

*LONG-TERM SEDIMENT MANAGEMENT STRATEGY
MAUMEE RIVER WATERSHED*

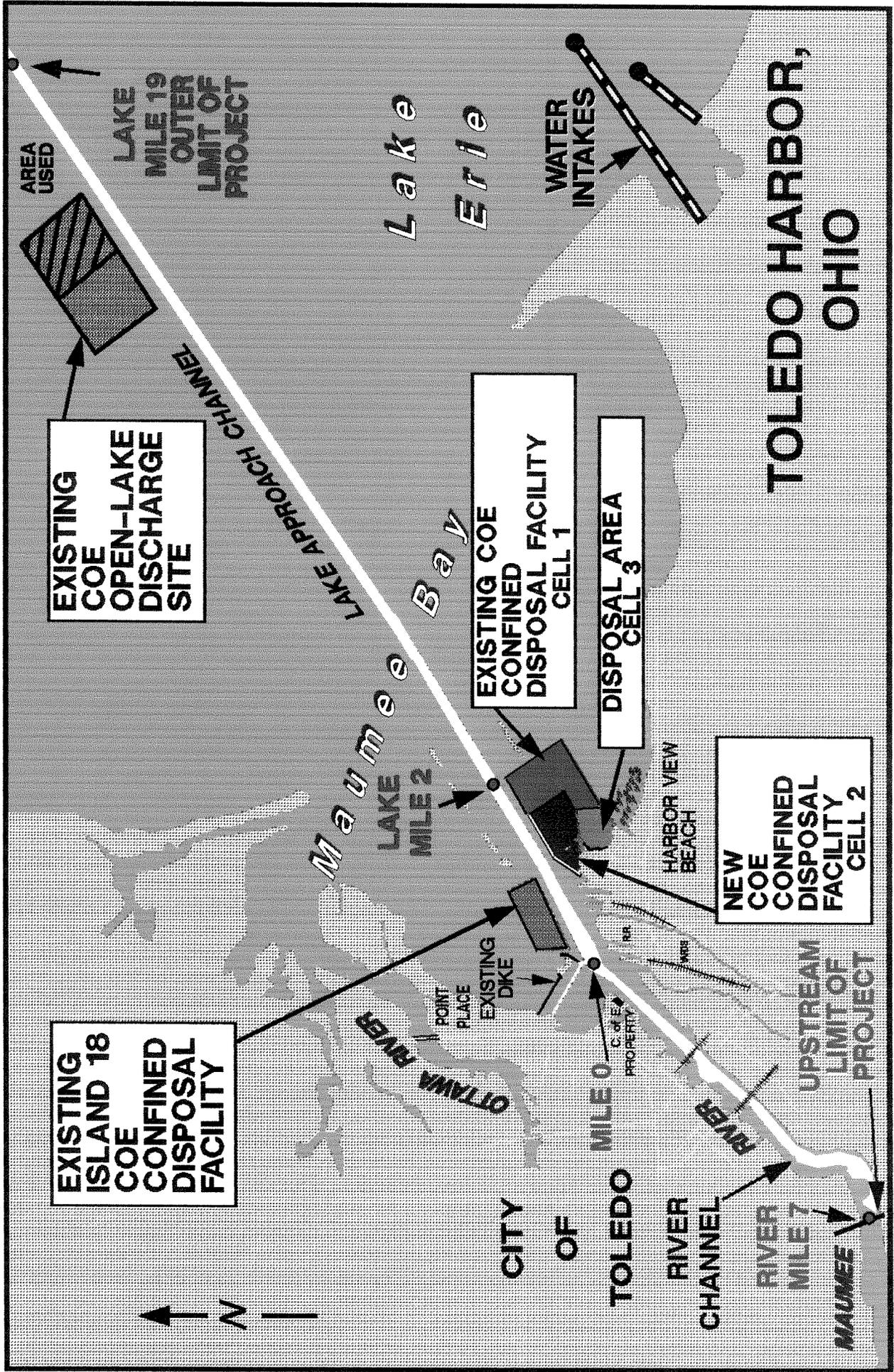
TOLEDOHARBOR, OHIO

Phase 2 Status Report

July 1993

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
Maumee Remedial Action Plan Committee
Toledo-Lucas County Port Authority



PHASE 2 STATUS REPORT LONG-TERM SEDIMENT MANAGEMENT STRATEGY MAUMEE RIVER WATERSHED

A. INTRODUCTION:

The Toledo Harbor Planning Group is on a steady course with the task of developing an Action Plan by October 1993, as directed. The development and implementation of the Action Plan would lead to a mutually acceptable Long-Term Sediment Management Plan for Toledo Harbor within the context of the Maumee River Watershed Sediment Management Strategy. Efforts of the Group to date have led to the preparation of the Phase 1 report in March 1993. The Phase 1 report provides a synopsis of past studies as well as the documentation of the dredged material management problem and formulation of potential solutions thereof. *The Phase 1 Executive Summary* is herewith enclosed for information (*See Enclosure 1*).

B. PLANNING GROUP (Composition and Structure):

The Planning Group is comprised of the following agencies.

US. Army Corps of Engineers	Ohio Environmental Protection Agency
U.S. Environmental Protection Agency	Ohio Dept. of Natural Resources
U.S. Fish and Wildlife Service	Maumee Remedial Action Plan Committee
U.S. Soil Conservation Service	Toledo Lucas County Port Authority
Michigan Dept. Of Natural Resources	City of Toledo

The Group is structured with an Executive Committee and a Study Team composed of representatives of the above agencies.

C. STUDY AUTHORITIES:

- 33 CFR 337.9
- Section 356 of WRDA 92
- Additional authorities from Federal, State and Local agencies

1. 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:** 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.

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: The Planning Group has additional authorities from the other Federal, State and local agencies involved in the study. Further authorities were provided by the Water Resources Development Act of 1992, which directed development of a comprehensive sediment management strategy for Maumee River.

D. PHASES AND CURRENT STATUS:

The Planning Group has completed the Phase 1 study in March 1993, the Phase 2 study in July 1993, and is in the process of completing work on the Phase 3 study. The five phases for developing and implementing the Long-Term sediment Management Strategy (LTMS) are briefly described below:

- Phase 1: Evaluate Existing Management Options
- Phase 2: Formulate Alternative
- Phase 3: Preliminary Analysis of Alternatives
- Phase 4: Detailed design and Implementation of Recommended Alternatives
- Phase 5: Periodic Review and Update

1. Preliminary Screening: The aforementioned Phase 1 report lists several specific options and/or activities that warranted further consideration in Phase 2 of the study. Early in Phase 2, the Planning Group performed a preliminary screening of these options/activities based on judgment, costs, time constraints, and experience in particular field of activities. Several options were eliminated from further consideration. Rationales developed to support the elimination of these options will be discussed in the Phase 3 report. A listing of these eliminated options is provided below:

- Reduction of Animal Waste Constituents;
- Construction of Recreational Hill using Dredged Material;
- Construction of Shallow Water Habitats using Dredged Material;
- Evaluation of the Market and Pricing Service for Canola Crop; and
- Assessment of Additional Market of Conservation Cropping Sequence

2. Feasibility Criteria: During Phase 2, the Planning Group has also developed the feasibility criteria (environmental, engineering, and economic criteria) for screening management options **and/or** alternative plans pursuant to Section 122 of Public Law 91-611. The main consideration in developing these criteria was to assure that possible adverse environmental, social, and economic effects relating to any proposed project are fully considered in developing such project, and that the final decisions on the project are made in the best overall public interest. Further, given the nature of this particular study and the potential long-term comprehensive plan that might be developed and implemented, timing of pertinent activities was considered a very important feasibility criterion. Therefore, it was concluded that practicable alternative plans must be:

- Engineeringly Feasible;
- Environmentally Sound and Socially Acceptable;
- Economically Feasible (Cost-effective); and
- Timely

3. Action Plan: Also in Phase 2, potential components of the Action Plan leading to the development of the long-term sediment management plan have been identified and put together on a preliminary basis. Two main items of the Action Plan are:

- a. Implementation of Immediately Feasible Projects; and*
- b. Execution of Detailed Studies of Potentially Viable Alternatives*

a. Implementation of Feasible Projects -- These projects will be implemented as an intermediate plan effected for the operations and maintenance of the Port of Toledo during the period 1995-1999. This five-year Intermediate Plan would provide the means to go from the current practice of disposing of the dredged material to a long-term practice of managing the sediment or the long-term Management Plan (LTMP). However, a period of time longer than five years may be necessary to progress toward the long-term solution. Two dredged material disposal alternatives (**Not Alternative Plans**) were identified for the Intermediate Plan:

- **Alternative 1: No Open-Lake Disposal starting in 1995**
- **Alternative 2: Combination of CDF confinement plus Open-Lake disposal**

Examples of Alternative plans, with either "No Open-Lake disposal" as a component, or "combination of CDFs and Open-Lake disposal" as a component, were developed to the Phase 2 level of details to guide the Planning Group in reaching conclusions and/or consensus prior to making phase 2 recommendation(s).

Components of the Intermediate Plans are: placement of dredged material in both Open-Lake and CDFs; implementation of conservation tillage or no-till farming to reduce farmland erosion thereby reducing the load of sediment entering Maumee River; management of CDFs by dewatering and consolidation of the dredged material to maximize the use of CDF space; and beneficial use of the dredged material to produce manufactured soils. The environmental impact of Open-Lake disposal, other facets of the disposal operations, 'as well as the other components of the Intermediate Plan will be monitored to measure their performance and effectiveness. Examples of alternative 1 and alternative 2 are outlined in *Enclosure 2*.

Three examples of intermediate alternative plans will be evaluated in phase 3 for inclusion in the Phase 3 report; they are as follows:

- Elimination of open-lake disposal in 1995 with confinement of all dredged material in CDFs; plus the other components described above and outlined in *Enclosure 2*;
- Open-lake disposal of material dredged lakeward of Lake Mile 2 with confinement of material dredged riverward of Lake Mile 2, plus the other components described above and outlined in *Enclosure 2*; and
- Open-Lake disposal of material dredged lakeward of Lake Mile 5 with confinement of material dredged river-ward of Lake Mile 5, plus the other components described above and outlined in *Enclosure 2*.

b. Execution of Detailed Studies --- A number of viable options such as study for vertically expanding CDFs, study of other beneficial uses of the dredged material (protection of shoreline from further erosion...), study of reusing CDFs in tandem, (that is, recycling CDFs in conjunction with the production of manufactured soils using the dredged material), and study of runoff retention reservoir or pond for capturing sediment, thus, reducing the load of sediment entering the Federal channels will be further developed to Phase 3 level of details by appropriate agencies of the Planning Group.

Further details of these examples of intermediate alternative plans illustrated in *Enclosure 2* are being considered for the identification of a mutually-acceptable Intermediate Plan, and the formulation of the Action Plan. The integration of the requirements for the National Environmental Protection Act (NEPA) is also part of this planning process. Potential components of the Action Plan are shown in *Enclosure 3*. For a more detailed description of the potential components of the Action Plan, see *Enclosure 4*.

4. Responsibilities: The responsibilities of the partner agencies involved in the implementation and monitoring of the pilot projects, and execution of the potentially viable studies have been drafted. The draft which addresses tasks, role and funding is being reviewed by the partner agencies prior to the development of the Phase 3 report. These responsibilities will be outlined in the Phase 3 report.

5. Issues and Position: The current issues being considered by the partner agencies, and the position of these agencies on the issues are summarized as follows:

a. Issues: -- The following issues are on the table:

- 1) *Immediate Elimination of Open-Lake Disposal of the material:*
- 2) *Breakpoint between zones of sediment suitable for open-Lake disposal and zones of sediment which require confinement; and*
- 3) *Funding of Watershed Sediment Load Reduction*

b. Position on the issues:--- The agency partners of the Planning Group have not opposed elimination of open-lake disposal. They have recognized potential adverse impacts of open-lake disposal to the aquatic environment, as well as the permanent loss of valuable nearshore aquatic habitats by construction and use of CDFs. Some believe open-lake disposal should be eliminated immediately after the 1994 dredging season when the current 401 Water Quality Certification expires. Others believe open-lake disposal should be phased out (**See enclosure 5, paragraph D**) by implementing a combination of large scale beneficial uses and confined disposal of the dredged material.

As a result of the 10 June 1993 Executive Committee meeting, and the 1 July 1993 Study Team meeting, the Planning Group expressed interest in the implementation of Alternative 2 which involves a combination of open-lake disposal and CDF confinement of the material in the interim time period 1995-1999. However, as discussed earlier in this report, the Planning Group will evaluate three alternative plans (1b, 2a, 2b) briefly described in Enclosure 2 to identify a preferred alternative plan for the Phase 3 study.

6. Amending the Work Plan: Developed in May 1992, the Work Plan laid out the studies, schedules, and the work that must be accomplished to achieve the specific results sought by the participating agencies. On 10 June 1993, the Planning Group agreed to amend the Work Plan to reflect changes in the original schedule because of the late approval of the

Work Plan, and subsequent expansion of the scope of the study to include the Maumee River Watershed rather than only Toledo Harbor. Considering time constraints, the Planning Group conducted a focused phase 2 of the study and is conducting a focused phase 3. The Work Plan schedule is amended as follows:

a. Schedule.--- The milestone dates on page 6 of the Work Plan are amended. The following schedule is now in effect:

<u>Product</u>	<u>Milestone Date</u>
Submit Phase 2 Status Report for concurrence	30 Jul 93
Develop Phase 3 Details	15 Aug 93
Initiate Phase 3 Report	16 Aug 93
Complete Phase 3 Report	15 Sep 93
Planning Group Reviews Report	16-30 Sep 93
Revise Phase 3 Report	1-15 Oct 93
Submit Phase 3 Report for Agency Review	30 Oct 93
Executive Committee meeting	December 93
Prep. and Hold Public Meeting	Jan 94
Finalize & Submit Report for Approval	March 94

b. Phases.--- The time period for the first three phases was revised as follows:

- *Phase 1.* The third sentence of paragraph 7.1 on page 7 of the Work Plan was revised to read: The first phase should last 7 months (Sept. 92 - March 93).
- *Phase 2.* The first sentence of Paragraph 7.2 on page 7 of the Work Plan was revised to read: This phase should last three months from April 93 to Jun 93.
- *Phase 3.* The first sentence of paragraph 7.3 on page 8 of the Work Plan was revised to read; This Phase should last eight months including review by the Planning Group, the general public and other agencies. (Jul 93 - March 1994).

7. **LTMS** Timeframe: The Planning Group is contemplating the development of a 30-year LTMS which would detail plans for Toledo Harbor dredged material management and Maumee River watershed sediment reduction.

FOR THE EXECUTIVE COMMITTEE:

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John W. Morris
Colonel, US Army
Chairman

ENCLOSURES

EXECUTIVE SUMMARY

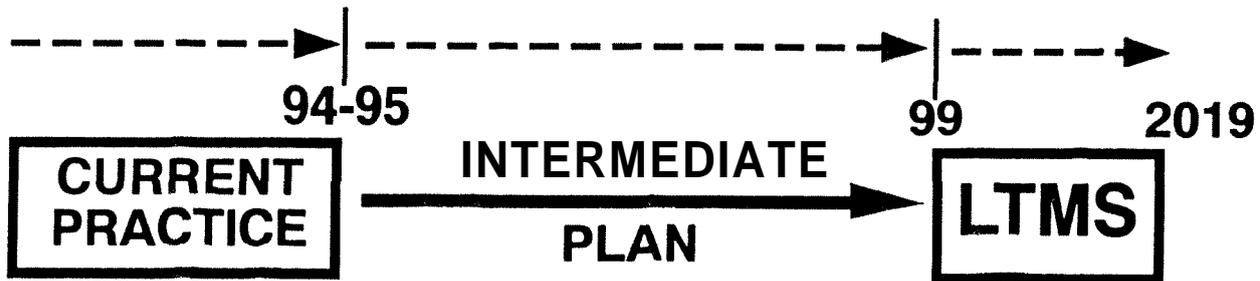
The Toledo Harbor Planning Group, made up of Federal, State and local agencies, is tasked to address the problem of managing sediment dredged from the Toledo Harbor River and Lake Approach Channels. In April 1992, the Assistant Secretary of the Army for Civil Works directed that this group be formed to work together as partners in the development of an Action Plan. A Work Plan, developed in May 1992 to lay out the studies and schedule, was signed by all the partner agencies. The Group expanded the scope of the study to include management of sediment throughout the **Maumee** River Watershed. This action by the Group requires investigation to develop a long-term sediment management strategy (**LTMS**) for the **Basin**.

This **Phase 1 Report** is the first compilation of the literature and field data collected, reviewed and summarized as well as the initial formulation of the problem and potential solutions leading to the Action Plan. The success of the Planning Group to date is measured by the progress made as expressed by this report, as well as, the commitment and cooperative team spirit of the partners. This group continues to progress towards the Action Plan which is scheduled for submission and approval in October 1993.

This report sets the stage for the formulation of alternative management options to be performed in Phase 2 study by: defining the problem; establishing the study geographic limits and time frame; reviewing historical dredging quantities and dredged material management actions; reviewing sediment characteristics and quality; presenting environmental concerns related to dredging and disposal; listing management options identified to date; and proposing several preliminary concept plans. The report also presents some preliminary screening of management options.

The No-Action plan discussed in this report presents the direction dredged material management is expected to take in the near term, and the potential for reduction in the level of maintenance dredging and preclusion of its use as a commercial harbor. The capacity of the existing disposal facilities could be depleted in a few years and without a **LTMS** the future maintenance of the Harbor could be stymied. This in turn could lead to real economic losses for the water-dependent and associated industries using the Harbor.

This Phase 1 Report draws several preliminary conclusions about the investigations needed to develop specific management options. It recommends moving ahead to the Phase 2 Study to address these options that would meet the goals of sediment load reduction, improvement in sediment and water quality, beneficial uses of the material, and a reduced dependency on construction of new Confined Disposal Facility (**CDF**). The report also cites the need for: the development of environmental, engineering and economic criteria for evaluating the alternative management options (Phase 2) with a view to developing and recommending an Action Plan (Phase 3) for detailed studies and implementation (Phase 4).



CDF + OPEN LAKE (LM5 - OUT)	ALT 1: NO OPEN LAKE	NO OPEN LAKE
	<p>Ex. 1a: All in CDF</p> <p>Ex. 1 b: All in CDF + Sediment Load Reduction + CDF Management † Beneficial Use † Monitoring</p> <p>ALT 2: CDF + OPEN LAKE</p> <p>Ex. 2a: CDF † Open Lake (LM5-OUT) † Sediment Load Reduction † CDF Management † Beneficial Use † Monitoring</p> <p>Ex. 2b: CDF † Open Lake (LM2-OUT) † Sediment Load Reduction † CDF Management † Beneficial Use † Monitoring</p>	<p>OPTIONS</p> <p>1: Raising CDF</p> <p>2: Shoreline Protection</p> <p>3: Surface Runoff Retention Pond</p> <p>4: Dredged Material Added To Agricultural Soil</p> <p>5: Recycling CDF</p> <p>6: Monitoring</p>

ACTION PLAN

INTERMEDIATE PLAN:

- LT NATIVE 1: NO OPEN LAKE
Examples (1a, 1b...)
- or
- LT NATIVE 2: CDF + OPEN LAKE
Examples (2a, 2b...)
- (NEED EA + 404.b.1 + 401) - SHORT TERM

STUDIES:

- (Technical, Engineering, Policy, Legal, Environmental, Economics)
- OPTION 1 : Raising CDF
- OPTION 2 : Shoreline Protection
- OPTION 3 : Recycling CDF
- OPTION 4 : Surface Runoff Retention Pond
- OPTION 5 : Dredged Material to Agricultural Soil
- OPTION 6 : Monitoring

(NEED EIS, 404.b.1, 401) - LONG TERM

Note: Action Plan Includes Sediment Testing Based On New Manual/State Regs.

ACTION PLAN

DESCRIPTION OF THE POTENTIAL COMPONENTS

The Action Plan will be developed and implemented in Phase 4 of the study. Its potential components are described below:

A. CONSERVATION TILLAGE - During the five-year period from 1995 to about year 2000, the Planning Group would implement a sediment load reduction program through application of Conservation Tillage. The Group's goal is to enroll 75 percent of the farmers to participate in the program. The program would build on the framework of the recent Lake Erie Phosphorous Reduction effort. 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 citizens, and other affected organizations. Incentive funding would 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 would include:

- a. Sediment Reduction Committee for each County involved;
- b. Education Program Grants for the farmers;
- c. Implementation of Innovative Local Program Grants;
- d. Land Owner Incentives; and
- e. Technical Assistance.

The program would cost about \$ 1.6 million per year for a total of \$ 8 million over five years. Sediment load reduction is estimated to increase from 80,000 cubic yards (second year) to about 140,000 cubic yards (fifth year) at an average rate of increase of about 20 percent per year for five years. After year 5, the reduction level should stay at 140,000 cubic yards per year at no additional costs. The program would be monitored in Phase 4 to measure its performance and effectiveness on a yearly basis over the 5-year period.

The Planning Group would develop the monitoring program in Phase 3 to possibly include, but not be limited to, installation of gauge(s) in **Maumee** River to record the volume of sediment entering the Federal River and Lake Approach Channels at Toledo Harbor. If successful, this practice would reduce total annual dredging quantities from the estimated 850,000 cubic yards per year to about 710,000 cubic yards per year in the long run.

B. BENEFICIAL USE (Manufactured soil) - Under the "beneficial use" option, the Island 18 CDF, the existing CDF (Cell 1) and the new CDF (Cell 2) of Facility No. 3 would eventually be used in tandem. During the Phase 4 Intermediate period, a maximum of 150,000 cubic yards of soft or wet material could be removed from Island 18 CDF. The

alternative site for initiating the “beneficial use” option is the existing CDF (Cell 1). The material would be processed on Island 18 to generate manufactured soils at an initial rate of 130,000 cubic yards per year. The total volume of soft or wet dredged material currently in the CDF, above maximum lake water level of +4.0 (See monthly bulletin of lake levels for the Great Lakes, April 1993) to elevation + 22.00 is estimated at 3.8 million cubic yards. This volume can be depleted in about 20 years or less depending on the success of the beneficial use of the dredged material. At the end of the 20-year period, the Island 18 CDF would be ready for reuse (refilling) with new dredged material.

Two alternatives have been identified under which the material would be removed:

a. The Corps would put the material in Island 18 up for bids, that is, sell the material to promote beneficial use. This presumes that the material is excess property (not excess real estate). In this case, selling the material is legal under the laws governing excess Federal property.

b. Another proposal is that the Port Authority would manage the beneficial use of the dredged material. The Port would pay for all upfront capital expenditures to ready the site for the “beneficial use” operation. Further research into the legality of this option is required. At this time, and if there is no value to the material, the alternative is for the Corps to pay to create space in the CDF.

Since it is likely that the dredged material has little monetary value at present, but may have more value in the future when there are established beneficial uses of the material, any alternative chosen must be re-evaluated at the end of a specified period of time.

C. CDF MANAGEMENT (Dewatering and Consolidation) - The Planning Group would estimate potential settlements of the excess pore pressure distribution, depth of the material that will consolidate and the coefficient of consolidation. Material in Cell 1 would be consolidated using surface trenches initially to speed up the consolidation of the surface soil. The installation of surface trenches would be followed by installation of strip drains to speed up the process. Horizontal strip drains are required to carry water from the vertical drains to the surface trenches.

The Planning Group would perform laboratory tests on soil samples to obtain the data for calculation of the rate of consolidation and potential for settlements. Data required include shear strength, water content, void ratio, density, specific gravity, permeability, and the coefficient of consolidation. Piezometers are required to measure the distribution of excess pore pressures.

Since raising the dikes to create more storage capacity is being considered, preference would be to install the drains at 10-foot interval to accelerate the rate at which consolidation will take place, and start recording appreciable settlements in about one year. This would

not only provide additional capacity, but also strengthen the soil to provide sufficient support for heavy equipment and construction of dikes.

The cost for this pilot project is estimated at \$500,000 to \$ 1,000,000.

Management of Cell No. 2 of facility #3 would not start until Cell No. 2 is filled with material up to Lake level at elevation of +2.00 Low Water Datum (LWD). This would take place in about year 3 of the intermediate plan at a rate of 600,000 cubic yards per year.

In addition to the above, no growth of vegetation would be allowed in CDFs to alleviate negative impacts on the capacity of the CDFs. This as well as the consolidation process would be monitored to measure the performance of the CDF management project and its technical and cost effectiveness.

D. DREDGED MATERIAL PLACEMENT - At the 28 April and 11 May 1993 Study Team meetings in Toledo, the majority of the agencies representatives, except the Port Authority and the City of Toledo, recognized the need for some open-lake discharges in the interim with the goal being elimination of open-lake disposal in the long run. The Port Authority, the City of Toledo and the Remedial Action Committee (RAP) representative favor elimination of open-lake disposal starting in 1995. However, at the 10 June 1993 Executive Committee meeting, and subsequent Study Team meeting on 1 July 1993, the Planning Group including the City, the Port, and RAP express interest in alternative Intermediate Plans 2a and 2b. Both Intermediate Alternative Plans call for combinations of Open-Lake and CDF placement of the dredged material. As discussed in paragraph D.3.a of this Phase 2 status report, the three examples of alternative plans will be evaluated in Phase 3 for the identification and inclusion of a preferred plan in the Phase 3 report.

E. STUDIES: The following studies will be performed in Phase 4 pending approval of the Phase 3 report.

a. Raising CDF. Facility Number 3 is composed of the existing Corps CDF built in 1978 and referred to as Cell 1; the new CDF which an expansion of cell 1, referred to as Cell 2; and the Port Authority CDFs. Facility 3 is located within the City of Oregon, and the Facility is visible from the City of Oregon Lakeshore, approximately 0.5 mile away.

Vertical expansion of Facility # 3 (excavation of a burrow pit within the center of cell 1, and/or incrementally raising elevation of cells 1 and 2) to create additional disposal capacity. To alleviate concerns over aesthetics associated with raising the dikes, development of a park or wildlife habitat on the southernmost portion of cell 1 is being considered

b. Adding dredged Material to Sandy Agricultural Soil. This study would investigate the feasibility and benefits of adding dewatered dredged material to sandy agricultural soil.

c. Holding Pond.-- Surface runoff retention reservoir or holding pond is also being considered on a pilot study basis. Holding ponds would be constructed on agricultural land in the Maumee River basin. These ponds would help reduce sediment loading to the Maumee River, and provide an on-farm water source for irrigation.

d. Shoreline Protection/Restoration.- Shoreline protection/restoration studies are also being considered to identify and formulate potential projects that could protect lakeshores within the study area against erosion using beneficially material dredged from Toledo Harbor.

F. MONITORING: During the early stage of the implementation of the intermediate plan, there would **be** several monitoring studies that would take place to measure the performance and effectiveness of the intermediate **plan**, and to make adjustments as necessary. The results of these monitoring and other technical studies of potential options listed as part of the **Action Plan** would contribute to the development and implementation of the long-term **plan**.