate period. The objective of the study of the market for manufactured soil products would be to refine the overall potential for using the manufactured product and to extend its use beyond topsoil to uses such as landfill cover and other. The results of this effort will be crucial when answering the question of: at what level of sustainable production will recycling CDFs become a sustainable option?

d. Site-Specific Designs: The result from the previously defined studies discussed above would be used in the overall development of site designs that incorporate the concept of recycling CDFs. The objective would be to develop the details needed for an analysis of alternatives considered sustainable over the life of the project.

e. Cost for Study of Recycling CDFs: The total cost for assessing the dewatering management of CDFs, site-specific manufactured products, analyzing the dredged material-product market, and executing detailed designs is estimated at $185,000, based on October 1993 prices.

RECYCLING REUSE FACILITY



TOLEDO HARBOR, TOLEDO, OHIO

LONG-TERM SEDIMENT MANAGEMENT STRATEGY

RECYCLING REUSE FACILITY

TOLEDO HARBOR PLANNING GROUP
DECEMBER 1993

FIGURE 2.4

3. Agricultural Runoff Retention Reservoir (ARRR):

a. General:

As discussed earlier in the problem identification section of this report, the Maumee River Watershed contributes approximately 1.2 million metric tons of sediment to Lake Erie annually. Adoption of Crop Residue Management during the intermediate period 1994-1998 would produce appreciable results. However, an additional decrease in sediment load reduction could be obtained by the installation of the ARRR. The ARRR may be a more reliable complementary structural measure which would further reduce the volume of sediment leaving the farmlands and entering Maumee River; and, at the same time, help achieve minimal or no discharge of pollutants.

The construction of reservoirs and the adoption of a water management system would consist of two parts. The first would be the construction of the reservoirs to receive agricultural runoff during the high runoff periods of winter and spring. The second part would be to use this water to charge a perched water table during the summer months when adequate supplies of water are in short supply for crop production. The practice would provide benefits of reduced sedimentation, reduced toxic emission, reduced non-point source pollution, and increased wetland habitat.

b. ARRR Study Cost:

The total cost to study the feasibility of the Agricultural Runoff Retention Reservoir option, including planning, design, operation and management, and analytical evaluation, is estimated at $300,000. However, the geographic limit or scope of this ARRR study appears to be beyond the authority provided by the 1992 Water Resources Development Act which directs the Corps of Engineers to **develop a Sediment Management Plan for Maumee River, Toledo, OH**. The principal tasks, schedule and associated costs are provided in Section III of this Phase 3 Report.

4. Protection and/or Restoration of the Shoreline:

One potential beneficial use/reuse of the material dredged from the Toledo Harbor Federal channels would be to provide erosion control and shoreline protection in the Western Basin of Lake Erie. The Western Basin of Lake Erie is a shallow habitat, and subject to severe storm conditions. Wave action brought about by these storms does extensive damage to shorelines throughout the Western Basin of Lake Erie. One impact of the storm action has been the near-total destruction of the Woodtick Peninsula in southeastern Michigan near the Ohio border (See *Figure 2.5* - Woodtick Peninsula 1979).

The impact of such erosion is threatening the existence of wildlife areas and wetlands adjacent to or behind the shoreline near Woodtick Peninsula, Metzger's Marsh, and McGee Marsh. Using dredged material to build offshore barrier islands would provide substantial

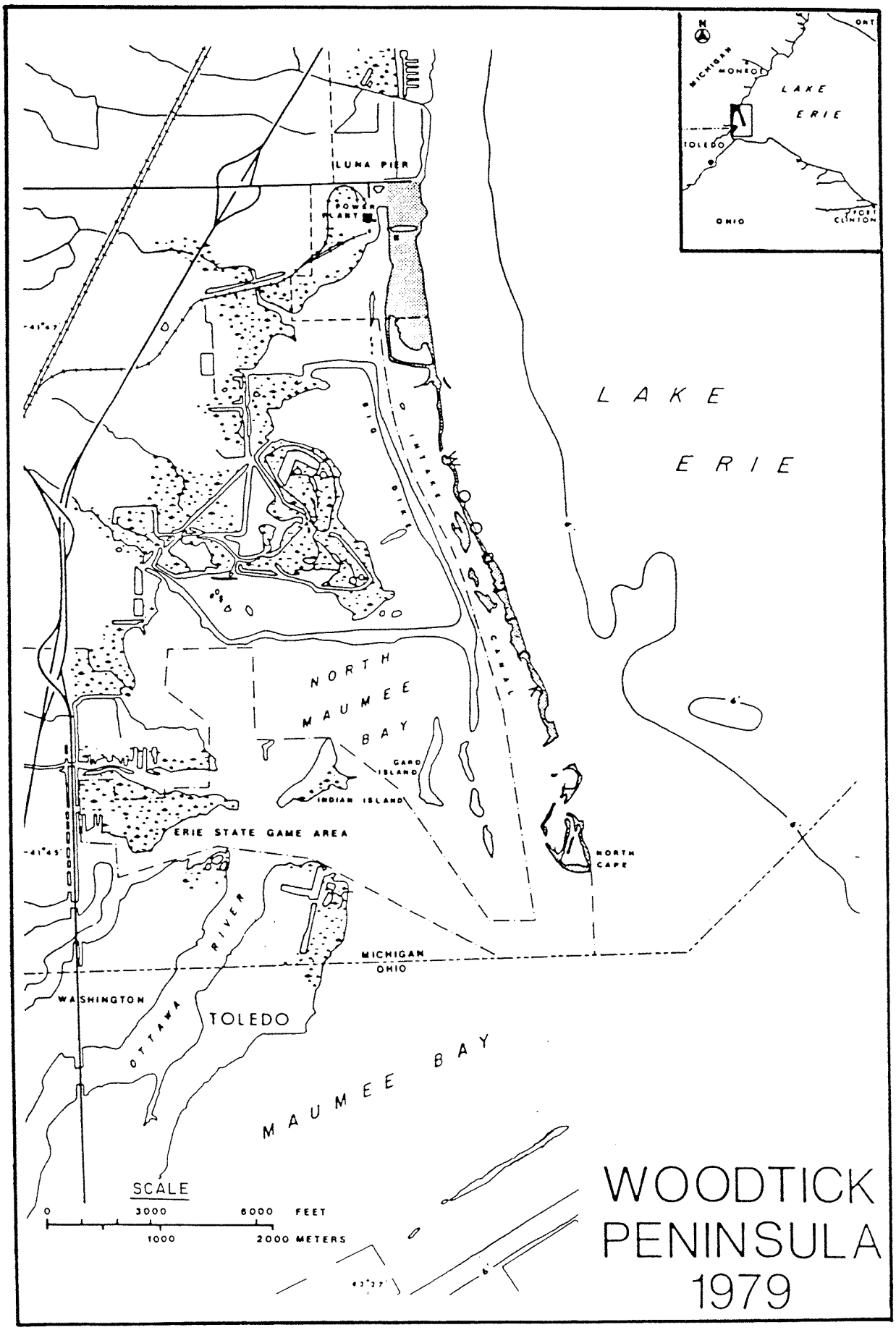


Figure 2.5 - Woodtick Peninsula

protection for these shorelines and preserve the wildlife areas behind them. This could also provide additional confined disposal space for material dredged from Toledo Harbor channels and other facilities in the Western Basin of Lake Erie.

Preliminary evaluation of restoring Woodtick Peninsula have been conducted. Additional studies, considering the use of offshore geotubes filled with dredged material, offshore CDFs, filling and extending the shoreline of Woodtick Peninsula, and creation of a wetland along the shoreline of the peninsula, should be conducted. this concept could beneficially use 6 million cy/yd of dredged material, result in a stabilized peninsula, and control shoreline erosion in the area.

Cost for this option is estimated at $500,000, including planning, design.

F. DERIVED ACTION PLAN (Output of Phase 3):

Having tentatively selected Alternative Intermediate Plan 2a as the intermediate plan, and having discussed the other options that show potential for becoming part of the long-term strategy, an Action Plan can be defined as outlined in the framework of actions presented below. This framework of actions will guide the development, execution, and implementation of future activities such as feasibility studies, test projects, monitoring and evaluation, derivation of the LTMP, pre-construction planning and engineering, and eventual implementation of the LTMP. A description of the **Action Plan** is provided below following the outline of the framework.

1. Action Plan Framework:

a. Implementation of Intermediate Plan 2a:

* Material Disposal
* Crop Residue Management
* CDF Management
* Manufactured Soil
* Evaluation

b. Execution of Detailed Studies:

* Expansion of CDFs;
* Recycling CDF;
* Agricultural Runoff Retention Reservoir;
* Environmental Restoration
* Institutional Studies
* Real Estate
* Detailed Design

c. Derivation of the LTMP:

* Results of Items 1a and 1b above
* Combination of Results
* Derived LTMP

d. Preconstruction Planning and Engineering for the LTMP:

* Refined Design
* Real Estate
* Plans and Specifications
* Construction and Other Contracts
* Monitoring Plan

e. Implementing and Monitoring the LTMP:

2. Description of the Action Plan:

The derived Action Plan has two key parts. First and foremost is the 5-year Intermediate Plan intended to provide a means to manage the material through a reuse, reduction and consolidation program while maintaining the operation of the port in a cost-effective and environmentally acceptable manner.

Through the Intermediate Plan, 5 actions would be implemented:

- **Ongoing Dredging**: This program would build o the existing OEPA 401 certification allowing material dredged form Lake Mile 5 to Lake Mile 19 to be placed in an open water site during the interim period. The remaining Lake and entire river dredging would be placed in the CDF. The Army Corps of Engineers will remain the lead agency on this issue.

- **Crop Residue Management**: This program is also known as conservation tillage which provides that a certain amount of crop residue be left on the farm field to minimize soil erosion into the Maumee River. The Soil Conservation Service (SCS) estimates that this program could reduce the amount of sediment into the river by 15 percent. This would decrease the amount of material dredged from the river from 850,000 cubic yards a year to 710,000 cubic yards. The USDA, Soil Conservation Service will provide the lead in working with local soil and water conservation districts and the State of Ohio to implement the crop residue management plan. Funds for this activity will be requested as part of this plan.

- **Manufactured Soils/Beneficial Reuse**: This effort entails the recycling of various waste products into a usable material. Demonstration projects tested to date have mixed dredged material with processed sewage sludge and spent lime sludge to produce a good quality top soil. The Intermediate Plan would expand this effort to Island 18 and other appropriate site(s) in order to produce large quantities of top soil more cost effectively while providing additional dredged disposal space for future use. The Port Authority will take the lead on this recycling effort.

- **CDF Management**: Better management of dredge material could substantially extend the life of existing CDFs. To that end existing dewatering and consolidation measures will be implemented to enhance the life of current CDF. The Army Corps of Engineers will take the lead on CDF management techniques.

- **Evaluation**: Each component of the intermediate plan including open-water disposal methods will be evaluated annually to measure progress towards achieving the projected reductions, beneficial reuse or CDF management goals. The executive committee will review the annual reports from the lead agencies and make recommendations for adjustments in order to account for unforeseen problems that may occur. This oversight activity is designed to review the progress and measure the performance and effectiveness of the Intermediate Plan.

The second part of the Action Plan is the additional studies listed below. During this 5-year period, these additional studies would be conducted in order to contribute to the LTMS. These additional studies include:

1. Vertical Expansion of CDFs
2. Recycling CDF
3. Agricultural Runoff Retention Reservoir
4. Environmental Restoration/Shoreline Protection
5. Institutional Studies
6. Real Estate
7. Detailed Designs

The third and other parts of the Action Plan call for the derivation of the LTMP by combining results from the two key parts described above. This would result in the overall development of the mutually-acceptable Long-Term sediment Management Plan. Upon completion of this formulation process and approval of the plan, work would begin to prepare the project for construction. Detailed design of structural features, if any, as well as Plans and Specifications, would be performed. An evaluation program would be developed to allow for periodic reevaluations of the LTMP. Real Estate studies to provide lands, easement, rights-of-way and relocations, and other appropriate institutional studies would be coordinated within the time frame allowed by the Action Plan to insure a smooth and non-

interrupted implementation. The primary techniques and/or strategies that would be utilized to implement the Action Plan are further discussed in the following "Implementation Strategies" sub-section of this report.

G. COST-SHARING REQUIREMENTS:

1. General:

The costs of studies for developing sediment management plans for continued maintenance of the existing Federal navigation channels at Toledo Harbor, OH, are primarily operation and maintenance costs which are Federally funded and subject to the following:

a. Cost of Participation in LTMS:

All member agencies of the Planning Group listed earlier in this report, and other users, if any, of the Toledo Harbor Federal Navigation Project, are partners in the sediment management, and as such, pay the costs of their participation in the sediment management studies, including participation in meetings, providing information, and other coordination activities.

b. Cost of Studies and Implementation of Projects:

The costs of the study and the implementation of intermediate and/or long-term projects attributable to meeting specific local and/or State Environmental Standards and/or requirements that are not provided for by the requirements of Federal laws and regulations, are non-Federal cost.

c. Cost of Other Related Studies:

Study activities, such as contamination source identification and control of non-point sources of pollution, related to the Sediment Management Study for Toledo Harbor, but not required for continued maintenance dredging and placement of the dredged material, are not funded by this navigation project and, therefore, will not be included in the Dredged Material Management Studies, except if they are funded by others.

d. Cost of Disposal of Non-Contaminated Material:

The total additional cost increment of disposing non-contaminated dredged material in CDF is a non-Federal cost responsibility. This additional cost increment includes the cost of the disposal facility. However, non-contaminated material can be considered as a part or separable element of the management plan to meet non-navigation objectives including fish and wildlife habitat restoration. This beneficial use of the material could be pursued under relevant authorities, funding sources, and cost sharing between Federal and non-Federal entities.

2. Cost of Beneficial Use Studies/Projects:

a. Restoration and Protection of Environmental Resources:

Pursuant to Section 1135 of the Water Resources Act of 1986, as amended, and/or Section 204 of the Water Resources Act of 1992, all incremental project costs above the Base Plan for the use of dredged material to restore and/or protect environmental resources are shared on the

basis of 75 percent Federal cost, and 25 percent non-Federal cost. Study costs are shared 75 percent Federal and 25 percent non-Federal shares.

b. Placement of Material on Beaches:

Pursuant to Section 933 of the Water Resources Act of 1986, and Section 207 of the Water Resources Act of 1992, the incremental project cost above the Base Plan for the placement of dredged material on beaches is shared 50 percent Federal and 50 percent non-Federal cost. The added cost of placement must be justified by the benefits associated with hurricane and storm protection. All other beneficial use projects not meeting the criteria for Corps of Engineers participation must be paid for by the non-Federal interests (Project Guidance Letter No. 40, Financing of Dredged Material Management Study, 25 March 1993).

3. Cost Sharing Percentages:

Cost sharing percentages for commercial navigation operation and maintenance dredging and related studies as they pertain to future CDFs are unknown as shown in *Table 2.15*. Costs are shared between the Federal government and the official non-Federal sponsors. Given the dificulty of establishing a cost-sharing formula, the Executive Committee decided that such policy issues be resolved at a higher level than those represented on the Executive Committee. Therefore, all cost sharing for the Action Plan and Potential LTMP will be based on applicable laws, policies, and guidance at the time of implementation of the LTMP.

Table 2.15 -- Cost Sharing Percentages
Commercial Navigation and Related Studies

	Federal		Non-Federal	
	COE	Other	TLCPA	Other
1. Restoration/Protection of Shoreline Section 1135 WRDA 86 and Section 204 WRDA 92				
A. FEASIBILITY STUDY	75			25
B. PROJECT	75			25
C. .OMRR&R	0	0		100
2. PLACEMENT OF MATERIAL ON BEACHES SECTION 933 WRDA 86 AND SECTION 203 WRDA 92				
A. FEASIBILITY STUDY	50		50	
B. PROJECT	50		50	
3. DREDGING/DISPOSAL;AND DISPOSAL FACILITIES				
A. DREDGING/DISPOSAL	100		LERR	
B. DISPOSAL FACILITIES	0 - 100 1/		100 - 0 1/	
4. OTHER O&M RELATED STUDIES	0		100	

LERR : Land, easements, rights-of-way, and relocations
TLCPA : Toledo-Lucas County Port Authority
OMRR &R: Operations, maintenance, replacement and rehabilitation

1/ Disposal facilities : For Toledo Harbor, disposal facilities are the responsibility of the non-Federal sponsor. However, as per 33 U.S.C. 560, the Federal Government may accept contribution from the non-Federal sponsor to share in the cost of providing these facilities.

H. COST ALLOCATION AND APPORTIONMENT:

Costs were allocated by purpose as defined in the Congressional authorizations shown in *Table 2.15*. The allocated costs would be shared primarily between the Federal Government and the official non-Federal sponsors, using the cost-sharing percentages shown in *Table 2.15*. However, the final cost apportionments between the Federal and non-Federal interests for the LTMS will be determined and better defined during Phase 4 upon approval of the LTMS. Cost sharing formulas may be based on applicable laws, policies, and current guidance prior to implementation of the LTMP.

Costs for the components of the Action Plan such as dredging and disposal cost, management of CDFs, appropriate beneficial use/reuse, restoration and protection of environmental resources, are allocated to commercial navigation, operation and maintenance costs, and environmental dredging costs, as appropriate.

Given that one of the primary purposes of this LTMS is the continued and effective operation and maintenance of the Federal Channels, costs of certain studies/projects that are not consistent with and part of the operation and maintenance, are either a non-Federal responsibility, or a shared Federal and non-Federal responsibility. Although not fully detailed, an example of cost sharing for the Action Plan is shown in *Table 2.16*.

I. PUBLIC VIEWS:

As part of its public involvement program, the Planning Group held a public meeting on 29 September 1992, at the Waite-Brand Auditorium of Riverside Hospital in the city of Toledo, OH to inform and give the public an opportunity to directly input in the process of developing long-term sediment management plans. Attendance was estimated at about 45 people including representatives from the agency partners of the Planning Group. Generally, the public was pleased with the formation, diversity, structure, and proceedings of the Planning Group. The public complimented and encouraged the Group in its pursuit of needed strategies that promote beneficial use/reuse of the dredged materials. The following are two direct quotes from the public meeting:

"... I would like to encourage the Group, wish you well, and offer my support and that of the County Commission in any way possible; and say it has been a long way and a long road coming here in the past. We have had some polarization, as you talked about, Colonel, and I would like to see that behind us, and I would like to see us work forward in a positive manner and once again pledge my support and thank everyone for the work that's been done to date. Thank you."

Table 2.16 -- Cost Allocation and Apportionment for the Action Plan: Yearly Cost at October 1993 Prices

1. TEST PROJECT Int. Plan 2a	Purpose	Yearly Cost ($)		
		Yearly Cost Over 5 Yrs.	Federal Share	Non. Federal Share
Dredging and Disposal	Operation & Maintenance	3,300,000	3,300,000	0
Conservation Tillage	356 WRDA 92 :Sediment Reduction	1,600,000	1,600,000	0
Dewatering	Operation & Maintenance	219,000	219,000	0
Manufactured Soil[1]	Beneficial Use[1]	800,000	0	800,000
2. OPTIONAL STUDIES/ PROJECTS		Yearly Cost Over 2 Yrs.		
CDF Expansion	Operation & Maintenance	250,000	250,000	0
Recycling CDF	1. O and M 2. Beneficial Use	93,000	47,000	46,000
Ag. Runoff Reservoir	356 WRDA 92 :Sediment Reduction	150,000	150,000	0
Protection/ restoration of shoreline study	1. 204 Environment Restoration 2. 1135 Shoreline Protection	250,000	187,500	62,500

[1] The Corps would provide the CDF site for processing the materials to produce manufactured soils at no cost to non-Federal interests. The confined material would be put up for bid to insure that all interested parties have a chance to participate on equal terms.

" I would like to thank those people who have been involved in setting up the Working Group. I think it is an excellent direction in which to go, the work that is coming up with productive solutions to the dredged material problem. I think that the Group that has been put together represents a great diversity of viewpoints, and if I can do anything to help you with regard to coming up with plans I would be glad to do what I can, and wish you the best of luck and best of success in coming up with a solution that is in the interest of all of us. Thank you."

In December 1992, the Planning Group held a technical seminar in Toledo, Ohio. The discussion focused on the technology of Reusable/Recycling CDFs, and use and marketability of dredged material. Attendance at the seminar included all members of the Study Team of the Planning Group, interested local groups, and individuals. The views expressed were that the invaluable exchange of technical information that took place would help develop long-term strategies to address the issue of dredged material management and open-lake disposal.

In October 1993, the Planning Group held a public workshop in Toledo, Ohio to inform the public of the alternative plans under consideration, and to give the public an opportunity to input into the process of formulating and assessing these alternative plans. Overall, there was no opposition to the array of alternative intermediate plans presented. However, several participants expressed concerns regarding the negative impact of the dredged material on the western Lake Erie Basin. They felt that this impact was not sufficiently evaluated in the information presented. On the other hand, there were concerns expressed regarding the accelerated filling of CDFs and associated cost, thereof. In addition, interest was expressed to further evaluate the use of the dredged material for shoreline protection, and restoration of the Woodstick Peninsula.

SECTION III

IMPLEMENTATION OF ACTION PLAN

III. IMPLEMENTATION OF ACTION PLAN- PHASE 4:

A. INTRODUCTION:

This section of the report discusses the implementation of the **Action Plan** as to the responsibilities of the partner agencies in implementing the selected plan. Federal and non-Federal responsibilities are based on the assumption that the Action Plan would be approved for implementation. A tentative schedule for the activities leading to the approval and initiation of Phase 4 is provided at the end of this section. This section also discusses cost allocation and apportionment, and provides a framework for the implementation and execution of the demonstration projects and other studies, respectively.

B. IMPLEMENTATION COST AND RESPONSIBILITIES:

1. Implementation cost:

a. Cost Allocation and Apportionment:

All costs for the basic components of the Action Plan are allocated to **environmental dredging** and **non-environmental dredging** measures such as commercial and recreational navigation, related maintenance dredging and disposal of the dredged material, beneficial reuse of the material, and reduction of sediment load (primarily agriculture).

Costs are apportioned between the Federal Government and the official non-Federal sponsors. Cost apportionment between the Federal Government and the official non-Federal sponsors, as stated in paragraphs G.3 and H of Section II of this report, will be based on applicable laws, policies, and guidance for cost sharing of the various purposes at the time of implementation of the LTMP. **The final cost apportionments between the various Federal and non-Federal interests will be determined upon approval of the LTMS or later.**

As a result of the Phase 3 studies, a distribution by purpose of the estimated total implementation cost for the Action Plan is apportioned as shown in *Table 2.16*. The total estimated yearly cost over 5 years of $3.3 million for operation and maintenance dredging of the Port, $1.6 million for implementing the sediment load reduction program, $219,000 for the dewatering and consolidation of the dredged material; and the estimated yearly cost over 2 years of $250,000 for the study of CDF expansion and $150,000 for the runoff retention reservoir would be borne 100 percent by the Federal Government. The $800,000 estimated yearly cost over 5 years for generating manufactured soils using the confined dredged material would be borne by the non-Federal sponsors. This will be modified based on the results of the Phase 4 studies.

The cost for executing the remaining studies would be shared on the basis of 50 percent Federal and 50 percent non-Federal shares. Therefore, the estimated yearly cost over 2 years of $93,000 for the study of recycling CDF and the $250,000 for shoreline protection and environmental restoration studies would be shared 50-50 between the Federal Government and the non-Federal sponsors.

2. Implementation Responsibilities:

In order to achieve the goals of the Toledo Harbor Planning Group, it was necessary to review existing policies and evaluate the need for changes and compromises that would move the project forward. The Executive Committee recognizes that it can not compel authorizing legislatures, council, and boards to commit resources towards the LTMS. However, the actions listed in this section are essential to insure the successful implementation of the LTMS.

a. Federal Responsibilities:

Specific Corps of Engineers responsibilities regarding the implementation of the intermediate plan, based on the approval of the Phase 3 Report and availability of funds, are:

- The U.S. Army Corps of Engineers will waive current policy and place sediments dredged between River Mile 7 and Lake Mile 5 in the CDF.

- The Corps will evaluate the viability of removing sediments from the CDF under a no cost contract, evaluate CDF management methods to consolidate material in the CDF and increase disposal capacity. The Corps will thus put the material up for bids and may:

  - Accept zero bids; and
  - Accept positive bids.

- The Corps working with the states of Michigan and Ohio, and the Port Authority will investigate the feasibility of constructing shoreline protection structures to contain dredged materials.

- The Corps will investigate the feasibility of expanding the capacity of current CDFs.

- **The Corps will lease the use of Island 18 to the Port Authority,** if practicable, to manage the recycling program for the interim period that will provide additional space for future disposal of sediments.

• The Natural Resource Conservation Service will develop an erosion-sediment reduction program and investigate additional soil conservation technologies to decrease the sediment delivered to Toledo Harbor.

b. Non-Federal Responsibilities:

The Local Cooperation Agreement (LCA) is a pre-requisite for establishing the non-Federal sponsors' responsibilities. The official non-Federal sponsor, the Toledo-Lucas County Port Authority, will be primarily responsible for providing the non-Federal share of the cost of implementing the Action Plan. Other non-Federal agencies of the Planning Group may be responsible for other tasks as agreed to.

Specifically, the non-Federal sponsors' responsibilities are:

• Ohio Department of Natural Resources will investigate the use of closed CDFs for parks and wildlife habitat.

• Ohio EPA will agree to issue 401 Water Quality Certifications to allow open-lake disposal of sediments dredged lakeward of Lake Mile 5 during the intermediate period.

• The City of Toledo will be the lead agency for the production of a Process to Further Reduce Pathogens (PFRP) sludge.

• Toledo-Lucas County Port Authority will remain the local sponsor for Federal navigation projects. This will require the Port to provide land, easements, rights-of-way, and relocations for the long-term and interim plan.

• The Port Authority will take the lead in developing Island 18 as a recycling facility which includes the expenditure of funds to upgrade the facility for such operations.

C. IMPLEMENTATION STRATEGIES:

This sub-section briefly describes the primary techniques and/or strategies that would be utilized to implement each item listed in the Action Plan framework and identify their resulting impact on the formulation of the Long-Term Sediment Management Plan (LTMP).

The strategy would focus on the resolution of the issue of water quality associated with open-lake disposal of dredged material at the existing disposal site, and on the resolution of the destruction of shallow water habitat associated with the proliferation of CDF in the nearshore area of Toledo Harbor. The Planning Group has reached consensus on the belief that:

- Elimination of Open-Lake disposal remain a primary goal of the LTMS and that the issues of Federal Standard and State Water Quality Standard, and funding and cost sharing be addressed as separate issues in the near future.

- New Water Quality Criteria and sediment testing procedures be developed to facilitate coordination between responsible parties involved in requesting and issuing Water Quality Certificates for the discharge of dredged material in waters of the United States. To this end, a draft "Inland Testing Manual" will be prepared by a work group comprised of individuals from the Corps of Engineers and U.S. Environmental Protection Agency. Conclusions reached utilizing this manual will be used to make factual determinations of the potential contaminant-based effects of a proposed discharge of dredged material on the physical, chemical, and biological components of the aquatic environment and other sensitive areas.

- Funding issues and cost sharing not be determined at the level of the Executive Committee of the Planning Group. Therefore, the Committee has devoted its attention to an overall strategic plan.

- Open-Lake disposal of the dredged material be studied further to verify or discontinue its use at the end of the intermediate period. Confined sediment will be removed from CDFs at the site of the Federal project to restore capacities in these CDFs for future disposal of dredged material.

- The construction of new nearshore CDFs at the Toledo Harbor be avoided unless other environmental or wildlife benefits can be achieved. Therefore, construction of new nearshore disposal facilities could cease. As a result, offshore and/or up-land CDFs might be considered by the non-Federal sponsors as a last resort, when all other options would have failed.

- The Corps of Engineers continue to do all that is required to meet the Federal Standard for dredged material disposal, that is, it will implement the least costly alternative, consistent with sound engineering practices, and which meets the environmental standards established by the 404(b)(1) evaluation process, and the 401 State Water Quality Certification process.

1. Strategies in Implementing Intermediate Plan 2a:

Alternative Intermediate Plan 2a has two components (beneficial reuse and dewatering) that would work toward restoration of storage capacity in filled CDFs. Restored storage capacities would be allocated to the disposal of the non-polluted or moderately polluted material from the Lake Approach channel. In the event enough storage capacity would not be restored to dispose of the non-polluted or moderately polluted material, new CDFs would be provided by the non-Federal sponsors at 100 percent non-Federal cost or as otherwise directed. The lead agencies for the beneficial reuse and dewatering projects would monitor and evaluate the results of these projects and the results of other optional studies. This would provide a tested mechanism by which the issues of open-lake disposal and non-proliferation of nearshore CDFs would scientifically and engineeringly be addressed to the satisfaction of the public and the scientific community, as well. This mechanism would involve the following:

a. Placement of Dredged Material:

The practice of placing dredged material at the existing open-lake disposal site would cease in 1998. The feasibility of a new site will be investigated through a monitoring and evaluation program to determine the susceptibility of a sensitive facility and/or site to impacts from an open-lake site. By field measurements, the monitoring program would help determine the entrainment and sediment flux climatology of the open-lake site, and quantify the conditions that would result in placed material being transported to sensitive areas. In all, the results of the monitoring and evaluation program would help arrive at, or contribute to, the decision on the feasibility and acceptability of a new site for the less-contaminated sediments, or the decision on no further pursuit of a new site.

b. Reduction-Conservation-Reuse Program:

(1) Crop Residue Management: The primary technique that would be utilized to implement the management of crop residue would be the technique of Conservation Tillage by which soil erosion would be reduced. Resulting impact would be to reduce the volume of sediment entering Maumee River, thereby, reducing the level of contaminants (pesticides and nutrients) going into western Lake Erie;

(2) CDF Management: The primary technique that would be utilized to implement the dewatering of CDFs would be the technique of surface trenching and installation of strip drains to dewater, desiccate, and consolidate the dredged material. Resulting impact would be to restore most of the storage capacity of the CDFs, thereby, prolonging their useful life, and to increase the shear strength of the material. If the trenching and strip drain technique resulted in being not cost-effective, electro-osmosis, and filter belts (centrifuge) are other techniques that would be tested on a low-scale basis to establish their economic and engineering feasibility.

(3) Beneficial Use: The primary beneficial use of the dredged material during the intermediate period would be the blending of the material with other admixtures to produce topsoil for landfill cover, landscaping material, road dressing, and/or shoreline protection. Resulting impacts would be to restore space in CDFs so that these CDFs can be reused at a later time to dispose of non-polluted and/or moderately polluted material from the lake approach channel.

The overall impacts of these three components working together would be to generate enough storage capacity, or adequate disposal resources to confine the above referenced moderately-polluted material, reduce dredging cost, and render the operation and maintenance of the Port of Toledo more cost-effective to the Federal Government.

2. Strategy in Executing Other Studies/Projects:

The strategy in executing the optional studies/projects carried into Phase 4 would be to gain additional storage capacity for the disposal of future dredged material over a 30-year period or more with significant cost savings and beneficial environmental impacts. particularly, the "Recycling CDF" option would substantially contribute to the development and implementation of an LTMP where CDFs would be used in tandem, and reused continuously. Also, vertical expansion of CDFs and shoreline and other environmental restoration projects would beneficially provide significant storage capacity for the disposal of future dredged material over many years. However, some of these options are not primarily required for continued maintenance dredging and placement of the dredged material. They would therefore be studied using existing and pertinent Congressional authorities and/or Corps-provided guidance and policies. Some of these authorities are briefly described below:

- Section 1135 of the Water Resources Act of 1986, as amended, and Section 204 of the Water Resources Act of 1992 for the restoration and protection of environmental resources;

- Section 145 of the Water Resources Act of 1976, as amended by Section 933 of the Water resources Act of 1986, and Section 207 of the Water Resources Act of 1992 for the placement of material on beaches; and

- Section 404 of the Clean Water Act, and the Coastal Zone Management Act, for environmental consistency and compliance with the NEPA.

- Section 204 of the Water Resources Act of 1992 providing for the restoration and/or protection of environmental resources.

- The Corps of Engineers and the other partner agencies' policies and budgetary priorities regarding the development and financing of sediment and dredged material management studies and related studies.

3. Derivation of the Long-Term Plan:

The results from the previously discussed projects of the intermediate plan, along with the results of the other studies/projects defined above, would be combined for the overall development of a mutually-acceptable LTMP. The strategy is to fully evaluate and use the data that would be recorded from the monitoring program which would be conducted during the intermediate period.

4. Execution of Preconstruction Planning and Design:

Upon the Planning Group concurrence and approval by all involved agencies in the mutually acceptable long-term sediment management plan, detailed pre-construction planning and engineering would take place. The LTMP implementation would then be subject to approval by Corps of Engineers Headquarters, and to availability of funds.

5. Implementing and Monitoring the LTMP:

Periodic review and updates of the Long-Term Sediment Management Plan (LTMP) would be on-going throughout the implementation period of the plan. The strategy would be to perform periodic re-evaluations of the LTMP, based on changing laws and regulations, local economy, environmental and physical conditions, and technology advances. These periodic re-evaluations would allow for verification of the validity of the assumptions that were made during the development of the LTMP, and assure that the decision-making process continues to maintain a viable implementation strategy which reflects changing times.

D. INDIVIDUAL PLAN OF WORK (Timeline Task/Charts):

1. Introduction:

Considering the framework of the Action Plan developed in Section II (Formulation of Action Plan), individual plan of work is as follows:

Prior to implementing any test projects, or conducting any feasibility studies, basic preparation such as sampling of material in Island 18, Cells 1 and 2, in the river and lake channels, and in open-water site(s), would be performed for further evaluation. As a result, sites should be characterized, suitability of material determined/redetermined, and baseline established as necessary. This work activity starts as early as Spring of 1994 in anticipation of Corps of Engineers Headquarters approval of the recommendation(s) of the Executive Committee. Principal work activities would be as follows:

a. Schedule
b. Mobilization
c. Test Projects
d. Feasibility Studies
e. Evaluation

2. Implementation of Projects and Execution of Studies:

The test projects and other optional studies/projects would be carried out as shown in pertinent timeline/charts summarizing the individual tasks *(See Charts 3.1 - 3.4)*. These charts describe the principal tasks to be accomplished with a brief description of each one of the tasks, and the time during which the work would be accomplished. Also provided is the cost of completing each task. These work activities could start as early as possible, and in an orderly fashion for timely completion and incorporation into the long-term plan. All required field surveys, sampling programs, and laboratory testing to insure the suitability of the sediment or dredged material for beneficial uses would be performed as appropriate. These laboratory results will be analyzed in light of established Federal and State guidelines prior to the use of the material.

CDF MANAGEMENT PROJECT
Timeline Task/Chart 3.1

	1993		1994		1995		1996		1997		1998		1999		2000	
	1[a]	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Task I																
Task II																
Task III																
Task IV																
Task V																
Task VI																

[a]Numbers refer to calendar year halves: 1 → Jan. 1 - Jun. 30; 2 → Jul. 1 - Dec. 31;

Task I Project Management Planning ($100,000)

- Project management initial planning phase
- Project management final planning phase
- Project management implementation stage

Task II Site Characterization ($60,000)

- Geologic survey
- Geophysical survey
- Geotechnical investigation
- Piezometers

Task III **Dewatering of Port Authority Facility (PAF) No. 3** **($740,000)**

- Consolidation and Dewatering analysis for Cell 1
- Consolidation and Dewatering analysis for Cell 2
- Trenching Cell 1
- Conventional procedures for dewatering Cell 2
- Electro-osmosis for Cell 1

Task IV **Vertical Expansion of PAF No. 3** **($250,000)**

- Subdivision dike for Cell 1
- Perimeter dike stability analysis for Cell 1

Task V **Evaluation of the Management of PAF No. 3** **($163,000)**

- Settlement plates
- Piezometers
- GPS ground surveys
- Aerial photography
- Geotechnical investigation of soil properties

Task VI **Assessment and Performance Report** **($30,000)**

CONFINED DISPOSAL FACILITY RECYCLING STUDY
Timeline Task/Chart 3.2

	1994		1995		1996		1997		1998		1999	
	1[a]	2	1	2	1	2	1	2	1	2	1	2
Task I												
Task II												
Task III												
Task IV												

[a]Numbers refer to calendar year halves: 1 → Jan. 1 - Jun. 30 ; 2 → Jul. 1 - Dec. 31

Task I Dewatering/Management Assessment ($75,000)

- Assessment of the dewatered material and filtrate
- Assessment of the environmental quality
- Data collection

Task II Site-Specific Manufactured Products Evaluation ($50,000)

- Identify topsoil to be made
- Evaluate the material bulk storage requirements
- Evaluate the design requirements for the manufacturing plants
- Packaging/distribution mechanisms

Task III Refinement of Market Analysis ($10,000)

- Refine the overall potential for using topsoil
- Extend use of topsoil beyond a landfill cover

Task IV Site-Specific Designs ($50,000)

- Analysis of sustainable alternatives

AGRICULTURE RUNOFF RETENTION RESERVOIR STUDY
Timeline task/Chart 3.3

	1994				1995				1996				1997			
	1[a]	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Task I																
Task II																
Task III																
Task IV																
Task V																
Task VI																

[a]Numbers refer to calendar year quarters: 1 → Jan. 1 - Mar. 31; 2 → Apr. 1 - Jun. 30; 3 → Jul. 1 - Sept. 30; 4 → Oct. 1 - Dec. 31.

Task I Workshops ($11,000)

- Host tri-state sub-irrigation conference in northwest Ohio
- Host summer tour of reservoir sites

Task II Site Selection ($11,000)

- Draft criteria for site selection
- Solicit interest from Maumee Valley RC&D area farmers
- View field and interview applicants
- Solicit and prioritize selected sites

<u>Task III</u> Survey & Design ($114,000)

- Survey reservoir sites
- Draft design
- Review design with RC&D committee
- Coordinate design with Michigan State University Ag. Engineering Dept./ OSU Ag. Engineering Dept.
- Review final plans with landowners
- Draft standards and specs - plan approval
- Solicit bids

<u>Task IV</u> Sub-Surface Irrigation (110,000)

- Survey for tile and include as built data
- Draft design
- Review design with RC&D committee
- Coordinate design with Michigan State University Ag. Engineering Dept./ OSU Ag. Engineering Dept.
- Review final plans with landowners
- Draft standards and specs - plan approval
- Solicit bids

Task V Charging The System ($30,000)

- Complete sub contracts for water quality monitoring with Heidelberg
- Install monitoring devices
- Pump water / collect water
- Complete O&M and agronomic planting plans
- Plant crops - control water table
- Conduct yield checks
- Tabulate findings from monitoring

Task VI Dissemination of Findings ($33,000)

- Take slides of construction and operation
- Take video of construction, operations, and runoff collection
- Assemble narrative of findings
- Conduct yield check and show cost effectiveness of the system

CROP RESIDUE MANAGEMENT PROJECT
Timeline Task/Chart 3.4

	1994		1995		1996		1997		1998		1999		2000	
	1[a]	2	1	2	1	2	1	2	1	2	1	2	1	2
Task I														
Task II														
Task III														
Task IV														
Task V														

[a]Numbers refer to calendar year halves: 1 → Jan. 1 - Jun. 30; 2 → Jul. 1 - Dec. 31

Task I **County Sediment Reduction Committees** **($31,500)**

- Develop and implement a county sediment reduction plan
- Involve diverse organizations in the implementation of sediment reduction

Task II **Educational Program Grants** **($100,100)**

- Award grants to sediment reduction committees, conservation groups, private industry, and others who may apply

Task III **Innovative/Local Program Grants** **($100,000)**

- Fund rental of conservation tillage equipment
- Fund construction of demonstrational wetland/ sediment-trap basins
- Fund establishment of county conservation tillage clubs
- Fund field trials of new or innovative sediment reduction practices

Task IV Landowner Incentives ($1,004,000)

- Financial incentive to purchase conservation tillage equipment
  - no-till grain drills
  - zone tillage planters
  - specialized no-till sprayers
  - residue spreading attachments
- Sediment traps within restored wetlands
- Group filter strip projects

Task V Technical Assistance ($365,000)

- Administer the grant programs
- Develop contracts and conservation plans with landowners
- Administer the financial aspects
- Publicize the sediment reduction project efforts
- Track and report on results

E. SCHEDULE THROUGH START OF ACTION PLAN:

Review of and concurrence in Revised Phase 3 Report by Partner Agencies	Dec. 95
Planning Group holds information Meeting	Mar. 96
Finalize Phase 3 Report	Apr. 96
Start Phase 4 Implementation of Action Plan	Apr. 96

SECTION IV

CONCLUSION(S) AND RECOMMENDATION(S)

IV. CONCLUSIONS AND RECOMMENDATION(S):

Acting on directives from the Secretary of the Army and the Water Resources Development Act of 1992 to develop a Long-Term sediment Management Strategy (LTMS) for Toledo Harbor, the Executive Committee concludes and recommends that:

A. CONCLUSION(S):

Since the initiation of this LTMS Study, an array of measures have been considered by the Toledo Harbor Planning Group to address the issues of sediment management, sediment dredging and disposal, and associated concerns over water quality and proliferation of CDFs. Some of the considered measures were eliminated or delayed from further consideration for economic, engineering, and/or environmental reasons. However, some of the measures that are still being pursued are untested from a point of view of engineering and economic efficiency. The need for a test period and/or transition period became apparent.

It also became apparent that the issue of elimination of open-lake disposal can be viewed as a means of addressing the water quality issue or water pollution problem in Maumee Bay. While open-lake disposal may be one of the factors affecting water quality, no convincing, and/or complete technical information has been introduced to the scientific community to fully validate this concern.

The issue of non-proliferation of CDF can be viewed as a means of addressing the issue of destruction of shallow water habitat and scarcity of nearshore land. While both means - elimination of open-lake disposal and non-proliferation of CDFs - are well-intentioned, they should be carefully balanced against the need for disposal facilities (confined and unconfined). However, the Planning Group is striving toward beneficial use of the dredge material to minimize the need for further CDFs. These disposal practices provide for the continued and safe operation and maintenance of the Port of Toledo, and at the same time, contribute to the local need for economic opportunity through waterborne commerce, and above all, must fulfill the national interest in the competitive global market economy by producing affordable, cheaper, and efficient waterborne transportation of goods and commodities.

The Planning Group evaluated the concerns of all the partner agencies regarding water quality, fish and wildlife habitat, and Coastal Zone Management in developing a joint Action Plan. The Executive Committee realizes that these concerns are beyond the abilities of the Planning Group to resolve. Also, new Water Quality Criteria and sediment testing procedures are being developed that will have an effect on these issues, particularly the discharge of dredge material on the aquatic environment and sensitive areas.

Based on the above and with the support of technical data gathered during this study, the Planning Group identified Alternative Intermediate Plan 2a as the best overall intermediate plan for implementation during the period 1994-98. During this intermediate period, an innovative conservation effort would be undertaken, monitored, evaluated; and results used to develop a 30-year or more Long-Term Management Plan (LTMP) to:

. reduce the quantity of dredged material entering Toledo Harbor via Maumee River, thereby extending the useful life of available disposal resources;

. actively dewater existing disposal facilities, differently manage new disposal facilities to consolidate the dredged material, and restore storage capacity for extending the useful life of these facilities; and

. remove from filled CDFs the consolidated, desiccated dredged material for the production of manufactured soils, thereby restoring storage capacity and extending the useful life of these disposal facilities.

The useful life of the new CDF (Cell 2) would be reevaluated by comparing simulations of past filling rates with field monitoring data and projections of future filling rates with a surface elevation of + 23.5 feet above Low Water Datum (LWD). The filling rates would be estimated using a mathematical model that considers both consolidation and desiccation of the dredged material.

Manufactured Soil, although restricted in its use, has been produced by combining three waste products. It offers excellent potential for contributing to the effort underway to differently manage the less-polluted sediments. Presently there is limited knowledge in the demand for this product and there is a need to demonstrate that there is a substantially strong dredged-material market to insure the economic feasibility and long-term use of the manufactured soil process. The anticipated market for manufactured soil, considering the existing landfill sites needing topsoil cap, is approximately 100,000 cy/yr. The full potential of the process of manufacturing this soil, will not be reached until a more extensive manufacturing program is implemented. Island 18, with a capacity of 3-4 million cubic yards of dredged material which can be removed using proper techniques, offers the opportunity of an extensive manufacturing program. However, the dredged material must meet current environmental agencies' standards for acceptable contamination level before it can be released for use by others.

It is expected that once the Phase 3 Report, which includes the EA and the Finding of No Significant Impact (FONSI), is reviewed and concurred in by agencies it would be coordinated for a 30-day review with Federal/State agency and the general public in accordance with the NEPA. After approval to go into Phase 4 by the Assistant Secretary of the Army for Civil Works, the Planning Group would initiate implementation of the Action Plan. The selected Intermediate Plan will provide for testing and assessment of its components to facilitate

evaluation and selection of an LTMP in 1998 or later. Appropriate planning and NEPA documentation will be prepared and coordinated for the LTMP at that time.

B. RECOMMENDATION(S):

- It remains the goal of the LTMS to eliminate the practice of open-lake disposal. However, the Executive Committee realizes that funding issues and cost sharing cannot be determined at this level, and instead, has devoted its attention to an overall plan. Funding and cost sharing must be taken up as a separate issue in the Phase 4 report.

To that end, the Executive Committee recommends:

- Eliminate open-lake disposal. The 30-year **Long-Term Management sediment Strategy (LTMS)** must depend on alternative methods of sediment disposal and sediment management. Those methods that the Executive Committee believes could be successfully implemented in the Toledo Harbor Project include:

1. Vertically expanding present CDFs,
2. Re-use of confined sediments,
3. Implementing erosion control measures in the Maumee River Watershed,
4. Environmental Restoration/Shoreline Protection, and
5. Actively managing sediment dewatering in CDFs.
6. Scientifically and economically validating the environmental unacceptability of open-lake disposal.

- That a 5-year interim plan (designated Intermediate Plan 2a) be adopted. This plan satisfied the requirements for the 5 year strategy required under the Water Resources Act. The Executive Committee recognized that components of the LTMS could be implemented in the intermediate plan. Others would require additional studies or time to implement. This interim plan will govern the 1994-1998 dredging seasons. Milestones were established to gauge progress towards implementing the LTMS.

- The construction of new nearshore CDFs at Toledo Harbor will be avoided unless other environmental or wildlife benefits can be achieved.

- That additional authority(ies) and funding sources for implementing the LTMS be explored upon approval of the Phase 3 report.

SECTION V

IMPLEMENTATION OF PHASE 4

V. IMPLEMENTATION OF PHASE 4:

As a result of the Phase 3 study, the Executive Committee recommends that Phase 4 of the LTMS study be implemented. This includes execution of the interim plan, detailed feasibility studies, detailed design, and recommendation of a Long-Term sediment Management Plan.

PHASE 3 REPORT

PART II

ENVIRONMENTAL ASSESSMENT

FIVE-YEAR INTERMEDIATE PLAN
FOR SHORT-TERM MANAGEMENT OF SEDIMENT
1994-1998

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

FIVE YEAR INTERMEDIATE PLAN
FOR SHORT-TERM SEDIMENT MANAGEMENT (1994-1998)
MAUMEE RIVER WATERSHED - TOLEDO HARBOR, OHIO

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

The Buffalo District Corps of Engineers has assessed the environmental impact of the subject plan (Plan 2a) in accordance with the National Environmental Policy Act of 1969, and has determined a Finding of No Significant Impact (FONSI). The attached Environmental Assessment (EA) presents the results of the environmental analysis.

The project area includes Toledo Harbor and extends to the boundaries of Maumee Bay and the Maumee River Watershed. Toledo Harbor is located at the city of Toledo in Lucas County, Ohio and is situated on the southwestern shore of Lake Erie at the mouth of the Maumee River and Bay. Toledo Harbor is an important domestic and international port along the Great Lakes and St. Lawerence Seaway system. The watershed is very large (about 4.2 million acres) and sediment loading is significant. Maumee Bay is shallow and substantial shoaling occurs. Significant amounts of sediment must be dredged periodically from the harbor channels and appropriately disposed of in order to maintain these channels.

Increased significance has been attached to the western end of Lake Erie (including Maumee Bay) relative to water and sediment quality, aquatic habitat, and associated environmental concerns. Since 1985, there have been a number of specific concerns expressed by various agencies/interests pertaining to pollution, sedimentation, water and sediment quality, aquatic habitats, dredging, open lake disposal, development of confined disposal facilities (particularly proliferation of CDF developments in the littoral zone), and associated economics.

In efforts to address these concerns, a special study has been initiated and the Toledo Harbor Planning Group established to develop interim and long-term sediment management plans for the Maumee River Watershed, Toledo Harbor, and Maumee Bay.

Since the initiation of this study, an array of measures have been considered by the Planning Group toward addressing concerns. Some of the measures were readily eliminated from further consideration through preliminary discussion, assessment, and evaluation for apparent economic, engineering, and/or environmental (natural, human, cultural resources) reasons. Some measures are to be pursued in further detail. Most of the considered measures however, are untested, and the need for an Intermediate Plan or test period plan became apparent.

Subsequently, alternative Intermediate Plans were formulated considering the spectrum of previously discussed issues/concerns. In addition to an array of dredging and open-lake/CDF disposal scenarios, the final array of considered Intermediate Plans include reasonably feasible sediment load reduction, CDF management, and beneficial use components.

The alternative Intermediate Plans were also assessed and evaluated for engineering and economic feasibility, environmental and social acceptability, and/or for best meeting planning objects. The most significant impact trade-off issues pertain to: water and sediment quality, accelerated fill of CDFs, proliferation of CDF development, sedimentation control, beneficial use of dredged material, and associated costs.

Assessment and evaluation of alternative Intermediate Plans resulted in the selection of Intermediate Plan 2a for implementation. Plan 2a involves placement of some dredged material into existing confined disposal facilities (CDFs) located at Toledo Harbor, and some into the existing open-lake disnosal site. Dredged sediment material removed from the lake approach channel from Lake Mile 5 riverward to River Mile 7 (about 543,000 cubic yards annually) would be placed in the CDFs, whereas, dredged material from Lake Mile 5 to Lake Mile 19 (about 223,000 cubic yards annually) would be placed into the open-lake disposal site. This plan reduces by 50% the amount of dredged material that is normally open-lake discharged. In addition to the aforementioned Maintenance Dredging/Disposal, the Plan also includes four other components: (1) application of Crop Residue Management (Conservation Tillage) in the watershed to help reduce the volume of sediment loss off terrestrial lands into the navigation channels; (2) Dewatering and Consolidation of Dredged Material to extend the useful life of CDFs; (3) Processing and Beneficial Use (Manufactured Soils) of Dredged Material to extend the useful life of CDFs, and (4) Associated Monitoring/ Assessment/Evaluation of alternative measures.

All practical measures would be incorporated to minimize any potential adverse impacts to the environment. Project contractors would be required to comply with the Corps of Engineers Civil Works Construction Specification entitled "Environmental Protection" (CW-01430, dated July 1978) pertaining to practical measures to be applied during construction/operations to protect significant water and associated land environmental resources (i.e., noise, dust, erosion, turbidity, run-off, etc. control).

The project is not a major Federal action, and analysis has shown that it would have no significant adverse effect on the quality of the natural or man-made environment. Public coordination to date has uncovered no area of significant environmental controversy. Based on these factors, it has been determined that an Environmental Impact Statement will not be required.

Those who have information which may alter this Environmental Assessment and lead to a reversal of this decision should notify me within 30 days after receipt of this document. If no comments that would alter this finding are received within the 30-day review period, or subsequent to addressing such comments, this finding will be signed and filed with the official project documentation.

29 Apr 96
Date

WALTER C. NEITZKE
Colonel, U.S. Army
Committee Chairperson

ENVIRONMENTAL ASSESSMENT (EA)

FIVE-YEAR INTERMEDIATE PLAN
FOR SHORT-TERM SEDIMENT MANAGEMENT (1994-1998)
MAUMEE RIVER WATERSHED - TOLEDO HARBOR, OHIO

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FIVE-YEAR INTERMEDIATE PLAN
FOR SHORT-TERM SEDIMENT MANAGEMENT (1994-1998)
MAUMEE RIVER WATERSHED - TOLEDO HARBOR, OHIO

ENVIRONMENTAL ASSESSMENT (EA)

1. PURPOSE, PROBLEM, NEED, AND AUTHORITY

1.1 Purpose of the Environmental Assessment (EA) - The purpose of this EA is to address and assess environmental parameters relative to intermediate plan options (alternatives) under consideration for sediment management in the Maumee River Watershed including the general vicinity of Maumee Bay, Toledo Harbor, Ohio. Reference Figures 1, 2, and 3 for project locations. The potential environmental effects are addressed in order to ascertain whether or not there are any significant impacts affecting the quality of the natural and manmade environment. This document facilitates compliance with the National Environmental Policy Act (NEPA) and the Clean Water Act. A section on Environmental Coordination and Compliance is included as Section 5.

1.2 Problem and Need for the Action - As stated in the Phase I Report (USACE, 1993), "Due to the shallowness of Lake Erie and the Maumee River, as well as large sediment load from the Maumee River and volume of vessel traffic, dredging of the Toledo Harbor, River, and Lake Approach channels remains necessary. These channels are an essential corridor for the flow of goods and economic well-being of the area". Therefore, continued operation and maintenance of the Port of Toledo to commerce is of significant importance.

Preparation of a long-term plan of action to manage the Maumee River Watershed and dredged sediment material is presently underway. However, such a plan will not be ready in time for implementation by the year 1994. Therefore, while the long-term plan is in the process of being formulated, in Intermediate Plan for sediment management is needed for implementation by 1994, in order to continue operation and maintenance of the Port of Toledo.

1.3 Authority - As indicated in the Phase I report relative to a Maumee River watershed sediment management strategy (Planning Group, 1993) the authorities for development of such a strategy for the watershed and Toledo Harbor, OH are as follows:

"The Office of the Assistant Secretary of the Army dated 23 April 1992 directed the Buffalo District Commander to convene a Planning Group to develop a long-term dredged material management plan for Toledo Harbor. The Long-Term Dredged Material Study was conducted under the Code of Federal Regulations for navigable waters (Part 200 to end), revised July 1, 1991, or 33 CFR 337.9 that authorizes the Corps to identify and develop dredged material disposal management strategies for long-term needs, and to implement the National Environmental Policy Act, 33 CFR 23 and 40 CFR 1501.7, to determine the scope and significance of issues related to a proposed action." Also, 33 CFR 337.9 specifies that :District Engineers should identify and develop dredged material disposal management strategies that satisfy the long-term needs for Corps projects. Full consideration should be given to all practical alternatives including upland, open water, beach nourishment, within banks disposal, lake disposal, etc. Within the existing policy, District Engineers should also explore beneficial uses of dredged material such as marsh establishment and dewatering techniques, in order to extend the useful life of existing disposal areas."

Also, authorization was further provided by the Water Resources Development Act of 1992 (Public Law 102-580) specifically Section 256 of the Act, which provides the authority for development and implementation of short-term Intermediate (5-Year) and long-term (20-Year) Sediment Management Strategies for the Maumee River, Toledo Harbor Area. Implementation of the short-term Intermediate Plan to contain dredged material, will lead to the development of a Long-Term Sediment Management Plan for implementation by approximately the year 2000.

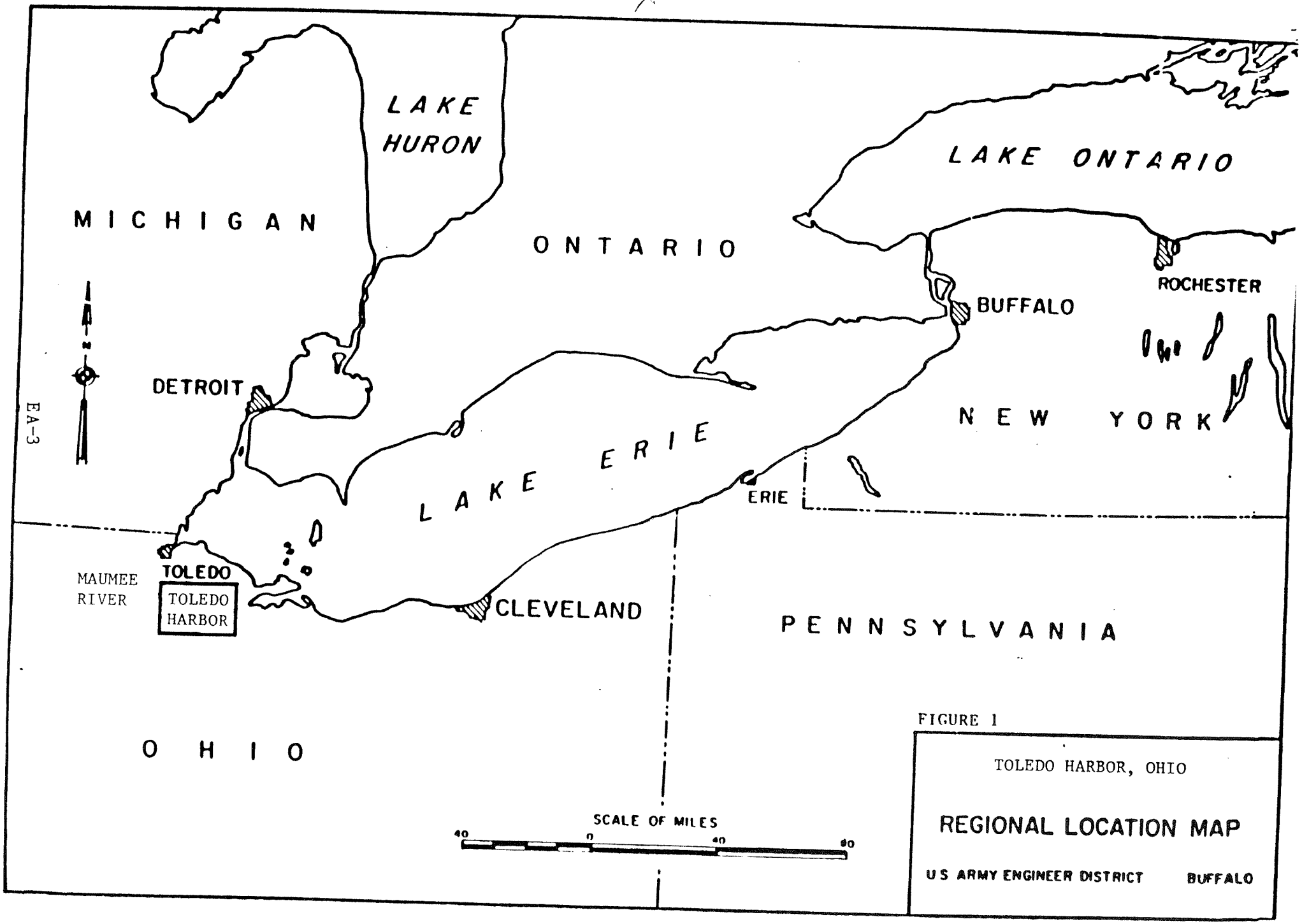


FIGURE 1

TOLEDO HARBOR, OHIO

REGIONAL LOCATION MAP

US ARMY ENGINEER DISTRICT BUFFALO

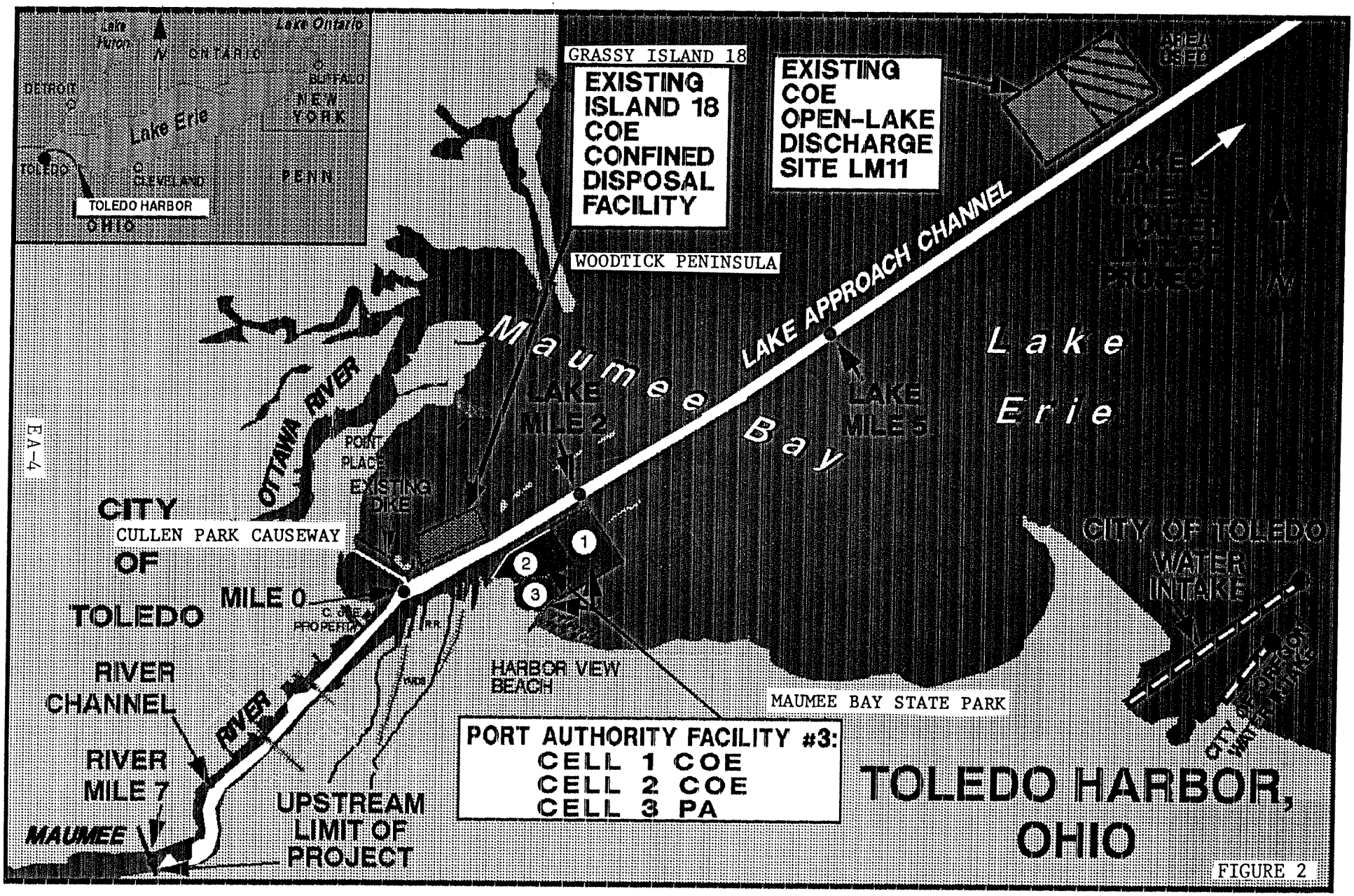
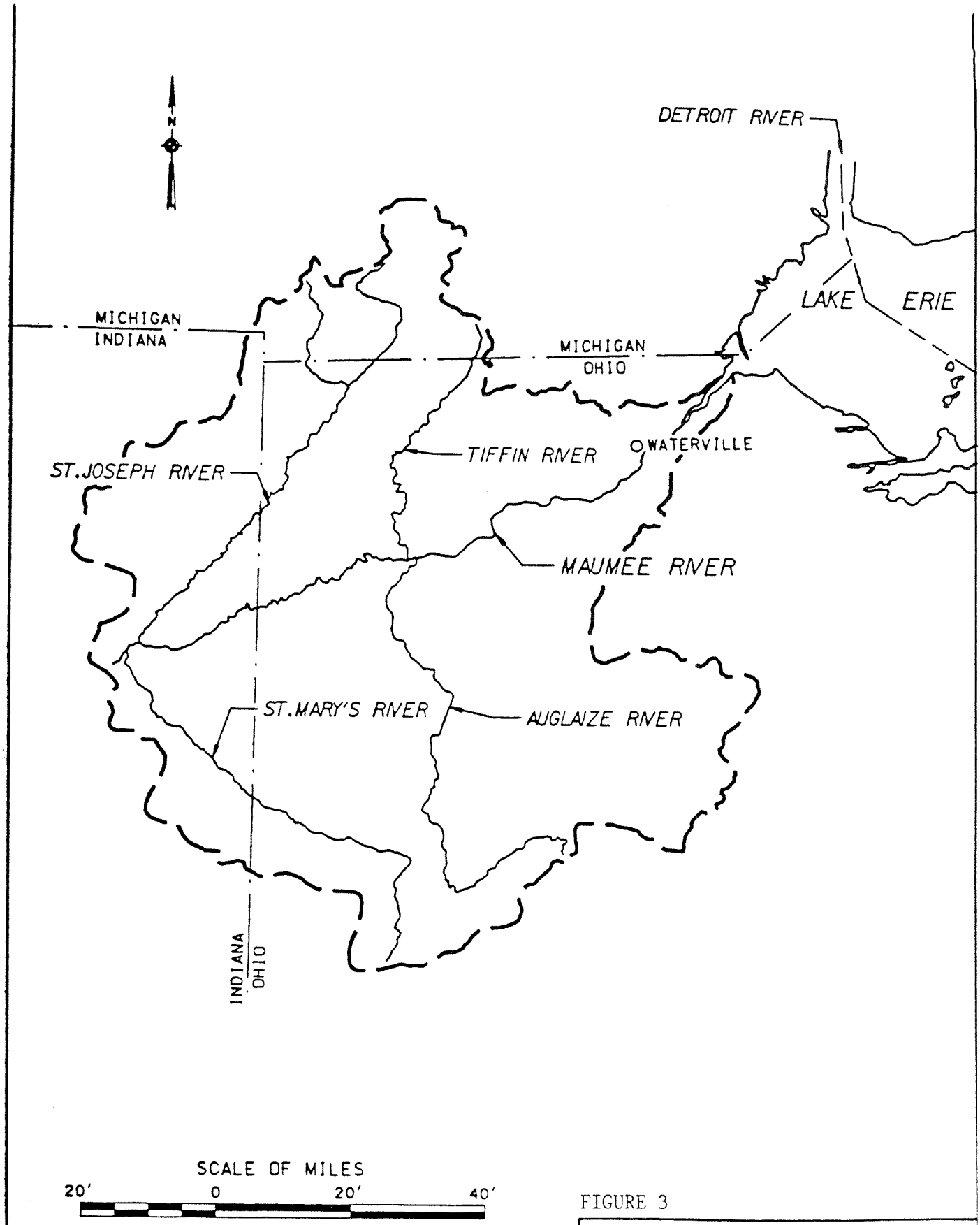

Lake Huron
N
ONTARIO
Lake Ontario
DETROIT
BUFFALO
NEW YORK
Lake Erie
TOLEDO
CLEVELAND
PENN
TOLEDO HARBOR
OHIO
GRASSY ISLAND 18
EXISTING ISLAND 18 COE CONFINED DISPOSAL FACILITY
EXISTING COE OPEN-LAKE DISCHARGE SITE LM11
AREA USED
WOODTICK PENINSULA
LAKE APPROACH CHANNEL
Maumee Bay
Lake Erie
LAKE MILE 2
LAKE MILE 5
OTTAWA RIVER
POINT PLACE
EXISTING DIKE
CITY OF TOLEDO
CULLEN PARK CAUSEWAY
MILE 0
COE PROPERTY
HARBOR VEW BEACH
MAUMEE BAY STATE PARK
CITY OF TOLEDO WATER INTAKE
RIVER CHANNEL
RIVER
RIVER MILE 7
MAUMEE
UPSTREAM LIMIT OF PROJECT
PORT AUTHORITY FACILITY #3:
CELL 1 COE
CELL 2 COE
CELL 3 PA
TOLEDO HARBOR, OHIO

FIGURE 2



SCALE OF MILES

20' 0 20' 40'

FIGURE 3

TOLEDO HARBOR, TOLEDO, OHIO

LONG-TERM SEDIMENT MANAGEMENT STRATEGY

MAUMEE RIVER BASIN

TOLEDO HARBOR PLANNING GROUP

2. EXISTING CONDITIONS

A. Natural Environment

2.1 Project Location and Description - The study area under consideration for the development of the long-term sediment management strategy extends beyond the limit of the existing Federal navigation project to the boundaries of the Maumee River Watershed (Reference Figures 2 and 3). The watershed drains an area of about 4.2 million acres (USACE, 1990) from the State of Michigan, Indiana, and Ohio. The watershed is relatively flat and consists primarily of farmlands: 3.3 million acres of cropland, 50,000 acres of pasture, 100,000 acres of farmsteads, and 300,000 acres of forest land, which results in the river carrying a high sediment load. The basin is shaped like a round saucer with flat lake plains in the low center, sloping till plains around the higher periphery, and beach ridges scattered in between. Soils are predominantly nearly level to gently sloping. Streams of the Maumee River system are mostly of flat gradient. Average slopes for the Maumee, St. Mary's and Saint Joseph's Rivers vary from 1.3 to 2.8 feet per mile.

2.2 Water/Sediment Quality - Herdendorf (1987) provides some insight into past water quality in western Lake Erie, from water quality data storage and retrieval STORE system information that was obtained between 1967 and 1982. The STORET data was compared with measurements of water quality obtained by Millie (1979) in several wester basin freezes over most winters, whereas water temperature goes to around 0.5° Centigrade from about mid-December to mid-March. Further, the report points out that lake water in this basin cools quicker in the fall and warms-up faster in the spring.

2.2.1 Water quality relative to the Maumee River and Maumee Bay was also described in a document by the U.S. Army Corps of Engineers (USACOE, 1990). Briefly, as the River flows through the watershed toward Lake Erie through low, flat agricultural land, its waters degrade in quality as a considerable sediment load is collected before passing through Toledo, where industrial discharges further contribute toward the River's water degradation. A low level of dissolved oxygen, as well as high levels of coliform bacteria, nutrients, turbidity, suspended solids and conductivity, including discharge of heavy metals and pesticides also add to water degradation. The report indicted that the Maumee River's water quality is poorest, followed by the Maumee Bay waters which improve lakeward. Most turbidity occurs in the spring season during heavy runoff events, as well as when dredging of navigation channels in Toledo Harbor is being done. Generally, the waters of Maumee Bay are more turbid than waters in the open-lake, but less turbid than waters at the mouth of the Maumee River.

2.2.2 Sediment and Associated Water Quality - The U.S. Army Corps of Engineers, Buffalo District has done extensive sediment and associated water quality testing and analysis associated with the harbor dredging maintenance program. Some general and specific information on sediment sampling and analysis is presented in Report Technical Sub-Appendix B4.

2.2.3 Based on previous (1984-1988) sediment sampling and analysis and relative to Clean Water Act Section 404 guidelines and guidelines for determining dredged sediments suitability for unrestricted open-lake disposal: 1)the open-lake disposal site was determined suitable as an open-lake disposal site and 2) sediment to be dredged from the River Channel and out to Lake Channel Mile 2 was considered not suitable for unrestricted open-lake disposal and was targeted for disposal in a CDF, while sediment to be dredged from Lake Channel Mile 2 lakeward was considered suitable for unrestricted open-lake disposal and was targeted for disposal at the open-lake disposal site. Of note, detailed COE studies on open lake disposal at Toledo in 1985 and 1986 showed only temporal increases in turbidity and metal levels. Storm induced resuspension of sediments completely mask the impacts of dredging and in-lake disposal on water quality and phosphorus levels.

2.2.4 As mentioned previously, increased significance has been attached to the western end of Lake Erie including Maumee Bay relative to water quality, aquatic habitat, and associated environmental concerns. Since 1985, there have been a number of concerns expressed by various agencies/interests pertaining to dredging, open-lake disposal, proliferation of CDF developments in the littoral zone, and associated economics.

2.2.5 From 1992 to the present, a minor compromise on dredging and disposal has been agreed to whereby some additional dredged material would be placed in the harbor CDF. Per this agreement, material dredged from the Lake Approach Channel Lake Mile 5 to Lake Mile 19 is disposed of at the present open-lake disposal site. Material dredged from Lake Mile 5 upriver to River Mile 7 is disposed of at the harbor CDF.

2.2.6 Of note, a revised sediment analysis procedure has recently been implemented to help determine dredged sediments suitability for unrestricted open-lake disposal or alternative disposal. The old procedure (goldbook) was more chemically oriented and emphasized chemical analysis as compared to developed acceptable standards, with some additional biological (bioassay) analysis, as necessary. The new procedure (greenbook) is more ecologically oriented and emphasizes chemical analysis as compared to reference site chemistry and more additional biological (bioassay) analysis, as necessary (tiered).

2.2.7 Extensive program sediment analysis conducted in 1988 was conducted per the goldbook guidelines. The Buffalo District conducted a pilot testing program in 1993 on Toledo Harbor sediments that applied Tier III biological testing procedures (10-day bioassay using the test species *Chironomus tentans* and *Hyallela azteca*) in accordance with protocols developed jointly by the U.S. Environmental Protection Agency (USEPA) and USA Corps of Engineers, as contained in the draft 1994 Great Lakes Dredged Material Testing and Evaluation Manual(greenbook). Although the primary objective of the program was to assist in the development of bioassay procedures for the draft Great Lakes sediment testing protocols, the results were inconsistent with one another and existing sediment chemistry, and were therefore considered to be inconclusive regarding toxicological characterizations of the sediments. In an effort to follow-up this pilot program and make a determination regarding the suitability of Lake Approach Channel sediments for open-lake disposal, the Buffalo District competed additional 10-day *C. tentans* and *H. azteca* bioassay on Toledo Harbor channel sediments between River Mile 3 and Lake Mile 6 in November 1994. The results of these analyses indicated that sediments in the Lake Approach Channel between Lake Mile 2 and 3 were acutely toxic (mean of 50 percent survival) when compared to sediments form the open-lake reference site in the Western Basin (mean of 86 percent survival). However, all channel sediments lakeward of Lake Mile 3 were found to exhibit no acute toxicity (mean greater than 92 percent survival).

2.3 <u>Air Quality</u> - The U.S. Environmental Protection Agency (USEPA) has developed maximum allowable concentrations of pollutant discharges into the air - referred to as National Ambient Air Quality Standards. Each state has developed ambient air quality pollution control standards that may either be the same, or more restrictive than the USEPA standards - reference Table 1 (OEPA), 1993) which shows USEPA and OEPA standards in this regard to be identical. Essentially, air quality conditions in the Toledo Harbor vicinity do not significantly violate and/or contravene established air quality standards.

2.4 <u>Fish, Benthos and Plankton</u> - A variety of fish species have been known to occur in nearshore and offshore areas of Maumee Bay. Among the species having utilized these waters are lake sturgeon, spotted* and longnose gar, bowfin, American eel, alewife, gizzard shad, mooneye*, the whitefish, chinook salmon, brown and rainbow trout, rainbow smelt, northern pike, muskellunge*, goldfish, common carp, silver club*, shiners (golden, emerald, spottail, spotfin, sand, redfin and mimic), bluntnose and fathead minnows, quillback, white sucker, bigmouth buffalo, redhorse (silver, golden, shorthead and greater*), bullhead (black, yellow, and brown), channel catfish, stonecat, brindled madtom, trout-perch, burbot*, brook silverside, white and yellow perch, bass (white, smallmouth and largemouth), green sunfish, pumpkinseed, bluegill, white and black crappie, darter

TABLE 1.
USEPA & OHIO EPA AMBIENT AIR QUALITY STANDARDS*

POLLUTANT	DURATION	RESTRICTION	MAXIMUM ALLOWABLE CONCENTRATIONS**	
			PRIMARY	SECONDARY
Particulate Matter <10 microns (PM_{10})	Annual arithmetic mean	Not to be exceeded	50 ug/m^3	50 ug/m^3
	24 - hour concentration	Not to be exceeded more than once per year	150 ug/m^3	150 ug/m^3
Sulfur Dioxide	Annual arithmetic mean	Not to be exceeded	80 ug/m^3 (0.03 ppm)	
	24 - hour arithmetic mean concentration	Not to be exceeded more than once per year	365 ug/m^3 (0.14 ppm)	
	3 - hour arithmetic mean concentration	Not to be exceeded more than once per year		1300 ug/m^3 (0.5 ppm)
Carbon Monoxide	8 - hour arithmetic mean concentration	Not to be exceeded more than once per year	10 mg/m^3 (9.0 ppm)	
	1 - hour mean concentration	Not to be exceeded more than once per year	40 mg/m^3 (35.0 ppm)	
Ozone	1 - hour mean concentration	Not to be exceeded on more than one day per year, average over three years	0.12 ppm (244 ug/m^3)	
Nitrogen Dioxide	Annual arithmetic mean	Not to be exceeded	.053 ppm (100 ug/m^3)	
Lead	3 - month arithmetic mean concentration	Not to be exceeded	1.5 ug/m^3	

NOTES:

Primary standards are established for the protection of public health

Secondary standards are established for the protection of public welfare

ug/m^3 = micrograms per cubic meter

ppm = parts per million

mg/m^3 = milligrams per cubic meter

*U.S. EPA & Ohio EPA Air Quality Standards Are Identical

**40 CFR 50. 4 - 50.12

Reference: Ohio Air Quality Report 1989

(Eastern Sand*, Iowa, Channel and Johnny*), logperch, sauger, walleye, freshwater drum and mottled sculpin (USFWS, 1985). NOTE: above species marked with an asterisk are classified as endangered species by the State of Ohio. Some of the fish species - including lake sturgeon, spotted gar, American eel, Eastern sand darter and Iowa darter would be very rare, if present at all in the area over the last 10 to 15 years (USFWS, 1987).

2.4.1 Both Maumee Bay and the Maumee River provide spawning and/or nursery habitat for a number of the above mentioned fish species. Table 2 entitled "Spawning and Nursery Habitat Use of Maumee Bay/Maumee River by Fish Species", provides a brief overview of past use of the Bay and River as such habitat, as indicated in the "Atlas of the Spawning and Nursery Areas of Great Lakes Fishes (Goodyear, C.D. et al, 1982). "Maumee Bay appears to be a major spawning and/or nursery area for forage fish, particularly gizzard shad. Gizzard shad are the most important forage species for walleye in the eastern basin of Lake Erie" (USFWS, 1987).

TABLE 2
SPAWNING AND/OR NURSERY HABITAT USE OF MAUMEE BAY/
MAUMEE RIVER BY FISH SPECIES*

FISH SPECIES	FISH HABITAT USE
Gar	Gar spawning runs occur in the Maumee River.
Alewives	In June-July months alewives spawn in nearshore shallows and tributaries of Maumee Bay.
Gizzard Shad	Maumee Bay is a major concentration area in the Western Basin of Lake Erie. Spawning occurs in the tributaries of Maumee River. The Maumee estuary provides a nursery area for young gizzard shad. In late June, the larvae concentrate at the River's mouth. The Bay provides habitat for overwintering young-of-the-year.
Mooneye	Larvae were reportedly collected in mid-Maumee Bay near the navigation channel in 1975.
Lake Whitefish	Spawning has been known to occur about 2 miles east of the Maumee River's mouth from about mid-November to 1 December.
Rainbow Smelt	Larvae have been collected in Maumee Bay from May to July. There may be some spawning along the existing confined disposal facility. Much lower concentrations of larvae were found in the inner Bay than in the outer Bay. Rainbow smelt were most abundant in late May in the southwest section of Ohio waters.
Northern Pike	From around March 25 to April 20, limited spawning occurs in Maumee Bay.
Goldfish	From about late May to August, goldfish spawn in nearshore areas of Maumee Bay.
Carp	From June to August, carp spawn in the marshy areas of the Bay.
Emerald Shiner	The Maumee River estuary is a spawning habitat. A large number of young-of-the-year were captured in the eastern 1/2 of Maumee Bay.
Spottail Shiner	The Western Basin of Lake Erie is a major spawning and nursery area. Spawning takes place over rocky areas and along the whole south shore - mainly within the 24-foot contour depth in late June and early July. Collections of spottail shiner larvae were made in the Bay during the months of May, June and July.
Shiner spp.	In Michigan waters, off Woodtick Peninsula, high densities of shiner larvae were found in 6-12 feet of water in late June and early July.
Quillback	The shoal north of Cedar Point in Maumee Bay provides a major spawning habitat for quillback. Such spawning occurs over a sandy bottom in May at depths of 1-6 feet.
White Sucker	A few larvae were collected in April 1977 in Maumee Bay's shipping channel.
Bigmouth Buffalo	Spawning occurs from mid-June to mid-July in the shallow nearshore warm waters of Maumee Bay.
Silver Redhorse	In waters just west of the Maumee River, spawning takes place from about April 1 - May 10.
Golden Redhorse	It is believed that spawning for this species occurs from about 1 April to May 10 in an area of Maumee Bay just west of the mouth of Maumee River and in the locale along the Shipping Channel.
Short Redhorse	(Same as for the Golden Redhorse)
Brown Bullhead	From about June 1 to July 15, it is believed that brown bullhead spawn in about a 1½ mile area southwest of Cedar Point in Maumee Bay, in water depths of about 3 feet along shore.
Channel Catfish	The Maumee River is considered to be a spawning area during the period of May 25 to July 20. The spawning occurs in an area north of the River's mouth and also along the shoreline from the River's mouth to Cedar Point. Young-of-the-year catfish were collected throughout Maumee Bay.

Tadpole Madtom	Spawning takes place over muddy bottom habitat alongshore as well as in the Bay.

FISH SPECIES	FISH HABITAT USE
Trout-Perch	Ripe or gravid adults of trout-perch were captured in May of 1975. Fry of this species were found to be most abundant in the southwest corner of the basin near Maumee Bay.
White Perch	A major spawning area for this species is located offshore of Cedar Point in water ranging from 1-6 feet in depth.
White Bass	Migrations of white bass enter the Maumee Bay and River. Maumee Bay may be a major spawning area for this species. Spawning is believed to occur on both sides of the Shipping Channel and in the southern part of Maumee Bay from around May 12 to June 25 over gravelly sand substrate. There is major spawning at a shoal off Cedar Point. The Bay is an important nursery area for prolarvae.
Rock Bass	This species constructs nests on shallow sand and gravelly shoals in harbors and bays that are protected.
Pumkinseed	This fish species spawns in all harbors along the Ohio shoreline.
White Crappie	This fish species spawns in Maumee Bay during May.
Black Crappie	This fish species spawns in Maumee Bay during May and June.
Yellow Perch	The entire south shore of the Western Basin of Lake Erie is a spawning and nursery area for this species. In Maumee Bay, the perch spawn on soil areas along the channel from April 15 to about May 5.
Logperch	Larvae of this fish species were collected throughout Maumee Bay in small numbers in April, June and July in 1975 and 1977.
Sauger	This species of fish has been known to move into the Maumee River to spawn in March and April. In May, concentrations of adult Sauger were found in Maumee Bay.

FISH SPECIES	FISH HABITAT USE
Walleye	Spawning by this fish species occurs form about late March to mid-May. This activity peaks in April. The Western Basin of Lake Erie is the major spawning and nursery area for walleye. Spawning takes place near reefs, in streams, in bays and along the shoreline. The fish migrate through Maumee Bay into the Maumee River to spawn on rocky areas in March and April. Maumee Bay contains a number of spawning areas (i.e. rocky shoals in the eastern part of the Bay; dredge islands along the navigation shipping channel).
Freshwater Drum	Drum enter the Maumee Bay and Maumee River in May and June to spawn - spawning occurs in the Bay from approximately mid-June to mid-July. The Bay provides a nursery area.

* Reference: Goodyear, C.D., T.A. Edsall, D.M.O. Demsey, G.D. Moss and P.E. Polanski. 1992. Atlas of Spawning and Nursery Areas of Great Lakes Fishes - Volume 1X - Lake Erie. U.S. Fish and Wildlife Service.

2.4.2 A number of the aforementioned fish species in Maumee Bay have sport and/or commercial value. Recently, the USFWS Sandusky Ohio Biological Station provided the Buffalo Corps District Office with a copy of a letter dated 16 July 1992 that was prepared by the Ohio Department of Natural Resources to the Ohio Environmental Protection Agency. The letter contained a summary of sport and/or commercial fish harvests for the years 1990/1991 on walleye, yellow perch, white bass, freshwater drum, channel catfish and white perch. The sport harvest for each of those years on each of these species follows: walleye (7,863lbs./10,304 lbs), yellow perch (2,849 lbs./7,759 lbs.), white bass (480 lbs./14,276 lbs.), freshwater drum (283 lbs./1862 lbs), channel catfish (4,667 lbs./202 lbs.) and white perch (93 lbs./416 lbs.). The commercial harvest for the following species in 1990 was white bass (32,006 lbs.), channel catfish (260 lbs.), freshwater drum (150 lbs.), bullhead (260 lbs.), buffalo (173 lbs.) and white perch (120 lbs.) (Planning Group, 1993).

2.4.3 Maumee Bay contains a diverse macroinvertebrate community that appears to be dominated by aquatic earthworms (oligochaetes), dipteran (fly) larvae and midges (chironomids). A recent EA/Section 404(b)(1) Evaluation for the general vicinity of the Island 18 (also referred to as Grassy Island) confined disposal facility site in Toledo Harbor (USACE, 1990) includes a brief summary of the benthic sampling accomplished in the 1980's by two consultant groups as follows:

2.4.3.1 "Science Applications International Corporation (1988) collected and identified six groups of macroinvertebrate organisms at 15 sampling stations in Maumee Bay as a portion of the Maumee Bay Bottom Characterization Study. Tubificids (oligochaetes) and ostracods appeared to co-dominate the benthic faunal community... Nematodes (roundworms) and chironomids, which were most abundant in shallow sampling station stations, were the next most abundant taxa sampled... Psisidiidae and Naididae (aquatic worms) were also collected.

2.4.3.2 "T.P. Associates (1987) collected eight benthic macroinvertebrate samples in Maumee Bay as part of an open-lake disposal site survey." this site is the currently used open-lake disposal site for discharge of dredged material. The benthic survey "showed a predominance of chironomids and oligochaetes in the benthic community. Chironomus spp. and Procladius spp. were the chironomids samples at the greatest relative abundance. The tubificid "Limnodrilus Hoffmeisteri appeared to dominate the oligochaete fauna. The mollusc (clam) group Sphariidae was also collected in this survey".

2.4.3.3 With regard to benthos at the existing confined disposal facility (CDF) Grassy Island 18, a portion of the facility - the extreme northwest corner - is seasonally flooded by rainfall during the spring and early summer periods. However, since this

area is temporarily inundated and subject to water evaporation as the summer season progresses, when most of the water eventually evaporates out, a moist-mudflat and possibly some very shallow pools are left, where it is likely that invertebrates of some of the aforementioned benthic organism species may continue to inhabit this zone in the CDF.

2.4.4 Aquatic areas in the Western Lake Erie Basin, both along shore and in the open waters of the lake, are utilized as habitat by a variety of plankton. Such organisms consist of possibly floating or weakly swimming plan and animal life in the water column, that are often microscopic in size which contribute to the food chain in the Lake's ecosystem. Herdendorf's biological report on western lake Erie (1987) identifies some of the common plankton and epiphyses (organisms that live on the surface of plants) such as algae, protozoans and zooplankton known to have occurred in this locale. The following is a brief summary of algae, protozoan/zooplankton phyla, including the number of families and species of these organisms represented in each phylum, that were mentioned in the report: Cyanophyta (blue-green algae) - represented by 22 families and 124 species; Pyrrhophyta (fire algae) - represented by 6 families and 10 species; Cryptophyla (cryptomonads) - represented by 1 family and 4 species; Rhodophyta (red algae) - represented by 3 families and 3 species; and Euglenophyta (Euglenoids) represented by 3 families and 37 species; Protozoa - represented by 29 families and 26 species; Coelenterata - represented by 1 family and 1 species; Rotifera - represented by 28 families and 78 species, and finally, the phylum Arthropoda - represented by 14 families and 33 species.

2.5 Vegetation: The Maumee River watershed lies within the eastern deciduous forest province, beech-maple forest section (Biley, R.G., 1976). A variety of oak along with a number of other hardwood tree species such as American basswood, black cherry, sycamore, elm, beech, hickory, black walnut, and butternut, have also established on upland terrain that has not been developed, abandoned, or is not in agricultural use. Shrubs, vines, herbaceous grasses and forbs populate idle fields, hedgerows and woodland understories, as well as on some scattered undisturbed riparian areas along the banks of the Lake Erie coastline and tributary waterways.

2.5.1 The littoral zone vicinity of Maumee Bay contains a number of submerged aquatic macrophyte beds. The final U.S. Fish and Wildlife Service's (USFWS) Coordination Act Report (1987) (USACOE, 1990) states that during an aerial survey of the Bay and lower Maumee River conducted by their service, a number of subergent aquatic plant beds were observed. The USFWS report indicated "seven areas containing small to moderate-size beds along the Maumee Bay shoreline east of the Bayshore Power Plant discharge, a relatively large bed at the mouth of, and just

upstream of Otter Creek, scattered beds northeast of Cullen Park peninsula, large beds in the Cullen Park embayment and smaller beds in the embayment just upstream of the Harrison Marina" were seen. The USFWS reported also mentioned that an Ohio Environmental Protection Agency representative "observed aquatic beds in a large embayment on the north side of the Maumee River just upstream of the railroad bridge and along the northwest side of Grassy Island". Further, although aquatic beds are not unique to the bay locale, "they are a part of a habitat type that is relatively scarce in the area".

2.5.2 The biological report by C.E. Herdendorf (1987) indicates that the open waters of the lake are mostly limited to submergent macrophytes such as curly pondweed, wild celery, sago pondweed, water milfoil and water stargrass, whereas in bay areas of the lake, the main species of aquatic submergents are Richardson's pondweed, waterweed and coontail.

2.6 Wildlife: In general, wildlife in the Maumee River watershed includes species adapted to farmland, woodland and wetland habitat land uses. Wildlife utilizing the watershed include, but are not limited to such species as white-tailed deer, fox opossum, muskrat, moles, voles, mice, eastern chipmunk, raccoon, weasel, squirrel, woodchuck, ruffed grouse, songbirds, shorebirds, waterfowl and birds of prey such as hawks and owls. Also included in the complex of wildlife are a variety of reptiles and amphibians, whose ranges include all or parts of the watershed locale. Among the reptiles that may be found are turtles (i.e. common snapping, spotted, midland painted, eastern box, banding's and eastern spring softshell) and snakes (i.e. northern red-bellied, northern brown, northern water, queen, eastern garter, eastern ribbon, eastern hognose massasauga). Amphibians in the watershed includes the mudpuppy, red-spotted newt, spotted salamander, marbled salamander, eastern tiger salamander, red-backed salamander, American toad, spring peeper, eastern gray tree frog, Blandard's cricket frog, western chorus frog, as well as other frogs such as pickerel, leopard, green, wood and bullfrogs (Conant, R. 1958)

2.6.1 Waterfowl are an important resource in the Western Basin of Lake Erie - which includes Maumee Bay. The biological report by herdendorf (1987) mentions that large number of water fowl are attracted to coastal marshes along the Lake during migration periods. Spring seasons migrations start around late February and last into May, whereas the fall season migration peaks into the months of September, and October. The Western Basin of Lake Erie has also been identified as a primary use waterfowl migration or wintering area, and its coastal marshes as primary use nesting and migration habitat (USFWS, 1975). Also, a recent Buffalo District Corps of Engineers Report (USACE, 1990) indicates that many of the waterfowl in this local are diving ducks (i.e. scaup, goldeneye, merganser, ruddy ducks). Dabbling

ducks such as mallards, black ducks, widgeon, gadwall and teal also use this area, but in more limited numbers. Maumee Bay provides a relatively shallow littoral zone feeding area for waterfowl. Also, resting areas are available in the Bay in the lee of small islands - such as in the vicinity of Island 18 (Grassy Island) and along the existing confined disposal facilities (CDFs). Even shallower water zones in the Bay and along CDFs are not only attractive to diving ducks and dabbling ducks, but also to fish eating wading birds (i.e. Herons and Egrets) as feeding areas.

2.6.2 The following limited field observations of birds in the general area of the "new" CDF constructed in Maumee Bay (Referenced Figure 2 of this EA) were made by USFWS biologists around 1985. The draft USFWL Coordination Act Report (1985) describes that bird use in the vicinity of the new CDF site area at the time of observation "appeared to be rather typical for the shoreline areas of Maumee Bay. Gulls were abundant along the dikes and on the water during all three site visits. Herring gulls appeared to substantially outnumber ring-billed gulls. Two or three great blue herons and about the same number of black-crowned night herons were generally seen on the small peninsula. Occasionally, one or two great egrets would be seen feeding along the peninsula shoreline. A few red-winged blackbirds were also seen on the peninsula. During the April site visit, two pairs of mallards and one ruddy duck were seen..." Further, "on July 30, 1985, nine flightless (molting) diving ducks were observed along with four unknown puddle ducks". The USFWS also predicted at the time that "in the spring and fall, it is likely that the site will be frequented by large number of diving ducks, particularly if young gizzard shad are abundant".

2.6.3 Although Maumee Bay, its coastal zone, and the lower portion of the Maumee River provide habitat for wildlife, the Woodtick Peninsula located about 3 1/2 miles north of the Ohio Shoreline and east of North Maumee Bay in the state of Michigan waters of Lake Erie, as well as the Cedar Point Wildlife Refuge located east of Toledo, Ohio were identified as being attractive funnelling sites for large populations of migrating birds, because of their geographical location and unique physical and vegetation characteristics (Scharf, W.C., 1979). The Woodtick Peninsula was identified as being a passerine bird and hawk migration site and important to shorebird migrations. The Cedar Point National Wildlife Refuge, located about 6 miles east of Toledo Harbor, is considered to be an important wetland complete that provides food and cover for migrating aquatic birds (i.e. waterfowl, shorebirds), as well as habitat for passerine birds and raptures.

2.7 Wetlands: Wetlands are a valuable resources, both to man and to fish and wildlife. Some of the benefits provided by wetlands include their contribution toward improved water quality and reduction of flooding damage, as well as providing fish spawning and nursery habitat, and feeding over wintering and resting habitat for a variety of wildlife (i.e. mammals, birds, amphibians and reptiles).

2.7.1 The coastal zone of Maumee Bay and lower Maumee River shoreline contain a number of lacustrine and palustrine wetland types. Emergent wetlands are present in the general vicinity of Cedar Point (Cedar Point National Wildlife Refuge) and the Woodtick Peninsula, as well as to some degree within the existing confined disposal facility in Maumee Bay referred to as Grassy Island 18. U.S. Department of Interior (USDOI) Wetland Inventory Maps entitled Rossford, Ohio, Oregon, Ohio and Reno Beach, Ohio prepared by the USFWS Office of Biological Services, show about 14 classification types for wetlands in the general vicinity of the Bay and lower portion of the River (Reference Table 13). The USDOI 1993 wetland Inventory Map showing Island 18 in Maumee Bay classifies this CDF as being a lacustrine, littoral, flat, spoil wetland type. approximately one-third of the western most portion of the Island 18 CDF contains a palustrine wetland with shallow standing water, with a saturated dredged spoil substrate (USACOE, 1990). The remaining portion of this CDF appears to be a palustrine, scrub-shrub forested wetland. Cursory field observations of Island 18 in 1989 by a Corps biologist found that, drier soils within the CDF contained dense woody and herbaceous vegetation consisting of black willow, eastern cotton woods, bitter sweet nightshade, catnip, common burdock, crown vetch, curled dock, jewelweed, purple loose strife, teasel, wild mint, reed grass and other grasses.

2.7.2 Herdedorf (1987) mentions that the main plant species growing in the Maumee Bay marshes include narrow broadleaved cattail, jewelweed, blue joint grass, swamp milkweed and swamp rosemallow, and the soft-stem bulrush and three-square bulrush dominate the transition zone between the cattail and open water of the Bay.

TABLE 3

WETLANDS CLASSIFICATIONS IN THE GENERAL VICINITY OF MAUMEE BAY AND LOWER PORTION OF THE MAUMEE RIVER, OHIO

Classification Description
Palustrine scrub/shrub broad-leaved deciduous vegetation with a saturated, semipermanent seasonal water regime.
Palustrine emergents with a saturated, semipermanent, seasonal water regime.
Palustrine open water permanent diked area.
Palustrine forested broad-leaved deciduous vegetation with a saturated semipermanent,seasonal water regime.
Palustrine forested broad-leaved deciduous vegetation, with a saturated semipermanent, seasonal water regime, diked.
Palustrine scrub/shrub broad-leaved deciduous vegetation mixed with palustrine emergent vegetation, with a saturated, semipermanent, seasonal water regime.
Palustrine forested vegetation mixed with scrub/shrubs, with a saturated, semipermanent, seasonal water regime.
Palustrine scrub/shrubs with emergents.
Lacustrine littoral rocky shore that is intermittently flooded (artificial).
Lacustrine littoral flat spoil area, water regime unknown.
Lacustrine littoral flat artificial wetland area.
Riverine lower perennial open water, intermittently exposed, permanent wetland.

* Reference: USDI (Fish and Wildlife Service) Wetland Inventory Maps for Rossford Ohio, Oregon Ohio and Reno Beach Ohio.

2.8 Threatened and Endangered Species: The USFWS recently provided the Buffalo COE District with Federally listed endangered and threatened species in Ohio. Review of this list (dated 1-11-93) for counties within the Maumee River watershed indicates that, the range of the Indiana Bat (Myotis Sodalis) includes all counties in the Ohio portion of the watershed, namely, Fulton, Lucas, Williams, Defiance, Wood, Henry, Paulding, Putnam, Hancock, Wyandot, Van Wert, Allen, Hardin, Mercer, Auglaize, Shebby, Seneca and Ottawa. The range of the American bald eagle (Haliaeetus leucocephalus) includes nesting and/or wintering habitat in Lucas, Wyandot, Mercer and Ottawa Counties, as well as a nest site of the Pergrine Falcon (Falco peregrinus) in Lucas county, With regard to endangered invertebrates, the white cat's paw pearly mussel (Epioblasma obiquata obliquata) is listed for Williams County, and the clubshell mussel for both Williams and Defiance Counties. The endangered inset "Karner Blue Butterfly" (Lycaeides melissa samuelis) is listed for Lacas County. Federally listed threatened plant species include the eastern prairie fringed orchid (Plantanthera leucophaea) in Lucas and Ottawa Counties, and lakeside daisy (Hymenoxys acavlis var. glabra) in Ottawa County. The USFWS report to Congress entitled "Endangered and Threatened Species Recovery Program (1990)" indicates that 19 acres of prime habitat for the lakeside daisy-which now contains a healthy population of this species-have been acquired by Ohio on the Marblehead peninsula.

2.8.1 As addressed in the Phase I Report of the long-term dredged material management plan (Toledo Harbor Planning Group, 1993), "Maumee Bay and vicinity lies within the range of the American bald eagle... Since this bird is known to nest at the nearby Ottawa National Wildlife Refuge located in the Western Basin of Lake Erie, it is possible that it utilizes the shoreline and littoral zone of Maumee Bay as a feeding area (personal communication with the USFWS, Ecological Services Office, Reynoldsburg, Ohio)".

2.9 Prime and Unique Farmlands - The existing confined disposal facilities in Maumee Bay contain polluted sediments dredged from authorized navigation channels located in the Toledo Harbor area of Lake Erie, and therefore are not considered to be classified as prime and unique farmland. If at some time in the future "manufactured" soils (as proposed in the Beneficial Use component of Alternatives 1b, 2a and 2b) are proposed for possible use as fill material on public or private land development sites, it would be the responsibility of the developer to coordinate with the local Soil Conservation Service Office (SCS) to obtain a determination as to whether or not the development site involves any prime and unique farmland concerns.

B. Human Environmental (Man-Made Resources)

2.10 Community and Regional Growth:

2.10.1 Location - Toledo Harbor is located in Lucas County, Ohio and is situated on the southwestern shore of Lake Erie at the mouth of the Maumee River approximately 90 miles west of Cleveland, Ohio and 50 miles south of Detroit, Michigan, Reference Figures 1-6. Toledo Harbor is an important domestic and international port along the Great Lakes and St. Lawrence Seaway system.

2.11 Population - Population figures for the States of Michigan and Ohio, Lucas County, the City of Toledo, and area minor civil divisions (including Monroe County, Michigan, located north of Maumee Bay) are presented in Table 4. The population in Lucas County, Ohio is approximately 48% male and 52% female and is approximately 82% white, 15% black, and 3% other. Approximately 26% of this population is 0-17 years old, 61% is 18-64 years old, and 13% is 65 years old and older. The median age is about 33 years old. The area population is expected to experience a steady growth in the next few decades (1990 BEA Regional Projects).

TABLE 4
POPULATION

LOCATION	POPULATION	DATA YEAR
State of Michigan	9,145,000	1986
State of Ohio	10,847,115	1990
Monroe Co., Michigan	132,000	1986
Lucas, Co., Ohio	642,361	1990
Washington (Town)	3,803	1990
Toledo (City)	332,943	1990
Maumee (City)	15,561	1990
Harbor View (Village)	122	1990
Oregon (City)	18,334	1990
Jerusalem (Town)	3,253	1990

Sources - City and County Data Book, 1988, U.S. Dept. of Commerce
- 1990 Census of Population and Housing, Ohio Summary U.S. Department of Commerce.

2.12 Toledo Harbor and Associated Land Use and Developments - Figures 1 through 6 depict Maumee Bay, Toledo Harbor and associated upland developments.

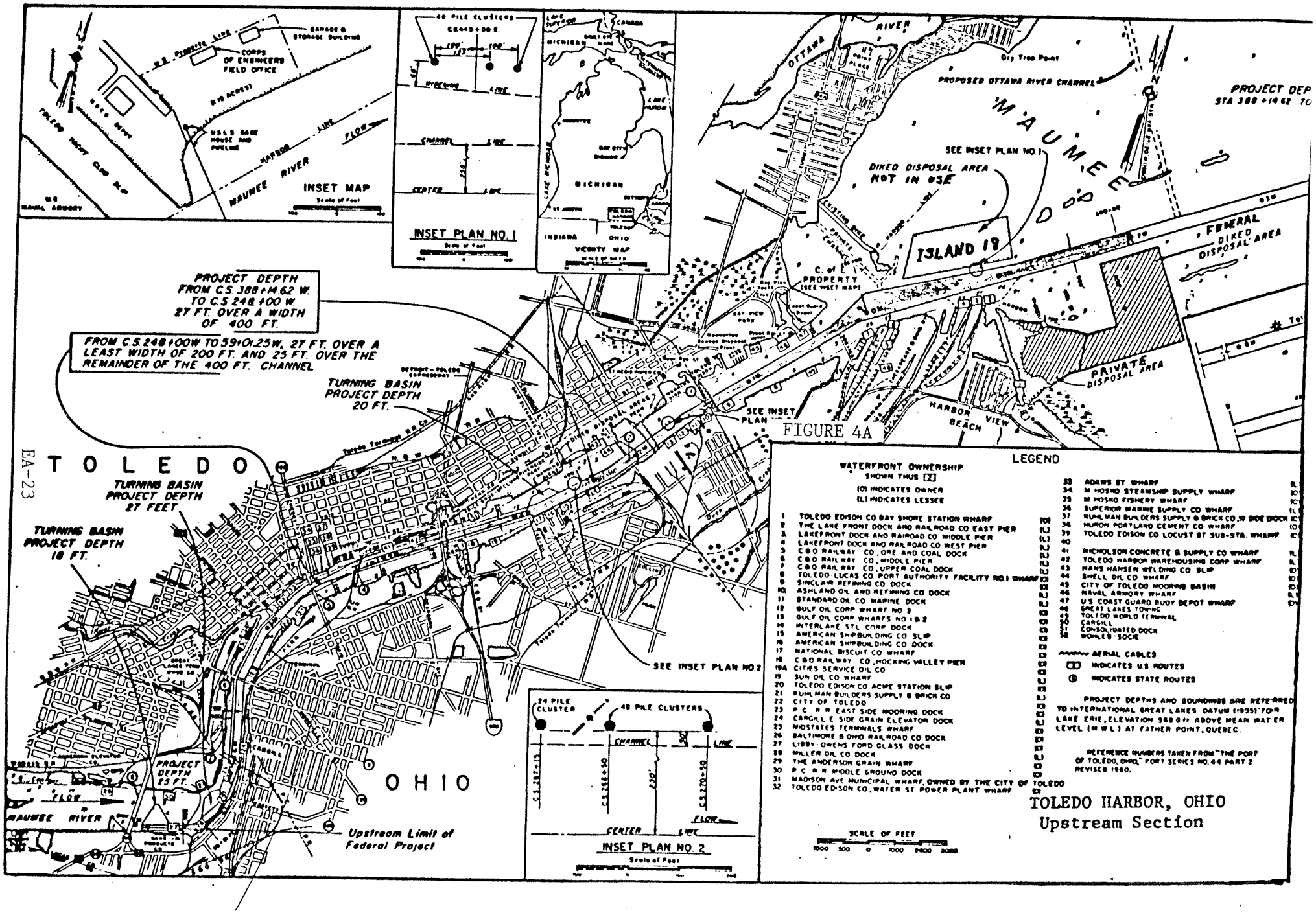

INSET MAP
INSET PLAN NO. 1
VICINITY MAP
PROJECT DEPTH FROM C.S. 388+14.62 W. TO C.S. 248+00 W. 27 FT. OVER A WIDTH OF 400 FT.
FROM C.S. 248+00W TO 59+01.25W, 27 FT. OVER A LEAST WIDTH OF 200 FT. AND 25 FT. OVER THE REMAINDER OF THE 400 FT. CHANNEL
TURNING BASIN PROJECT DEPTH 20 FT.
TURNING BASIN PROJECT DEPTH 27 FEET
TURNING BASIN PROJECT DEPTH 18 FT.
PROJECT DEPTH 25 FT.
TOLEDO
OHIO
MAUMEE RIVER
OTTAWA RIVER
PROPOSED OTTAWA RIVER CHANNEL
SEE INSET PLAN NO. 1
DIKED DISPOSAL AREA NOT IN USE
ISLAND 18
FEDERAL DIKED DISPOSAL AREA
PRIVATE DISPOSAL AREA
HARBOR VIEW BEACH
SEE INSET PLAN
SEE INSET PLAN NO. 2
Upstream Limit of Federal Project
INSET PLAN NO. 2
24 PILE CLUSTER
48 PILE CLUSTERS
CHANNEL LINE
CENTER LINE
FLOW
LEGEND
WATERFRONT OWNERSHIP SHOWN THUS
(O) INDICATES OWNER
(L) INDICATES LESSEE
1 TOLEDO EDISON CO BAY SHORE STATION WHARF
2 THE LAKE FRONT DOCK AND RAILROAD CO EAST PIER
3 LAKEFRONT DOCK AND RAILROAD CO MIDDLE PIER
4 LAKEFRONT DOCK AND RAILROAD CO WEST PIER
5 C&O RAILWAY CO., ORE AND COAL DOCK
6 C&O RAILWAY CO., MIDDLE PIER
7 C&O RAILWAY CO., UPPER COAL DOCK
8 TOLEDO-LUCAS CO PORT AUTHORITY FACILITY NO. 1 WHARF
9 SINCLAIR REFINING CO DOCK
10 ASHLAND OIL AND REFINING CO DOCK
11 STANDARD OIL CO MARINE DOCK
12 GULF OIL CORP WHARF NO 3
13 GULF OIL CORP WHARFS NO 1 & 2
14 INTERLAKE STL CORP DOCK
15 AMERICAN SHIPBUILDING CO SLIP
16 AMERICAN SHIPBUILDING CO DOCK
17 NATIONAL BISCUIT CO WHARF
18 C&O RAILWAY CO., HOCKING VALLEY PIER
18A CITIES SERVICE OIL CO
19 SUN OIL CO WHARF
20 TOLEDO EDISON CO ACME STATION SLIP
21 RUHLMAN BUILDERS SUPPLY & BRICK CO
22 CITY OF TOLEDO
23 P C R R EAST SIDE MOORING DOCK
24 CARGILL E SIDE GRAIN ELEVATOR DOCK
25 MIDSTATES TERMINALS WHARF
26 BALTIMORE & OHIO RAILROAD CO DOCK
27 LIBBY-OWENS FORD GLASS DOCK
28 MILLER OIL CO DOCK
29 THE ANDERSON GRAIN WHARF
30 P C R R MIDDLE GROUND DOCK
31 MADISON AVE MUNICIPAL WHARF, OWNED BY THE CITY OF TOLEDO
32 TOLEDO EDISON CO., WATER ST POWER PLANT WHARF
33 ADAMS ST WHARF
34 M HOSKO STEAMSHIP SUPPLY WHARF
35 M HOSKO FISHERY WHARF
36 SUPERIOR MARINE SUPPLY CO WHARF
37 RUHLMAN BUILDERS SUPPLY & BRICK CO., W SIDE DOCK
38 HURON PORTLAND CEMENT CO WHARF
39 TOLEDO EDISON CO LOCUST ST SUB-STA. WHARF
40
41 NICHOLSON CONCRETE & SUPPLY CO WHARF
42 TOLEDO HARBOR WAREHOUSING CORP WHARF
43 HANS HANSEN WELDING CO SLIP
44 SHELL OIL CO WHARF
45 CITY OF TOLEDO MOORING BASIN
46 NAVAL ARMORY WHARF
47 U.S. COAST GUARD BUOY DEPOT WHARF
48 GREAT LAKES TOWING
49 TOLEDO WORLD TERMINAL
50 CARGILL
51 CONSOLIDATED DOCK
52 WONLER SOCK
AERIAL CABLES
INDICATES U.S. ROUTES
INDICATES STATE ROUTES
PROJECT DEPTHS AND SOUNDINGS ARE REFERRED TO INTERNATIONAL GREAT LAKES DATUM (1955) FOR LAKE ERIE, ELEVATION 569.6 ft ABOVE MEAN WATER LEVEL (IWL) AT FATHER POINT, QUEBEC.
REFERENCE MARKS TAKEN FROM "THE PORT OF TOLEDO, OHIO," PORT SERIES NO. 44 PART 2 REVISED 1960.
SCALE OF FEET
TOLEDO HARBOR, OHIO
Upstream Section

FIGURE 4A

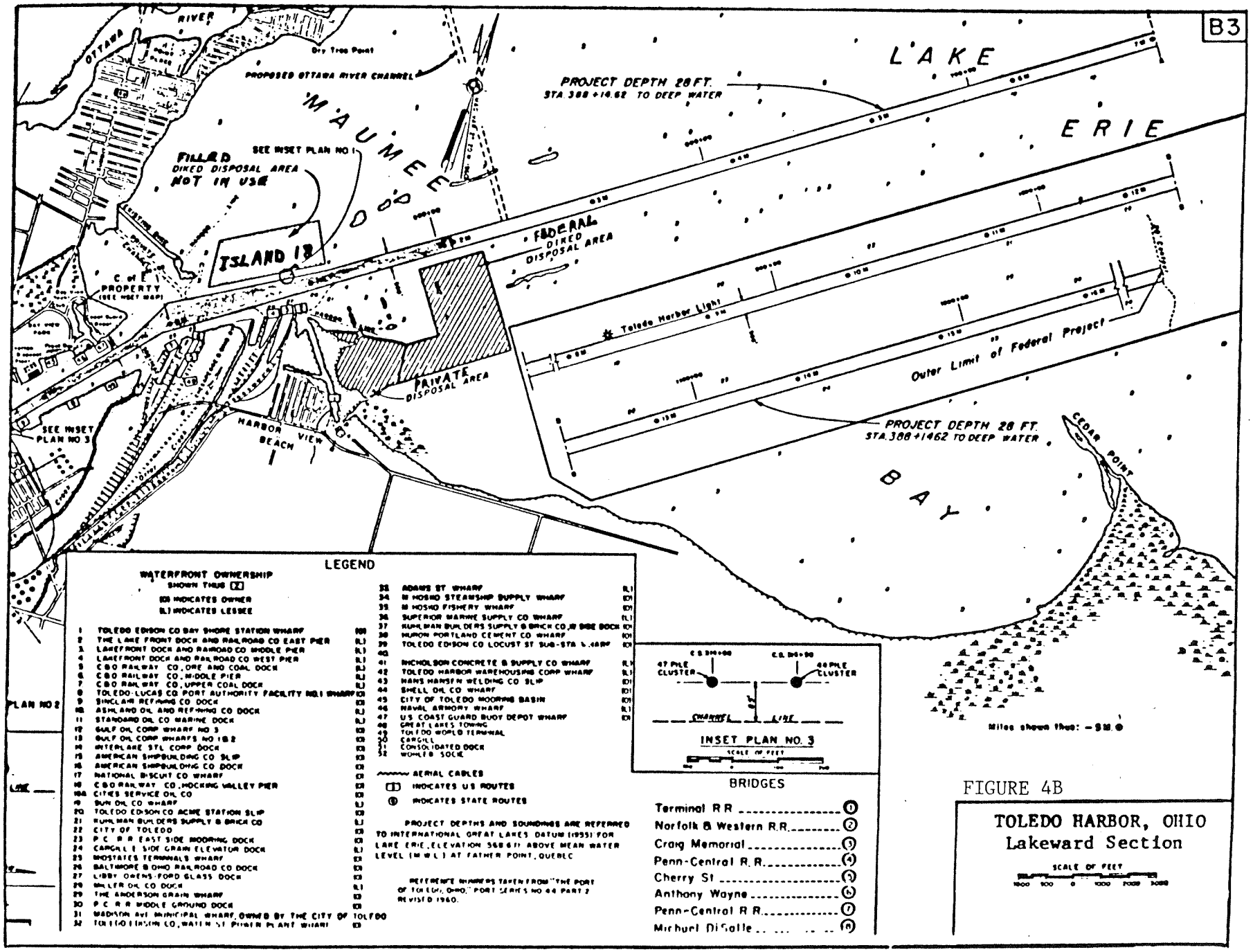
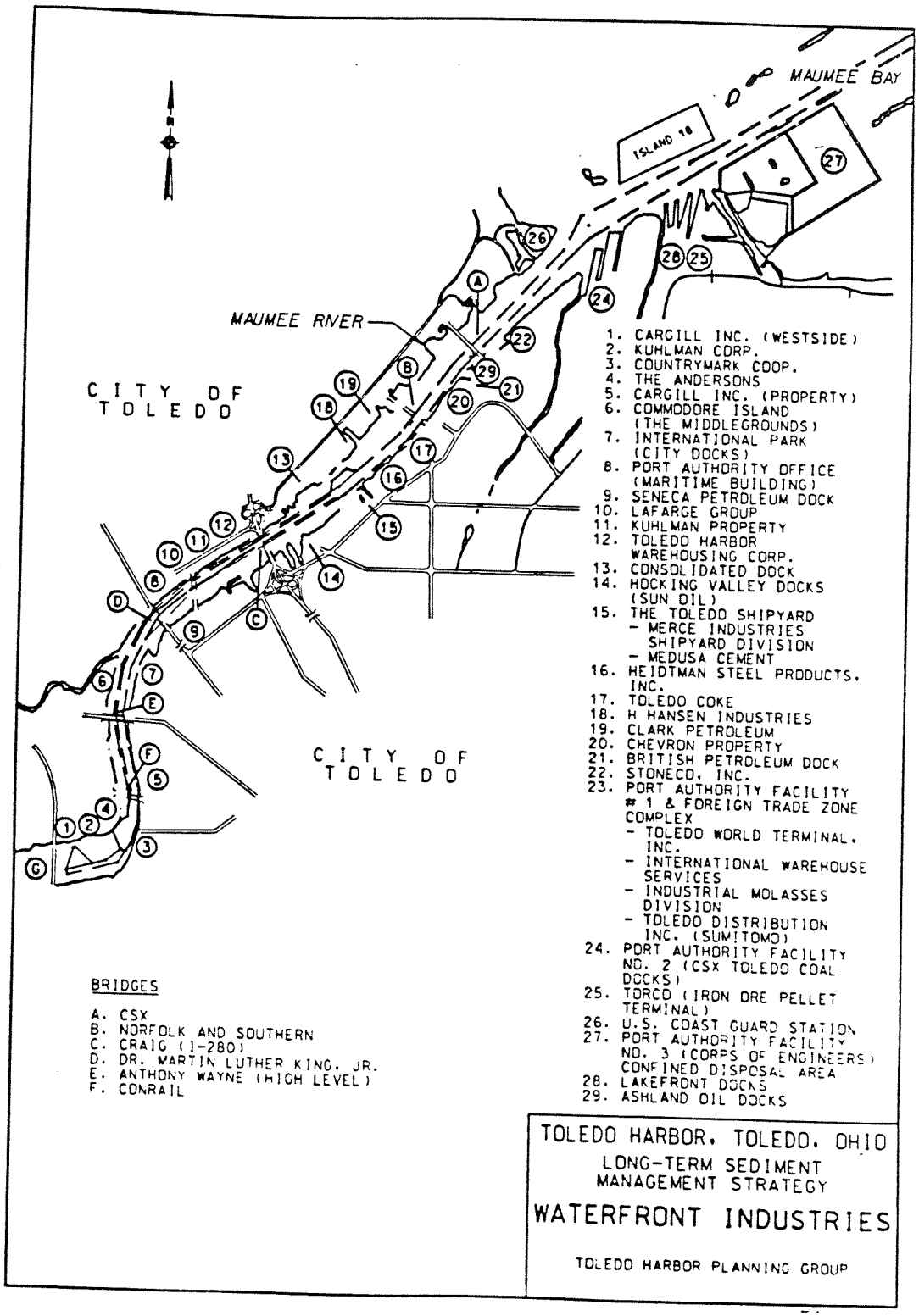


FIGURE 4B

TOLEDO HARBOR, OHIO
Lakeward Section



Waterfront Industries

FIGURE 5

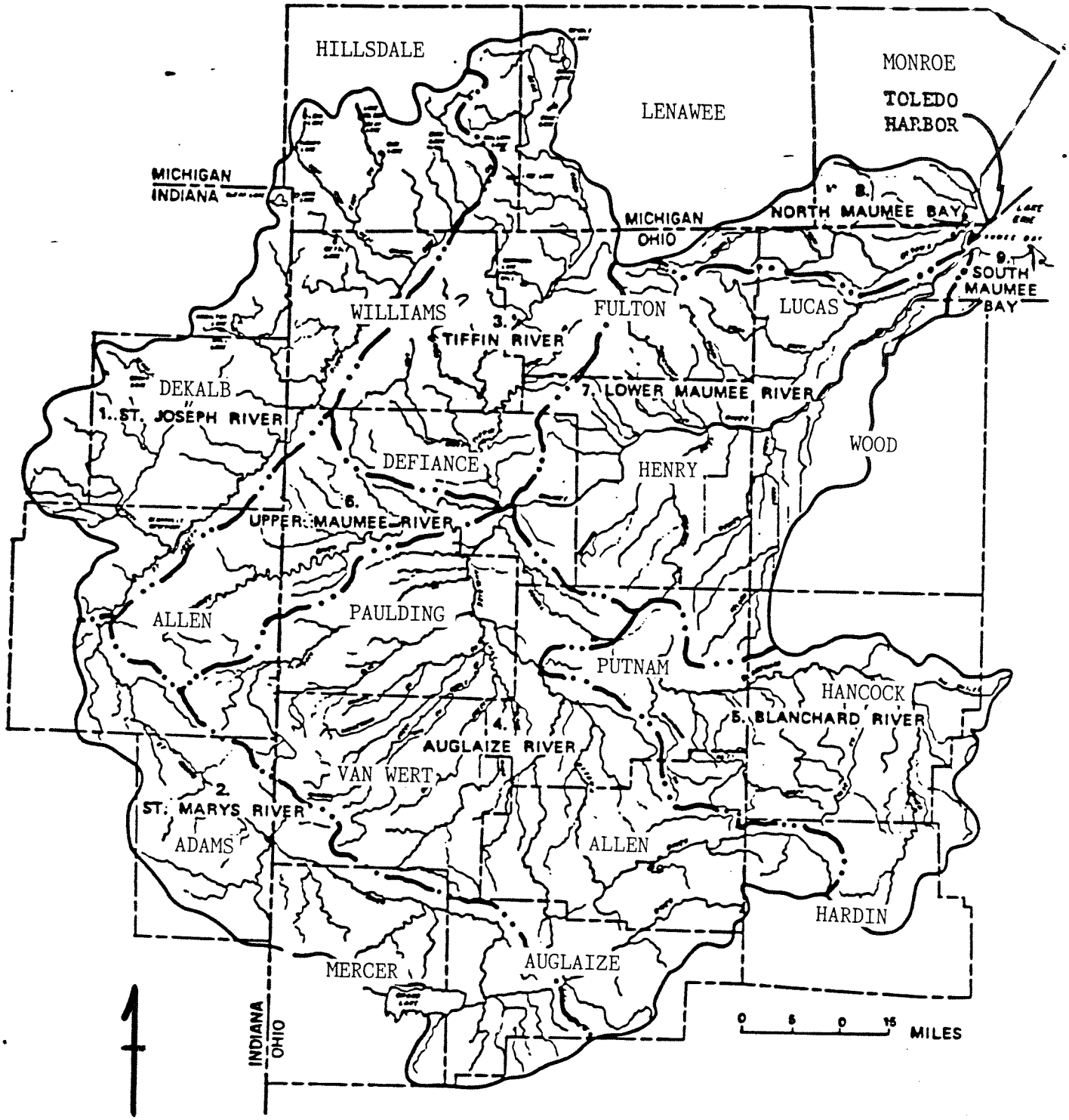


FIGURE 6

TOLEDO HARBOR - LTSMP

BASIN & COUNTIES

USA - COE BUFFALO

2.12.1 Maumee Bay is an area at the mouth of the Maumee River which extends lakeward to two spits - North Cape, which extends south from Michigan, and Little Cedar Point, which extends northwest from Ohio. The Maumee River, Ottawa River, and several small creeks enter the shallow bay on the west. Water circulation within the bay is influenced by the Maumee River flow, the Toledo Edison Power Plant, Lake Erie currents, wind and physical irregularities in the bay shoreline and bottom such as man-made side-cast islands, submerged dikes, and existing confined disposal facilities.

2.12.2 The Toledo Harbor Federal Navigation Channel Project includes the following as shown in items a through g below (Reference Figure 4).

a. A Lake Approach Channel (Maumee Bay Channel), -28 feet Low Water Datum (LWD) in depth and 500 feet in width, extending from the deep water of Lake Erie to the mouth of the Maumee River (an approximate distance of 18 miles);

b. Widening 38.6 acres of the above opposite Chesapeake and Ohio Railway and Lakefront Terminal Docks;

c. A River Channel, -27 feet LWD in depth and 400 feet in width, extending from River Mile 0 to River Mile 3; thence a channel 400 feet wide from River Mile 3 to River Mile 6.5, with depths of 127 feet LWD over a least width of 200 feet, and depths of -25 feet LWD over the remainder of the 400 -foot channel width; thence a channel -25 feet LWD in depth and 200 feet wide to upper limit of Federal project at River Mile 7:

d. A Turning Basin opposite American Shipbuilding docks (River Mile 2.7), -20 feet LWD deep, 750 feet wide and 800 feet long;

e. A Turning Basin just upstream from old Fassett Street Bridge (River Mile 6.5), semicircular in shape with a radius of 730 feet and depth of -27 feet LWD;

f. An 8.25-acre Turning Basin at the upper Federal project limit with a depth of -18 feet LWD;

g. Clearing of a sailing course between the Maumee Bay Channel and East Outer Channel of the Detroit River, to a depth of -28 feet LWD, over a width of 1,200 feet.

2.12.3 Approximately 900,000 cubic yards (cy) of material has been dredged from Toledo Harbor navigation channels on an average annual basis. In past years, moderately polluted material dredged from the river channels (~350,000 CY AA) has been confined in various confined disposal facilities (CDFs), while

cleaner material dredged from the lake channels (~550,000 CY AA) has been deposited at open lake disposal sites. CDF sites include Grassy Island 18 (~132 acres) located just northeast of the mouth of the river, and those located just southeast of the mouth of the river (Cell 1 - ~242 acres, Cell 2 - ~155 acres, Cell 3 - ~90 acres). The open-lake disposal sites (~two square miles) are located just north of the lake navigation channel, about 12 miles northeast of Toledo Harbor. Reference Figures 2 and 4.

2.12.4 Toledo Harbor is one of the most active ports on Lake Erie and the Great Lakes. The primary commodities shipped through the port include: coal, petroleum, iron ore, steel products, stone, gravel and sand, grain, and various general cargoes.

2.12.5 Toledo Harbor is primarily a transshipment point. Its domestic waterborne commerce consists mostly of the shipment of coal and petroleum and products to lake ports of the United States and Canada, and the receipt of iron ore from the Lake Superior region. Railroads and trucks provide the lineage between the harbor facilities and interior manufacturing localities.

2.12.6 Figures 4 and 5 depict development and waterfront industries along Maumee Bay and Toledo Harbor and the lower Maumee River. Numerous piers, wharves, and docks are in use at Toledo Harbor, some of which are located along Maumee Bay just east of the mouth of the Maumee River, and the remaining of which are equally divided along the right and left banks of the lower seven miles of the Maumee River. Land along the southern shore of Maumee Bay near the river mouth provides for various commercial and recreational uses. Diked disposal areas, Toledo Edison Co., Lakefront Dock and Railroad Co., C&O Railway Co., and the Toledo Harbor-Lucas County Port Authority properties are located in this area. Land use is less commercialized opposite this side of the river mouth. The U.S. Coast Guard and Army Corps of Engineers properties are situated at the mouth, and further north on the bay are Bay View Yacht Club and residential properties. Acreage along the lower Maumee River is extensively developed for commercial use. Manhattan Sewage Disposal Plant, Toledo Edison Co., Sinclair Refining Co., as well as numerous oil tank and properties are situated along this area of the river. Such development will likely be sustained in the future.

2.12.7 The study area under consideration for the development of the long-term sediment management strategy extends beyond the limit of the existing Federal navigation project to the boundaries of the Maumee River watershed (Reference Figure 6). The watershed drains an area of about 4.2 million acres (USDA, 1993) from the States of Michigan, Indiana, and Ohio. The watershed is relatively flat and consists primarily of farmlands;

3.3 million acres of cropland, 50,000 acres of pasture, 100,000 acres of farmsteads, and 300,000 acres of forest land, which results in the river carrying a high sediment load. The River is the largest tributary to the Great Lakes with an average discharge of about 4,800 cubic feet per second.

2.13 Business and Industry and Employment and Income - As mentioned previously, Toledo Harbor is one of the most active ports on Lake Erie and the Great Lakes. Toledo's location at the hub of a major North American market has made it a key player in Midwestern commerce, and within the past three decades since the opening of Saint Lawrence Seaway, a factor in global commerce as well. In 1992, over 12 million tons of cargo came into the port of Toledo, a 5% increase over 1991. Primary commodities shipped through the port include: coal, petroleum, iron ore, steel products, stone, gravel and sand, grain, and various general cargoes. Increase in non-ferrous and coal commodities may be expected. Harbor activities and developments are discussed in some further detail in the preceding narrative sections. Figure 5 identifies some key waterfront industries at the harbor. Port operations are responsible for about 5,000 jobs and had a monetary impact of over half a billion dollars (1992).

2.13.1 Recreational fishing and boating is big business for the vicinity and the western end of Lake Erie. Sport fisheries (particularly walleye') are important to the area. Thousands of boats and numerous charter fishing operations operate out of the Bay area. Hundreds of jobs and millions of business dollars are generated via recreational fishing and boating.

2.13.2 In 1982, there were some 7,620 accountable non-farm related business establishments located in Lucas County Ohio. Of those about 9% pertained to manufacturing, 10% to wholesale, 45% to retail, and 36% to service industries. In 1986, of the 231,057 civilian labor force in Lucas County, 211,023 were employed and 20,034 were unemployed for an unemployment rate of 8.7%. Major employment sectors (based on 1985 non-farm private employment)included manufacturing at 26%; retail at 21%; finance, insurance, real estate at 5%; services at 31%; and other at 17%. Area employment is expected to experience increase through the year 2010 followed by some decrease (1990
BEA Regional Projections). Most sectors are expected to experience increases in employment except manufacturing.

2.13.2 In 1985, per capita income for Lucas County was about $10,866. Steady growth in per capita income is expected (1990 BEA Regional Projections).

2.14 Public Facilities and Services - Within the Toledo area, the project vicinity is adequately serviced by major facility and service developments including: water, sewer, gas, electric telephone, police, fire, emergency (rescue) medical, transportation, and sanitation developments. All of the various utility agencies and companies that serve the City of Toledo have facilities in, or provide service to, the harbor.

2.15 Water and Sewer Facilities - The City of Toledo and City of Oregon water intakes, two major water intakes, extend into Lake Erie (12,000 and 4,800 ft)from the vicinity just east of Cedar Point and the Cedar Point National Wildlife Refuge. Toledo's 120 million gallons per day (mgd) system services a total population of approximately 464,000 plus industrial customers, with Oregon's 8 mgd. system serving a population of 25,000 and industrial customers. The Maumee River supplies the 0.8 mgd Waterville plant and the 6 mgd facility in Bowling Green.

2.15.1 Wastewater treatment plants are located in Perrysburg, on the north bank at the mouth of the Maumee River (Lucas County plant), Oregon (on Dupont Road), and in Bay View, and discharge into adjacent waters. An outflow facility is located in the embayment just south of the Toledo Harbor active CDF facilities. The City of Perrysburg's wastewater treatment plant is an active sludge treatment plant with an average design capacity of 5.4 million gallons per day (mgd) for primary, and only 2.75 mgd for secondary treatment (being modified). The Maumee River (Lucas County) wastewater treatment plant is a 10 mgd activated sludge plant. The City of Oregon's Dupont Road wastewater treatment plant is an activated sludge treatment facility with an average design capacity of 8 mgd. The Bay View wastewater treatment plant is a 102 mgd activated sludge plant. Most sludge is applied to area agricultural land.

2.16 Transportation - Toledo Harbor is one of the most active ports on Lake Erie and the Great Lakes. Harbor facilities and development are discussed in some further details in the preceding narrative sections. Reference Figures 2 and 4. Toledo Harbor Light, 72 feet above the water, is shown from a square brick buff colored dwelling with an attached fog signal house on the northwest side of the entrance channel about 8.5 miles north east of the river mouth. A fog signal and radio beacon are at the light. The light is listed on the National Register of Historic Places. Maumee Bay Entrance Light 2, about 8 miles northeast of the Toledo Harbor Light, is equiped with a radar transponder and fog signal. A Coastal Guard Marine Safety Office is located at Toledo on the northwest side of the mouth of the Maumee River. The Toledo Harbor Patrol maintains an office adjacent to the Coast Guard Station. Toledo is served by nine railroad lines and has good highway connections. Several airports are located near the city.

2.17 Recreation (Water Related) - Water related recreational developments/activities in the Maumee Bay and Toledo Harbor vicinity include those associated with parks, fishing, and boating. Figures 2, 3, and 4 depict Maumee Bay and Toledo Harbor developments including many water related recreational developments.

2.17.1 Two large game/refuge areas are located in the vicinity. The Erie Marsh State Game Area (includes Woodtick Peninsula) is located in Michigan in the vicinity of North Maumee Bay. The Cedar Point National Wildlife Refuse is located just southeast of Maumee Bay and Cedar Point. Carland Beach is located just north of Dry Tree Point. Cullen Park, Detwiler Park and Bayview Park are located along the southern shore of Maumee Bay. These parks provide a number of activities including beaches, hiking/biking trails, picnic areas, even golf courses.

2.17.2 Fishing is popular in the vicinity from the shoreline and from boats. A variety of fish species inhabit the area. Sport fisheries (particularly walleye) are important to recreation and associated business at Maumee Bay and the western end of Lake Erie. Reference also the section on fisheries.

2.17.3 Recreational boating is a significant activity in the Maumee Bay and Toledo Harbor vicinity. Numerous marinas and associated facilities are located along North Maumee Bay, the Ottawa River, the Maumee River (Toledo Harbor) and other protected areas along the bay. Marinas provide seasonal docking and storage, launch ramps, transient docking, hull and engine repair and services, fuel, ice and water, electricity, sewage pump-out, marine supplies and associated upland facilities (parking, restrooms, restaurants, fish cleaning stations, etc.). Thousands of boats operate out of the Bay area. Numerous charter fishing operations also operate out of the Bay area. Since the Bay is very shallow, Federal and local navigation channels are also important to many large recreational vessels, particularly those with deep draft fixed-keels.

2.17.4 Demand for water oriented recreational facilities continues to grow. This may be attributed to several factors including: community development changes, improved water quality and increased income and leisure time. The State, county, and local entities, continue to develop plans and facilities, as possible, in addressing these needs.

2.18 Property Value and Tax Revenue - The average value of farmland (land and buildings) in Lucas County is roughly estimated at $3,500 per acre. The median value of developed land (structure and land) is roughly estimated at $65,900. The value of prime Lakefront property would be expected to be considerably higher. Local tax revenues generally include revenue sharing (federal, state, local), and local property, service district, and sales taxes.

2.19 Noise and Aesthetics - Noise and aesthetics of the harbor area is that associated with the various harbor area developments including: navigation facilities, industrial and commercial development, transportation facilities, recreational facilities, (primarily parks, marinas), and some nearby residential developments. The primary sources of noise generation include: industrial development areas, and noise generated by vehicular movement within the area including: ships, boats, autos, trucks, trains, and planes. Areas of higher aesthetic values include shoreline areas with a view to or from the lake, park, marinas, and some residential and/or commercial (i.e. restaurant) areas. Areas of aesthetic disconcern include dilapidated former water shoreline, and upland developments.

2.20 Community Cohesion - Community cohesion is a result of a number of social and economic factors. Many Toledo area residents and entities have resided in the area for a very long time. General community pride/cohesion is strong. The harbor has played an important part in this development. While harbor facilities and associated businesses remain active, as in most areas, pursuit of environmental and recreational developments has received increased emphasis. Community efforts have sought to sustain business and industry, while pursuing these and alternative developments (including environmental and recreational), where possible.

2.20.1 Relative to continued Harbor operation and maintenance, most interests agree that the Harbor should be maintained to facilitate industry and commerce and associated community economic and social well-being, and that dredged material should be appropriately managed and disposed of.

2.21 Area of Concern (AOC) - Remedial Action Plan (RAP) - The Maumee River has been identified as a Great Lakes AOC, which includes the lower 20.5 miles of the River, including the River's mouth, Maumee Bay, the nearshore area of Lake Erie southeast of the river mouth and the lower segments of several tributaries to the River and Bay. The most contaminated sections of the AOC are the ship channel in the lower 11 km (6.6 miles) of the river, lower Swan Creek, Otter Creek, and the Bay immediately adjacent to the river mouth.

2.21.1 The primary problems in the Maumee River AOC are contaminated water and sediment. Contaminants in water and sediment samples include heavy metals, such as cadmium, lead, zinc, mercury, and PCB's, PAHs and other organic chemicals, fecal coliform bacteria as well as pesticides and phosphorus.

2.21.2 The Maumee River, the largest tributary to Lake Erie flows through both agricultural and industrial regions and flows into Maumee Bay and Lake Erie at Toledo.

2.21.3 The primary sources of contaminants are agricultural runoff, discharges from municipal sewage treatment plants, combined sewer overflows, and 48 point sources (nine municipal and 39 industrial). There are 33 known industrial and municipal landfills within the AOC that may be contributing pollutants via leachate and surface runoff.

2.21.4 Sediment in the shipping channel is contaminated with heavy metals, PCBs, PAHs, and other organic chemicals. One concern is the open-lake disposal of less contaminated sediments dredged from the lakeward portion of the channel. There is concern over the environmental impacts of open-lake disposal including resuspension of sediment and phosphorus and the perceived diminished quality of the City of Toledo's public water supply. Contaminated sediments are disposed of in an authorized confined disposal space in the current disposal facility.

2.21.5 Many desired uses of the AOC have been impaired due to the problems and sources. These include navigation (due to limitation on maintenance dredging in the ship canal); aesthetics; warm water habitat for fish, plants and other aquatic organisms; industrial and agricultural uses - such as cooling water and irrigation due to contaminated water - and contact water recreation (i.e. swimming, water skiing etc.).

2.21.6 The Ohio Environmental Protection Agency is responsible for ensuring development of the Maumee River RAP. The Toledo Metropolitan Area Council of Governments (TMACOG) has been preparing the RAP. The RAP program is working to identify and significantly limit or eliminate sources of pollution (point, non-point); clean-up and/or contain residual pollution from past developments) and restore aquatic and terrestrial habitat quality. Some RAP measures have been underway for some time - often independently - (i.e. pollution control regulations, improvements to sewage treatment plants and combined overflow, sedimentation reduction, etc.), while some continued to be examined (identification, treatment and/or containment of past residual pollutants, dredging, treatment and/or containment of dredged material, restoration, etc.). This study/project will contribute towards the goals of the RAP.

2.22 Cultural Resourecs - Some information on cultural resources in the general vicinity of Toledo harbor was obtained from a formerly prepared environmental impact statement (USACOE, 1990) on a potential new confined disposal facility site (CDF) located adjacent to the Federal navigation channel and existing CDF as follows: The National Register of Historic Places (NRHP), the National Park Service, Ohio State Historic Preservation Office (OSHPO), as well as local experts were consulted, in order to help identify significant cultural resources within the project area. The NRHP listed the following harbor-related properties; a) Toledo Yacht Club, Bay View Park, b) West Sister Island Light, and c)Toledo Harbor Light. Federal project Harbor developments (i.e. dredging, open-lake disposal, CDFs) have been formerly coordinated from a cultural resources perspective via associated previous planning and NEPA study/report coordination. With regard to disposition of manufactured soils, it would be the responsibility of the developer disposing of such soil to maintain coordination with the Ohio State Historic Preservation Officer located at the Ohio Historical Center, 1982 Velma Avenue, Columbus, Ohio 43211-2497, in order to obtain a determination as to whether or not there would be any impact on cultural resources.

3. ALTERNATIVES CONSIDERED

3.1 Introduction. This section summarizes alternative plan options considered by the Toledo Harbor Planning Group, which includes a brief evaluation of alternatives investigated but not further pursued for the reasons shown in Table 5, as well as alternatives that are currently being further considered by the Group, from which a plan will be selected for implementation as the Intermediate 5-Year Plan. (Reference Figures 2 and 7 through 11)

3.2 Alternatives Eliminated from Further Consideration:

Table 5 - Summary of Screening (Phases 1 - 3) (Reference Appendix A)

Options	Phases			Rationale for Elimination Problem Areas			
	PH-1	PH-2	PH-3	Engrg	Envir	Econ	Time
A. SEDIMENT LOAD REDUCTION:							
1. Crop Residue Management;	C	C	C				
2. Conservation Cropping Sequence;	C	E	-			X	X
3. Alternative Crops;	C	E	-			X	
4. Grassed Waterway;	C	C	E	X		X	
5. Wetland Sediment Ponds;	C	C	C				
6. AgriRunoff Retention Reservoir	C	C	C				
7. Filter Strip;	E	-	-	X	X		
8. Streambank Erosion Control;	E	-	-			X	
9. Market for Canola Crop.	C	E	-	X		X	
B. CONTAMINANT LEVEL REDUCTION:							
1. Nutrient Management;	C	E	-	X			X
2. Animal Waste Management;	C	E	-	X			X
3. Pest Management.	E	-	-		X		
C. BENEFICIAL USES:							
1. Manufactured Soils;	C	C	C				
2. Environ. Restoration / Protection (Woodtick);	C	C	C				
3. Shallow Water Habitat;	C	E	-	X	X	X	
4. Grassy Island;	C	C	C				
5. Recreational Hill	C	E	-			X	X
6. Strip-Mine Reclamation	NC	NC	E			X	
D. CONFINED DISPOSAL FACILITIES:							
1. Expansion of CDFs;	C	C	C				
2. CDF Reuse Management (Dewatering);	C	C	C				
3. Recycling CDFs;	C	C	C				
4. Construction of Nearshore CDFs;	C	C	C				
5. Up-Land and Offshore CDFs.	C	C	C				
E. OPEN-WATER DISPOSAL:							
1. Existing site;	C	C	C(1)				
2. New site.	C	C	C				
F. NO-ACTION:	C	C	C				

C : Carried through
E : Eliminated. This option was considered in this phase, but was eliminated.
NC : Not Considered
(1) Open-lake disposal at the existing site will be eliminated at the end of the intermediate period in 1998.

3.3 Alternative Plans Currently Under Consideration:

3.3.1 No Action Alternative (Without Project Conditions) - The No Action Alternative establishes a baseline from which other alternatives are evaluated as to their relative contribution to the planning objectives. For Toledo Harbor, the No Action Alternative is defined as a continuance of the Operation and Maintenance (O&M) procedures used by the Corps of Engineers consistent with Corps Dredging Policies and the current sediment and water sampling and analysis program. Prior maintenance and operation practice called for placement of an average annual amount of 350,000 cubic yards of "polluted" dredged materials, from the Maumee River channel out to Mile 2 of the lake channel, into confined disposal facilities (CDFs). An average annual amount of about 550,000 cubic yards of dredged material considered to be suitable for open lake disposal from lake Mile 2 lakeward to lake Mile 19 were discharged into open-water at the designated discharge area in Western Lake Erie. This O&M practice is subject to Agency review considerations and continuance by the State of Ohio Environmental Protection Agency (OEPA) to grant 401 water quality certification.

3.3.2 Alternative Plan 1b - This alternative consists of five components that would work together as an effective program for managing Maumee River sediment in operating and maintaining the Port of Toledo. This program is designed to provide for the interim transition (1994-1998) from the current practice of disposing of dredged material, to the eventual implementation (around the year 2000) of a long-term sediment management plan. The existing CDFs would then be reused continuously and open-water disposal of dredged material would be reduced or eliminated, thus alleviating the expressed adverse impact concern associated with the disposal method. The five components of Alternative Plan 1b are: A) Dredged Material Placement, B) Sediment Load Reduction, C) CDF Management (Dewatering and Consolidation of Dredged Material), D) Processing and Beneficial Use of Dredged Materials from CDFs (manufactured soils), and E) Monitoring. A further description of each of these aforementioned components follows: (Reference Figures 2, and 7 through 11).

A. Dredged Material Placement Component - All material dredged from Federal navigation channels from Mile 0 riverward to River Mile 7, and from Mile 0 lakeward to Lake Mile 19, will be placed into existing CDFs. There would be no open water disposal for dredged material during the transition period if Alternative Plan 1b was selected. Under this alternative plan, during the five-year (1994-1998) intermediate period, an estimated average annual volume of 766,000 cubic yards of dredged material would be placed into existing CDFs. Sediments would be periodically sampled and tested to determine contaminant levels and management

requirements. Dredging/Placement of the material would probably be done by hydraulic dredge, where the material would be conveyed through pipes into the CDF, or by mechanical dredge, whereby the material would be dredged by clamshell bucket and conveyed from stationary barges into the CDF hydraulically or by clamshell bucket.

B. Sediment Load Reduction Component - This component will be implemented to reduce the volume of sediment entering the Maumee River, that normally is conveyed into Federal navigation channels off the watershed. Successful execution of the program will contribute to the effort underway for effective management of dredged material at Toledo Harbor. Specifically, the program will be executed by practicing the farming method known as "Conservation Tillage", in order to reduce farmland erosion and sediment runoff from the watershed. The expected effect of Conservation Tillage is reduction in the total annual volume of sediment dredged from navigation channels by about 15% and also, a contribution toward reduction in the level of contaminants that would end up in the Western Basin of Lake Erie. Under existing conditions, sediment is delivered to Toledo Harbor via runoff from agricultural land within the Maumee River Watershed. Some source reduction would be achieved through both acceleration and intensification of existing sediment control efforts; also mentioned previously, by introduction of Conservation Tillage (No-Till farming), which is an innovative land treatment measure, whereby land managers utilizing this practice seed directly through the previous harvest's crop residue. Sediment reduction goals would be assigned to each county. Each Soil and Water Conservation District would create a county sediment reduction committee involving agricultural and environmental groups, agribusiness, private citizen and other affected organizations. This group would be charged with implementing a sediment reduction strategy at the county level. The specific components of the generalized concept would include: County Sediment Reduction Committees, Educational Program Grants, Innovative/Local Program Grants, Landowner Incentives and Technical Assistance. (Reference Appendix B3).

C. CDF Management Component (Dewatering and Consolidation of Dredged Material) - This component would involve implementation of a dewatering, consolidation and desiccation program. The process would decant the water content of the dredged material off the CDF through a weir, thereby causing the material to shrink and occupy a lesser volume in the CDF. Consolidation of dredged material confined in the 240-acre Cell 1 CDF would be expedited by use of surface trenches followed by installation of vertical strip drains. Surface trenches would initially be dug around the perimeter and into the interior of Cell 1, to allow water to drain from dredged material within the cell as a result of gravity flow. The trenches would be interconnected in order to speed up drainage and consolidation of

surface soil. Such CDF management would help to increase soil stability needed to support heavy equipment for later installation of strip drains. These trenches would be typically spaced about 100 feet apart. Vertical strip drains would be spaced 10 to 15 feet apart depending on the rate at which consolidation take place. Drainage water would collect and particulate settling would occur in the lower perimeter drainage ditches. Normally, water would be left to evaporate. Any discharge from the CDFs would be controlled by setting the existing CDF discharge weirs to provide for required particulate settling time to meet effluent water quality discharge requirements (usually limited to no more than 100 mgl or ppm particulate). When the previously disposed of dredge material reaches favorable consolidation levels, it would be excavated (maintaining necessary drainage slopes) down to the saturation line by excavation equipment (i.e., dragline, dozer, front-end-loader, earth mover, truck, etc.); then transported to the CDF resuse processing area. Initially, about 150,000 (130,000 consolidated) cubic yards of material would be progressively removed from about a 25 to 30 acre excavation section of the CDF to about a 4 or 5-foot depth. Low level vegetation cover (grasses, legumes, small shrubs, etc.) would be maintained on the non-active portions of the CDF. Initial and on-going vegetation removal would also be processed (mulched, composted, mixed) at the CDF reused processing area. These operations would be expanded to facilitate increased reuse of deposited dredged material to the extent possible in the future. Federal CDFs namely Grassy Island 18, CDF (Cell 1), and CDF (Cell 2) would be utilized in about 20 to 10 year cycles for dredge material dewatering excavation, processing, and beneficial reuse, as well as for dredged material disposal reuse. During the 5-year Intermediate Plan (1994-1998) implementation period, it is expected that excavation and reuse processing measures would be initiated on Grassy Island 18 and/or CDF Cell 1. Drainage measures would be initiated at CDF (Cell 1). CDF (Cell 2) will be utilized for on-going dredged material disposal. These dewatering and excavation, processing and reuse operations will be monitored to confirm LTSMP feasibility. (Reference Appendix B2)

D. Processing and Beneficial Use (Manufactures Soils) Component - Substantial beneficial use of dredged material from CDFs would be initiated and further evaluated during the 5-year Intermediate Plan implementation period (1994-1998), with the intent of eventually significantly expanding the operations after 2000 for the Long-Term Sediment Management Plan (LTSMP). Dewatering and consolidation of dredged material was previously discussed in paragraph C. Figure 7 provides existing Toledo Harbor CDF (Cell) locations. Figures 7, 8, and 9 provide a generalized scheme for reuse processing and dewatering. Figure 9 represents a general idea of a potential "Reuse Processing Area Scheme" for a CDF. Each of the CDFs has a dredged material reuse

capacity of about 4 million cubic yards. A good portion of the excavated and dried dredged material may have potential use directly as fill or soil additive material. Although dredged material contaminant levels may not be suitable for unrestricted open-lake disposal relative to clean water parameters, such material may have suitability for use in other areas. Testing during processing measures would determine characteristics and suitability of dredged material for various uses. Other portions of the excavated and dried dredged material may be treated for minor decontamination (if any), and/or mixed with nutrient or process by-products (i.e., waste water treatment sludge, water treatment lime, cement kiln dust, etc.) to form processed or manufactured soils utilized as topsoil or topsoil additive. Although the Grassy Island 18 CDF is the preferred site for the beneficial use operation during the intermediate period (prior to the year 2,000), the goal is to use all three existing CDF's in sequence for eventual long-term operation and management at Toledo Harbor. Some material may be utilized form CDF Cell 1 during the intermediate period. Paragraphs (a) through (d) below further expand upon the concept of processing and beneficial uses of dredged material as follows:

(a) With regard to manufactured soils, during the 5-Year intermediate period, dredged material in the Island 18 CDF or CDF Cell 1 would be processed to produce manufactured soil for beneficial use. As previously mentioned, other admixtures (i.e. lime, etc.) would be added to the dredged material and processed into soil. A maximum of about 150,000 cubic yards of soft or wet material would be removed from the CDF, which would then be processed on Island 18 or CDF cell/ to generate a maximum of 130,000 cubic yards of manufactured soil. Admixtures would be brought to the CDF site by truck and/or barges, and the final soil product then shipped off-site for authorized use, as appropriate. Mining of the estimated 3.8 million cubic yards of dredged material above the maximum water level of +4.0 from the CDF site, could take up to 20 years - depending on future expansion of the dredged material market. Figures 10 and 11 show potential local sources of processing additives and potential beneficial use sites, respectively.

(b) It should be noted that sheer processing and movement of these mass volumes of material would be a formidable task. Movement of 150,000 to 750,000 cubic yards of material equates to about 4,167 truck-loads (36 cy/truck) to 20,833 truck-loads per year or about 16 to 80 truckloads per day for a 260 day work year. Therefore, it appears that use of trucks to transport more than several hundred thousand cubic yards of material per year from one point would be a problem. Measures involving use of mass material transport vehicles (i.e. trains, barges, ships), and/or decentralization of processing/distribution centers, should be investigated.

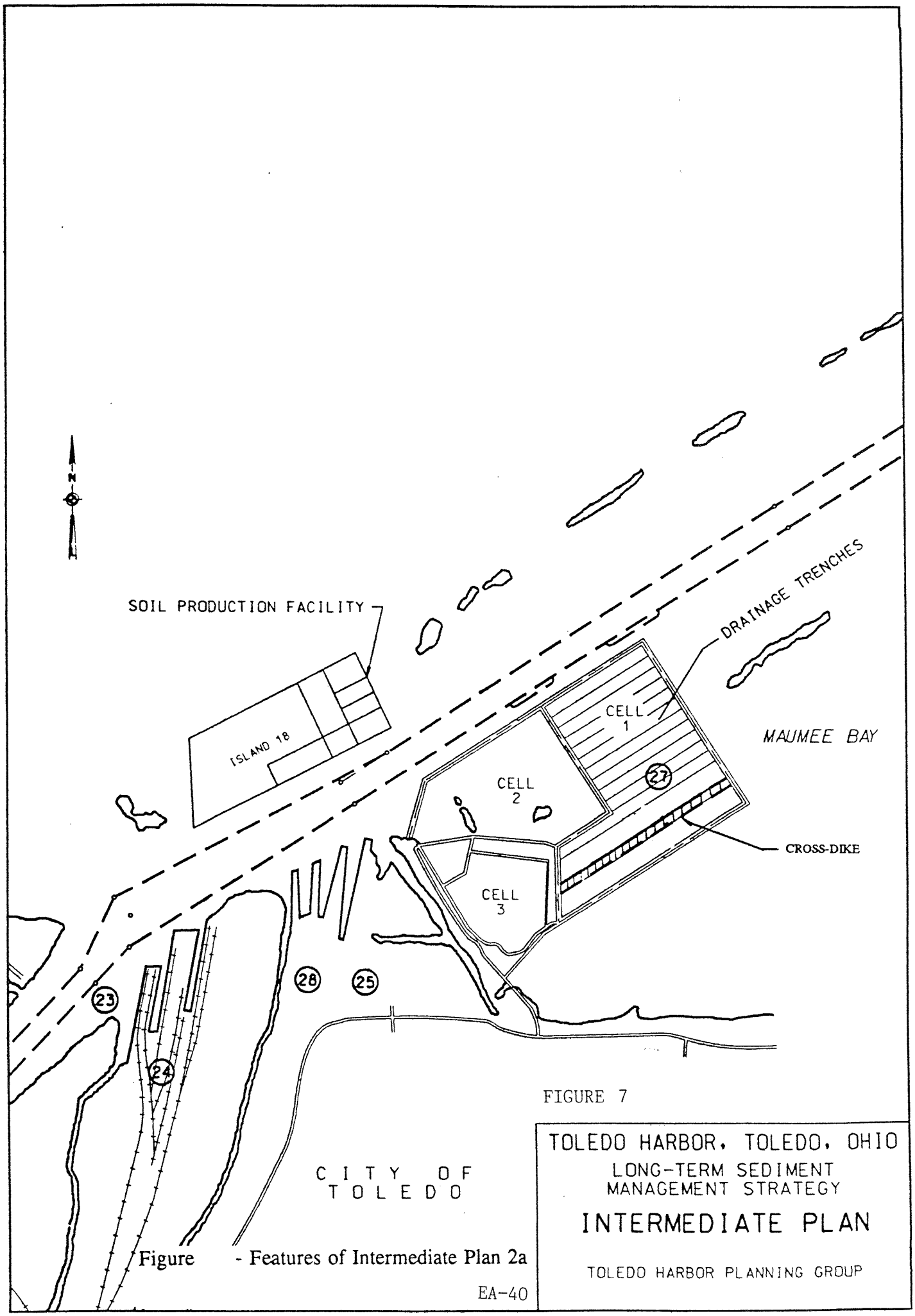


FIGURE 7

TOLEDO HARBOR, TOLEDO, OHIO
LONG-TERM SEDIMENT MANAGEMENT STRATEGY
INTERMEDIATE PLAN
TOLEDO HARBOR PLANNING GROUP

Figure - Features of Intermediate Plan 2a

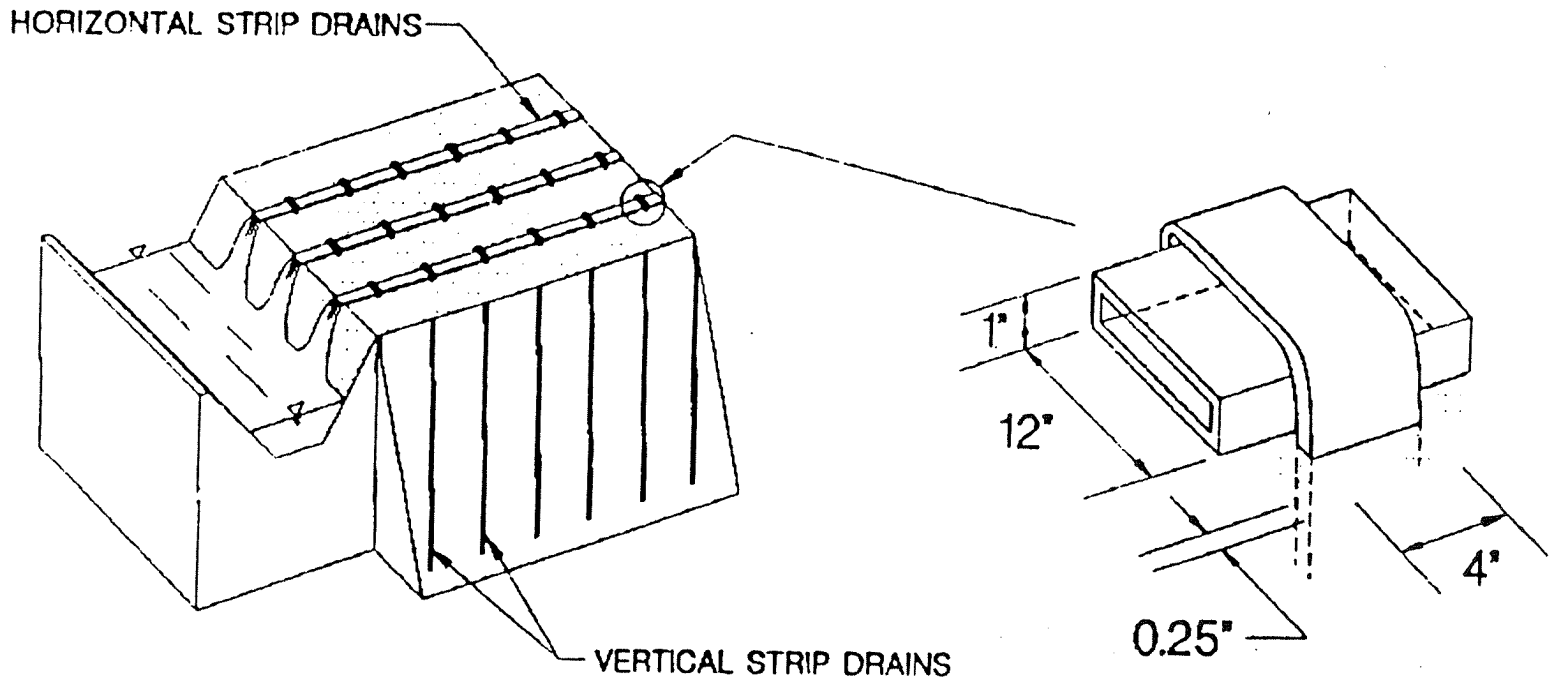


Figure 8 Vertical and horizontal strip drains

RECYCLING REUSE FACILITY

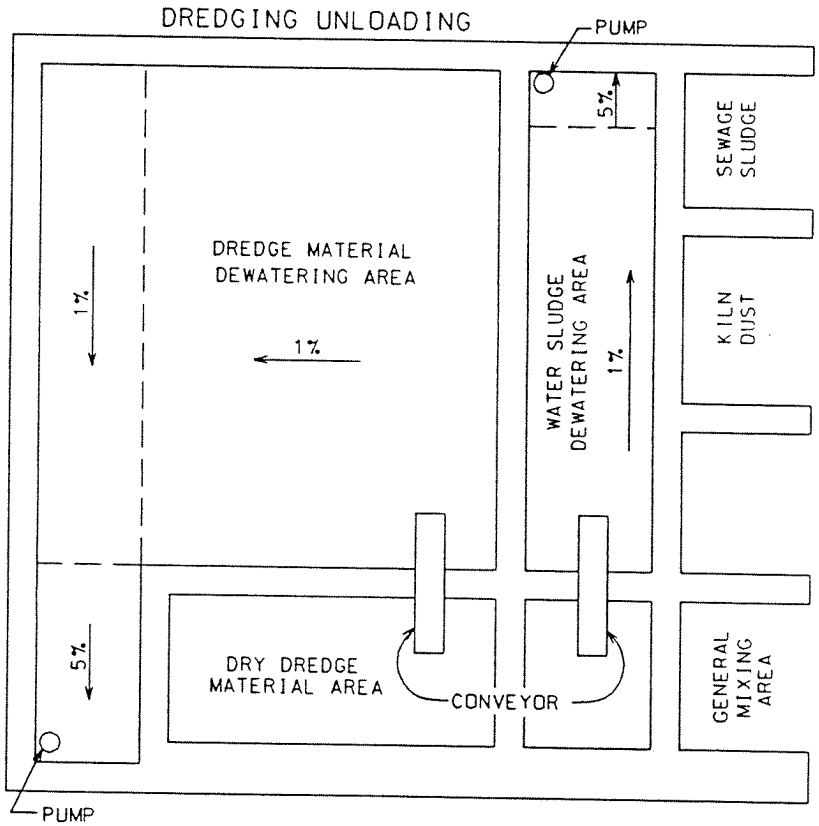


FIGURE 9

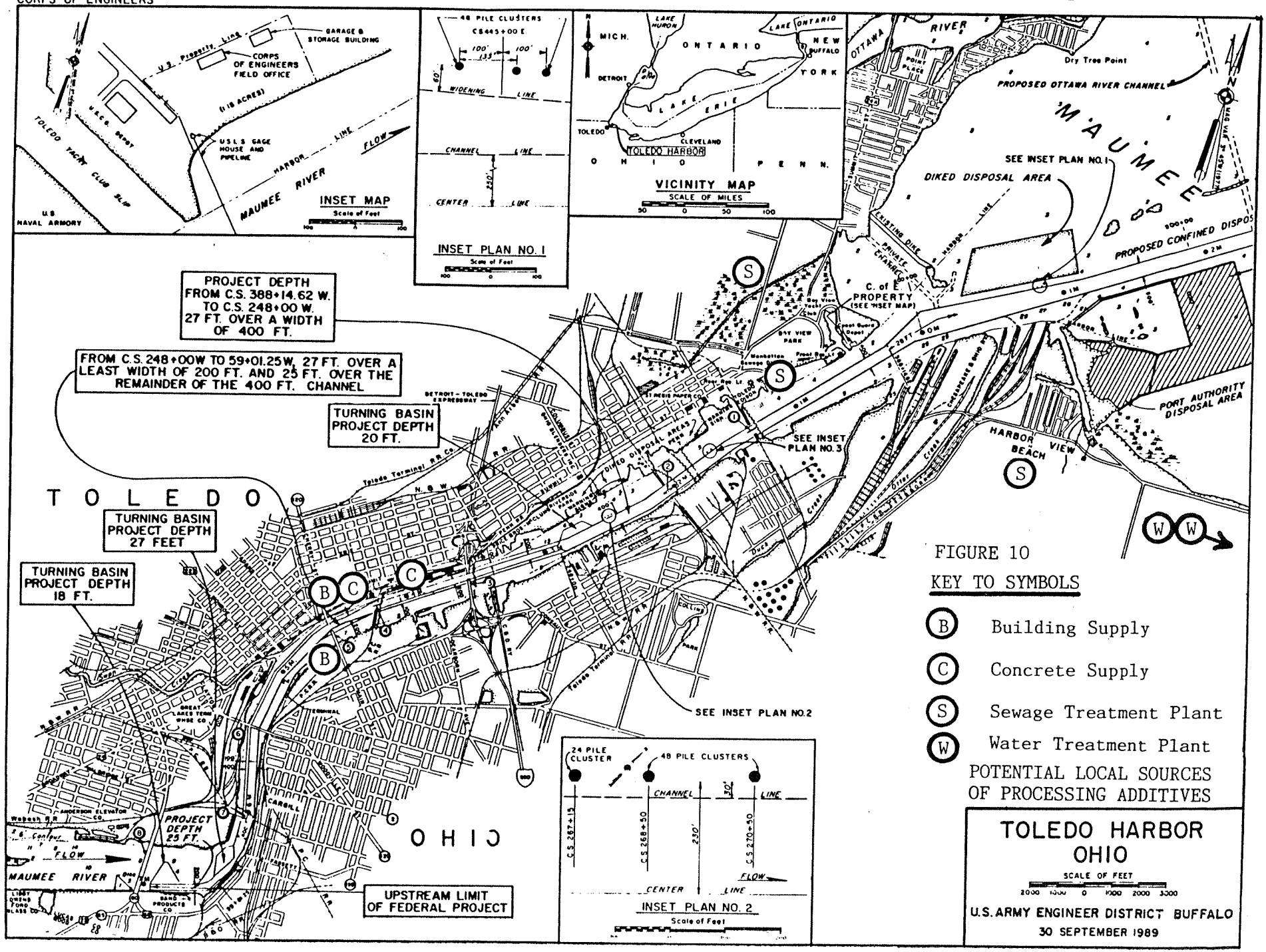
TOLEDO HARBOR, TOLEDO, OHIO

LONG-TERM SEDIMENT MANAGEMENT STRATEGY

RECYCLING REUSE FACILITY

TOLEDO HARBOR PLANNING GROUP

CORPS OF ENGINEERS



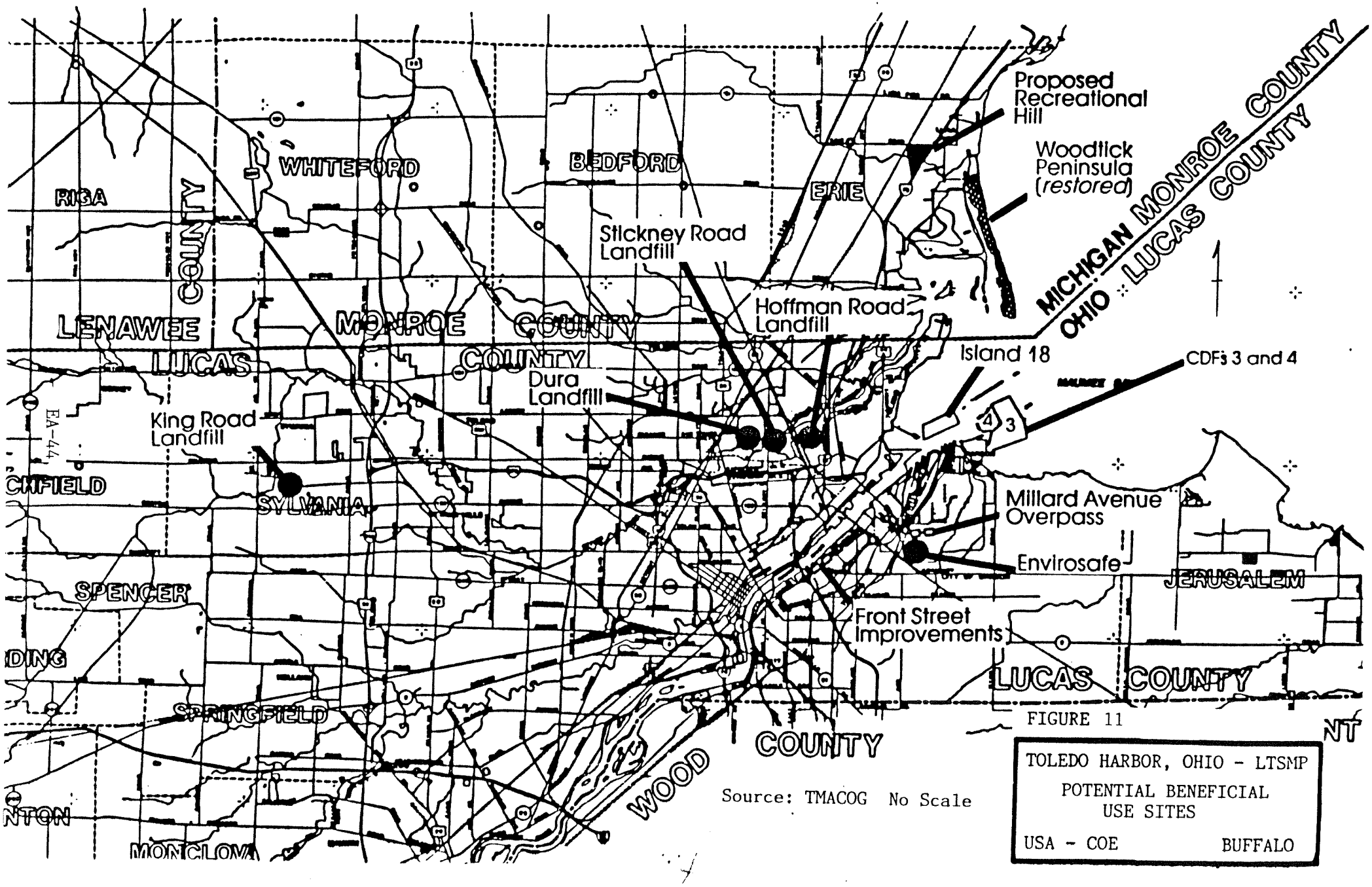


FIGURE 11

Source: TMACOG No Scale

TOLEDO HARBOR, OHIO - LTSMP
POTENTIAL BENEFICIAL USE SITES
USA - COE BUFFALO

(c) It is anticipated that processed soils would be provided and/or solid for various area or regional project uses. The Toledo Metropolitan Area Council of Governments (TMACOG) has pursued potential beneficial uses as indicated in their document entitled "Toledo Harbor Dredged Material Beneficial Reuse Alternatives Status and Needs Report." Beneficial uses identified in the TMACOG report, and/or similar projects would be pursued during the Intermediate Plan period (1994-1998). Beneficial use planning assessment and evaluation will likely concentrate on transport, processing, and overall marketability/feasibility. Site use plans (of others) will need to comply with applicable zoning and permit requirements.

(d) Beneficial use of manufactured soil would probably be pursued by the Ohio Lake Commission Agencies namely, the Ohio Environmental Protection Agency, the Ohio Department of Natural Resources, the Ohio Department of Health, the Ohio Department of Agriculture, the Ohio Department of Development, the Ohio Department of Transportation, and the City of Toledo; for landfill cover, fill or topsoil.

E. Monitoring Component - The CDF Management, Sediment Load Reduction and Beneficial Use components would be monitored to measure their effectiveness. As a result of such monitoring, adjustments or recommendations (as needed) would then be made as to the applicability of each aforementioned component for further use in the formulation of a Long-Term Sediment Management Plan (LTSMP). There would be no "open-lake" discharge of dredged material under Alternative Plan 1b; therefore, no monitoring of an open-lake disposal site could be pursued if this plan was implemented.

3.3.3 Alternative Plan 2a (The Preferred Plan) - Except for the dredged material placement component of Alternative Plan 2a, all the other components of this Alternative are the same as those for Alternative Plan 1b. In this alternative the dredged material would be placed in both existing CDFs and into the existing open lake disposal site. Specifically, material dredged from Lake Mile 5 riverward to River Mile 7 would be placed in CDFs, while materials dredged from Lake Mile 5 lakeward to Lake Mile 19 would be placed in the open-lake site. Under this alternative plan, during the five year (1994-1998) intermediate period, an estimated average annual volume of 543,000 cubic yards of dredged material would be placed in CDFs, while an estimated average annual volume of 223,000 cubic yards would be placed in the open-lake disposal site for a total average annual volume of 766,000 cubic yards. The plan would reduce by 50% the amount of dredged material that has normally been placed in the lake.

3.3.4 Alternative Plan 2b - Components of Alternative Plan 2b are the same as for Alternative Plan 1b and 2a, except that the breakpoint between the zone of dredged sediment to be placed at the open-lake disposal site and the zone of sediment to be placed in a CDF is at Lake Mile 2. Therefore, material dredged from Lake Mile 2 riverward to River Mile 7 would be placed in CDFs, while materials dredged from Lake Mile 2 lakeward to Lake Mile 19 would be placed in the open-lake. Under this alternative plan, during the five year (1994-1998)intermediate period, an estimated average annual volume of 360,000 cubic yards of dredged material would be placed in CDFs, while an estimated average annual volume of 406,000 cubic yards would be placed in the open-lake disposal site, for a total average annual volume of 766,000 cubic yards. The plan slightly reduces the amount of dredged material that has normally been placed in the lake.

4. ENVIRONMENTAL EFFECTS (ASSESSMENT)

4.1 Introduction. This section briefly compares anticipated environmental effects of the most feasible alternative plan proposals, relative to the various environmental assessment evaluation parameters. This environmental effects assessment section was developed to facilitate decision makers in the selection and implementation of a 5-year Intermediate Plan (1994-1998) and in eventual development of the LTSMP. Aspects of a number of considered alternate components (measures) have been addressed in previous planning and NEPA documentation (assessed or not assessed) as summarized in Table 6. These are incorporated by reference into the overall project assessment and evaluations, where applicable.

TABLE 6

MEASURES ASSESSED OR NOT ASSESSED BY PREVIOUS DOCUMENTATION

Previously Addressed	Not Previously Addressed	Report Reference	Plans
X		USACOE FEIS, 1976	Dredging (Existing Operations and Maintenance)
X		USACOE EA/404(b)(1),1989	Open Lake Disposal (Existing Operations and Maintenance)
X		USACOE FEIS, 1974	Existing Filled CDF #1 (Conventional Use); 242 acre site.
X		USACOE EA/404 (b)(1), 1990	New CDF #2 (Conventional Use) - 155 acre site
X		USACOE EA/404(b)(1), 1990	Grassy Island 18 (Resume Use)
•			
	X		CDF Management
	X		Beneficial Use
	X		Monitoring

Also, the U.S. Soil Conservation Service has provided a general description and assessment of the Maumee River Watershed Sediment Load Reduction component of the alternative plans still being further evaluated by the Toledo Harbor Planning Group, for consideration with the overall project assessment and evaluation. If conservation practices proposed by SCS (mainly conservation tillage) are implemented, the amount of dredging may be reduced from ~85,000 to 137,000 cy/year or 10 to 15 percent of annual dredging. Reference Appendix B3.

4.2 Table 7 entitled "Comparative Assessment of Intermediate Alternative Plans (1994-1998) provides assessment input for alternative plans currently under consideration in selection of a 5-Year Intermediate Plan (1994-1998). It concentrates on components of issue and those not previously addressed; namely, the issues of open-lake disposal, dewatering and consolidation of dredged material, and processing and beneficial use of dredged material. The assessment also concentrates more on beneficial use processing. transport, and marketability. It is assumed that beneficial use site plans (by others) will need to comply independently with necessary planning, zoning, and environmental permit matters involving beneficial use of dredged material as a fill or soil substitute. Large scale LTSMP (government) site projects will probably need to be addressed in further detail sometime in the future as this study progresses. (i.e. Woodtick Peninsula, hill landscapes, etc.)

4.3 No new Section 404(b)(1) Evaluation has been prepared for this EA. Dredging, open-lake, and CDF discharges for Toledo Harbor, Ohio have been addressed in other Section 404(b)(1) evaluation documents including those dated February 1989, June 1990, and November 1990. Watershed and CDF management of sediments (as described) does not directly involve placement of material into U.S. waters. Drainage from the CDF areas would continue to be contained within the CDF and any discharges from the CDF would continue to be controlled via the CDF facility processes. No significant adverse impacts to water quality would be expected with implementation of the intermediate Plan 2a. Detailed COE studies on open-lake disposal at Toledo in 1985 and 1986 showed only temporal increases in turbidity, and metal levels. Storm induced resuspension of sediments completely mask the impacts of dredged and in-lake disposal on water quality and phosphorous levels.

TABLE 7

COMPARATIVE ASSESSMENT OF INTERMEDIATE ALTERNATIVE PLANS (1994-1998)

A Overall Summary of Cost and Impact Cost Assessment
October 1993 Prices

PLAN	CDF LIFE	TOTAL COST ($) x 1,000,000					REMAINING LIFE IN '98
		Dredging	CRM	CDF M	MS	Impact	
BASE PLAN	20 YRS	3.5	0	0	0	0	15 YRS
LM2-RM7 (LM):Lake mile LM2-LM19 (RM):River mile		TOTAL COST : 3.5 EXCESS COST : N/A					
ALT. PLAN 1	17 YRS	4.2	1.6	.2	.8	1.9	12 YRS
All material in CDF Crop Residue Mgmt. (CRM) CDF Management (CDFM) Manufactured Soil (MS) Monitoring		TOTAL COST : 8.7 EXCESS COST : 5.2					
ALT. PLAN 2a	20 YRS	3.3	1.6	.2	.8	0	15 YRS
LM5-RM7 ; LM5-LM19 Crop Residue Management CDF Management Manufactured Soil Monitoring		TOTAL COST : 5.9 EXCESS COST : 2.4					
ALT. PLAN 2b	23 YRS	3.1	1.6	.2	.8	-1.5	18 YRS
LM2-RM7 ; LM2-LM19 Crop Residue Management CDF Management Manufactured Soil Monitoring		TOTAL COST : 4.8 EXCESS COST : 0.7					

TABLE 7 SUMMARY OF COMPARATIVE ASSESSMENT OF INTERMEDIATE PLANS (1994-1998)

EVALUATION PARAMETERS	NO ACTION (WITHOUT PROJECT COND)	ALTERNATIVE 1b CDF (SLR&BU)	ALTERNATIVE 2a CDF&OL (LM5) SLR&BU	ALTERNATIVE 2b CDF&OL (LM2) SLR&BU
Economics				
	(SEE PREVIOUS PAGE)			
Natural Environmental Resources				
Water/Sediment Quality	ST:Not Significant LT:Not Significant	ST:Moderate Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Minor Beneficial	ST:Not Significant LT:Not Significant
Air Quality	ST:Not Significant LT:Not Significant	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse
Fish, Benthos, & Plankton	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial
Vegetation	ST:Moderate Adverse LT:Minor Adverse	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Adverse
Wildlife	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial	ST:Moderate Adverse LT:Moderate Adverse Moderate Beneficial
Wetlands	ST:Minor Adverse LT:Moderate Adverse	ST:Minor Adverse LT:Moderate Adverse Moderate Beneficial	ST:Minor Adverse LT:Moderate Adverse Moderate Beneficial	ST:Minor Adverse LT:Moderate Adverse Moderate Beneficial
Threatened/ Endangered Species	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Prime and Unique Farmlands	ST:Not Significant LT:Not Significant	ST:Not Significant LT: Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Human (Man-Made) Resources				
Community and Regional Growth	ST:Minor Adverse LT:Moderate Adverse	ST:Minor Beneficial LT:Moderate Beneficial	ST:Moderate Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Moderate Beneficial
Displacement of People	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Displacement of Farms	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant
Business/ Employment/ Income	ST:Not Significant LT:Moderate Adverse	ST:Minor Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Moderate Beneficial	ST:Minor Beneficial LT:Moderate Beneficial
Public Facilities and Services	ST:Not Significant LT:Minor Adverse	ST:Minor Beneficial LT:Minor Beneficial	ST:Minor Beneficial LT:Minor Beneficial	ST:Minor Beneficial LT:Minor Beneficial
Property Values & Tax Revenues	ST:Not Significant LT:Minor Adverse	ST:Not Significant LT:Minor Adverse	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Minor Beneficial
Noise and Aesthetics	ST:Not Significant LT:Not Significant	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse	ST:Minor Adverse LT:Minor Adverse
Community Cohesion	ST:Moderate Adverse LT:Moderate Adverse	ST:Moderate Adverse LT:Moderate Beneficial	ST:Minor Adverse LT:Moderate Beneficial	ST:Moderate Adverse LT:Moderate Beneficial
Cultural Resources	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant	ST:Not Significant LT:Not Significant

KEY	RANGE OF RELATIVE IMPACTS
ST: Short Term	Major Beneficial
LT: Long Term	Moderate Beneficial
NA: Not Applicable	Minor Beneficial
AA: Average Annual	Not Significant
	Minor Adverse
	Moderate Adverse
	Major Adverse

TABLE 7

COMPARATIVE ASSESSMENT OF INTERMEDIATE ALTERNATIVE PLANS (1994-1998)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
Natural Resources Environment:				
Water/Sediment Quality	ST: Not Significant LT: Not Significant No Action as defined in paragraph 3.3.1 of this Environmental Assessment (EA) would involve continuation of historically approved operation and maintenance (O&M) work to dredge and discharge accumulated sediments from authorized navigation channels in the lower reach of this Maumee River and in Toledo Harbor, in order to keep the Port open. Polluted dredged sediments would continue to be discharged into an existing CDF. Sediments determined to be acceptable for open-lake discharge would be disposed of at the existing OEPA approved, open-lake site - pending granting of continued 401 water quality certification to the Corps of Engineers by OEPA. Standard amount of dredged material would be disposed of at the open lake and CDF disposal sites. No change relative to water/sediment quality. Some temporary localized water quality degradation would be anticipated in the general vicinity of dredging activity and at the sediment disposal sites. Dredging would likely temporarily resuspend some pollutants into the water column. These short-term water quality degradations are not expected to be significant. Turbidity plumes in the vicinity of navigation channels and open-lake disposal site would likely be influenced by wave	ST: Moderate Beneficial LT: Moderate Beneficial Temporary short-term water quality degradation would occur during dredging operations in the general vicinity of authorized navigation channels (i.e. due to water turbidity; resuspension of pollutants into water column; minor discharge of oil, grease and fuel during normal operation of heavy equipment). Some unavoidable localized water degradation from minor spillage of oil, grease or fuel used to operate vessel equipment may occur into the lake water outside the CDF, where operation and maintenance activity is occurring to discharge dredged material into the facility. No dredged material would be disposed of at the open lake disposal site. All dredged material would be disposed of at the CDF disposal site. Moderate beneficial to water/sediment quality. With regard to the sediment load reduction component of this alternative plan, some decrease in water pollution, water turbidity and sediment accumulation in the Maumee River and Toledo Harbor would be expected, as the practice of Conservation Tillage is started in the watershed. In the long run, as this practice is more widely implemented in the watershed, a substantial contribution toward decreasing water pollution, turbidity and sediment accumulation in	ST: Minor Beneficial LT: Minor Beneficial Temporary short-term water quality degradation would occur during dredging and discharge operations in the general vicinity of authorized navigation channels and at the open lake disposal site (i.e. due to water turbidity; resuspension of pollutants into the water column; minor discharge of oil, grease and fuel during normal operation of heavy equipment). Some unavoidable localized water degradation from minor spillage of oil, grease or fuel used to operate vessel equipment may occur into the lake water outside the CDF, where operation and maintenance activity is occurring to discharge dredged material into the facility. Slightly less than standard amount of dredged material would be disposed of at the open lake disposal site. Slightly more than standard amount of dredged material would be disposed of at the CDF disposal site. Slightly beneficial to water/sediment quality. With regard to the sediment load reduction component of this alternative plan, the impact on water quality would be similar to that described for Alternative Plan 1b during the Intermediate Plan implementation period. Long-term impact on water quality would also be similar.	ST: Not Significant LT: Not Significant Temporary short-term water quality degradation impacts during dredging and discharge operations would be similar to those described for Alternative 2a. The duration of temporary impact on water quality would be less in the vicinity of the immediate CDF into which dredged material is being discharged, because less dredged sediment material would be deposited annually into the CDF. However, in comparison to Alternative Plan 2a, the duration of temporary adverse impact at the open-lake disposal site would be somewhat longer for Alternative Plan 2b, since more dredged material would be discharged annually into the lake. Standard amount of dredged material would be disposed of at the open lake and CDF disposal sites. No change relative to water/sediment quality. Some unavoidable localized water degradation from minor spillage of oil, grease or fuel used to operate vessel equipment may occur into lake water outside the CDF, where operation and maintenance activity is occurring to discharge dredged material into the facility. With regard to the sediment load

*Indicates alternative plan component

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	action, wind patterns and water currents. Suspended sediments in the effluent discharged over the CDF weir may temporarily decrease water quality at the receiving water site in the lake. However, such sediment discharge through the effluent would be limited to concentrations of 100 ppm, or less. No conservation tillage practice would be implemented to reduce the sediment load off the water shed. Consequently pollutants and sediment accumulation from runoff would continue to occur by usual into the Maumee River and Toledo Harbor.	the River and Harbor is anticipated. Also, reference the water quality impact paragraph prepared by the U.S. Soil Conservation Service in Appendix B of this Environmental Assessment (EA). Since the sediment management component involves decanting the water content of dredged material in the CDF, with subsequent discharge of such water through a weir into receiving waters of the lake outside the dike (whereby particulates in the effluent discharge would be limited to no more than 100 mgl or parts per million), some short-term water quality degradation in the mixing zone would be anticipated. With regard to the impact of the beneficial use component, some processed dredged material (manufactured soils) may be accidentally discharged (spilled) into the lake during loading onto transportation vehicles or water borne vessels. With regard to the impact of the Monitoring Component no impact on water quality is anticipated.	With regard to the impact of the sediment management component of this alternative plan, the impact on water quality would be similar to that described for Alternative Plan 1b during the Intermediate Plan implementation period. Long-term impact on water quality would also be similar . With regard to the beneficial use component impact on water quality, it is anticipated that the impact would be similar to that described for Alternative Plan 1b. With regard to the impact of the monitoring component, no impact on water quality is anticipated.	reduction component of this alternative plan, the impact on water quality would be similar to that described for Alternative Plan 1b during the Intermediate Plan implementation period. Long-term impact on water quality would also be similar. With regard to the sediment management component of this alternative plan, the impact on water quality would be similar to that described for Alternative Plan 1b during the Intermediate Plan implementation period. Long-term impact on water quality would be similar. With regard to the beneficial use component, impact on water quality, it is anticipated that the impact would be similar to that described for Alternative Plan 1b. With regard to the impact of the monitoring component, no impact on water quality is anticipated.
Air Quality	**ST:Not Significant** **LT:Not Significant** Utilization of heavy construction equipment to dredge navigation channels and deposit sediments into an existing CDF, may result in some unavoidable	**ST:Minor Adverse** **LT:Minor Adverse** Some unavoidable localized emission of pollutants into the air may occur from construction equipment as described by the No Action Plan - except that no	**ST:Minor Adverse** **LT:Minor Adverse** Impact on air quality would likely be similar to those described for Alternative Plan 1b.	**ST:Minor Adverse** **LT:Minor Adverse** Impacts on air quality would likely be similar to those described for Alternative Plan 1b.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	localized emissions of suspended particulates, nitrogen dioxide carbon monoxide and other pollutants, that would temporarily contribute to short-term localized air quality degradation in the vicinity of the lake project area. Coordination by the contractor doing the work with the state agency responsible for air quality standards (OEPA) may be needed, in order to insure pollutant emissions would be within an acceptable range.	dredged material would be discharged at an open lake deposition site. Additionally some temporary dust may be generated into the atmosphere at mining, processing and loading sites, as well as along any travel routes that manufactured soil material is transported. Further, with regard to impact on air quality for the Sediment Load Reduction component, reference the paragraph on air quality prepared by the SCS in Appendix B of this EA. Unless odor is controlled for manufactured soil additives (i.e. treated sewage sludge), some odor may occur at the processing site fill areas and possibly along haul routes.		
Fish, Benthos and Plankton	ST: Moderate Adverse LT: Moderate Adverse Continued maintenance dredging of authorized navigation channels and discharge of dredged material deemed suitable for open-lake disposal, would result in short-term avoidance of these areas by most fish during such	ST: Moderate Adverse LT: Moderate Adverse; Moderate Beneficial Impacts on fish and fish habitat would likely be similar to those described for the No Action Plan, except there would be not open-lake discharge of dredge material and therefore no adverse impacts	ST: Moderate Adverse LT: Moderate Adverse; Moderate Beneficial Impact on fish and fish habitat are likely to be similar to those described for the no Action alternative and Alternative 1b, except that the duration of turbidity and water disruption impact	ST: Moderate Adverse LT: Moderate Adverse; Moderate Beneficial Impacts on fish and fish habitat are likely to be similar to those described for the No Action Alternative and Alternative 1b, except that the duration

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	construction activity. Substrate habitat along these channels would continue to be annually disrupted during excavation of sediment accumulations,and the water column would be disrupted by agitation and turbidity. Water turbidity caused during dredging of channels and during discharge of sediments at the open-lake site may temporarily aggravate gills of some fish. Also fish may be temporarily disrupted from a portion of the aquatic habitat area along the lakeward side of the CDF dike - at the location where the dredge material haul vessel disrupts the water column, as it maneuvers along-side the stone dike hook-up to the dredge material pipe discharge system. Some spawning fish utilizing the submerged stone of the dike and/or spawned fish eggs may be disrupted. Disruption of substrate sediments in the navigation channels by dredging, as well as at the open-lake discharge site, would displace and/or destroy a number of invertebrate benthic organisms at these locations. However, such organisms would likely soon reestablish over remaining disrupted habitat after operations and maintenance work ceased. Even though disruption to benthic habitat would occur annually due to O&M work, organisms that survived dredging and discharge actions, as well as benthic species from nearby habitats in the lake would contribute toward repopulating the channels and open-lake site to some degree. Continued O&M work would annually disrupt	on fish or fish habitat out at the open-lake disposal site. With regard to the sediment load reduction component, some improvement in aquatic fish habitat would be anticipated by interception of silt and polluted sediment run-off from the watershed. Improved sediment and water quality and less accumulation of such material in spawning areas of the River and Harbor would be beneficial to the existing fishery. With regard to the CDF management component, effluent discharged over the CDF weir, would cause some temporary localized degradation of water quality used as fish habitat, until suspended material settled out of the water column. With regard to the beneficial use component. Some minor amounts of manufactured soil (containing additives such as nutrients - that could promote algal growth or other process by-products) may be accidentally discharged into fish habitat of the lake, where such material is being transferred from the CDF processing location onto transportation haul vessels, unless conveyances of such material onto such transportation vessels have tight leak-proof seals. If manufactured soil is still somewhat wet or damp when being transported over	would be somewhat less than in the No Action plan with regard to open-lake site discharges, since less dredged material would be deposited into the open-lake site. With regard to the sediment load reduction component, the beneficial impact would likely be similar to that described for Alternative 1b. With regard to the CDF management component, the impact on fish and fish habitat would likely be similar to that described for Alternative 1b. With regard to the beneficial use component, impacts on fish and fish habitat would likely be similar to those described for Alternative 1b. With regard to the Monitoring component, no significant adverse impact on fisheries, benthic organisms or plankton is anticipated. Impact on benthic organisms at the dredging, CDF and open-lake site areas would likely be similar to that described for the No Action plan. However, the direction of adverse impact on benthic organisms at the open-lake disposal site would be less since less dredged material would be discharged. With regard to the sediment load reduction component impact on benthos, the impact on benthic invertebrate organisms would likely be similar to	of turbidity and water disruption impact would be somewhat longer than for Alternative 2a, since more dredged material would be deposited into the open-lake site. With regard to the sediment load reduction component impact on fish, the beneficial impact would likely be similar to that described for Alternative 1b. With regard to the CDF management component, the impact on fish and fish habitat would likely be similar to that described for Alternative 1b. With regard to the beneficial use of component, impacts on fish and fish habitat would likely be similar to those described for Alternative 1b. With regard to the Monitoring Component, no significant adverse impact on fisheries, benthic organisms or plankton is anticipated. Impact on benthic organisms at the dredging, CDF and open-lake site areas would likely be similar to that described for the No Action Plan. However, the duration of adverse impact on benthic organisms would be less than for the No Action Plan, but somewhat longer than for Alternative 2a. With regard to the sediment load reduction component impact on benthos, the impact on benthic invertebrate organisms would likely be similar to

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	and destroy some benthic invertebrate organisms in navigation channels and at the open-lake and CDF site. Dredging excavation would remove many benthic organisms from the channels and redeposit them into the CDF and at the open-lake disposal site. Deposition of dredged material over existing benthos would destroy, smother and/or displace bottom dwelling invertebrates at the discharge sites. Turbidity may temporarily aggravate breathing systems of benthic types. Once dredging operations ceased, and water turbidity dissipated, some degree of repopulation by invertebrates is likely to continue annually at the disrupted sites. Benthos that survived, invaded the areas from adjoining substrate of drifted into the channels and open lake sites would utilize the new habitats created by redeposited silt sediment and detritus. Excavation and discharge of dredged material would cause temporarily turbidity and agitate the water column at construction sites, which would have a short-term adverse impact on plankton, by disrupting and destroying some free-floating microscopic plants (phytoplankton) and microscopic animals (zooplankton).	roadways by vehicles that have faulty seals, effluent from such material deposited on roadways or over bridges by leakage may eventually wash into ditches that lead to water courses supporting fish life. If haul routes are often used by trucks having leakage, there may eventually be a cumulative effect of such effluent discharge in some waterways, that could contribute toward some degradation of fish habitat quality overtime - particularly in lentic (still) waters. Impact on benthic organisms at the dredging and CDF sites would likely be similar to those described for the No Action Plan, except that no impact would occur at the open-lake site since no discharge of dredged material at the site would be permitted. With regard to the sediment load reduction component on benthos, less silt, sediment and pollution runoff from the watershed would help decrease water turbidity, which would contribute toward improving sediment and water quality for benthic life. With regard to the CDF management component impact on benthos, dewatering and drying of dredged material within the facility would destroy many benthic organisms inside the CDF. Also, discharge of ellutriate over the CDF weir into the adjoining receiving water of the lake, may cause some short-term minor localized disturbance to benthic	those described for Alternative 1b. With regard to the sediment management component impact on benthos, the impacts would likely be similar to those described for Alternative 1b. With regard to the beneficial use component impact on benthos, the impact would likely be similar to that described for Alternative 1b. With regard to the Monitoring component impact on fisheries, benthic organisms and plankton, no significant impact is anticipated	those described for Alternative 1b. With regard to the sediment management component impact on benthos, the impacts would likely be similar to those described for Alternative 1b. With regard to the beneficial use component impact on benthos, the impact would likely be similar to that described for Alternative 1b. With regard to the Monitoring Component impact on fisheries, benthic organisms and plankton, no significant impact is anticipated.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		temporarily dredging water in the mixing zone. With regard to the beneficial use component impact on benthos, many aquatic benthic organisms in dredged material would probably be destroyed during the processing and addition of additives to create manufactured soil. With regard to the monitoring component impact on fisheries benthic organisms and plankton, no significant impact is anticipated.		
Vegetation	ST: Moderate Adverse LT: Minor Adverse No significant adverse impact on vegetation in the new CDF is anticipated during continued annual operations and maintenance (O&M) period. Although water in the vicinity of the Harbor is generally turbid, suspension of bottom silts, sediments and detritus during dredging and discharge operations would further contribute to water turbidity, that would reduce the degree of sunlight energy penetration through the water column to submerged aquatic plants (algae and macrophytes). Consequently, the rate of plant photosynthesis may further decrease, until suspended materials in the water column settled out and ambient conditions returned in the Harbor.	ST: Moderate Adverse LT: Moderate Adverse The impact on aquatic vegetation would likely be similar to that described for the No Action alternative, except that no adverse impact would occur at the open-lake disposal site, since no discharge of dredged material at the open-lake site would be allowed. With regard to the impact of the sediment Load reduction Component, a decrease in silt and sediment runoff from the watershed due to implementation of Conservation Tillage, would contribute toward reduction of water turbidity in the Maumee River and Toledo Harbor. Improved water clarity would allow sunlight energy to penetrate the water column, thereby improving potential for increasing the rate of photosynthesis in	ST: Moderate Adverse LT: Moderate Adverse The impact on submergent aquatic vegetation would likely be similar to that described for the O&M work in the No Action alternative. With regard to the impact of the Sediment Load Reduction component, the anticipated impact on vegetation would likely be similar to that described for Alternative 1b. With regard to the impact of the CDF Management component, the anticipated impact on vegetation would likely be similar to that described for Alternative 1b. However, the number of events of temporary effluent discharge over the CDF weir may be somewhat less than in Alternative 1b, since less dredged	ST: Moderate Adverse LT: Moderate Adverse The impact on submergent aquatic vegetation would likely be similar to that described for the O and M work in the No Action alternative. With regard to the impact of the Sediment Load Reduction Component, the anticipated impact on vegetation would likely be similar to that described for Alternative 1b. With regard to impact on vegetation of the CDF Management Component, the anticipated impact would likely be similar to that described for Alternative 1b. However, the number of events of temporary discharge of effluent over the CDF weir may be somewhat less than either Alternative 1b or Alternative 2a, since

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	Settling of resuspended materials may cover and smother some submergent aquatic plants in the general vicinity of dredging work and the open-lake disposal area. Since the existing open-lake disposal site is beyond the shallower, more plant productive littoral zone, the adverse impact of discharged material and turbidity on aquatic plants is anticipated to be minor. Once the CDF discharge site was filled to capacity and became drier, upland natural vegetation would invade and dominate the plant community on the site.	green submergent plants. Further, with regard to the impact on vegetation of the Sediment Load Reduction component, reference the paragraph on wild and domestic plants prepared by the SCS in Appendix B of this EA. With regard to impact on vegetation of the CDF Management Component, periodic minor turbidity due to discharge of effluent over the CDF Weir, may temporarily contribute to some localized, short term reduction in the rate of photosynthesis carried on by submerged aquatic plants. With regard to the impact of the Beneficial Use Component, vegetation that has naturally established on the existing CDF sites would eventually be destroyed, as the dredged material in the CDF was excavated out for movement to a nearby "manufactured soil processing site" at CDF Island 18. Some limited natural vegetation may temporarily reestablish on excavated CDF sites, during periods when such sites are not being immediately refilled with dredged material, or not being actively disrupted by excavation. Depending on where "manufactured soils" are eventually deposited or terrestrial areas, some vegetation may or may not be disrupted or destroyed. Such soil areas may be seeded, planted or allowed to become invaded with natural vegetation. With regard to the impact of monitoring	material would be placed into the CDF site annually. With regard to the impact on vegetation of the Beneficial Use component, the impact would likely be similar to that described for Alternative 1b. With regard to the impact on vegetation of the Monitoring component, no significant impact is anticipated.	less dredged material would be discharged into the CDF. With regard to the impact on vegetation of the Beneficial Use Component, the impact would likely be similar to that described for Alternative 1b. With regard to the impact on vegetation of the Monitoring Component, no significant impact is anticipated.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		on vegetation, no significant impact is anticipated.		
Wildlife	ST: Moderate Adverse LT: Moderate Adverse; Moderate Beneficial	ST: Moderate Adverse LT: Moderate Adverse; Moderate beneficial	ST: Moderate Adverse LT: Moderate Adverse; Moderate Beneficial	ST: Moderate Adverse LT: Moderate Adverse; Moderate Beneficial
	Since under the No Action alternative, O&M work involving annual dredging of navigation channels and disposal of dredged material would continue as in the past, some impact on wildlife habitat and associated wildlife would be anticipated during construction periods. Bird species (i.e. primarily gulls, terms and waterfowl) would tend to avoid the immediate open-water and new CDF work zones until construction ceased. If Grassy Island 18 CDF or the old existing filled CDF (shown as Cell 1 on Figure 7) - both of which contain established woody and herbaceous vegetation - are further utilized to discharge dredged material, existing wildlife cover and nesting habitat, as well as some associated terrestrial birds and small mammals (i.e. cottontail rabbits, mice, Norway rats, muskrat) may be disrupted or destroyed by deposition of such fill. Once the new CDF (155 acres in size)which is now aquatic habitat is filled to capacity and dries out, the CDF would revert to terrestrial habitat and upland wildlife would eventually utilize the CDF for cover, nesting and feeding. If the other existing CDFs are used to deposit	Annual dredging activity in navigation channels and discharge of dredged material into the open water area of the existing new CDF (reference Cell 2 in Figure 7) would temporarily displace aquatic birds from these areas during O&M construction activity. Birds would tend to avoid those areas during such work periods. With regard to the impact on wildlife of the Sediment Load Reduction component;, reference the SCS wildlife impacts paragraph on wildlife on Page EA-B-6 in Appendix B of this EA. With regard to impact on wildlife of the CDF Management Component, decanting effluent from dredged material would tend to decrease the potential for botulism outbreak occurrence in wildlife (i.e. shorebirds and waterfowl) by drying the sediments on site. With regard to the impact on wildlife of the Beneficial Use component, destruction of existing vegetated habitat at the CDF sites where mining of dried consolidated dredged material, as well as processing of such material is occurring, may disrupt, displace or destroy some wildlife. Long term continuation of such	Annual dredging activity in navigation channels and discharge of dredged material into open water areas of the existing new CDF, as well as into the existing open-lake disposal site, would temporarily displace aquatic birds from these areas. Birds would tend to avoid these zones during such work periods. With regard to the impact on wildlife of the Sediment Load Reduction Component, reference SCS Wildlife impacts paragraph in Appendix B of this EA. With regard to the impact on Wildlife of the CDF Management Component, the impact would likely be similar to that described for Alternative 1b. Less dredged material would have to be decanted in Alternative 2a than in Alternative 1b since less dredged sediment would be discharged into the CDF. With regard to the impact on Wildlife of the Beneficial Use Component, the impact would likely be similar to that described for Alternative 1b. With regard to the impact on Wildlife of the Monitoring Component, no significant impact is anticipated.	Annual dredging activity in navigation channels and discharge of dredged material into open water areas of the existing new CDF, as well as into the existing open-lake disposal site, would temporarily displace aquatic birds from these areas. Birds would tend to avoid these zones during such work periods. With regard to the impact on wildlife of the Sediment Load Reduction Component, reference SCS Wildlife Impacts paragraph in Appendix B of this EA. With regard to the impact on wildlife of the CDF Management Component, the impact would likely be similar to that described for Alternative 1b. Less dredged material would have to be decanted in Alternative 2b than in either Alternatives 1b or 2a. With regard to the impact on Wildlife of the Beneficial Use Component, the impact would likely be similar to that described in Alternative 1b. With regard to the impact on Wildlife of the Monitoring Component, no significant impact is anticipated.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	fill at sometime in the future, once construction ceased and upland vegetation reinvaded these sites, wildlife would repopulate these areas to some degree. Open-water habitat which is predominantly utilized by aquatic birds at the new CDF, would eventually be lost when the site is filled to capacity. In order to minimize impacts on colonial nesting birds at and near existing CDF facilities, dredging and dredged material would likely be scheduled to occur after mid-July as much as is practically possible.	activities at the CDF's would maintain unstable habitat conditions for wildlife at such sites, by preventing or severly limiting woody and herbaceous vegetation from establishing for long periods, to supply adequate cover and nesting habitat attractive to wild birds and small furbearing mammals. With regard to the impact on wildlife of the monitoring component, no significant impact is anticipated.		
Wetlands	ST: Minor Adverse LT: Moderate Adverse A minor amount of resuspended silts, sediments and detritus caused by O&M dredging and discharge operations, may settle out of the water column along peripheral areas of some coastal wetlands in the general vicinity of Maumee Bay. Continued discharge of dredged material into existing CDF Cell 2 may alter some man-made wetland inclusions that have formed following past deposition of dredged material. Similarly, if dredged material is discharged into the Grassy Island 18 CDF, the man-made wetlands that were created over part of the site may be altered or destroyed by the fill material.	ST: Minor Adverse LT: Moderate Adverse; Moderate Beneficial The adverse impact on shoreline wetlands along Maumee Bay is anticipated to be minor. Some resuspended silts, sediments and detritus caused by dredging in navigation channels may settle out along peripheral shoreline wetlands in the general vicinity of the Bay. As compared to the No Action alternative, the potential impact would be less in Alternative 1b, since no dredged material would be discharged into an open-lake site. With regard to impact on wetlands for the Sediment Load Reduction component, no significant adverse impact on wetlands is anticipated. Application of	ST: Minor Adverse LT: Moderate Adverse; Moderate Beneficial Impact on wetland resources relative to annual routine O&M dredging and discharge of dredged material would likely be similar to those described for the No Action and 1b alternatives except that less dredged material would be discharged into the open-lake. With regard to the impact on wetlands for the Sediment Load Reduction component, the impact would likely be similar to that described for Alternative 1b. With regard to the impact on wetlands for the CDF Management component, the impact would be similar to that described for Alternative 1b.	ST: Minor Adverse LT: Moderate Adverse; Moderate Beneficial Impact on wetland resources relative to dredging and discharge of dredged material would likely be similar to those described for the No Action and 1b alternatives, except that less dredged material would be discharged into the open-lake. In comparison to Alternative 2a, more dredged material would be discharged into the open-lake in Alternative 2b. With regard to impact on wetlands for the Sediment Load Reduction Component, the impact would likely be similar to that described for Alternative 1b. With regard to impact on wetlands for the

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		Conservation Tillage would help reduce sediment runoff deposition into wetlands of the watershed as well as into riverine wetlands of the Maumee River and coastal zone of Maumee Bay. With regard to impact on wetlands for the CDF Management component, decanting water from dredged material followed by drying and consolidation of such sediments, would probably alter and destroy some man-made wetland inclusions within the existing CDF facilities. No significant adverse impact on coastal zone wetlands in Maumee Bay is anticipated. With regard to impact on wetlands for the Beneficial Use component mining and processing of dredged material from existing CDFs would probably destroy some man-made wetland inclusions within such facilities. No significant adverse impact on coastal zone wetland in Maumee Bay is anticipated. If manufactured soils are transported and deposited on uplands in the watershed, provision would need to be made by the Contractor to prevent return of any such material by runoff into waters of the United States as well as into any associated wetlands. It would be the responsibility of the Contractor to maintain coordination with ODNR on any potential manufactured soil deposition sites, in order to prevent significant impact on wetland resources. With regard to impact on wetlands for the Monitoring component, no impact on such resources is anticipated.	With regard to the impact on wetlands for the Beneficial Use component the impact would likely be similar to that described for Alternative 1b. With regard to the impact on wetlands of the Monitoring component, no significant impact on such resources is anticipated.	CDF Management Component, the impact would likely be similar to that described for Alternative 1b. With regard to the impact on wetlands for the Beneficial Use Component, the impact would likely be similar to that described for Alternative 1b. With regard to the impact on Wetlands of the Monitoring Component, no significant impact on such resources in anticipated.
Threatened and Endangered Species	ST: Not Significant LT: Not Significant Based on past correspondence received	ST: Not Significant LT: Not Significant Based on a review of previous	ST: Not Significant LT: Not Significant Similarly, as described for Alternative	ST: Not Significant LT: Not Significant Similarly, as described for Alternative

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	from the U.S. Fish and Wildlife Service (USFWS) in Ohio (correspondence dated August 1985 and January 1990) relative to O&M dredging, disposal of dredged material and CDF project in the general vicinity of Toledo Harbor the USFWS indicated that although the Harbor area lies within the range of some federally listed species, due to the project type size and location, no impact on such species is anticipated.	correspondence received from the USFWS for part O&M and Cdf projects in the vicinity of Toledo Harbor (Reference correspondence indicated in the No Action impact column), no significant adverse impact on threatened or endangered species is anticipated by implementation of navigation channel dredging and discharge of dredged material into existing open lake and CDF sites. No significant adverse impact is also anticipated for the Sediment Load Reduction component, CDF Management component, Beneficial Use component (specifically, transportation of dredged material to the CDF processing site and processing of such material into manufactured soil), and for the monitoring component. Prior to any use of manufactured soils as fill at private or public development sites is would be the responsibility of site developers to coordinate and obtain views of the USFWS as to whether or not any such actions would or would not have an adverse impact on threatened or endangered species.	1b, no significant adverse impact is anticipated on Federally listed threatened or endangered species by implementation of Alternative 2a. Prior to use of manufactured soils as fill at private or public development sites, it would be the responsibility of site developers to coordinate and obtain views of the USFWS, as to whether or not any such actions would or would not have an adverse impact on threatened or endangered species.	1b, no significant adverse impact is anticipated on federally listed threatened or endangered species by implementation of Alternative 2b. Prior to use of manufactured soils as fill at private or public development sites, it would be the responsibility of site developers to coordinate and obtain views of the USFWS, as to whether or not any such actions would or would not have an adverse impact on threatened or endangered species.
Prime and Unique Farmlands	ST: Not Significant LT: Not Significant No significant adverse impact on prime and unique farmland is anticipated by implementation of the No Action alternative.	ST: Not Significant LT: Not Significant No significant adverse impact on prime and unique farmlands is anticipated by implementation of Alternative 1b. However, as indicated in Paragraph 2.0 of this EA, if at some time in the future "manufactured soils" are proposed for	ST: Not Significant LT: Not Significant No significant adverse impact on prime and unique farmlands is anticipated by implementation of Alternative 2a. The remark regarding deposition of "manufactured soils" on development sites described for Alternative 1b would also	ST: Not Significant LT: Not Significant No significant adverse impact on prime and unique farmlands is anticipated by implementation of Alternative 2b. The remark regarding deposition of "manufactured soils" on development sites described for Alternative 1b would also

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		possible use as fill material on public or private land development sites, it would be the responsibility of the developer to coordinate with the local office of the U.S. Soil Conservation Service, for a determination as to whether or not the development site involves any prime and unique farmland impact concerns.	apply to Alternative 2a.	apply to Alternative 2b.
Human (Man-made) Resources Environment:				
Community and Regional Growth	ST: Minor Adverse LT: Moderate Adverse Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report. Due to the number of variables, the scenario with this alternative is uncertain. Existing concern, conflicts, problems, and needs would likely persist. Resources and therefore efforts toward clear resolution would be limited. A likely scenario with this alternative is that the harbor channels would continue to be dredged for the interim period (1994-1998) with placement of some dredged material determined to be not suitable for open lake disposal into available CDFs and placement of some	ST: Minor Beneficial LT: Moderate Beneficial Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report. Under this scenario, harbor channels would be dredged for the interim period (1994-1998) with placement of all dredged material in available CDFs, immediately eliminating perceived problems with open-lake disposal and sustaining harbor enterprises dependent upon the navigation channels and shipping. About 738,000 cubic yards of dredged material would be placed into the available CDFs annually during the interim period, which is more than double	ST: Moderate Beneficial LT: Moderate Beneficial Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report. Under this scenario, harbor channels would be dredged for the interim period (1994-1998), with placement of more polluted sediments dredged from the River Channel and out to Lake Channel Mile 5 into the CDF (-518,600 CY average annual), and cleaner sediments dredged from Lake Channel Mile 5 out to Lake Channel Mile 19 into the open-lake site (-219,000 CY average annual). This would substantially reduce the amount and level of somewhat polluted sediments disposed of into the open-lake site as well as associated perceived problems, while	ST: Minor Beneficial LT: Moderate Beneficial Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report. Under this scenario, harbor channels would be dredged for the interim period (1994-1998), with placement of more polluted sediments dredged from the River Channel and out to Lake Channel Mile 2 into the CDF (-339,200 CY average annual), and cleaner sediments dredged from Lake Channel Mile 2 out to Lake Channel Mile 19 into the open-lake site (-398,800 CY average annual). This would slightly reduce the amount and level of somewhat polluted sediments disposed of into the open-lake site as well as associated perceived problems, while

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	dredged material determined to be suitable for open lake disposal into the existing open-lake disposal site (i.e. LM 2-5), based on most recent sediment sampling, analysis, and evaluation criteria (Provided an open-lake 401 certification is granted). This would somewhat reduce perceived problems with open-lake disposal, while sustaining harbor enterprises dependent upon the navigation channels and shipping. Should a 401 certification be denied for placement of potentially dredged material that is determined to be suitable for open-lake disposal by the aforementioned sediment testing and evaluation criteria, it is likely that associated channel areas would not be dredged. Such material would not be placed into available CDFs utilizing valuable CDF disposal space. Undredged navigation channel areas would limit channel access and within a few years, adversely affect harbor enterprises dependent upon the navigation channels and shipping. Both water quality and CDF disposal space would continue to be considered valuable resources during the interim period (1994-1998) and into the future. Only limited efforts could be made to pursue and determine feasibility for sediment load reduction, CDF management, and beneficial use of dredged material measures. Similar to existing conditions sediment	the amount that would be placed into the CDFs with the former Lake Mile 2 CDF/Open Lake disposal cut-off plan, thereby consuming associated available CDF disposal space. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use programs to reduce the amount of material to be dredged and to provide CDF reuse space. Based upon the results of the aforementioned efforts, a LTSMP could be better determined. Considerable sediment load reduction (~140,000 CY average annual), use of waste additives (~15,000 CY average annual) and beneficial use of dredged material (~150,000 CY average annual) would be expected during the interim period, thereby providing a transition toward maximum sediment load reduction and beneficial use, to minimize or eliminate open-lake disposal and CDF construction for the long-term. Maximum beneficial use of 738,000 CYs (20,500-36 CY truck loads) of dredged material annually is a monumental task and feasibility of such action needs to be examined. Reuse of the CDFs would preclude any other land use plans for the sites. Transport of large quantities of bulk beneficial use material, would likely noticeably alter transportation facilities (may require increased	sustaining harbor enterprises dependent upon the navigation channels and shipping. About 518,600 cubic yards of dredged material would be placed into the available CDFs annually during the interim period, which is several hundred thousand more cubic yards annually than would be placed into the CDF with the former Lake Mile 2 CDF/Open Lake disposal cut off plan, thereby consuming associated available CDF disposal space. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use programs to reduce the amount of material to be dredged and to provide CDF reuse space. Based upon the results of the aforementioned efforts, a LTSMP could be better determined. Considerable sediment load reduction (~140,000 CY average annual), use of waste additives (~15,000 CY average annual), and beneficial use of dredged material (~150,000 CY average annual) would be expected during the interim period, thereby providing a transition toward maximum sediment load reduction and beneficial use to minimize or eliminate open-lake disposal and CDF construction for the long-term. Maximum beneficial use of 738,000 CYs (20,500-36 CY truck loads) of dredged material is a monumental task and feasibility of such action needs to be examined.	sustaining harbor enterprises dependent upon the navigation channels and shipping. About 339,200 cubic yards of dredged material would be placed into the available CDFs annually during the interim period, which is slightly less cubic yards annually than would be placed into the CDF with the former Lake Mile 2 CDF/open-lake disposal cut off plan, thereby providing associated CDF disposal space. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management and beneficial use programs, to reduce the amount of material to be dredged and to provide CDF reuse space. Based upon the results of the aforementioned efforts, a LTSMP could be better determined. Considerable sediment load reduction (~140,000 CY average annual), use of waste additives (~15,000 CY average annual), and beneficial use of dredged material (~150,000 CY average annual) would be expected during the interim period thereby providing a transition toward maximum sediment load reduction and beneficial use, to minimize or eliminate open-lake disposal and CDF construction for the long-term. Maximum beneficial use of 738,000 Cys (20,500-36 CY truck loads) of dredged material is a monumental task and feasibility of such action needs to be examined.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	load and dredging quantities and CDF and open-lake disposal quantities (~350,000 cy and 550,000 cy respectively) would be expected.	maintenance and/or possibly modifications) and increase traffic through the community.	Reuse of the CDFs would preclude any other land use plans for the sites. Transport of large quantities of bulk beneficial use material would likely noticeably alter transportation facilities (may require increased maintenance and/or possibly modifications) and increase traffic through the community.	Reuse of the CDFs would preclude any other land use plans for the sites. Transport of large quantities of bulk beneficial use material would likely noticeably alter transportation facilities (may require increased maintenance and/or possibly modifications) and increase traffic through the community.
Displacement of People	ST: Not Significant LT: Not Significant No displacement of people	ST: Not significant LT: Not significant No displacement of people Reuse of CDFs would preclude any other land use plans for the site.	ST: Not Significant LT: Not Significant No displacement of people Reuse of CDFs would preclude any other land use plans for the site.	ST: Not Significant LT: Not Significant No displacement of people. Reuse of CDFs would preclude any other land use plans for the site.
Displacement of Farms	ST: Not Significant LT: Not Significant No displacement of farms.	ST: Not Significant LT: Not Significant No displacement of farms Interim period testing includes that for beneficial use of manufactured soils as agricultural soil mix. The sediment load reduction program includes measures on farms to reduce sedimentation run-off. Reference SCS program and assessment in Appendix B of this EA.	ST: Not Significant LT: Not Significant No displacement of farms. Interim period testing includes that for beneficial use of manufactured soils as agricultural soil mix. The sediment load reduction program includes measures on farms to reduce sedimentation run-off. Reference SCS program and assessment in Appendix B of this EA.	ST: Not Significant LT: Not Significant No displacement of farms. Interim period testing includes that for beneficial use of manufactured soils as agricultural soil mix. The sediment load reduction program includes measures on farms to reduce sedimentation run-off. Reference SCS program and assessment in Appendix B of this EA.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
Business/Industry Employment/Income	ST: Not Significant LT: Moderate Adverse The harbor channels would likely continue to be dredged for the interim period (1994-1998), thereby sustaining harbor enterprises dependent upon the navigation channels and shipping (Provided an open-lake disposal 401 certification is granted). Should a 401 certification be denied for placement of potentially dredged material determined to be suitable for open-lake disposal by standard sediment testing and evaluation criteria, it is likely that associated channel areas would not be dredged. Undredged navigation channels would limit channel access and within a few years adversely affect harbor enterprises dependent upon the navigation channels and shipping. Only limited efforts could be made to pursue and determine feasibility for sediment load reduction, CDF management, and beneficial use of dredged material measures. Problems would persist.	ST: Minor Beneficial LT: Moderate Beneficial The harbor channels would continue to be dredged for the interim period (1994-1998), thereby sustaining harbor enterprises dependent upon the navigation channels and shipping. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management and beneficial use of dredged material programs. These programs and the determined LTSMP, would provide associated business, industry, employment, and income opportunities. Reuse of the CDFs would preclude any other land use plans for the sites. Existing fill and topsoil oriented business would likely be adversely affected by the increased availability of generated fill and topsoil products.	ST: Minor Beneficial LT: Moderate Beneficial The harbor channels would continue to be dredged for the interim period (1994-1998), thereby sustaining harbor enterprises dependent upon the navigation channels and shipping. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use of dredged material programs. These programs and the determined LTSMP, would provide associated business, industry, employment, and income opportunities Reuse of the CDFs would preclude any other land use plans for the sites. Existing fill and topsoil oriented business would likely be adversely affected by the increased availability of generated fill and topsoil products.	ST: Minor Beneficial LT: Moderate Beneficial The harbor channels would continue to be dredged for the interim period (1994-1998), thereby sustaining harbor enterprises dependent upon the navigation channels and shipping. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use of dredged material programs. These programs and the determined LTSMP, would provide associated business, industry, employment, and income opportunities. Reuse of the CDFs would preclude any other land use plans for the sites. Existing fill and topsoil oriented business would likely be adversely affected by the increased availability of generated fill and topsoil products.
Public Facilities and Services	ST: Not Significant LT: Minor Adverse Harbor channels would likely continue to be dredged for the interim period (1994-1998), (Provided an open-lake disposal 401 certification is granted) Similar to existing conditions sediment	ST: Minor Beneficial LT: Minor Beneficial Harbor channels would continue to be dredged for the interim period (1994-1998), with placement of all dredged material in available CDFs, thereby immediately eliminating perceived problems with open-lake disposal (i.e.	ST: Minor Beneficial LT: Minor Beneficial Harbor channels would continue to be dredged for the interim period (1994-1998) with placement of more polluted sediments dredged from the River Channel and out to Lake Channel Mile 5 into the CDF (~518,000 CY average annual) and	ST: Minor Beneficial LT: Minor Beneficial Harbor channels would continue to be dredged for the interim period (1994-1998), with placement of more polluted sediments dredged from the River Channel and out to Lake Channel Mile 2 into the CDF (~339,200 CY average annual) and

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
	load and dredging quantities and CDF and open-lake disposal quantities would be expected. Should a 401 certification be denied for placement of potentially dredged material determined to be suitable for open=lake disposal by standard sediment testing and evaluation criteria, it is likely that associated channel areas would not be dredged. Such material would not be placed into available CDFs utilizing valuable CDF disposal space. Only limited efforts could be made to pursue and determine feasibility for sediment load reduction, CDF management, and beneficial use of dredged material measures. Problems and concerns would persist.	water quality and water intakes). About 738,000 cubic yards of dredged material would be placed into the available CDFs annually during the interim period, which is more than double the amount than would be placed into the CDFs with the former Lake Mile 2 CDF & Open-Lake disposal cut off plan, thereby consuming associated available CDF disposal space. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use programs to reduce the amount of material to be dredged and to provide CDF reuse space. Considerable sediment load reduction (~140,000 CY average annual), use of waste additives (~15,000 CY annual average) and beneficial use of dredged material (~150,000 CY average annual) would be expected during the interim period, thereby providing a transition toward maximum sediment load reduction and beneficial use, to minimize or eliminate open lake disposal and CDF construction for the long-term. CDF sites would need to be modified according to plan in order to facilitate dredged material beneficial use processing. Reuse of the CDFs would preclude any other land use plans for the site.	cleaner sediments dredged from Lake Channel Mile 5 out to Lake Channel Mile 19 into the open-lake site (~219,400 CY average annual), thereby substantially reducing the amount and level of somewhat polluted sediments disposed of into the open-lake site, as well as associated perceived problems (ie. water quality and water intakes). About 518,600 cubic yards of dredged material would be placed into the available CDFs annually during the interim period, which is several hundred thousand more cubic yards annually than would be placed into the CDF with the former Lake Mile 2 CDF/Open Lake disposal cut-off plan, consuming associated avail CDF disposal space. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use programs to reduce the amount of material to be dredged and to provide CDF reuse space. Considerable sediment load reduction (~140,000 CY average annual), use of waste additives (~15,000 CY average annual), and beneficial use of dredged material (~150,000 CY average annual) would be expected during the interim period, thereby providing a transition toward maximum sediment load reduction and beneficial use to minimize or eliminate open-lake disposal and CDF construction for the long-term.	cleaner sediments dredged from Lake Channel Mile 2 out to Lake Channel Mile 19 into the open-lake site (~398,800 CY average annual). This would slightly reduce the amount and level of somewhat polluted sediments disposed of into the open-lake site as well as associated perceived problems (i.e., water quality and water intakes). About 339,200 cubic yards of dredged material would be placed into the available CDFs annually during the interim period which is slightly less cubic yards annual than would be placed into the CDF with the former Lake Mile 2 CDF/Open-Lake Disposal cut off plan. In the meantime, during the interim period, efforts would be made to pursue and to test the feasibility of sediment load reduction, CDF management, and beneficial use programs to reduce the amount of material to be dredged and to provide CDF reuse space. Considerable sediment load reduction (~140,000 CY average annual), use of waste additives (~15,000 CY average annual), and beneficial use of dredged material (~150,000 CY average annual) would be expected during the interim period, thereby providing a transition toward maximum sediment load reduction and beneficial use, to minimize or eliminate open-lake disposal and CDF construction for the long-term. CDF sites would need to be modified

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		Transport of large quantities of bulk beneficial use materials (150,000 CY = 4,167 - 36 truck loads) would likely noticeably alter transportation facilities (may require increased maintenance and/or possibly modifications) and increase traffic through the community.	CDF sites would need to be modified according to plan in order to facilitate dredged material beneficial use processing. Reuse of the CDFs would preclude any other land use plans for the site. Transport of large quantities of bulk beneficial use material (150,000 CY = 4,162 - 36 CY truckloads) would likely noticeably alter transportation facilities (may require increased maintenance and/or possibly modifications) and increase traffic through the community.	according to plan in order to facilitate dredged material beneficial use processing. Reuse of the CDFs would preclude any other land use plans for the sites. Transport of large quantities of bulk beneficial use material (150,000 CY = 4,167 - 36 CY truckloads) would likely noticeably alter transportation facilities (may require increased maintenance and/or possibly modifications) and increase traffic through the community.
Property Values and Tax Revenues	ST: Not Significant LT: Minor Adverse Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report. No significant changes in property values and associated tax revenues would be expected with implementation of this alternative during the interim period.	ST: Not Significant LT: Minor Adverse Reference alternative project Federal/Non Federal costs in the appropriate section of the Phase 3 Report (CDF disposal space values). No significant changes in property values and associated tax revenues would be expected with implementation of this alternative during the interim period.	ST: Not Significant LT: Not Significant Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report (CDF disposal space value). No significant changes in property values and associated tax revenues would be expected with implementation of this alternative during the interim period.	ST: Not Significant LT: Minor Beneficial Reference alternative project Federal/Non-Federal costs in the appropriate section of the Phase 3 Report (CDF disposal space value). No significant changes in property values and associated tax revenues would be expected with implementation of this alternative during the interim period.
Noise and Aesthetics	ST: Not Significant LT: Not Significant Similar to existing conditions would be expected with implementation of this alternative during the interim period.	ST: Minor Adverse LT: Minor Adverse Noise would be generated and extended during increased disposal operations at the CDF.	ST: Minor Adverse LT: Minor Adverse Noise would be generated and extended during increased disposal operations at the CDF.	ST: Minor Adverse LT: Minor Adverse Noise would be generated and extended during increased disposal operations at the CDF.

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		Noise would be generated by the operation of heavy equipment during CDF dredged material beneficial use processing site preparation and operations, and by trucks and barges transporting additive materials to the processing site and processed materials from the processing site. Noise generated at the CDF site or industrial/commercial areas would not be expected to cause any problem in light of the settings. Routing considerations would need to be considered to avoid and/or minimize impacts to any more noise sensitive community areas. Dredged material beneficial use processing site aesthetics would be altered by site preparation and operations. CDF peripheral aesthetic buffers would likely be utilized to some degree.	Noise would be generated by the operation of heavy equipment during CDF dredged material beneficial use processing site preparation and operations, and by trucks and barges transporting additive materials to the processing site and processed materials from the processing site. Noise generated at the CDF site or industrial/commercial areas would not be expected to cause any problem in light of the settings. Routing considerations would need to be considered to avoid and/or minimize impacts to any noise sensitive community areas. Dredged material beneficial use processing site aesthetics would be altered by site preparation and operations. CDF peripheral aesthetic buffer would likely be utilized to some degree.	Noise would be generated by the operation of heavy equipment during CDF dredged material beneficial use processing site preparation and operations, and by trucks and barges transporting additive materials to the processing site and processed materials from the processing site. Noise generated at the CDF site or industrial/commercial areas would not be expected to cause any problems in light of the settings. Routing considerations would need to be considered to avoid and/or minimize impacts to any noise sensitive community areas. Dredged material beneficial use processing site aesthetics would be altered by site preparation and operations. CDF peripheral aesthetic buffers would likely be utilized to some degree.
Community Cohesion	ST: Moderate Adverse LT: Moderate Adverse Reference statements for the previous evaluation parameter **Community and Regional Growth.** Interest conflicts would likely continue in the interim period and the long-term	ST: Moderate Adverse LT: Moderate Beneficial Reference statements for the previous evaluation parameter Community and Regional Growth. Lake water and sediment quality perception interests may significantly benefit in the interim period, while CDF disposal space interests would disbenefit. Sediment load reduction, CDF management,	ST: Minor Adverse LT: Moderate Beneficial Reference statements for the previous evaluation parameter Community and Regional Growth. Lake water and sediment quality perception interests may substantially benefit in the interim period, while CDF disposal space interest may disbenefit somewhat. Sediment load reduction, CDF management,	ST: Moderate Adverse LT: Moderate Beneficial Reference statements for the previous evaluation parameter Community and Region of Growth. Lake water and sediment quality perception interests may somewhat benefit in the interim period, while CDF disposal space interests may somewhat benefit (sediment load reduction). Sediment load reduction, CDF management,

TABLE 7 (Continued)

Evaluation Parameters	No Action (Without Project Conditions)	Alternative 1b (CDF & No Open Lake Discharge) *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2a (CDF & Open Lake Discharge) Ref. Lake Mile 5 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring	Alternative 2b (CDF & Open Lake Discharge) Ref. Lake Mile 2 *Sediment Load Reduction *CDF Management *Beneficial Use *Monitoring
		and beneficial use (manufactured soils) measures would be implemented on a limited basis and evaluated, and associated interests benefitted. Resolutions may be better determined via interim evaluations.	and beneficial use (manufactured soils) measures would be implemented on a limited basis and evaluated, and associated interests benefitted. Resolutions may be better determined via interim evaluations.	and beneficial use (manufactured soils) measures would be implemented on a limited basis and evaluated, and associated interests benefitted. Resolutions may be better determined via interim evaluations.
CULTURAL RESOURCES	ST: Not Significant LT: Not Significant Since no new or additional project area would be impacted by alternative plan implementation, no impact to cultural resources would be expected.	ST: Not Significant LT: Not Significant Since no new or additional project area would be impacted by alternative plan implementation, no impact to cultural resources would be expected.	ST: Not Significant LT: Not Significant Since no new or additional project area would be impacted by alternative plan implementation, no impact to cultural resources would be expected.	ST: Not Significant LT: Not Significant Since no new or additional project area would be impacted by alternative plan implementation, no impact to cultural resources would be expected.

5. ENVIRONMENTAL COORDINATION AND COMPLIANCE

5.1 Introduction - This section briefly summarizes project interests, project coordination, views, and environmental compliance.

5.2 Project Interests - The following representatives, agencies, and interest groups have been and/or will be coordinated with pertaining to this study/project:

Congressional

Honorable John Glenn, U.S. Senator
Honorable Michael DeWine, U.S. Senator
Honorable Marcy Kaptur, U.S. Representative

Federal

Advisory Council on Historic Preservation
Federal Emergency Management Agency
Federal Highway Administration
Federal Maritime Commission
U.S. Department of Agriculture:
- Soil Conservation Service
U.S. Department of Commerce:
- National Oceanic and Atmospheric Administration
U.S. Environmental Protection Agency
U.S. Department of Health and Human Services
U.S. Department of Housing and Urban Development
U.S. Department of the Interior:
- Fish and Wildlife Service
- National Park Service
U.S. Department of Transportation - U.S. Coast Guard
U.S. Department of Energy

State

Ohio State Clearinghouse
Ohio Department of Development
Ohio Department of Health
Ohio Department of Natural Resources
Ohio Department of Transportation
Ohio Environmental Protection Agency
Ohio Historic Preservation Office
Ohio Sea Grant
Michigan State Clearinghouse
Michigan Department of Natural Resources
Michigan Historical Division

Local

Toledo Metropolitan Area Council of Governments
Toledo-Lucas County Planning Commission
Toledo-Lucas County Port Authority
City of Toledo
- City Manager
- Department of Public Utilities
- Division of Streets, Bridges and Harbors
- Pollution Control Agency

City of Oregon
Monroe County (Michigan)

Other Organizations

Lake Carriers Association
Great Lakes Commission
Great Lakes United
National Wildlife Federation
Sierra Club
Toledo Edison Company
Association of Yacht Clubs of Toledo

5.3 Project Coordination - Study activities are coordinated with government agencies, interest groups, and the general public. The general intent is to gain assistance in: identifying and scoping existing conditions, problems, needs, and concerns; developing feasible alternative solutions; and assessing, evaluating, and identifying preferred and selected plans. This study's public involvement process incorporates public meeting/workshops, written correspondence, telephone communication, and draft and final report review procedures.

5.3.1 Initial project coordination/scoping was primarily via established planning group meeting/workshops, interim communication, and reporting. The planning group consists of representatives from the following agencies:

U.S. Army Corps of Engineers
U.S. Soil Conservation Service
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Michigan Dept. of Natural Resources
City of Toledo
Ohio Dept. of Natural Resources
Ohio Environmental Protection Agency
Ohio Lake Erie Office
Toledo Lucas Co. Port Authority

5.3.2 Planning group meetings and reporting occurred on the following dates.

April	1992	ASACW Directive
May	7, 1992	Initial Meeting
May	19, 1992	Study Team Conference Call
May	21, 1992	Study Team/Executive Committee
June	30, 1992	Study Team
August	26, 1992	Study Team
September	29, 1992	Study Team/Executive Committee and Public Information Meeting
September	30, 1992	Coastweeks 92 Conference
November	18, 1992	Study Team (Woodtick Peninsula)
December	1-4, 1992	Beneficial Use Conference (New Orleans)
December	10, 1992	Beneficial Use Technical Seminar
March	1993	Phase I Report
March	30, 1993	Study Team Conference Call
April	12, 1993	Study Team/Executive Committee
April	28, 1993	Study Team
May	11, 1993	Study Team
June	10, 1993	Executive Committee
July	1993	Phase II Report
July	1, 1993	Study Team
August	31, 1993	Study Team
October	1993	Public Workshop
November	9, 1993	Executive Committee Meeting
July	27, 1994	Executive Committee Meeting
February	10, 1995	Executive Committee Meeting
September	22, 1995	Executive Committee Meeting

5.4 Agency Views - The views of the local sponsors and concerned resources agencies played a major role in the evaluation and selection of the proposed plan. The following lists some key planning agencies and publics and some issues expressed during this study.

5.4.1 U.S. Army Corps of Engineers: Dredge to maintain Federal navigation channels. Need to dispose of about 800,000 to 900,000 cubic yards of dredged material annually. Disposal needs to be economically and environmentally acceptable. Past and existing practice of open- lake and CDF disposal.

5.4.2 U.S. Soil Conservation Service: Concerned with loss of soils through the watershed. Working to reduce soil loss through the watershed via promoting best management practices pertaining to use of fertilizers and waste management to reduce associated contaminant runoff.

5.4.3 U.S. Environmental Protection Agency: Pollution control and reduction. Working to attain Clean Water Act objectives/goals. Concerned with potential adverse impacts of open-lake disposal. Concerned with continued proliferation of disposal sites that utilize Lake Erie littoral zone. Prefer alternatives, which must also be environmentally acceptable.

5.4.4 Ohio Environmental Protection Agency: Similar statement as for U.S.E.P.A.

5.4.5 U.S. Fish and Wildlife Service: Concerned with continued proliferation of disposal sites that utilize Lake Erie littoral zone. Concerned with potential adverse impacts of open-lake disposal. Prefer alternatives, which must also be environmentally acceptable. Avoid significant adverse impacts to fish and wildlife resources.

5.4.6 Ohio Department of Natural Resources & Michigan Department of Natural Resources: Similar statement as for U.S.F.W.S

5.4.7 Toledo Lucas County Port Authority: Maintain channels and harbor facilities. Dredging and disposal needs to be economically and environmentally acceptable.

5.4.8 City of Toledo: Maintain channels and harbor facilities. Dredging and disposal needs to be economically and environmentally acceptable. Concerned with potential adverse impacts of open-lake disposal to water quality and water intake (supply) facility processing needs.

5.5 Required Environmental Coordination and Compliance - In order to characterize the resource base of the project area and to facilitate project assessment, information has been obtained from existing literature and coordination with those Federal, State, and local agencies, charged with administering fish and wildlife resources, environmental and land use plans, and cultural resources. Agencies, interest groups, and publics which have been and/or are being coordinated with include: the U.S. Environmental Protection Agency, the U.S. Department of Interior - Fish and Wildlife Service, the Ohio State Clearinghouse, the Ohio Department of Natural Resources, the Ohio Environmental Protection Agency, the Ohio Department of Health, the Ohio Historic Preservation Office, the Toledo Metropolitan Area Council of Governments, the Toledo-Lucas County Planning Commission, the Toledo-Lucas County Department of Health, the City of Toledo, and the City of Toledo - Department of Health Reference Attachments.

5.5.1 As summarized in Table 8, compliance with pertinent Federal and State environmental statute is as follows. The soil beneficial use user/developer(s) shall comply with any applicable Federal, State, and local land application and development regulations.

5.5.2 Preservation of Historical Archaeological Data Act of 1974, 16 USC et seq.; National Historic Preservation Act of 1966, as amended, 16 USC 470 et seq.; Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971 - Project coordination was conducted with the Ohio Office of Historic Preservation in the regard. The Ohio Office of Historic Preservation indicated in their letter response that they have no concern with management or removal of dredged material from the confined disposal facility. They stressed however, that the soil beneficial use user/developer(s) shall comply with any applicable Federal, State and local land application and development regulations. Their concern is from the placement of material. They recommend a programmatic agreement to facilitate the implementation of the proposed undertaking.

5.5.3 Clean Air Act, as amended, 42 USC 7401 et seq. - Project coordination was conducted with the U.S. Environmental Protection Agency, the Ohio Environmental Protection Agency, and the Ohio Department of Natural Resources. No significant adverse impacts to air quality would be expected with implementation of the project.

5.5.4 Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 USC 1251 et seq - Project coordination was conducted with the U.S. Environmental Protection Agency, the Ohio Environmental Protection Agency, and the Ohio Department of Natural Resources. No new Section 404(b)(1) Evaluation has been prepared for this EA. Dredging, open-lake, and CDF discharges for Toledo Harbor, Ohio have been addressed in other Section 404(b)(1) evaluation documents including those dated February 1989, June 1990, and November 1990. Watershed and CDF management of sediments (as described) does not directly involve placement of material into U.S. waters. Drainage from the CDF areas would continue to be contained within the CDF and any discharges from the CDF would continue to be controlled via the CDF facility processes. No significant adverse impacts to water quality would be expected with implementation of the interim project.

5.5.5 National Environmental Policy Act, 42 USC 470a, et seq - Project plans are developed and evaluated in accordance with environmental considerations as set forth by this Act, as promulgated by the Department of the Army's: Principles and Guidelines; ER 200-2-2 Environmental Quality - Policies and Procedures for Implementing NEPA; and COE Section 122 Guidelines. The project environmental assessment was/is coordinated with numerous agencies and interests in this regard.

5.5.6 River and Harbor Act, 33 USC 401 et seq - This is a key authority for the Corps of Engineers. Requirements of this authority are fulfilled via the Corps planning, design, operations and maintenance, and permitting authorities and processes. Project plans are developed and evaluated in accordance with considerations, including Section 122 Guidelines, as set forth by this Act. The project was/is coordinated with numerous agencies and interests in this regard.

5.5.7 Fish and Wildlife Coordination Act, 16 USC 661 et seq - Project coordination was conducted with the U.S. Department of the Interior - Fish and Wildlife Service, and the Ohio Department of Natural Resources. A preliminary U.S. Fish and Wildlife Coordination Act Report (FWCAR) dated 22 December 1993 addressing the 5-year Intermediate Plan (1994-1998) - identified as Plan 2a - of the Long-Term Sediment Management Strategy for the Maumee River Watershed, was received by the Buffalo District office on 27 December 1993. Briefly, the report indicated that the plan, as well as other alternative plans considered, will have widespread environmental benefits (direct and indirect) for fish and wildlife; however, all aspects of the plan would need to be implemented for the plan to be successful. The FWCAR report stipulated that Intermediate Plan 2a is an environmentally responsible plan developed through innovative interagency effort. Reference, the FWCAR letter in Appendix C.

5.5.8 Endangered Species Act, as amended, 16 USC 1531 et seq - Project coordination was conducted with the U.S. Department of the Interior - Fish and Wildlife Service and the Ohio Department of Natural Resources. The U.S. Fish and Wildlife Service indicated in their coordination act report that:

"There are a number of Federally threatened and endangered species that are found either seasonally or permanently within the Maumee River Basin or the western basin of Lake Erie. Due to the nature of the Plan 2a, including its separate measures, it is not possible to address the impacts of Plan 2a on each species individually. However, as stated previously, Plan 2a will have widespread environmental benefits including positive benefits upon fish and wildlife resources which includes Federally threatened and endangered species. Decreased levels of sedimentation and turbidity, decreased erosion rates, increased wildlife habitat, and increased food sources for wildlife will all have beneficial impacts on threatened and endangered species." ODNR did not identify any potential significant adverse impacts to State threatened or endangered species.

5.5.9 Executive Order 11990, Protection of Wetlands, 24 May 1977 - Project coordination was conducted with the U.S. Department of the Interior - Fish and Wildlife Service, the U.S. Environmental Protection Agency, the Ohio Department of Natural Resources and the Ohio Environmental Protection Agency. Generally, the project

area has been elevated with discharged dredged material above CDF wetland conditions. Considering the scope of the project and nature of the project site (a CDF) and associated continual disruption, no significant wetland areas would be expected with implementation of the project, as described.

5.5.10 Wild and Scenic Rivers Act, 16 USC 1271 et seq. - Project coordination was conducted with the U.S. Department of the Interior and the Ohio Department of Natural Resources. The Ohio Department of Natural Resources has listed the Maumee River reach from about Perrysburg (just upstream of Toledo Harbor) upstream to about Defiance (about 53 miles) as an important recreational river segment, and the reach from about Defiance to the Ohio - Indiana State Line (about 43 miles) as an important scenic river segment. The lower Maumee River was not listed. These designated will need to be considered, as appropriate, as plans develop.

5.5.11 Coastal Zone Management Act, as amended, 16 USC 1451 et seq - Project coordination was conducted with the U.S. Department of Commerce. A consistency determination under the Coastal Zone Management Act was not prepared, since the State of Ohio does not have an approved coastal zone management program. The study however, is being coordinated with the State of Ohio and associated agencies including ODNR.

5.5.12 Federal Water Project Recreation Act, as amended, 16 USC 460-1 (12) et seq - Project coordination was conducted with the U.S. Department of Interior for their review of the study/project in this regard relative to consistency with long-term land and associated water use plans, including those for recreational developments.

5.5.13 Land and Water Conservation Fund Act, 16 USC 4601 et seq - Project coordination was conducted with the U.S. Department of the Interior for their review of the study/project in this regard, as well as for consistency with their comprehensive outdoor recreation plans.

5.5.14 Watershed Protection and Flood Prevention Act, 15 USC 1001 et seq. - Project coordination was conducted among numerous agencies and interests with interest in water shed protection and flood prevention including the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Department of Interior, the U.S. Department of Agriculture - Soil Conservation Service, the Ohio Environmental Protection Agency, the Ohio Department of Natural Resources, and State regional and local interests. Based on assessment/evaluation of the project, no

significant adverse impacts to watershed protection or flood prevention would be expected with implementation of the project, as described. No significant concerns were express in this regard.

5.5.15 Executive Order 11988, Flood Plain Management, 24 May 1977 - Project coordination was conducted among numerous agencies and interests with interests in flood plain management including the U.S. Army Corps of Engineers and State and local interests. No significant adverse impacts to flood plain management would be expected with implementation of the project, as described. No significant concerns were expressed in this regard.

5.5.16 Farmland Protection Policy Act (PL 97-98) and Executive Memorandum Analysis of Impacts on Prime and Unique Farmlands. - Project coordination was conducted with the U.S. Department of Agriculture - Soil Conservation Service (SCS). The Soil Conservation Service is represented on the study/project planning group and is the lead agency for coordinating/implementing sediment load reduction measures in the Maumee River watershed and has considered associated impacts in this regard (Reference Appendix B3). Under the beneficial uses component in the selected plan, once a developer identifies a site (or sites) where "manufactured soils" may be utilized, it would be the responsibility of the developer to coordinate with the local Soil Conservation Service office (prior to any deposition of such material), in order to obtain a determination as to whether or not any prime or unique farmlands would be impacted.

5.5.17 State and Local - Project coordination was initiated with State and local agencies. The project appears to be consistent with State and local environmental legislation and local land use plans. To date, coordination indicates that the State and local interests are supportive of the proposed project. The soil beneficial use user/developer(s) shall comply with any applicable Federal, State, and local application and development regulations.

SUMMARY TABLE **8**
RELATIONSHIP OF PLAN TO ENVIRONMENTAL PROTECTION
STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

	PLAN
FEDERAL STATUTES	
Preservation of Historical Archaeological Data Act, as amended, 16 USC 469, et seq.	Full
National Historic Preservation Act, as amended, 16 USC 470, et seq	Full
Clean Air Act, as amended ,42 USC 7401, et seq.	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et seq.	Full
National Environmental Policy Act, as amended, 42 USC 470a, et seq.	Full
River and Harbors Act, 33 USC 401, et. seq.	Full
Fish and Wildlife Coordination Act, as amended, 16 USC 661, et seq.	Full
Endangered Species Act, as amended, 16 USC 1531, et seq.	Full
Wild and Scenic Rivers Act, as amended, 16 USC 1271, et seq.	Full
Federal Water Project Recreation Act, as amended, 16 USC 460-1(12), et seq.	Full
Land and Water Conservation Fund Act, as amended, 16 USC 4601, et seq.	Full
Coastal Zone Management Act, as amended, 16 USC 1451, et seq.	Full
Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.	Full
Farmland Protection Policy Act, (7 USC 4201 et seq.)	Full
EXECUTIVE ORDERS, MEMORANDA, ETC.	
Protection and Enhancement of the Cultural Environment (EO 11593)	Full
Protection of Wetlands (EO 11990)	Full
Flood Plain Management (EO 11988)	Full
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	Full
STATE AND LOCAL	
	Full

The compliance categories used in this table were assigned based on the following definitions:

a. Full compliance - All requirements of the statute, EO, or other policy and related regulations have been met for this stage of the study.

b. Partial Compliance - Some requirements of the statute, EO, or other policy and related regulations, which are normally met by this stage of planning, remain to be met.

c. Noncompliance - None of the requirements of the statute, EO, or other policy and related regulations have been met.

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PHASE 3 REPORT

APPENDICES

APPENDICES

Appendix A - Preliminary Phase 1 and 2 Screening
Appendix B - Technical Appendices
    Sub-Appendix B1 - Cost
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    Sub-Appendix B3 - Crop Residue Management
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APPENDIX A

PRELIMINARY PHASE 1 AND 2 SCREENING

APPENDIX A

PRELIMINARY PHASE 1 AND 2 SCREENING

1. Phase 1 Screening:

a. Options Considered in Phase 1:

During the development of Phase 1 of this LTMS, several management options were considered as having potential for contributing to solution(s) to the problem of managing sediment from the Maumee River Watershed and dredged material from Toledo Harbor. These options went through a preliminary screening summarized in *Table A.1* of this Appendix A. Options which showed potential for meeting the stated objectives of the Planning Group were selected and carried forward into Phase 2 for further studies. The other options were eliminated early in Phase 1 for various technical and/or practical reasons. A listing of these options that were eliminated along with the rationale for their elimination are provided below.

b. Options Eliminated Early in Phase 1 -- Rationales:

(1) Filter Strip:

Filter strips are areas of vegetation that would be established to help curtail and filter out a large percentage of the silt and sand particles during runoff periods in the watershed. They were considered in Phase 1 of the study. However, as indicated in the Phase 1 LTMS Report (Toledo Harbor Planning Group, March 1993), flow over sufficient width of vegetation would be required for filter strips to be effective. If properly designed and installed, they would filter out a large percentage of the sand and silt particles. However, the material that reaches the harbor is predominantly fine silts and clays. Filter strips would reduce the cost of local drainage maintenance, but would not significantly reduce the volume of sediment entering the Federal channels. In order to effectively remove clay particles, such filter strips would have to be about 100 to 150 feet wide, and preferably planted to trees. Therefore, it was determined that this alternative option would not be pursued further.

(2) Streambank Erosion Control:

The Maumee River Level B Study Report by Ohio Environmental Protection Agency (OEPA) in 1990, estimated that the rate of erosion at 100,000 tons per year, that is, 1 percent of the total erosion occurring in the basin. Because most streambank erosion is currently being solved with expensive regrading and riprap, the cost per ton to control this type of erosion and preventing it from entering the Federal channels would be too excessive. Therefore, it was concluded that this alternative option would not be pursued further.

(10) Woodtick Peninsula:

The Woodtick Peninsula, located in Michigan, is a natural barrier beach which protects an area of ecological and cultural significance. Figure 2.5 in the main report illustrates the configuration of the peninsula in 1979. The peninsula is 3.75 miles long and comprised of an elongated sand spit south of Toledo Beach along Michigan's Lake Erie coast. The peninsula has experienced significant shoreline erosion since 1915, which has been particularly severe during the period 1964-1979. (USACE, Detroit District, April 1982).

(11) Shallow Water Habitat:

A shallow water habitat is an area submerged in shallow water which is inhabited by various species of fish.

(12) Grassy Island:

Also know as Island 18, Grassy Island is a 132-acre diked enclosure (150 acres total) built and owned by the Corps. Since 1962, the island had been used for disposal of material dredged from the Federal channel (lake approach channel). The island is currently under consideration as a recycling facility to produce manufactured soils. It was considered for the development of a wildlife habitat early in the study process.

(13) Recreational Hill:

The considered recreational hill is a facility that would be on a 320-acre upland site in Erie Township, Monroe County, Michigan. The hill would be built with dredged material. Sediment would first be pumped from a pumpout to the southern tip of Woodtick Peninsula. The material would then be moved to the upland disposal area where it would be used to construct the hill. An estimated 32 million cubic yards of sediment would be needed for this purpose.

(14) Expansion of CDFs:

The CDFs (Cell 1 and Cell 2) can be vertically expanded by pre-excavating material from Cell 2 during construction. However, a sound strategy must be devised for economical storage and retrieval of the material when it is needed. Also, Cell 1 can be vertically expanded by raising its perimeter dikes to the maximum environmentally-acceptable height.

(15) Dewatering of CDF:

A process by which water is removed from confined dredged material to consolidate the material and restore storage space in CDFs. Surface trenching, strip drains, electro-osmosis are some of the techniques that would be applied to dewater.

(16) Recycling CDF:

Figure A.2 of this Appendix A illustrates the concept of how the recycling components could be incorporated into the overall plan for the reusable CDF. The management objective of this concept would be to optimize the potential to totally reuse the dredged material placed in the CDF over time and, therefore, reuse the CDF.

(17) Nearshore CDF:

Construction of Nearshore CDFs would be avoided at Toledo Harbor, OH, unless other environmental or wildlife benefits can be achieved.

(18) Upland and Offshore CDFs:

Upland and offshore CDFs continue to be a potentially viable option for consideration in the formulation of the LTMP.

(19) Open-Lake Disposal:

Within the context of this LTMS study, open-lake disposal is the placement of dredged material in the open waters of the western Lake Erie Basin or Maumee Bay. Disposal at the existing open-lake site, located about 11 miles from the mouth of River would be eliminated at the end of the interim period. A new site in deeper water may be feasible.

(20) No-Action:

No-Action would reflect the prevailing conditions (base conditions) if the Planning Group would fail to reach its goals and objectives as stated in this and previous reports. This prevailing condition would be that the 400,000 cy/yr of polluted dredged material would be placed in Cell 2; and 450,000 cy/yr of less-polluted material would be placed in the open-lake or other locally-provided disposal facilities.

2. Phase 2 Screening:

Based on engineering judgment, cost, time constraints and experience in particular fields of activities; several options carried into Phase 2 were eliminated early from further consideration. The rationales for their elimination are provided below:

a. Options Eliminated Early in Phase 2 -- Rationales:

(1) Conservation Cropping Sequence:

The amount of acres of additional hay required to meet the expected sediment volume reduction was much greater than the expected participation by farmers. In the long run, this may be a viable option. At this time, however, this option would not be pursued further.

(2) Alternative Crops:

One alternative crop considered was canola. Canola requires separate bins and management and the farmers will not raise it. There is no local market to deliver it.

(3) Market for Canola Crop:

Only a small market exists for Canola; and additional acres are unlikely without a complete overhaul of the grain marketing system. Therefore, it was concluded that this option would not be pursued further.

(4) Nutrient and Animal Waste Management:

Manure management is not a significant contributor of sediment or pollutants to Toledo Harbor. Most of the agricultural activity in northwest Ohio is devoted to cropland. The percentage of land in livestock production is small and spread out; so any improvements associated with manure management would be difficult to measure. However, nutrient management, including guidelines for applying animal wastes to cropland, continues to be of importance to local farm agencies.

(5) Construction of Shallow Water Habitat:

Constructing shallow water habitats filled with dredged material, even with less contaminated dredged material from Lake Mile 2 lakeward, raises the possibility of increasing the contaminant level in those animals that would be attracted to these areas. Animals such as waterfowl, and other fish and wildlife organisms can concentrate contaminants in their body tissues.

These shallow water sites would have to be kept to a maximum elevation approximating current lake levels. This would limit the amount of dredged material that could be deposited in each site. The cost of acquisition and placement of geotubes (flexible textile tubes) or some other containment structures, and related maintenance cost, could be quite high versus the expected benefits of disposing of minimal volumes of dredged material in these sites.

Also, recent improvement in the quality of Lake Erie waters (400% - 600%) in some places results in a large increase in the amount of rooted vegetation present in shallow waters of Lake Erie. This further decreases the need for the construction of man-made shallow water habitats.

(6) Construction of Recreational Hill:

Hull & Associates, Inc., under contract to a local "Working Group," conducted a preliminary engineering study of constructing a recreational hill with sediment from a pumpout at the southern tip of Woodtick Peninsula. The study concluded that the recreational hill CDF proposal was technically feasible, and would accommodate approximately 25 million cubic yards of sediment at a total cost of $30.0 million. Throughout the planning effort then, several counties showed considerable support for the project, but the local community was not able to furnish its share of the cost of the study. Since 1989, the local community has not shown any interest in reviving the upland recreational hill CDF idea.

b. Options Carried into Phase 3:

(1) Crop Residue Management;

(2) Grassed Waterway;

(3) Wetland Sediment Ponds;

(4) Runoff Retention Reservoir;

(5) Manufactured Soils and Use of Grassy Island;

(6) Protection/Restoration of Shoreline

c. Alternative Intermediate Plans assessed in Phase 3:

These disposal choices were developed into the following Alternative Intermediate (interim) Plans:

Alternative Intermediate Plans:

(a) Alternative Intermediate Plan 1a:

All material dredged from the Federal channels would be placed in CDF, starting in 1995.

(b) Alternative Intermediate Plan 1b:

* All dredged material in CDF, starting in 1995
* Crop Residue Management
* Manufactured Soils (Beneficial Reuse)
* CDF Management
* Evaluation

(c) Alternative Intermediate Plan 2a:

Table A.1 - Summary of Screening (Phase 1 - 3)

Options	Phases			Rationale for Elimination Problem Areas			
	PH-1	PH-2	PH-3	Engrg	Envir	Econ	Time
A. SEDIMENT LOAD REDUCTION:							
1. Crop Residue Management;	C	C	C				
2. Conservation Cropping Sequence;	C	E	-			X	X
3. Alternative Crops;	C	E	-			X	
4. Grassed Waterway;	C	C	E	X		X	
5. Wetland Sediment Ponds;	C	C	C				
6. AgriRunoff Retention Reservoir	C	C	C				
7. Filter Strip;	E	-	-	X	X		
8. Streambank Erosion Control;	E	-	-			X	
9. Market for Canola Crop.	C	E	-	X		X	
B. CONTAMINANT LEVEL REDUCTION:							
1. Nutrient Management;	C	E	-	X			X
2. Animal Waste Management;	C	E	-	X			X
3. Pest Management.	E	-	-		X		
C. BENEFICIAL USES:							
1. Manufactured Soils;	C	C	C				
2. Environ. Restoration / Protection (Woodtick);	C	C	C				
3. Shallow Water Habitat;	C	E	-	X	X	X	
4. Grassy Island;	C	C	C				
5. Recreational Hill	C	E	-			X	X
6. Strip-Mine Reclamation	NC	NC	E			X	
D. CONFINED DISPOSAL FACILITIES:							
1. Expansion of CDFs;	C	C	C				
2. CDF Reuse Management (Dewatering);	C	C	C				
3. Recycling CDFs;	C	C	C				
4. Construction of Nearshore CDFs;	C	C	C				
5. Up-Land and Offshore CDFs.	C	C	C				
E. OPEN-WATER DISPOSAL:							
1. Existing site;	C	C	C(1)				
2. New site.	C	C	C				
F. NO-ACTION:	C	C	C				

C : Carried through
E : Eliminated
NC : Not Considered
(1) Open-lake disposal at the existing site will be eliminated at the end of the intermediate period in 1998.

(3) Pest Management:

Pest management, a means of reducing adverse effects on plant growth, was also considered in Phase 1. As indicated in the Phase 1 LTMS Report (Toledo Harbor Planning Group, March 1993), while the principles of an integrated Pest Management Program should be applied when managing pest infestations, a review of existing sediment data for Toledo Harbor indicated that concentrations of pesticides are generally below analytical detection limits. Therefore, it was determined that this option would not be pursued any further.

c. Phase 1 Conceptual Action Plans:

Three preliminary concepts of the Action Plan were put together late in Phase 1 as a starting point for formulating, developing, and analyzing a mutually-acceptable Action Plan in the next phases. These concepts considered combinations of confined and unconfined disposal of the dredged material, and other likely viable options to provide for the continued operation and maintenance of the Port of Toledo over a period of 5 years. These concepts called for the development and implementation of a 5-year intermediate plan to provide for continued operation and maintenance of Toledo Harbor during the intermediate period, and to help formulate the Long-Term sediment Management Plan. A typical concept is summarized in *Figure A.1.*

d. Options Carried Forward into Phase 2:

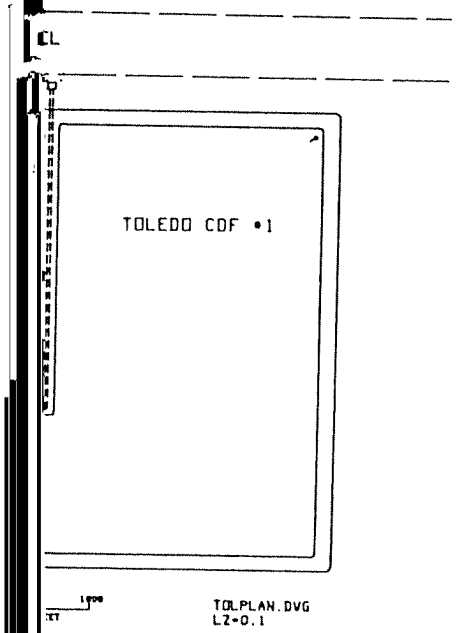
During the Phase 1 study, it was concluded that the following options that are briefly described below warranted further investigation. They were, therefore, carried into Phase 2 of the study.

(1) Crop Residue Management:

Crop Residue Management is a management system where the farmer reduces the amount of annual tillage to the point where a specific amount of crop residue covers the soil surface from harvest through the planting of the next crop. This method known as Conservation Tillage requires that 30 - 100 percent of the soil surface be covered with the previous crop residue after planting.

(2) Conservation Cropping Sequence:

Conservation cropping sequence refers to the adapted sequence of crops designed to provide adequate organic residue for maintenance or improvement of soil tilth. Its purpose is to improve or maintain good physical, chemical, and biological conditions of the soil, help reduce erosion, improve water use efficiency, and water quality and improve wildlife habitat. This cropping practice applies to all croplands or other lands where agricultural crops are grown.



UAL INTERMEDIATE/LONG-TERM ACTION PLAN

1993
600000 CY IN TOLEDO CDF •1
300000 CY IN OPEN-LAKE

1994
400000 CY IN TOLEDO CDF •1
200000 CY IN TOLEDO CDF •2
300000 CY IN OPEN-LAKE
BEGIN DEWATERING EASTERN PORTION OF TOLEDO CDF •1

1995
600000 CY IN TOLEDO CDF•2
300000 CY IN OPEN-LAKE
CONTINUE DEWATERING EASTERN PORTION OF TOLEDO CDF •1
BEGIN MINING WESTERN PORTION OF TOLEDO CDF •1

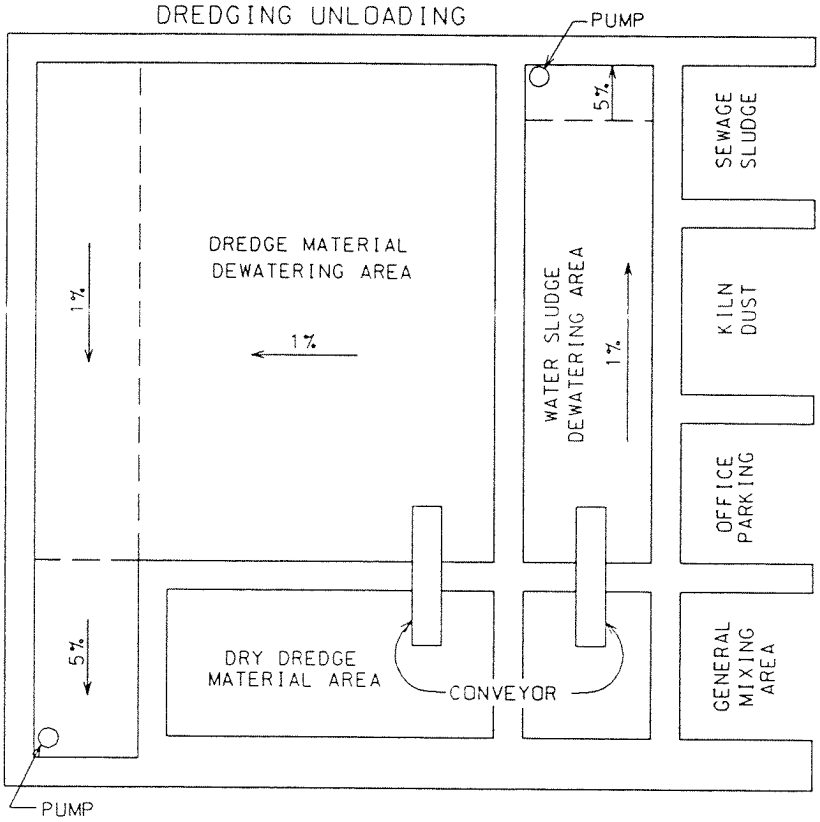
1996
600000 CY IN TOLEDO CDF •2
300000 CY IN OPEN-LAKE
CONTINUE DEWATERING EASTERN PORTION TOLEDO CDF •1
CONTINUE MINING WESTERN PORTION OF TOLEDO CDF •1

1997
600000 CY IN TOLEDO CDF •2
NOTE: MATERIAL EXCEEDS LAKE LEVEL. BEGIN DEWATERING
300000 CY IN OPEN-LAKE
CONTINUE DEWATERING EASTERN PORTION TOLEDO CDF •1
CONTINUE MINING WESTERN PORTION OF TOLEDO CDF •1

1998
TRANSITION ENDS:
- WATER QUALITY CRITERIA IN PLACE
- LOWER DREDGED MATERIAL QUANTITY DUE TO SEDIMENT LOAD REDUCTION
- GRASSY ISLAND RESTORATION
- WOODTICK PENINSULA RESTORATION
- INCREASED MINING OPERATION (BENEFICIAL USE)
- MANAGE CDF (DEWATERING)
- NO OPEN-LAKE DISPOSAL

FUTURE
ULTIMATE REUSABLE CDF

RECYCLING REUSE FACILITY



TOLEDO HARBOR, TOLEDO, OHIO

LONG-TERM SEDIMENT MANAGEMENT STRATEGY

RECYCLING REUSE FACILITY

TOLEDO HARBOR PLANNING GROUP
DECEMBER 1993

FIGURE A2

TECHNICAL APPENDIX B

- **SUB-APPENDIX B1** Cost and Percent Sediment Distribution
- **SUB-APPENDIX B2** CDF Management
- **SUB-APPENDIX B3** Crop Residue Management
- **SUB-APPENDIX B4** Sediment and Water Quality Testing

SUB- APPENDIX B1

COST AND PERCENT DISTRIBUTION OF SEDIMENT

COST - SUB-APPENDIX B1

1. **ESTIMATED COSTS:**

Estimated costs have been prepared to the level of detail normally associated with early evaluation of alternatives during feasibility. All costs are provided at October 1993 price levels.

a. **Maintenance Dredging**

Costs are representative of unit prices for dredging and disposal only, under contract; does not include mobilization costs, engineering and design (E&D), or construction management (CM).

	Confined Disposal	Open-Lake Disposal
Lake Miles 2 to 5	$3.00/cy	$3.75/cy
Beyond Lake Mile 5	$5.00/cy	$2.25/cy

b. **Subdividing Existing Disposal Area**

Construction of 2,300 foot long "cross-dike;" includes E&D and CM.

Using conventional equipment and offsite borrow	$150,000
Using geotubes and dredge plant	$575,000

c. **Raising channelward portion of existing CDF** using conventional equipment and offsite borrow, after construction of "cross-dike;" includes E&D and CM.

Raise CDF an initial 10 feet	$2,240,000
Raise CDF an additional 5 feet	$1,090,000

d. **Raising new CDF** using conventional equipment and offsite borrow; includes E&D and CM.

Raise new CDF an initial 10 feet	$1,940,000
Raise new CDF an additional 5 feet	$ 960,000

e. **Construction of future CDF capacity**

Construction costs for this work will be highly site specific. Based on previously completed work, the following unit cost ranges (which include E&D and CM), have been identified for sites comparable to those previously constructed at Toledo.

Sites accessible by land: $2-$5/cy of capacity
Site accessible only by marine equipment: $5-$10/cy of capacity.

f. **Disposal Area Management**

The costs developed by the Waterways Experiment Station (WES) for both Surface Trenches ($0.50/ft) and vertical strip drains ($0.60/ft of depth) appears reasonable for use at this stage. More specific information/cost experience will be required to be developed if this plan component is included for further consideration.

2. DISTRIBUTION OF SEDIMENT VOLUME REDUCTION

A total of 850,000 cy/yr of material would be dredged from three reaches of the Federal navigation channels. Volumes dredged per reach are as follows:

LM2-RM7	==>	400,000 cy
LM2-LM5	==>	200,000 cy
LM5-LM19	==>	250,000 cy
TOTAL	==>	850,000 cy

Given the amount of material dredged per reach, the percentage of total volume for each reach are calculated.

400,000	÷ 850,000	47%	for (LM2-RM7)
200,000	÷ 850,000	24%	for (LM2-LM5)
+ 250,000	÷ 850,000	29%	for (LM5-LM19)
850,000	Total		

3. CALCULATIONS

The amount of material that is dredged from each reach after conservation techniques are applied, are calculated as follows:

Year	Volume					
1	850,000		400,000 (LM2-RM7)			
	- 0		200,000 (LM2-LM5)			
	850,000	Total	250,000 (LM5-LM19)			
2	850,000		47% (768,000)	=	361,000	
	- 82,000		24% (768,000)	=	184,000	
	768,000	Total	29% (768,000)	=	223,000	
3	850,000		47% (757,000)	=	356,000	
	- 93,000		24% (757,000)	=	182,000	
	757,000	Total	29% (757,000)	=	220,000	
4	850,000		47% (742,000)	=	349,000	
	- 108,000		24% (742,000)	=	178,000	
	742,000	Total	29% (742,000)	=	215,000	
5	850,000		47% (713,000)	=	335,000	
	- 137,000		24% (713,000)	=	171,000	
	713,000	Total	29% (713,000)	=	207,000	

4. COST PER YEAR OVER 5 YEARS FOR EACH ALTERNATIVE PLAN

The volume of dredged material for each reach is multiplied by the unit cost of disposal for that reach. The unit costs vary depending on both reach and disposal facility and site location (either open-lake or CDF). The unit costs are given on the first page of the Cost Appendix and kept constant.

This same procedure is used on each of the Alternative Intermediate Plans.

a. Alternative Intermediate Plan 1b (5-Year Average Cost)

Year	Reach	Volume	Unit Cost (4)	Itemized Cost ($)	Total Cost ($)
1	LM2-RM7	400,000	5.40	2,160,000	
	LM2-LM5	200,000	4.40	880,000	
	LM5-LM19	250,000	6.40	1,600,000	
					4,640,000
2	LM2-RM7	361,000	5.40	1,949,400	
	LM2-LM5	184,000	4.40	809,600	
	LM5-LM19	223,000	6.40	1,427,200	
					4,186,200
3	LM2-RM7	356,000	5.40	1,922,400	
	LM2-LM5	182,000	4.40	800,800	
	LM5-LM19	220,000	6.40	1,408,000	
					4,131,200
4	LM2-RM7	349,000	5.40	1,884,600	
	LM2-LM5	178,000	4.40	783,200	
	LM5-LM19	215,000	6.40	1,376,000	
					4,043,800
5	LM2-RM7	335,000	5.40	1,809,000	
	LM2-LM5	171,000	4.40	752,400	
	LM5-LM19	207,000	6.40	1,324,800	
					3,886,200

5 year average volume ==> 766,000 cy
5 year average cost ==> $4,177,480 SAY $4.2 million

b. Alternative Intermediate Plan 2a (5-Year Average Cost)

Year	Reach	Volume	Unit Cost (4)	Itemized Cost ($)	Total Cost ($)
1	LM2-RM7	400,000	5.40	2,160,000	
	LM2-LM5	200,000	4.40	880,000	
	LM5-LM19	250,000	2.25	562,500	
					3,602,500
2	LM2-RM7	361,000	5.40	1,949,400	
	LM2-LM5	184,000	4.40	809,600	
	LM5-LM19	223,000	2.25	501,750	
					3,260,750
3	LM2-RM7	356,000	5.40	1,922,400	
	LM2-LM5	182,000	4.40	800,800	
	LM5-LM19	220,000	2.25	495,000	
					3,218,200
4	LM2-RM7	349,000	5.40	1,884,600	
	LM2-LM5	178,000	4.40	783,200	
	LM5-LM19	215,000	2.25	483,750	
					3,151,550
5	LM2-RM7	335,000	5.40	1,809,000	
	LM2-LM5	171,000	4.40	752,400	
	LM5-LM19	207,000	2.25	465,750	
					3,027,150

5 year average volume ==> 766,000 cy
5 year average cost ==> $3,252,030 SAY $3.25 million

c. Alternative Intermediate Plan 2b (5-Year Average Cost)

Year	Reach	Volume	Unit Cost (4)	Itemized Cost ($)	Total Cost ($)
1	LM2-RM7	400,000	5.40	2,160,000	
	LM2-LM5	200,000	3.75	750,000	
	LM5-LM19	250,000	2.25	562,500	
					3,472,500
2	LM2-RM7	361,000	5.40	1,949,400	
	LM2-LM5	184,000	3.75	690,000	
	LM5-LM19	223,000	2.25	501,750	
					3,141,150
3	LM2-RM7	356,000	5.40	1,922,400	
	LM2-LM5	182,000	3.75	682,500	
	LM5-LM19	220,000	2.25	495,000	
					3,099,900
4	LM2-RM7	349,000	5.40	1,884,600	
	LM2-LM5	178,000	3.75	667,500	
	LM5-LM19	215,000	2.25	483,750	
					3,035,850
5	LM2-RM7	335,000	5.40	1,809,000	
	LM2-LM5	171,000	3.75	641,250	
	LM5-LM19	207,000	2.25	465,750	
					3,916,000

5 year average volume ==> 766,000 cy
5 year average cost ==> $3,133,080 SAY $3.1 million

5. DETAILED COST/REACH FOR MATERIAL PLACEMENT

Detailed cost per reach for the material placement is calculated for each plan.

The average volume of material for each reach is calculated over the 5 year plan.

The average volume is then multiplied by the cost. The result is the average cost for each reach.

These costs will be used in the following tables.

a. Detail Cost/Reach for Material Placement - Plan 1b

5-Year Average Volume for Plan 1b

Year 1	LM2-RM7	400,000
Year 2	LM2-RM7	361,000
Year 3	LM2-RM7	356,000
Year 4	LM2-RM7	349,000
Year 5	LM2-RM7	335,000
	5-year Average Volume	360,000

Cost: 360,000 X 5.40 ==> 1,944,000

Year 1	LM2-LM5	200,000
Year 2	LM2-LM5	184,000
Year 3	LM2-LM5	182,000
Year 4	LM2-LM5	178,000
Year 5	LM2-LM5	171,000
	5-year average Volume	183,000

Cost: 183,000 X 4.40 ==> 805,200

Year 1	LM5-LM19	250,000
Year 2	LM5-LM19	223,000
Year 3	LM5-LM19	220,000
Year 4	LM5-LM19	215,000
Year 5	LM5-LM19	207,000
	5-year Average Volume	223,000

Cost: 223,000 X 6.40 ==> 1,427,200

5-Year Average Cost For Material Placement for Plan 1b $4,176,400

SAY $4.2 million

b. **Detailed Cost/Reach for Material Placement - Plan 2a**

5-Year Average Volume for Plan 2a

Year 1	LM2-RM7	400,000
Year 2	LM2-RM7	361,000
Year 3	LM2-RM7	356,000
Year 4	LM2-RM7	349,000
Year 5	LM2-RM7	335,000
	5-Year Average	360,000

Cost: 360,000 X 5.40 ==> 1,944,000

Year 1	LM2-LM5	200,000
Year 2	LM2-LM5	184,000
Year 3	LM2-LM5	182,000
Year 4	LM2-LM5	178,000
Year 5	LM2-LM5	171,000
	5-Year Average	183,000

Cost: 183,000 X 4.40 ==> 805,200

Year 1	LM5-LM19	250,000
Year 2	LM5-LM19	223,000
Year 3	LM5-LM19	220,000
Year 4	LM5-LM19	215,000
Year 5	LM5-LM19	207,000
	5-Year Average	223,000

Cost: 223,000 X 2.25 ==> 501,750

5-Year Average Cost For Material Placement For Plan 2a $3,250,950

SAY $3.3 million

c. **Detail Cost/Reach for Material Placement - Plan 2b**

5-Year Average Volume for Plan 2b

Year 1	LM2-RM7	400,000
Year 2	LM2-RM7	361,000
Year 3	LM2-RM7	356,000
Year 4	LM2-RM7	349,000
Year 5	LM2-RM7	335,000
	5-Year Average	360,000

Cost: 360,000 X 5.40 ==> 1,944,000

Year 1	LM2-LM5	200,000
Year 2	LM2-LM5	184,000
Year 3	LM2-LM5	182,000
Year 4	LM2-LM5	178,000
Year 5	LM2-LM5	171,000
	5-Year Average	183,000

Cost: 183,000 X 3.75 ==> 686,250

Year 1	LM5-LM19	250,000
Year 2	LM5-LM19	223,000
Year 3	LM5-LM19	220,000
Year 4	LM5-LM19	215,000
Year 5	LM5-LM19	207,000
	5-Year Average	223,000

Cost: 223,000 X 2.25 ==> 501,750

5-Year Average Cost For Material Placement for Plan 2b $3,132,000
SAY $3.1 million

6. 5-YEAR AVERAGE COSTS PER COMPONENTS OF PLANS

a. 5-Year Average Cost for Components of Plan 1b

(1) Cost for Component 1 of Plan 1b: Interim Placement of Dredged Material:

Under Alternative Intermediate Plan 1b, there would be no open-lake disposal. All material dredged from the Federal channels (River Mile 7 through to Lake Mile 19) would be contained in the new CDF (Cell 2). Therefore, the total cost for this component of Plan 1b at October 1993 prices is summarized in *Table B1.1* below.

Table B1.1 - 5-Year Average Cost of Material Placement - Plan 1b October 1993 Price Levels

Reach (mile)	Volume(1) (cy)	Unit Cost ($/cy)	Sub-Total ($/cy)
LM2 - RM7	360,000	5.40	1,944,000
LM2 - LM5	183,000	4.40	805,000
LM5 - LM19	223,000	6.40	1,408,000
			4,157,000

5-Year Average Cost: $4.16 million

NOTE: Unit cost are at October 1993 prices.
(1) 5-Year average volume

(2) Cost for Component 2 of Plan 1b: Crop Residue Management:

The cost for implementing the crop residue management test project is based on the premise that 75 percent of the watershed would be under the Conservation Tillage Method of farming. The cost for the 5-year crop residue management test project is summarized in *Table B1.2* below.

Table B1.2 - 5-Year Average Cost for Crop Residue Management - Plan 1b

October 1993 Price Levels

Program Component	Annual Cost ($)
County Committees	31,000
Educational Grants	100,000
Grants	100,000
Landowner Funds and Equipment Buydown	1,004,000
Technical Assistance (SWCDs)	65,000
Technical Assistance (SCS)	300,000
	1,600,000

5-Year Average Cost: $1.6 million

* Includes cost for evaluation the result of this crop residue management test project.

(3) Cost for Component 3 of Plan 1b: Manufactured Soils:

The blending and processing of the dredged material with admixtures to produce manufactured soils would take place on Grassy Island (Island 18). The manufactured soils would be transported to a distribution center within a 35 mile radius of the recycling CDF site. The estimated cost to produce the manufactured soils includes the cost of the admixtures, processing, and upfront capital cost to build staging areas, and cost of 115,00 cy/yr of manufactured soil at $7.15/cy is estimated at $.8 million.

(4) Cost for Component 4 of Plan 1b: CDF Management:

The intermediate CDF management test project involves management of surface water in Cell 1 or possibly in Cell 2 to facilitate dewatering, consolidation, and surface desiccation for increased storage capacity, as well as improved site mobility. The cost for implementing this CDF management test project is presented in Table B1.3 below. The strip drain technique for the dewatering project would be initially demonstrated over a 10-acre site. Estimated costs shown in Table B1.3 are total costs to implement the interim CDF management program. The 5-year average cost is derived from the total estimated costs.

Table B1.3 - 5-Year Average Cost for CDF Management - Plan 1b October 1993 Price Levels

Site	Surface Trenches ($)	Soil Sample Test ($)	Install Drains ($)	Sub-total Cost ($)
Cell 1	80,000	32,000	916,000	1,028,000
Cell 2	65,000	--	--	65,000
		Total Estimated Costs		1,093,000

5-Year Average Cost: $219,000*

* Includes cost for mobilization/demobilization and monitoring.

b. **5-Year Average Cost for Components of Plan 2a**

(1) Cost for Component 1 of Plan 2a: Dredged Material Placement:

Alternative Intermediate Plan 2a calls for a combination of confined and unconfined placement of the dredged material. all material dredged from the Federal channels from River Mile 7 through to Lake Mile 5 would be contained in the new CDF (Cell 2); and all material dredged from Lake Mile 5 through to Lake Mile 19 would be placed in the existing open-lake site, which would be monitored for potential impacts. The total cost for the material placement component of Alternative Intermediate Plan 2a, at October 1993 prices, is summarized in Table B1.4 as follows:

Table B1.4 - 5-Year Average Cost of Material Placement - Plan 2a October 1993 Price Levels

Reach (mile)	Volume(1) (cy)	Unit Cost ($/cy)	Sub-Total ($/cy)
LM2 - RM7	360,000	5.40(c)	1,944,000
LM2 - LM5	183,000	4.40(c)	805,000
LM5 - LM19	223,000	2.25(u)	502,000
			3,251,000

5-Year Average Cost: $3.25 million

(1) 5-Year average volume
(u) Unconfined
(c) Confined

(2) Cost of Component 2 of Plan 2a: Crop Residue Management:

The cost for implementing the Crop Residue Management Test Project would be the same as that for Plan 1b. It is based on the premise that 75 percent of the watershed will be under the Conservation Tillage Method of farming. **The cost for the 5-year Crop Residue Management Test Project is estimated at $8.0 million with an average annual cost of $1,600,000.**

(3) Cost of Component 3 of Plan 2a: Manufactured Soils:

The annual cost for producing 115,000 cubic yards of manufactured soils under Alternative Intermediate Plan 2a is the same as that for Plan 1b. The cost annual was estimated at $.8 million.

(4) Cost for Component 4 of Plan 2a: Management of CDF:

The CDF Management Test Project involves management of surface water in Cell 1 and Cell 2 to facilitate dewatering, consolidation, and surface desiccation for increased storage capacity, as well as improved site mobility. **The cost for implementing this CDF Management Project is the same as that for Plan 1b, and is estimated at a total cost of $1.1 million with an average cost of $219,000.**

c. **5-Year Average Cost for Components of Plan 2b**

(1) Cost for Component 1 of Plan 2b: Dredged Material Placement:

Alternative Intermediate Plan 2b calls for a combination of confined and unconfined placement of the dredged material. All material dredged from the Federal channels from River Mile 7 through to Lake Mile 2 would be contained in the new CDF (Cell 2); and all material dredged from Lake Mile 2 through to Lake Mile 19 would be placed in the existing open-lake site, which would be monitored for potential impacts. The total cost for this component of Alternative Intermediate Plan 2b, at October 1993 prices, is summarized in Table B1.5 as follows:

Table B1.5 - 5-Year Average Cost of Material Placement - Plan 2b
October 1993 Price Levels

Reach (mile)	Volume(1) (cy)	Unit Cost ($/cy)	Sub-Total ($/cy)
LM2 - RM7	360,000	5.40(c)	1,944,000
LM2 - LM5	183,000	4.40(u)	805,000
LM5 - LM19	223,000	6.40(u)	1,408,000
			3,132,000

5-Year Average Cost: $3.13 million

(1) 5-Year average volume
(u) Unconfined (c) Confined

(2) Cost of Component 2 of Plan 2b: Crop Residue Management:

The cost for implementing the Crop Residue Management Test Project would be the same as that for Plan 2a. It is based on the premise that 75 percent of the watershed will be under the Conservation Tillage Method of farming. **The cost for the 5-year Crop Residue Management Test Project is estimated at $8.0 million with an average annual cost of $1,600,000.** This cost is summarized in Table B1.2.

(3) Cost of Component 3 of Plan 2b: Manufactured Soils:

The annual cost for producing 115,000 cubic yards of manufactured soils under Alternative Intermediate Plan 2b is the same as that for either Plan 1b or Plan 2a. The annual cost was estimated at $.8 million.

(4) Cost for Component 4 of Plan 2b: Management of CDF:

The CDF Management Test Project involves management of surface water in Cell 1 and Cell 2 to facilitate dewatering, consolidation, and surface desiccation for increased storage capacity, as well as improved site mobility. **The cost for implementing this CDF Management Project is the same as that for Plan 2a, and is estimated at a total cost of $1.1 million with an average cost of $219,000.**

SUB-APPENDIX B2

CDF MANAGEMENT

CDF MANAGEMENT SUB-APPENDIX B2

1. DEWATERING CONSTRUCTION COST ESTIMATES FOR CELL 1

The dredged material is mostly silts and clays with probably low permeability. Excess pore pressures are probable in Cell 1. An estimate of the potential settlement will be possible from measurements of the excess pore pressure distribution, depth of the soil that will consolidate, and a reasonable estimate of the coefficient of consolidation.

Consolidation of Cell 1 will be expedited by the use of surface trenches followed by an installation of vertical strip drains. Surface trenches should be initially installed to speed up drainage and consolidation of surface soil. The surface soil will also increase in strength to provide sufficient support for heavy equipment required for possible installation of vertical strip drains. Surface trenches are typically spaced about 100 feet apart. Surface trenches that might be placed in Cell 1 are shown in Figure B2.1.

Preliminary investigation indicates that strip drains won't be needed because of the low water pressure at the CDFs site. However, vertical strip drains could possibly be spaced 10 to 15 feet apart depending on the rate at which consolidations should take place. These strip drains would be placed between the surface trenches as shown in Figure B2.1. These trenches are spaced about 100 feet apart so there will be space for about 10 or 15 rows of strip drains between each row of surface trenches.

A spacing of 10 feet would be adequate if consolidation is required in about 1 year, while a spacing of 15 feet will probably be adequate if consolidation can take place over a 5 year period. Horizontal strip drains are also required to carry water from the vertical strip drains to the surface trenches. Figure B2.2 illustrates vertical strip drains with horizontal strip drains feeding water into a surface trench. Vertical strip drains are about 4 inches wide by about 0.25 inch thick, while horizontal drains are about 1 foot wide by about 1 inch thick. Consolidation is considered to take place over a depth of about 15 feet in CDF 1.

A cross-dike may be required to separate or divide the CDF into east and northeast compartments. This dike may be made of quarry or rubble material or it may be made from a 16 foot diameter geotube. It would allow for continued use of the CDF while the material is being dewatered and consolidated.

a. **Surface Trenches**

Surface trenches cost about $0.50 per foot to build. For East CDF 1, the preliminary cost estimate is:

$COST_{trench} = N \times L \times Cost/ft = 12 \times 3900 \times 0.50 = \$23,400$

where
N = number of trenches
L = average length of each trench, feet

For Northeast CDF 1, the preliminary cost estimate is:

$COST_{trench} = N \times L \times Cost/ft = 24 \times 2300 \times 0.50 = \$27,600$

The collector surface trench shown in Figure B2.1 would be about 3,600 feet long and it should cost about $2,000. Total cost for surface trenches would be about $53,000. The total area to be dewatered is about 10 million square feet or 230 acres. Cost/acre for surface trenches is about $230.

b. **Vertical Strip Drains**

Vertical strip drains are estimated at about $0.60 per foot of depth. Preliminary cost estimate would be as follows:

Site	Drain Spacing (ft)	Number of Drains	Estimated Cost
Northeast CDF 1	10	55,000	495,000
	15	24,500	221,000
East CDF 1	10	46,800	421,000
	15	20,800	187,000

The cost for vertical strip drains would be about $1 million for a 10 foot spacing and perhaps half of his or $500,000 or so for a spacing of 15 feet. Cost per acre would be about $4,400 for a 10 foot spacing or $2,200 per acre for a 15 foot spacing.

Laboratory tests have been performed on soil samples to obtain the data for calculation of the rate of consolidation and potential for settlement. Data required includes shear strength, water content, Atterberg limits, void ratio, density, specific gravity, permeability, and the coefficient of consolidation. Piezometers had been installed to measure the distribution of excess pore

pressures. Total cost for these tests would probably be $30,000 to $50,000.

c. **Dike**

A dike about 8 feet high, placed between Northeast CDF 1 and East CDF 1, would cost about $200/foot from quarry material or about $50/foot if a geotube is used. A dike made out of quarry material will have to be supported by a geotextile because the soil may be very soft. The cost estimate for a 2,300-foot long dike is as follows:

quarry material:	$460,000
Geotube:	115,000

d. **Sampling for Cell 1 of Port Facility #3**

To characterize the existing Confined Disposal Facility #3 at Toledo, Ohio, a program of sampling in-place materials, performing certain index and classification tests on those materials, and installing piezometers to evaluate in-situ pore water pressure conditions is proposed. Evaluation of pore water pressure conditions is necessary to determine if certain procedures for dewatering would be feasible and appropriate, both in terms of effectiveness and cost.

The plan for the boreholes and the piezometers is shown on Figure B2.3. Sample materials from six boreholes (H-1 through H-6, as shown on Figure B2.3), had been taken or hand augured. Six piezometers were installed, three at different levels in two locations (P-1 and P-2) as shown in Figure B2.3. It is necessary to install piezometers at different elevations to evaluate pore pressure variation with depth. Approximately one pint of soil will be retained from each of the six boreholes for chemical analyses, if these are desired to be performed later.

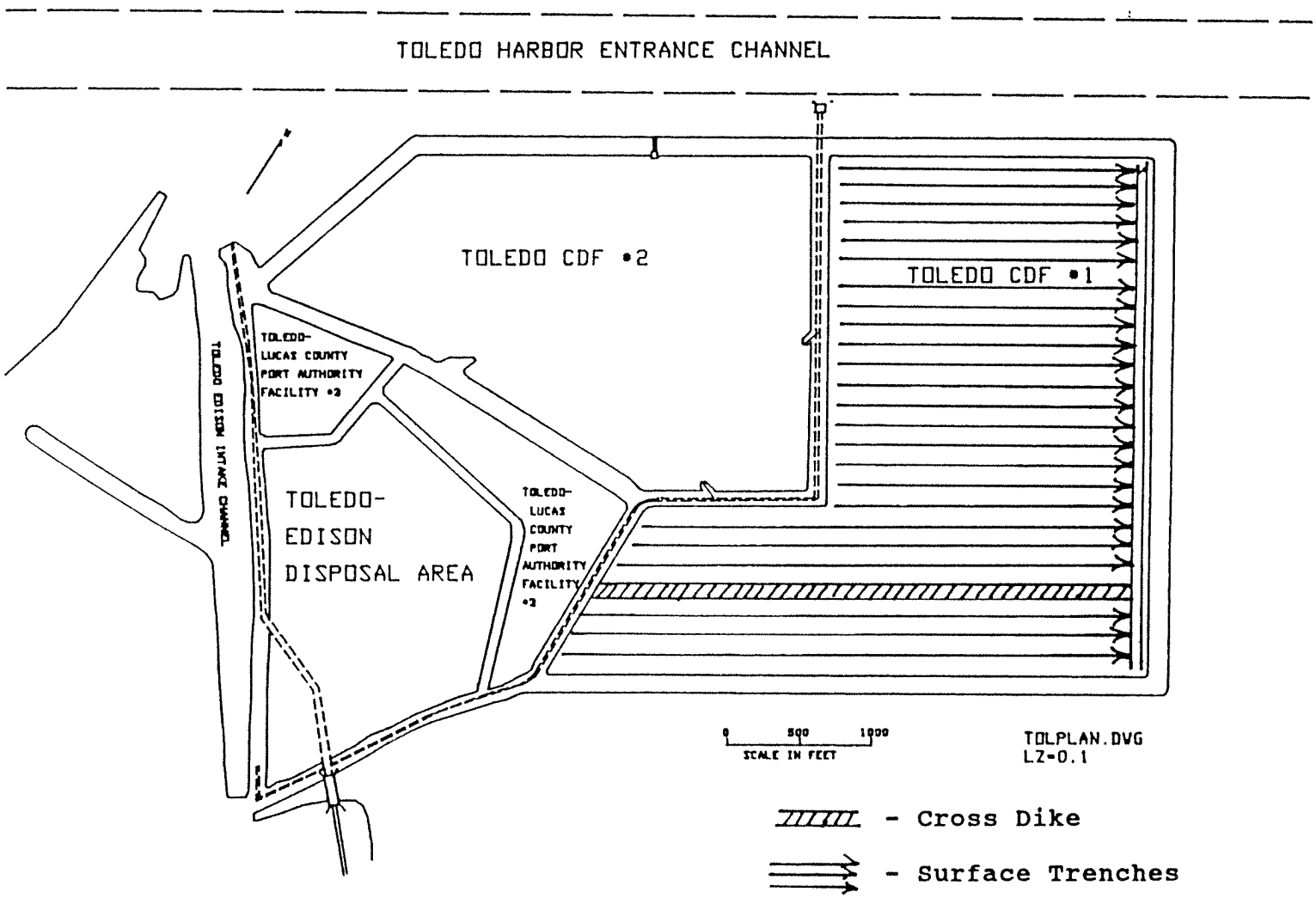


Figure B2.1 Drainage Trenches

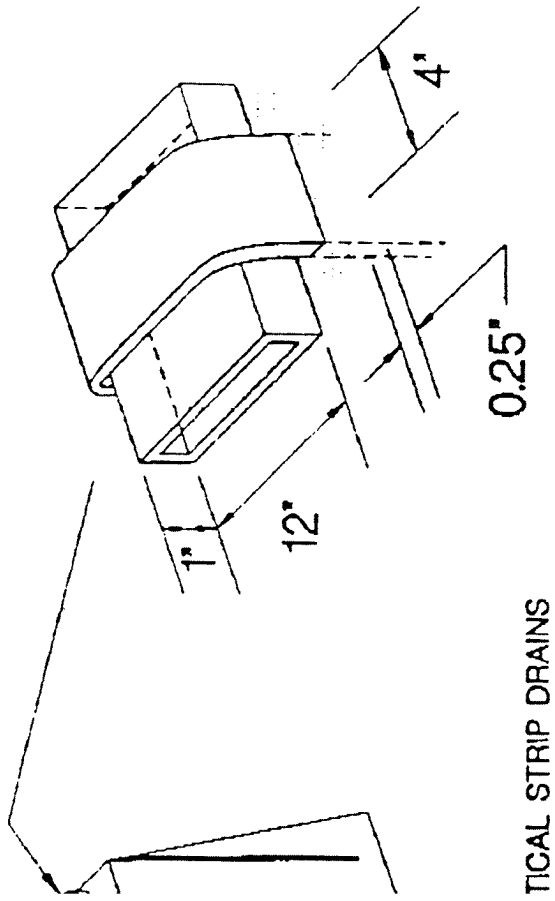


Figure B2.2 Vertical and horizontal strip drains

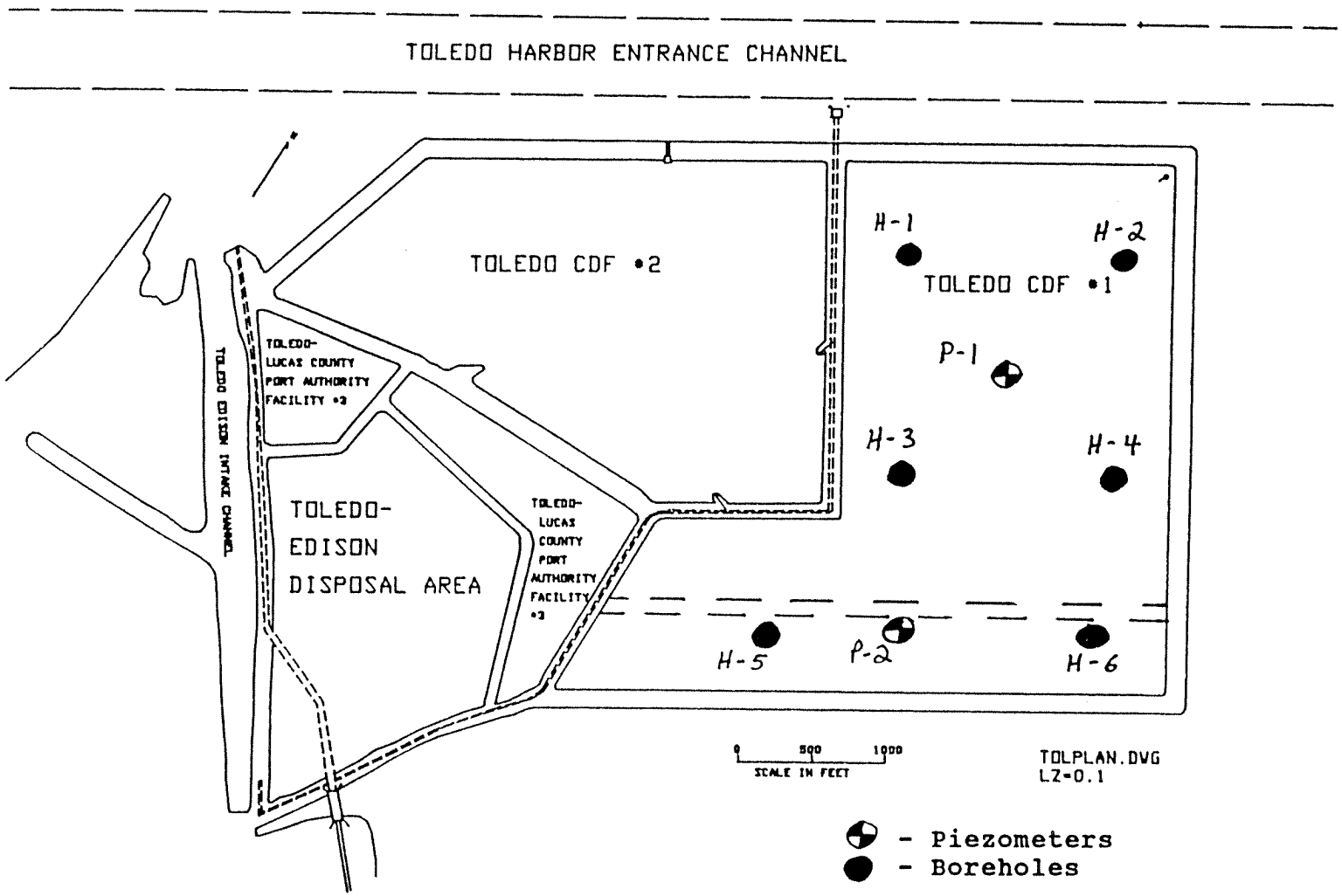


Figure B2.3 Boreholes and Piezometers

SUB-APPENDIX B3

CROP RESIDUE MANAGEMENT

I. Introduction

The Maumee River Basin drains 4,230,000 acres from three states. Agricultural and forestland comprise the majority of land use in the basin. There are approximately 3,300,000 acres of cropland, 50,000 acres of pasture land, 100,000 acres of farmsteads, and 300,000 acres of forestland in the basin. The remainder of the acreage consists of urban and built-up land and land devoted to miscellaneous and rural transportation uses.

II. Physiology and Geology and Soils

The basin is shaped like a round saucer with flat lake plains in the low center, sloping till plains around the higher periphery, and beach ridges scattered in between. The basin lies in the glaciated lake and till plains of the central lowlands physiographic province. The central and lower portion of the basin is in Major Land Resource Area (MLRA) 99, Erie Huron Plain. This section has a nearly flat to gently undulating surface veneered with lacustrine (lake) deposits. Relief is generally 5 to 10 feet, but in some areas near streams it may reach 20 feet. The periphery of the basin is in MLRA 111, Indiana and Ohio Till Plain. Till plain land is relatively flat to undulating and characterized by broken ridges (end moraines) roughly paralleling the shore of Lake Erie.

Bedrock exposures are rare in the basin. Streams of the Maumee River system are mostly of flat gradient, except for the St. Joseph River headwaters in Hillsdale County, Michigan. This stream flows southwest through Williams County, Ohio, to Fort Wayne in Allen County, Indiana, where it joins stream flow from the St. Marys River flowing northwest to form the Maumee River. The Maumee then flows northeast to Lake Erie at Toledo. Two other streams join the Maumee River at Defiance. The Tiffin River flows south from Hillsdale and Lenawee Counties, Michigan, and the Auglaize-Blanchard River systems which drain much of the southern portion of the Maumee Basin.

The Maumee River from Fort Wayne to Toledo has an average slope of 1.3 feet per mile; St. Marys 2.8 ft/mi; St. Joseph 1.6; Tiffin 1.2; Auglaize 3.2; Little Auglaize 2.5; and Blanchard 0.9 feet per mile. Some of the headwater streams have a fall of 10 feet per mile.

The soils in the Maumee River Basin are predominantly nearly level to gently sloping. They are very poorly to somewhat poorly drained, moderately fine to fine textured, and formed in lacustrine and till material. In local areas throughout the basin, there are better drained soils, such as sloping soils and gravelly and sandy soils, and a few bog soil areas. Alluvial soils in the basin are mostly dark colored and very poorly drained.

III. Recent History of Maumee Basin

Settlement by people of European decent was later than that of surrounding lands because of the nearly impassable "Black Swamp" that covered the central and lower part of the basin. Early settlers located on land along the streams and creeks. Little progress was made in settling the rest of the country until methods of draining the swamp were developed about the time of the Civil War. At first the wet areas were drained by open ditches and subsurface wooden drains, but later clay, concrete, and plastic lines replaced the wooden drains.
As more and more acreage was cleared and drained, the land was opened to the process of accelerated erosion and sedimentation. Initially, the field sizes were small, 5 to 10 acres, and small grain and hay rotations were used to control weeds and pests.[1/] Small field sizes and long rotations provided a reasonable measure of erosion and sediment control until the period following World War II.

The mechanical and chemical technology developed during the war years was adapted to the farm equipment arena. With the ever increasing power and size of farm machinery, fence rows were eliminated and the size of fields increased. By the late 1960's and early 1970's, a combination of high commodity prices and the use of agricultural chemicals led farm operators to remove the remaining fences and concentrate on basically a row crop rotation.

IV. Watershed Erosion

Watershed erosion by water consists of three defined types: sheet and rill erosion, gully erosion, and streambank erosion. Estimates of sheet and rill erosion show that since about 1955 approximately 10,200,000 tons of soil eroded (detached from the soil surface) in the Maumee Basin on an average annual basis.[2/] Streambank and gully erosion were estimated to be 100,000 tons per year.[3/] Total watershed erosion for this period would average approximately 10,300,000 tons per year.

1/ Ohio Agricultural Statistics and Ohio Department of Agriculture Annual Report.
2/ USDA, Soil Conservation Service. National Resources Inventory. 1982.
3/ Maumee River Basin, Level B Study. Erosion and Sedimentation Technical Paper. August 1975.

V. Transport of Eroded Material

Only a portion of the soil that is eroded within a basin is transported to the mouth of the basin. Some soil remains in upland fields or is trapped in floodplains, channels, lakes, and ponds. The Waterville Gauge on the Maumee River at Waterville, Ohio, has measured an average annual suspended sediment load of 1,300,000 tons. Since 1951,[1] this load represents most of the sediment that enters Toledo Harbor, but is only 12 percent of the 10,259,000 tons of soil that has eroded within the basin annually. This percentage is termed a delivery rate or delivery ratio.

A sediment rating curve was developed for discharge and sediment load data from the Waterville Gauge. This relationship shows that the sediment load increases in linear proportion to water discharge. This relationship is further demonstrated by plotting annual sediment load against average annual water discharge as displayed in the graph "Water and Sediment Discharge for Maumee River Basin."[2]

The "Sediment Discharge Ratio A/B" graph is an attempt to neutralize the impact of water discharge cycles in order to isolate cycles of sediment availability. The graph is elevated for periods 1951-1957 and 1972-1976. These elevations may correspond to post war changes in agricultural management and later to the row crop rotation which was induced by commodity price increases and extensive use of agricultural chemicals (see section entitled "Recent History of Maumee Basin").

VI. Fluvial Sedimentation Dynamics in the Toledo Harbor

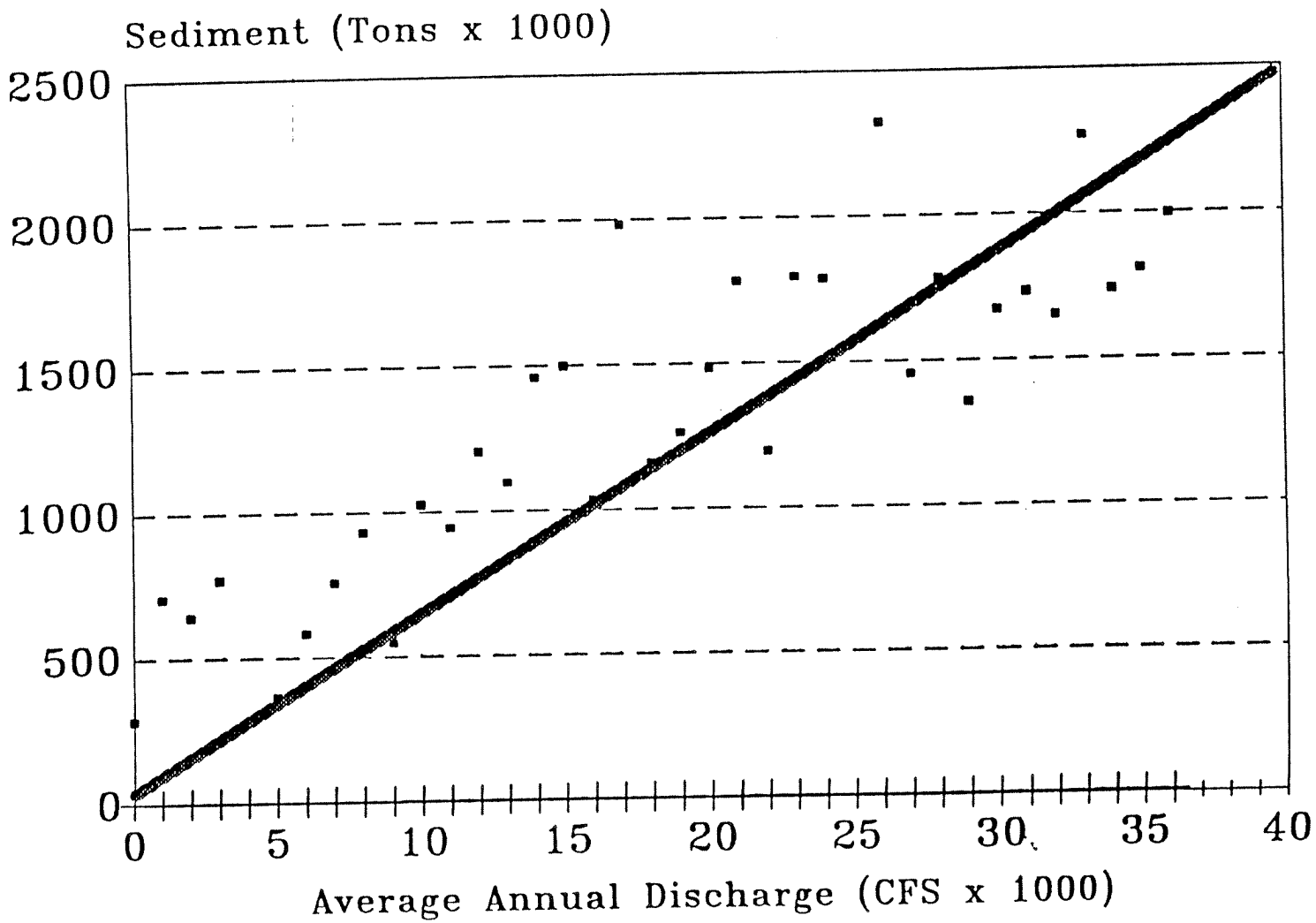
As stated previously in this document, approximately 1,300,000 tons of sediment annually passes the USGS stream gauge at Waterville, Ohio. A portion of this material is deposited in the ship channel each year. The U.S. Army Corps of Engineers reports that an average of 850,000 cubic yards of sediment are dredged from the ship channel annually.

Available data on situ sediments in the Maumee Basin indicate average densities of approximately 40 pounds per cubic foot.[3] At this density, the dredged mass would average approximately 459,000 tons annually, or 36 percent of the sediment that passes the Waterville Stream Gauge. The value of 36 percent is the average sediment trap efficiency of the ship channel. This value was also evaluated by empirical methods using sediment type,

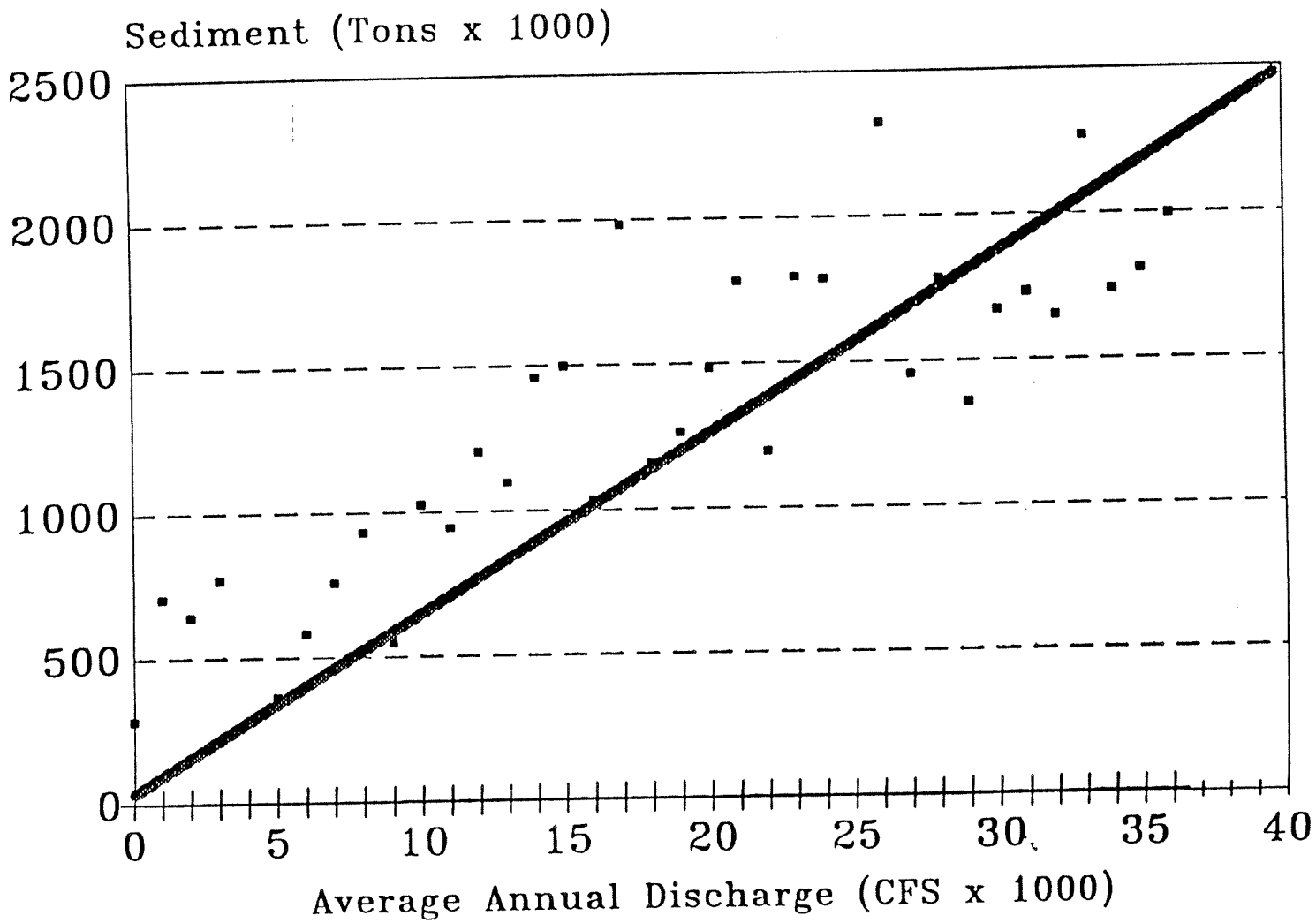
1990.

1/ USDA, Soil Conservation Service. National Engineering Handbook, Section 3, Sedimentation.

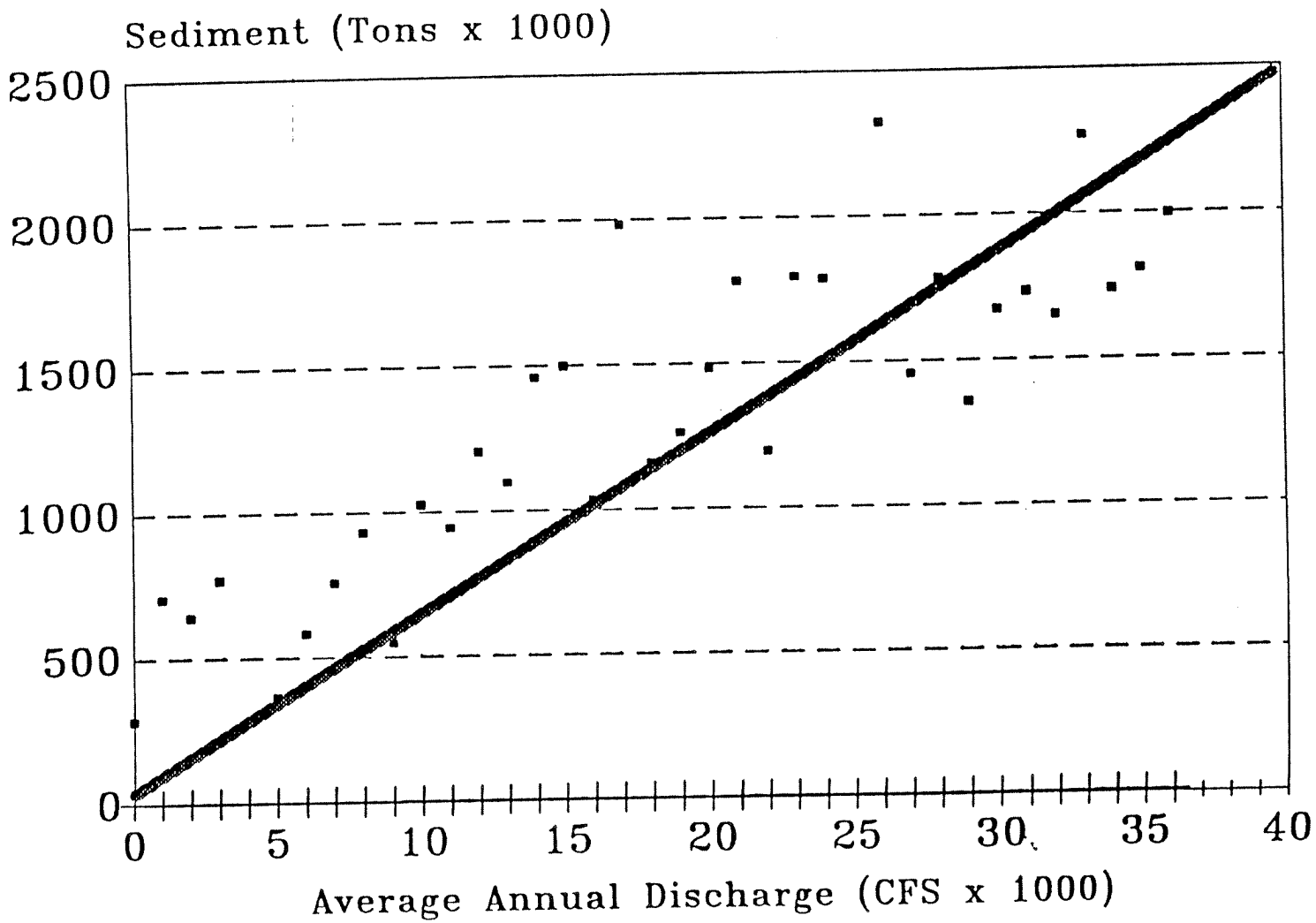
Sediment Rating Curve
Maumee River – Waterville Gauge



Sediment Rating Curve
Maumee River – Waterville Gauge



Sediment Rating Curve
Maumee River – Waterville Gauge



Discharge
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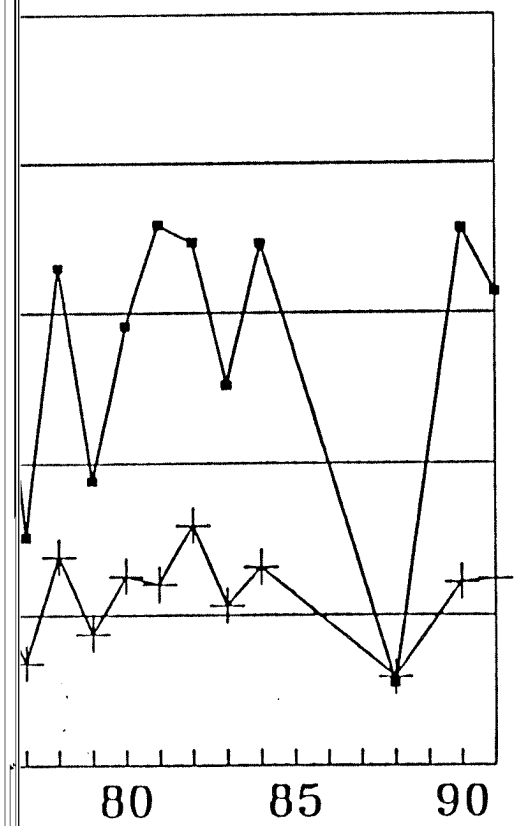
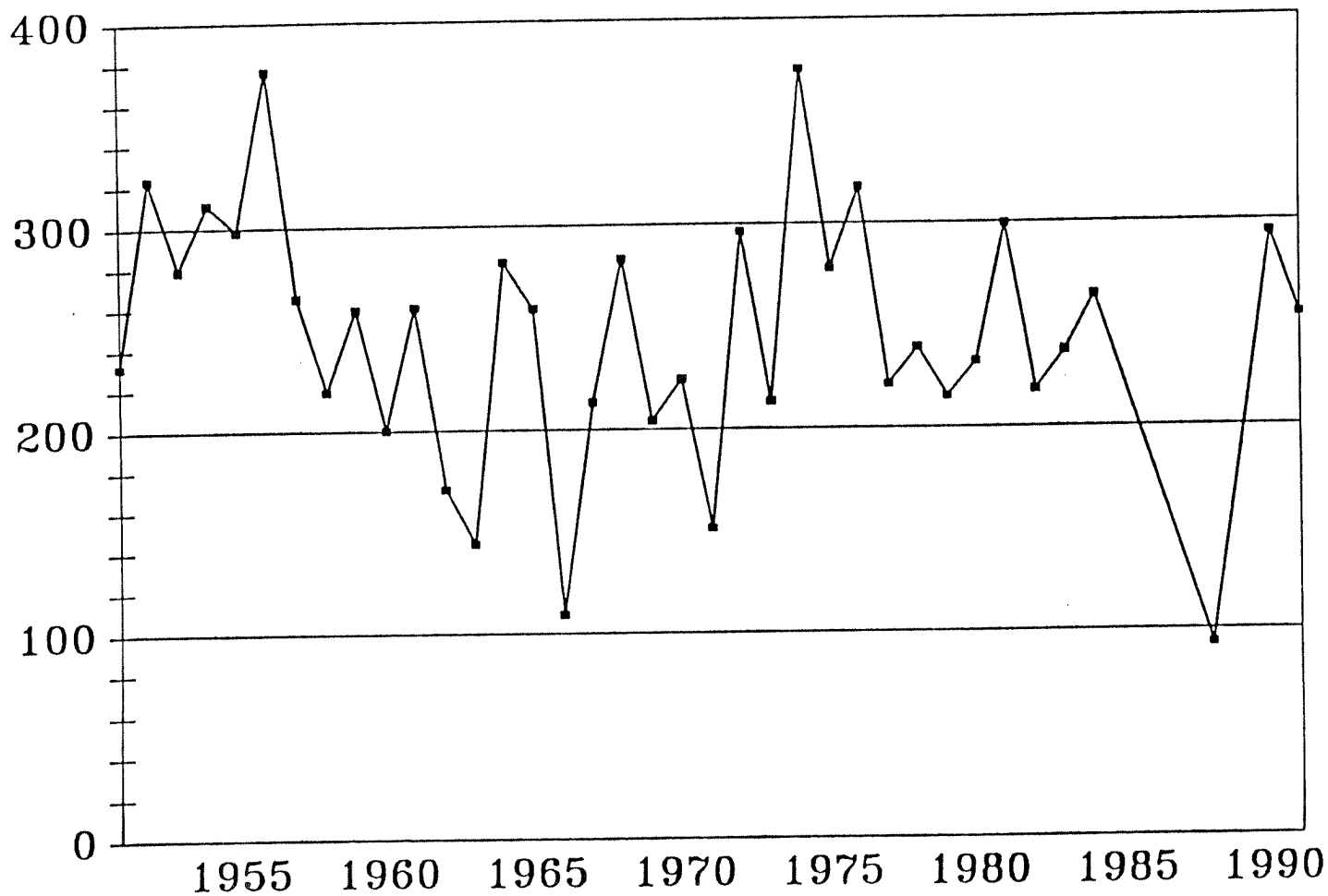


CFS

Sediment Discharge Ratio A/B [1/]



1/ $\frac{\text{Annual sediment discharge tons}}{\text{Annual average flow cfs}}$

2/ No data available for 1985, 1986, 1987, and 1989

VII. Methodology of Analysis Used to Determine Sedimentation Reductions in the Toledo Harbor Due to Erosion Reductions on Basin Soils

The reduction of soil erosion on the land in the basin will reduce the amount of sediment delivered to the harbor.

This analysis utilizes the following parameters:

a. Soil loss reduction in tons per year.[1/]

b. Basin delivery rate (approximately 10 percent).

c. Ship channel trap efficiency (approximately 32 percent).

The relationship is:
Annual basin soil loss reduction (tons) x basin delivery rate x ship channel trap efficiency = annual tonnage reduction of sediment deposited in the ship channel (one ton = 1.85 cubic yards).

A hypothetical example would be:

Given:
a. Annual soil loss reduction of 1,000 tons
b. Delivery rate of approximately 10 percent
c. Ship channel trap efficiency of 32 percent

1,000 t/yr x 0.1 x 0.32 = 32 t/yr

32 t/yr x 1.85 cu yd/t = 59.2 cu/yd

1/ USDA, Soil Conservation Service, Universal Soil Loss Equation.

VIII. Erosion Reduction Methods

Over 90 percent of the erosion occurring in the basin occurs as a result of crop production. An additional 3 to 4 percent comes from gully and large rill erosion and the rest comes from all other sources. Therefore, the obvious place to begin an analysis of erosion reduction is in the cropland area. Seventy-five percent of the cropland acreage (about 2.5 million acres) is planted to corn and soybeans each year. While most sources of erosion and most methods of control will be analyzed, our recommended alternative will be to increase crop residue management through decreased tillage.

There are two broad categories of erosion control, one is through change in annual management and the other is the installation of permanent "structural practices."

A. Management practices for erosion control fall into two subcategories, crop residue management and conservation cropping sequence.

1. Crop Residue Management:

   Crop residue management consists of a management system where the farmer manages a specific amount (15-100 percent of soil surface covered with the previous crop residue immediately after planting) of crop residue on the soil surface from harvest through the next crop. <u>This usually requires specialized, but not scarce, equipment</u>.

   a. *No-Till* planting means the soil is not tilled from the time of the harvest of the previous crop until the planting of the following crop. <u>This is one of the recommended alternatives.</u>

   b. *Mulch Tillage* means that the soil is tilled after harvest, but is tilled in such a manner that at least 30 percent of the soil surface is covered with the previous crop residue after planting. To save 146,000 cubic yards of dredging would require that 80 percent of the corn and soybean acreages to be in a crop residue management system. <u>This is one of the recommended alternatives</u>.

2. Conservation Cropping Sequence:

   Conservation cropping sequence is a cropping sequence designed to provide adequate organic residue for maintenance or improvement of soil tilth. Generally high residue producing crops provide more erosion reduction than low residue producing crops.

a. Hay

Hay is an environmentally friendly crop, but there are problems in increasing acreages of this crop. The problems are perception, market, and government programs. The perception is that hay is not a moneymaking crop and is too labor intensive to grow. There is no set price or local delivery locations as there are for corn and soybeans. Also, hay is not a commodity crop so there is no government subsidy.

One advantage is that each acre converted to hay reduces the same amount of erosion as two acres of crop residue management with 30 percent cover because of the superior erosion protection. To reduce 146,000 cubic yards of sediment in the harbor would require the conversion of 500,000 acres of cropland from corn and soybeans to hay. This is highly unlikely in the short term, but in the long term some additional acres could be converted. A look at the impacts of this crop and additional markets is recommended for long range study.

b. Small Grains - Wheat and Oats

1. Oats

While the demand for oat products remains high, most of the oats for human consumption are imported. There are no government subsidies for oats and the average price is around $1.20 per bushel. With yields averaging 50 to 70 bushels per acre, gross returns are only $70 to $100 per acre. This barely covers the cost of land rental payments. No further action is recommended at this time.

2. Wheat

Wheat is a subsidized crop and acreage limitations are imposed yearly on this commodity crop. Significant increases in acreages are unlikely because those individuals who increase wheat acres more than their allotment would be ineligible for all government crop subsidies. Without these dollars being replaced from some other source, this is not going to happen. No further action is recommended at this time.

3. Alternative Crops

At least one alternative crop--canola--appears to have a chance at increasing acreage with additional assistance. Canola provides an excellent winter cover and would be beneficial to erosion reductions in the basin if included in the rotation. It is usually substituted for soybeans. Limitations are one of scale and market. The market infrastructure will not gear up to handle canola because it requires separate bins and management and the farmer will not raise it because there is no local market to deliver to and obtain the same pricing service that they get from corn and soybeans. It is recommended that this alternative crop be explored in the long range.

B. Structural Measures

Structural practices are those erosion reduction efforts that last more than one year, usually 10 to 20 years with maintenance, and provide an accumulated erosion savings over time. They usually require off-farm assistance for design and installation. In the basin, these would be filter strips, grass waterways, streambank protection, and wetland/sedimentation basins.

1. Filter strips, as the name implies, are designed to filter out sediments and nutrients and possibly pesticides. They are planted to grasses, legumes, or trees. Design requires laminar flow over a sufficient width of vegetation to be effective. Rarely do these conditions exist. Storms larger than a 2 to 3 year rainfall result in concentrated flow through the filter strip and carry sediment and other material directly into the stream. The strips, if properly designed and installed, would filter out a large percentage of the sand and silt particles. However, this is not the material that reaches the harbor which is predominantly fine silts and clays. In the absence of filter strips, most of the sand and silts are being deposited in the extensive drainage system that exits in the basin. Filter strips would reduce the cost of local drainage maintenance, but would not reduce volumes at the harbor significantly except for the reduction of erosion caused by the conversion of cropland to permanent vegetative cover. However, this would be minor when compared to the total remaining erosion.

   To be effective, filter strips would have to be wider than is commonly accepted by the farm manager. Filter strips of the width required to remove clay particles may have to be 100 to 150 feet wide and preferrably planted to trees. <u>No further action is recommended at this time</u>.

2. Grass waterways eliminate the erosion caused by concentrated flow of water. A detailed inventory of the amount of grass waterways needed in the basin has not been done. Almost all of the grass waterways installed in the basin are designed to eliminate erosion occurring in gullies that are 6 inches to 3 feet deep that occur on cropland that has a slope of 2 percent or greater. The average length is 800 to 1000 feet long and causes about 15 tons of soil loss per year. About one waterway is needed for every 30 acres of cropland with slopes over 2 percent. From the 1982 National Resource Inventory, there are 440,000 acres of cropland with slopes above 2 percent. Dividing this by 30 acres per waterway results in 14,700 waterways. About half or more already have been installed. This leaves 7,300. Many of these will be installed as the result of the 1985 and 1990 Farm Bill (FACTA) which requires concentrated flow erosion to be controlled by 1995 or lose government subsidies. <u>Additional technical assistance is recommend at this time</u>.

3. Streambank erosion was estimated in the Maumee Level B Study at 100,000 tons a year. This is 1 percent of the total erosion occurring in the basin. Streambank erosion is dramatic when it occurs, but the relative low velocities of the stream and the flat topography keep the figures from being significant. Most streambank erosion is currently being solved with expensive regrading and rip rap. Unless lower cost solutions can be found to control this type of erosion, the cost per ton saved is too great. <u>No further action is recommended</u>.

4. Wetland/sediment basins are an unknown factor. Research reveals the potential to filter out sediments as well as other contaminants. A large number of these (perhaps one every 40 acres) would have to be built before it is anticipated that significant sediment reduction could occur. However, if these are coupled with some type of crop irrigation scheme and an investment return from wildlife can be obtained, their viability is enhanced. <u>It is recommended that a study be conducted to determine the feasibility of this type of approach</u>.

C. Nutrient, Livestock Waste, and Pest Management

These items are a concern to the overall water quality in the stream and Lake Erie; however, they have no direct bearing on the sediment deposition in the harbor and will not be addressed in this report.

Landcover (in acres) and Potential Sediment Reduction 1992

		Maumee Basin							
		Ohio		Indiana		Michigan		Totals	
	Tons/Ac/Yr	Acres	USLE Tn	Acres	USLE Tn	Acres	USLE Tn	Acres	USLE Tn
Setaside	0.12	51,311	6,157	6,535	784	18,408	2,209	76,254	9,150
Wheat	0.57	386,905	220,536	54,273	30,936	12,480	7,114	453,658	258,585
Oats	0.57	22,052	12,570	8,054	4,591	3,298	1,880	33,404	19,040
Hay	0.12	77,048	9,246	10,870	1,304	3,323	399	91,241	10,949
Corn Conv.	3.93	508,477	1,998,315	128,863	506,432	40,735	160,089	678,075	2,664,835
Corn Contill.	1.51	245,858	371,246	42,656	64,441	35,615	53,779	324,129	489,435
Soy Bean Conv.	3.93	648,261	2,547,666	121,245	476,493	19,992	78,569	789,498	3,102,727
Soy Bean Contill.	1.51	431,080	650,931	108,684	164,113	21,858	33,006	561,622	848,049
C.R.P.	0.12	66,078	7,929	48,942	5,873	19,521	2,343	134,541	16,145
TOTALS 1/		2,437,100	5,824,600	530,100	1,254,900	175,200	339,400	3,142,400	7,418,900

Achievable Goal - 70%

	TOTAL 2/	CONV. TILL.-92	CONS. TILL.-92	GOAL 70% CON-TILL	AC. NEEDED ABOVE 1992	REDUCT. TONS/YR	REDUCT. 3/ CU. YDS/YR	SAVINGS $10/YD
CORN	935,000	687,131	332,242	654,500	322,258	773,419	45,832	458,322
SOYBEANS	1,448,000	876,030	548,180	1,013,600	465,420	1,117,008	66,193	661,931
TOTAL	2,383,000	1,563,161	880,422	1,668,100	787,678	1,890,427	112,025	1,120,253

Achievable Goal - 80%

	TOTAL 2/	CONV. TILL.-92	CONS. TILL.-92	GOAL 80% CON-TILL	AC. NEEDED ABOVE 1992	REDUCT. TONS/YR	REDUCT. 3/ CU. YDS/YR	SAVINGS $10/YD
CORN	935,000	687,131	332,242	748,000	415,758	997,819	59,130	591,300
SOYBEANS	1,448,000	876,030	548,180	1,158,400	610,220	1,464,528	86,787	867,868
TOTAL	2,383,000	1,563,161	880,422	1,906,400	1,025,978	2,462,347	145,917	1,459,169

Achievable Goal - 90%

	TOTAL 2/	CONV. TILL.-92	CONS. TILL.-92	GOAL 90% CON-TILL	AC. NEEDED ABOVE 1992	REDUCT. TONS/YR	REDUCT. 3/ CU. YDS/YR	SAVINGS $10/YD
CORN	935,000	687,131	332,242	841,500	509,258	1,222,219	72,428	724,278
SOYBEANS	1,448,000	876,030	548,180	1,303,200	755,020	1,812,048	107,381	1,073,806
TOTAL	2,383,000	1,563,161	880,422	2,144,700	1,264,278	3,034,267	179,808	1,798,084

1/ Totals are rounded.
2/ Average of 87-92 acreages
3/ Tons*deliver ratio to river (.1)* channel trap efficiency of .32 divided by 1080 pounds per cubic yard of sediment/2000 pound per tc

2/22/93

Maumee Basin USLE Basin Erosion 1992 Base Year

COUNTY	% in MAUMEE W.S.	BASIN	CORN CONVENTIONAL COUNTY	CORN CONVENTIONAL BASIN	CORN CONVENTIONAL USLE-TNS	CORN CONSERV. -TILL COUNTY	CORN CONSERV. -TILL BASIN	CORN CONSERV. -TILL USLE-TNS	SOYBEANS CONVENTIONAL COUNTY	SOYBEANS CONVENTIONAL BASIN	SOYBEANS CONVENTIONAL USLE-TNS	SOYBEANS CONSERV. - TILL COUNTY	SOYBEANS CONSERV. - TILL BASIN	SOYBEANS CONSERV. - TILL USLE-TNS	WHEAT COUNTY	WHEAT BASIN	WHEAT USLE-TNS
ALLEN	1	1	59,207	59,207	232,684	10,007	10,007	15,111	59,624	59,624	234,322	17,929	17,929	27,073	27,677	27,677	15,776
AUGLAIZE	0.79	1	43,654	34,487	135,533	20,281	16,022	24,193	52,032	41,105	161,544	32,187	25,428	38,396	28,000	22,120	12,608
DEFIANCE	1	1	17,092	17,092	67,172	14,591	14,591	22,032	43,352	43,352	170,373	52,944	52,944	79,945	31,216	31,216	17,793
FULTON	1	1	42,676	42,676	167,717	45,400	45,400	68,554	42,222	42,222	165,932	49,486	49,486	74,724	16,344	16,344	9,316
HANCOCK	1	0.8	66,731	53,385	209,802	16,269	13,015	19,653	97,861	78,289	307,675	37,440	29,952	45,228	52,400	41,920	23,894
HARDIN	0.42	0.7	48,300	14,200	55,807	21,700	6,380	9,633	54,600	16,052	63,086	41,400	12,172	18,379	30,000	8,820	5,027
HENRY	1	1	44,257	44,257	173,930	34,773	34,773	52,507	54,056	54,056	212,440	40,780	40,780	61,578	36,128	36,128	20,593
LUCAS	1	0.8	17,548	14,038	55,171	12,162	9,730	14,692	27,799	22,239	87,400	19,459	15,567	23,506	8,382	6,706	3,822
MERCER	0.47	1	65,996	31,018	121,901	16,054	7,545	11,394	56,910	26,748	105,118	22,550	10,599	16,004	18,825	8,848	5,043
PAULDING	1	1	35,999	35,999	141,476	14,941	14,941	22,561	67,187	67,187	264,045	43,135	43,135	65,134	57,673	57,673	32,874
PUTNAM	1	1	67,533	67,533	265,405	13,390	13,390	20,219	82,669	82,669	324,889	32,601	32,601	49,228	51,560	51,560	29,389
VAN WERT	1	1	48,535	48,535	190,743	26,135	26,135	39,464	59,398	59,398	233,434	46,669	46,669	70,470	33,024	33,024	18,824
WILLIAMS	1	1	29,650	29,650	116,525	22,530	22,530	34,020	32,415	32,415	127,391	38,345	38,345	57,901	32,420	32,420	18,479
WOOD	1	0.25	58,400	14,600	57,378	39,600	9,900	14,949	81,200	20,300	79,779	54,800	13,700	20,687	45,000	11,250	6,412
SHELBY	0.06	1	30,000	1,800	7,074	25,000	1,500	2,265	43,420	2,605	10,238	29,580	1,775	2,680	20,000	1,200	684
HILLSDALE	0.53	1	53,900	28,567	112,268	51,100	27,083	40,895	19,000	10,070	39,575	26,000	13,780	20,808	12,000	6,630	3,625
LENAWEE	0.18	1	67,600	12,128	47,820	47,400	8,532	12,883	55,121	9,922	38,993	44,879	8,078	12,198	34,000	6,120	3,488
ADAMS	0.75	1	52,700	39,525	155,333	10,000	7,500	11,325	46,000	34,500	135,585	32,000	24,000	36,240	26,000	19,500	11,115
ALLEN	0.70	1	75,700	52,990	208,251	18,376	12,863	19,423	76,798	53,759	211,271	52,674	36,872	55,676	23,591	16,514	9,413
DEKALB	0.97	1	27,950	27,112	106,548	9,050	8,779	13,256	31,000	30,070	118,175	36,400	35,308	53,315	14,000	13,580	7,741
NOBLE	0.18	1	33,000	5,940	23,344	33,000	5,940	8,969	10,500	1,890	7,428	31,500	5,670	8,562	14,000	2,520	1,436
STUEBEN	0.20	1	8,360	1,672	6,571	33,440	6,688	10,099	2,210	442	1,737	19,898	3,980	6,009	7,800	1,560	889
WELLS	0.04	1	40,610	1,624	6,384	22,143	886	1,337	14,611	584	2,297	71,339	2,854	4,309	14,964	599	341
TOTAL			675,578	508,477	2,623,173	332,833	245,859	455,158	854,745	648,262	3,129,895	559,305	431,081	855,669	488,649	386,905	261,076

Maumee Basin USLE Basin Erosion 1992 Base Year (Continued)

COUNTY	in MAUMEE W.S.	BASIN	OATS COUNTY	OATS BASIN	OATS USLE-TNS	HAY COUNTY	HAY BASIN	HAY USLE-TNS	SETASIDE COUNTY	SETASIDE BASIN	SETASIDE USLE-TNS	CRP COUNTY	CRP BASIN	CRP USLE-TNS	TOTALS USLE TONS	GOALS REDUCTION TONS 1/
ALLEN	1	1	3,178	3,178	1,811	4,200	4,200	504	3,114	3,114	374	7,367	7,367	884	528,538	144,227
AUGLAIZE	0.79	1	3,600	2,844	1,621	14,000	11,060	1,327	2,935	2,319	278	8,431	6,660	799	376,300	121,534
DEFIANCE	1	1	1,601	1,601	913	6,800	6,800	816	3,456	3,456	415	12,085	12,085	1,450	360,909	137,353
FULTON	1	1	908	908	518	3,500	3,500	420	14,771	14,771	1,773	3,384	3,384	406	489,359	164,018
HANCOCK	1	0.8	1,100	880	502	5,000	4,000	480	4,734	3,787	454	874	699	84	607,772	169,445
HARDIN	0.42	0.7	3,220	947	540	5,700	1,676	201	5,000	1,470	176	7,404	2,177	261	153,111	47,920
HENRY	1	1	750	750	427	8,200	8,200	984	4,000	4,000	480	576	576	69	523,009	167,640
LUCAS	1	0.8	1,000	800	456	1,100	880	106	1,200	960	115	248	198	24	185,292	53,339
MERCER	0.47	1	8,000	3,760	2,143	18,600	8,742	1,049	4,367	2,052	246	933	439	53	262,951	74,813
PAULDING	1	1	1,280	1,280	730	6,900	6,900	828	3,400	3,400	408	2,128	2,128	255	528,310	174,482
PUTNAM	1	1	2,000	2,000	1,140	10,800	10,800	1,296	2,262	2,262	271	885	885	106	691,943	197,775
VAN WERT	1	1	1,000	1,000	570	3,900	3,900	468	3,287	3,287	394	601	601	72	554,439	166,912
WILLIAMS	1	1	1,180	1,180	673	4,800	4,800	576	4,800	4,800	576	28,770	28,770	3,452	359,593	146,183
WOOD	1	0.25	2,500	625	356	3,600	900	108	5,622	1,406	169	262	66	8	179,846	54,560
SHELBY	0.06	1	5,000	300	171	11,500	690	83	3,800	228	27	718	43	5	23,228	7,606
HILLSDALE	0.53	1	5,000	2,650	1,510	2,500	1,325	159	30,700	16,271	1,953	29,700	15,741	1,889	222,683	91,385
LENAWEE	0.18	1	3,600	648	369	11,098	1,198	240	11,870	2,137	256	21,000	3,780	454	116,702	40,037
ADAMS	0.75	1	4,800	3,600	2,052	7,500	5,625	675	2,750	2,063	248	4,053	3,040	365	352,938	104,514
ALLEN	0.70	1	1,800	1,260	718	2,180	1,526	183	1,978	1,385	166	9,089	6,362	763	505,866	137,648
DEKALB	0.97	1	2,500	2,425	1,382	2,500	2,425	291	2,000	1,940	233	32,000	31,040	3,725	304,665	114,509
NOBLE	0.18	1	2,500	450	257	4,000	720	86	1,089	196	24	17,210	3,098	372	50,478	19,818
STUEBEN	0.20	1	1,400	280	160	1,500	300	36	3,500	700	84	26,000	5,200	624	26,209	15,616
WELLS	0.04	1	963	39	22	6,853	274	33	6,275	251	30	5,054	202	24	14,777	5,484
															7,378,162	2,325,543
TOTAL			60,165	35,345		160,652	102,503		84,340	57,846		168,072	115,020			
					20,147			12,300			6,942			13,802	7,378,162	

1/ 0.75 USLE Tons Per Cropland Acre

Toledo Harbor Sediment Reduction
Technical(TA) and Financial(FA) Assistance Needed

TYPE	ONE	TWO	THREE	YEARS FOUR	FIVE	SIX	7-15	16-20	TOTAL
Technical Assistance-$ SCS [1]									
3-Planners	105000	110250	115763	121551	127628	134010	0	0	714201
1-Engineer	46000	48300	50715	53251	55913	58709	0	0	312888
Overhead	22680	23814	25005	26255	27568	28946	0	0	154267
1-Administrator	42000	44100	46305	48620	51051	53604	0	0	285680
Overhead	6300	6615	6946	7293	7658	8041	0	0	42852
SWCD's Included in FA as needed									
Subtotal	221980	233079	244733	256970	269818	283309	0	0	1509889
Financial Assistance SWCDs									
A $.40 per cropland acre in basin - incentive payment	1322520	1322520	1322520	1322520	1322520	1322520	0	0	7935122
B $.35 per cropland acre - capitilization of maintenance fund	1157205	1157205	1157205	1157205	1157205	1157205	0	0	6943232
Local County Steering Committees (21*$1000)	21000	21000	21000	21000	21000	0	0	0	105000
Subtotal	2500726	2500726	2500726	2500726	2500726	2479726	0	0	14983355
Total	2722706	2733805	2745459	2757696	2770544	2763035	0	0	16493245

[1] Does not include three SCS Water Quality Coordinators presently in Ohio in the Maummee Basin.

MAUMEE RIVER WATERSHED SEDIMENT MANAGEMENT STRATEGY

AGRICULTURAL LAND TREATMENT

GENERALIZED CONCEPT PROPOSAL

One component of the Long Term Dredged Material Management Plan for Toledo Harbor is source reduction of sediment that is delivered to the harbor via runoff from agricutural lands within the watershed.

Source reduction will be achieved through both acceleration and intensification of existing sediment control efforts, and the introduction of some new and innovative land treatment measures. The proposed effort will utilize the existing technical assistance delivery system of the Soil Conservation Service and local Soil and Water Conservation Districts.

GENERALIZED CONCEPT

The concept for sediment reduction will build on the framework of the recent Lake Erie Phosphorous Reduction effort. Sediment reduction goals will be assigned to each county. Each Soil and Water Conservation District will create a county sediment reduction committee, involving agricultural and environmental groups, agribusiness, private citizens, and other affected organizations. This group will be charged with implementing a sediment reduction strategy at the county level. Incentive funding will be made available to encourage counties to develop strategies, and to assist with financing the implementation of the strategies. The specific components of the generalized concept will include the following:

1. County Sediment Reduction Committees
2. Educational Program Grants
3. Innovative/local Program Grants
4. Landowner Incentives
5. Technical Assistance

Each of the components is explained in more detail as follows:

County Sediment Reduction Committees

These committees will be organized by the SWCD Board of Supervisors. The Board of Supervisors will act as the umbrella organization and provide organizational and

administrative support. Each county will be assigned a sediment reduction goal. The sediment reduction committee will be charged with developing and implementing a county sediment reduction plan that will achieve this goal within a specified time period (five to ten year program). This approach will achieve local involvement and ownership of the sediment reduction plan.

Each committee will receive yearly a small grant to be used as operational expenses. Receipt of this grant will be contingent upon developing an approved sediment reduction strategy by a prescribed time period and satisfactory annual progress towards implementing the strategy. The purpose of this committee will be to keep the focus on sediment reduction and to involve diverse organizations and groups in the implementation process.

Educational Grants For Sediment Reduction

Educational grants will be offered for the purpose of sediment reduction educational programs within the watershed. These grants will be awarded on a competitive basis to county sediment reduction committees, conservation groups, private industry, and/or others who may apply. A specific amount will be set aside each year to fund this grant pool. Grants will be awarded on the merits of the projects submitted, and may vary in amount and duration as appropriate.

Innovative Local Project Grants

A grant pool will also be established to fund innovative local sediment reduction projects. This grant pool will be similar to the education grants but will target projects that are demonstrational and/or focus on implementation. Examples of grant requests that would fall into this category would include;

- Rental of conservation tillage equipment.
- Construction of demonstrational wetland/sediment-trap basins.
- Establishment of county conservation tillage clubs.
- Field trials of new or innovative sediment reduction practices.

Financial Incentives to Landowners

The largest component of this proposal consists of a package of financial incentives to landowners who will contract to install sediment reduction measures on their property.

Under this component landowners will agree to implement a plan to control erosion on a specific number of acres for a specific time period. As part of this agreement the

landowner will receive a financial incentive (rebate) to purchase the conservation tillage equipment necessary to implement the plan. Incentives will range from $500 to $3000 depending on the acres, type of equipment and length of contract.

The types of conservation tillage equipment in the incentive package would include the following items:

- No-till grain drills
- Zone tillage planters
- Specialized no-till sprayers
- Residue spreading attachments

In addition to conservation tillage, incentives are also proposed for selective identified land treatment measures. These might include items such as the following:

- Sediment traps within restored wetlands
- Group filter strip projects

Traditional conservation practices such as sod-waterways, erosion control structures, etc., are not included in this financial incentive package. These practices are currently covered under current federal and state programs. The financial incentives envisioned in this proposal are those new and/or innovative items that are not currently offered under any ongoing programs.

The equipment buy-down component of this proposal is modeled after the highly successful Maumee Basin RAP equipment buy-down program which was recently implemented on a limited scale.

Technical Assistance

Additional technical assistance will be needed if sediment reduction is to be accelerated beyond current efforts. This technical assistance will be used to administer the grant programs, develop the contracts and conservation plans with landowners (one on one on their farms), administer the financial aspects, publicize the sediment reduction project efforts, and track and report on results.

The technical assistance needed (beyond current levels) for the Soil Conservation Service is four positions. One position would be a water quality coordinator, and the remaining 3 positions would be soil conservationists.

Local Soil and Water Conservation Districts will also need additional resources to carry out their obligations under the proposal. It is proposed that each individual SWCD be

reimbursed for 5 percent of the grant and landowner incentive funds that are awarded to their county.

SUMMARY

The mechanisms to put the above program into action are already in place with existing agencies and programs. All that is lacking is a financial commitment at a level sufficient to accelerate the program.

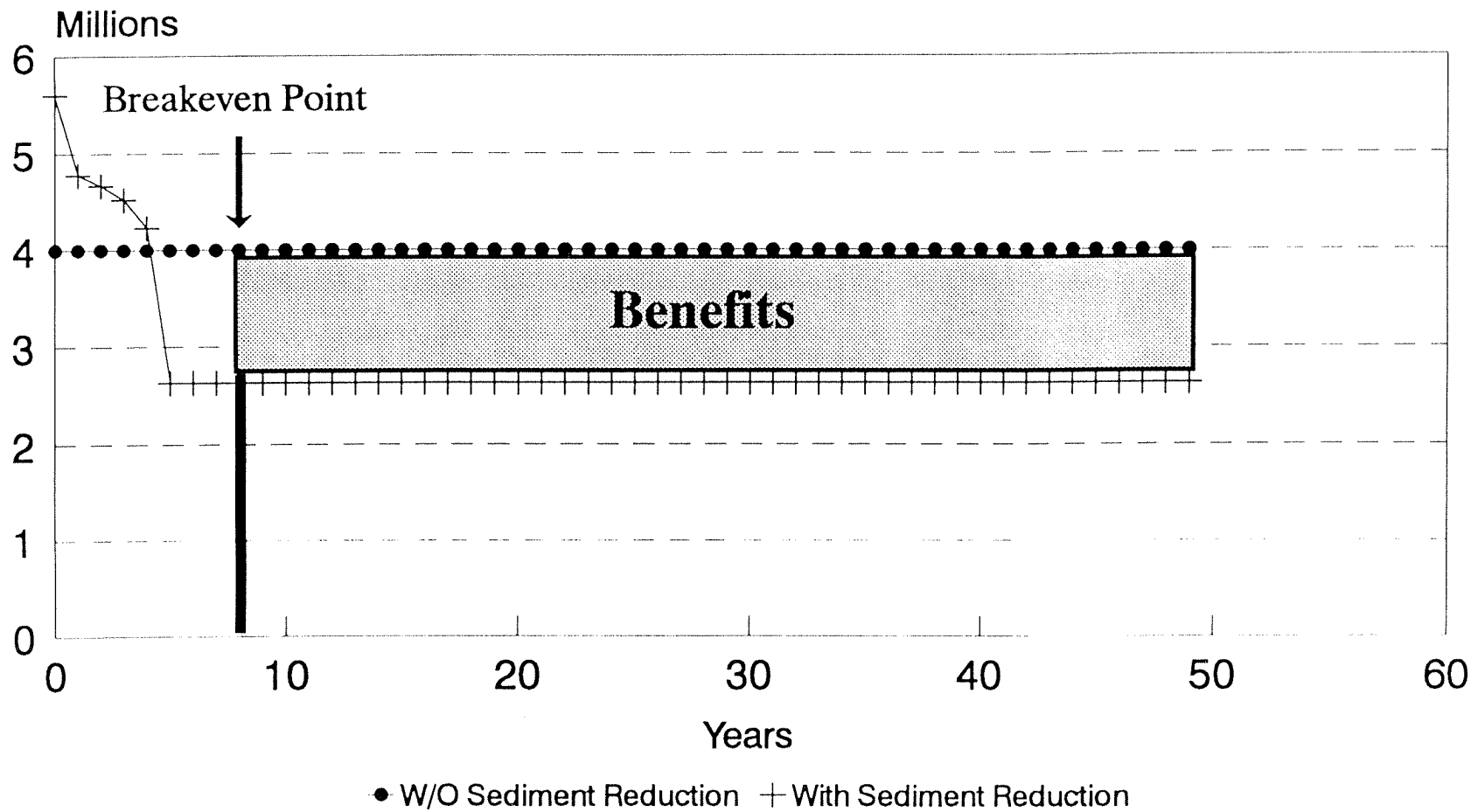
This proposal is modeled on recent successful efforts including the Lake Erie Phosphorous Reduction Committees and the Maumee Basin RAP Equipment Buy-down program. The track record of these two efforts shows that, given sufficient resources, goals, and appropriate incentives, the soil conservation community can deliver.

Goal	75 percent of watershed in conservation tillage
Results	Sediment entering harbor is reduced by 137,000 cubic yards per year.
Cost	$8,002,500 Total $1,600,500 Per year for a five year period

$ 31,500	County sediment committees
100,000	Educational grants
100,000	Project type grants
1,004,000	Landowner funds, equipment buydown
65,000	Technical assistance, 5 percent for SWCD's
300,000	Technical assistance, SCS
$1,600,500	Total per year

Sediment Savings	Year 1	0	Cubic yards
	Year 2	82,125	Cubic yards
	Year 3	93,160	Cubic yards
	Year 4	107,770	Cubic yards
	Year 5+	137,000	Cubic yards

Benefits of Sediment Reduction
Toledo Harbor



Annual Values, 1992 Dollars

Environmental Assessment for Toledo Harbor Sediment Reduction

(I am assuming there will be an overall intro and environmental setting given for the entire project)

SOIL

EROSION - SEDIMENT IMPACTS

Approximately 1,300,000 tons of sediment on an annual average basis flow to the Toledo harbor. Most of this is the result of 7.5 million tons of erosion due to farming and 100,000 tons of streambank erosion. Geologic delivery of sediments is estimated at less than 20,000 tons annually.

Implementation of the project will reduce the amount of sediment dredged in the harbor by 130,000 tons annually, a reduction of 15%. This will reduce turbidity, decrease the amount of dredging required, extend the life of existing confined disposal facilities, reduce nutrient and pesticide loadings to the Maumee River and Lake Erie. It will also increase the amount of crop residue left on the fields in the watershed during the critical winter and spring months by 850,000 acres.

Increased surface residue cover and minimal soil disturbance increases organic matter content at the soil surface. Soil tilth tends to improve with decreased tillage.

WATER

WATER QUALITY

Increased residue cover and decreased tillage improves water quality by decreasing sediment and phosphorus loadings.

However, there has been a increase in surface water nitrate loadings in the basin. The cause is unknown. Some contribute this increase to increased nitrogen fertilization in corn fields. Historically, acreages of corn have not increased and nitrogen fertilizer use is level to slightly increasing. The one factor that has changed is a large increase in the acreage of soybeans being grown in the basin. Soybeans are legumes that fix nitrogen while growing and then release it into the soil profile as the plant decays.

Nitrates, because they are water soluble, may be further increased as infiltration rates increase.

WATER QUANTITY

Increased infiltration rates will decrease surface runoff and increase ground water recharge. The extensive subsurface drainage system that exists in the basin, however, will reintroduced a considerable portion of the increased infiltrated water back into the surface water system. The timing of discharge to the surface system will change by the amount of time it takes the water to percolate down through the soil profile and out the subsurface drainage system. Flows could therefor be lower in peaks but longer in duration.

ANIMAL

WILDLIFE IMPACTS

Increased winter and spring crop residues provides winter feed and cover for wildlife species in the basin. Also reduction of sediment delivered to Lake Erie will improve shallow water habitat.

LIVESTOCK IMPACTS

No known impact to domestic livestock.

PLANTS

WILD AND DOMESTIC

There will be a short term increase in the use of herbicides as farmers adjust management techniques to compensate for the loss weed control obtained with tillage. However, farmers participating in the project will be required to have and follow an approved nutrient and pesticide management plan. Therefore, the long term trend will be a reduction in herbicide usage as farmers learn to tailor their applications to specific weed problems.

AIR

Increased surface residue cover will decrease particulate matter content. Decreased fuel consumption, mulch and No-till will use 2-3 gallons will decrease emissions.

ENERGY

Fuel consumption by farmers will also be reduced as tillage needs decrease.

SUB-APPENDIX B4

SEDIMENT AND WATER QUALITY TESTING

MATERIAL CHARACTERISTICS

I. FEDERAL NAVIGATION CHANNEL SEDIMENTS (DREDGED MATERIAL)

1. This section describes the characteristics of the dredged material within the limits of the authorized Federal navigation channels and the existing dredged material open-lake discharge site at Toledo Harbor, Ohio. Information on the material characteristics was obtained from sediment analyses performed under contract to the the Buffalo District.

2. Sediment Sampling and Testing. In April 1988, a petite Ponar grab sampler was used to collect a total of 28 surface sediment composite grab samples from the authorized Federal navigation channels of Toledo Harbor (Figure 1), as well as an open-lake discharge site (Figure 2) (Aqua Tech Environmental Consultants 1988). The open-lake discharge site shown in Figure 2 was discontinued in 1988, but is used to address the characteristics of the dredged material that was discharged at the site between 1985 and 1988. With regard to the existing open-lake discharge site (shown in Figure 3), there are no data available on the dredged material on the bottom of the site which accumulated as a result of open-lake discharge operations between 1989 and the present. However, there are physical, chemical, bioassay and biological data available on sediments at this site prior to its use for dredged material discharge activities (T.P. Associates, International Inc. 1987). Sampling Sites D-1 through D-4 represent the open-lake discharge site used for dredged material discharge between 1985 and 1988, Sites L-1-M through L-16-M the Lake Approach Channel, and Sites O-M through R-7-M the River Channel. Water depths at the sampling sites ranged from 17 to 25 feet. Individual homogenized composite samples consisted of three samples taken within a 50-foot radius of the designated sediment sampling site. One liter of sediment from each sampling site was subjected to bulk inorganic and organic analyses, as well as elutriate testing (Aqua Tech Environmental Consultants 1988). Four liters of sediment from each sampling site were used for acute toxicity tests (bioassays).

3. Sediment Physical Characteristics. Grain size distributions of the sediment samples were determined using CRL Method 485. Under this method of analyses, particles passing through a #200 sieve are considered fine-grain (i.e., silts and clays), and those retained are considered coarse-grain (i.e., sands and gravels). The results of the physical analysis are presented in Table 1. On the average, the channel sediment samples consisted of 88 percent silts and clays, with the remainder coarse-grain material. With few exceptions (i.e., Sampling Sites L-16-M, L-13-M, R-6-M and R-5-M), the sediment samples were comprised of between about 80 and 98 percent silts and clays. The open-lake discharge site sediment samples consisted of an average of 96.8 percent silts and clays, with the remainder coarse-grain material. In situ silty material that is routinely maintenance dredged is minimally compacted, similar to the physical properties of a fluid mud. During the discharge process, water is usually added to the material (either in the water column or in a hydraulic pipeline) and it takes on the physical properties of a disaggregated mud slurry (USAEWES 1992).

4. Sediment Chemical Inventory.

4.1 **Inorganic Analyses.** All sediment samples were analyzed for total solids, total volatile solids, Chemical Oxygen Demand (COD), nitrate/nitrate nitrogen, ammonia-nitrogen, total Kjeldahl nitrogen (TKN), oil/grease, phenols, and total phosphorus, cyanide, mercury, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc. Dry weight bulk inorganics data on the sediment samples are summarized in Table 2. Higher levels of arsenic, barium, cyanide and phosphorus, and moderate to high levels of ammonia-nitrogen, COD and iron were measured in most of the sediment samples. The apparently higher concentrations of arsenic and cyanide in the sediment samples are comparable to local Lake Erie background levels. Copper, manganese, nickel, total volatile solids, TKN, and zinc generally showed moderate levels in the sediment samples. Low levels of cadmium, lead, mercury, and oil/grease were measured in most of the sediment samples. Overall, heavy metal and nutrient contamination is highest in the River Channel sediment samples, particularly from the lower reach. Lake Approach Channel, open-lake discharge site and upper River Channel sediment samples show relatively lower inorganic contamination.

4.2 **Organic Analyses.** All sediment samples were subjected to a diverse array of organic analyses, including Pesticides, Polychlorinated Biphenyls (PCBs), Purgeable Halocarbons, Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalate Esters. Dry weight bulk Pesticide and PCB data are summarized in Table 3. Table 4 presents the dry weight bulk Purgeable Halocarbon data. No Pesticides, PCBs or Purgeable Halocarbons were detected in any of the sediment samples. The results of the dry weight bulk PAH and Phthalate Ester analyses are presented in Table 5. These data show PAHs at nondetectable to very low levels (i.e., around or below 1 ppm) in Lake Approach Channel and open-lake discharge site sediment samples. Phthalate Esters were also generally nondetectable, or at levels around or below 2 ppm in these sediment samples. In River Channel sediment samples, a more diverse array of PAHs were detected at concentrations generally around or below 3 ppm. However, Bis(2-ethylhexyl)Phthalate, the only Phthalate Ester detected in any of the sediment samples (except Di-n-octyl Phthalate at Sampling Site R-1-M), was measured at 17.8 ppm at Sampling Site R-1-M in the River Channel. Generally, PAH and Purgeable Halocarbon contamination was higher in sediment samples from the lower River Channel, as compared to those from the upper reach. The most predominant PAHs measured in the sediment samples include Naphthalene, Phenanthrene, Pyrene, Flouranthene and Chrysene.

5. Sediment Elutriate Testing. The primary objective of elutriate testing is to simulate and/or predict inorganic contaminant releases from the sediments during dredging and dredged material open-water discharge processes. The elutriate test data are summarized in Table 6. Moderate to higher releases of barium, iron, manganese, nitrogen-ammonia, TKN and zinc were measured from most of the sediment samples. Chromium, mercury, nitrate, and oil/grease generally showed lower releases. Phosphorus releases were nondetectable from all of the Lake Approach Channel sediment samples, and nondetectable or low in the River Channel samples. When compared to elutriate data on sediment samples from the Lake Approach Channel and open-lake discharge site, the River Channel sediment samples generally showed higher releases for most of the parameters measured.

6. Sediment Bioassays. Ninety six-hour bioassays were performed on all of the samples to evaluate the potential toxicological effects of the sediments on sellect aquatic species. These bioassays were conducted according to procedures described by Prater and Anderson (1977a,b). Test species utilized in the bioassays include the burrowing mayfly (Hexagenia limbata Walsh), water flea (Daphnia magna Straus) and fathead minnow (Pimephales promelas Rafinesque). Mortality data (in percentages) on these test species were compared to the pollutional classification scheme used in Prater and Anderson (1977a,b). According to this categorization, sediments from all of the sampling sites are classified as "nonpolluted" with respect to fathead minnow mortalities, since the measured mortalities were within the 10 percent range for this species. All but two of the sediment samples were classified as "moderately polluted" within the 10-50 percent mortality range for the burrowing mayfly. Sediments from Sampling Sites R-1-M and R-4-M were classified as "heavily polluted" since they exceeded the 50 percent mortality value for the mayfly. D. magna mortalities classified all but four of the sediment samples as "nonpolluted" within the 10 percent mortality range for this species. Sampling Sites L-9-M, O-M, R-3-M and D-2 were classified as "moderately polluted" with respect to D. magna mortalities. In summary, these bioassays indicate that sediment samples in the Lake Approach Channel and open-lake discharge site are classified overall as "nonpolluted" to "moderately polluted" with respect to the test species mortalities. River Channel sediment samples, particularly from the lower reach, are categorized overall as "moderately polluted" to "heavily polluted."

II. CONFINED DISPOSAL FACILITY SEDIMENTS (CONSOLIDATED DREDGED MATERIAL)

1. This section describes the characteristics of the soil/dredged material within the existing dredged material Confined Disposal Facilities (CDFs) at Toledo Harbor, Ohio, which include the Island 18 CDF and the currently used CDF. Sediments throughout Toledo Harbor Federal navigation channels were placed in the Island 18 and currently used CDF. Use of the Island 18 CDF for dredged material discharge was discontinued in 1977, and use of the currently used CDF began in 1978. Information on the characteristics of the dredged material in the CDFs was obtained from sediment analyses performed under contract to the the Buffalo District.

2. Sediment Sampling and Testing. In October 1984, Buffalo District personnel used a bucket auger to collect five core soil/dredged material samples from the Island 18 CDF and currently used CDF at Toledo Harbor, Ohio. These samples represent dredged material which was placed in the CDFs prior to 1984. The soil sampling sites within these facilities are shown in Figure 4; Sampling Sites I through III represent the material in the Island 18 CDF, and IV and V represent that in the currently used CDF. The core samples were separated into intervals with respect to depth from the soil surface for a total of 18 samples, as summarized in Table 7. All soil samples were subjected to bulk physical and chemical (inorganic and organic) analyses. Column leach testing was performed on three of the soil samples. All analyses were conducted by Aqua Tech Environmental Consultants (1984).

3. Sediment Physical Characteristics. Grain size distributions of the soil samples were determined using CRL Method 485. The results of the physical analysis are presented in Table 8. On the average, the CDF soil samples consisted of 81 percent silts and clays, with the remainder coarse-grain material. With few exceptions (i.e., Sampling Sites IV-2, IV-3 and IV-4), the sediment samples were comprised of between about 91 and 98 percent silts and clays. With the exception of the most recently discharged mud slurry material, the majority of material in CDFs is dewatered and consolidated to some degree, which depends

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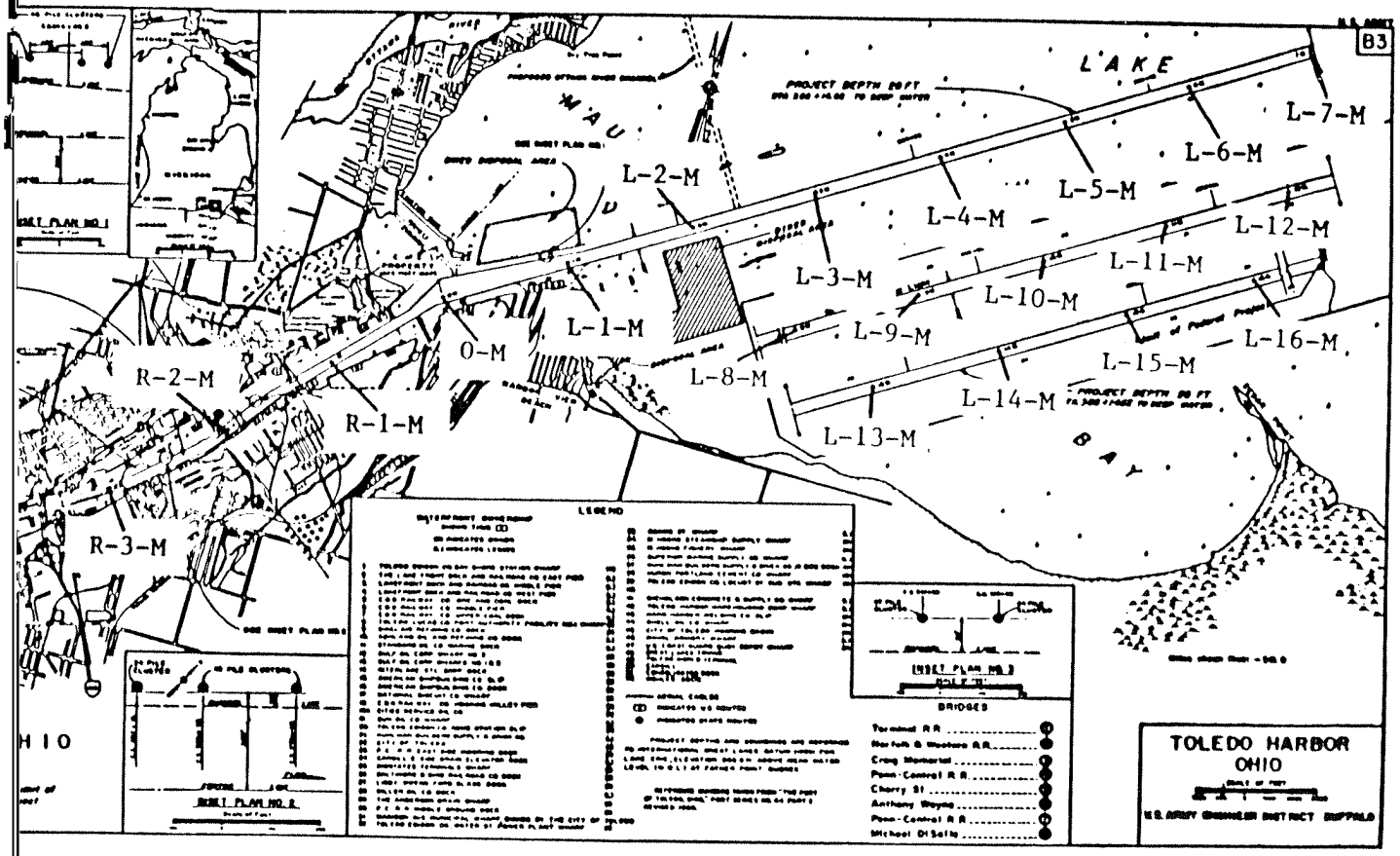
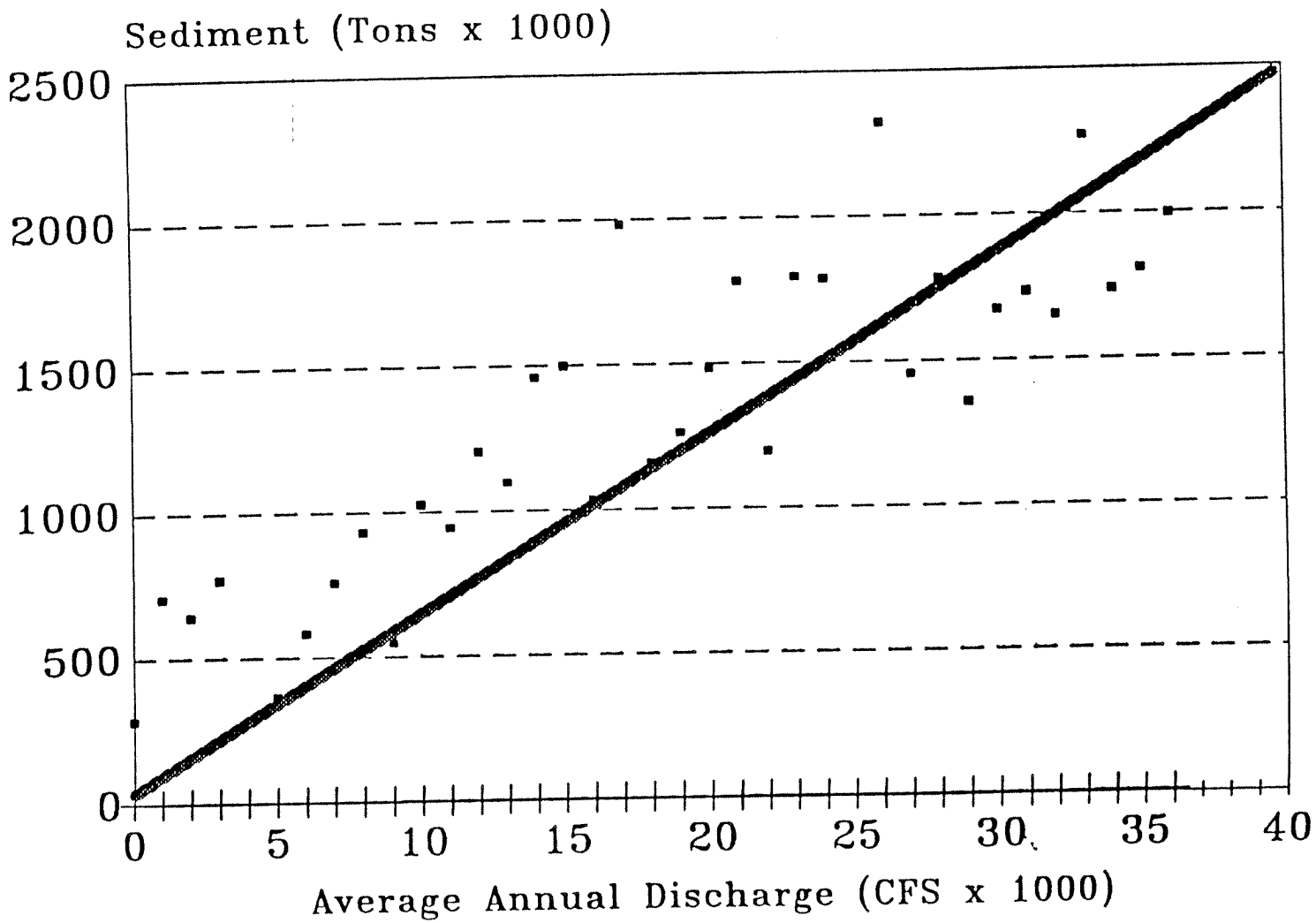
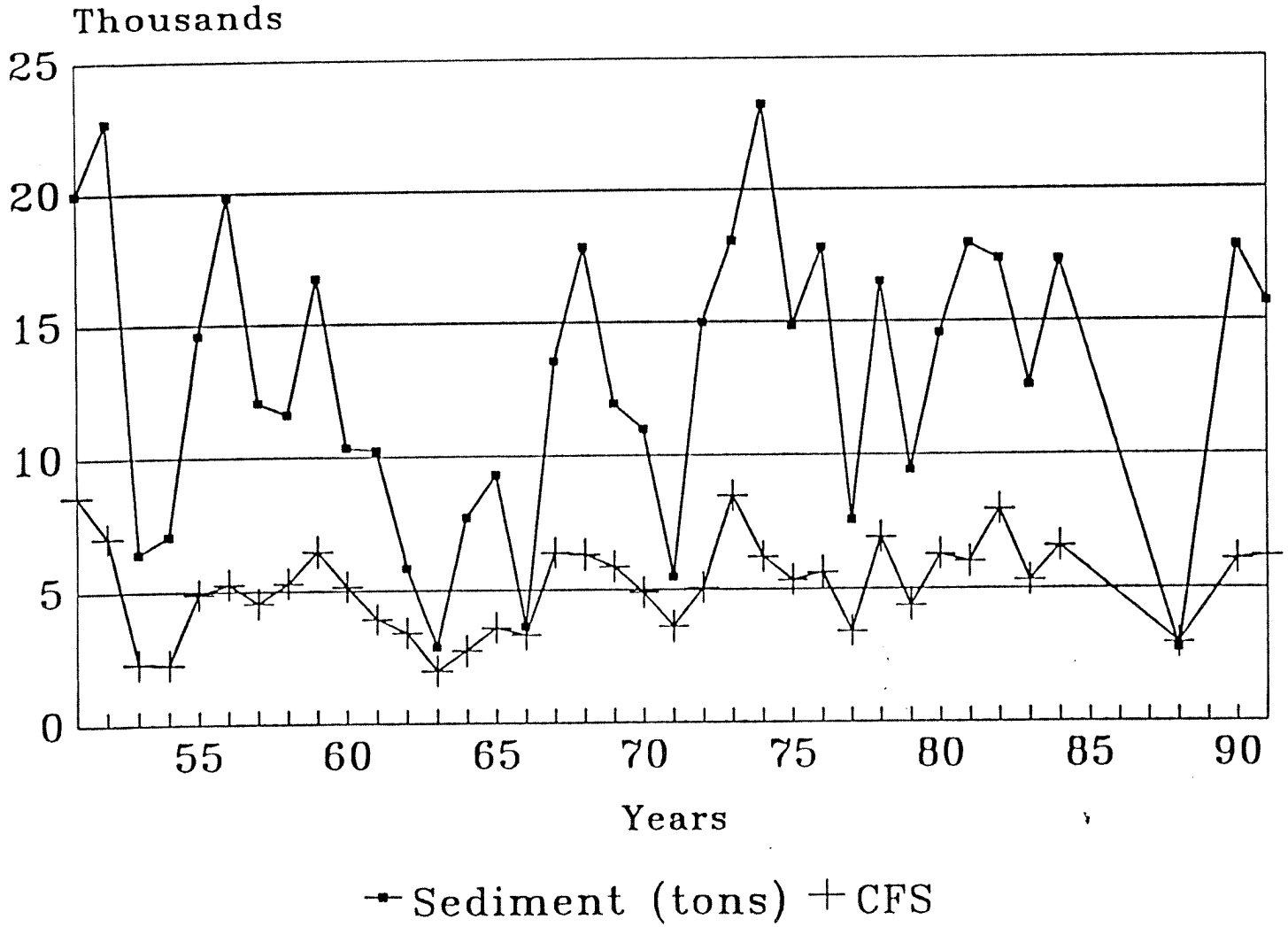


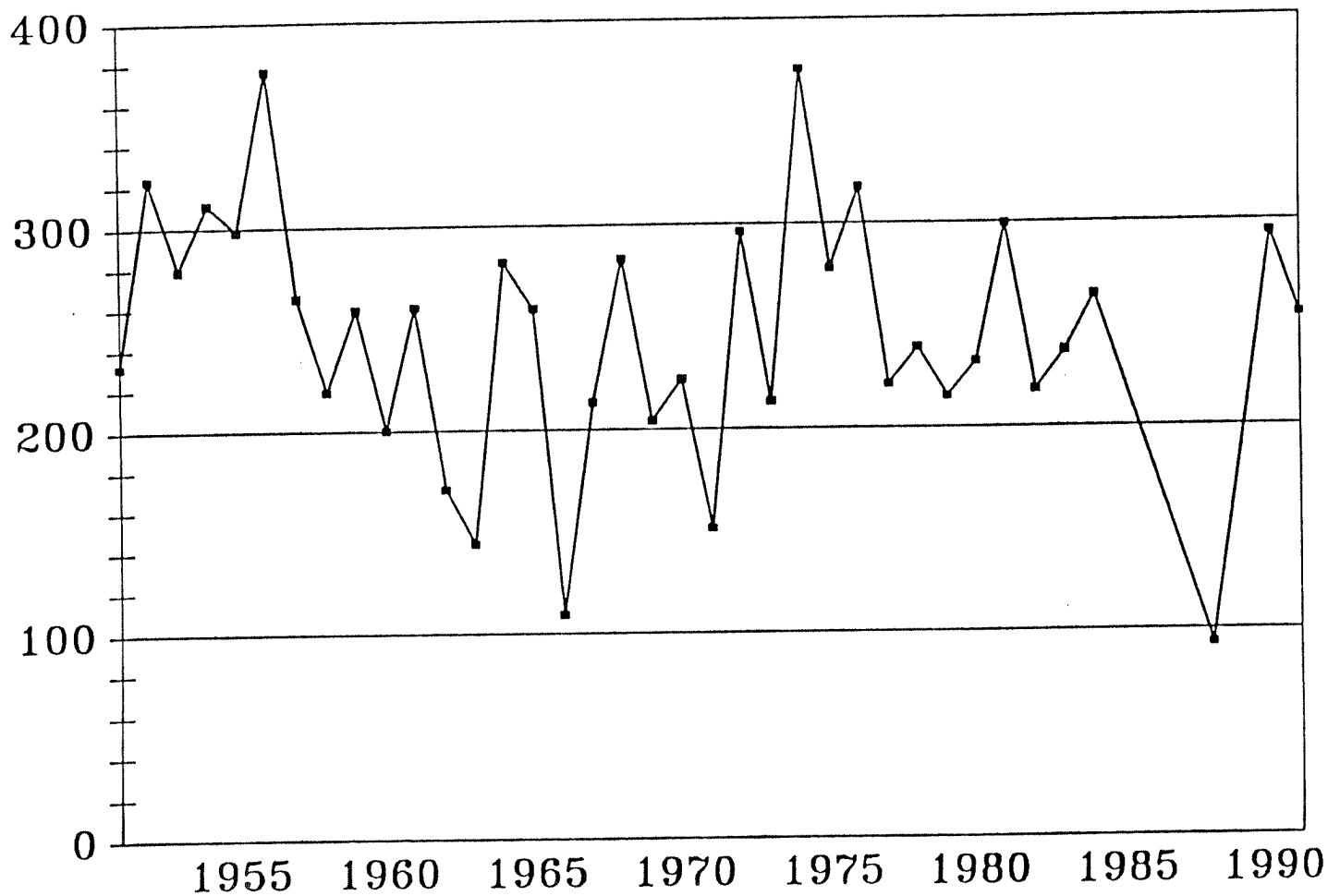
Sediment Rating Curve
Maumee River – Waterville Gauge



Water and Sediment Discharge for Maumee River Basin



Sediment Discharge Ratio A/B [1/]



1/ $\frac{\text{Annual sediment discharge tons}}{\text{Annual average flow cfs}}$

2/ No data available for 1985, 1986, 1987, and 1989

2/22/93

Maumee Basin USLE Basin Erosion 1992 Base Year

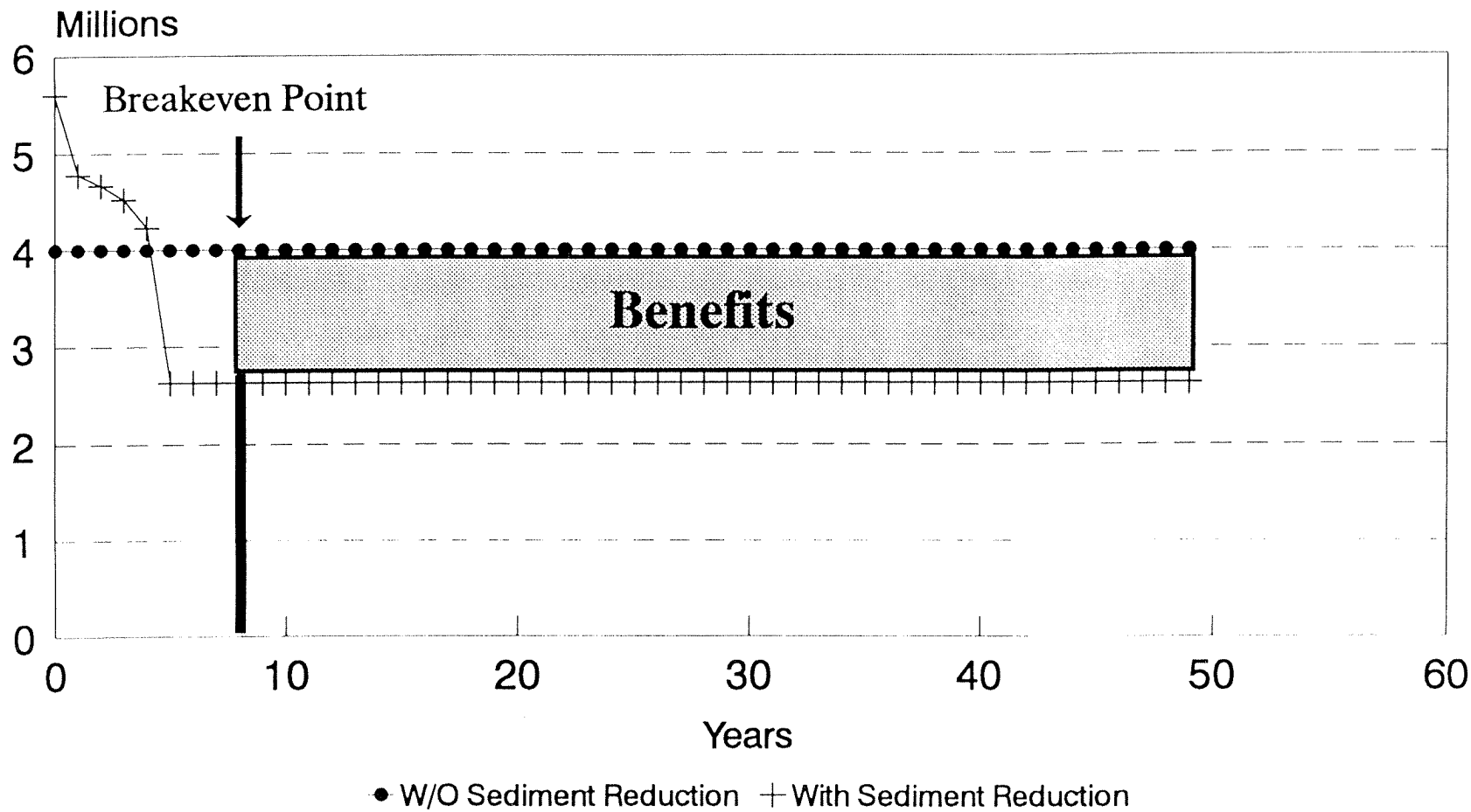
COUNTY	% in MAUMEE W.S.	BASIN	CORN CONVENTIONAL COUNTY	CORN CONVENTIONAL BASIN	CORN CONVENTIONAL USLE-TNS	CORN CONSERV. -TILL COUNTY	CORN CONSERV. -TILL BASIN	CORN CONSERV. -TILL USLE-TNS	SOYBEANS CONVENTIONAL COUNTY	SOYBEANS CONVENTIONAL BASIN	SOYBEANS CONVENTIONAL USLE-TNS	SOYBEANS CONSERV. - TILL COUNTY	SOYBEANS CONSERV. - TILL BASIN	SOYBEANS CONSERV. - TILL USLE-TNS	WHEAT COUNTY	WHEAT BASIN	WHEAT USLE-TNS
ALLEN	1	1	59,207	59,207	232,684	10,007	10,007	15,111	59,624	59,624	234,322	17,929	17,929	27,073	27,677	27,677	15,776
AUGLAIZE	0.79	1	43,654	34,487	135,533	20,281	16,022	24,193	52,032	41,105	161,544	32,187	25,428	38,396	28,000	22,120	12,608
DEFIANCE	1	1	17,092	17,092	67,172	14,591	14,591	22,032	43,352	43,352	170,373	52,944	52,944	79,945	31,216	31,216	17,793
FULTON	1	1	42,676	42,676	167,717	45,400	45,400	68,554	42,222	42,222	165,932	49,486	49,486	74,724	16,344	16,344	9,316
HANCOCK	1	0.8	66,731	53,385	209,802	16,269	13,015	19,653	97,861	78,289	307,675	37,440	29,952	45,228	52,400	41,920	23,894
HARDIN	0.42	0.7	48,300	14,200	55,807	21,700	6,380	9,633	54,600	16,052	63,086	41,400	12,172	18,379	30,000	8,820	5,027
HENRY	1	1	44,257	44,257	173,930	34,773	34,773	52,507	54,056	54,056	212,440	40,780	40,780	61,578	36,128	36,128	20,593
LUCAS	1	0.8	17,548	14,038	55,171	12,162	9,730	14,692	27,799	22,239	87,400	19,459	15,567	23,506	8,382	6,706	3,822
MERCER	0.47	1	65,996	31,018	121,901	16,054	7,545	11,394	56,910	26,748	105,118	22,550	10,599	16,004	18,825	8,848	5,043
PAULDING	1	1	35,999	35,999	141,476	14,941	14,941	22,561	67,187	67,187	264,045	43,135	43,135	65,134	57,673	57,673	32,874
PUTNAM	1	1	67,533	67,533	265,405	13,390	13,390	20,219	82,669	82,669	324,889	32,601	32,601	49,228	51,560	51,560	29,389
VAN WERT	1	1	48,535	48,535	190,743	26,135	26,135	39,464	59,398	59,398	233,434	46,669	46,669	70,470	33,024	33,024	18,824
WILLIAMS	1	1	29,650	29,650	116,525	22,530	22,530	34,020	32,415	32,415	127,391	38,345	38,345	57,901	32,420	32,420	18,479
WOOD	1	0.25	58,400	14,600	57,378	39,600	9,900	14,949	81,200	20,300	79,779	54,800	13,700	20,687	45,000	11,250	6,412
SHELBY	0.06	1	30,000	1,800	7,074	25,000	1,500	2,265	43,420	2,605	10,238	29,580	1,775	2,680	20,000	1,200	684
HILLSDALE	0.53	1	53,900	28,567	112,268	51,100	27,083	40,895	19,000	10,070	39,575	26,000	13,780	20,808	12,000	6,630	3,625
LENAWEE	0.18	1	67,600	12,128	47,820	47,400	8,532	12,883	55,121	9,922	38,993	44,879	8,078	12,198	34,000	6,120	3,488
ADAMS	0.75	1	52,700	39,525	155,333	10,000	7,500	11,325	46,000	34,500	135,585	32,000	24,000	36,240	26,000	19,500	11,115
ALLEN	0.70	1	75,700	52,990	208,251	18,376	12,863	19,423	76,798	53,759	211,271	52,674	36,872	55,676	23,591	16,514	9,413
DEKALB	0.97	1	27,950	27,112	106,548	9,050	8,779	13,256	31,000	30,070	118,175	36,400	35,308	53,315	14,000	13,580	7,741
NOBLE	0.18	1	33,000	5,940	23,344	33,000	5,940	8,969	10,500	1,890	7,428	31,500	5,670	8,562	14,000	2,520	1,436
STUEBEN	0.20	1	8,360	1,672	6,571	33,440	6,688	10,099	2,210	442	1,737	19,898	3,980	6,009	7,800	1,560	889
WELLS	0.04	1	40,610	1,624	6,384	22,143	886	1,337	14,611	584	2,297	71,339	2,854	4,309	14,964	599	341
TOTAL			675,578	508,477	2,623,173	332,833	245,859	455,158	854,745	648,262	3,129,895	559,305	431,081	855,669	488,649	386,905	261,076

Maumee Basin USLE Basin Erosion 1992 Base Year (Continued)

COUNTY	in MAUMEE W.S.	BASIN	OATS COUNTY	OATS BASIN	OATS USLE-TNS	HAY COUNTY	HAY BASIN	HAY USLE-TNS	SETASIDE COUNTY	SETASIDE BASIN	SETASIDE USLE-TNS	CRP COUNTY	CRP BASIN	CRP USLE-TNS	TOTALS USLE TONS	GOALS REDUCTION TONS 1/
ALLEN	1	1	3,178	3,178	1,811	4,200	4,200	504	3,114	3,114	374	7,367	7,367	884	528,538	144,227
AUGLAIZE	0.79	1	3,600	2,844	1,621	14,000	11,060	1,327	2,935	2,319	278	8,431	6,660	799	376,300	121,534
DEFIANCE	1	1	1,601	1,601	913	6,800	6,800	816	3,456	3,456	415	12,085	12,085	1,450	360,909	137,353
FULTON	1	1	908	908	518	3,500	3,500	420	14,771	14,771	1,773	3,384	3,384	406	489,359	164,018
HANCOCK	1	0.8	1,100	880	502	5,000	4,000	480	4,734	3,787	454	874	699	84	607,772	169,445
HARDIN	0.42	0.7	3,220	947	540	5,700	1,676	201	5,000	1,470	176	7,404	2,177	261	153,111	47,920
HENRY	1	1	750	750	427	8,200	8,200	984	4,000	4,000	480	576	576	69	523,009	167,640
LUCAS	1	0.8	1,000	800	456	1,100	880	106	1,200	960	115	248	198	24	185,292	53,339
MERCER	0.47	1	8,000	3,760	2,143	18,600	8,742	1,049	4,367	2,052	246	933	439	53	262,951	74,813
PAULDING	1	1	1,280	1,280	730	6,900	6,900	828	3,400	3,400	408	2,128	2,128	255	528,310	174,482
PUTNAM	1	1	2,000	2,000	1,140	10,800	10,800	1,296	2,262	2,262	271	885	885	106	691,943	197,775
VAN WERT	1	1	1,000	1,000	570	3,900	3,900	468	3,287	3,287	394	601	601	72	554,439	166,912
WILLIAMS	1	1	1,180	1,180	673	4,800	4,800	576	4,800	4,800	576	28,770	28,770	3,452	359,593	146,183
WOOD	1	0.25	2,500	625	356	3,600	900	108	5,622	1,406	169	262	66	8	179,846	54,560
SHELBY	0.06	1	5,000	300	171	11,500	690	83	3,800	228	27	718	43	5	23,228	7,606
HILLSDALE	0.53	1	5,000	2,650	1,510	2,500	1,325	159	30,700	16,271	1,953	29,700	15,741	1,889	222,683	91,385
LENAWEE	0.18	1	3,600	648	369	11,098	1,198	240	11,870	2,137	256	21,000	3,780	454	116,702	40,037
ADAMS	0.75	1	4,800	3,600	2,052	7,500	5,625	675	2,750	2,063	248	4,053	3,040	365	352,938	104,514
ALLEN	0.70	1	1,800	1,260	718	2,180	1,526	183	1,978	1,385	166	9,089	6,362	763	505,866	137,648
DEKALB	0.97	1	2,500	2,425	1,382	2,500	2,425	291	2,000	1,940	233	32,000	31,040	3,725	304,665	114,509
NOBLE	0.18	1	2,500	450	257	4,000	720	86	1,089	196	24	17,210	3,098	372	50,478	19,818
STUEBEN	0.20	1	1,400	280	160	1,500	300	36	3,500	700	84	26,000	5,200	624	26,209	15,616
WELLS	0.04	1	963	39	22	6,853	274	33	6,275	251	30	5,054	202	24	14,777	5,484
															7,378,162	2,325,543
TOTAL			60,165	35,345		160,652	102,503		84,340	57,846		168,072	115,020			
					20,147			12,300			6,942			13,802	7,378,162	

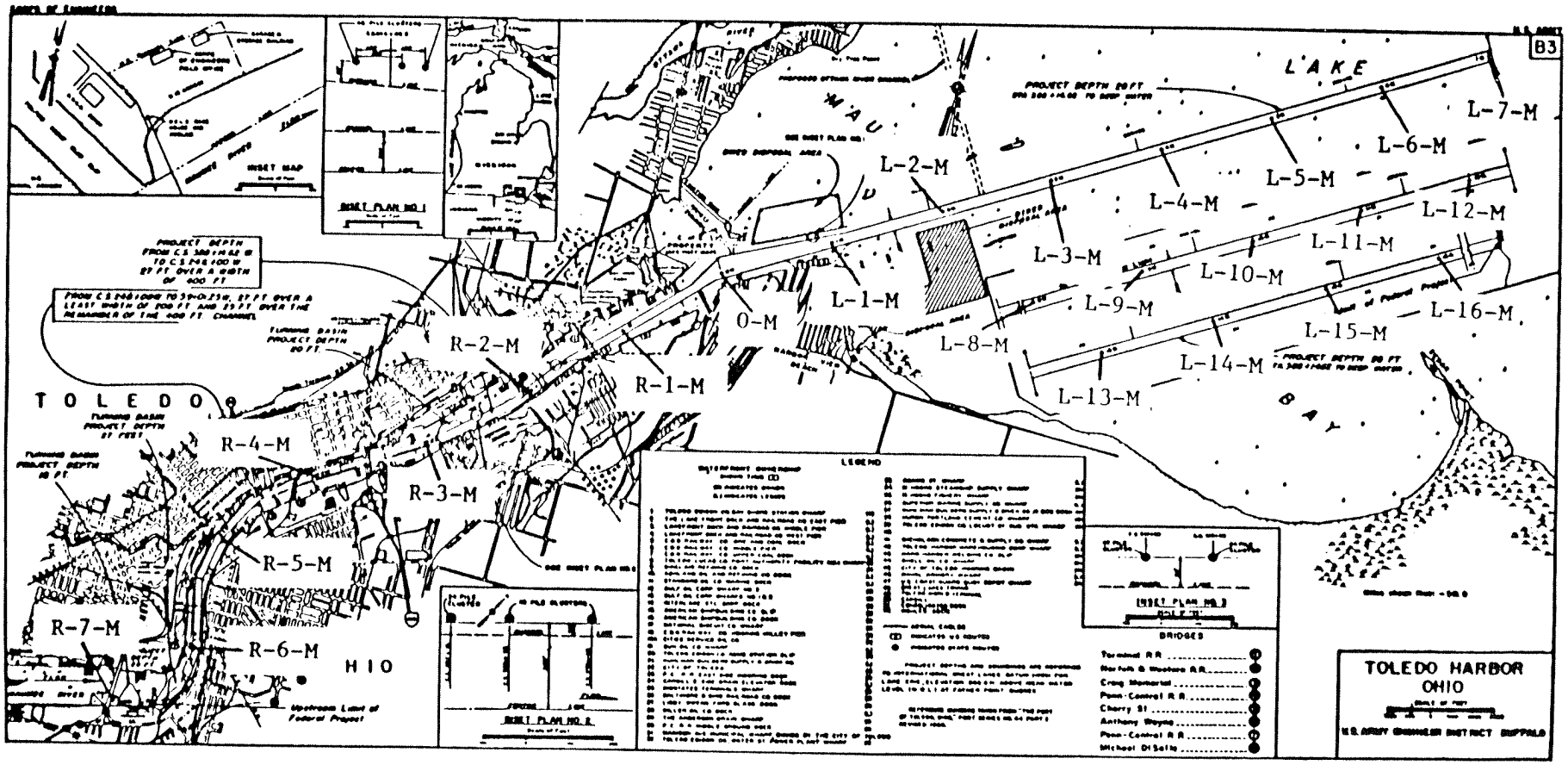
1/ 0.75 USLE Tons Per Cropland Acre

Benefits of Sediment Reduction
Toledo Harbor



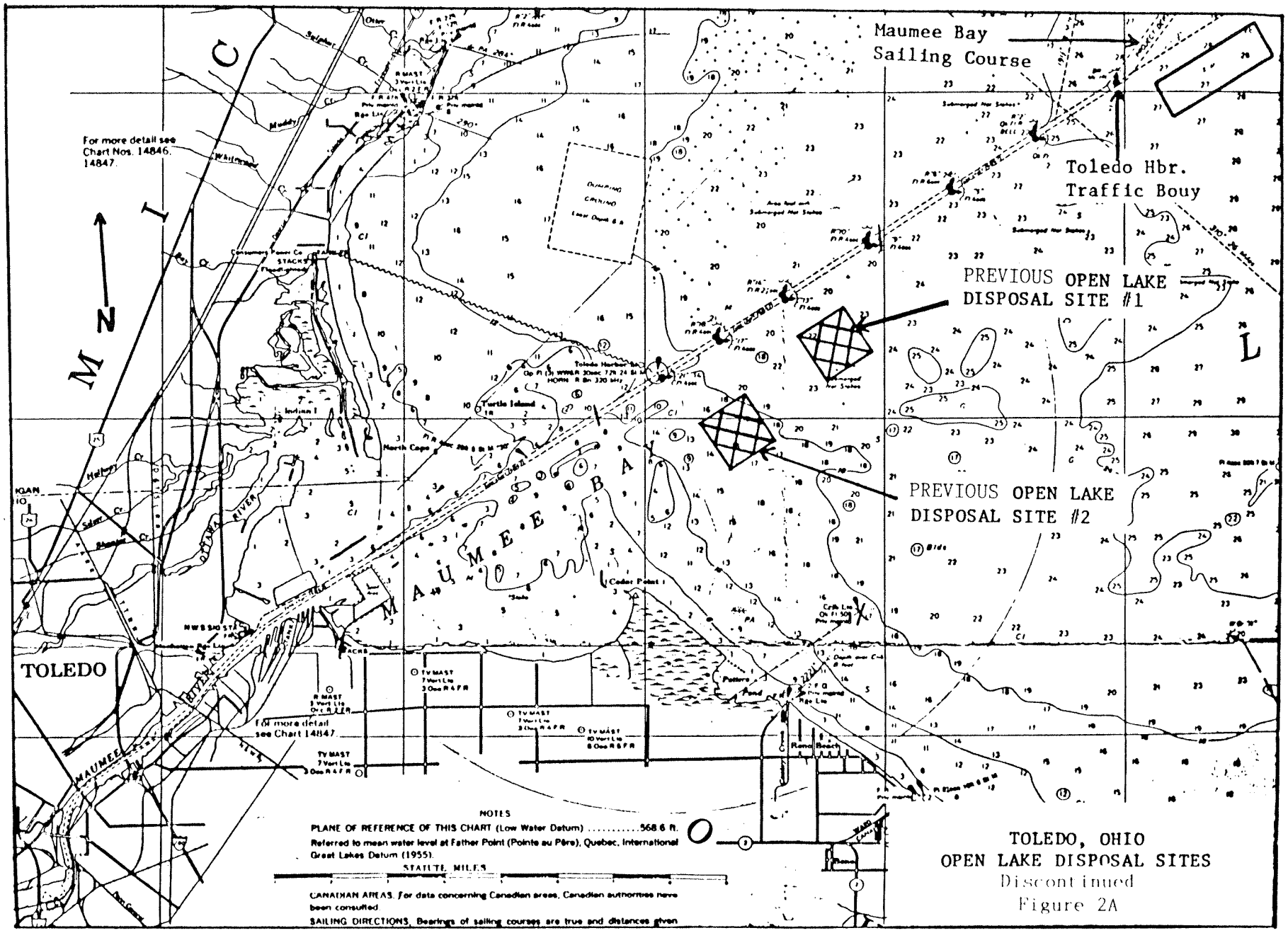
Annual Values, 1992 Dollars

Figure 1. Toledo Harbor, Lucas County, Ohio, Federal navigation project - Federal navigation channel sediment sampling sites.



84 - #1 & 2
85 "
86 - #1 Only

Last Used in 1983.



TOLEDO, OHIO
OPEN LAKE DISPOSAL SITES
Discontinued
Figure 2A

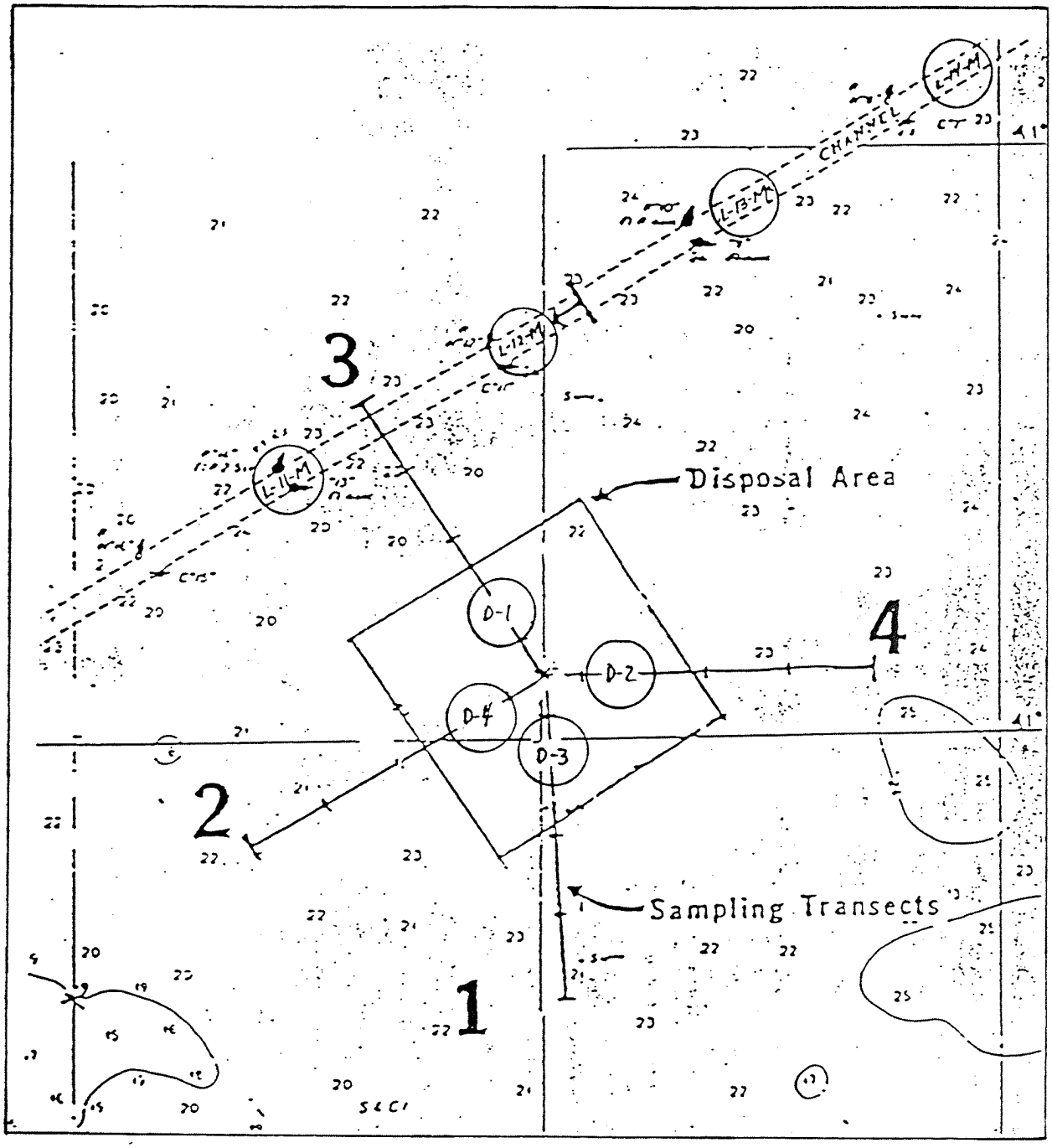


Figure 2B Toledo Harbor, Ohio sampling sites.

Figure 3. Toledo Harbor, Lucas County, Ohio - Existing open-lake discharge site for dredged material (the open-lake reference site is for comparison purposes only).

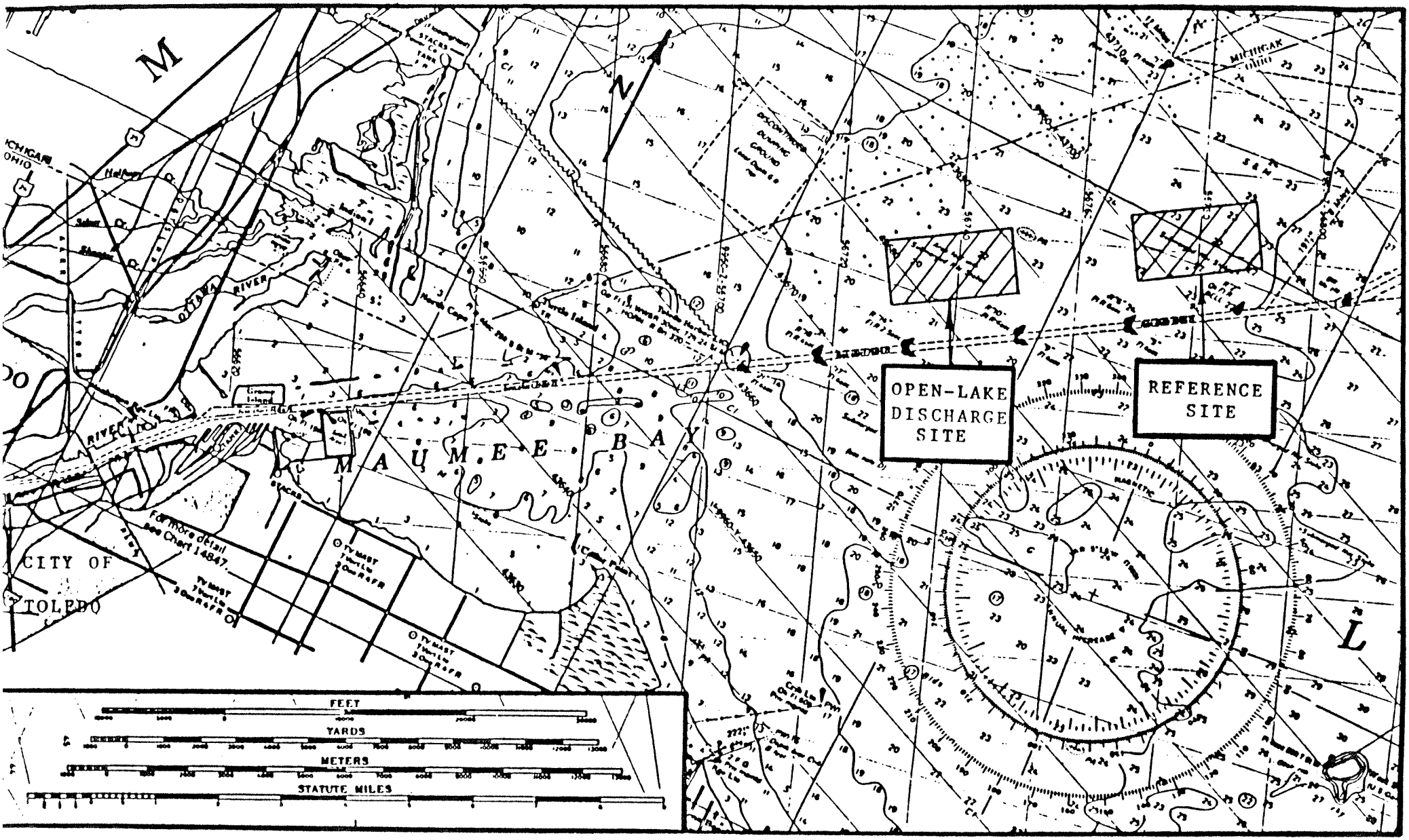


Figure 4. Toledo Harbor, Lucas County, Ohio - CDFs and their respective soil sampling sites.

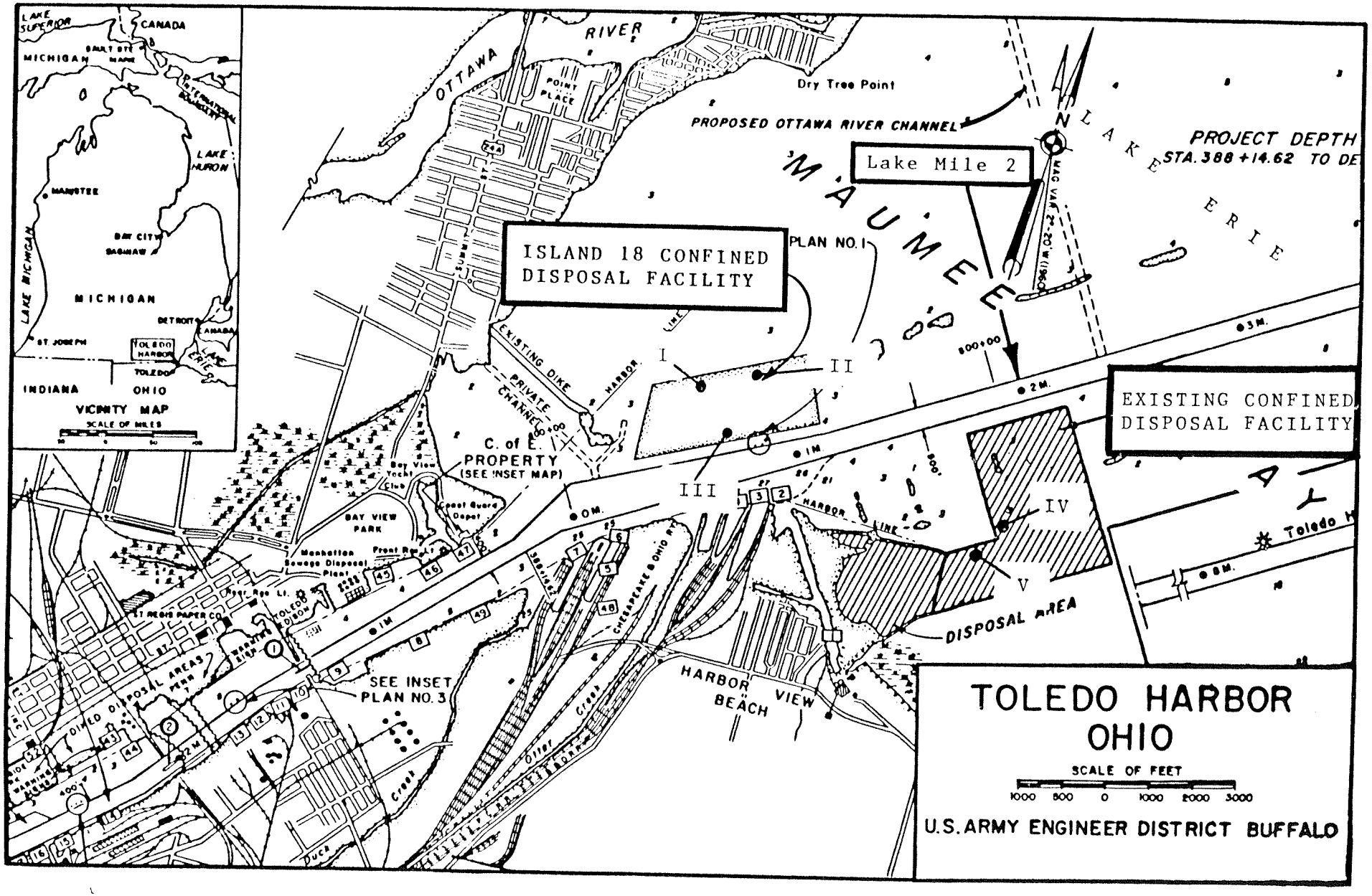


Table 1 - Particle Size Analyses of Sediment Samples from Toledo Harbor Federal Navigation Channels and Open-Lake Discharge Site.

Sediment Sampling Site	Percent Retained						#200 Passed
	#8	#16	#30	#50	#100	#200	
D-4	<0.1	<0.1	<0.1	0.2	0.5	0.3	99.0
D-4 Rpt.	<0.1	<0.1	<0.1	0.1	0.3	1.4	98.2
D-3	<0.1	0.2	<0.1	0.4	0.6	2.2	96.6
D-2	<0.1	<0.1	<0.1	<0.1	0.5	1.0	98.5
D-1	0.1	0.1	0.1	0.8	2.0	5.4	91.5
L-16-M	<0.1	0.2	0.3	0.7	7.5	26.1	65.2
L-15-M	0.3	<0.1	<0.1	0.5	1.8	6.5	90.9
L-14-M	<0.1	<0.1	0.2	0.3	2.0	9.3	88.2
L-13-M	<0.1	<0.1	0.2	1.5	11.3	25.9	61.1
L-12-M	<0.1	0.2	<0.1	1.0	4.2	8.1	86.5
L-11-M	<0.1	0.2	0.3	1.4	6.0	8.2	83.9
L-10-M	<0.1	<0.1	<0.1	0.6	1.7	2.8	94.9
L-9-M	<0.1	<0.1	0.2	0.8	1.9	4.4	92.7
L-9-M Rpt.	<0.1	0.1	0.1	0.8	2.0	3.3	93.7
L-8-M	0.3	0.2	<0.1	0.7	2.2	5.1	91.5
L-7-M	0.2	<0.1	<0.1	0.7	1.5	6.9	90.7
L-6-M	0.1	0.3	0.3	0.7	1.1	3.5	94.0
L-5-M	0.8	0.3	0.5	0.8	1.9	6.7	89.0
L-4-M	<0.1	0.2	<0.1	0.5	0.5	1.9	96.9
L-3-M	<0.1	<0.1	<0.1	0.4	0.9	6.1	92.6
L-2-M	<0.1	<0.1	<0.1	0.3	0.6	2.7	96.4
L-1-M	<0.1	0.2	<0.1	0.2	0.6	1.1	97.9
O-M	<0.1	<0.1	<0.1	0.5	1.2	1.4	96.9
R-1-M	0.2	0.2	0.2	0.5	4.6	11.5	82.8
R-2-M	<0.1	<0.1	<0.1	0.4	1.7	1.4	96.5
R-3-M	<0.1	<0.1	<0.1	0.6	1.0	0.4	98.0
R-3-M Rpt.	<0.1	0.2	<0.1	1.1	1.3	0.5	96.9
R-4-M	1.0	0.7	1.5	6.2	7.1	2.9	80.6
R-5-M	7.3	2.6	2.9	5.8	4.8	3.1	73.5
R-6-M	7.2	2.7	2.3	2.8	9.0	8.3	67.7
R-7-M	<0.1	1.3	0.6	2.3	9.1	5.7	81.0

Table 2 - Bulk Inorganics Data on Sediment Samples Collected from Toledo Harbor Federal Navigation Channels and Open-Lake Discharge Site. All units are in ppm, unless otherwise indicated.

Sediment Sampling Site	Inorganic Parameter																				
	Arsenic, Total	Barium, Total	Cadmium, Total	Chromium, Total	COD	Copper, Total	Cyanide, Total	Iron, Total	Lead, Total	Manganese, Total	Mercury, Total	Nickel, Total	Nitrate	Nitrogen, Ammonia	Oil/ Grease	Phenols, 4-AAP	Phosphorus, Total	Residue, T. Volatile, %	Residue, Total (TS), %	Total Kjeldahl N	Zinc, Total
D-4	18	67	1	25	51000	31	<0.5	20300	29	400	0.1	29	<7	87	270	0.23	870	4.50	48.3	1320	110
D-3	22	79	3	48	110000	54	<0.6	26000	57	440	0.6	52	<12	89	400	0.24	890	6.60	33.2	1330	210
D-2	14	87	3	78	96000	58	<0.7	25500	69	500	0.5	56	<12	96	650	0.25	1100	5.57	31.0	1470	230
D-1	15	60	2	25	57000	37	<0.4	19300	35	360	0.2	33	<9	120	320	0.14	780	2.32	42.2	1080	130
L-16-M	9	29	2	32	34000	32	<0.3	12600	40	280	0.3	30	<6	21	880	0.26	570	2.51	59.4	472	130
L-15-M	16	49	3	49	72000	50	<0.5	17700	67	400	0.7	49	<9	50	830	0.13	830	5.12	38.5	952	200
L-14-M	13	42	3	38	53000	39	<0.5	14700	45	350	0.5	39	<9	42	520	0.14	710	4.81	42.2	852	160
L-13-M	9	31	2	28	38000	30	<0.4	11300	34	255	0.3	32	<7	37	250	0.16	560	3.23	54.0	649	110
L-12-M	19	60	3	37	76000	44	0.69	22300	59	400	0.4	42	<11	93	650	0.28	760	4.67	35.0	1050	160
L-11-M	18	60	2	31	74000	43	0.35	17600	48	400	0.3	38	<11	110	460	0.20	780	4.89	36.3	1440	160
L-10-M	21	69	2	30	93000	41	0.75	23300	38	440	0.3	39	<13	170	590	0.20	750	6.51	30.0	1470	150
L-9-M	17	53	2	19	67000	31	0.4	15300	23	450	0.3	28	<10	81	4300	0.18	700	4.77	38.2	1300	100
L-8-M	14	67	2	21	63000	29	0.23	18000	33	360	0.2	25	<7	59	620	0.10	760	3.88	48.8	1060	100
L-7-M	16	74	0.9	18	76000	28	0.52	20300	25	440	0.1	29	<10	120	420	0.19	750	5.52	39.3	1270	100
L-6-M	16	76	1	19	76000	27	0.6	18900	24	360	0.3	25	<9	160	330	0.23	770	5.58	44.4	1460	95
L-5-M	15	72	1	18	72000	29	0.56	14400	24	370	0.1	23	<8	140	30	0.13	830	6.11	46.2	1450	100
L-4-M	20	90	1	20	82000	32	0.48	23100	23	400	0.1	27	<10	110	340	0.20	840	5.98	38.9	1500	110
L-3-M	18	82	1	17	74000	29	0.47	16000	23	355	0.3	24	<9	160	380	<0.10	900	4.83	43.3	1810	98
L-2-M	20	92	2	23	86000	33	0.7	22900	29	470	0.1	30	<10	200	680	0.39	980	7.16	36.9	1420	120
L-1-M	22	110	2	24	97000	37	1.5	24900	26	460	0.1	32	<9	180	900	0.23	1100	7.58	37.6	1870	150
O-M	20	100	2	31	83000	38	0.52	27200	34	390	0.2	33	<9	270	1300	0.21	1200	6.63	42.3	1700	140
R-1-M	21	120	2	57	120000	52	1.58	31500	52	420	0.4	46	<10	870	3900	0.69	3500	8.84	36.8	2620	330
R-2-M	22	120	2	39	84000	39	0.67	29000	29	530	0.2	33	<10	210	1100	0.29	1400	7.45	37.0	1630	170
R-3-M	23	120	2	24	87000	36	0.98	30600	32	470	0.1	31	<10	150	710	0.16	1100	7.29	37.6	2860	160
R-4-M	12	70	2	14	46000	27	<0.3	13900	23	320	0.2	19	<6	88	340	0.13	840	4.29	54.7	1630	93
R-5-M	22	110	1	20	82000	40	0.5	24500	41	440	0.2	27	<9	150	980	0.17	1100	10.0	41.5	2750	150
R-6-M	18	82	0.9	16	56000	26	<0.6	19900	19	340	0.1	23	<7	91	270	0.13	820	4.25	46.6	1690	97
R-7-M	16	65	2	13	61000	23	<0.5	13200	16	335	0.2	23	<8	89	430	0.12	735	7.47	47.6	1980	82

Table 3 - Bulk Organochlorine Pesticide and PCB Analyses Conducted on Sediment Samples from Toledo Harbor Federal Navigation Channels and Open-Lake Discharge Site. All units are in ppm.

Organochlorine Pesticide/PCB	Sediment Sampling Site																											
	D-1	D-2	D-3	D-4	L-1-M	L-2-M	L-3-M	L-4-M	L-5-M	L-6-M	L-7-M	L-8-M	L-9-M	L-10-M	L-11-M	L-12-M	L-13-M	L-14-M	L-15-M	L-16-M	O-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
alpha-Endosulfan	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
beta-Endosulfan	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
Endosulfan Sulfate	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
alpha-BHC	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
beta-BHC	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
gamma-BHC (Lindane)	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
delta-BHC	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
Aldrin	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
Dieldrin	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
4,4'-DDE	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
4,4'-DDD	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
4,4'-DDT	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
Endrin	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
Endrin Aldehyde	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
Heptachlor	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
Heptachlor Epoxide	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
Chlordane	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.20
Toxaphene	<0.50	<0.50	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00	<0.50	<0.50	<0.50	<0.50	<1.00
Aroclor 1016	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1221	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1232	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1242	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1248	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1254	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1260	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Table 4 - Bulk Purgeable Halocarbon Analyses Conducted on Sediment Samples from Toledo Harbor Federal Navigation Channels and Open-Lake Discharge Site. All units are in ppm.

Purgeable Halocarbon	Sediment Sampling Site																											
	D-1	D-2	D-3	D-4	L-1-M	L-2-M	L-3-M	L-4-M	L-5-M	L-6-M	L-7-M	L-8-M	L-9-M	L-10-M	L-11-M	L-12-M	L-13-M	L-14-M	L-15-M	L-16-M	O-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
Bromoform	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Bromodichloromethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Carbon Tetrachloride	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chloroethane	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
2-Chloroethyl Vinyl Ether	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chloroform	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibromochloromethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,2-Dichloropropane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
trans-1,3-Dichloropropene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
1,1,2,2-Tetrachloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Tetrachloroethene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
trans-1,2-Dichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,1-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,1,2-Trichloroethane	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Trichloroethene	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Vinyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

Table 5 - Bulk PAH and Phthalate Esters Analyses Conducted on Sediment Samples from Toledo Harbor Federal Navigation Channels and Open-Lake Discharge Site. All units are in ppm.

	Sediment Sampling Site																											
PAH/Phthalate Esters	D-1	D-2	D-3	D-4	L-1-M	L-2-M	L-3-M	L-4-M	L-5-M	L-6-M	L-7-M	L-8-M	L-9-M	L-10-M	L-11-M	L-12-M	L-13-M	L-14-M	L-15-M	L-16-M	O-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
Acenaphthene	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.39	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Anthracene	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	0.47	<0.10	<0.10	0.40	0.40	<0.10
Benzo(a)Anthracene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1.21	<0.30	<0.30	1.01	<0.30	<0.30
Benzo(a)Phrene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.65	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(b)Fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(ghi)Perylene	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Benzo(k)Fluoranthene	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	<0.20	<0.20	<0.20	<0.20	1.05	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.38	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.67	1.45	<0.20	<0.20	1.27	<0.20	<0.20
Dibenzo(a,h)Anthracene	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Fluoranthene	<0.30	<0.30	<0.30	<0.30	0.41	0.46	0.40	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.67	1.99	2.73	0.88	0.93	1.96	0.75	0.33
Fluorene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.71	<0.30	<0.30	0.33	<0.30	<0.30
Indeno(1,2,3-cd)Pyrene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Naphtalene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.65	0.57	0.61	<0.30	<0.30	<0.30	<0.30	<0.30
Phenanthrene	0.17	0.16	0.16	0.24	0.67	0.53	0.38	0.19	0.25	0.13	0.15	0.22	<0.10	0.12	0.14	<0.10	<0.10	0.16	<0.10	<0.10	0.77	1.57	2.99	0.81	0.85	1.53	0.44	0.26
Pyrene	0.45	0.37	0.33	0.61	0.98	0.87	1.06	0.38	0.48	0.31	0.53	0.55	0.41	0.28	0.42	<0.20	<0.20	<0.20	0.24	<0.20	1.20	2.44	2.24	1.50	1.98	2.40	0.78	0.36
Bis(2-ethylhexyl)Phthalate	<0.30	0.83	0.85	0.49	1.76	<0.30	2.09	0.78	1.20	1.09	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.60	<0.30	0.93	<0.30	3.05	17.8	3.82	2.34	<0.30	1.88	<0.30	0.83
Butylbenzyl Phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Di-n-butyl Phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Diethyl Phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dimethyl Phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Di-n-octyl Phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	1.79	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Table 6 - Elutriate Test Data on Sediment Samples Collected from Toledo Habor Federal Navigation Channels and Open-Lake Discharge Site.

Sediment Sampling Site	Inorganic Parameter																	
	Arsenic, Total UG/L	Barium, Total UG/L	Cadmium, Total UG/L	Chromium, Total UG/L	Copper, Total UG/L	Cyanide, Total MG/L	Iron, Total UG/L	Lead, Total UG/L	Manganese, Total UG/L	Mercury, Total UG/L	Nickel, Total UG/L	Nitrate MG/L	Nitrogen, Ammonia MG/L	Oil/ Grease MG/L	Phenols, 4-AAP MG/L	Phosphorus, Total MG/L	Total Kjeldahl N MG/L	Zinc, Total UG/L
D-4	8	170	<1	<30	<20	0.01	160	<5	420	<2.0	<30	0.14	2.53	24	<0.01	<0.10	3.00	55
D-3	<5	200	<1	<30	<20	<0.01	200	<5	540	2.0	<30	0.11	1.98	1	<0.01	<0.10	2.04	47
D-2	<5	170	<1	<30	<20	<0.01	220	<5	660	<2.0	<30	<0.08	1.68	5	<0.01	<0.10	1.71	41
D-1	5	180	<1	<30	<20	<0.01	220	<5	640	2.0	<37	<0.08	4.11	<1	<0.01	<0.10	4.22	40
L-16-M	<5	180	<1	<30	<20	<0.01	160	<5	470	<2.0	<30	0.11	1.33	1	<0.01	<0.10	1.50	35
L-15-M	<5	170	<1	<30	<20	<0.01	310	<5	540	<2.0	<30	<0.08	1.80	<1	<0.01	<0.10	1.81	33
L-14-M	<5	190	<1	<30	<20	<0.01	280	<5	720	<2.0	<30	<0.08	1.50	1	<0.01	<0.10	1.90	42
L-13-M	<5	190	<1	<30	<20	<0.01	130	<5	530	<2.0	<30	<0.08	1.59	2	<0.01	<0.10	1.78	35
L-13-M Rpt.	<5	170	<1	<30	<20	<0.01	160	<5	600	<2.0	<30	<0.08	1.57	2	<0.01	<0.10	1.63	29
BLANK	<5	170	<1	<30	<20	<0.01	56	<5	91	2.0	<30	<0.08	<0.02	<1	<0.01	<0.10	<0.10	<20
L-12-M	<5	54	<1	<30	<20	<0.01	77	<5	99	<2.0	<30	0.14	2.21	<1	<0.01	<0.10	2.56	<20
L-11-M	<5	150	<1	<30	<20	<0.01	85	<5	360	<2.0	<30	<0.08	3.25	1	<0.01	<0.10	3.76	25
L-10-M	<5	180	<1	<30	<20	<0.01	110	<5	1000	3.0	<30	<0.08	5.11	2	<0.01	<0.10	5.54	41
L-9-M	<5	190	<1	<30	<20	<0.01	110	<5	590	<2.0	<30	<0.08	2.93	<1	<0.01	<0.10	3.23	34
L-8-M	<5	190	<1	<31	<20	<0.01	85	<5	450	2.0	<31	<0.08	1.77	3	<0.01	<0.10	1.89	23
L-7-M	<5	240	<1	<30	<20	<0.01	150	<5	1200	2.0	<30	<0.08	5.92	<1	<0.01	<0.10	7.02	53
L-6-M	<5	180	<1	<30	<20	<0.01	130	<5	980	<2.0	<30	<0.08	8.33	8	<0.01	<0.10	8.79	41
L-5-M	5	180	<1	<30	<20	<0.01	130	<5	390	4.0	<30	0.18	6.55	<1	<0.01	<0.10	6.74	37
L-4-M	11	190	<1	<30	<20	<0.01	140	<5	1300	<2.0	<30	<0.08	6.11	<1	<0.01	<0.10	6.20	54
L-3-M	6	190	<1	<30	<20	<0.01	110	<5	1100	<2.0	<30	0.11	6.80	1	<0.01	<0.10	7.56	46
L-3-M Rpt.	7	250	<1	<30	<20	<0.01	120	<5	1100	<2.0	<30	0.11	7.44	<1	<0.01	<0.10	8.30	61
L-2-M	7	170	<1	<30	<20	<0.01	250	<5	1400	11.0	<30	<0.08	8.38	1	<0.01	<0.10	8.80	34
L-1-M	8	190	<1	<30	<20	<0.01	400	<5	1400	3.0	<30	<0.08	8.02	<1	<0.01	<0.10	8.60	37
O-M	5	190	<1	<30	<20	<0.01	110	<5	410	<2.0	<30	0.43	8.03	<1	<0.01	<0.10	8.50	41
R-1-M	8	230	<1	<30	<20	<0.01	450	<5	690	<2.0	<30	<0.08	27.5	4	<0.01	<0.10	30.6	51
R-2-M	11	150	<1	<30	<20	<0.01	110	<5	580	<2.0	<30	0.36	6.70	4	<0.01	<0.10	7.20	27
R-3-M	11	180	<1	<30	<20	<0.01	230	<5	1200	<2.0	<30	0.14	6.37	<1	<0.01	0.11	6.60	29
R-4-M	14	200	<1	<30	<20	<0.01	110	<5	830	22	<30	0.39	4.04	<1	<0.01	0.18	4.80	44
R-5-M	18	200	<1	<30	<20	<0.01	100	<5	640	4.0	<30	0.29	5.14	1	<0.01	0.23	5.40	52
R-6-M	12	140	<1	<30	<20	<0.01	92	<5	670	3.0	<30	0.32	3.49	<1	<0.01	<0.10	3.70	28
R-7-M	16	190	<1	<30	<20	<0.01	180	<5	1000	<2.0	<30	0.11	4.41	1	<0.01	0.11	5.30	46
R-7-M Rpt.	12	190	<1	<30	<20	<0.01	110	<5	1100	<2.0	<30	0.18	4.10	<1	<0.01	<0.10	5.00	47

Table 7 - Depth Intervals (in Inches) of Soil Samples Collected in Toledo Harbor CDFs.

Soil Sampling Site	Sample Number 1	2	3	4	5	6	7
I	0-3[1]	12-38	38-72	72-114	114-156	156-186	*
II	10[1]	*	12-60	70-126	126-156	156	--
III	0-3	12-70	70-180	180-220	--	--	--
IV	0-6[1]	6-72	72-128	*	--	--	--
V	0-12	--	--	--	--	--	--

[1] Not Analyzed.
* One gallon sample obtained from surface to approximately one foot of depth, and subjected to column leach testing.
-- No sample obtained.

Table 8 - Particle Size Analyses of Soil Samples Collected from Toledo Harbor Dredged Material CDFs.

Soil Sampling Site	Percent Retained						#200 Passed
	#8	#16	#30	#50	#100	#200	
I-2	<1.0	<1.0	<1.0	<1.0	<1.0	4.2	95.4
I-3	<1.0	<1.0	<1.0	<1.0	<1.2	6.1	91.4
I-4	<1.0	1.0	<1.0	<1.0	<1.0	4.4	94.5
I-5	<0.5	4.7	<0.5	0.5	1.6	4.7	92.2
I-6	<0.5	<0.5	<0.5	0.5	0.9	2.0	96.1
II-3	<0.4	0.7	0.4	<0.4	0.4	1.7	95.8
II-4	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	97.0
II-5	<0.6	<0.6	<0.6	<0.6	0.8	4.5	94.0
III-1	<0.8	<0.8	<0.8	<0.8	<0.8	4.2	96.8
III-2	<0.7	<0.7	<0.7	<0.7	<0.7	1.8	96.9
III-3	<0.6	<0.6	<0.6	<0.6	<0.6	2.0	97.9
III-4	<0.7	<0.7	<0.7	<0.7	<0.7	2.4	98.0
IV-2	<0.6	2.8	3.4	7.5	14.7	11.3	61.0
IV-3	3.7	7.0	8.1	18.3	34.2	14.4	13.1
II-2	<0.3	<0.3	<0.3	0.8	0.5	0.6	97.3
II-2 Replicate	<0.3	<0.3	<0.3	0.6	0.4	2.4	97.4
V-1	<0.3	<0.3	<0.3	0.4	<0.3	1.4	98.5
IV-4	8.6	7.5	14.0	25.0	31.4	8.7	4.1
IV-4 Replicate	6.6	9.9	20.2	26.6	24.5	6.9	5.2
IV-7	<0.2	0.2	0.6	1.4	0.5	1.6	97.2

Table 9 - Bulk Inorganic Analyses Conducted on Soil Samples Collected from the Toledo Harbor CDFs. All data are reported in ppm, unless otherwise indicated.

Inorganic Parameter	Soil Sampling Site																	
	I-2	I-3	I-4	I-5	I-6	II-3	II-4	II-5	III-1	III-2	III-3	III-4	IV-2	IV-3	II-2	V-1	IV-4	I-7
Total Solids, %	73.0	74.3	69.7	71.3	65.3	64.3	64.6	63.5	74.7	69.9	66.2	65.5	71.2	72.6	70.5	48.1	84.7	75.7
T. Volatile Solids, %	5.98	5.03	5.81	5.20	5.78	5.70	5.56	5.32	5.07	6.11	4.39	4.63	2.74	3.20	7.13	5.78	1.39	6.72
Arsenic	7.5	4.1	6.5	4.0	9.1	5.9	10.6	8.7	7.0	4.9	13.4	9.3	4.2	2.9	13.7	4.9	2.3	5.6
Barium	135	118	136	127	139	138	132	145	130	185	135	112	94	92	195	160	29	180
Cadmium	4.1	2.7	4.6	3.4	4.3	3.4	4.0	4.4	2.5	4.3	3.3	2.1	1.1	1.5	5.2	2.3	4.5	4.3
Chromium	48	31	51	35	41	43	44	53	34	45	38	24	19	23	67	28	7	50
Copper	46	35	49	39	50	43	45	52	49	46	45	34	25	34	59	34	10	49
Lead	50	35	50	39	65	41	43	49	43	41	42	27	19	33	62	27	7	47
Mercury	0.25	0.25	0.28	0.24	0.39	0.33	0.28	0.36	0.28	0.28	0.32	0.20	0.12	0.24	0.48	0.24	<0.12	0.36
Nickel	50	42	47	40	46	47	48	50	44	51	47	36	30	35	56	40	14	50
Zinc	195	140	190	140	200	170	170	190	160	190	155	130	98	120	260	150	36	210
Iron	22,800	17,400	20,900	17,400	24,100	22,800	22,300	21,300	20,900	23,800	21,000	17,500	16,400	16,300	27,300	22,600	6,700	25,300
Manganese	345	320	380	350	390	350	380	370	370	370	371	360	290	280	380	380	150	420
Ammonia N	6.6	21.8	84.8	64.9	169	125	297	263	<1.6	8.5	80.7	89.8	61.0	30.0	3.8	127	16.2	3.1
TKN	1,270	624	4.6	646	669	817	1,520	1,080	880	878	580	663	822	395	514	1,710	92.5	273
Total P	1,600	950	1,580	1,110	1,250	1,260	1,260	1,470	1,320	1,245	1,310	810	940	780	1,980	1,230	350	1,440

Table 10 - Bulk Pesticide, PCB, Oil/Grease Analyses Conducted on Soil Samples Collected in Toledo Harbor CDFs. All data are reported in ppm.

Pesicide/PCB/ Oil/Grease	Soil Sampling Site																	
	I-2	I-3	I-4	I-5	I-6	II-3	II-4	II-5	III-1	III-2	III-3	III-4	IV-2	IV-3	I-1	II-2	IV-4	V-1
beta-Endosulfan	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
alpha-Endosulfan	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Endosulfan Sulfate	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
alpha-BHC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
beta-BHC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
gamma-BHC (Lindane)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4,4'-DDE	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4,4'-DDD	0.04	<0.02	0.07	0.07	0.06	0.14	0.12	0.04	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4,4'-DDT	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Endrin	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Endrin Aldehyde	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Heptachlor	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Heptachlor Epoxide	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chlordane	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Toxaphene	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methoxychlor	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Mirex	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1016	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1221	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1232	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1242	0.40	0.80	0.90	0.40	0.40	0.50	1.50	1.00	0.60	2.30	0.40	0.40	0.30	0.20	0.40	0.40	<0.10	0.80
Aroclor 1248	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1254	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aroclor 1260	0.60	0.30	0.60	0.40	0.40	1.00	1.60	0.60	0.50	2.60	0.40	0.40	0.10	<0.10	0.60	0.50	<0.10	0.30
Oil & Grease	1550	887	1410	1620	2260	1140	2920	2780	704	2370	1340	1340	422	298	1600	2440	260	1340

Table 11 - Bulk PAH Analyses Conducted on Soil Samples Collected in Toledo Harbor CDFs. All data are reported in ppm.

PAH	Soil Sampling Site																	
	I-2	I-3	I-4	I-5	I-6	II-3	II-4	II-5	III-1	III-2	III-3	III-4	IV-2	IV-3	I-1	II-2	IV-4	V-1
Phenanthrene	0.83	<0.27	1.10	0.52	<0.27	<0.27	1.5	1.6	0.74	<0.27	<0.27	<0.27	1.90	<0.27	<0.27	<0.27	<0.27	<0.27
Anthracene	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	1.80	<0.13	<0.13	<0.13	<0.13	<0.13
Fluoranthene	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10
Pyrene	<1.47	<1.47	3.46	<1.47	<1.47	<1.47	7.52	5.86	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47	<1.47
Benzo(a)Anthracene	1.20	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Chrysene	1.92	1.20	3.40	1.45	1.68	<0.42	4.10	3.9	<0.42	<0.42	<0.42	<0.42	1.45	<0.42	<0.42	<0.42	<0.42	<0.42
Benzo(b)Fluoranthene	<0.44	<0.44	1.90	<0.44	<0.44	<0.44	2.1	1.6	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44
Benzo(k)Fluoranthene	<0.59	<0.59	<0.59	<0.59	0.64	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59
Benzo(a)Pyrene	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	1.3	1.7	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42
Dibenzo(a,h)Anthracene	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10
Indeno(1,2,3-cd)Pyrene	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48	<1.48
Benzo(ghi)Perylene	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37

Table 12 - Column Leach Testing Data on Soil Samples Collected from the Toledo Harbor CDFs - Sampling Interval No. 1.

Analyte	Soil Sampling Site					
	I-7		II-2		IV-4	
Leachate Collected, ml	1200		350		850	
pH, S.U.	7.1		6.6		7.1	
Conductivity, umho	693		1,100		506	
T. Solids, mg/l	577	(453)*	897	(223)	293	(145)
T. Volatile solids, mg/l	100	(78)	233	(58)	104	(52)
Susp. Solids, mg/l	<1	(<0.7)	<1	(<0.2)	<1	(<0.5)
Ammonia N, mg/l	<0.1	(<0.078)	<0.1	(<0.025)	10.1	(5.01)
TKN, mg/l	1.50	(1.18)	3.36	(0.83)	14.0	(6.94)
Total P, mg/l	0.32	(0.25)	0.46	(0.11)	0.85	(0.42)
Arsenic, ug/l	28	(0.022)	17	(0.042)	22	(0.011)
Barium, ug/l	<100	(<0.078)	<100	(<0.025)	100	(<0.050)
Cadmium, ug/l	11	(0.0086)	7	(0.002)	1	(0.001)
Chromium, ug/l	8	(0.006)	<20	(<0.005)	5	(0.002)
Copper, ug/l	38	(0.030)	60	(0.015)	30	(0.015)
Lead, ug/l	<5	(<0.004)	<30	(<0.007)	5	(0.002)
Mercury, ug/l	<0.3	(<0.0002)	<0.4	(<0.0001)	0.3	(<0.0001)
Nickel, ug/l	45	(0.035)	80	(0.020)	35	(0.017)
Zinc, ug/l	28	(0.022)	50	(0.012)	38	(0.019)
Iron, ug/l	1940	(1.52)	240	(0.060)	2590	(1.28)
Manganese, ug/l	470	(0.37)	290	(0.072)	290	(0.14)

* Numbers in parentheses represent mg of leached material per kg of sediment (dry) in column.

Table 13 - Column Leach Testing Data on Soil Samples Collected from the Toledo Harbor CDFs - Sampling Interval No. 2.

Analyte	Soil Sampling Site					
	I-7		II-2		IV-4	
Leachate Collected, ml	925		600		1,000	
pH, S.U.	6.9		7.0		6.6	
Conductivity, umho	452		933		210	
T. Solids, mg/l	250	(151)*	708	(301)	96	(56)
T. Volatile solids, mg/l	60	(36)	448	(191)	36	(21)
Susp. Solids, mg/l	4	(2)	<2	(<0.9)	46	(27)
Ammonia N, mg/l	<0.1	(<0.06)	<0.1	(<0.04)	2.63	(1.53)
TKN, mg/l	0.88	(0.53)	1.13	(0.48)	4.38	(2.56)
Total P, mg/l	0.45	(0.27)	0.79	(0.34)	1.52	(0.89)
Arsenic, ug/l	12	(0.0073)	13	(0.0055)	13	(0.0076)
Barium, ug/l	<100	(<0.06)	<100	(<0.04)	<100	(<0.06)
Cadmium, ug/l	12	(0.0073)	13	(0.0055)	13	(0.0076)
Chromium, ug/l	10	(0.006)	13	(0.0055)	13	(0.0076)
Copper, ug/l	150	(0.091)	150	(0.063)	130	(0.076)
Lead, ug/l	210	(0.13)	230	(0.098)	280	(0.16)
Mercury, ug/l	<0.3	(<0.0002)	<0.3	(<0.0001)	<0.3	(<0.0002)
Nickel, ug/l	95	(0.057)	98	(0.042)	83	(0.048)
Zinc, ug/l	40	(0.020)	45	(0.019)	58	(0.034)
Iron, ug/l	1,100	(0.665)	620	(0.26)	1,500	(0.875)
Manganese, ug/l	630	(0.38)	860	(0.37)	320	(0.19)

* Numbers in parentheses represent mg of leached material per kg of sediment (dry) in column.

CURRENT OPEN LAKE DISPOSAL SITE PRE-USE SEDIMENT SAMPLING AND ANALYSES (1987) (FIGURE 1)

Analysis of bottom sediments from the proposed open-lake disposal site was conducted in 1987 (T.P. Associates International, Inc., 1987). This evaluation included particle size analysis, bulk chemical analyses, bioassay testing, and a benthic organism inventory. Bottom sediments at the proposed open-lake site were found to consist primarily of silts and clays. Particle size analysis of these sediments indicated that from 45.3 to 96.4 percent of the material passed through the No. 200 sieve. The benthic survey of the site indicated a predominant faunal assemblage of chironomids and oligochaetes and a somewhat limited species diversity. Bulk chemical analysis of the bottom material indicated "highly polluted" levels for cyanide and total phosphorus (see following two Tables). Arsenic, barium, COD, lead, and TKN were within the "highly polluted/moderately polluted" range. "Moderately polluted" contaminant levels were recorded for chromium, copper, manganese, nickel, ammonia-nitrogen, total volatile residue, and zinc.

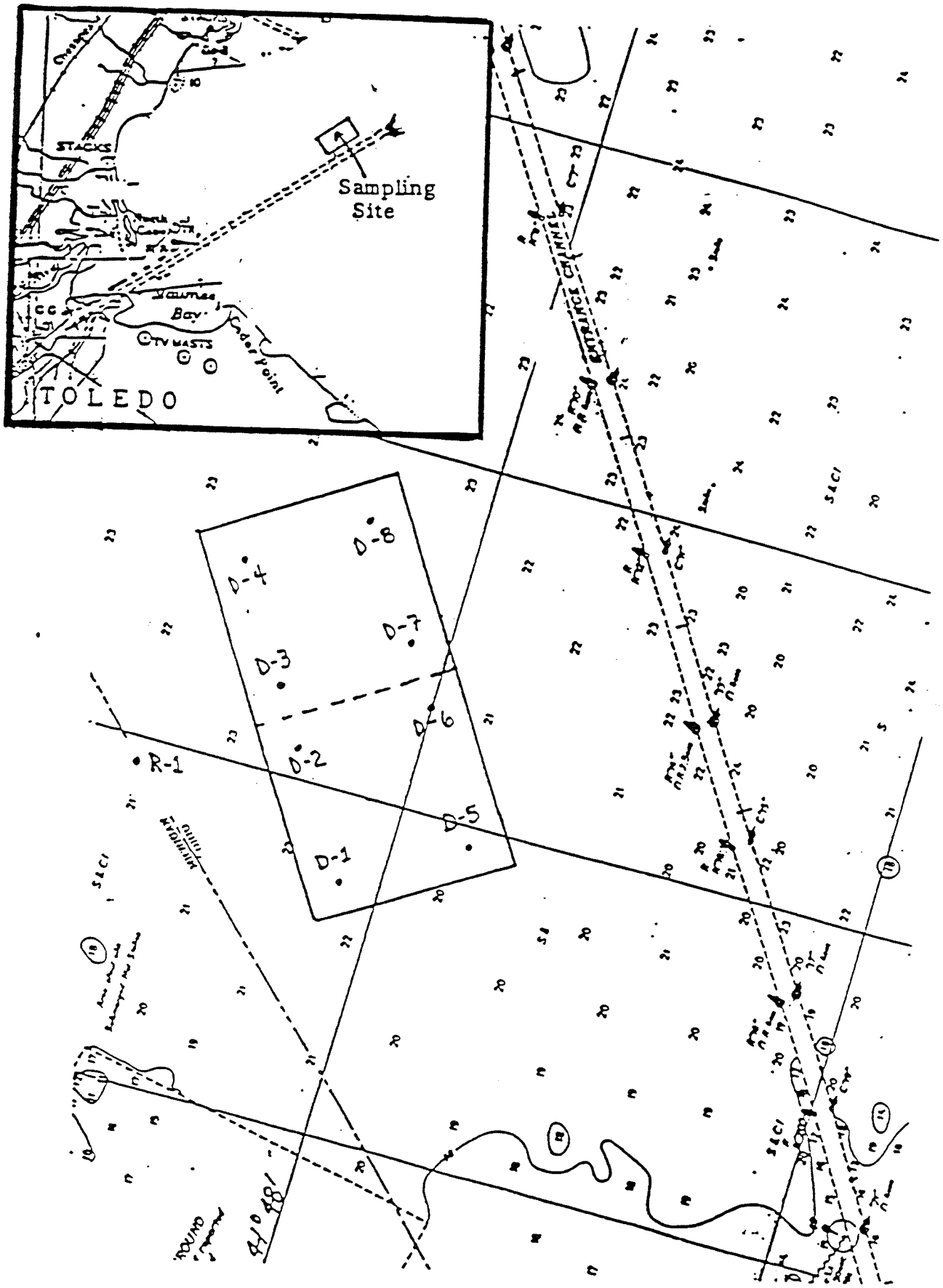


Figure 1. Open-Lake Disposal Site Sampling Locations, Toledo Harbor, OH

LAB NO.	7792-87	7793-87	7794-87	7795-87	7796-87
IDENTIFICATION	D-1	D-2	D-3	R-1	D-4
ARSENIC, TOTAL, AS	8	4	6	9	4
BARIUM, TOTAL, BA	76	33	47	62	31
CADMIUM, TOTAL, CD	2	1	2	2	1
CHROMIUM, TOTAL, CR	36	14	25	31	13
COD	120000	53000	44000	65000	58000
COPPER, TOTAL, CU	47	17	30	40	16
CYANIDE, TOTAL, CN	<0.76	<0.42	<0.51	0.54	<0.37
IRON, TOTAL, FE	7600	7500	7900	7800	7800
LEAD, TOTAL, PB	53	19	34	44	21
MANGANESE, TOTAL, MN	400	180	260	340	170
MERCURY, TOTAL, HG	0.75	0.12	0.37	0.64	0.13
NICKEL, TOTAL, NI	42	18	27	35	16
NITRATE N	<3	1	<2	<2	<2
NITROGEN, AMMONIA, N	86	37	46	60	31
OIL/GREASE	1100	432	969	856	444
PHENOLS, 4-AAP	<0.152	<0.086	<0.097	<0.124	<0.055
PHOSPHORUS, TOTAL, P	6060	2200	1820	1750	2190
RESIDUE, T. VOLATILE, %	7.29	2.64	3.71	4.26	2.53
RESIDUE, TOTAL (TS), %	32.0	55.8	48.0	41.2	63.6
TOTAL KJELDAHL N	3660	869	1310	1970	966
ZINC, TOTAL, ZN	180	71	130	160	69

LAB NO.	7797-87	7798-87	7798-87	7800-87
IDENTIFICATION	D-8	D-7	D-6	D-5
ARSENIC, TOTAL, AS	14	8	9	7
BARIUM, TOTAL, BA	80	47	70	55
CADMIUM, TOTAL, CD	2	2	2	1
CHROMIUM, TOTAL, CR	34	21	32	30
COD	85000	63000	71000	59000
COPPER, TOTAL, CU	47	28	43	38
CYANIDE, TOTAL, CN	<0.58	<0.53	<0.64	<0.46
IRON, TOTAL, FE	7500	7800	7600	15000
LEAD, TOTAL, PB	49	62	52	46
MANGANESE, TOTAL, MN	400	240	350	140
MERCURY, TOTAL, HG	0.99	0.58	0.97	1.11
NICKEL, TOTAL, NI	43	24	39	34
NITRATE N	<3	<2	<2	<2
NITROGEN, AMMONIA, N	91	62	59	46
OIL/GREASE	828	487	873	967
PHENOLS, 4-AAP	<0.139	<0.108	<0.111	<0.108
PHOSPHORUS, TOTAL, P	2720	1670	1740	1980
RESIDUE, T. VOLATILE, %	5.97	4.23	5.79	5.9
RESIDUE, TOTAL (TS), %	33.7	41.4	36.3	44.5
TOTAL KJELDAHL N	2890	1670	2020	2100
ZINC, TOTAL, ZN	170	110	160	160

Above data, except as noted, reported as mg/kg (dry wt. basis).

TOLEDO HARBOR, OHIO
SEDIMENT TESTING 1993-1994
USA CORPS OF ENGINEERS, BUFFALO
SUMMARY
(Extracted From PN-95-02)

The Buffalo District conducted a pilot testing program in 1993 on Toledo Harbor sediments that applied Tier III biological testing procedures (10-day bioassays using the test species *Chironomus tentans* and *Hyallela azteca*) in accordance with protocols developed jointly by the U.S. Environmental Protection Agency (USEPA) and USACE, as contained in the draft 1994 Great Lakes Dredged Material Testing and Evaluation Manual. Although the primary objective of the program was to assist in the development of bioassay procedures for the draft Great Lakes sediment testing protocols, the results were inconsistent with one another and existing sediment chemistry, and were therefore considered to be inconclusive regarding toxicological characterizations of the sediments. In an effort to follow-up this pilot program and make a determination regarding the suitability of Lake Approach Channel sediments for open-lake disposal, the Buffalo District completed additional 10-day *C. tentans* and *H. azteca* bioassays on Toledo Harbor channel sediments between River Mile 3 and Lake Mile 6 in November 1994. The results of these analyses indicate that sediments in the Lake Approach Channel between Lake Miles 2 and 3 were acutely toxic (mean of 50 percent survival) when compared to sediments from the open-lake reference site in the Western Basin (mean of 86 percent survival). However, all channel sediments lakeward of Lake Mile 3 were found to exhibit no acute toxicity (mean greater than 92 percent survival). With respect to interpretation under the draft Great Lakes Dredged Material Testing and Evaluation Manual, these data support the open-lake disposal of sediments dredged from the Lake Approach Channel lakeward of Lake Mile 3. Reference Figures 1 and 2, and Tables 1 and 2.

FIGURE 1. Toledo Harbor, Lucas County, Ohio.

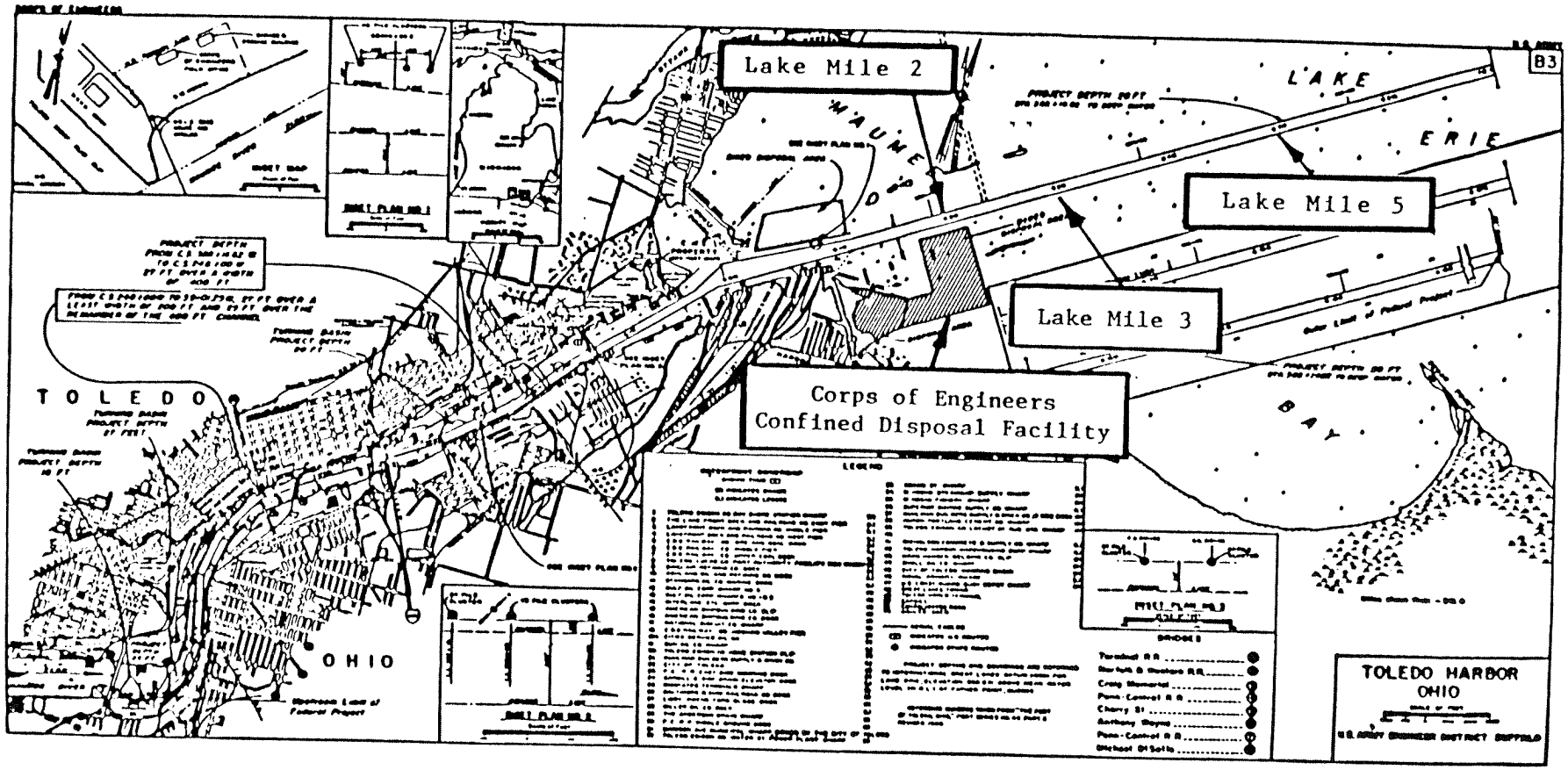


FIGURE 2. Toledo Harbor, Ohio, Open-lake Discharge Site (Reference Site is for Comparison Purposes).

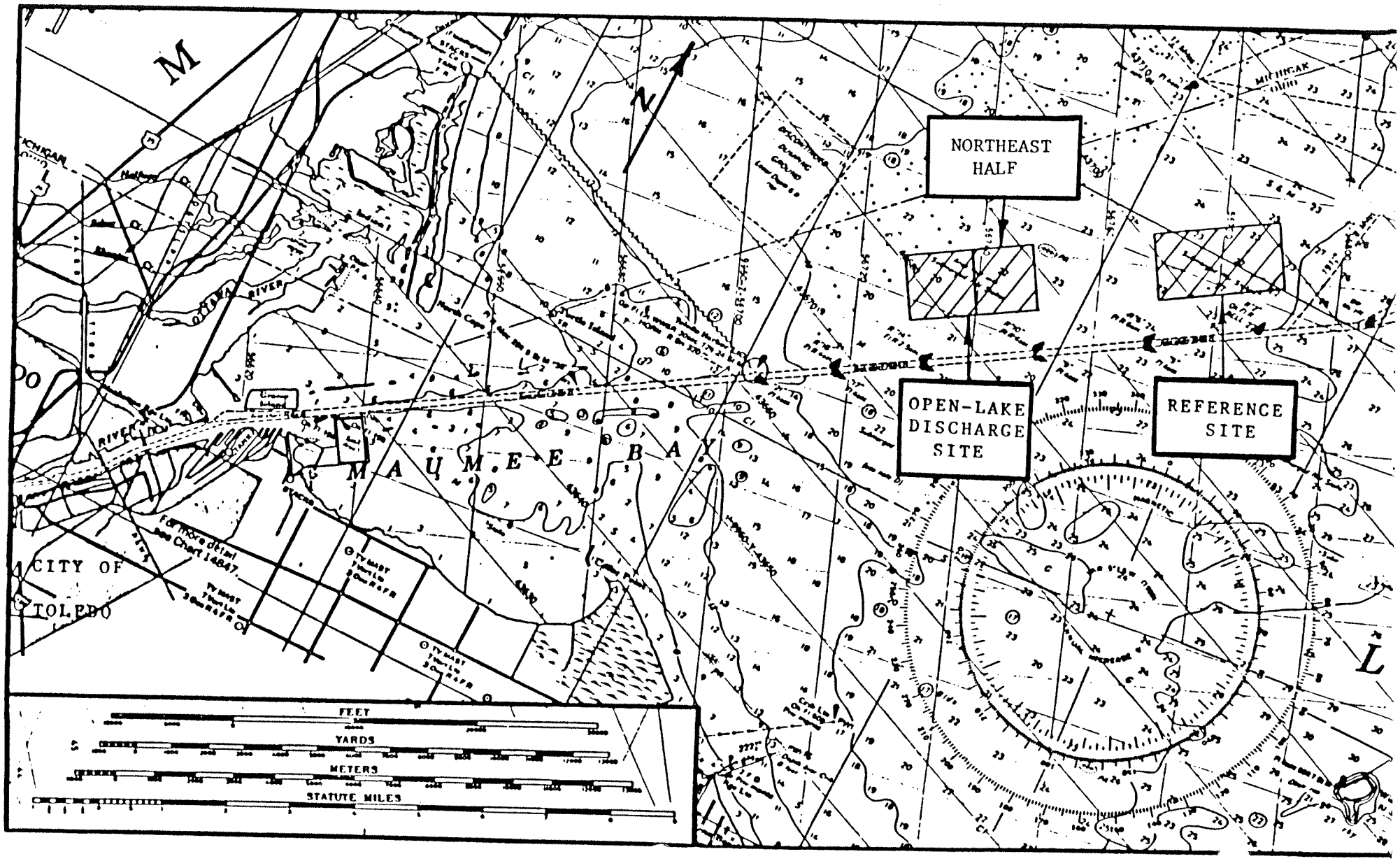


Table 1. 10-Day Survival of *H. azteca* Exposed to Sediments from Toledo Harbor, Lucas County, Ohio (Page 1 of 2)

Location	Replicate	Number Exposed	Number Alive	Number Dead	Survival (%)
Control	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Reference Site	A	10	10	0	100
	B	10	10	0	100
	C	10	4	6 NF	40
	D	10	9	1 NF	90
	E	10	8	2 NF	80
Sediment LM 0-1	A	10	9	1 NF	90
	B	10	10	0	100
	C	10	8	2 NF	80
	D	10	10	0	100
	E	10	10	0	100
Sediment LM 1-2	A	10	9	1 NF	90
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment LM 2-3	A	10	10	0	100
	B	10	9	1 NF	90
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment LM 3-4	A	10	10	0	100
	B	10	8	2 NF	80
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100

Table 1. 10-Day Survival of *H. azteca* Exposed to Sediments from Toledo Harbor, Lucas County, Ohio (Page 2 of 2)

Location	Replicate	Number Exposed	Number Alive	Number Dead	Survival (%)
Sediment LM 4-5	A	10	9	1 NF	90
	B	10	10	0	100
	C	10	10	0	100
	D	10	9	1 NF	90
	E	10	10	0	100
Sediment LM 5-6	A	10	8	2 NF	80
	B	10	10	0	100
	C	10	9	1 NF	90
	D	10	10	0	100
	E	10	10	0	100
Sediment RM 0-1	A	10	10	0	100
	B	10	9	1 NF	90
	C	10	9	1 D	90
	D	10	10	0	100
	E	10	10	0	100
Sediment RM 1-2	A	10	9	1 NF	90
	B	10	8	2 NF	80
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment RM 2-3	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100

NF = Organism not found at test termination.
D = Organism dead at test termination

Source: ESE, 1994.

Table 2. 10-Day Survival of *C. Tentans* Exposed to Sediments from Toledo Harbor, Lucas County, Ohio (Page 1 of 2)

Location	Replicate	Number Exposed	Number Alive	Number Dead	Survival (%)
Control	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Reference Site	A	10	3	3 NF,4 D	30
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment LM 0-1	A	10	10	0	100
	B	10	7	3 D	70
	C	10	0	10 NF	0
	D	10	10	0	100
	E	10	0	10 NF	0
Sediment LM 1-2	A	10	10	0	100
	B	10	7	3 D	70
	C	10	5	5 D	50
	D	10	2	8 D	20
	E	10	7	3 D	70
Sediment LM 2-3	A	10	10	0	100
	B	10	0	10 NF	0
	C	10	4	6 D	40
	D	10	5	5 D	50
	E	10	6	4 D	60
Sediment LM 3-4	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	6	4 NF	60
	E	10	10	0	100

Table 2. 10-Day Survival of *C. Tentans* Exposed to Sediments from Toledo Harbor, Lucas County, Ohio (Page 2 of 2)

Location	Replicate	Number Exposed	Number Alive	Number Dead	Survival (%)
Sediment LM 4-5	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment LM 5-6	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment RM 0-1	A	10	10	0	100
	B	10	10	0	100
	C	10	8	2 D	80
	D	10	10	0	100
	E	10	10	0	100
Sediment RM 1-2	A	10	10	0	100
	B	10	10	0	100
	C	10	10	0	100
	D	10	10	0	100
	E	10	10	0	100
Sediment RM 2-3	A	10	10	0	100
	B	10	8	2 D	80
	C	10	7	3 D	70
	D	10	10	0	100
	E	10	10	0	100

NF = Organism not found at test termination.
D = Organism dead at test termination.

Source: ESE, 1994.

APPENDIX C

USFWS COORDINATION ACT REPORT

United States Department of the Interior

Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115

TAKE PRIDE IN AMERICA

In Reply Refer to:

Comm: 614/469-6923/FAX: 614/469-6919

December 22, 1993

Colonel Walter C. Neitzke
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Neitzke:

This is the U.S. Fish and Wildlife Service's Preliminary Fish and Wildlife Coordination Act Report (FWCA) on the Long-Term Sediment Management Strategy (LTMS) Study for Maumee River Watershed, Toledo Harbor, Ohio. This FWCA report was requested by Mr. James M. Bennett, Chief, Environmental Analysis Section of your staff in his November 16, 1993 letter. This FWCA report addresses the 5-Year Intermediate Plan (1994-1998) of the LTMS.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U.S. Fish and Wildlife Service's Mitigation Policy.

This interagency LTMS study started officially in July 1992 with the finalization and signing of the Work Plan and Memorandum of Understanding. The agencies that have participated in the LTMS are the Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Soil Conservation Service, Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Toledo-Lucas County Port Authority, and the City of Toledo.

The LTMS study was precipitated by the desire of several agencies including Ohio EPA to phase out all open-lake disposal of dredged material. This includes the dredged material from both the river (River Mile 7.0 to 0.0) and lake portions (Lake Mile 0.0 to 19.0) of the Federal navigation channel. Ohio EPA with the support of USEPA has been gradually strengthening the conditions of the 401 certification for the annual maintenance dredging operation with the goal of eliminating open-lake disposal over a set period of time. This resulted in several related issues being raised, but the main issue was how to dispose of the 850,000 cubic yards that are dredged annually

if open-lake disposal was to be eliminated. This was the central goal of the LTMS and why the agencies joined the LTMS study.

Project Description -

A wide variety of options were considered with some being accepted for further study and eventual incorporation into one or more alternative plans. Phase III of the LTMS resulted in four Alternative Intermediate Plans; Base Plan, Plan 1b, Plan 2a, and Plan 2b. These plans are discussed in detail in the working draft of the Phase III report which was distributed by the Corps of Engineers in late November 1993. Plan 2a was generally selected as an acceptable intermediate plan to go forward with for the 5 year period 1994 - 1998.

Plan 2a consists of the following measures.

1. Dredged Material Placement - Dredged material from River Mile 7.0 to Lake Mile 5.0 (650,000 cubic yards) will be disposed of in the new Confined Disposal Facility (CDF) #2. Dredged material from Lake Mile 5.0 to Lake Mile 19.0 (250,000 cubic yards) will continue to be disposed of in the existing open-lake disposal site.

2. Crop Residue Management - This would consist of the Soil Conservation Service promoting increased implementation of conservation tillage throughout the Maumee River Basin. Successful implementation of this measure would decrease the amount of soil being eroded from farm fields, decrease the amount of eroded soil being washed into the nearest waterway, and ultimately decrease the amount of material being deposited in the Toledo Harbor area. This would decrease the amount of material that would need to be dredged and disposed of to an estimated 710,000 cubic yards.

3. Manufactured Soils - This measure would consist of the beneficial use/reuse of some of the spoil material in the production of manufactured soils for use as landfill cover, topsoil, landscaping, fertilizer, road dressing, etc. It is estimated that this measure could use up to 100,000 cubic yards annually initially. The Toledo-Lucas County Port Authority would be the lead agency for this measure.

4. Confined Disposal Facility Management - This measure would consist of dewatering/consolidating actions at the existing CDF #1 to increase its storage capacity. Dewatering actions would be initiated when dredge spoil is deposited in the new CDF #2 which will increase its holding capacity beyond designed limits. The Corps of Engineers would be the lead agency for this measure.

5. Monitoring - This measure calls for monitoring the performance and effectiveness of measures 2, 3, and 4.

Discussion -

Plan 2a as well as the other alternative intermediate plans that were considered will have widespread environmental benefits. All aspects of the plan will need to be implemented in order for it to be successful. In addition, there are some additional measures that will be studied and possibly implemented which could increase the plans effectiveness even more.

The elimination of open-lake disposal will be beneficial as it will eliminate the adverse impacts of disposing of dredge spoil. The Fish and Wildlife Service has supported the goal of eliminating open-lake disposal during this LTMS effort as there is no disagreement that it would be beneficial. The Service has repeatedly expressed our concern that the agencies not react too quickly and select a plan that will end up requiring the construction of more CDF's in the future. The Service believes construction of one or more CDF's in the future will be more damaging to the aquatic values of the western basin of Lake Erie than continued limited open-lake disposal. When a CDF is constructed, there is a permanent and total loss of the aquatic values of that area. The Corps of Engineers has also taken the position that no mitigation is required for the construction of a CDF. There are adverse impacts related to the open-lake disposal of dredged material but we believe they are short-term and localized. Plan 2a seems to provide a viable means of eliminating open-lake disposal without the need for constructing additional CDF's in the future.

The increased use of crop residue management (conservation tillage) throughout the Maumee River Basin will have widespread beneficial impacts. The aquatic resources in rivers, streams, and tributaries throughout the Basin would benefit. There would be decreased amounts of siltation and turbidity which would benefit the aquatic resources throughout the Basin. Wildlife resources would benefit due to increased habitat including nesting cover, winter cover, and food sources.

The manufactured soil measures are not expected to have direct beneficial effects upon fish and wildlife resources. However, there should be indirect benefits such as using manufactured soil to cover landfills, road dressing, etc.

CDF management should have indirect benefits to fish and wildlife resources as it will increase the amount of dredge spoil that can be deposited in existing CDF's. This measure combined with the other measures in Plan 2a should make it possible to eliminate open-lake disposal and avoid the future need for the construction of CDF's. Both of these actions have adverse environmental impacts.

Endangered Species Comments -

There are a number of Federally threatened and endangered species that are found either seasonally or permanently within the Maumee River Basin or the western basin of Lake Erie. Due to the nature of the Plan 2a, including its separate measures, it is not possible to address the impacts of Plan 2a on each species individually. However, as stated previously, Plan 2a will have widespread environmental benefits including positive benefits upon fish and wildlife resources which includes Federally threatened and endangered species. Decreased levels of sedimentation and turbidity, decreased erosion rates, increased wildlife habitat, and increased food sources for wildlife will all have beneficial impacts on threatened and endangered species.

Summary -

The Toledo LTMS study has been an innovative interagency effort to develop a multi-faceted plan to deal with the difficult and complex situation of annually dredging the Toledo Harbor and disposing of the dredge spoil. Intermediate Plan 2a is an environmentally responsible plan that will accomplish the objectives of the intermediate plan and will facilitate the implementation of the 30-year or more Long-Term Sediment Management Plan for Toledo Harbor.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: DOW, Wildlife Environmental Section, Columbus, OH (John Marshall)

APPENDIX D

GENERAL CORRESPONDENCE

CENCD-CO-O (CENCB-PE-PT/17 Oct 94) 3rd End
Mr. Monteen/tjm/(312) 353-6378
SUBJECT: Phase 3 Report by the Toledo Harbor Planning Group on Long-term Sediment Management Strategy (LTMS) - Maumee River Watershed, Toledo, Ohio

Commander, North Central Division, U.S. Army Corps of Engineers, 111 N. Canal Street, Chicago, IL 60606-7205 16 AUG 1995

FOR Commander, Buffalo District, ATTN: CENCB-PE-PT

1. Forwarded for action.

2. The HQ, NCD, POC is Mr. Tim Monteen, CENCD-CO-O, (312) 353-6378.

FOR THE COMMANDER:

ROY J. DEDA, P.E.
Acting Director, Directorate of Construction and Operations

Exhibit

11 AUG 1996

CECW-PC (CENCD-CO-O/21 Oct 94) (1105) 2nd End Kennedy/(202)272-8529
SUBJECT: Phase 3 Report by the Toledo Harbor Planning Group on Long Term Sediment Management Strategy (LTMS) - Maumee River Watershed, Toledo, Ohio

Commander, HQUSACE (CECW-PC), WASH, DC 20314-1000

TO Commander, North Central Division, U.S. Army Corps of Engineers,
ATTN: CENCD-CO-O, 111 N. Canal St., Chicago, IL 60606-7205.

1. We concur in the Executive Committee report, both as representative of the Planning Group's views and as an appropriate road map for the next five years. However, we have serious concerns for the longer term. It appears to us that the Executive Committee has strayed from the original strategy provided in ASA(CW) Memorandum for the Director of Civil Works, Subject: Action Plan for Toledo Harbor Dredging, dated 23 April 1992 . The District Commander, Buffalo District, must reaffirm this strategy to the Executive Committee. In particular, all disposal options must be put back on the table and be considered viable until there is a scientific basis for ruling them out. Special emphasis should be placed on developing alternatives for beneficial use of dredged material. Also, the phosphorus loading reduction goals for the State of Ohio are yet to be addressed; phosphorus loading is one of the main factors for objections by the U.S. Environmental Protection Agency. Some Executive Committee members have adopted positions opposing open water and other disposal methods; all the more reason to establish the scientific basis for giving each disposal option a full and fair evaluation during Phase 4 planning.

2. The Commander, Buffalo District, in his capacity as a member of the Executive Committee, should explain to the Committee that the formulation and evaluation of alternatives must be based solely on economics and science and not the question of cost sharing. The full array of alternatives must be evaluated before identifying the National Economic Development (NED) Plan, selecting the recommended plan and determining cost sharing. The Executive Committee should make wise use of what the Federal Government has brought to the table: a five-year commitment to continue operation and maintenance of the harbor and funding for a five-year study. This is the last opportunity to develop the broadest array of effective solutions.

3. The Planning, Policy and Operations functions at HQUSACE are hopeful that this study will provide useful lessons for other dredged material management studies. CECW-P, as the office responsible for managing the Dredged Material Management Planning Program, intends to monitor the progress of the study by attending key Executive Committee meetings. Please provide, ATTN: Barry Kennedy, CECW-PC, the schedule of milestones for the study and ensure that he receives announcements for each of the Executive Committee meetings.

CECW-PC
SUBJECT: Phase 3 Report by the Toledo Harbor Planning Group on Long Term Sediment Management Strategy (LTMS) - Maumee River Watershed, Toledo, Ohio

4. In answer to the policy issues posed in the 1st End:

a. Elimination of Open-Lake Disposal - Paragraph 2c(2) of CECW-PA/OD Memorandum, Subject: Policy Guidance Letter (PGL) No. 40, Development and Financing of Dredged Material Management Studies, dated 25 March 1993, states that all measures must be considered. No alternative should be eliminated without a scientifc basis.

b. Interim Period - Inasmuch as the earliest dredging season in which the plan could be implemented is 1996, the five year period should be 1996-2000.

c. Cost Sharing for Upland Sediment Control - Normally, the Corps of Engineers would look to the non-Federal interests, individual landowners and the Natural Resources Conservation Service (NRCS), previously the Soil Conservation Service, to keep soil on the land. However, in Public Law 103-126, the Energy and Water Development Appropriations Act, 1994, the Congress provided $1 million more than the Administration had budgeted. After considering the wording in House Report 103-135, the Corps special instructions said "Use up to $1,000,000 provided for engineering activities associated with implementation of the Long-Term Sediment Management Plan." We concur in the District's plan to accomplish upland sediment control work through the NRCS, provided that the work is in the form of engineering activities. You are reminded of the Anti-Deficiency Act requirements regarding interagency funding.

d. After the funds appropriated in the Fiscal Year 1994 Appropriations Act are used, leadership for further upland sediment control must come from others, including the NRCS, State, county and local governments, and individual landowners. The strength of a partnership comes from its ability to collectively describe goals and focus the participants to see ways in which they can cooperate, each within their authorities, policies and resources, to achieve the goals. No additional funding for upland sediment control will be provided by the Corps beyond that identified in the Fiscal Year 1994 Appropriations Act.

e. The partnership can achieve more by cooperating than working separately. In the same way as the Corps is prepared to contribute to the partnership by using its resources for work appropriate to its authorities, other Federal, State and local governments and non-governmental organizations must be prepared to follow through with their appropriate responsibilities. For the partnership to be successful, each party must respect the obligation of the others to act responsibly within their mission areas and avoid pressuring one participating organization to do what is more properly the mission of another organization. Thus, measures designed to manage sediments within the authorized navigation project are appropriate to the Corps mission areas and measures to keep soil on the land are not.

Exhibit 1a

CECW-PC
SUBJECT: Phase 3 Report by the Toledo Harbor Planning Group on Long Term Sediment Management Strategy (LTMS) - Maumee River Watershed, Toledo, Ohio

f. Cost Sharing (Table 2.15) - Regarding the first category (Sections 1135/204), the first line of the table should be corrected to show the appropriate feasibility study cost sharing based on the purpose of the project, i.e., 75% Federal and 25% non-Federal. The first category should also include an extra line for operations, maintenance, replacement, and rehabilitation (OMRR&R) costs for projects pursued under Section 204 of Public law 102-580, the Water Resources Development Act of 1992. That line should state that Non-Federal sponsors must pay 100% of OMRR&R. Regarding the second category (Sections 933/203), we question whether there are real opportunities.

5. The State of Ohio phosphorus reduction goal is not a "standard." The distinction is important. The Corps will comply if the State publishes the goal as a standard. The Corps position is based on the Clean Water Act Section 404(b)(1) guidelines which state "No discharge...shall be permitted if ...violations of any applicable State water quality standard... ." This issue must be resolved as early as possible during the Phase 4 study.

6. The following are considerations that should be advanced for consideration during Phase 4 planning:

a. Future Contaminant Levels - With ongoing regional pollution abatement activities underway and continuing dredging, it is likely that the amount and location of contaminated sediments will change over time. Thus, the Phase 4 planning effort should develop a strategy for determining these changes.

b. The Phase 3 Report does not address the disposal consequences of dredging by non-Federal interests. This concern should be addressed in the Phase 4 Report.

c. The Phase 4 Report should include an evaluation of the role that could be played, in sediment reduction, by the U.S. Fish and Wildlife Service program to restore wetlands in agricultural areas.

d. During Phase 4 planning, the Planning Group should further investigate the potential of the Remedial Action Plan that was mentioned on page EA-30 of the Phase 3 Report.

e. All costs and benefits must be stated in average annual equivalent terms.

f. The Coastal Zone Management Act compliance must be coordinated through the National Oceanographic and Atmospheric Administration or their designated state agency.

CECW-PC
SUBJECT: Phase 3 Report by the Toledo Harbor Planning Group on Long Term Sediment Management Strategy (LTMS) - Maumee River Watershed, Toledo, Ohio

g. Inasmuch as 25 percent of the basin is located in Indiana, that State should be a participant in the Phase 4 planning effort.

h. Inasmuch as a shift to conservation tillage is a goal of this planning effort, and conservation tillage is said to require use of additional chemicals, the impacts and tradeoffs must be evaluated.

i. The environmental assessment portion of the final report must include a statement as to whether the study area is in "attainment" or "non-attainment" status under the Clean Air Act.

2 Encl nc
Rpt w/d

JOHN J. BURNS
Acting Chief, Planning Division
Directorate of Civil Works

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

REPLY TO
ATTENTION OF

27 JUL 1995

MEMORANDUM FOR THE DIRECTOR OF CIVIL WORKS

SUBJECT: Toledo Harbor Planning Group - Phase 3 Report

This responds to a March 15, 1995, memorandum from your Planning Division that provided the subject report for review and approval. That memorandum also recommended proceeding into Phase 4 of the study of dredged material disposal options for Toledo Harbor.

I approve the Phase 3 report, subject to the concerns noted in the March 15, 1995, memorandum. I also approve proceeding into Phase 4 and relying on Plan 2a as the operating plan for the 5-year duration of Phase 4.

Your implementing instructions, as proposed in the March 15, 1995, memorandum should be revised to require that those conducting the study and its review, avoid raising issues relating to identifying the National Economic Development Plan or cost sharing for a recommended plan. The formulation and evaluation of alternative disposal options should be based on economics and science, and finding beneficial uses of dredged material, and not on the question of cost sharing.

John H. Zirschky
Acting Assistant Secretary of the Army
(Civil Works)

United States
Department of
Agriculture

Natural Resources
Conservation
Service

200 North High Street
Room 522
Columbus, Ohio 43215

CF: W. Cadet
R. Nicaise
Orig - Brook

95 MAR 28 PM 2:02

March 22, 1995

Colonel Walter C. Neitzke
District Engineer
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 19207-3199

28 MAR 95 11 07
MAILROOM
CENCB-IM-S

Dear Colonel Neitzke:

The Natural Resources Conservation Service (NRCS) in Ohio has completed a review of the Executive Committee Phase 3 report with Environmental Assessment for the Long Term Dredged Material Management Plan, Toledo Harbor, Ohio. The report is dated December 1993 and revised September 1994.

The NRCS concurs with the information submitted in the report and supports the recommendations as presented. We would like to clarify the information presented in table 2.16, page 71 and on pages 84 thru 88 concerning the costs for the Agricultural Runoff Relention Reservoir Study and the Crop Residue Management Project. The figures shown are "annual" costs for each of the respective projects. Total costs for each are $300,000 and $8.0 million respectively.

We would like to further emphasize the point made in Section B Recommendations that "It remains the goal of the LTMS to eliminate the practice of open lake disposal..." This is a long term strategy but one worth striving to achieve in order to improve water quality and maintain the economic vitality of the Toledo Harbor.

NRCS will continue to work closely with all interested parties in accomplishing the goals outlined by the committee.

Sincerely,

Lawrence E. Clark

LAWRENCE E. CLARK
State Conservationist

cc:
Julie Letterhos, OEPA, Columbus, Ohio
Kent Kroonemeyer, USFWS, Columbus, Ohio
Bill Franz, USEPA, Chicago, Illinois
Gary Overmier, NRCS, Columbus, Ohio
Jeff Busch, Ohio Lake Erie Office, Toledo, Ohio
John Loftus, Toledo Lucas County Port Authority, Toledo, Ohio
Witt Von Cott, City of Toledo, Toledo, Ohio
Hal Harrington, Michigan Department of Natural Resources, Lansing, Michigan
Robert Burris, NRCS, Toledo, Ohio

The Natural Resources Conservation Service,
formerly the Soil Conservation Service
is an agency of the
Department of Agriculture

AN EQUAL OPPORTUNITY EMPLOYER

Exhibit 1c

December 7, 1994

Colonel Nietzke
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Colonel Nietzke:

I would like to take this opportunity to respond on the Revised Phase 3 Report of the Executive Committee on the Long-Term Dredged Material Management Plan for the Maumee River Watershed. In general, the report reflects the activities of the study group and Executive Committee of the Long Term Dredged Material Management Plan over the last two years. In order to continue the progress that has been made, I would suggest that we move forward with the report. However, even in this latest draft, I have some concerns regarding certain elements contained in the report, but do not believe that they should hold up our continued effort. Attached, please find comments regarding these elements of concern.

I look forward to our next meeting which will deal with the cost-sharing elements of implementing this comprehensive sediment management strategy. If you have any questions regarding this matter, please contact me at (419) 243-8251.

Sincerely,

TOLEDO-LUCAS COUNTY PORT AUTHORITY

John M. Loftus
Seaport Director

JML:cmy
Attachment
comaxec.ltr

TOLEDO-LUCAS COUNTY PORT AUTHORITY One Maritime Plaza • Toledo, Ohio 43604-1866 U.S.A. • (419) 243-8251 • FAX (419) 243-1835

Exhibit 1d

1. **Page 2, paragraph 1, in regard to the reclassification of the material from Lake Mile 2 to Lake Mile 19.** I would like to point out that this reclassification was never accepted by the local community or Ohio E.P.A.

2. **Page 8, paragraph 1, in regard to Material Characteristics.** Once again, there is discussion that the material was suitable for open-lake disposal. This was determined by Corps criteria, and not necessarily accepted by the local community or Ohio EPA.

3. **Page 18, last paragraph, in regard to the discussion of using dredged material for strip mine reclamation.** The second sentence of the last paragraph should read: "The current dredge disposal facilities have little, if any, infrastructure to provide access for rail loading."

4. **Page 68, Cost Sharing Percentages.** While this statement can be used to describe the cost sharing discussion, there may be a need for more elaborate discussion of the difficulty of establishing a cost-sharing formula, and that it was the Executive Committee's decision that such policy issues will be decided at a higher level than those represented on the Executive Committee.

5. **Page 70, Item H, in regard to cost allocation and apportionment.** I do not believe that this reflects the outcome of the Executive Committee meetings. It was decided at the Executive Committee level that the next phase of discussions would be on a cost-sharing formula, which could then be submitted to Congress and other higher authority for approval.

6. **Page 73, Item B, in regard to implementation cost and responsibilities.** Once again, there were certain assumptions made on Item 1.a. regarding the cost allocation for the management strategy, and I would point out that it was the Executive Committee's decision that these discussions would take place in the next phase and that Congress and other higher authority would establish a funding allocation policy to address the unique nature of this comprehensive sediment management strategy.

Exhibit 13

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

NOV 30 1994

REPLY TO THE ATTENTION OF:

ME-19J

Mr. Wiener Cadet
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Mr. Cadet:

We have reviewed the Executive Summary and the Draft Phase 3 Report on the Long-Term Sediment Management Strategy (LTMS) at Toledo Harbor, Ohio. We offer the following comments.

Executive Summary

In paragraph 3 of page iv, it states "Then in 1991, the USEPA concurred with OEPA's determination that the current practice of open lake disposal is environmentally unacceptable." This sentence refers to the February 13, 1992 letter from U.S. EPA to Colonel Morris which states "...your agency's proposal to dispose of the Toledo Harbor sediments at the existing two-square mile open lake discharge site in Lake Erie is environmentally unacceptable." We recommend that your agency either modify the language to reflect that which was written in the February 13, 1992 letter, or include the language from the April 12, 1990 letter from U.S. EPA to Colonel Boyd which states "...our Agency maintains that, as evidenced by the Phosphorus Reduction Control Strategy, the Great Lakes Water Quality Agreement, and the State's 401 certification decision, your proposal to dispose of Toledo Harbor sediments (lakeward of lake mile 2.0) in the open lake is environmentally unacceptable."

On page ix, the second action listed states that "Ohio EPA will agree to issue 401 water quality certifications to allow open lake disposal of sediments dredged lakeward of Lake Mile 5 during the intermediate plan." The phrase "will agree to issue 401 water quality certifications" should be replaced with "will agree to waive 401 water quality certifications."

Phase 3 Report

The last sentence of section B, on page 4 states "The LTMS will provide a consistent, logical procedure by which alternatives can be identified, evaluated, screened, recommended and selected for the management of sediment and/or dredged material in a timely and cost-effective manner." The phrase "environmentally-sound" should be added so that the sentence reads "...in a timely, environmentally-sound, and cost-effective manner."

Exhibit 1e

Printed on Recycled Paper

In paragraph 2 of section B of page 4, we recommend that the sentence that reads "It would lead to the development and implementation of a long-term plan which would address the next 20-30 years and beyond," be revised to "It would lead to the development and implementation of a long-term plan which would address the next 30 years."

On page 16, under Environmental Criteria for the confined disposal facilities management option, we recommend that the phrase "no impacts to fish habitat in Toledo Harbor" be included.

On page 17, under both manufactured soil and crop residue management options, the term "acceptable" should be defined.

It is stated on page 48 that "the Planning Group concluded that Alternative Intermediate Plan 2a represents the best overall, short-term solution to the problem of managing sediment from the Maumee River Watershed which includes Toledo Harbor... Further, Alternative Intermediate Plan 2a was identified as the best transition mechanism to help move from the practice of disposing of the dredged material to the practice of managing the sediment." This paragraph should be reworded so that it does not imply that a decision has already been made prior to implementation of the NEPA process.

We appreciate the opportunity to review this report. If you have any questions on our comments, please contact Holly Wirick of my staff at (312) 353-6704.

Sincerely,

Shirley Mitchell

Shirley Mitchell, Chief
Planning and Assessment Branch
Planning and Management Division

Exhibit 1e

OHIO
Department of Natural Resources

94 NOV 22 AM 9:58

George V. Voinovich • *Governor*
Frances S. Buchholzer • *Director*

November 9, 1994

Colonel Walter C. Neitzke
District Engineer
U.S. Army, Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199
Attn: Wiener Cadet

Dear Colonel Neitzke:

The Ohio Department of Natural Resources has completed a review of the Executive Committee Phase 3 Report with Environmental Assessment for the Long Term Dredged Material Management Plan, Toledo Harbor, Ohio. The report is dated December 1993 and revised September 1994.

The ODNR concurs with the information submitted in the report and supports the conclusions and recommendations as presented. We will continue to work closely with all interested parties in furtherance of the goals of the Committee.

Sincerely,

Wayne Warren
Deputy Director

WW:adp

cc: Ms. Julie Letterhos, OEPA
Mr. Kent Kroonemeyer, USFWS
Mr. Bill Franz, USEPA
Mr. Gary Overmeier, SCS
Mr. Jeff Busch, Ohio Lake Erie Office
Mr. John Loftus, Toledo Lucas County Port Authority
Mr. Witt VanCott, City of Toledo
Mr. Hal Harrington, Michigan DNR

Exhibit 1f

RECYCLED PAPER
SOY BASED INK
DNR 5001

Fountain Square • Columbus, Ohio 43224-1387

CITY OF TOLEDO OHIO

DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF WATER
COLLINS PARK
P. O. BOX 786
TOLEDO, OHIO 43697-0786

Donald M. Moline
Director
Whit Van Cott
Commissioner
Phone:(419)697-3330

Robert C. Stevenson
Manager
Phone: (419)693-6277
Fax (419)697-3338

November 10, 1994

Walter C. Neitzke
Colonel, U.S. Army
Chair, Exec. Committee
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Colonel Neitzke:

The City of Toledo administration, has reviewed the Toledo Harbor Planning Group Revised Draft for the Phase III Report on Long-term Sediment Management. We are in agreement with the information provided in the Executive Summary and Phase III Report. The City of Toledo is still concerned with the perspective that the Corps of Engineers takes with environmental acceptability of open lake disposal of dredged material within eight miles of our Water Intake. This concern, along with future funding responsibilities, needs to be pursued as we work through the recommendations of the short-term and long-term plans.

Sincerely yours,

Carleton S. Finkbeiner
Mayor
City of Toledo

CSF/ps

cc: Donald M. Moline, Director of Public Utilities
Whit Van Cott, Commr. of Treatment Services
John Loftus, Port Authority
Edwin Hammett, OEPA

Exhibit 1g

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6950-H Americana Parkway
Reynoldsburg, Ohio 43068

94 OCT 31 PM 12: 24

IN REPLY REFER TO:

Comm: 614/469-6923/FAX: 614/469-6919

October 28, 1994

Colonel Walter C. Neitzke
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Dear Colonel Neitzke:

This responds to your recent letter transmitting the revised Draft Phase 3 report on the Long-Term Sediment Management Strategy dated September 1994 for Toledo Harbor, Ohio, for review and comment.

The U.S. Fish and Wildlife Service has reviewed the report. We concur with the report including the Conclusions and Recommendations in Section IV.

The Fish and Wildlife Service looks forward to continued involvement in this project with the Corps of Engineers and the other interested governmental and non-governmental interests.

Sincerely,

Kent E. Kroonemeyer
Supervisor

cc: Ms. Julie Letterhos, OEPA
Mr. Bill Franz, USEPA
Mr. Gary Overmeier, SCS
Mr. Jeff Busch, Ohio Lake Erie Office
Mr. John Loftus, Toledo Port Authority
Mr. Whit VanCott, City of Toledo
Mr. John Rupert, ODNR
Mr. Hal Harrington, Michigan DNR

Exhibit 1h

NATURAL RESOURCES
COMMISSION
JE[illegible]. BARTNIK
LA[illegible] DEVUYST
PAUL EISELE
JAMES P. HILL
DAVID HOLLI
JOEY M. SPANO
JORDAN B. TATTER

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

Stevens T. Mason Building, P.O. Box 30028, Lansing, MI 48909

ROLAND HARMES, Director

August 5, 1994

Mr. John Loftus
c/o Toledo Port Authority
One Maritime Plaza
Toledo, Ohio 43604-1866

Dear Mr. Loftus: Re: Woodtick

Just an update on the project status. We met on August 4, 1994 with the DNR Division Chiefs and reps on the offshore CDF concept. No known show stoppers were raised at the meeting to the concept of an offshore CDF. The Division chiefs are to respond with a memo in the next two weeks with their tentative concurrence to the concept of an offshore CDF and any specific concerns or requirements. When we have those memos, we will brief the three Deputy Directors and then the Director and the Natural Resources Commission. I believe the DNR letter is forthcoming but not in the time frame I projected since this is being staffed to insure all parties concur since the Governor will likely be involved.

The primary concern raised to date is from the Environmental Protection Bureau with the possibility that a CDF cell would be proposed to handle TSCA regulated wastes from the Ottawa River. Based on what I've heard, I believe that MDNR would object to any CDF cell constructed in the open waters (whether Michigan or Ohio) that would contain TSCA material as it is not perceived as an environmentally sound practice.

When we have more information, I'll let you know.

Sincerely,

Hal Harrington

Hal Harrington
Submerged Lands Management Unit
Land and Water Management Division
517-373-1950

cc:USCE Buffalo W. Cadet

Exhibit 1i

OHIO
Department of Natural Resources

George V. Voinovich • *Governor*
Frances S. Buchholzer • *Director*

July 8, 1994

Kelly Rivera
Toledo-Lucas County Port Authority
One Maritime Plaza
Toledo, Ohio 43604-1866

Re: Long-Term Sediment Management Study, Toledo Harbor
Executive Summary

Dear Ms. Rivera:

The Ohio Department of Natural Resources has reviewed the Executive Summary for the Long-Term Sediment Management Study for Toledo Harbor. This document has been prepared by the Toledo Harbor Planning Group as part of the Phase III Report as directed in the Memorandum of Understanding guiding the study effort.

The Department of Natural Resources has worked closely with the Planning Group to find alternatives to open lake disposal of dredged material from Toledo Harbor based upon the premise that Ohio EPA would administratively eliminate open lake disposal as an alternative to dredged material management. The Department has been neither an opponent nor a proponent of open lake disposal, but has held the opinion that open lake disposal must be considered as an alternative based upon the relative merits of all options. We remain convinced that a true alternative analysis cannot ignore open lake disposal. However, in the interest of expediency, we have continued to work with the Planning Group to explore alternatives to open lake disposal hoping that other options would in fact be found that are both economically and environmentally viable. In this regard, we support the efforts of the Planning Group and the continued search for these alternatives.

The Department concurs with the findings of the Executive Summary. We further support adoption of interim alternative 2a for the 1994 through 1998 dredging seasons so that the continued operations of the Port of Toledo are not compromised. As part of the interim plan, we strongly recommend that progress be monitored to ensure the meeting of established goals and objectives that would allow for the elimination of open lake disposal in a cost effective and environmentally sound manner.

RECYCLED PAPER
SOY BASED INK

Fountain Square • Columbus, Ohio 43224-1387

Exhibit 2

We look forward to continuing our work with the Planning Team members in investigating options at Toledo Harbor.

Sincerely,

Wayne Warren
Deputy Director

cc: Weiner Cadet, BCOE
Bill Franz, USEPA
Colleen Crook, OEPA
Gary Overmier, SCS
Hal Harrington, MDNR
Kent Kroonemeyer, USFWS
Witt Van Cott, City of Toledo
Jeff Busch, OLEO

SUBJECT: Phase 3 Report on the Long-Term Sediment Management Strategy - Maumee River Watershed, Toledo, Ohio

Dear:

Enclosed for your review are four copies of the Toledo Harbor Planning Group Draft Phase 3 report on the Long-Term Sediment Management Strategy. The Phase 3 report includes an Executive Summary. The Planning Group (Study Team and Executive Committee) provided comments which have been incorporated into the report.

The Phase 3 report contains Planning Group recommendations for a joint "Action Plan" to develop a Long-Term sediment Management Plan (LTMP). A schedule of near-term events which would lead to the initiation of the Action Plan is provided in the Executive Summary. The schedule shows that the report will undergo concurrent review by Corps Headquarters and other partner agencies prior to its release to the general public. Your comments are requested by the end of January 1994, as indicated in the schedule.

Also enclosed for your information and use are copies of five (5) pages of material from the various members of the Study Team. This material is essentially incorporated in this revised Executive Summary.

A copy of this report has been forwarded to Mr.
member of the Executive Committee.

I can be reached at telephone number 716-879-4247.

Sincerely,

Wiener Cadet
Technical Manager
Study Team Representative

Enclosures

This letter has been sent to the following:

Ms. Julie Letterhos
Ohio Environmental Protection Agency
P.O. Box 10940
1800 Watermark Drive
Columbus, Ohio 43266-0149

Mr. Kent Kroonemeyer
Field Supervisor
U.S. Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068

Mr. Bill Franz
U.S. Environmental Protection Agency
ATTN: Ms. Holly Wirick
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Robert Burris
U.S. Soil Conservation Service
200 North High Stret, Room 522
Columbus, Ohio 43215

Mr. Jeff Busch
Ohio Lake Erie Office
One Maritime Plaza, 4th Floor
Toledo, Ohio 43604-1866

Mr. John Loftus
Toledo-Lucas County Port Authority
One Maritime Plaza
Toledo, Ohio 43604-1866

Mr. Whit VanCott
City of Toledo
City Hall, Suite 222
One Government Center
Toledo, Ohio 43604

Mr. John Rupert
Ohio Department of Natural Resources
Fountain Square
Columbus, Ohio 43224

Mr. Hal Harrington
Michigan Department of Natural Resources
530 West Allegan
Mason Buuilding, 6th Floor
Lansing, Michigan 48933

12-29-93

TOLEDO HARBOR PLANNING GROUP
LONG-TERM DREDGED MATERIAL MANAGEMENT

SUBJECT: Phase 3 Report on the Long-Term Sediment Management Strategy - Maumee River Watershed, Toledo, Ohio

Dear Mr.

Enclosed for your review is a copy of the Toledo Harbor Planning Group Draft Phase 3 report on the Long-Term Sediment Management Strategy. The Phase 3 report includes an Executive Summary. The Planning Group (Study Team and Executive Committee) provided comments which have been incorporated into the report.

The Phase 3 report contains Planning Group recommendations for a joint "Action Plan" to develop a Long-Term sediment Management Plan (LTMP). A schedule of near-term events which would lead to the initiation of the Action Plan is provided in the Executive Summary. The schedule shows that the report will undergo concurrent review by Corps Headquarters and other partner agencies prior to its release to the general public. Your comments are requested by the end of January 1994, as indicated in the schedule.

Also enclosed for your information and use are copies of five (5) pages of material from the various members of the Study Team. This material is essentially incorporated in this revised Executive Summary.

I want to thank you for your sincere efforts to develop a sound Executive Committee product.

12/29/93

SUBJECT: Phase 3 Report on the Long-Term Sediment Management Strategy - Maumee River Watershed, Toledo, Ohio

My point of contact pertaining to this matter is Mr. Wiener Cadet, Technical Manager. Mr. Cadet can be reached at telephone number 716-879-4247.

Sincerely,

Walter C. Neitzke
Colonel, U.S. Army
Chairman, Executive Committee

Enclosure

The attached letter was sent to the following: 12/93

Mr. Valdas V. Adamkus
Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Donald R. Schregardus
Director
Ohio Environmental Protection Agency
P.O. Box 10940
1800 Watermark Drive
Columbus, Ohio 43266-0149

Mr. Carthy Finkbeiner
Mayor
City of Toledo
One Government Center
Suite 222
Toledo, Ohio 43604

Mr. Gary L. Failor
President and Chief Executive Officer
Toledo Lucas County Port Authority
One Maritime Plaza
Toledo, Ohio 43604-1866

Ms. Frances Buchholzer
Director
Ohio Department of Natural Resources
Fountain Square
Columbus, Ohio 43224

Mr. Joseph E. Branco
State Conservationist
U.S. Soil Conservation Service
200 North High Street
Room 522
Columbus, Ohio 43215

United States Department of the Interior

Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115

TAKE PRIDE IN AMERICA

In Reply Refer to:

Comm: 614/469-6923/FAX: 614/469-6919

December 22, 1993

Colonel Walter C. Neitzke
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Neitzke:

This is the U.S. Fish and Wildlife Service's Preliminary Fish and Wildlife Coordination Act Report (FWCA) on the Long-Term Sediment Management Strategy (LTMS) Study for Maumee River Watershed, Toledo Harbor, Ohio. This FWCA report was requested by Mr. James M. Bennett, Chief, Environmental Analysis Section of your staff in his November 16, 1993 letter. This FWCA report addresses the 5-Year Intermediate Plan (1994-1998) of the LTMS.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U.S. Fish and Wildlife Service's Mitigation Policy.

This interagency LTMS study started officially in July 1992 with the finalization and signing of the Work Plan and Memorandum of Understanding. The agencies that have participated in the LTMS are the Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Soil Conservation Service, Ohio Environmental Protection Agency, Ohio Department of Natural Resources, Toledo-Lucas County Port Authority, and the City of Toledo.

The LTMS study was precipitated by the desire of several agencies including Ohio EPA to phase out all open-lake disposal of dredged material. This includes the dredged material from both the river (River Mile 7.0 to 0.0) and lake portions (Lake Mile 0.0 to 19.0) of the Federal navigation channel. Ohio EPA with the support of USEPA has been gradually strengthening the conditions of the 401 certification for the annual maintenance dredging operation with the goal of eliminating open-lake disposal over a set period of time. This resulted in several related issues being raised, but the main issue was how to dispose of the 850,000 cubic yards that are dredged annually

if open-lake disposal was to be eliminated. This was the central goal of the LTMS and why the agencies joined the LTMS study.

Project Description -

A wide variety of options were considered with some being accepted for further study and eventual incorporation into one or more alternative plans. Phase III of the LTMS resulted in four Alternative Intermediate Plans; Base Plan, Plan 1b, Plan 2a, and Plan 2b. These plans are discussed in detail in the working draft of the Phase III report which was distributed by the Corps of Engineers in late November 1993. Plan 2a was generally selected as an acceptable intermediate plan to go forward with for the 5 year period 1994 - 1998.

Plan 2a consists of the following measures.

1. Dredged Material Placement - Dredged material from River Mile 7.0 to Lake Mile 5.0 (650,000 cubic yards) will be disposed of in the new Confined Disposal Facility (CDF) #2. Dredged material from Lake Mile 5.0 to Lake Mile 19.0 (250,000 cubic yards) will continue to be disposed of in the existing open-lake disposal site.

2. Crop Residue Management - This would consist of the Soil Conservation Service promoting increased implementation of conservation tillage throughout the Maumee River Basin. Successful implementation of this measure would decrease the amount of soil being eroded from farm fields, decrease the amount of eroded soil being washed into the nearest waterway, and ultimately decrease the amount of material being deposited in the Toledo Harbor area. This would decrease the amount of material that would need to be dredged and disposed of to an estimated 710,000 cubic yards.

3. Manufactured Soils - This measure would consist of the beneficial use/reuse of some of the spoil material in the production of manufactured soils for use as landfill cover, topsoil, landscaping, fertilizer, road dressing, etc. It is estimated that this measure could use up to 100,000 cubic yards annually initially. The Toledo-Lucas County Port Authority would be the lead agency for this measure.

4. Confined Disposal Facility Management - This measure would consist of dewatering/consolidating actions at the existing CDF #1 to increase its storage capacity. Dewatering actions would be initiated when dredge spoil is deposited in the new CDF #2 which will increase its holding capacity beyond designed limits. The Corps of Engineers would be the lead agency for this measure.

5. Monitoring - This measure calls for monitoring the performance and effectiveness of measures 2, 3, and 4.

Discussion -

Plan 2a as well as the other alternative intermediate plans that were considered will have widespread environmental benefits. All aspects of the plan will need to be implemented in order for it to be successful. In addition, there are some additional measures that will be studied and possibly implemented which could increase the plans effectiveness even more.

The elimination of open-lake disposal will be beneficial as it will eliminate the adverse impacts of disposing of dredge spoil. The Fish and Wildlife Service has supported the goal of eliminating open-lake disposal during this LTMS effort as there is no disagreement that it would be beneficial. The Service has repeatedly expressed our concern that the agencies not react too quickly and select a plan that will end up requiring the construction of more CDF's in the future. The Service believes construction of one or more CDF's in the future will be more damaging to the aquatic values of the western basin of Lake Erie than continued limited open-lake disposal. When a CDF is constructed, there is a permanent and total loss of the aquatic values of that area. The Corps of Engineers has also taken the position that no mitigation is required for the construction of a CDF. There are adverse impacts related to the open-lake disposal of dredged material but we believe they are short-term and localized. Plan 2a seems to provide a viable means of eliminating open-lake disposal without the need for constructing additional CDF's in the future.

The increased use of crop residue management (conservation tillage) throughout the Maumee River Basin will have widespread beneficial impacts. The aquatic resources in rivers, streams, and tributaries throughout the Basin would benefit. There would be decreased amounts of siltation and turbidity which would benefit the aquatic resources throughout the Basin. Wildlife resources would benefit due to increased habitat including nesting cover, winter cover, and food sources.

The manufactured soil measures are not expected to have direct beneficial effects upon fish and wildlife resources. However, there should be indirect benefits such as using manufactured soil to cover landfills, road dressing, etc.

CDF management should have indirect benefits to fish and wildlife resources as it will increase the amount of dredge spoil that can be deposited in existing CDF's. This measure combined with the other measures in Plan 2a should make it possible to eliminate open-lake disposal and avoid the future need for the construction of CDF's. Both of these actions have adverse environmental impacts.

Endangered Species Comments -

There are a number of Federally threatened and endangered species that are found either seasonally or permanently within the Maumee River Basin or the western basin of Lake Erie. Due to the nature of the Plan 2a, including its separate measures, it is not possible to address the impacts of Plan 2a on each species individually. However, as stated previously, Plan 2a will have widespread environmental benefits including positive benefits upon fish and wildlife resources which includes Federally threatened and endangered species. Decreased levels of sedimentation and turbidity, decreased erosion rates, increased wildlife habitat, and increased food sources for wildlife will all have beneficial impacts on threatened and endangered species.

Summary -

The Toledo LTMS study has been an innovative interagency effort to develop a multi-faceted plan to deal with the difficult and complex situation of annually dredging the Toledo Harbor and disposing of the dredge spoil. Intermediate Plan 2a is an environmentally responsible plan that will accomplish the objectives of the intermediate plan and will facilitate the implementation of the 30-year or more Long-Term Sediment Management Plan for Toledo Harbor.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: DOW, Wildlife Environmental Section, Columbus, OH (John Marshall)

Ohio Historic Preservation Office

Ohio Historical Center
1982 Velma Avenue
Columbus, Ohio 43211-2497
614/297-2470
Fax: 297-2411

OHIO HISTORICAL SOCIETY
SINCE 1885

December 17, 1993

Mr. Leonard Bryniarski
Environmental Analysis Section
U.S. Army Corps of Engineers, Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Re: Five Year Plan
Toledo Harbor, Ohio

Dear Mr. Bryniarski,

This is in response to correspondence from your office dated November 15, 1993 (received November 18) regarding the above referenced project. The comments of the Ohio Historic Preservation Office (OHPO) are submitted in accordance with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]); the U.S. Army Corps of Engineers, Buffalo District, serves as the lead federal agency. My staff has reviewed this project, and I offer the following comments.

The project involves the development of a five-year plan for the continuing maintenance of Toledo Harbor. In developing this plan, OHPO recommends that you consider the potential for impacts to historic properties. Changes in existing operations could result in adverse effects to important historic properties. Open lake disposal could result in damage to any submerged resources, such as any sunken vessels in that area. An underwater survey for Ashtabula Harbor disposal area revealed the presence of what is believed to be a sunken vessel, and an underwater survey of the open lake disposal area may be warranted. Continued use of landward confined disposal facilities could result in adverse effects to important architectural properties. And, development of new upland disposal facilities or initiatives to change agricultural patterns could have impacts on important archaeological sites. Further coordination with this office is recommended during the development of this five-year plan.

Any questions concerning this matter should be addressed to David Snyder at (614) 297-2470, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

Martha J. Raymond, Department Head
Technical and Review Services

MJR/DMS:ds

Exhibit 6

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
230 S. Dearborn, Suite 3422
Chicago, Illinois 60604

TAKE PRIDE IN AMERICA

November 29, 1993

Mr. Leonard Bryniarski
Environmental Analysis Section
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Mr. Bryniarski:

This is in response to the Corps of Engineers letter dated November 15, 1993 requesting comments on the Toledo Harbor, Ohio - Five Year Intermediate Plan.

This office has/will have no comment during your consultation process. However, the following Interior bureaus should be contacted for their input. These bureaus will respond directly concerning any impacts to resources under our jurisdiction and expertise, and provide technical assistance as needed.

Regional Director
National Park Service
1709 Jackson Street
Omaha, NE 68102-2571
Attn: Chief, Division of Planning and Environmental Quality
Telephone: (402) 221-3484

Field Supervisor
U.S. Fish & Wildlife Service
6950-H Americana Parkway
Reynoldsburg, OH 43068
Telephone: (614) 469-6923

If I can be of further assistance, please contact me at 312/353-6612.

Sincerely,

Sheila Minor Huff
Regional Environmental Officer

Exhibit 7

GEORGE J. RYAN, *President*
GORDON D. HALL, *Vice President / Treasurer*
ROL ANN LANE, *Secretary*

HAROLD W. HENDERSON, *General Counsel*
GLEN NEKVASIL, *Communications Director*

LAKE CARRIERS' ASSOCIATION

614 Superior Avenue, West
915 Rockefeller Building
Cleveland, Ohio 44113-1383
Telephone: (216) 621-1107 / Fax: (216) 241-8262

November 18, 1993

Mr. James M. Bennett
Chief, Environmental Analysis Section
Buffalo District
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Mr. Bennett:

I am writing in response to your November 15, 1993, letter on the subject of the Five-Year Intermedia Plan for Toledo Harbor.

Lake Carriers' Association represents 15 U. S.-flag Great Lakes fleets which have a combined total of 62 vessels with a per-trip capacity of 1,819,383 gross tons of bulk cargo. These commercial vessels range in length from 383 to 1,013 feet and comprise more than 98 percent of the tonnage of U. S. Great Lakes vessels engaged in the domestic trade. These vessels can carry more than 120 million tons of cargo each year. The primary trades for our member companies serving Toledo are inbound shipments of iron ore pellets (3,702,000 tons in 1990 - most recent year for which data is published) and coal (3,355,000 tons in 1990). In terms of all tonnage moved, Toledo is Ohio's biggest port.

Our member companies are vitally interested in seeing federal channels dredged to their authorized project depths. Every inch of silting results in a reduction of roughly 270 net tons on the largest vessels and roughly 120 net tons on the smaller vessels. Not only does this result in less efficient marine transportation, but the steel, coal, construction, and farming segments of American industry served by vessels suffer a loss of efficiency as well. It is an efficiency loss that no segment of the U. S. economy can suffer in today's global markets and hope to remain competitive. Maintenance of channel depths are of extreme importance.

Our member companies are delighted to see the Corps beginning involvement in developing basin-wide management of sediment transfer. The Association has expressed its opinion for close to ten years that the community has to start dealing with the sediment transfer far upstream that moves downstream to clog harbors and channels. Simply put, one must deal with the cause as well as the effect. Consequently, t "No Action Alternative" is one the nation cannot afford environmentally or economically.

Continued . . . \

Alternative Plan 1B has many attractive features. The Association would question only the dredged material placement component which calls for placement of all dredged material from Mile 0 lakeward to Lake Mile 19 in a CDF. No issue is taken with placement of sediments that exceed agreed on contaminant levels in a CDF, but placement of dredged materials not meeting such levels in a CDF is wasteful. It is noted under "Processing and Beneficial Use" that sheer processing and movement of the mass volumes envisioned would be a formidable (and presumably an expensive) task. CDF management expenses should not be unnecessarily inflated by burden with dredged materials which do not require CDF placement.

Consequently, the Association leans heavily to Alternative Plan 2A or 2B. However, neither of these plans may be correct in setting a cutoff at Lake Mile 5 or Lake Mile 2. Content of the material dredged should dictate the cutoff point and it could vary from year-to-year dependent at least in part on the success of sediment load reduction upstream. Where contaminants may be detected as far as Lake Mile 5 in the early years, Lake Mile 2 could become acceptable in later years. The extent to which heavy rains above the norm carry a farmer's fertilizer away in one year contrasted with what may result in a drought year may also be reason to have a moveable line based on actual monitor results.

In view of the expense involved, every effort should be made to utilize a flexible standard based on actual analysis rather than an inflexible standard that would be too far lakeward one year and not far enough a year later.

As already mentioned, the Association applauds the "Sediment Load Reduction Component" of the plan. Likewise, the "CDF Management Component" will be an effective management procedure to increase the efficiency of the CDF, as will processing of the dredged materials for beneficial use. Costing out this latter component should be examined very carefully, for, as pointed out in paragraph D(b), movement by truck is not realistic, and laying a rail bed for trains could be an investment which may be difficult to amortize.

The Association appreciates the opportunity for comment and hopes our thoughts will be of assistance.

Sincerely,

George J. Ryan
President

GJR:GDH:jbb

cc: John M. Loftus .....Toledo-Lucas County Port Authority
Dr. Jeffrey L. Busch .....Ohio Lake Erie Office

NOV 15 1993

Environmental Analysis Section

SUBJECT: Toledo Harbor, Ohio - Five Year Intermediate Plan

See Attached List

Dear :

Recognizing that continued operation and maintenance of the Port of Toledo in Ohio is of commercial importance to the area's economy as well as to the National interest, the U.S. Army Corps of Engineers (COE) Buffalo District Office, working with the Toledo Harbor Planning Group, is currently studying the feasibility of developing a five-year Intermediate Plan for implementation during the period 1995 to 1999, to manage sediments coming into and accummulating in, authorized navigation channels at Toledo Harbor. Among the concerns expressed are those pertaining to open lake disposal and water quality, and continued development of confined disposal facilities (CDFs). The Planning Committee is working with a goal toward eventual reduction or elimination of open lake discharge of dredged material while limiting development of additional CDFs.

The attached enclosure contains a narrative description of each alternative plan that is currently under consideration from which a five year Intermediate Plan may be selected. Included are several map figures - a Regional Location Map, Basin and Counties Map, and existing CDF Locations Map - for your information.

Note that concurrent with the five-year Intermediate Plan investigation, study is also underway toward evaluation and development of a long term plan of action to manage the Maumee River Watershed (Basin) and dredged material sediments.

Implementation of the National Environmental Policy Act of 1969, as amended, requires that Federal agencies initiate "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action." As a part of this scoping process, I wish to invite your comments and recommendations

Environmental Analysis Section
SUBJECT: Toledo Harbor, Ohio - Five Year Intermediate Plan

pertaining to this study. In order to identify any significant natural and manmade resources within the project vicinity, and to more fully assess probable impacts resulting from a potential project, please provide me with any comments, concerns, and recommendations that you feel should be brought to the attention of the Buffalo District for consideration in the planning process.

My point of contact pertaining to this matter is Mr. Leonard Bryniarski of my Environmental Analysis Section, who can be contacted by calling 716-879-4173, or by writing to him at the above address.

Sincerely,

James M. Bennett
Chief, Environmental Analysis
Section

Enclosure

Supplemental

Addresses for Scoping Letters and Mailing Labels

Ms. Sheila Minor Huff
Regional Environmental Officer
U.S. Department of the Interior
Office of Environmental Affairs
John Kluezynski Building, Room 3422
230 South Dearborn Street
Chicago, Illinois 60604

District Chief, Water Resources Division
U.S. Geological Survey
U.S. Department of the Interior
975 West Third Avenue
Columbus, Ohio 43212

Mr. Don H. Castleberry
Regional Director
Midwest Region
U.S. Department of the Interior
National Park Service
1709 Jackson Street
Omaha, Nebraska 68102-2571

Commander
U.S. Coast Guard
5101 Federal Building
234 Summit Street
Toledo, Ohio 43604

Mr. W. Ray Luce
State Historic Preservation Officer
Ohio Historic Preservation Office
1982 Velma Avenue
Columbus, Ohio 43211-2497

Mr. Bernard B. Hurst, P.E.
Director
Ohio Department of Transportation
25 South Front Street
P.O. Box 899
Columbus, Ohio 43216-0899

Mr. Wesley Fahrboch II
Ohio Department of Development
Regional Office
1 Government Center
Suite 1410
Toledo, Ohio 43604-2205

Ms. Ann Colwell
Ohio Department of Health
One Government Center
Suite 1320
Toledo, Ohio 43604

Jeffrey M. Reutter, Ph.D.
Director, Ohio Sea Grant
Ohio State University
1314 Kinear Road
Columbus, Ohio 43212

Mr. Joseph W. Ballard
Areawide Review Officer
Toledo Metropolitan Area Council
of Governments
123 Michigan Street
Toledo, Ohio 43604

Mr. Walter T. Edelen
Executive Director
Toledo-Lucas County Planning Commission
One Government Center - Suite 1620
Toledo, Ohio 43604

Mr. H. Pinkley
Association of Yacht Clubs of Toledo
5725 Edgewater
Toledo, Ohio 43611

Mr. Jim Sullivan
Toledo Edison Company
Edison Plaza
300 Madison Avenue
Toledo, Ohio 43652

Ms. Sandy Bihn
Environmental Coordinator
City of Oregon
5330 Seaman Road
P.O. Box 7541
Oregon, Ohio 43616-0541

Dr. Michael Donahue
Executive Director
Great Lakes Commission
The Argus II Building
400 S. Fourth Street
Ann Arbor, Michigan 48103-4816

Mr. James Cowden
Great Lakes Tomorrow
P.O. Box 470448
Cleveland, Ohio 44147-0448

Mr. Terry Yonker
Executive Director
Great Lakes United, Inc.
State University College at
Buffalo
Cassety Hall
1300 Elmwood Avenue
Buffalo, New York 14222

Ms. Emily M. Kress
Regional Director
National Wildlife Federation
Region 6
R.R. 1, Box 465
Parker City, IN 47368

Mr. Carl Zichella
Midwest Representative
Sierra Club
214 N. Henry Street
Suite 203
Madison, Wisconsin 53703

Mr. Fred Abraham
Regional Director
Ducks Unlimited
7605 Shepler Church Road
Navarre, Ohio 44662

Mr. Gordon D. Hall
Vice President/Treasurer
Lake Carriers Association
614 Superior Avenue, NW
915 Rockefeller Building
Cleveland, Ohio 44113-1306

Mr. Kent Kroonemeyer
Supervisor, U.S. Department of the
Interior
Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115

United States
Department of
Agriculture

Soil
Conservation
Service

200 North High Street
Room 522
Columbus, Ohio 43215

October 19, 1993

Colonel Walter C. Neitzke
Chairman, Executive Committee
Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Neitzke:

The Soil Conservation Service is pleased to participate in the planning for the long-term sediment management strategy for the Maumee River Watershed and Toledo Harbor. My staff has developed a sediment reduction strategy for the project and has outlined the objectives and financial resources that will be needed to accomplish this task.

However, I must take issue with the statement in the information packet on page 8 under "Cost Responsibilities." The Soil Conservation Service will not bear the cost of implementing the Crop Residue Management components. I have no program or source of funds in my budget to meet this commitment. The only way I can accomplish this would be to receive funding from another agency or program. I am under the assumption that this report will go forward with the committee's support to request the funding needed to accomplish the tasks outlined in the final document.

I am willing to support the initiatives outlined in this report, but I want to make it clearly understood that I have no existing resources available to accomplish this work.

Sincerely,

Joseph C. Branco

JOSEPH C. BRANCO
State Conservationist

TOLEDO HARBOR PLANNING GROUP
LONG-TERM DREDGED MATERIAL MANAGEMENT

SUBJECT: Long-Term Sediment Management Strategy - Toledo Harbor, Ohio
WORKSHOP

Dear Participant:

You are invited to participate at a workshop to discuss the alternative intermediate plans that are currently under consideration by the Toledo Harbor Planning Group. The alternative intermediate plans consist of several demonstration projects that would help derive a Long-Term sediment Management Plan (LTMP) for the Maumee River Watershed including Toledo Harbor. The goal is to develop a mutually accepatble LTMP and eventually eliminate disposal of dredged material in the Open-Lake.

The worshop will be held on **October 19, 1993 at 7:00 P.M** in Toledo, Ohio. The Workshop will take place **in the conference room at the Water Division Building located at 401 South Erie Street** at Hamilton Street, between Collingwood and Indiana Avenues. Directions to the building is herewith attached.

Sincerely,

FOR THE EXECUTIVE COMMITTEE:

Walter C. Neitzke
Colonel, U.S. Army
Chairman, Executive Committee

Exhibit 11

OHIO
Department of Natural Resources

George V. Voinovich • Governor
Frances S. Buchholzer • Director

June 3, 1993

Colonel John W. Morris
District Engineer
Buffalo District, Corps of Engineers
U.S. Department of the Army
1776 Niagara Street
Buffalo, NY 14207-3199

Attn: CENCB-PE-PF, Wiener Cadet

Re: Toledo Harbor

Dear Colonel Morris:

This letter is in response to a request of participants at the May 11, 1993, Long Term Management Study Team meeting to provide statements describing agency positions on material placement.

The Ohio Department of Natural Resources has long supported efforts by the U.S. Army, Corps of Engineers to maintain the federal navigation channels at Toledo Harbor. The federal participation has helped Toledo Harbor sustain its posture as one of the premier ports on the Great Lakes.

By virtue of the shallow nature of the western basin of Lake Erie and the sediment load from the Maumee River, maintenance of Toledo Harbor has required annual dredging of nearly a million cubic yards of material. Disposal of this vast quantity of material has been challenging. Historically, the Corps of Engineers has used a combination of open lake and confined disposal. Material placed into confined disposal facilities (CDFs) has been the most heavily polluted of the dredgings; open lake disposal has been used for the remainder. The ODNR concurs with this strategy, which minimizes the permanent loss of valuable nearshore aquatic habitat by construction and use of CDFs.

The proposed elimination of open lake disposal would result in much larger quantities of dredged material being placed into CDFs, greatly reducing their life spans. It is the Department's goal to see that use of these facilities is maximized for best management of heavily polluted materials and not utilized strictly for convenience.

The Department is not opposed, per se, to the elimination of open lake disposal. We recognize the short term impacts to the aquatic ecosystem and to utilization of the natural resources of Lake Erie as a result of this action. In planning strategies to manage dredged material, however, environmental impacts and costs associated with all alternatives must be considered. In this context, open lake disposal of dredged material remains a viable alternative for dredged material management.

Fountain Square • Columbus, Ohio 43224-1387

Exhibit 12

The Department recommends that:

Sources of sediment be reduced by all practicable means. The ODNR has been a cooperative partner with other agencies in promoting conservation tillage and in minimizing non-point sources of pollution. These efforts must continue with renewed emphasis.

Beneficial reuse options be further identified and developed such that dredged sediments are utilized as a resource. Existing CDFs should be used to process dredged material for beneficial reuse. An ultimate reuse CDF could receive as much dredged material as is removed allowing perpetual use.

Open lake disposal of material lakeward of lake mile two should continue. Use of CDFs for this material should be limited to an equivalent quantity to that removed for beneficial reuse.

The Department will continue to work cooperatively with all affected parties within the framework of the Long Term Management Strategy for Toledo Harbor. If you have any questions, please contact Mr. John Rupert (614-265-6415) of the Coastal Management Program.

Sincerely,

Wayne R. Warren

Wayne R. Warren, Deputy Director
Ohio Department of Natural Resources

WRW/JCR:ag

United States Department of the Interior

Fish and Wildlife Service
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115

TAKE PRIDE IN AMERICA

In Reply Refer to:

Comm: 614/469-6923/FAX: 614/469-6919

June 2, 1993

Colonel John W. Morris
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

ATTN: Mr. Weiner Cadet

Dear Colonel Morris:

This letter is in regards to the Toledo Long Term Management Strategy (LTMS) study. At the May 11, 1993 meeting, a request was made that all agencies participating in the study provide a statement clarifying their position on the elimination of open lake disposal of dredge spoil. This specifically addresses the disposal of channel sediments located lakeward of Lake Mile 2.0.

The U.S. Fish and Wildlife Service does not object to the elimination of open lake disposal of these channel sediments. However, we are very concerned about how it is accomplished including how and where these sediments are disposed of at an alternative location or locations. The Service believes that the optimum disposal method for these materials would be their beneficial reuse at upland or existing confined disposal facility (CDF) sites. For several years now there has been an ongoing effort to design or implement a reuse project for sediments dredged from the harbor and channel areas. Only recently has there been a project implemented which reuses some of this material, and it uses only a small portion of the material that is dredged annually. This leaves the vast majority of sediments that must either be placed in a CDF (sediments riverward of Lake Mile 2.0) or disposed of in the open lake disposal site (sediments lakeward of Lake Mile 2.0).

The Service strongly believes that the dredge material located lakeward of Lake Mile 2.0 should not be disposed of in a CDF either permanently or long-term pending implementation of a large scale reuse program at some time in the future. The remaining space located in CDF #3 and the space in the CDF under construction should be used only for storage of sediments located riverward of Lake Mile 2.0 which is the current situation. Only when a large scale reuse program is ready for implementation should sediments located lakeward of Lake Mile 2.0 be spoiled in a CDF and then the amount should be limited to that which can be reused on an annual basis.

Exhibit 13

Due to our concerns about the possible proliferation of in-water CDFs and their adverse impacts on Maumee Bay, we continue to recommend that open lake disposal be retained as one of the disposal alternatives for that portion of the annual lake channel dredging (lakeward of Lake Mile 2.0) for which a practical reuse alternative has not been identified.

We recognize that open lake disposal has adverse impacts on the aquatic environment including the release of moderate amounts of bioavailable phosphorus, the short-term suppression of the benthic community, the short-term degradation of water quality at the disposal site, and the short-term loss of recreational fishing use in the vicinity of the disposal area. We believe, however, that these impacts are less severe than the permanent loss of fish and wildlife resources that would occur with the potential elimination of hundreds of acres of shallow water habitat over a period of years if lake channel sediments are placed in CDFs and no practicable reuse alternatives are found for the majority of these sediments. Some of the adverse impacts of open lake disposal probably could be lessened if the disposal site were relocated further offshore in deeper water.

In addition, we believe that information regarding the adverse impacts of open lake disposal be provided to the Study Team including the Steering Committee. This would enable the people making decisions to weigh the adverse impacts of open lake disposal versus the increased cost of maintenance dredging which the federal government will be expected to pay for.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: AES/DHC

Ohio Lake Erie Office
Enhancing Lake Erie

George V. Voinovich
Governor

Jeffrey L. Busch, Ph.D.
Executive Director

Lake Erie Commission:
Ohio Environmental Protection Agency
Ohio Department of Natural Resources
Ohio Department of Health
Ohio Department of Agriculture
Ohio Department of Development
Ohio Department of Transportation

June 2, 1993

Toledo Harbor Planning Group
Long-Term Dredged Material Management
Mr. Weiner Cadet, Study Team Coordinator
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Dear Mr. Cadet:

The Maumee River Basin Remedial Action Plan Committee has been consistent in its position on open-lake disposal of dredged sediments. Its position has not changed from the policy put forth in Volume 4: Recommendations for Implementation (July, 1990):

> **The local community believes that because of the detrimental effects upon the Maumee Bay ecosystem ..., the practice of open-lake disposal of dredged sediments should be eliminated. We see this meaning that the entirety of sediments dredged from the shipping channel of the Maumee River and Bay shall be confined in such a manner that maximizes its safe confinement and/or reuse potential and minimizes the destruction of bottom lands in the Maumee River and Bay.**
>
> **Our immediate effort must be directed toward drafting and implementing in cooperation with the Corps of Engineers an approved Long Term Management Strategy (LTMS) for sediment disposal. This plan should account for the desired disposal of all sediments for a minimum of twenty-five (25) years.**
>
> **At this time, we see the LTMS consisting of three strategies: confinement projects, recycling programs, and other management strategies involving dredging techniques and source prevention...**

In the opinion of the Maumee RAP, the implementation of the LTMP was to be driven by the mandates of the Ohio EPA five-year plan. This required that by 1992, 100% of the dredged sediments were to be confined in some manner provided the storage capacity became available. Our opinion is that after the present 401 certification agreement between OEPA and the Corps of Engineers expires after the 1994 dredging season (which allows for

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Exhibit 14

open-lake disposal of materials dredged lakeward of lake mile #5) , all material dredged from the Toledo navigational channel should be confined. In 1995, the extension to the present confined disposal facility will be on-line and able to accept the entirety of the dredged sediment until an additional project(s) anticipated in the LTMS can be constructed.

The Maumee RAP is not in favor of an interim period, as proposed by the Corps of Engineers, which would continue to allow up to 300,000 cubic yards of sediment to be disposed into Maumee Bay during an interim period which could extend until the year 2000. This proposal is not consistent with the Maumee River Basin RAP recommendations, nor do we believe that it is consistent with Ohio EPA's five year plan and the Toledo Harbor Memorandum of Agreement.

Jeffrey L. Busch, Ph.D.
Executive Director

CENCD-CO-O (CECW-OD/24 Sep 92) (11-2-240g) 2nd End
Mr. Vowinkel/sgv/(312) 353-6373
SUBJECT: Toledo Harbor Dredged Material Management Plan

Commander, North Central Division, U.S. Army Corps of Engineers,
111 North Canal Street, Chicago, IL 60606-7205 30 SEP 1992

FOR Commander, Buffalo District, ATTN: CENCB-CO

1. Forwarded for your action are the Memorandums from ASA(CW) and HQUSACE approving the Work Plan and Memorandum Of Understanding for the subject study.

2. You are to continue proceeding on this study as has been previously outlined through telephone conversations and other written communications.

3. The HQ, NCD, POC is Mr. Scott Vowinkel, CENCD-CO-O, (312) 353-6373.

FOR THE COMMANDER:

for CARL C. CABLE, P.E.
Director, Directorate of
Construction and Operations

2 Oct 92 08 58

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CECW-OD

24 SEP 1992

MEMORANDUM FOR THE COMMANDER OF NORTH CENTRAL DIVISION

SUBJECT: Toledo Harbor Dredged Material Management Plan

The attached Memorandum from the Assistant Secretary of the Army (Civil Works) is furnished for your action.

Encl

for STANLEY G. GENEGA
Brigadier General (P), USA
Director of Civil Works

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

REPLY TO
ATTENTION OF

11 AUG 1992

MEMORANDUM FOR THE DIRECTOR OF CIVIL WORKS

SUBJECT: Toledo Harbor Dredged Material Management Plan

The plan, including the Memorandum of Understanding (MOU), submitted with your memorandum of July 15, 1992, is approved and authority to sign the MOU is hereby delegated to the Buffalo District Commander.

Please express my appreciation to all involved in resolving this most difficult issue.

Nancy P. Dorn
Assistant Secretary of the Army
(Civil Works)

OhioEPA
State of Ohio Environmental Protection Agency

Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

MAILROOM
CENCB-IM-S
28 SEP 92 10 13

George V. Voinovich
Governor

Donald R. Schregardus
Director

September 25, 1992

U.S. Army Corps of Engineers,
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

92 SEP 28 PM 1:50

RE: Lucas County
City of Toledo
Grant of Section 401 Certification
Project to perform maintenance dredging in Toledo Harbor, discharge dredge material in Lake Erie and in confined disposal facility in 1993 and 1994
Public Notice No. N/A

Dear Colonel Morris:

Pursuant to Section 401 of the Federal Water Pollution Control Act, Public Law 95-217, the Director of Ohio Environmental Protection Agency hereby certifies that the above-referenced project will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the Federal Water Pollution Control Act. This certification is specifically limited to a 401 certification with respect to water pollution and does not relieve the applicant of further certifications or permits as may be necessary under the law. This Certification is issued subject to the following conditions:

> The maintenance dredging and disposal of dredged material shall be conducted in accordance with the request for certification dated June 9, 1992.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code by any person who was a party to this proceeding. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after the notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Law Division of the Office of the Attorney General within three (3) days of the filing with the Board. An appeal may be filed with the Environmental Board of Review, 236 East Town Street, Room 30, Columbus, Ohio 43266-0557.

Sincerely,

Donald R Schregardus

Donald R. Schregardus
Director

cc: William Franz, U.S.EPA, Region V
Wiener Cadet, U.S. Army Corps of Engineers, Buffalo District
Kent Kroonemeyer, U.S. Fish & Wildlife Service
John Rupert, Ohio DNR, Office of Real Estate & Land Management
John Loftus, Toledo-Lucas County Port Authority
Whit Van Cott, City of Toledo
Colleen Crook, Ohio EPA, DWQPA

401Toled401.esc

Exhibit 16

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

REPLY TO
ATTENTION OF

23 APR 1992

MEMORANDUM FOR THE DIRECTOR OF CIVIL WORKS

SUBJECT: Action Plan for Toledo Harbor Dredging

Based on discussions with various interests, the following actions should be taken with respect to future dredging of Toledo Harbor.

For Fiscal Years (FY) 1992 and 1993, material beyond channel mile 5 should be disposed of in open water. Material inside mile 5 should be disposed of in the Confined Disposal Facility (CDF). We understand this is consistent with the Clean Water Act Section 401 Water Quality Certification issued by the State of Ohio for FY 1992 and proposed for FY 1993. We further understand that the Ohio Environmental Protection Agency and the City of Toledo Water Division remain concerned about the 1994 disposal plan, depending upon results of further sampling to be done during the next two dredging seasons and the space available in the CDF in 1994.

For use of the new CDF to be placed in service in 1995 and to address the concerns about FY 1994 dredging, you should begin immediately to develop, jointly with the Port of Toledo, the Ohio Environmental Protection Agency, the U. S. Environmental Protection Agency, and the City of Toledo, a dredged material management plan for long-term disposal decisions. The process must be geared toward producing a plan which is jointly supportable among the interests involved.

Elements of the plan should include an evaluation of the relative costs of confined disposal versus open water disposal; options for cost sharing of disposal costs, including beneficial uses of the material; further field and laboratory studies to define more precisely the actual impacts on the environment of the various disposal options; alternatives to assist the State of Ohio in reaching its

phosphorus loading reduction goals and other water quality parameters for Lake Erie, and any other areas which the interested parties deem appropriate for a well rounded program of disposal management.

You may proceed with FY 1992 dredging contracts in accordance with the water quality certification. You should also apply as soon as possible for a water quality certification for FY 1993 along the lines of the plan noted above for FY 1993.

Also, please establish a planning group among the interested parties to develop within 18 months a full joint management plan for disposal activities at Toledo Harbor. The District Commander, Buffalo District, should represent Army on the planning group. However, this office will remain closely involved so that should any impasse arise in the planning group's deliberations with respect to Army's policies, we can provide assistance for quick resolution.

You should direct the District Commander to convene the planning group as soon as possible and to produce a work plan and schedule by May 31, 1992, with a view to having a completed plan by October 1993. This will be necessary to be able to reach timely decisions for FY 1994 dredging.

Nancy P. Dorn

Nancy P. Dorn
Assistant Secretary of the Army
(Civil Works)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

FEB 13, 1992

REPLY TO THE ATTENTION OF:

Colonel John W. Morris
Environmental Analysis Section
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Morris:

The U.S. Environmental Protection Agency (USEPA) is writing in response to your agency's Public Notice of December 31, 1991, in which comments were requested on the proposed Federal Operation and Maintenance Dredging of Toledo Harbor, Lucas County, Ohio. Your agency proposes to dredge approximately 200,000 cubic yards of sediment classified as "Heavily Polluted" from the Maumee River and Lake Approach Channels and place them into the existing Confined Disposal Facility (CDF). An estimated 500,000 cubic yards of sediments classified as "Nonpolluted" to "Moderately Polluted" are proposed to be dredged from the Lake Approach Channel and discharged in the northeast half of the existing two-square mile open lake discharge site in Lake Erie. The purpose of the project is to maintain sufficient water depths in order to provide access for deep-draft commercial vessels, thereby accommodating the shipment of commodities to and through the port at Toledo, Ohio. We offer the following comments.

The Toledo Harbor sediments contain significant quantities of phosphorus. Allowing open-lake disposal to continue at Toledo Harbor would impair the state of Ohio's efforts to implement the Great Lakes Phosphorus Reduction Control Strategy, which was developed by State and Federal governmental agencies for the purpose of reversing the eutrophication process in Lake Erie, Lake Ontario, and Saginaw Bay. Placement of the Toledo Harbor sediments at the proposed open lake disposal site, which is shallow and erosive, may result in the resuspension of the dredged material, allowing for the potential uptake of phosphorus by the biota. This would add to the eutrophication problem in western Lake Erie.

Disposal of the Toledo Harbor sediments at the aforementioned open lake disposal site would also run counter to the March 30, 1987 Section 401 Water Quality Certification in which the Ohio Environmental Protection Agency had inserted the condition that open lake disposal was to be phased out over a five year period. The practice of open lake disposal of Toledo Harbor sediments was to be discontinued after 1991. Even though our Agency approved the State's water quality standards that formed the basis for its denial of

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the Section 401 Water Quality Certification, we believe that U.S. EPA approval is not the key to validating a state's 401 Certification, which we believe stands as a separate state determination that is binding with or without a separate EPA action on a state's water quality standard.

We maintain the position, as stated in our April 12, 1990 letter to your agency, and as evidenced by the Phosphorus Reduction Control Strategy, the Great Lakes Water Quality Agreement, and the State's Section 401 Water Quality Certification decision, that your agency's proposal to dispose of the Toledo Harbor sediments at the existing two-square mile open lake discharge site in Lake Erie is environmentally unacceptable. We recommend that another disposal option be evaluated, preferably one in which the material would be reused or properly disposed of in confinement facilities for future beneficial reuse, or placed in a deeper location in Lake Erie where the material would not be susceptible to erosion and movement.

If you have any questions on our comments, please contact Holly Wirick of my staff at (312) 353-6704 or 353-6704 (FTS).

Sincerely yours,

William D. Franz

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

cc: Colleen Crook, OEPA
Marc Tuchman, USEPA
Jan Miller, USCOE

APPENDIX E

COMMENTS/RESPONSES ON THE PHASE 3 REPORTS

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO
ATTENTION OF

Environmental Analysis Section

FEB 16 1996

SUBJECT: Long-Term Sediment Management Study, Maumee River Watershed, Toledo Harbor, Ohio (Intermediate Plan 2a)

To All Interested Parties:

Enclosed for your review are copies of the subject project Main Report, Environmental Assessment and Finding of No Significant Impact (EA-FONSI), and Appendices. The reports are being coordinated for a 30-day review period in compliance with Federal planning and National Environmental Policy Act (NEPA) guidelines.

Written comments, if any, should be forwarded within 30 days of receipt of these reports. If no comments are received within 30 days that would reverse the FONSI, and/or, if and after comments can be reasonably addressed, the FONSI may be signed and filed as part of the project official decision documents. The project may then proceed to implementation.

My points of contact pertaining to this matter are Mr. Wiener Cadet of my Plan Formulation and Technical Management Section and Mr. Tod Smith of my Environmental Analysis Section, who may be contacted by calling 716-879-4247 or 716-879-4175, respectively, or by writing to their attention at the above address.

Sincerely,

Walter C. Neitzke
Colonel, U.S. Army
Commanding

Enclosure

Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS)
Phase 3 Reports

Date	Comments/Responses	Page
02/20/96	State of Ohio -	1
03/20/96	Office of Budget and Management	2
	No Response Necessary	3
03/01/96	U.S. Department of the Interior Fish and Wildlife Service	4
04/15/96	Committee Chairperson Response	5
03/15/96	Associated Yacht Clubs	6
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03/15/96	Point Place Business Association	10
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STATE CLEARINGHOUSE

State of Ohio - Office of Budget and Management

30 EAST BROAD STREET • 34TH FLOOR • COLUMBUS, OHIO 43266-0411 • (614) 466-0697 / 0698

U.S. DEPT OF THE ARMY, CORPS OF ENGINEERS
1776 NIAGARA STREET, ENVIRONMENTAL ANALYSIS
BUFFALO, NY, 14207-3199

ATTENTION: W CADET OR T SMITH PHONE: 716-879-4175

RE: STATE CLEARINGHOUSE INTERGOVERNMENTAL REVIEW- APPLICATION RECEIPT LETTER

TITLE: ARMY - ENVIRONMENTAL IMPACT ASSESSMENT
PROJECT DESCRIPTION: TOLEDO, LUCAS COUNTY, LONG-TERM DREDGED MATERIAL MGMT PLAN, MAUMEE RIVER WATERSHED SEDIMENT MGMT STRATEGY PHASE 3, ENVIRONMENTAL ASSESSMENT, NOVEMBER 1995

STATE IDENTIFICATION (SAI) NUMBER: OH960220-C784-36.422
PROPOSED FEDERAL FUNDING: $0

Dear Applicant:

The State Clearinghouse has received your notification for either a direct federal development project, environmental assessment/impact statement, or, an application for federal funds. The review process has begun at the State level and will be completed on March 20, 1996.

A State Application Identification (SAI) number has been assigned to your project. Please refer to this number in all future contacts with the State Clearinghouse and the Area Clearinghouse(s). This number should also be forwarded to the funding agency, to become part of your application.

Sincerely,

Linda Wise
Project Coordinator

OBM 6000

STATE CLEARINGHOUSE
State of Ohio - Office of Budget and Management

30 EAST BROAD STREET • 34TH FLOOR • COLUMBUS, OHIO 43266-0411 • (614) 466-0697 / 0698

March 20, 1996

U.S. DEPT OF THE ARMY, CORPS OF ENGINEERS
1776 NIAGARA STREET, ENVIRONMENTAL ANALYSIS
BUFFALO, NY 14207-3199

Attention: W CADET OR T SMITH PHONE: 716-879-4175

RE: STATE INTERGOVERNMENTAL REVIEW
ENVIRONMENTAL ASSESSMENT/IMPACT STATEMENT COMPLETION LETTER

State Application Identification (SAI) Number: OH960220-C784-36.422

Project Description: TOLEDO, LUCAS COUNTY, LONG-TERM DREDGED MATERIAL MGMT PLAN, MAUMEE RIVER WATERSHED SEDIMENT MGMT STRATEGY PHASE 3, ENVIRONMENTAL ASSESSMENT, NOVEMBER 1995

Dear Applicant:

The State Clearinghouse has reviewed the Environmental Assessment/Impact Statement for the above identified project that is covered by the National Environmental Act of 1969, and any amendments; the Intergovernmental Review Process (Presidential Executive Order 12372); Gubernatorial Executive Order authorized under Ohio Revised Code, Section 107.18(A); and/or other pertinent regulations and guidelines.

This document has been simultaneously reviewed by interested state agencies, with a notice to the impacted area clearinghouse(s). Our office may have attached comments for your consideration and/or response.

You should be advised that some of the reviewing state agencies may respond directly to you without submitting their comments through the Single Point Of Contact. We encourage our reviewing agencies to keep in direct contact with issuing agencies on all environmental assessment/impact statement reviews. Therefore, consider their directly generated comments as valid responses.

It is recommended that contact be made with all commenting agencies. Addresses and phone numbers are available on individual Transmittal Forms and /or contained in a letter received by our agency. The comments which have been generated should become part of the proposal and responded to before a final decision is made regarding this environmental assessment/impact statement.

Should this be a draft proposal, please provide our office with fourteen (14) copies of the final product.

Sincerely, Larry W. Weaver | VT

Larry W. Weaver, Federal Funds Coordinator
Office of Budget and Management

2

OBM 6000

NO RESPONSE NECESSARY

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6950-H Americana Parkway
Reynoldsburg, Ohio 43068

IN REPLY REFER TO:

4 MAR 96 11 51

Comm: 614/469-6923/FAX: 614/469-6919

March 1, 1996

Colonel Walter C. Neitzke
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Attention: Mr. Weiner Cadet

Dear Colonel Neitzke:

This responds to your February 16, 1996 letter transmitting the November 1995 Executive Committee Phase 3 Report with Environmental Assessment for the Toledo Long-Term Dredged Material Management Plan, Toledo Harbor, Ohio.
The Fish and Wildlife Service has reviewed the Report and finds it acceptable as the previous versions have been acceptable. There are two items that the Service wishes to comment on and they are listed below.

1. Page vii, II. Recommendations of the Executive Committee, A.6. Scientifically and economically validating the environmental unacceptability of open-lake disposal. The Service would like to be provided the opportunity to review the information that is being collected. The issue of the environmental unacceptability of open-lake disposal is critical to the whole Toledo LTMS effort and it remains unresolved.

2. Page 16, Confined Disposal Facilities: Engineering - One of the criteria listed is "Dike vertical expansion not to exceed 15 feet." The Service wishes to indicate that vertical expansion of CDF's beyond 15 feet is acceptable to the Service. The aquatic damages and losses are realized when a CDF is originally built. Raising the CDF vertically up to the indicated 15 feet and beyond causes no further damages to aquatic resources. Raising one or more CDFs vertically above the indicated 15 foot limitation would be very preferable to constructing a new CDF necessitated by the 15 foot limit which restricted disposal capacity.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: ODNR, DOW, Wildlife Environmental Section, Columbus, OH (John Marshall)
ODNR, Office of Realty and Land Management, Columbus, OH
Ohio EPA, Water Quality Monitoring, Columbus, OH (Colleen Crook)
USEPA, Office of Environmental Review, Chicago, IL (Holly Wirick)
Toledo Port Authority, Attn: John Loftus, Toledo, OH
Natural Resources Conservation Service, Attn: Larry Clark, Columbus, OH

Plan Formulation/Technical
Management Section

SUBJECT: Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS)- Phase 3 Reports

MAILROOM
CENCB-IM-S

Mr. Kent E. Kroonemeyer
Supervisor
United States Department of
the Interior
Fish and Wildlife Service,
Ecological Services
6950-H Americana Parkway
Reynoldsburg, Ohio 43068

Dear Mr. Kroonemeyer:

Thank you for your letter dated March 1, 1996, regarding your review of, and comments on, the LTMS Phase 3 reports. Responses to the two comments you made are listed below:

1. The Service will be provided an opportunity to review the information that is being collected with a view toward resolution of the open-lake disposal issue.

2. We noted your comments. The vertical expansion of CDFs will be assessed further during Phase 4 of the LTMS.

My points of contact pertaining to this matter are Mr. Wiener Cadet of my Plan Formulation and Technical Management Section, and Mr. Tod Smith of my Environmental Analysis Section, who may be contacted by calling (716)879-4247 or (716)879-4175, respectively, or by writing to their attention at the above address.

Sincerely,

SIGNED

Walter C. Neitzke
Colonel, U.S. Army
Committee Chairperson

CF:
CENCB-CO
CENCB-PE-EA
CENCB-PPM
CENCB-PE-PT

Cadet:040396:4247
T.Smith
Moriyama DeJohn
Brooks Berkeley
Coniglio
Neitzke

FILED: CADET\TOHBLTMS.KEK
WP 6.0

ASSOCIATED YACHT CLUBS

James Bridge, Commodore
23302 Bradner Road
Perrysburg, Ohio 43551
419-837-6081

March 15, 1996

Your Reference: Long Term Sediment Management Study, Maumee River Toledo Watershed, Harbor, Ohio (Intermediate Plan 2a). ASSOCIATED YACHT CLUBS comments.

Mr. Tod Smith
Environmental Management Section
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Mr. Smith:

The ASSOCIATED YACHT CLUBS is an association of thirty-one incorporated clubs representing approximately twelve thousand members and spouses, operating approximately sixty-two hundred sail and power boats, located on Western Lake Erie basin and the Detroit River within a fifty mile radius of the Toledo Harbor Light, owning and/or leasing and managing real property adjacent to navigable water in the States of Michigan and Ohio, and in the Province of Ontario, Canada, and providing dockage for members and guests.

The objectives of the ASSOCIATED YACHT CLUBS is to unite the member clubs in a common goal for the advancement and perpetuation of yachting, sail and powerboat contest and junior sailing activities on the Great Lakes, their tributaries and inland waters; the protection of the aquatic environment and to support or oppose such actions by government bodies or the private sector which affect the general and good welfare of the member clubs and the association as a whole.

Be advised that we concur with the Code of Federal Regulations 33 CFR 337.9, National Environmental Policy Act 33 CFR 233 and 40 CFR 1501.7, and the Water Resources Development Act of 1992 (WARDA92).

Also be advised that we do not concur with parts of the Executive Committee Phase 3 Report with Environmental Assessment. In particular, we object to any activity at Island 18 (Grassy Island) that will eliminate navigation course options in its area, erect bridges to close the existing navigation channel between Island 18 and the Cullen Park peninsula, pumping or transfer module installations that restrict navigation in its area, develop any airborne particulate discharges greater than existed in the fall of 1995, impact the water quality and Lake Erie bottoms immediate to the Island (1995 baseline), or increase the Island elevation. The Island 18 seaways are historically a high use egress area for sail and powerboat navigation by all ASSOCIATED YACHT CLUBS.

Furthermore, be advised that we object to the construction of any barrier island at Woodtick Peninsula using dredge sediments behind a stone breakwater. The area east of Woodtick Peninsula and west of the Toledo Harbor channel, north to Turtle Island and south to Island 18 historically is a high use competition area for sail, and egress for sail and powerboat navigation by all ASSOCIATED YACHT CLUBS entering or exiting their harbors on the Maumee and Ottawa Rivers.

Furthermore, be advised that we object to the construction of any barrier island at Woodtick Peninsula using dredge sediments behind a stone breakwater. We believe this will increase sedimentation of Maumee Bay west of the Toledo Shipping Channel, south of Woodtick Peninsula and north of Island 18 eliminating this historically navigable body of water for all ASSOCIATED YACHT CLUBS.

The ASSOCIATION acts as a responsible neighbor to Lake Erie, we react to environmental mishaps responsibly, we seek safe boat operation compliance through inspection, we achieve compliance to local and state laws through exemplary management of our club and docking facilities, we have a substantial history of responsibility in the western Lake Erie basin. We were the caretakers of Maumee Bay while those who prepared the referenced Project and Finding of No Significant Impact were tending other ambitions. We respectfully request representation on the Toledo Harbor Planning Group. Our representation is important to assure that we do not lose use of this Warm Water Habitat for Primary Contact Recreation while contributing to Toledo Harbor improvements.

Sincerely,

James P. Haren

James P. Haren, Ecology Chairman
Associated Yacht Clubs
712 Meadowsprings Court
Maumee, OH 43537
419-893-4570

PR. 1 5

Plan Formulation/Technical
Management Section

SUBJECT: Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS) - Phase 3 Reports

15 APR 96 10 04
MAILROOM
CENCH-TM-S

Mr. James P. Haren
Ecology Chairman
Associated Yacht Clubs
712 Meadowsprings Court
Maumee, Ohio 43537

Dear Mr. Haren:

Thank you for your letter dated March 15, 1996, on the above subject. In the letter, you made comments regarding "Island 18" and Woodtick Peninsula.

Only a pilot demonstration project to verify the suitability and economic feasibility of recycling the material confined in Island 18 or other confined disposal facilities has been proposed. At this time, it is uncertain whether the Committee will implement this demonstration project on Island 18. Raising Island 18 would not occur as a result of this project during the interim period. I will recommend that the Committee coordinate with you on this matter and on every issue that is before the Committee for resolution.

Regarding the Woodtick Peninsula, the Committee has not developed any alternative plans, nor has it proposed any barrier island construction at Woodtick Peninsula. The Committee has, however, put together a preliminary concept for the restoration of the peninsula. This concept has not been subjected to any detailed study, coordination, or assessment/evaluation to date. As I indicated above, I will recommend that the Committee coordinate with you on this and other issues.

My points of contact pertaining to this matter are Mr. Wiener Cadet of my Plan Formulation and Technical Management Section, and Mr. Tod Smith of my Environmental Analysis Section, who may

Plan Formulation/Technical
Management Section
SUBJECT: Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS) - Phase 3 Reports

be contacted by calling (716)879-4247 or (716)879-4175, respectively, or by writing to their attention at the above address.

Sincerely,

SIGNED

Walter C. Neitzke
Colonel, U.S. Army
Committee Chairperson

CF:
CENCB-CO
CENCB-PE-EA
CENCB-PPM
CENCB-PE-PT

Cadet:040396:4247_____
T.Smith_____
DeJohn_____
Berkeley_____
Coniglio_____
Neitzke_____

FILED: CADET\TOHBLTMS.JPH
WP 6.0

Point Place Business Association

March 15, 1996

YOUR REFERENCE; Long Term Sediment Management Study, Maumee River Toledo Watershead, Harbor, Ohio (Intermediate Plan 2a). Point Place Business Association Comments.

Mr. Todd Smith and Mr. Wiener Cadet
Environmental Section
Dept. Of The Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Mr. Smith and Mr. Wiener Cadet;

The Point Place Business Association representing 166 businesses in the Point Place area and some 35,000 families (Mouth of the Maumee River) join together to voice our opinions relating to the Executive Committee Phase 3 Report to the Long Term Sediment Management Study for the Toledo Harbor (Plan 2a)

We object to any activity at Island 18 and the Cullen Park Peninsula and Marina that would hinder the activities that are presently in operation.

Further, let us say that the Promises made several years ago with the conversion of Island 18 by the State of Ohio-Toledo Port Authority and the City of Toledo that this Island be coverted to a Park with the following;

A new Marina with docks services etc;
Museum for marine artifacts;
Yacht Club;
Sports facility with buildings to play sports inside and out;
Pond for Model boat shows-racing etc;
Special Victory Monument at Harbor Entrance;

A few years ago we attended a meeting at the Toledo Port Authority with a request to allow the City of Toledo and the Port Authority to haul sludge from the Sewage treatment plant to Island 18 to reprocess land materials and sludge into a usable material for farming, fill, etc; Trucks hauling this material would have to pass thru Point Place to get to Island 18; This would creat problems with street maintence and leave a bad smell in the area. It was brought to the attention of all parties that Point Place doesn't need any more foul odors then we have at present----The Toledo Sewage plant presently produces an odor problem from the SOUTH and the Hoffman Landfill produces odor and dust problems from the West. The Horrible Polution and odor problems from the Ottawa River on the West and North, and now you want to add an odor problem to the East. In plain words, we don't need any more odor problems. There are many suitable places in the Perrysburg and Sylvania area to take this project.

In reference to the Woodtick Peninsula and the proposal to add a barrier reef to prevent shore erosion we wish to state the following;

P.O. Box 5074 • Toledo, Ohio 43611

The owner of this Peninsula (State of Michigan) has seen fit to ignore this problem for many years and could have placed finger piers along the shore to restore the beach .(just like they due in Florida). The corps of Engineers are very familar with this procedure.

This is a great area for boating, swiming and camping and is used by hundreds of people every week of the summer.

For over 100 years we have used the area surrounding the Woodtick Peninsula for fishing, sailing, water skiing and other boating activities . At this point the Corps of Engineers and the Toledo Port Authority have lost all concept for recreational activities in this area. What about the 4000 + boats moored in this area and the marinas and yacht clubs and the facilities they have built over the years? What about the thousands of boaters who frequent this area for fishing and sailing? We think it's time to tell the Corps and the Port Authority to stay out of our area with proposed barrier reefs which are used for disposal areas as a result of commerical traffic in the Maumee River.

Point Place is truly a great place to live and work and provide recreational activities for all families living in the Toledo Metro Area.

It is further suggested that any future planing, that is to take place in this area, that due representation be given to our association.

Please feel free to contact us if you have any questions.

Sincerely,

Howard Pinkley, Past President
CC/Mayor, City of Toledo, Toledo Port Authority, PP Business Association,John Garcia
Stae of Ohio, Jeanne Perry, City Council-Toledo

15 APR 96 10 02

Plan Formulation/Technical
Management Section

MAIL ROOM
OENOP-IM-S

SUBJECT: Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS) - Phase 3 Reports

Mr. Howard Pinkly
Past President
Point Place Business Association
P.O. Box 5074
Toledo, Ohio 43611

Dear Mr. Pinkly:

Thank you for your letter dated March 15, 1996, on the above subject. In the letter, you made comments regarding "Island 18" and Woodtick Peninsula.

Let me assure you that the Committee has no plan to undertake any activity on Island 18 that would hinder the activities that are presently in operation in Maumee Bay. Only a pilot demonstration project to verify the suitability and economic feasibility of recycling the material confined in Island 18 or other confined disposal facilities has been proposed. At this time, it is uncertain whether the Committee will implement this demonstration project on Island 18. Other alternatives such as those mentioned in your letter have been under consideration by the Committee and will certainly be revisited during the implementation of Phase 4 of the LTMS. I will recommend that the Committee coordinate with you on this matter and on every issue that is before the Committee for resolution.

Regarding the Woodtick Peninsula, the Committee has not developed any alternative plans, nor has it proposed any barrier island construction at Woodtick Peninsula. The Committee has, however, put together a preliminary concept for the restoration of the peninsula. This concept has not been subjected to any detailed study, coordination, or assessment/evaluation to date. As I indicated above, I will recommend that the Committee coordinate with you on this and other issues.

My points of contact pertaining to this matter are Mr. Wiener Cadet of my Plan Formulation and Technical Management Section, and Mr. Tod Smith of my Environmental Analysis Section, who may

Plan Formulation/Technical
Management Section
SUBJECT: Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS) - Phase 3 Reports

be contacted by calling (716)879-4247 or (716)879-4175, respectively, or by writing to their attention at the above address.

Sincerely,

Walter C. Neitzke
Colonel, U.S. Army
Committee Chairperson

CF:
CENCB-CO
✓CENCB-PE-EA
CENCB-PPM
CENCB-PE-PT

Cadet:040396:4247_____
T.Smith_____
DeJohn_____
Berkeley_____
Coniglio_____
Neitzke_____

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WP 6.0

JOLLY ROGER SAILING CLUB

5961 EDGEWATER DRIVE
TOLEDO, OHIO 43616
(419) 729-4971

March 27, 1996

Your Reference: Long Term Sediment Management Study, Maumee River Watershed, Toledo Harbor, Ohio (Intermediate Plan 2a). Jolly Roger Sailing Club comments.

Mr. Tod Smith
Environmental Management Section
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Mr. Smith:

Jolly Roger Sailing Club is an Ohio Corporation founded in 1946. The 465 members operate 225 sailing craft on the Ottawa River, Maumee Bay and Lake Erie. The Club owns approximately three acres with buildings fronting on the Ottawa River in the City of Toledo. It manages a clubhouse with meeting rooms, storage buildings, and boat storage. Wet dockage is provided for members and guests at the Club and at a marina on Lost Peninsula, Maumee Bay, Michigan.

The Club objective is to promote and encourage sailing and sailing yacht racing for pleasure and sport, to foster good fellowship among its members, and to provide facilities for these purposes. It fosters sailing by adolescents (juniors - under 18 years of age), participates in state and national junior sailing events, founded a nonprofit corporation in 1994 to provide long term support for junior sailing, is an active participant in senior and junior regional, national and international yachting associations, and it participates in these associations' sponsored sailing yacht competitions.

Be advised that we concur with the Code of Federal Regulations 33 CFR 337.9, National Environmental Policy Act 33 CFR 233 and 40 CFR 1501,7, and the Water Resources Development Act of 1992 (WARDA92).

Also be advised that we do not concur with parts of the Executive Committee Phase 3 Report with Environmental Assessment. In particular, we object to the construction of any barrier island east of Woodtick Peninsula using dredge sediments behind a stone breakwater.

Furthermore, be advised that we object to the unilateral construction of any barrier island at Woodtick Peninsula using dredge sediments behind a stone breakwater. For fifty years the seaway north to Luna Pier, south to Island 18, east of Woodtick Peninsula and west of Toledo Harbor channel has annually been used for sailing and sailing yacht racing April 15th through October 24th. In this area, the Club conducts three sailing yacht races each week, as well as three major annual invitational sailing yacht race events, also Club members and guests navigate cruising sailing yachts through this area for Club harbor egress.

Furthermore, be advised that we object to the unilateral construction of any barrier island at Woodtick Peninsula using dredge sediments behind a stone breakwater. This will increase the sedimentation of Maumee Bay south of Woodtick Peninsula, west of the Toledo Shipping Channel, and north of Island 18 eliminating this historically navigable body of water for Club, invitational and guest sailing yacht racing events and cruising activities.

Furthermore, it is unconscionable that a planning body of appointed and hired government officials arrive at this conclusion, barrier island construction, to end the use of a Warm Water Habitat for Primary Contact Recreation for the accommodation channel dredgings. The concept of a barrier island was developed without studying or becoming cognizant of Ohio recreational boaters use of the proposed barrier island area, we have been very visible in that area for 50 years. Construction of a barrier island will effectively close down all Club sponsored activities. Additionally, we are dismayed that this planning body does not or will not understand that the island under consideration blocks navigable recreational egress for Ottawa River and Maumee Bay harbors.

As users of these bay, off shore and lake navigable waters we advise you that we strenuously object to your study or any construction activity to build a barrier island in these navigable waterways.

Sincerely,

Nick Smith, Commodore
Jolly Roger Sailing Club

Plan Formulation/Technical
Management Section

SUBJECT: Toledo Harbor, Ohio, Long-Term Sediment Management Study (LTMS) - Phase 3 Reports

Mr. Nick Smith, Commodore
Jolly Roger Sailing Club
5961 Edgewater
Toledo, Ohio 43616

Dear Mr. Smith:

Thank you for your letter dated March 27, 1996, on the above subject. In the letter, you made comments regarding Woodtick Peninsula.

Regarding the Woodtick Peninsula, the Committee has not developed any alternative plans, nor has it proposed any barrier island construction at Woodtick Peninsula. The Committee has, however, put together a preliminary concept for the restoration of the peninsula. This concept has not been subjected to any detailed study, coordination, or assessment/evaluation to date. The process considers interests input and comments such as yours. The Committe will also be considering a number of other alternative beneficial use alternatives during the Phase 4 study. I will recommend that the Committee coordinate with you on this matter and on every issue that is before the Committee for resolution.

My points of contact pertaining to this matter are Mr. Wiener Cadet of my Plan Formulation and Technical Management Section, and Mr. Tod Smith of my Environmental Analysis Section, who may be contacted by calling (716)879-4247 or (716)879-4175, respectively, or by writing to their attention at the above address.

Sincerely,

SIGNED

Walter C. Neitzke
Colonel, U.S. Army
Committee Chairperson

CF:
CENCB-CO
CENCB-PPM
CENCB-PE-PT
CENCB-PE-EA ✓

W. Cadet _____
T. Smith _____
M. DeJohn _____
P. Berkeley _____
A. Coniglio _____
Col. Neitzke _____

TDS WP