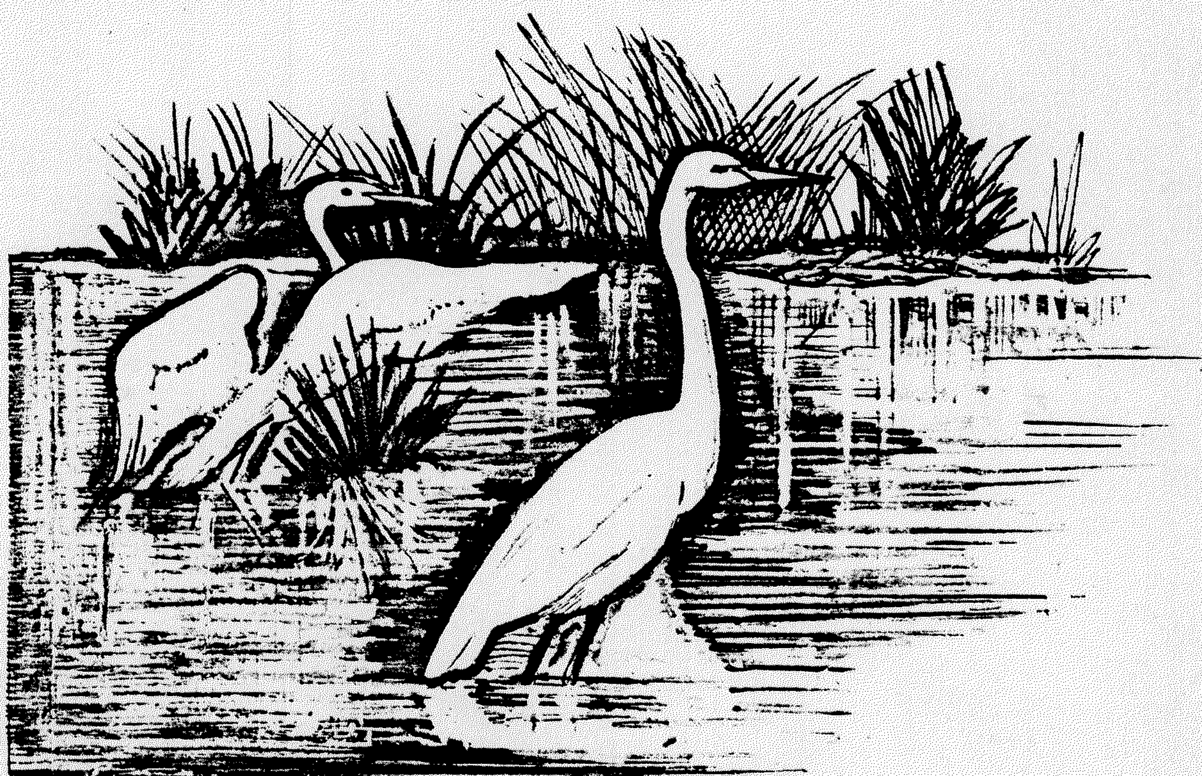
US Army Corps
of Engineers
Buffalo District

Toledo Harbor, Ohio
Confined Disposal Facility

Final Environmental Impact Statement



June 1990

CONFINED DISPOSAL FACILITY
TOLEDO HARBOR
LUCAS COUNTY, OHIO

FINAL ENVIRONMENTAL IMPACT STATEMENT

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207-3199

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CONFINED DISPOSAL FACILITY

TOLEDO HARBOR
LUCAS COUNTY, OHIO

The responsible lead agency is the U.S. Army Corps of Engineers, Buffalo District.

The local sponsor is the Toledo-Lucas County Port Authority.

Abstract: Toledo Harbor, Ohio is located on the northwest shore of Lake Erie about 100 miles west of Cleveland, Ohio and 60 miles south of Detroit, Michigan. The Buffalo District has investigated public concerns related to the annual disposal of from 400,000 to 700,000 cubic yards of "heavily polluted" materials dredged from the Federal navigation channels at Toledo Harbor. Various confined disposal measures and plans were analyzed by the Buffalo District during this study. The No Action Alternative was also considered throughout the study. The preferred action involves construction of a new lakeshore Confined Disposal Facility (CDF), Alternative 1C, which would be connected to the existing Federal CDF at Toledo Harbor. The new CDF would enclose an area of about 155 acres and have a capacity for 7,470,000 million cubic yards of consolidated dredged material giving it a maximum effective life of 21 years.

Send your comments to the District Commander by: AUG 2 0 1990

If you would like further information on this statement, please contact:

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SUMMARY

Major Conclusions and Findings

The proposed project involves the construction of a Confined Disposal Facility (CDF) for the containment of "heavily polluted" sediments dredged from the Maumee River Federal navigation channel at Toledo, Ohio. The existing 242-acre CDF was constructed under the authority of Section 123 of the 1970 Rivers and Harbor and Flood Control Act (Public Law 91-611). Toledo Harbor is dredged on an annual basis using normal operations and maintenance authorities of the Corps of Engineers. Plans developed have been carefully evaluated to select those which best meet the planning objectives of the study. A national planning objective for all Corps planning studies is to enhance National Economic Development (NED) by increasing the value of the nation's output of goods and services and improving national economic efficiency. The primary goal of planning for this project is to evaluate alternative confined disposal facilities for "heavily polluted" dredged material from Toledo Harbor and to develop a plan that is engineeringly feasible, economically efficient, and consistent with protecting the nation's environment pursuant to Federal statutes, applicable executive orders and other Federal planning requirements. Objectives associated with this primary goal include: maintenance of adequate depths for commercial and recreational navigation; providing safe handling and transport of "heavily polluted" sediments to a permanent, confined disposal site (or sites); minimizing adverse impacts to aesthetics, and fish and wildlife values; protection of water quality; and preservation of significant cultural resources.

Alternatives involving the reuse of the dredged material did not prove to be economically, environmentally, or technically feasible. The Selected Plan utilizes an acceptable site adjacent to existing CDFs and walls of the existing facilities to enclose over half of its perimeter making it highly cost-efficient when compared to other facilities of equal or less life expectancy.

The Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" require that feasible alternatives be evaluated to determine their efficiency in meeting the objectives of the plan formulation process. Further, the "Principles and Guidelines" require the identification of an NED Plan in the evaluation process. The NED Plan represents the best return on the investment of economic resources needed for construction.

Benefit-cost (B/C) ratios for project implementation utilizing single-site Alternatives 1A, 1B, 1C, 5A, and 5B are 2.28, 2.22, 2.05, 2.36, and 2.26, respectively (A, B, and C indicate various dike heights). For alternatives which combine the two sites 5A/1A, 5A/1B, 5A/1C, 5B/1A, 5B/1B, and 5B/1C, B/C ratios are 2.18, 2.13, 1.97, 2.09, 2.03, and 1.88, respectively.

In calculating the B/C ratios, the Buffalo District used costs for construction, amortization, and dredging of the bay and river channels. Benefits were calculated as the difference in shipping costs that occur when the bay and river channels are not maintained.

Unresolved Issues

The U.S. Fish and Wildlife Service (USFWS) has noted that wetlands, sago pondweed beds, and shoals are relatively scarce in Maumee Bay and have high habitat value for certain species of fish and wildlife in the project area. In their comments on the Draft Environmental Impact Statement, the U.S. Department of the Interior, U.S. Environmental Protection Agency, Ohio Environmental Protection Agency, and Ohio Department of Natural Resources all expressed objections to the proposed project based on its adverse environmental impacts and lack of appropriate mitigation measures. The U.S. Army Corps of Engineers, Buffalo District has concluded that the affected resources at the CDF do not meet Corps of Engineers criteria for significance, i.e., they are neither scarce nor unique. As a result, separable mitigation features are not justified.

In 1986, the Corps of Engineers, Ohio Environmental Protection Agency, Toledo Metropolitan Area Council of Governments (TMACOG) Toledo/Lucas County port Authority, and City of Toledo signed a Memorandum of Agreement to actively pursue beneficial reuses of sediments dredged from Toledo Harbor and ship channels. Under a plan proposed by TMACOG, "heavily polluted" dredged material would be pumped via a pipeline to an upland site in Erie Township, Monroe County, Michigan. This material would be used to construct a recreational hill at the site. The 300-acre± site has a 26-million cubic yard capacity. Although t has been agreed that the Corps of Engineers continue the planning and construction of a new confined disposal facility, non-Federal agencies are studying the feasibility of alternative plans.

Relationship to Environmental Requirements

The detailed project plans have been considered in relationship to a number of Federal, State, and local laws and policies. Table EIS-1 lists these laws and policies and their compliance with these statutes as applicable for the present stage of project planning.

Areas of Controversy

The selection of a dredged material management strategy, to include the use of open-lake disposal, diked confinement and siting, and possible reuse alternatives is an area of controversy. To a large extent these issues remain controversial due to the fact that open-lake disposal remains an unresolved issue. An average of about 1,000,000 cubic yards of material are annually dredged from the Toledo Federal project. From 1976 through 1984, all material dredged from Toledo Harbor was placed in the existing CDF. Testing of the dredged material in 1983 has indicated that a higher percentage of the material is classified as "unpolluted/moderately polluted" and is suitable for open-lake disposal. As a result, about 60 percent of the material dredged from Toledo

Harbor in 1985 and 1986 was placed in the open-lake sites and about 40 percent was placed in the Toledo CDF. Recently (Fall 1986), however, the Ohio Environmental Protection Agency denied water quality certification for the disposal of the "moderately polluted" material from the outer channel at the open-lake sites. Basically, local governments and organizations are opposed to open-lake disposal of any dredged material from the Federal channel and are in favor of the reuse of such materials.

A considerable number of alternatives to include reuse alternatives were identified by the Buffalo District in the Toledo Confined Disposal Project, Toledo, Ohio, Letter Report, dated September 1985. Those alternatives which were determined to be economically, environmentally and technically feasible were reviewed.

A number of dredged material confinement alternatives, including reuse, were evaluated by the Buffalo District. The "No Action" Alternative was also considered throughout the planning process. The choice of a confinement plan was highly dependent upon cost. Three confinement alternatives were evaluated in detail by the Buffalo District. They included: Alternative I - construction of a new 155-acre CDF adjacent to the existing Federal CDF located east of the channel at the mouth of the Maumee River; Alternative 5B - raising the dike walls 10 feet on the existing CDF; and the No Action Alternative.

Concern has been expressed regarding the seepage of solids through the CDF walls. Like the existing Toledo CDF, the proposed CDF design permits the flow of water through the dike during the first one-third of the CDF life. During this time, the long detention times in the CDF and the filtering properties of the prepared limestone (center core) is adequate and acceptable to settle and retain the polluted solids. Testing and monitoring at other Buffalo District's permeable dike CDF's (i.e., Buffalo, Huron, and Cleveland) indicate that no pollutants were detected leaking from the site. The Buffalo District contends that the existing dike design in Toledo is sufficient, and any additional cost to construct an impermeable dike is not justified.

Table EIS-1 - Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements

	No Action	Alternative 5B (Elevate Existing CDF Walls)	Alternative 1C (Construction of a New CDF)
Federal Statutes			
Historical and Archeological Data Preservation Act, as amended, 16 USC 469, et seq.	N/A	Full	Full
National Historic Preservation Act, as amended, 16 USC 470, et seq.	N/A	Full	Full
Fish and Wildlife Coordination Act, as amended, 16 USC 661, et seq.	N/A	Full	Full
Endangered Species Act, as amended, 16 USC 1531, et seq.	N/A	Full	Full
Clean Air Act, as amended, 42 USC 7401, et seq.	N/A	Full	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et seq.	N/A	Full	Full
Federal Water Project Recreation Act, as amended, 16 USC 460-l(12), et seq.	N/A	Full	Full
Land and Water Conservation Fund Act, as Amended, 16 USC 4601-4601-11, et seq.	N/A	Full	Full
National Environmental Policy Act, as amended, 42 USC 4321, et seq.	N/A	Full	Full
Rivers and Harbors Act, 33 USC 401, et seq.	N/A	Full	Full
Wild and Scenic Rivers Act, as amended, 16 USC 1271, et seq.	N/A	N/A	N/A
Coastal Zone Management Act, as amended, 16 USC 1451, et seq.	N/A	N/A	N/A
Estuary Protection Act, 16 USC 1221, et seq.	N/A	N/A	N/A
Marine Protection, Research and Sanctuaries Act, 22 USC 1401, et seq.	N/A	N/A	N/A
Watershed Protection and Flood Prevention Act, 16 USC 1001, et seq.	N/A	N/A	N/A
Executive Orders, Memoranda, etc.			
Flood Plain Management (EO 11988)	N/A	Full	Full
Protection of Wetlands (EO 11990)	N/A	Full	Full
Environmental Effects Abroad of Major Federal Actions (EO 12114)	N/A	N/A	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	N/A	Full	Full
Protection and Enhancement of the Cultural Environmental (EO 11593)	N/A	Full	Full
Local Land Use Plans	N/A	Full	Full

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

a. Full Compliance - All requirements of the statute, Executive Order (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.

d. N/A - The statute, EO, or other policy and related regulations are not applicable for this study.

FINAL ENVIRONMENTAL IMPACT STATEMENT

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1. NEED FOR AND OBJECTIVES OF THE ACTION

1.1 Authority

1.1.1 This study of alternative disposal practices for polluted dredged materials and the proposed construction of a new Confined Disposal Facility (CDF) at Toledo Harbor, Ohio was undertaken because the existing 242-acre site is within 3 to 6 years of being filled to capacity. At the present time, sediments dredged from Station L-2-M (roughly midway and adjacent to the existing CDF) upstream in the Maumee River to R-5-M (shaded area on Plate EIS-1) are classified as "heavily polluted" and unsuitable for open-lake disposal. Sediments from R-5-M to R-7-M are confined due to PAH (polynuclear aromatic hydrocarbons) contamination. Sediments from Station L-2-M lakeward (unshaded area on Plate EIS-2) were, in 1985 and 1986, classified as "moderately polluted," and dredged material from these areas was disposed of at the open-lake sites illustrated on Plate 2.2. Of the sediments dredged from Toledo in 1987 and 1988, approximately 36 percent were classified as "heavily polluted" and placed in the CDF.

1.1.2 Toledo Harbor was constructed in stages under the authority of a number of River and Harbor Acts since the first appropriation on 23 June 1866, which was used to deepen and widen the 7-1/2-mile long natural channel through Maumee Bay. The existing 242-acre CDF was constructed under the authority of Section 123 of the 1970 Rivers and Harbors and Flood Control Act (Public Law 91-611). Toledo Harbor is dredged on an annual basis using normal operations and maintenance authorities of the Corps of Engineers.

1.2 Public Concerns

1.2.1 Throughout the course of project planning, numerous concerns, problems, and needs were expressed by individuals, government agencies, and other interested parties. These concerns were identified primarily through agency meetings and public coordination. A primary concern expressed by commercial shipping interests was the maintenance of channel depths for safe navigation on the Toledo Harbor Channels. Since some of the bottom sediments from the Toledo Harbor channels are classified as "heavily polluted," the safe removal and confinement of these sediments was also a major concern. A major recent concern is the "unconfined" open-lake disposal of less polluted sediments from the Toledo Harbor Channels. Many people believe that all dredged material from Toledo Harbor should be subject to confined disposal. For additional information regarding public views, the reader is referred to Section 6 of this Environmental Impact Statement.

1.2.2 In their comments on the Draft Environmental Impact Statement, the U.S. Department of the Interior, U.S. Environmental Protection Agency, Ohio Environmental Protection Agency, and Ohio Department of Natural Resources all expressed objections to the proposed project due to its impacts on significant shallow water habitat. As a result, the Buffalo District transferred funds to the U.S. Fish and Wildlife Service - Reynoldsburg Field Office to provide additional information on the habitat values of the proposed CDF site and possible mitigation alternatives. After review of this additional information, the Buffalo District has concluded that the affected resources at the proposed CDF site do not meet Corps of Engineers criteria for significance (i.e., scarcity and uniqueness) and therefore separable mitigation features are not justified.

1.3 Planning Objectives

1.3.1 The national planning objective for all Corps of Engineers planning studies is to enhance National Economic Development (NED) by increasing the value of the nation's output of goods and services and improving national economic efficiency in a manner which is consistent with protecting the nations's environment pursuant to Federal statutes, applicable executive orders and other Federal planning requirements. The annual costs of the various plans considered are compared with the annual benefits in order to evaluate plans on the basis of economic efficiency.

1.3.2 The primary goal of planning for this project is to evaluate alternative confined disposal facilities for "heavily polluted" dredged material from Toledo Harbor and to develop a plan that is engineeringly feasible, economically efficient and environmentally acceptable with sufficient capacity and life expectancy for expected quantities of "heavily polluted" dredged materials. Objectives associated with this primary goal are as follows:

a. Maintain adequate depths for commercial and recreational navigation in the Toledo Harbor Federal Channels.

b. Provide safe handling and transport of heavily polluted sediments from Toledo Harbor to a permanent, confined disposal site (or sites).

c. Minimize adverse impacts to aesthetics, and fish and wildlife values.

d. Protect water quality.

e. Preserve significant cultural resources.

1.4 Planning Constraints

1.4.1 Costs/Benefits. One of the primary considerations when developing alternative dredged material disposal plans is the consideration of costs of confined disposal and alternative methods of dredged material disposal. Many productive uses of dredged material, such as transport off-site and use for landfill, construction of wetlands, etc., can be developed; however, they are usually very costly alternatives and quite often have benefit to cost (B/C) ratios of less than 1.0. Therefore, for an alternative "heavily polluted" dredged material disposal scheme to be deemed feasible in this study, its benefits must outweigh its costs (i.e., it must have a B/C ratio greater than 1.0).

1.4.2 Dredged Material Quality. The determination of the quality of the dredged material, what fraction is classified as "heavily polluted" and subject to confined disposal, and what is classified as "nonpolluted" or "moderately polluted" and suitable for open-lake disposal, plays a major role in determining the type and capacity of the CDF. At Toledo Harbor, based upon 1988 testing, it has been determined that only sediments dredged from the upstream limits of the project to the existing CDF (see Plates EIS-1 and EIS-2) are "heavily polluted" or contaminated with PAH's and subject to confined disposal. PAH's are a class of chemical ring compounds known as polynuclear aromatic hydrocarbons. They are generally formed from low temperature combusion of coal (coke) and other fuels. Some materials in this class of compounds, notably benzo a pyrene, have been implicated as carcinogens or chemical precursors of carcinogens in fish and man. It has been assumed, as part of this study, that this classification will remain the same in the future, and therefore any alternative confined disposal plans for Toledo Harbor must have capacity for at least 400,000 cubic yards of dredged material annually for the effective lifetime of the facility.

2. ALTERNATIVES

2.1 Dredging of Toledo Harbor and Channels

2.1.1 Introduction. Annual maintenance dredging is performed to remove sediments deposited by the Maumee River in the Toledo Federal Navigation Channel. From 1976 to 1988, about 9.2 million cubic yards of sediments dredged from the Federal project were placed in the existing Toledo CDF, which has a design capacity of 11.1 million cubic yards. Under the current dredging and disposal plans, life expectancy of the existing CDF is until about 1993.

2.1.2 Various open-lake disposal sites and the existing CDF are used to accommodate sediments dredged from the Toledo Harbor Federal project. The site used in 1988 is a two-square mile area located 3-1/2 miles from the Toledo Harbor Light at an azimuth of 33 degrees. The Toledo Harbor Federal CDF is located 355 feet southeast of the Toledo Harbor Navigation Channel and is adjacent to the Toledo Edison Company's Bay Shore Station. The Federal facility is boot-shaped and covers an area of about 242 acres. The existing Federal CDF at Toledo Harbor is illustrated on Plate EIS-3 and the open-lake site is illustrated on Plate EIS-4. Private disposal facilities for the Toledo-Lucas County Port Authority and Toledo Edison border the CDF.

2.1.3 Recent sediment testing (T. P. Associates International, Inc., 1988) indicated that sediments dredged lakeward of Station L-2-M are suitable for open-lake disposal. Sediments dredged inland from Station L-2-M inland (see Plates EIS-1 and EIS-2) are classified as "heavily polluted" and disposed of in the existing Toledo Harbor CDF. Paragraphs 3.2.9 to 3.2.16 of this EIS describe the sediment test results in more detail. Appendix EIS-D contains the actual data and U.S. Environmental Protection Agency (USEPA) pollutional classification criteria.

2.1.4 An average of about 1,000,000 cubic yards of material are annually dredged from the Toledo Harbor Federal project. From 1976 through 1984, all material dredged from Toledo Harbor was placed in the existing CDF. Testing of the dredged material in 1983 indicated that a higher percentage of the material is classified as "unpolluted/moderately polluted" and is suitable for open-lake disposal. As a result, about 64 percent of the material dredged from Toledo Harbor in 1987 and 1988 was placed in the open-lake disposal sites and about 36 percent was placed in the Toledo CDF.

2.1.5 During the planning of new confined disposal facilities for Toledo Harbor, it has been assumed that the same percentage of "heavily polluted" dredged material (30-40 percent or about 400,000 cubic yards annually) would have to be confined in the future. If pollutional classifications of the dredged materials from Toledo Harbor change, the conclusions of this study would still be valid, the only difference is that any new CDF would have a shorter effective lifetime if the amount of dredged material requiring confinement increases or a longer effective lifetime if the amount of dredged material requiring confinement decreases.

2.1.6 The mouth of the Maumee River, 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 have been designated by the Great Lakes Water

Quality Board of the International Joint Commission as one of 42 Areas of Concern (AOC) in the Great Lakes Basin. The Toledo Metropolitan Area Council of Governments (TMACOG) has been contracted by the Ohio Environmental Protection Agency to prepare an Investigation Report to document pollution problems and sources (October 1988), and Water Quality Problem Matrix which assesses the impact of each of the problems identified in the Investigation Report on each stream in the AOC (July 1989). The Water Quality Problem Matrix identifies contaminated sediments and open-water disposal of dredged material by the Corps of Engineers as two of the twelve water quality problem areas that affect the streams of the Lower Maumee Basin (TMACOG, 1988). The Investigation Report discusses maintenance dredging operations at Toledo Harbor and notes that the water quality impacts of construction of a CDF at Site No. 1 should be relatively minor and "the fish and wildlife resources of the site are significant but not unique" (TMACOG, 1988). The Recommendations Report, scheduled for completion by July 1990, will present recommendations on solutions to the identified water quality problems and will likely recommend further investigation of potential beneficial uses of dredged material. Dependent upon the effectiveness of the RAP and continued pollution-reducing measures (e.g.; phosphate detergent ban, conservation tillage), water and sediment quality would gradually improve in the Toledo Harbor area to some degree. An indication of recent improvement in sediment quality is the fact that dredged material lakeward of Station L-2-M has been found to be suitable for open-lake disposal in recent years. If conditions change and a greater percentage of the dredged material from the existing polluted area becomes environmentally acceptable for open-lake disposal, the material would most likely be discharged in the open lake, provided the volume saved in the CDF would be required for future polluted dredgings. It is economically more advantageous to contain the material from the existing polluted area than to open-lake dispose, provided the sunk cost of the CDF is not included. At the other end of the spectrum, the CDF has sufficient capacity to accommodate all the material from the Toledo Harbor Federal project, if necessary. As a result, by adding essentially one wall to an existing, semi-enclosed area, the recommended plan provides sufficient flexibility to accommodate changes in the pollutional classification of the Toledo Harbor Federal Channel dredged material.

2.2 Plans Eliminated from Further Study

2.2.1 Introduction. A large number of alternative plans and measures for disposal of "heavily polluted" dredged material were considered during the Toledo Harbor Study but eliminated from detailed study due to insufficient economic justification, impracticality of implementation, adverse environmental effect, and/or other reasons. These plans and measures are briefly described in the following paragraphs and their reasons for elimination from detailed study are given. More detailed discussion of these plans and measures can be found in the Toledo Harbor CDF Letter Report.

2.2.2 Previous Plans Considered in the 1974 CDF Study. Prior to construction of the existing CDF at Toledo Harbor, a number of plans were considered as alternatives to construction of the existing CDF. These alternatives are discussed in considerable detail in the Final EIS (USAED, Detroit, 1974) for construction of the existing CDF and are updated in the Letter Report. The 1974 alternative plans included:

- Discontinue Maintenance Dredging.

- Open-Water Disposal of Dredged Material.

- Onshore Disposal.

- Monroe, Michigan Site.

- Original Port Authority Proposal As Described In The Draft EIS

- Modified Port Authority Site (Short Length).

- Modified Port Authority Site (Broad Width).

- Modified Port Authority Site (Island).

- Peninsula Site, West of Channel.

- Wolf Creek Sportsmen Club Proposed Site.

- Lake Erie Waterfowlers, Wildlife and Recreation Area Concept.

2.2.3 Of the alternatives considered in 1974, only three were reevaluated in detail in this study. Plans involving Monroe, Michigan; Peninsula Site, West of Channel; Wolf Creek Sportsmen Club; and Lake Erie Waterfowlers, Wildlife and Recreation Area were not considered in detail in this study due to various combinations of excess cost, remoteness from the dredging site and adverse environmental effects on water circulation and biological resources of Maumee Bay. The Original Port Authority Site, Modified Port Authority Site (Short Length), and Modified Port Authority Site (Broad Width) all involve construction of a CDF, at least partially, in the area occupied by the existing Toledo Harbor CDF and are therefore not feasible.

2.2.4 Of the remaining three, only Discontinue Maintenance Dredging has been designated a detailed plan in this study. It is discussed later in this Section as the "No Action" Alternative.

2.2.5 Open-Water Disposal (M2). Open-water disposal of dredged materials (either in Maumee Bay or Lake Erie) is the least costly alternative for dredged material disposal at Toledo Harbor; however, as discussed previously a large amount of the dredged material (400,000 cubic yards annually) is classified as "heavily polluted" and not suitable for open-water disposal by USEPA and others. Therefore, this alternative is considered environmentally unacceptable and was not carried forth into detailed study.

2.2.6 Onshore Disposal (M3). Onshore or upland disposal was considered during the 1974 study and has been reconsidered during this study. The primary problems with upland disposal are the lack of available disposal sites, high costs associated with development of upland disposal sites, and the high costs associated with transport of dredged materials to an upland disposal site. During this study, no feasible upland disposal sites were identified, therefore, this alternative measure was eliminated from detailed study.

2.2.7 Shore Restoration at Woodtick Peninsula. A plan was considered for using dredged material from Toledo Harbor for possible shore restoration at Woodtick Peninsula in Michigan. As illustrated on Plate EIS-5, Woodtick Peninsula is located about 6 miles to the northwest of the Toledo Harbor CDF. Dredged materials would be placed on areas that existed as an island or peninsula before high lake levels and erosion reduced their area. The reconstructed peninsula would be about 1,000 feet wide and 16,500 feet long. It would provide capacity for about 6 million cubic yards of dredged material at a cost of about $45.3 million. The Woodtick Peninsula Shoreline Restoration plan was eliminated primarily due to its extremely high costs. Nevertheless, the feasibility of this plan is currently being investigated by the Toledo Metropolitan Area Council of Governments as an alternative dredged material disposal method.

2.2.8 Reuse of Existing Confined Disposal Facilities. The possible reuse of dredged materials from existing CDF's at Toledo Harbor would allow the continual future use of the facilities for "heavily polluted" dredged material disposal. A number of upland uses for dredged material have been evaluated and others continue to be reviewed. These include use as topsoil on golf courses and parklands, and cover for landfills. The bulk chemical testing and water column leachate tests discussed in the previous section clearly show that there would be no problems with land or water (surface and groundwater) contamination associated with upland uses of dredged material from Toledo Harbor CDF's. The major problems associated with upland use are drying of saturated dredged material from the existing CDF, logistics of handling and transport to potential users, and the costs associated with alternative uses.

2.2.9 Limited study has been conducted on drying of the wet dredged material in windrows. It has been observed that the wet material dries into a very hard mass which would be undesirable for topsoil without breaking up this mass into a more suitably structured material. On the other hand, material which has been in place at CDF's for many years (7-10 years) such as at Island 18 and Penn 7 had dried to a depth of about 5 feet and had a favorable structure for topsoil. It appears that this material could be excavated and directly shipped as topsoil.

2.2.10 Use as Topsoil on Maumee Bay State Park and Golf Course. The State of Ohio plans to construct an 18-hole golf course at the Maumee Bay State Park located approximately 5 miles from the Toledo CDF's. The possible use of dredged material for landscaping and as topsoil for this facility is being investigated. Discussions with the Ohio Department of Natural Resources indicate that the potential use for 300,000 yards of dredged material exists. Dr. Carl Daneburger, a turf specialist at the Ohio State University, conducted tests to ascertain the suitability of recent dredged material and older material (Penn 7) for turf growth. His tests included germination of turf grass species, compatibility, water infiltration, and other factors important for turf growth.

2.2.11 Upon completion of the tests, Dr. Daneburger concluded that sandy material from the existing CDF (10 percent of site volume) was well-suited for turf establishment. The fine-grained silt and clay sediment of the site was not suitable because it becomes very hard and unworkable upon removing and drying. The fine sediments of the older CDF's including Island 18 and Penn 7 have dried to a considerable depth (4-5 feet) and regained physical structure favorable for turf growth. A sample of this material from Penn 7 exhibited favorable turf establishment in testing by Dr. Daneburger.

2.2.12 Preliminary cost estimates have been prepared for the cost of obtaining 300,000 cubic yards of CDF sediments, transporting to the golf course site, and spreading on the site as topsoil, or to build mounds or other landscape features on the golf course. Separate costs were estimated for obtaining sediments from the existing CDF, including drying, or from the Island 18 site. The estimated cost of material from the existing site is \$8.00/cubic yard; the estimated cost from Island 18 is \$9.65/cubic yard. The additional cost for Island 18 results from the use of a scow from the island to land before loading into trucks for transport. The extension of an existing causeway to Island 18 at an estimated cost of \$238,000 for 300,000 cubic yards or more of material removed would result in costs of about \$8.00/cubic yard from either site.

2.2.13 Present plans at the golf course site call for stripping and storage of topsoil at the site and the use of pond-excavated material to attain design grades for fairways, mounds, and other features. The stripped top soil would then be replaced. The cost of excavation is estimated at \$2/cubic yard.

2.2.14 Stripping, storage, and replacement of stripped soil is estimated at \$4 to \$5 per yard. If dredged material is found to be satisfactory or better than the somewhat clayey topsoil currently at the site, the net cost of obtaining and transporting the dredged material would be about \$2 per cubic yard.

2.2.15 Considerable effort has been made to identify and develop other specific uses and users for Toledo Harbor dredged material. To this end, the Buffalo District contracted with the Toledo Metropolitan Area Council of Governments (TMACOG) for development of local initiatives. TMACOG identified the following of potential uses/users for dredged material:

Dura Landfill (city of Toledo)	210,000 yd^3
Stickney Landfill (city of Toledo)	110,000 yd^3
King Road Landfill (Lucas County)	230,000 yd^3
Browning Ferris Landfill	200,000 yd^3
Buckeye Basin Project	1,000,000 yd^3

2.2.16 The above sites, except for the King Road Landfill, are within 10 miles of the Toledo Harbor CDF's. The King Road Landfill is 20 miles from the CDF's. The Buckeye Basin project actually consists of many privately owned parcels in low topographic areas between I-280 and Summit Street which would need filling before construction. The Corps of Engineers suggested that some local entity could act as a coordinating agency among the property owners for filling the Buckeye Basin and also providing soil for landfill covers and other uses which may be identified at later dates. TMACOG is the local coordinating agency.

2.2.17 The city of Toledo has expressed a need for final cover material to establish vegetation on filled landfills (Dura, Stickney), but may not wish to pay for transportation of dredged material. The King Road Landfill need is primarily for heavy clay with a smaller demand for use as topsoil. An immeiiate need for about 100,000 cubic yards of fill material for a housing development along the Ottawa River was also identified.

2.2.18 As explained earlier, the estimated cost of excavating and shipping dredged material distances of 10 miles or less is about \$8 per cubic yard. Thus, a potential user must be willing to pay about \$8 per yard for the dredged material. This compares to a cost of \$10 - 11 per yard for commercial topsoil. In addition to the problems of finding users willing to pay for transportation costs is the problem of moving 400,000 cubic yards of material per year. This equates to 33,333 12-cubic yard truck loads, 167 trucks per day for a 200-day working season or 21 trucks per hour or for an 8-hour working day.

2.2.19 The Buffalo District will continue to cooperate with TMACOG, and local and State agencies in identifying users for dredged material. Special attention will be given to identifying and implementing a local entity for the distribution of dredged material if sufficient users are identified. It should be noted that no viable use of the dredged material has been found to date.

2.3 Plans Considered in Detail

2.3.1 No Action. During the course of any water resources study, a No Action Alternative is always considered. If the No Action Plan were selected, the Corps of Engineers would not construct a new confined disposal facility (CDF) to contain polluted sediments from Toledo Harbor. Within 3 to 6 years the existing CDF at Toledo would be filled to capacity and dredging of the polluted channels would cease. It is also likely that dredging of the lake channels, which contains dredged materials that are open-water dumped, would also cease as these channels only provide access to the river channel in Toledo Harbor proper.

2.3.2 Without the proposed Federal project, the polluted sediment would remain in the Toledo River and continue to adversely impact the environment and the commercial and recreational navigation in the area. Although private and local government interests recognize the need and importance of removing the polluted sediment, they lack the funds necessary to proceed by themselves with the required dredging and confined disposal of the "heavily polluted" sediment. Without a confined disposal facility, the Buffalo District cannot maintain the areas containing "heavily polluted" sediments. The resulting accumulation of sediments would decrease the available navigation depths and decrease both recreational and commercial activity in Toledo Harbor. Upon recommendation by the District Commander through the Division Commander and the Chief of Engineers, the Secretary of the Army may authorize emergency maintenance dredging of a Congressionally authorized navigation channel if such maintenance dredging and disposal is in the national interest, after contacting appropriate Federal and State agencies. At this time, the only feasible alternative for disposal during emergency dredging in the absence of a CDF appears to be open-lake disposal. The U.S. Environmental Protection Agency has made a determination that the dredged material within the river section of the project is unacceptable for open-lake disposal. Therefore, emergency dredging and open-lake disposal would result in undesirable aquatic impacts.

2.3.3 Toledo Harbor is a major port on the Great Lakes, handling on the average about 20,000,000 tons of iron ore, coal, grain, sand, gravel, and other bulk items annually. The elimination of maintenance dredging of the harbor would have major, far-reaching economic impacts. Ships using the harbor would have to carry lighter loads as the channels fill in eventually to the point where it would not be profitable to use the harbor. Total tonnage would undoubtedly decrease and many jobs related to shipping and bulk commodity transshipment would be lost from the Toledo area.

2.3.4 No action is not the selected plan as there are feasible alternatives to deal with "heavily polluted" dredged materials from the Toledo Harbor Federal Navigation Channels.

2.3.5 Elevate Existing CDF Walls. The capacity of a number of the existing CDF's at Toledo Harbor could be increased by elevating their walls. Of all the CDF's, it appears that the most practical and cost-effective to elevate would be the existing Federal CDF. Two alternative plans with different dike heights were developed and evaluated for this alternative. Cross sections at the elevated dike walls for both plans are illustrated on Plate EIS-6. Alternative 5A would raise the existing dikes 5 feet around the entire 242-acre area. This would increase the effective capacity of the existing CDF by 1,952,000 cubic yards and extend its life for about 5.8 years. The first cost of this plan would be $2,061,000 and it would have net benefits of $2,545,900. Alternative 5B would raise the dike walls 10 feet, increasing its capacity by 3,900,000 cubic yards and its life by 11.4 years after consolidation of the dredged material. Alternative 5B would have a first cost of $3,501,000 and net benefits of $3,960,000. Neither plan was recommended because higher dike walls would reduce the long-term potential for port expansion at this site, and cause adverse aesthetic impacts to shoreline property owners. In addition, both plans have short effective lifetimes, limited contained volumes and neither have sufficient net benefits to qualify as the National Economic Development plan.

2.3.6 Construction of a New Confined Disposal Facility. Seven different alternative possibilities were considered for construction of a new lakeshore CDF at Toledo Harbor. These alternatives are illustrated on Plate EIS-7. Alternative 4, construction of a completely unattached, island-like CDF, was eliminated from detailed evaluation due to its extremely high costs (e.g., about 25,000 feet of new dike wall would have to be built) and adverse aquatic effects. Alternative 4 would cover some of the old sidecast gravel bars that provide important spawning and feeding areas to fish species common to Maumee Bay. In addition, construction at Site 4 could have adverse effects on water quality in the bay by interfering with current mixing patterns. For similar reasons, Alternatives 3A and 3B were also eliminated from detailed consideration. Alternative 2 would involve construction of three new dike walls about 15,400 feet in length, adjacent to the lakeward side of the existing Federal CDF. In addition to extremely high costs, this alternative was eliminated from detailed consideration due to its probable adverse effects on gravel bars and water circulation in the bay.

2.3.7 Three different alternatives with varying dike heights were developed for Site 1. This site, as illustrated on Plate EIS-7, encompasses an area bounded by a line from the northwest corner of the existing CDF to the most northerly reach of the Toledo Edison water intake channel. Construction of a new CDF at Site 1 has several advantages over the other alternative CDF's considered. First, only one new dike wall would have to be built as the new dike would incorporate existing walls of other dikes. This would considerably reduce the first cost of dike construction. Construction of a new dike in this area would not have significant adverse effects on water quality in the bay, at least when compared with other alternative CDF's. Three alternatives with different dike heights, and therefore different capacities and effective lifetimes were evaluated as described below.

2.3.8 Alternative 1A. This plan would involve construction of a new dike wall about 4,265 feet in length with dike walls 16 feet in height. It would have an effective capacity of 5 million cubic yards of consolidated dredged material and a life of about 12.5 years. The first cost of this plan would be $5,785,000 and it would have net benefits of $4,182,600. A cross section of the dike for Alternative 1A is illustrated on Plate EIS-8.

2.3.9 Alternative 1B. This plan would involve construction of a new dike wall about 4,265 feet in length with dike walls 21 feet in height. It would have an effective capacity of 6,570,000 cubic yards of consolidated dredged material and a life of about 16.4 years. The first cost of this plan would be $7,819,200 and it would have net benefits of $4,678,400. A cross section of the dike for Alternative 1B is illustrated on Plate EIS-8.

2.4 Selected Plan

2.4.1 Alternative 1C. This plan has been designated the Selected Plan for a number of reasons, chiefly due to the fact that it would have the greatest net annual benefits ($4,838,600) of all the single site plans. Alternative 1C (Plate EIS-9) would involve construction of a new dike wall, about 4,260 feet in length and 29.5 feet in height, to enclose a 155-acre shallow water area adjacent to the Federal Channel and the existing Federal CDF. In addition, the dikes of the existing Federal CDF and Toledo-Lucas County Port Authority Disposal Area would be reconstructed and elevated to a height of 29.5 feet along a distance of 3,412 feet to complete the proposed CDF. Alternative 1C is illustrated on Plate EIS-9 and cross sections of the new dike and elevated dike walls are shown on Plate EIS-10.

2.4.2 The work to be performed would include the following features:

a. New Dike. Placement of prepared limestone base, clay dike, and limestone slope protection in the water adjacent to the existing Corps of Engineers CDF to form a 4,260-foot long dike enclosing approximately 155 acres. A set of three water quality monitoring wells would be installed in the proposed dike. Clay embankment material would be obtained from within the proposed CDF and/or Toledo-Edison CDF, or from other adjacent or off-site areas.

b. Existing Dike Modification. Placement of clay and protective limestone on the existing Toledo-Lucas County Port Authority dikes thereby modifying them to match the height and width of the new dike.

c. Overflow Weirs. Construction of four 8-foot by 10-foot rectangular overflow weirs of fabricated steel panels with adjustable wood stop logs, outfall pipes and access walkways. The overflow structure would be located at the approximate midpoint of the proposed CDF's northwest dike. A new discharge pipeline would extend from the existing pumpout No. 1 platform, then along the existing Corps of Engineers CDF, to four separate discharge points spaced along these walls.

d. Existing Pumpout Facility Modification. Extend existing pumpout platform, replace damaged round timber piles with steel H-piles, add additional 24-foot diameter steel pipeline for discharges to the proposed CDF.

e. Access-Haul Road (Optional). Regrading 450 feet of haul road to provide an access ramp at the southwest terminus of the proposed CDF. The work would involve regrading the slope and surface to the section required to provide a 16-foot wide gravel roadway and ramp, in stages, as dike construction proceeds to its final grade at elevation +23.5 feet LWD. The roadway would be maintained and retained in place upon completion of the CDF. Both sides of the roadway would be provided with a protective turf.

f. Topsoil Fertilizing, Seeding, and Mulching. All exposed clay surfaces of the dike slope and all other disturbed turf areas would be covered with four inches of topsoil, fertilized, seeded, and mulched. The dike slopes would be seeded with crown vetch (Coronilla varia) and tall fescue (Festuca arundinacea); other disturbed areas would be seeded with creeping red fescue (Festuca rubra), perennial ryegrass (Lolium perenne), and Kentucky bluegrass (Poa pratensis). Dredged material from the adjacent CDF could be used for topsoil on the interior dike slope. The most likely vegetation succession during the life of the CDF would be submerged aquatic vegetation--emergent vegetation (e.g., willow, dogwood)--forested wetland/upland (e.g., mature willow, cottonwood). The climax vegetation of the site would be ultimately impacted by the to-be-determined final use of the CDF.

2.4.3 The CDF would be constructed by water and land-based equipment. It is anticipated that the Contractor would use both a barge-mounted crane and a land-based truck-operated crane to construct the facility. Stone of increasing size would be placed to form the dike. The heavier armor stone would be placed last on the bay slope of the western enclosing wall.

2.4.4 Alternative 1C would have sufficient capacity (8,764,000 cubic yards) for 21.9 years of consolidated dredged material from Toledo Harbor. The first cost of the plan would be $11,670,000, and it would have net benefits of $4,838,600 and a benefit/cost ratio of 2.05 to 1.

2.4.5 Mitigation Requirements. To mitigate for bird kills associated with potential botulism outbreaks, a botulism control plan has been developed for the proposed CDF. This plan would involve coordination with the U.S. Fish and Wildlife Service and Ohio Department of Natural Resources, monitoring the facility, quick removal of sick and dead birds, increased water levels in CDF when a botulism outbreak is evident, seeding of mudflat areas with certain grass species to discourage bird use, controlled placement and timing of discharges into the facility, and surface trenching to improve drainage. This botulism control plan is more fully outlined in Appendix EIS-E.

2.4.6 As many fish as practical (all species and sizes) would be removed from the completed or nearly completed diked disposal area and released into the surrounding waters. Fish removal would take place either in late September through early November to minimize stress on the fish and avoid interference with fish migrations. Standard commercial fishing nets of the smallest mesh available would be employed to remove the majority of fish from the containment area. The U.S. Fish and Wildlife Service and/or Ohio Department of Natural Resources would be consulted for placement and orientation of the nets. Fish would be removed at the rate of three lifts per week at each location. The nets would be set in the confined area for a total of three weeks to insure removal of the majority of fish in the confined area. All live fish would be released in the lake outside of the CDF, a sufficient distance from the Toledo Edison Bayshore Power Plant to prevent them from being drawn into the plant's water intake. Arrangements would be made with the city of Toledo Solid Waste Division in the event that the disposal of dead fish is necessary.

2.5 Comparative Impacts of Detailed Plans

2.5.1 Table EIS-2 of this section describes, in comparative form, the plans currently under consideration for confinement of "heavily polluted" dredged material from Toledo Harbor. More detailed discussions of the overall impacts of the plans is contained in Section 4 of this EIS.

Table EIS-2 - Comparative Impacts of Detailed Plans

Parameter	No Action	Alternative 5B (Elevate Existing CDF Walls)	Alternative 1C (Construction of a New CDF)
Plan Economics			
First Cost	$0	$3,501,000	$11,670,000
Net Benefits	$0	$3,960,000	$ 4,838,600
B/C Ratio	0	2.26	2.05
Project Features			
Length of New Dike (ft)	N/A	N/A	4,265
Capacity (cy) (1)	N/A	4,530,000	8,764,000
Lifetime (years) (1)	N/A	11.5	21.9
Water Area Inclosed (ac)	0	NOTE: Project incloses existing 242-acre dike; water area has already been lost.	155
Groundwater, Geology, and Soils	No signigicant impacts.	No signigicant impacts.	No significant impacts.
Sediment Quality	After existing CDF is filled (3-4 years), polluted sediments will migrate from the river to the bay in potentially larger quantities.	Continued dredging of "heavily polluted" sediments and confined disposal for the next 13-16 years. Gradual improvement in quality of channel bottom sedi- as upland sources of pollution are reduced.	Continued dredging of "heavily polluted" sediments and confined disposal for the next 21 years. Gradual improvement in channel bottom sediments as upland sources of pollution are reduced.
Water Quality	Degradation will occur from the resuspension of sediments due to navigation over reduced depths.	Reduction in the quantity of "heavily polluted" bottom sediments available for resuspension into the water column.	Reduction in the quantity of "heavily poluted" bottom sediments available for resuspension into the water column. Construction of the CDF would tend to deflect more polluted Toledo River water further into Maumee Bay increasing dilution effects.
Air Quality	No significant effect.	Temporary adverse effect (not significant) during construction and filling due to machinery operation.	Same as Alternative 5B.
Noise	Possible long-term decreases due to less boat traffic and associated commercial activities in the harbor.	Minor increases due to machinery operation.	Same as Alternative 5B.
Fish and Wildlife Resources	Degradation of sediment and water quality will adversely impact fish and wildlife resources over time.	Temporary disturbance to gulls and shorebirds using the CDF walls for resting and nesting. 400,000 cubic yards of "heavily polluted" bottom sediments effectively removed from the aquatic ecosystem.	Loss of about 169 acres of shallow water habitat including mud bottom habitat and sandy shoal habitat as well as some riprapped shoreline (1.5 acres) and aquatic emergent vegetation, offset somewhat by creation of 1.5 acres of rocky habitat. 400,000 cubic yards of "heavily polluted" bottom sediments effectively removed from the aquatic ecosystem.
Commercial and Recreational Navigation	Eventual cessation of commercial navigation and potentially severe effects on recreational navigation at Toledo Harbor.	Full commercial and recreational navigation potential of Toledo Harbor assured for 13 to 16 years.	Full commercial and recreational navigation potential of Toledo Harbor assured for 21 years.
Business and Industry	Reductions and closures of businesses and industries that rely on Toledo Harbor navigation.	Continuation and/or expansion of businesses and industries that rely on Toledo Harbor navigation. Temporary, minor increases during construction.	Same as Alternative 5B.
Public Facilities and Services	No significant effects.	No significant effect.	No significant effects.
Population, Desirable Regional and Community Growth	Possible severe adverse effects as businesses and industries that rely on Toledo Harbor commercial navigation close and/or move from the Toledo Harbor area.	Area growth facilitated, although probably at a slow rate.	Same as Alternative 5B.
Employment	Decreases for all businesses and industries associated or relying on Toledo Harbor navigation.	Minor increases during CDF construction. Harbor-related employment maintained.	Same as Alternative 5B.
Property Values and Tax Revenues	Probable major decrease in property values along Toledo River commercial areas. Long-term loss of tax revenues (property, sales, income) as businesses close and employment decreases.	Minor increases in tax revenues during project construction. Long-term status quo in property values and revenues maintained.	Same as Alternative 5B.
Community Cohesion	Severe disruptions as employment levels decrease.	No significant effects.	No significant effects.
Aesthetics	Deterioration due to adverse effects on businesses using the Toledo Harbor area.	Some adverse effects due to extremely high CDF walls that would be constructed.	Some adverse effects due to construction and filling of CDF and loss of about 169 acres of open-water area.
Cultural Resources	No significant effects.	No significant effects.	No significant effects.

(1) Assumes the volume of the consolidated dredged material is 86 percent of the volume of the in-place material.

3. AFFECTED ENVIRONMENT

3.1 Environmental Conditions.

3.1.1 Toledo Harbor is located at the southwestern corner of Lake Erie where the Maumee River flows into Maumee Bay. Cleveland, Ohio is located about 100 miles to the east and Detroit, Michigan is located 60 miles to the north. The Maumee River is the largest tributary to the Great Lakes with a 6,750-square mile watershed and an average discharge of about 4,800 cubic feet per second. The Maumee River forms at Fort Wayne, Indiana, at the confluence of the St. Marys and St. Joseph Rivers and flows approximately 130 miles before entering Lake Erie at Toledo, Ohio (Plate EIS-11). The basin is relatively flat and consists primarily of farmland which causes the river to carry a high sediment load. The average annual amount of material dredged from Toledo Harbor is more than any other single harbor in the Great Lakes (Fraleigh, et al., 1979). The proposed project area is located within Maumee Bay.

3.1.2 Maumee Bay is an area at the mouth of the 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 (Plate EIS-12). 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.

3.1.3 The area served by Toledo Harbor includes the cities of Toledo and Oregon and adjacent communities. The Toledo metropolitan area has a population of approximately 700,000 people. Toledo Harbor is the most active port on Lake Erie and the third largest port on the Great Lakes. The primary commodities shipped through this port are coal, iron ore, grain, petroleum products, stone, sand and gravel, and steel products. The Federal navigation channel is an essential corridor for the flow of economic goods and the economic well-being of the area. Primary factors influencing the maintenance of these channels are cost and environmental considerations.

3.2 Significant Resources

3.2.1 Harbor Commerce and Navigation. Toledo Harbor became important after the formation of Toledo in 1833. The city was incorporated in 1839, after the close of the "Toledo War" between the states of Michigan and Ohio, and became one of the great transshipment ports on the Great Lakes. Toledo developed as a large city because of functions serving transportation, commerce, and manufacturing. Principal industries are the manufacturing of automobiles and accessories, glass, excavating machinery, weighing scales, locomotives, electrical equipment, and oil refining. However, few of these products are shipped by vessel. Toledo Harbor is primarily a transshipment point, its domestic waterborne commerce consisting mostly of the shipment of coal and petroleum and its 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 linkage between the harbor facilities interior manufacturing localities.

3.2.2 The first appropriation for the improvement of the 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 15 feet in 1875 to a depth of 25 feet which was completed in 1936. The straight channel completed in 1892 is 17 miles long and 500 feet wide in Maumee Bay; it is 7 miles long and 400 feet wide in the Maumee River. Authorization to deepen the channel to 27 feet was given in 1960. The section of channel between the river mouth and Lake Erie was deepened to 28 feet while the 7-mile river section was dredged to a 27-foot depth below low water datum (+568.6 feet IGLD).

3.2.3 The existing Federal project provides for a channel 28 feet deep and 500 feet wide from deep water in Lake Erie about 18 miles to the mouth of Maumee River; including a widening of 38.6 acres opposite the Chesapeake and Ohio Railway and Lakefront Terminal Company docks; a channel in the river 27 feet deep and 400 feet wide from the river mouth to Mile 3; a channel approximately 400 feet wide to mile 6.5 with depths of 27 feet; a channel 25 feet deep and 200 feet wide to upper limit of project, Mile 7; a turning basin opposite the American Shipbuilding Company docks (Mile 2.7) 750 feet wide, 800 feet long, and 20 feet deep; a turning basin just upstream of the Old Fassett Street bridge (Mile 6.5) generally semicircular in shape with a radius of 730 feet, and 27 feet deep; and a turning basin 18 feet deep and 8.25 acres in area at the upper project limit. The project also provides for clearing the sailing course between Maumee Bay Channel and East Outer Channel which leads to the Detroit River Entrance Channel.

3.2.4 Waterborne commerce has been relatively stable, but there has been a decrease since 1970. Table EIS-3 summarizes recent commodity movements for Toledo Harbor. The major commodities which comprise 85-90 percent of harbor traffic are centered on the import and export of iron ore, coal, and grain.

Table EIS-3 - Commodity Movements (1981-87), Toledo Harbor, Ohio
(thousands of tons)

	Foreign				Domestic		
	Overseas		Canadian				
Year	Import	Export	Import	Export	Receipts	Shipments	Local
1987	368.9	1313.9	1160.9	4990	3897.3	4319	161.6
1986	429.6	1409.8	1215.1	4565.6	3097.2	6912.7	188.5
1985	441.1	1293.4	1249.7	5866.4	3308.5	6091.6	149.8
1984	330.9	1419.5	872.2	5905.2	4094.1	8060.9	153.7
1983	266.3	694.7	716.9	5174.3	3044.1	7327.9	184.6
1982	244.5	986.2	720.7	4594.6	2929.3	6835.2	81.3
1981	432.7	730.1	1038.1	7021.3	4635.3	8872.1	232.6

3.2.5 Aquatic Resources. The recommended site for the construction of a confined disposal facility (CDF) at Toledo Harbor (Site No. 1) currently includes the following aquatic habitats:

a. Riprapped shoreline (6,100 linear feet),
b. Sand, gravel, and cobble shoal (600 linear feet),
c. Wetland (0.13 acre),
d. Sago pondweed beds (3 acres), and
e. Unvegetated mud bottom (160 acres)

date (see page A-41)

In their Final Fish and Wildlife Coordination Act Report dated 16 July 1987, the U.S. Fish and Wildlife Service (USF&WS) noted that wetlands, sago pondweed beds (vegetated shallows), and shoals are relatively scarce in Maumee Bay and have high habitat value for certain species of fish and wildlife in the project area.

3.2.6 Benthic macroinvertebrate communities within the Maumee River and Bay include species such as oligochaete worms, dipteran larvae, and chironomid larvae. From 1930 to 1961, high levels of pollution in the Maumee Bay area was evidenced by high oligochaete densities and by the loss of pollution-intollerant organisms such as the mayfly nymph (Hexagenia). By 1982, oligochaete densities showed a marked decrease in the Maumee River area of the western basin. Although water quality at Site 1 may be degraded, the site does support a moderately diverse benthic community. Submerged aquatic beds of sago pondweed at the site also support a community of epiphytic macroinvertebrates. USF&WS noted large numbers of midge larvae along the stems and leaves. These aquatic plant communities are also known to provide important spawning and nursery habitat for some fish species (USF&WS, 1987).

3.2.7 While factors such as water quality and obstruction to traditional spawning areas up the Maumee River have resulted in the extirpation and/or decline of some fish species, both the diversity and productivity of the fish community remain very high. A total of a least 59 species of fish have been collected in Maumee Bay since 1974. Forty-two of these species have been found in the area of the proposed CDF, including moderate numbers of sport species such as walleye, white bass, yellow perch, channel catfish, white crappies, and freshwater drum. The sheltered environment of the proposed CDF site and existing stone dike walls may be conducive to spawning for white crappie and channel catfish. Walleye and white bass in spawning condition have been collected in the area (USF&WS, 1987), and walleye eggs were collected on the majority of egg trees set on the rocky shoals that parallel the Federal navigation channel (Fraleigh et al., 1979).

3.2.8 In spite of obvious water quality problems in the lower Maumee River and Maumee Bay, these areas serve as nursery habitat and perhaps spawning habitat for white bass and other sport and commercial species such as walleye, yellow perch, freshwater drum, and channel catfish. The average density of larval white bass in Maumee Bay was more than five times greater than the average density east of the bay and more than seven times greater than the average density north of the bay. A similar pattern was found for freshwater drum. For larval walleye, the density found in Maumee Bay was slightly greater than that north of the bay, but considerably less than that east of the bay (Mizera, 1981).

3.2.9 Maumee Bay also appears to be a major spawning and/or nursery area for forage fish, particularly gizzard shad. The average density of gizzard shad larvae in Maumee Bay in 1977 was almost three times that of the areas east and north of the bay (Heniken, 1977). Gizzard shad are the most important forage species for walleye in the western basin of Lake Erie (USF&WS, 1987).

3.2.10 Maumee Bay, and to a lesser extent the Maumee River, provide habitat for a large diversity of waterfowl. The greater number of birds are "divers" such as lesser and greater scaup, common goldeneye, red-breasted, American and hooded mergansers, and ruddy ducks. Dabbling ducks such as mallards, black ducks, widgeon, gadwalls, and teal are also found but in more limited numbers. The numbers and diversity of ducks is dependent upon season and prevailing weather conditions. The bay provides a feeding area representative of shallow water areas in the western basin of Lake Erie. Numerous resting areas are available, depending upon wind direction, in the lee of small islands, such as Grassy Island and the Federal CDF. The "shadow" of the CDF is especially attractive to fish-eating ducks, gulls, and other birds such as great blue heron due to the thermal plume from the Toledo Edison Power Plant which attracts fish during cold weather periods.

3.2.11 Recreation Resources. Recreational boating is continuing to become a large and important activity in the Toledo area. Numerous marinas currently exist along the Maumee River, Ottawa River, and in other protected areas of the bay. Both the number of marinas and the size of existing marinas are expanding. Although high lake levels aid navigation for recreational craft, the Federal channel is important due to the nature of the shallow bay. This is especially important for fixed-keel craft. The Ohio Department of Natural Resources identified approximately 20 major marina facilities with over 2,200 berths in the Toledo area in a 1983 census.

3.2.12 Dredged Material Quantity and Quality. Particle size analysis of sediment samples showed that the material consists primarily of silts and clays, mixed with a limited amount of fine sand. Properties for individual samples are shown in Table EIS-4. USEPA - Region V and the Buffalo District have been involved over the years in a substantial amount of testing with regard to the pollutional characteristics of Toledo Harbor. There have been gradual improvements in sediment quality in the Federal project area during the last 15 years. This improvement is reflected in USEPA's changes in pollution classification of the sediments, which has resulted in the designation of more material as suitable for unconfined, open-lake disposal.

3.2.13 In 1973, USEPA classified sediments in the Maumee River Navigation Channel as "heavily polluted." In 1975, the USEPA study showed that sediments in the navigation channel from the Toledo Harbor light lakeward were "moderately" to "heavily polluted" with occasional patches of "unpolluted" sediment. In 1981, chemical and bioassay analysis of sediment samples from the Toledo Harbor entrance beyond the Toledo Harbor light and Channel 2, the Toledo Sailing Course channel, showed no critical contaminants of concern. Bioassay results indicated that sediments from the Federal Navigation Channels were no more toxic to aquatic organisms than surrounding sediments of the Western Basin. Sampling and laboratory testing of Toledo Harbor sediments were recently completed by T.P. Associates International, Inc. in June 1988. Testing included particle size, bulk and elutriate chemical analysis for inorganic and organic priority pollutants, and where appropriate, the 96-hour acute toxicity sediment bioassay procedure. Considerable interest had been expressed during the review of the Draft EIS regarding actual contaminant measurements and the USEPA guidelines against which the measurements were classified. Consequently, the test results for bulk inorganics analysis and USEPA guidelines have been added to the Final EIS as Appendix EIS-D for the reader's convenience.

3.2.14 Bulk Sediment Chemistry. Table EIS-6 summarizes the pollutional classification of sediment samples taken from Station L-2-M to R-7-M. The area between Stations L-2-M and R-5-M is the portion of the river that the USEPA still considers to be too polluted for open-lake disposal, based on considerations of bulk chemistry, elutriate, and bioassay data. USEPA classified sediments between Stations R-5-M and R-7-M as acceptable for open-water disposal, but the Corps of Engineers has decided that sediments from Stations R-5-M to R-6-M should also be confined due to significant levels of several PAH's. Therefore, the decision has been made to confine all river sediments unless further testing clearly demonstrates lower PAH levels at upstream stations. The samples have been categorized as "unpolluted," "moderately polluted," or "heavily polluted" based on USEPA - Region V's bulk chemistry, elutriate, and

Table EIS-4 - Particle Size Analysis
(Sediments Collected from Toledo
Harbor/Maumee Bay, 25 April 1988)

	Percentage of Sediment Per Particle Size						
Identif. (Site No.)	Retained: No. 8	Retained: No. 16	Retained: No. 30	Retained: No. 50	Retained: No. 100	Retained: No. 200	Passed No. 200
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
0-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 Replicate	<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

SOURCE: T.P. Associates International, Inc., "The Analyses of Sediments from Toledo Harbor," June 1988.

Table EIS-5 - Bulk Chemistry, Inorganic Parameters, Toledo Harbor, Ohio (1988)

	L-2-M	L-1-M	O-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
Arsenic, Total (mg/kg)	20	22	20	21	22	23	12	22	18	16
Barium, Total (mg/kg)	92	110	100	120	120	120	70	110	82	65
Cadmium, Total (mg/kg)	2	2	2	2	2	2	2	1	0.9	2
Chromium, Total (mg/kg)	23	24	31	57	39	24	14	20	16	13
COD (mg/kg)	86000	97000	83000	120000	84000	87000	46000	82000	58000	61000
Copper, Total (mg/kg)	33	37	38	52	39	36	27	40	26	23
Cyanide, Total (mg/kg)	0.7	1.5	0.52	1.58	0.67	0.98	<0.3	0.5	<0.6	<0.3
Iron, Total (mg/kg)	22900	24900	27200	31500	29000	30600	13900	24500	19900	13200
Lead, Total (mg/kg)	29	26	34	52	29	32	23	41	19	16
Manganese, Total (mg/kg)	470	460	390	420	530	470	320	440	340	335
Mercury, Total (mg/kg)	0.1	0.1	0.2	0.4	0.2	0.1	0.2	0.2	0.1	0.2
Nickel, Total (mg/kg)	30	32	33	46	33	31	19	27	23	23
Nitrate N (mg/kg)	<10	<9	<9	<10	<10	<10	<6	<9	<7	<8
Nitrogen, Ammonia (mg/kg)	200	180	270	870	210	150	88	150	91	89
Oil/Grease (mg/kg)	680	900	1300	3900	1100	710	340	980	270	430
Phenols, 4-AAP (mg/kg)	0.39	0.23	0.21	0.69	0.29	0.16	0.13	0.17	0.13	0.12
Phosphorus, Total (mg/kg)	980	1100	1200	3500	1400	1100	840	1100	820	735
Residue, T, Volatile (%)	7.16	7.58	6.63	8.84	7.45	7.29	4.29	10.0	4.25	7.47
Residue, Total (%)	36.9	37.6	42.3	36.8	37.0	37.6	54.7	41.5	46.6	47.6
Total Kjeldahl N (MG/KG)	1420	1870	1700	2620	1630	2860	1630	2750	1690	1980
Zinc, Total (MG/KG)	120	150	140	330	170	160	93	150	97	82

SOURCE: T.P. Associates International, Inc., June 1988.

Table EIS-6 - Pollutional Status of Toledo Harbor/Maumee River Sediments (1988)

	L-2-M	L-1-M	0-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
Total Volatile Solids	M	M	M	H	M	M	U	H	U	M
Cyanide	H	H	H	H	H	H	H	H	H	H
Arsenic	H	H	H	H	H	H	H	H	H	H
Cadmium	U	U	U	U	U	U	U	U	U	U
Chromium	U	U	M	M	M	U	U	U	U	U
Copper	M	M	M	H	M	M	M	M	M	U
Lead	U	U	U	M	U	U	U	M	U	U
Mercury	U	U	U	U	U	U	U	U	U	U
Nickel	M	M	M	M	M	M	U	M	M	M
Zinc	M	M	M	H	M	M	M	M	M	U
Iron	H	H	H	H	H	H	U	M	M	U
Manganese	M	M	M	M	H	M	M	M	M	M
COD	H	H	H	H	H	H	M	H	M	M
Ammonia-N	M	M	H	H	H	M	M	M	M	M
TKN	M	M	M	H	M	H	M	H	M	M
Total Phosphorus	H	H	H	H	H	H	H	H	H	H
SUMMARY										
Unpolluted	4	4	3	2	3	4	7	3	5	7
Mod. Polluted	7	7	7	4	6	6	6	7	8	5
Heavily Polluted	5	5	6	10	7	6	3	6	3	3
Mode	M	M	M	H	H	M-H	U	M	M	U

H - Heavily Polluted
M - Moderately Polluted
U - Unpolluted

bioassay data guidelines. The overall classification of each sampling location is taken as the mode, or most common classification, of the individual parameters in each sample. Based on these guidelines, the most heavily contaminated area is from Stations R-1-M to R-3-M. The remainder of the area falls into the "moderately polluted" to "unpolluted" classification.

3.2.15 Most of the sediment samples taken were heavily contaminated with iron, arsenic, and phosphorus, but the levels are not untypical of the range of these elements found naturally in humid region soils. Most of the samples are also contaminated with cyanide. Cyanide is not commonly found naturally in soils, and is probably present in the sediments as a result of industrial point source discharges. In the lower reaches of the river between Stations R-2-M to L-1-M, the levels of chemical oxygen demand (COD), and ammonia and total kjeldahl nitrogen (TKN) were very high and are typical of contamination by municipal sewage. With the exception of the cyanide, COD, ammonia and TKN levels, the contamination of sediments in the lower part of the river is not significantly greater than the levels found throughout the remainder of the Western Basin of Lake Erie. These samples were also analyzed for the organic priority pollutants, including PCB's, pesticides, polynuclear aromatic hydrocarbons (PAH's), and other industrial organic compounds. The results indicated significant contamination with several PAH's. PAH's are by-products of low-temperature pyrolysis of hydrocarbon fuels. They are commonly found as a contaminant in the area of oil refineries and coal industry. Both these activities are present in Toledo Harbor. The only other priority pollutant detected in the sediments was bis (2-ethylhexyl) phthalate.

3.2.16 Sediment samples were taken in the area of the proposed confined disposal facility and analyzed for nutrients, metals, and extractable organic contaminants. The complete results of these analyses are on file in a report available for examination at the Buffalo District Office. Contaminant levels were generally very similar to samples taken from the shipping channel adjacent to the site. Arsenic, chromium, nickel, iron, and chemical oxygen demand were significantly lower in this area. Ammonia and total kjeldahl nitrogen showed significantly greater contamination. With regard to organics, there were no measurable concentrations of the nitroaromatics, nitro phenols, nitrosamines, PCB's, pesticides, phthalates, chloro or alkyl-substituted benzenes, or unsaturated chlorinated alkyl compounds. Only the lower polynuclear aromatic hydrocarbons (PAH's) showed significantly greater contamination than the adjacent river channel area. This is probably due to the proximity of the site to coal unloading facilities immediately adjacent to the site.

3.2.17 Elutriate Test. The elutriate test is a procedure used to estimate the amounts of chemical substances which may be exchanged with water. One part of sediment is shaken for 30 minutes with four parts of site water. The results of the elutriate test for metals, cyanide, TKN, ammonia and nitrate-nitrogen, phosphorus, oil and grease, and phenols are compared against standards to estimate the potential impact of these substances on water quality. The elutriate results indicated manganese, mercury, ammonia-nitrogen, and zinc levels had the potential of creating a violation of water quality standards (Appendix EIS-D, Table EIS-D-3).

3.2.18 Bioassay Testing. The purpose of the bioassay test is to determine the acute toxicity of the sediments to sensitive organisms in the water column or in the sediments around any potential sediment disposal site. Three test species were used: *Hexagenia limbata* - the larval stage of mayfly; *Daphnia magna* - a zooplankton; and *Pimephales promelas* - the fathead minnow. Table EIS-7 outlines suggested criteria for the pollutional classification of harbor sediments based on the mortality of these three organisms in contact with the test sediment over a 96-hour period.

3.2.19 Table EIS-8 presents the results of the bioassay testing. Only sediments at Station R-1-M are classified as "heavily polluted," while the remaining are classified as "unpolluted" or "moderately polluted."

Table EIS-7 - Suggested Percent Mortality Range from a 96-Hour Sediment Bioassay for *Hexagenia limbata, Daphnia magna,* and *Pimephales promelas* to be Used in Sediment Classification

Species	Non-Polluted (%)	Moderately Polluted (%)	Heavily Polluted (%)
H. limbata	<10	10-50	>50
D. magna	<10	10-50	>50
P. promelas	<10	10-50	>50

SOURCE: Prater, 1976.

Table EIS-8 - Results of a 96-Hour Sediment Bioassay Test (Acute Toxicity) Percent Mortality

	Control (%)	L-2-M (%)	L-1-M (%)	O-M (%)	R-1-M (%)	R-3-M (%)	R-5-M (%)	R-7-M (%)
Pimephales promelas	3.3	8	6.6	3.3	1.6	5	6.6	0
Hexagenia limbata	11.6	17	20	33	60	37	17	20
Daphnia magna	4	3	3	17	4	11	6	5
Overall Classification*		M	M	M	H	M	M	M

* Taking into account mortality in the controls.
SOURCE: T.P. Associates International, Inc., June 1988.

3.2.20 Dredging Frequency and Volumes. Dredging in the Federal Navigation Channels at Toledo Harbor is performed annually to remove the shoaling that develops in the channels from sediments deposited by the Maumee River. Annual dredging volumes for the years 1975-1988 are shown in Table EIS-9. An average annual volume of 1,010,000 cubic yards is dredged to maintain authorized project drafts. The duration of the dredging and disposal operation is controlled by the Corps of Engineers Contractor and the limitations imposed on his equipment.

3.2.21 Endangered Species. The project area lies within the range of the bald eagle (*Haliaeetus leucocephalus*) and Indiana bat (*Myotis sodalis*), Federally listed endangered species. To date, no individuals or critical habitat for these species have been idenfified in the project area. Coordination activities with the U.S. Fish and Wildlife Service are summarized in Section 6 of this Final EIS.

3.2.22 Water Quality. The water of Maumee Bay is generally of poor quality which is attributed to the Maumee River. The river flows through low, flat, agricultural land where it collects a considerable sediment load before passing through Toledo where municipal and industrial discharges further degrade its quality. Water quality is poorest in the river, followed by the bay which generally improves lakeward. The river is characterized by low dissolved oxygen levels, high nutrient levels, high coliform bacteria levels, high turbidity and suspended solids levels, high conductivity, and the discharge of heavy metals and pesticides (Corps of Engineers, 1974).

3.2.23 Dissolved oxygen in the lower Maumee River is low and only improves slightly as the water mixes in the bay. Ranges in values for the Maumee River are 2.20 to 5.26 ppm, 1.6 to 12.6 ppm for the mouth of the Maumee River and 9.27 to 14.32 ppm for open bay water (Corps of Engineers, 1974). U.S. Fish and Wildlife Service, however, reports values of 8.9 ppm down to 5.4 ppm for April through July of 1986 (letter dated 29 July 1986, Appendix EIS-A). The low dissolved oxygen in the river may be due to organic loading and decomposition (Fraleigh, *et al.*, 1975). Photosynthetic activity of phytoplankton may significantly influence oxygen levels with supersaturation occurring during blooms and depletion occurring during stratification of the water column under slack wind conditions. Periods of oxygen depletion have not been reported for Maumee Bay (Wapora, 1976).

3.2.24 Turbidity is greatest in the spring during heavy runoff events and during dredging activities in the Toledo Harbor navigation channel. Both organic and inorganic materials are transported in suspended sediments in the Maumee River which carries approximately 2 million tons annually. Annual average secchi disc depths were 8.7 inches in the river and 23.5 inches on the lake side of the bay (Fraleigh, *et al.*, 1975). Generally, bay waters are considerably more turbid than lake waters but less turbid than waters at the mouth of the Maumee River.

3.2.25 The Maumee River tends to be slightly warmer than Lake Erie and the shallow bay warms more quickly in the spring and summer than lake water (Fraleigh, *et al.*, 1975). The dynamics of heating and cooling of the bay is influenced by the river, wind tides, seiches, and the Toledo Edison Power Plant.

Table EIS-9 - Dredging Activity - Toledo Harbor

Year	Contractor or Dredge	Volume (CY)	Type of Disposal
1975	Dredge Hoffman and Markham	2,105,762	Lake, shore, and land dump
1976	Dredge Hoffman and Markham	442,238	Confined
1977	Dredge Hoffman and Markham	796,944	Confined
1978	Dredge Hoffman and Markham	1,162,747	Confined
1979	Dredge Hoffman and Markham	654,530	Confined
1980	Dredge Markham and Lyman	859,893	Confined
1981	Dredge Hoffman, Markham, and Lyman	999,592	Confined
1982	Dredge Markham	854,949	Confined
1983	Dredge Markham	899,939	Confined
1984	North America Trailing Co. and Canonie Offshore Co.	916,244	Confined
1985	North America Trailing Co. and Canonie Offshore Co.	308,663 567,487	Confined Open-Lake
1986	North America Trailing Co. and Canonie Offshore Co.	375,244 862,368	Confined Open-Lake
1987	North America Trailing Co. and Canonie Offshore Co.	384,645 689,646	Confined Open-Lake
1988	North America Trailing Co. and Canonie Offshore Co.	273,952 503,003	Confined Open-Lake
	TOTAL	13,657,846	
	Average	975,560	

3.2.26 Nutrients and coliform bacteria are added to the Maumee River in considerable quantities as a result of agricultural runoff and improper sewage treatment. Nitrogen levels as nitrate and nitrite of 0.70 ppm and total phosphorus levels of 1.40 ppm were found in the mouth of the river in March 1975 (Herdendorf, 1975). Coliform bacteria levels are highest in the river and decrease lakeward in the bay. Seasonal and short-term variations are common with the highest levels generally occurring during warm summer months (Fraleigh, et al., 1975). In September 1974, fecal coliform counts of 78 to 290 organisms/100 ml were found between River Miles 6 and 9 and higher counts of 80 to 1,840 organisms/100 ml were found downstream between River Mile 5.4 and the mouth of the river (Horowitz, et al., 1975).

3.2.27 Federal Project. The existing Federal project provides for a channel 28 feet deep and 500 feet wide from deep water in Lake Erie about 18 miles to the mouth of the Maumee River; including a widening of 38.6 acres opposite the Chesapeake and Ohio Railway and Lakefront Terminal Company docks; a channel in the river 27 feet deep and 400 feet wide at Mile 0 (river mouth) to Mile 3; a channel 400 feet wide to Mile 6.5 with depths of 27 feet over a least width of 200 feet and 25 feet over the remaining 400-foot channel width; a channel 25 feet deep and 200 feet wide to upper limit of project, Mile 7; for a turning basin opposite American Shipbuilding Company docks (Mile 2.7) 750 feet wide, 800 feet long, and 20 feet deep; a turning basin just upstream of the old Fassett Street bridge (Mile 6.5) generally semicircular in shape with a radius of 730 feet, and 27 feet deep; and a turning basin 18 feet deep and 8.25 acres in area at the upper project limit. The project also provides for clearing the sailing course between Maumee Bay Channel and East Outer Channel, Detroit River, to 28 feet deep over a width of 1,200 feet.

3.2.28 The Toledo Federal Confined Disposal Facility (CDF) is located 355 feet southeast of the Toledo Harbor Navigational Channel and is adjacent to the Toledo Edison Company's Bay Shore Station. The facility is boot-shaped and covers an area of about 242 acres. From 1976 to 1984, an average of 843,008 cubic yards of sediment was placed in the CDF. After the 1989 dredging, 2,200,000 cubic yards of the CDF capacity remained. At the present disposal rate, the CDF will be filled in 5.5 years (if approval is received to continue open-lake disposal). However, in 1985 Ohio EPA permitted open-lake disposal of 400,000 cubic yards of material dredged from Lake Mile 2 (LM2) to the Toledo Harbor lights (LM7). As a result, an average of 400,332 cubic yards has been placed in the facility since 1985.

Existing filled CDF

3.2.29 Cultural Resources. The National Register of Historic Places (NRHP), National Park Service, Ohio State Historic Preservation Office (SHPO), as well as local experts were consulted to identify significant cultural resources within the project area. The NRHP lists the following harbor-related properties:

- Toledo Yacht Club, Bay View Park
- West Sister Island Light
- Toledo Harbor Light

However, none of these properties are located within close proximity to the project area. In a letter dated 9 September 1985, the Ohio SHPO indicated that the proposed project would not affect any property listed in or eligible for the NRHP (Appendix EIS-A). A Cultural Resources Assessment for the proposed project was completed and included with the Draft EIS for review and comment (Appendix EIS-C). This assessment concluded that construction of the proposed CDF is highly unlikely to have any significant impact on Cultural Resources.

4. ENVIRONMENTAL EFFECTS

4.1 Introduction

4.1.1 This section contains a detailed analysis of the environmental consequences of each alternative, including the proposed action, using the parameters identified in Section 3 of this Final EIS. Under each parameter, any future conditions that could be reasonably expected to occur without the proposed project will be identified first as the effects of the No Action Alternative. The No Action Alternative represents the base case for evaluation of each of the Action Alternatives described below. Evaluation of the environmental impacts of previous plans considered in the 1974 CDF study are discussed in paragraphs 2.2.2 through 2.2.7 of this Final EIS. Further discussion of these plans and measures can be found in the Toledo Harbor CDF Letter Report (February 1986).

4.1.2 This Section of the Final EIS, therefore, addresses the impacts of those alternatives identified in the Toledo Harbor CDF Letter Report (February 1986) as being technically feasible, economically viable, environmentally sound, and which are practicable. They include the No Action Alternative; Elevation of Existing CDF Walls; and the Construction of a New Confined Disposal Facility.

4.2 Effects on the Natural Environment

4.2.1 Harbor Commerce and Navigation. The "No Action" Alternative would jeopardize commercial shipping and eventually hamper recreational and other navigation activities due to the fact that dredging would have to cease since there would not be an adequate confinement facility. Channel filling is caused by two primary factors - lake shoaling and river sedimentation. The bay section is primarily impacted by shoaling which encroaches from the channel edges and reduces the available deep-draft width. Lake waves and to some extent littoral drift causes material to move in from each side of the channel. In addition, sedimentation would become an increasing problem in the bay if the river section is not dredged. Once the river began to fill in, increased sediment loads would impact the bay section. The upper channel within the Maumee River is impacted primarily from river transport sediments which settle out once they enter the deeper waters of the channels. This "shoaling" is actually sedimentation which impacts channel depth relatively uniformly in regard to depth from the edge of the channel. Within two years, accumulated sediments would reduce port utilization. Consequently, individuals and enterprises dependent on this mode of transportation for their livelihood would suffer economically.

4.2.2 Aquatic Resources. Under the No Action Alternative, aquatic resources in the Maumee River and Bay would initially be expected to remain at current levels. If the lack of a disposal facility causes dredging and consequently commercial and recreation navigation to be reduced, fish and wildlife populations would be expected to increase due to a reduction in disturbance to the aquatic environment. A detrimental impact in regard to the movement of more heavily polluted sediments would also be anticipated. Over time, sediments in the

Maumee River would accumulate and move in greater quantities downstream into the bay. These widespread pollutional characteristics could adversely impact any gains initially experienced by fish and wildlife resources and have further reaching impacts on Lake Erie resources. This is assuming that Maumee River sediments continue to be polluted to a greater extent than ambient bay sediments and that the net transport of sediments from the river to the bay is greater under a no-action condition.

4.2.3 The construction of a CDF at Site No. 1 would result in the loss of approximately 169 acres of shallow water habitat; some areas of submergent vegetation; and the loss of a submerged shoal consisting of sand, gravel, and cobble. The unconsolidated shoal extends northeast from the Toledo Edison dike beginning as a remnant side-cast island dominated by a variety of plants before becoming inundated and gradually tapering into a mud bottom. The emergent portion of the shoal is triangular in shape with a base about 75 feet wide and extending about 150 feet in length. The submerged shoal section extends 600 feet into the embayment. This shoal is typical of other remnant shoals which were formed by side-casting material during past channel dredging. These shoals which once existed as islands before being eroded away are found parallel to, and approximately 1,000 feet from the channel and extend from the river mouth to approximately 7 miles into the bay. Past studies indicate that the shoals reduce water circulation (Fraleigh, et al., 1975) and are believed to provide valuable fish habitat (Fraleigh, et al., 1975; Wapora, 1976). The area which would be occupied by the CDF is typical of other shallow water areas of Maumee Bay with the exception that it is sheltered by the present Corps of Engineers CDF on the northeast and the Toledo Edison disposal site on the southeast and contains areas of submergent vegetation.

4.2.4 The operation of existing nearshore CDF's in Lake Erie has resulted in conditions conducive to botulism outbreaks and waterfowl mortality. Conditions favorable to the botulism bacteria (Clostridium Botulinum) include warm shallow, anaerobic decomposition, and fairly clear water. The bacteria produces a toxin which can be ingested by water-associated birds ultimately resulting in death. A critical time period for bird use of existing as well as the proposed CDF is mid-July to mid-October when migratory waterfowl and shorebirds begin their southward migration. This is also the time period when conditions are most suitable for the botulism bacteria. Not only are birds using the CDF susceptible to the toxicity, but these outbreaks may also affect water birds at nearby State and Federal wildlife refuges through the movement of contaminated birds from the CDF to these areas.

4.2.5 The Corps of Engineers has concluded that one of the most effective methods to prevent botulism outbreaks is to manage the CDF and, if feasible, complete dredging and disposal operations before mid-June. If the operational phase can be completed by early to mid-June, vegetation already established on the site would have sufficient time to colonize the dredged material. However, environmental constraints prevent the dredging of the Maumee River until 1 June, therefore the completion of disposal activities prior to 15 June would not be possible. Since placement cannot be completed within this period, a botulism control plan has been developed for the proposed CDF. This plan would involve coordination with the U.S. Fish and Wildlife Service and Ohio Department of Natural Resources, monitoring the facility, quick removal of sick and dead birds, increasing water levels in the CDF, seeding of mud flat areas with certain grass species to discourage bird use, controlled placement and timing of discharges into the facility, and surface trenching to improve drainage. This botulism control plan is outlined more fully in Appendix EIS-E.

4.2.6 Elevation of the existing CDF walls (Alternative 5B) would have no significant impacts on aquatic resources. The increased height may affect wind direction and velocity in areas immediately adjacent to the facility but this change is not expected to significantly impact wind-driven water circulation patterns.

4.2.7 Dredged Material Quantity and Quality. Under the No Action Alternative, dredging would cease since approximately only 60 percent of the material dredged annually was ever authorized for disposal in the open lake. Since the remaining more heavily contaminated material is located in the river section of the harbor, navigation would be restricted and eventually cease. Dredged material quantity and quality would not be an issue since bottom sediments would not be dredged.

4.2.8 Alternatives 1C and 5B would provide a minimum capacity of 7,470,000 cubic yards and 3,530,000 cubic yards of disposal volume, respectively. Since maintenance of the Federal channel would continue, "heavily polluted" sediments would be removed thereby maintaining present substrate qualities (Also see paragraphs 4.2.4 and 4.2.5 regarding aquatic resource impacts). As sediment quality increases through improved point and nonpoint discharge controls, additional material could possibly be disposed of at the open-lake disposal sites.

4.2.9 Endangered Species. The proposed project lies within range of the bald eagle and the Indiana bat, which are Federally listed endangered species. This project has been coordinated with the U.S. Fish and Wildlife Service (USFWS) which has determined that due to the project type, size, and location, its construction would have no effect on these species. This precludes the need for further action on this project as required by the 1973 Endangered Species Act, as amended (Appendix EIS-A, USFWS letter dated 15 August 1985).

4.2.10 Water Quality. Under the No Action Alternative, water quality is expected to improve initially followed by degradation. Water quality would be primarily influenced by sediment quality and movement. The No Action Alternative assumes that dredging would cease because of the lack of facilities to confine contaminated dredged material. Initially, water quality may improve due to the fact that dredging would not resuspend sediments in the water column and thereby reduce turbidity and the movement of sediments from man-induced activities. This change would only be temporary however, since once the channel began to fill in, the sediments would be disturbed by vessels due to the lack of adequate under-keel draft clearance. Additionally, the natural movement of sediments would increase once the channel reached its natural equilibrium resulting in an additional sediment load to the bay. Currently, the navigation channel acts as a stilling basin for sediments and becomes a man-made "sink" for pollutants (see paragraph 4.2.2, Aquatic Resources).

4.2.11 Alternative 1C would allow the continued dredging of "heavily polluted" sediments thereby maintaining long-term water quality at present or improved levels. The reduction of bay area by the construction of the 155-acre facility and the placement of the outer dike adjacent and parallel to the navigation channel would have some minor impact on the mixing zone and water circulation. This action would reduce the opening between Grassy Island and the mainland, thereby restricting the flow of the river and perhaps deflecting it more to the north. This impact is not considered significant due to the fact that this area is close to the river mouth where little mixing has occurred and downstream of the Toledo Edison generating intake channel which has a significant impact in regard to diverting water to the east. Of all the alternatives reviewed by the U.S. Fish and Wildlife Service, this alternative was determined to have the least impact on water circulation [Appendix EIS-A, U.S. Fish and Wildlife Service letters dated 15 November 1984; Draft Fish and Wildlife Coordination Act Report, 15 August 1985 (included in Draft EIS, May 1986)].

4.2.12 Concern has been expressed during the review of the Draft EIS regarding supernatant discharge during the operation of the facility. At a minimum, the proposed facility would offer the same level of environmental protection as the existing facility. The Corps of Engineers has worked closely with the Ohio Environmental Protection Agency in regard to monitoring programs for supernatant at the existing facility and proposes to continue. No violations of State water quality standards have been experienced and the discharge weir of the new facility would be improved. The distance between the weir(s) and the dredge discharge pipe would be maximized while minimizing dead zone areas within the CDF caused by short-circuiting. The total weir length incorporated into the proposed CDF would be longer than the existing weir such that the withdraw depth would be reduced, therefore minimizing suspended solids in the effluent. Management of the weir(s) would help avoid botulism, produce a quality effluent, and fully utilize storage capacity of the CDF.

4.2.13 The seepage of solids on movement of contaminants through the dike was a concern expressed during the review of the Draft EIS. Like the existing Toledo CDF, the proposed CDF design would permit the flow of water through the dike during the first one-third of the facility's life. During this time, the long detention times in the CDF and the filtering properties of the prepared limestone would be adequate to settle and retain the polluted solids. Monitoring at other Buffalo District permeable dike CDF's (i.e., Buffalo, Huron, and Cleveland) indicate that no pollutants were detected leaking from the sites. In fact, shortly after the disposal operation has ceased, the water quality inside the disposal facility mirrors that of the reference site in the lake. These results reflect research by the Corps of Engineers Waterways Experiment Station (WES) which indicate the pollutants adhere tightly to the fine grain sediments. In addition, laboratory leachate tests performed for the Buffalo District on polluted material indicated the release of an inconsequential amount of pollutants. Based on Corps of Engineers studies, an impermeable dike is not necessary to contain pollutants associated with dredged material. In order to build an impermeable dike of clay, the construction area would have to be dewatered, since clay cannot be compacted under saturated conditions. Dewatering would greatly increase the CDF construction cost. The Buffalo District contends that the existing dike design in Toledo is sufficient and additional costs to construct an impermeable dike are not warranted. The Corps of Engineers would periodically monitor suspended sediment content of the overflow while the CDF is being filled. It is expected that water would seep through the lower portion of the dike containing prepared limestone. However, particulates containing over 99 percent of the pollutants would be filtered out.

4.2.14 Raising existing dike walls to enlarge present facilities (Alternative 5B) would allow continued dredging and provide the benefits discussed in paragraph 4.2.10. No adverse impact on existing water circulation conditions would occur.

4.2.15 Federal Project. The No Action Alternative would result in the loss of "heavily polluted" dredged material confinement capacity at the existing CDF within 3-6 years depending upon the amount of dredged material which can be disposed of in the open lake. Since all of the material dredged from Toledo Harbor is not suitable for open-lake disposal, complete dredging would not be permitted and the ability to maintain the Federal project would cease. This would result in a significant adverse impact to commerce and recreational navigation.

4.2.16 Alternative 1C would provide for the continued disposal of "heavily polluted" sediments from the Maumee River in a confined disposal area and allow the uninhibited maintenance of the Federal project.

4.2.17 Raising existing dike walls to increase the capacity of the present facility (Alternative 5B) would provide the same benefits as Alternative 1C. Capacity, first cost, and operations cost, however, would increase annual costs and reduce the net annual benefits over the life of the facility.

4.3 Other Effects

4.3.1 Section 122 of the River and Harbor Flood Control Act of 1970 (PL 91-611) and Corps of Engineers Regulation ER 200-2-2, dated 4 March 1988, requires that at least 17 specific environmental factors be identified and evaluated in relation to the proposed action. Appropriate Section 122 factors and other parameters that might be affected by the proposed project are described in the following paragraphs.

4.3.2 Man-Made Resources - Commercial and Recreational Navigation. Under the No Action Alternative, commercial and recreational vessels would experience increased difficulties in navigating the Maumee River and Bay Channel as they continued to silt in. Eventually, virtually all commercial navigation on the Maumee River would cease if dredging did not take place. Recreational use of the river would also decrease until the waterway could only be navigated by power boats; use by sail craft would also be greatly reduced. Recreational boating is an increasing and important use of the Federal channel and connecting waterways of the Maumee Bay area. Currently, marina expansion is occurring in the Toledo area as it is throughout western Ohio. This trend is expected to continue despite negative economic indication in commercial shipping and heavy industry. The waterway is expected to be an important economic stimulator as reflected by the Owens-Illinois, Inc., new corporate headquarters, the new Toledo Trust Building, and other downtown waterfront development including the Portside complex.

4.3.3 Under either of the CDF alternatives considered, commercial and recreational navigation in the Maumee River would be maintained or possibly expanded. Commercial establishments would more easily be able to use the Maumee River for existing or new businesses. Recreational boating facilities, which are currently in high demand, would be able to expand their marina accommodations. Temporary inconveniences to area boating activities could occur due to the operation of machinery in Maumee River during the dredging and sediment handling operation. Disposal alternatives should produce no significant impacts to commercial or recreational navigation. Alternative 1C would reduce the bay area by approximately 169 acres; however, considering the available acreage of the bay, this impact is not considered a significant impact on navigation in the bay.

4.3.4 Business and Industry. Under the No Action Alternative, businesses and industry dependent upon commercial shipping, and local marinas which rely on the Federal channel for navigation, would be forced to either reduce operations or close their business establishments. Under either CDF alternative, these businesses would be expected to continue operation at present or expanded levels. The possibility exists that new businesses could be established which would make use of the Maumee River channel. No significant long-term impacts on business and industry would be expected to result due to implementation of any of the CDF alternatives. Alternative 1C has the potential for future port development due to its proximity to the navigation channel.

4.3.5 Implementation of any of the construction plans would constitute a business activity of an industrial nature. Each of the plans should produce a temporary, positive effect.

4.3.6 Public Facilities and Services. No significant impacts to public water supply intakes or other public facilities and services are expected due to no action or implementation of either of the considered action alternatives.

4.3.7 Population, Desirable Community Growth, and Regional Growth. Under the No Action Alternative, the population would be expected to be reduced with Toledo area population growth being considerably less than the State average. Implementation of either Alternative 1C or 5B would maintain desirable area growth, although the area may continue to grow at a rate lower than the State average. Neither of the considered action alternatives would produce significant impacts on population, desirable community growth, or regional growth.

4.3.8 Employment. Labor force distribution would be expected to shift under the No Action Alternative; a decrease in employment would occur for businesses dependent on the Maumee River for commercial navigational purposes. Both of the considered CDF alternatives would help to retain current employment levels and may generate additional marina and commercial use of the Maumee River. Alternatives 1C and 5B would result in a temporary increase in employment and the labor force during the construction phase. These impacts would be relatively minor and of short duration since the combined dredging, sediment handling, and disposal operations would employ no more than 75-80 construction workers and require a time span of about 1 year.

4.3.9 Property Values and Tax Revenues. The property values of marinas and other businesses along the Maumee River would be expected to diminish as navigability of the waterway deteriorates under no action. Tax revenues currently generated by these establishments would also be reduced under the No Action Alternative. Implementation of any of the plans except the No Action Alternative should result in a minor and temporary increase in income tax revenues due to the increase in employment associated with the work. Taxes would also be received for materials purchased. Either Action Alternative would help to maintain or improve property values and tax revenues associated with businesses dependent on Maumee River navigation. No significant impacts to property values and tax revenues are expected due to implementation of any of the CDF alternatives considered.

4.3.10 Community Cohesion. None of the alternatives considered are expected to have significant impacts on community cohesion in the Toledo area.

4.3.11 Aesthetics. Under the No Action Alternative, aesthetic conditions along the Maumee River would be expected to gradually deteriorate as marinas and other businesses suffered from decreased navigation depths. Implementation of either action alternative would help to prevent this deterioration and may improve aesthetics over the long term by facilitating the upgrading and expansion of existing businesses. The maintenance of a viable port at Toledo would discourage the gradual growth of dilapidated harbor properties and encourage the progressive upgrading of existing facilities. Under Alternative 5B, the raising of the existing dike walls by 10 feet would interrupt the shoreline/lake vista for the life of the project. Since only limited access to the shoreline is available, this impact is expected to be minor.

4.3.12 The addition of another CDF facility at Site No. 1 within Maumee Bay would not result in any significant adverse aesthetic impacts. Site No. 1 is surrounded on three sides by the present Federal CDF to the north and northeast and the Toledo Edison disposal facility on the east and southeast. No significant impact would occur since any view from the river mouth of the bay to the east is interrupted by these existing structures. An additional structure would not block the view of open water areas. In addition, CDF's add a degree of diversity to the open water nature of the bay and take on an isolated appearance which is conducive to colonization by a wide diversity of birds such as gulls, wading and shorebirds, and other waterfowl.

4.3.13 Air Quality. Existing air quality is expected to be maintained over the long term regardless of the outcome of the proposed Corps of Engineers project. Minor, temporary increases in air emissions by construction equipment would be associated with any of the action alternatives considered.

4.3.14 Noise. The No Action Alternative would cause no significant increase in noise in the harbor area. Noise associated with river traffic would be reduced as less boats would be able to navigate the river channel. Noise would be generated by machinery operating at the dredging and disposal areas under action alternatives. No significant adverse impacts are expected in these areas since they are located in industrial/commercial environments.

4.3.15 Displacement of Farms. No impacts to existing farms would occur due to No Action or implementation of any of the construction plans.

4.3.16 Cultural Resources. The results of a Cultural Resources Assessment (Appendix EIS-C) as well as coordination with the Ohio State Historic Preservation Office has indicated that the proposed project would have no effect on properties listed in or eligible for the National Register of Historic Places.

5. LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Impact Statement:

Name	Discipline/Expertise	Experience	Role in Preparing EIS
Mr. William F. MacDonald	Wildlife Biology, Natural Resource Management, Wetlands Ecology.	7 years Environmental Impact Analysis which includes 4 years Project Management; Wetlands development, restoration, and enhancement; natural resource mitigation.	Impacts on Biological and Natural Resources
Mr. Richard P. Leonard	Geography, Environmental Chemistry, and Soils Science	5 years - Soil Scientist USDA. 13 years - Environmental Research (Private Industry). 10 years - Sediment Chemical and Biological Testing and Environmental Analyses, Buffalo District.	Sediment Analysis, Water Quality, Bioassays
Mr. John Adams	Chemistry	Member of staff, Lake Erie Wastewater Management Study. 8 years - writing and managing contracts for environmental sampling and analysis. Member of International (IJC) working group in Pollution from Land Use Activities. Experienced in use of geographic information systems for environmental studies.	Water Quality and Leachates
Mr. Michael S. Pelone	Regional Economist	15 years economic impact analysis for water resources planning, Buffalo District.	Identification of transportation costs, alternate routes, and financial penalties
Mr. William E. Butler	Geography/Social Impact Assessment	10 years Environmental Impact Analysis, Buffalo District	EIS Coordinator
Mr. Brian Troyer, P.E.	Civil Engineer	15 years Project Management, Buffalo District, 4 years Project Engineer, private consulting firms.	Individual Project Manager
Mr. Ted Valerio, P.E.	Civil Engineer	13 years Project Management, Buffalo District.	Project Manager

6. PUBLIC INVOLVEMENT

6.1 Public Involvement Program

6.1.1 Coordination between the Buffalo District, local interests, and concerned resource agencies has been performed during early scoping and preparation of the EIS for the project. A Notice of Intent to prepare a Draft EIS was prepared by the Buffalo District and published in the Federal Register on 29 August 1985. Project meetings have included the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, Ohio Department of Natural Resources, Ohio Environmental Protection Agency, Ohio Historic Preservation Office, City of Toledo, Toledo Metropolitan Area Council of Governments, Toledo-Lucas County Plan Commissions, Toledo-Lucas County Port Authority, City of Oregon, Ohio Department of Transportation, Toledo Edison, local citizens, environmental groups, and public officials. A series of three (3) meetings were held in Toledo, Ohio. The first meeting was held in August 1984 and discussed the scope of the study. Subsequent meetings held in April and July 1985 discussed disposal options and reuse alternatives. Coordination letters concerning the project and proposed disposal site are included in Appendix EIS-A.

6.1.2 Public coordination confirmed that local governments, agencies, and industry are concerned that: a new confined material disposal facility be built to accommodate polluted dredged material; considerable effort be expended to review a wide range of alternatives to include dredged material reuse; and existing facility expansion be considered.

6.2 Required Coordination

6.2.1 The National Environmental Policy Act (NEPA) requires that this EIS be circulated for review and comment to all Federal and State agencies having jurisdiction by law or having special expertise with respect to any environmental impact involved. NEPA also requires that this EIS be circulated to Federal and State agencies authorized to develop and enforce applicable environmental standards. This EIS has also been made available to the general public and individuals on the project mailing list.

6.2.2 Clean Water Act. Section 404(b)(1) of the Clean Water Act requires that the environmental effects associated with the discharge of dredged or fill material into waters of the United States be evaluated in accordance with specific evaluation parameters. A Section 404(b)(1) Evaluation addressing applicable components of Alternative 1C is contained in Appendix EIS-B. Appendix EIS-B also contains a Public Notice for 30-day review of the Section 404(b)(1) Evaluation providing reviewers an opportunity to request a public hearing. Water quality certification for the fill and discharges addressed in Appendix EIS-B is requested from the Ohio Environmental Protection Agency (OEPA) under Section 401 of the Act.

6.2.3 Coordination with the U.S. Fish and Wildlife Service (USF&WS). Throughout the course of the Toledo Harbor Confined Disposal Study, close coordination has been maintained with the Reynoldsburg, Ohio, Field Office of the USF&WS. This coordination involved the development of alternative confined disposal schemes for polluted dredged materials from Toledo Harbor, field investigations of fish and wildlife resources which might be impacted by construction of alternative confined disposal facilities, and the development of various mitigation measures. The USF&WS has provided a Final Fish and Wildlife Coordination Act Report (dated 16 July 1987, Appendix EIS-A) which describes the fish and wildlife resources of the Toledo Harbor, Ohio, area and provides preliminary recommendations of the USF&WS regarding alternative disposal sites and fish and wildlife recommendations for Alternative 1C. This report was supplemented in order to determine the significance of fish and wildlife resources at he project site and if separable mitigation measures would be justified.

6.2.4 The USF&WS has indicated that construction of a CDF at Alternative Site 1 should have the least potential water quality impacts. However, USF&WS has also indicated that a submerged bar located within the confines of Site 1 contains a significant amount of sand, gravel, and cobble habitat that might have some significant fishery value. The USF&WS has also indicated that Site 1 contains a significant amount of sago pondweed that might also have some significant value. In addition, the riprapped shoreline in the area (6,100 feet according to USF&WS) could provide spawning habitat for bullheads, channel catfish, and other species.

6.2.5 In conclusion, the USF&WS recommended that alternatives other than filling Maumee Bay be considered for confined disposal of polluted dredged material from Toledo Harbor. However, USF&WS also recommended, that if Site 1 is the selected site, all habitat losses be mitigated. USF&WS indicated that losses subject to mitigation included: (a) loss of about 162 acres of mud bottom; (b) loss of 1,600 feet of riprapped shoreline; (c) loss of relatively large areas of submergent vegetation; and (d) loss of an undetermined amount of sand, gravel, and cobble habitat on the sandbar and peninsula.

6.2.6 USF&WS noted that wetlands, sago pondweed beds (vegetated shallows), and shoals are relatively scarce in Maumee Bay and have high habitat value for certain species of fish and wildlife in the project area. USF&WS has categorized these three habitat types as Resource Category 2 (USF&WS's Mitigation Policy, Federal Register, 23 January 1981). USF&WS's mitigation goal for Resource Category 2 is no net loss of in-kind habitat value. The shoreline riprap and mud-bottom habitats are more common in the area and are included in Resource Category 3. The mitigation goal for Resource Category 3 is no net loss of habitat value while minimizing the loss of in-kind habitat value.

6.2.7 USF&WS characterized Site No. 1 as an area of improving water and sediment quality and noted that the existing fisheries resources of Maumee Bay are quite diverse. The shallow waters of the bay provide important spawning and nursery habitats for both forage and games species. The various habitats found at Site 1 are an important contributing factor to the area's diversity.

6.2.8 In response to comments on the Draft EIS recommending the inclusion of mitigation measures in the Selected Plan, the Buffalo District worked closely with the USF&WS in providing additional information on existing and future fish and wildlife resources of the proposed CDF site, quantifying habitat values of the project site, formulating alternative mitigation plans, and projecting habitat value benefits for each plan. It was ultimately decided by the Buffalo District that separable mitigation features for the proposed project are not necessary since the affected resources at the CDF site do not meet Corps of Engineers criteria for significance, i.e., they are neither scarce or unique.

6.2.9 Coordination with the Ohio Department of Natural Resources. In addition to the coordination maintained through the project meetings, the Ohio Department of Natural Resources (ODNR) reviewed and provided comments regarding USF&WS's Final Fish and Wildlife Coordination Act Report (Appendix EIS-A, letter dated 26 May 1987). ODNR concurred that mitigation measures would be required to compensate for the loss of fish and wildlife resources resulting from construction of the proposed project.

6.2.10 ODNR also has expressed concern in regard to annual waterfowl botulism problems which have been experienced at CDF areas in the past. Improper water management of the CDF can result in a condition which is conducive to botulism growth and waterfowl mortality. Discharge from the CDF would be regulated by flow over a weir. It is currently planned to design a management scheme which would remove water as quickly as possible consistent with the objective of maintaining a high quality effluent. By utilizing a rapid draw-down, the CDF could be "dried" thoroughly by mid-summer to prevent conditions suitable for botulism in late summer when they may impact migrating waterfowl.

6.2.11 Coordination with the Ohio State Historic Preservation Office. The Ohio State Historic Preservation Office (SHPO) was asked to review the proposed project and has determined that the proposed project would have no effect on properties listed in or eligible for the National Register of Historic Places. The results of a Cultural Resources Assessment (Appendix EIS-C) as well as the coordination with the SHPO have been coordinated with the Department of Interior, National Park Service to facilitate compliance with Section 106 of the National Historic Preservation Act (PL 89-665), the Archaeological and Historic Preservation Act of 1974 (PL 93-291), Executive Order 11593 (Protection and Enhancement of the Cultural Environment) and Corps Regulations 36 CFR, Part 800.

6.2.12 Other Coordination. A consistency determination under the Coastal Zone Management Act is not required since the State of Ohio does not have an approved coastal zone management program at this time. This EIS has been circulated to the appropriate resource agencies in compliance with the Clean Air Act, the Federal Water Project Recreation Act, and the Land and Water Conservation Fund Act.

6.3 Statement Recipients

6.3.1 The Draft EIS presenting Alternative 1C as the tentatively Selected Plan was distributed to the agencies, individuals, and groups listed below for review and comment (agencies which provided comments are marked with an asterisk). At the same time, the Draft EIS was submitted to the U.S.

Environmental Protection Agency and Notice of Availability was published in the Federal Register (20 June 1986), commencing the official 45-day review period. All comments received on the Draft EIS and the Corps of Engineers' responses are included in pages EIS-57 through EIS-85. The following agencies, groups, and individuals received copies of the Draft EIS for review and comment:

Federal

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

State

Ohio Sea Grant
* Ohio State Clearinghouse:
  Department of Health
* Department of Natural Resources
  Department of Development
  Department of Development - Division of Energy
  Department of Transportation
* Environmental Protection Agency
  Historic Preservation Office

Local

City of Oregon
Toledo-Lucas County Port Authority
City of Toledo
Toledo Metropolitan Area Council of Governments
Lucas County

Public Officials

Honorable John Glenn, U.S. Senator
Honorable Howard M. Metzenbaum, U.S. Senator
Honorable Marcy Kaptur, U.S. Representative

Other

Private Companies, Organizations, and Concerned Public

6.4 Public Views and Responses

6.4.1 The views of local officials and concerned resource agencies played a major role in the selection of the proposed disposal alternatives. The city of Toledo, Toledo Metropolitan Area Council of Governments, and other local interest expressed a desire that all feasible alternatives which would involve the use of dredged material be explored. Their primary concern involved the possibility of impacting the Maumee Bay-Lake Erie ecosystem through disposal of polluted dredged material in the open-lake. Water quality studies are being conducted to insure that unacceptable impacts are avoided. These studies are being conducted with the cooperation and review of the U.S. Environmental Protection Agency and Ohio Environmental Protection Agency. It is the position of these local officials that polluted material be confined to protect water quality gains made in Lake Erie in recent years.

6.4.2 Specific agency and public concerns are included in Appendix EIS-B (Letters of Coordination). These concerns have been considered during project planning and have been addressed as appropriate in this EIS.

6.4.3 The U.S. Environmental Protection Agency (USEPA) has assigned the Draft EIS a rating of EC-2 which indicates that USEPA has environmental concerns because of potential adverse impacts on water quality, aquatic biota, and wildlife. USEPA has requested that additional information be provided in response to their comments on the Draft EIS. This additional information has been included in the Final EIS and referenced in the Corps of Engineers responses to USEPA's comments (pp. EIS-59-64).

7. INDEX, REFERENCES, AND APPENDICES (Selected Plan is 1C)

7. INDEX, REFERENCES, AND APPENDICES (Selected Plan is 1C) (Cont'd)

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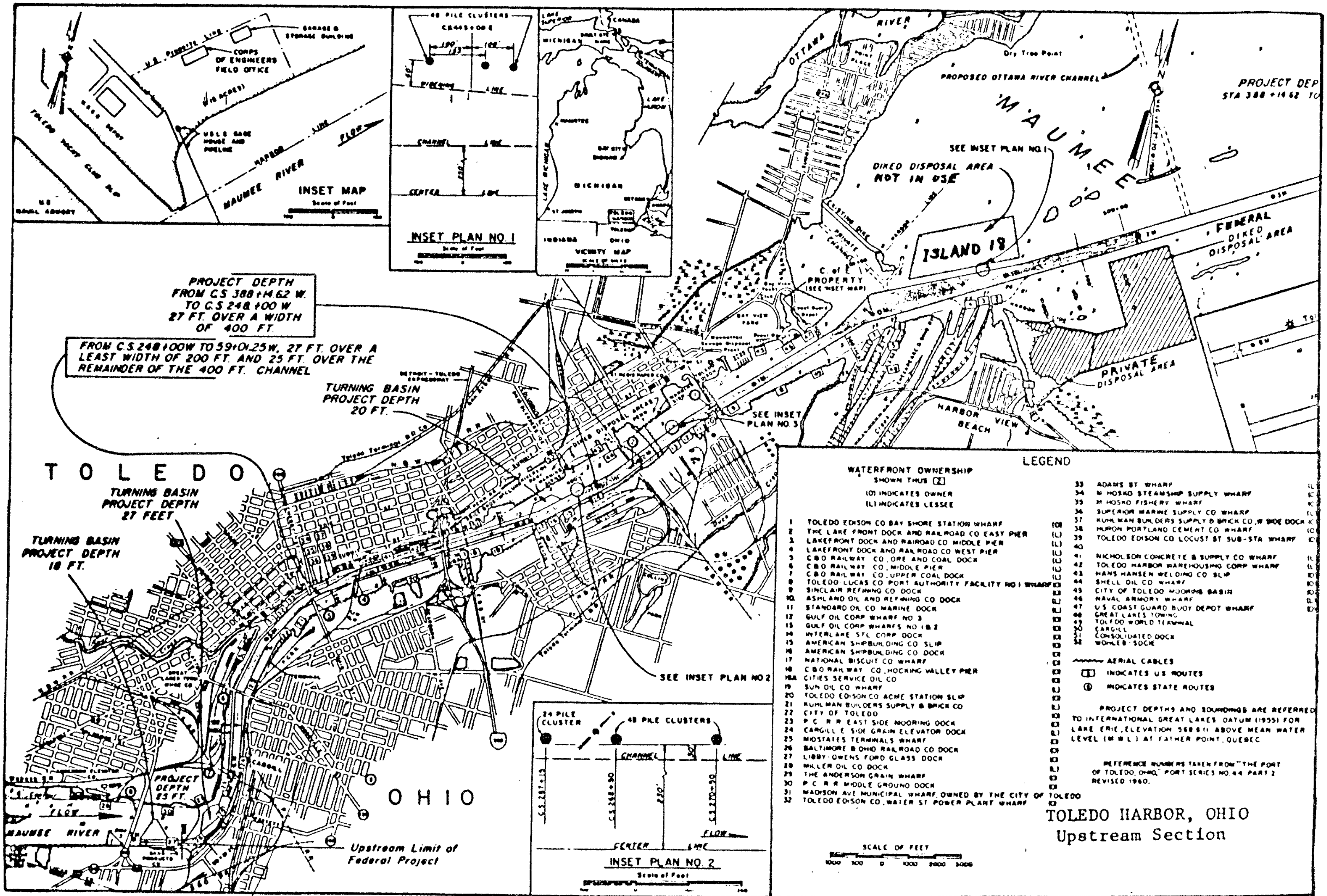


TOLEDO HARBOR, OHIO
Upstream Section

EIS-44

Plate EIS-1

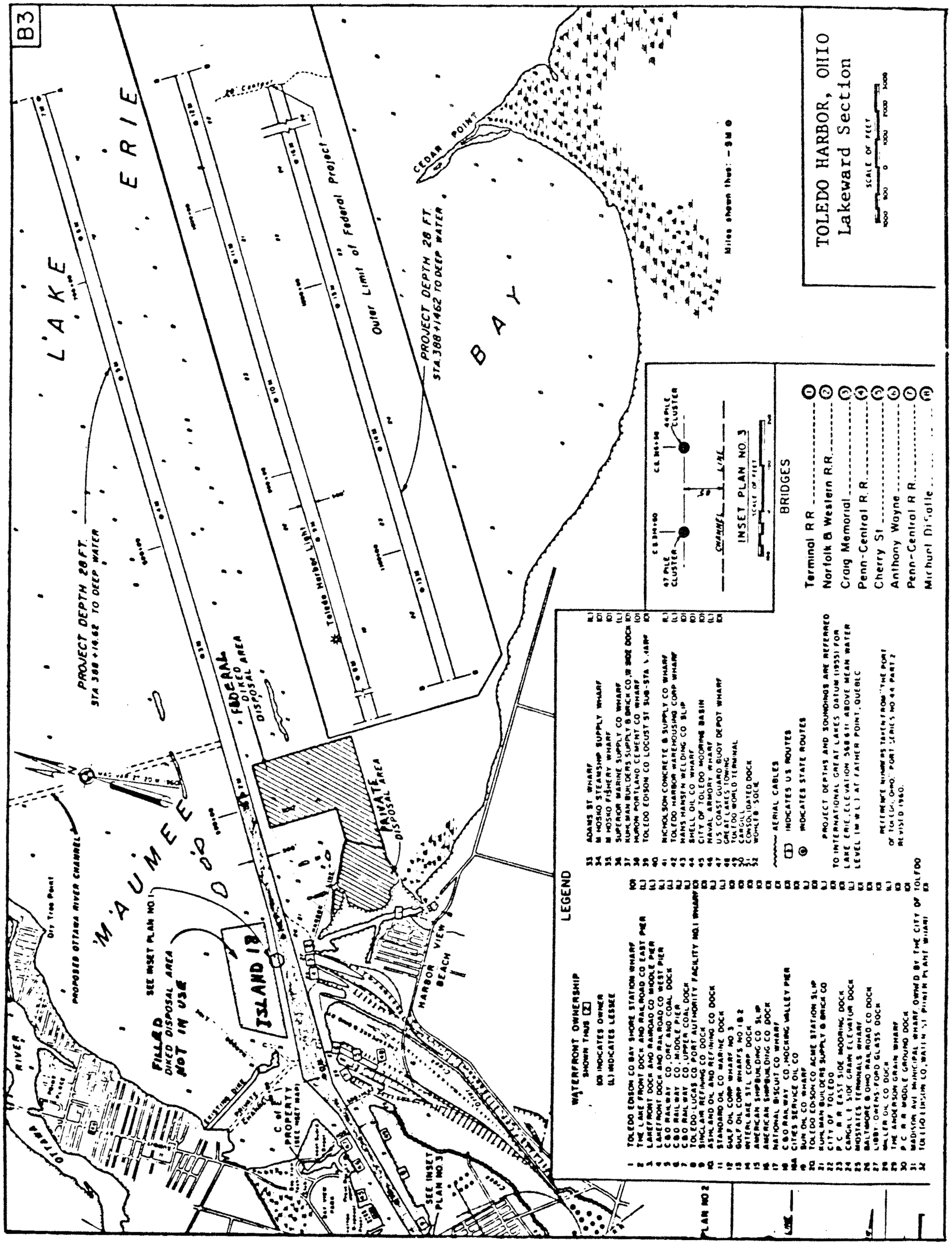
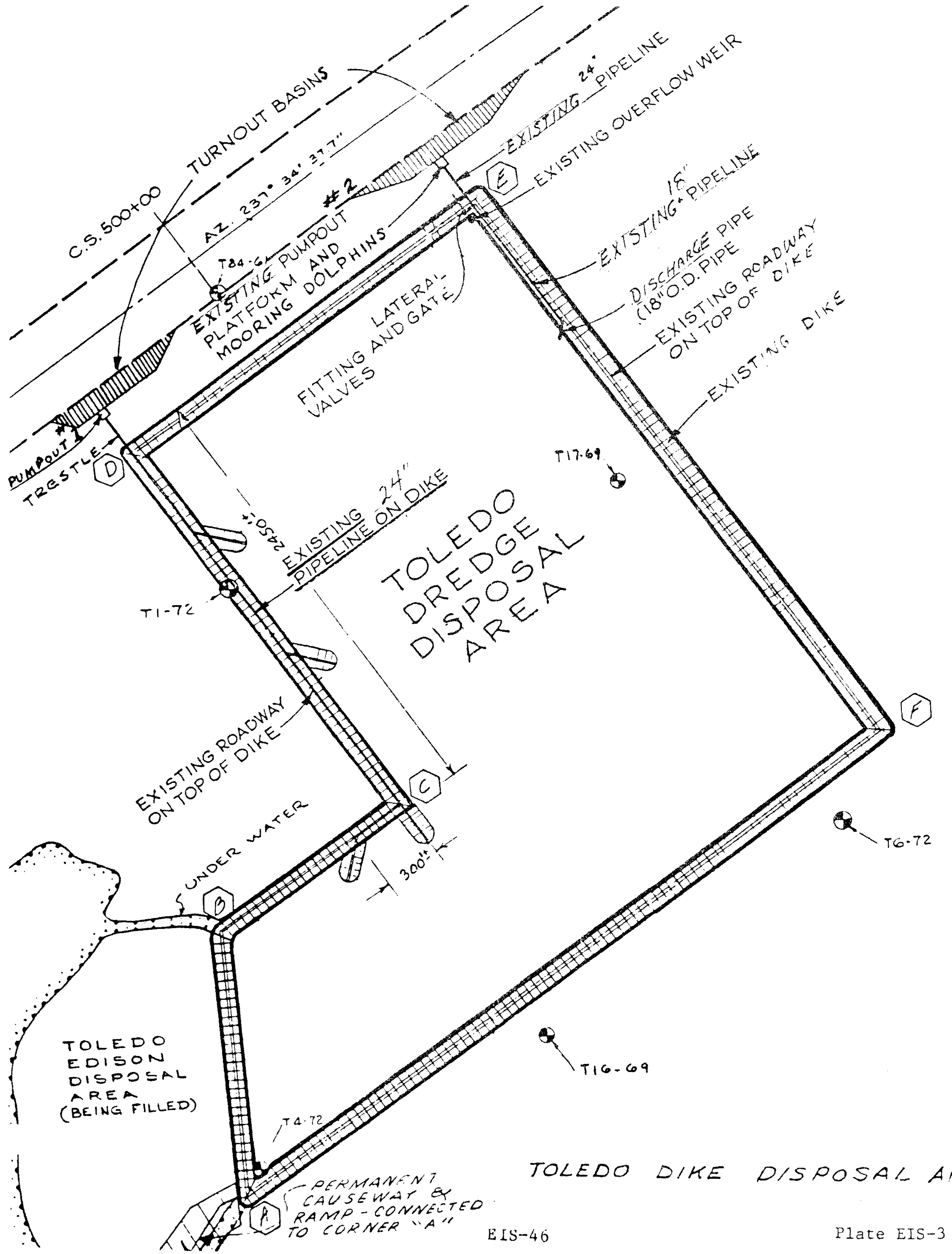
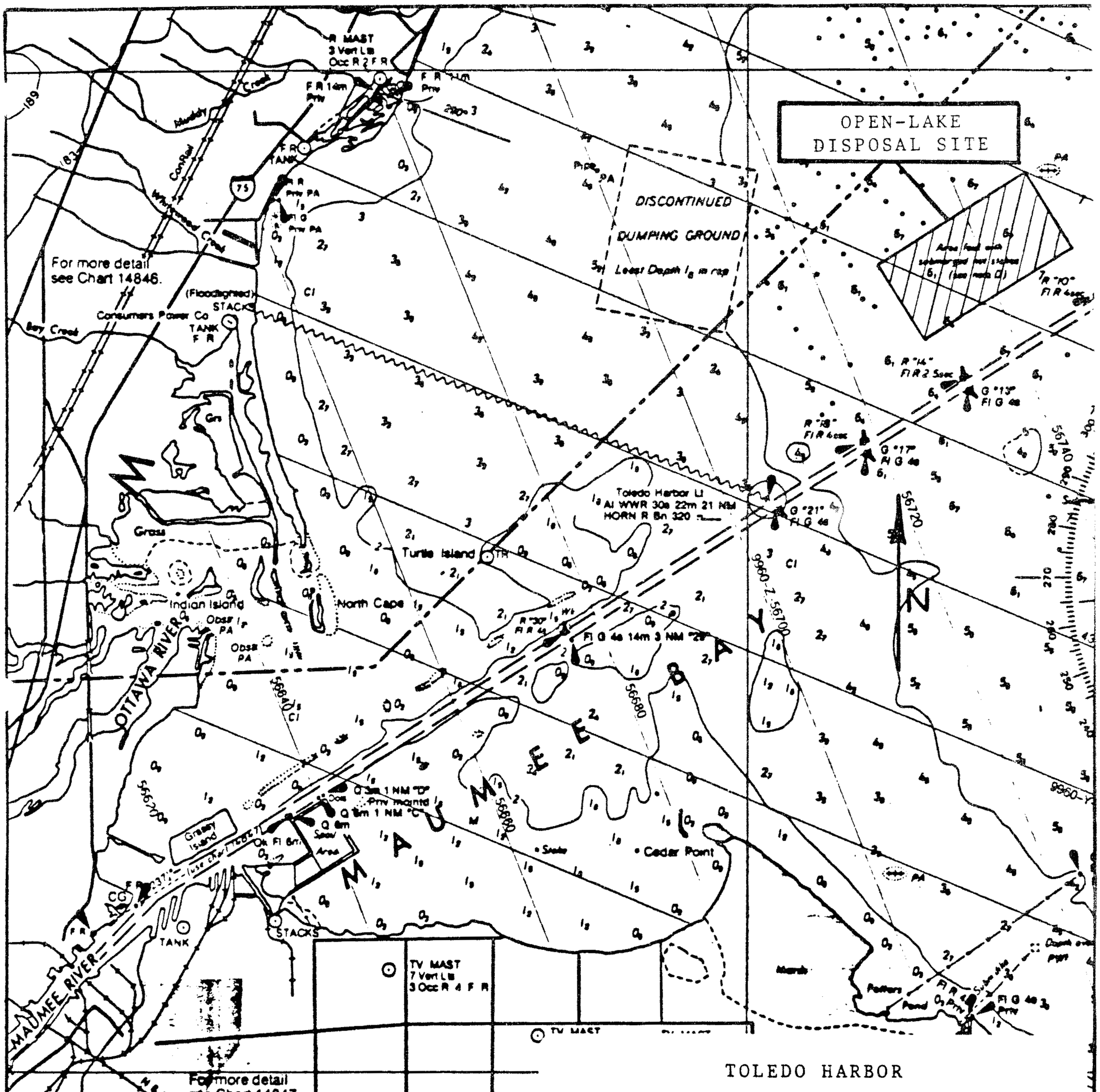

B3
TOLEDO HARBOR, OHIO
Lakeward Section
SCALE OF FEET
LAKE ERIE
MAUMEE BAY
CEDAR POINT
PROJECT DEPTH 28 FT.
STA 388+14.62 TO DEEP WATER
PROJECT DEPTH 28 FT.
STA 388+1462 TO DEEP WATER
Outer Limit of Federal Project
Toledo Harbor Light
FEDERAL DIKED DISPOSAL AREA
PRIVATE DISPOSAL AREA
ISLAND 18
SEE INSET PLAN NO 1
FILLED DIKED DISPOSAL AREA NOT IN USE
PROPOSED OTTAWA RIVER CHANNEL
OTTAWA RIVER
C of T PROPERTY
HARBOR VIEW BEACH
SEE INSET PLAN NO 3
INSET PLAN NO 3
CHANNEL LINE
BRIDGES
Terminal RR
Norfolk & Western R.R.
Craig Memorial
Penn-Central R.R.
Cherry St
Anthony Wayne
Penn-Central R.R.
Michael DiSalle
LEGEND
WATERFRONT OWNERSHIP
AERIAL CABLES
INDICATES US ROUTES
INDICATES STATE ROUTES

Plate EIS-2



TOLEDO DIKE DISPOSAL ARE.

Plate EIS-3



TOLEDO HARBOR

OPEN-LAKE DISPOSAL SITE

NO SCALE

Plate EIS-4

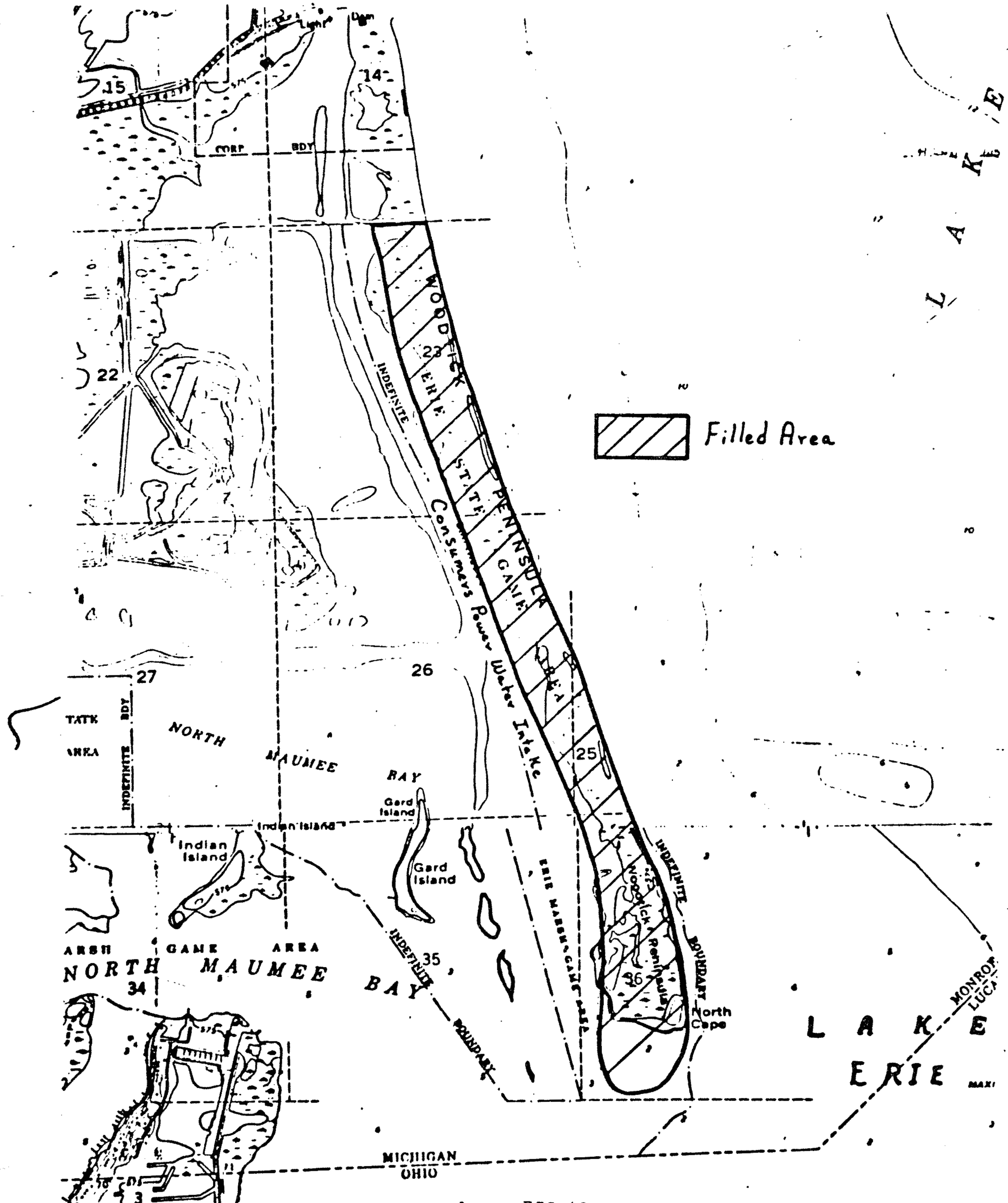
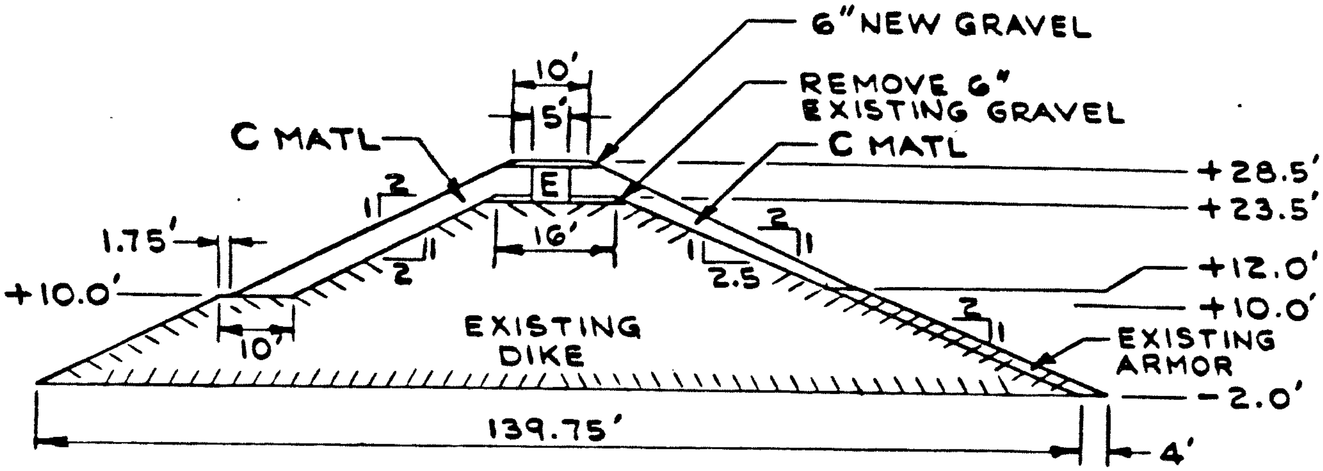

Filled Area
WOODTICK PENINSULA
ERIE STATE GAME AREA
Consumers Power Water Intake
INDEFINITE
CORP BDY
Dam
15
14
22
23
26
27
25
35
34
36
3
NORTH MAUMEE BAY
Gard Island
Indian Island
ERIE MARSH GAME AREA
INDEFINITE BOUNDARY
Woodtick Peninsula
North Cape
LAKE ERIE
NORTH MAUMEE BAY
MICHIGAN
OHIO
MONROE
LUCAS

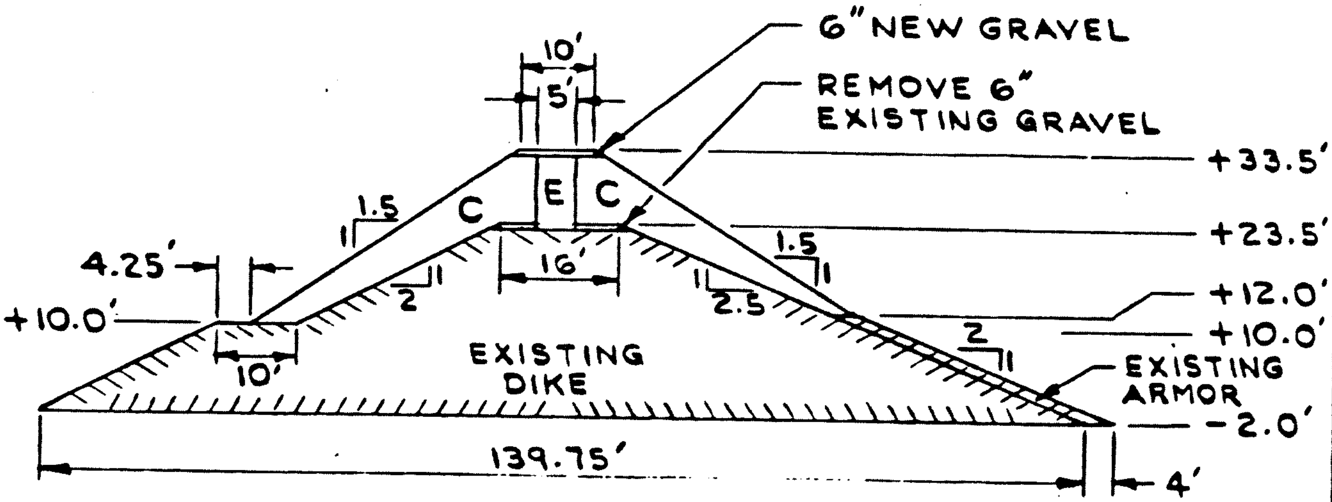
Plate EIS-5

ALTERNATIVE 5A
a) RAISE EXISTING DIKE 5 FEET



WIDTH OF EXISTING SECTION AT +10.0 LWD = 85.75'
WIDTH OF NEW SECTION AT +10.0 LWD = 84.0'

ALTERNATIVE 5B
b) RAISE EXISTING DIKE 10 FEET



WIDTH OF EXISTING SECTION AT +10.0 LWD = 85.75'
WIDTH OF NEW SECTION AT +10.0 LWD = 81.5'

C - CORE MATERIAL - PREPARED LIMESTONE.
E - CLAY - EXCAVATED FROM BOTTOM WITHIN ENCLOSED AREA.
LENGTH OF DIKE 15,372 FT.

SCALE 1MM = 1FT

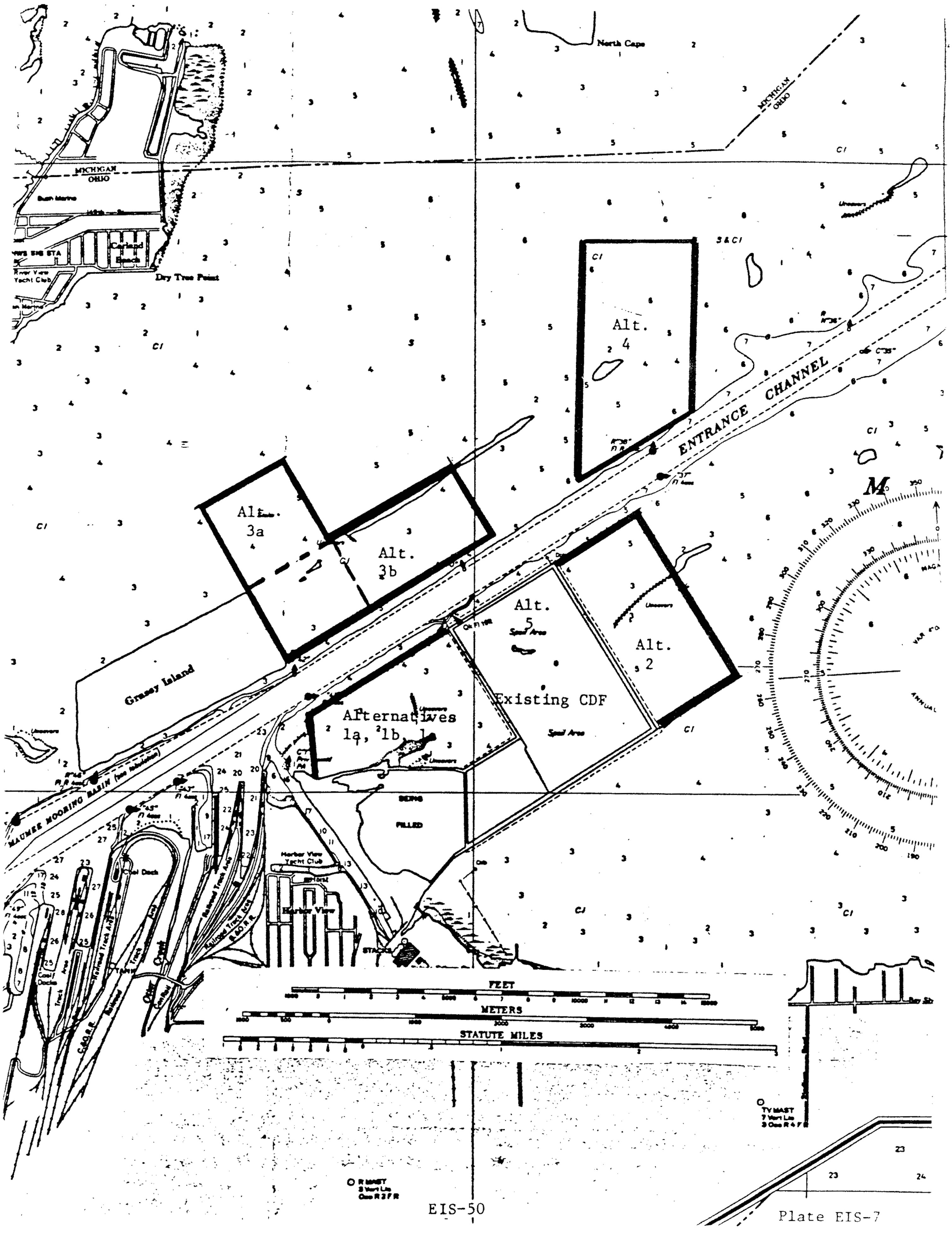
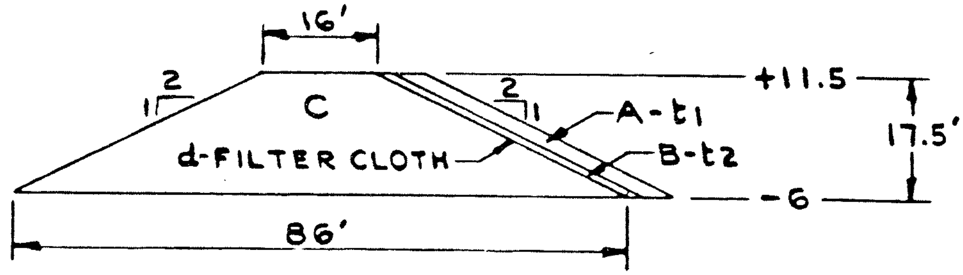

North Cape
MICHIGAN
OHIO
Bush Marina
Gerland Beach
Dry Tree Point
River View Yacht Club
Alt. 4
ENTRANCE CHANNEL
Alt. 3a
Alt. 3b
Alt. 5
Alt. 2
Existing CDF
Alternatives 1a, 1b, 1c
Grassy Island
MAUMEE MOORING BASIN
Spoil Area
Uncovers
BEING FILLED
Harbor View Yacht Club
Harbor View
Coal Dock
Coal Docks
Otter Creek
FEET
METERS
STATUTE MILES
TV MAST
R MAST

Plate EIS-7

ALTERNATIVE 1A

a) NEW DIKE

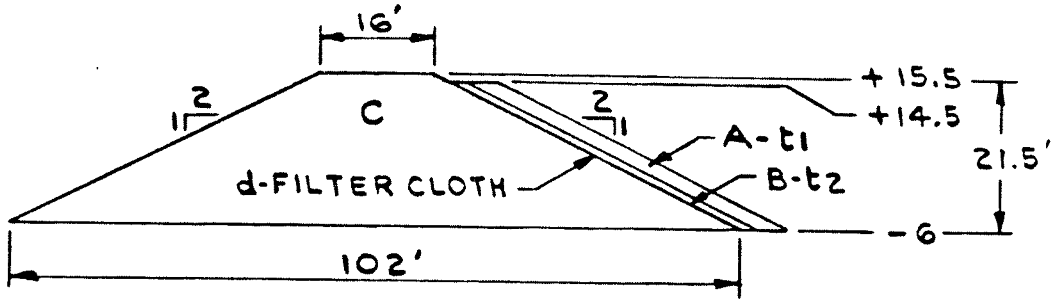


LENGTH OF DIKE 4265'

t1 = 24"
t2 = 12"

ALTERNATIVE 1B

b) NEW DIKE



LENGTH OF DIKE 4265'

t1 = 24"
t2 = 12"

A - ARMOR - 1000 - 3000 LBS.
B - UNDERLAYER - 50 - 200 LBS.
C - CORE MATERIAL - PREPARED LIMESTONE.
d - PLASTIC FILTER CLOTH INSTALLED UNDER UNDERLAYER.
2' SETTLEMENT ASSUMED.

SCALE 1MM = 1FT

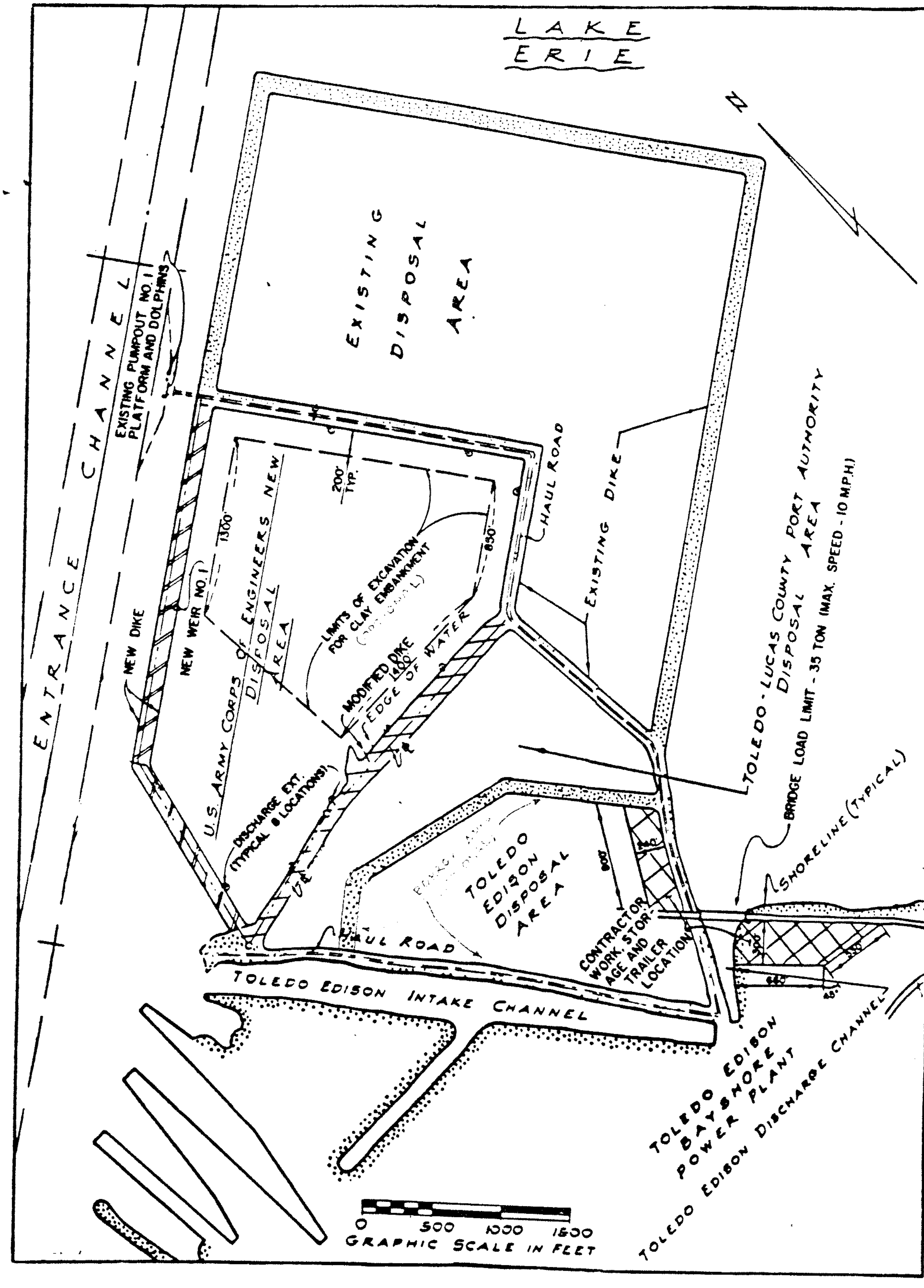
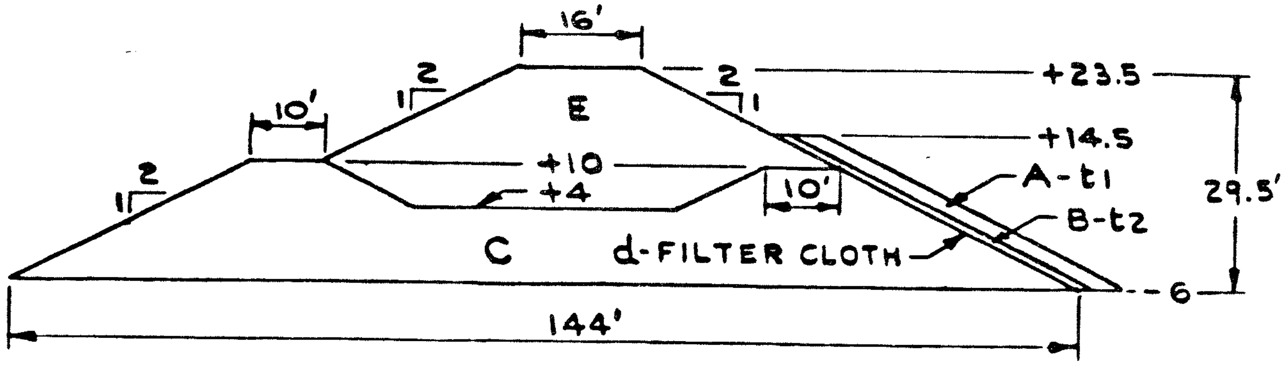

LAKE ERIE
N
EXISTING DISPOSAL AREA
ENTRANCE CHANNEL
EXISTING PUMPOUT NO. 1 PLATFORM AND DOLPHINS
NEW DIKE
NEW WEIR NO. 1
U.S. ARMY CORPS OF ENGINEERS NEW DISPOSAL AREA
LIMITS OF EXCAVATION FOR CLAY EMBANKMENT
MODIFIED DIKE
EDGE OF WATER
200' TYP.
1300'
850'
1400'
HAUL ROAD
EXISTING DIKE
TOLEDO-LUCAS COUNTY PORT AUTHORITY DISPOSAL AREA
BRIDGE LOAD LIMIT - 35 TON (MAX. SPEED - 10 M.P.H.)
SHORELINE (TYPICAL)
DISCHARGE EXT. (TYPICAL 8 LOCATIONS)
TOLEDO EDISON DISPOSAL AREA
CONTRACTOR WORK, STORAGE AND TRAILER LOCATIONS
HAUL ROAD
TOLEDO EDISON INTAKE CHANNEL
TOLEDO EDISON BAYSHORE POWER PLANT
TOLEDO EDISON DISCHARGE CHANNEL
0 500 1000 1500
GRAPHIC SCALE IN FEET

Plate EIS-9

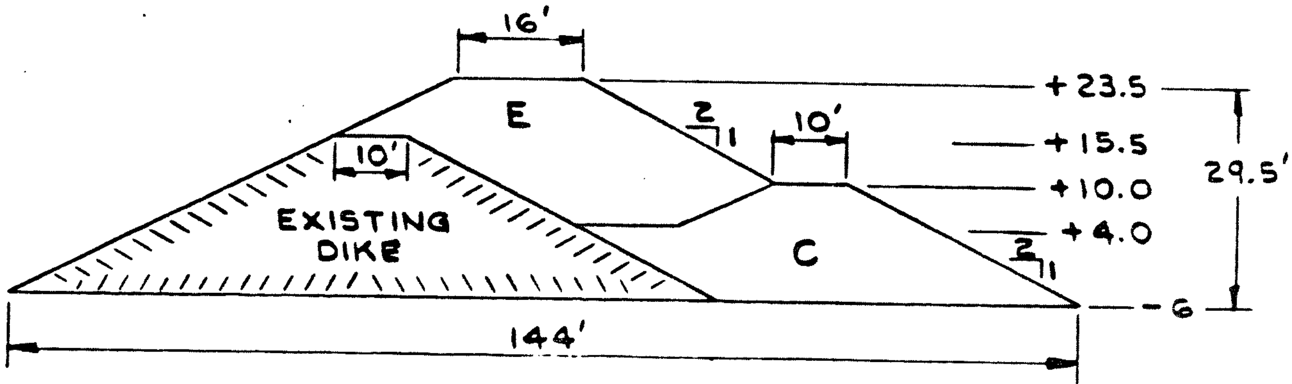
a) NEW DIKE



LENGTH OF DIKE 4265'

t1 = 24"
t2 = 12"

b) RAISE DIKE



LENGTH OF DIKE 3412'

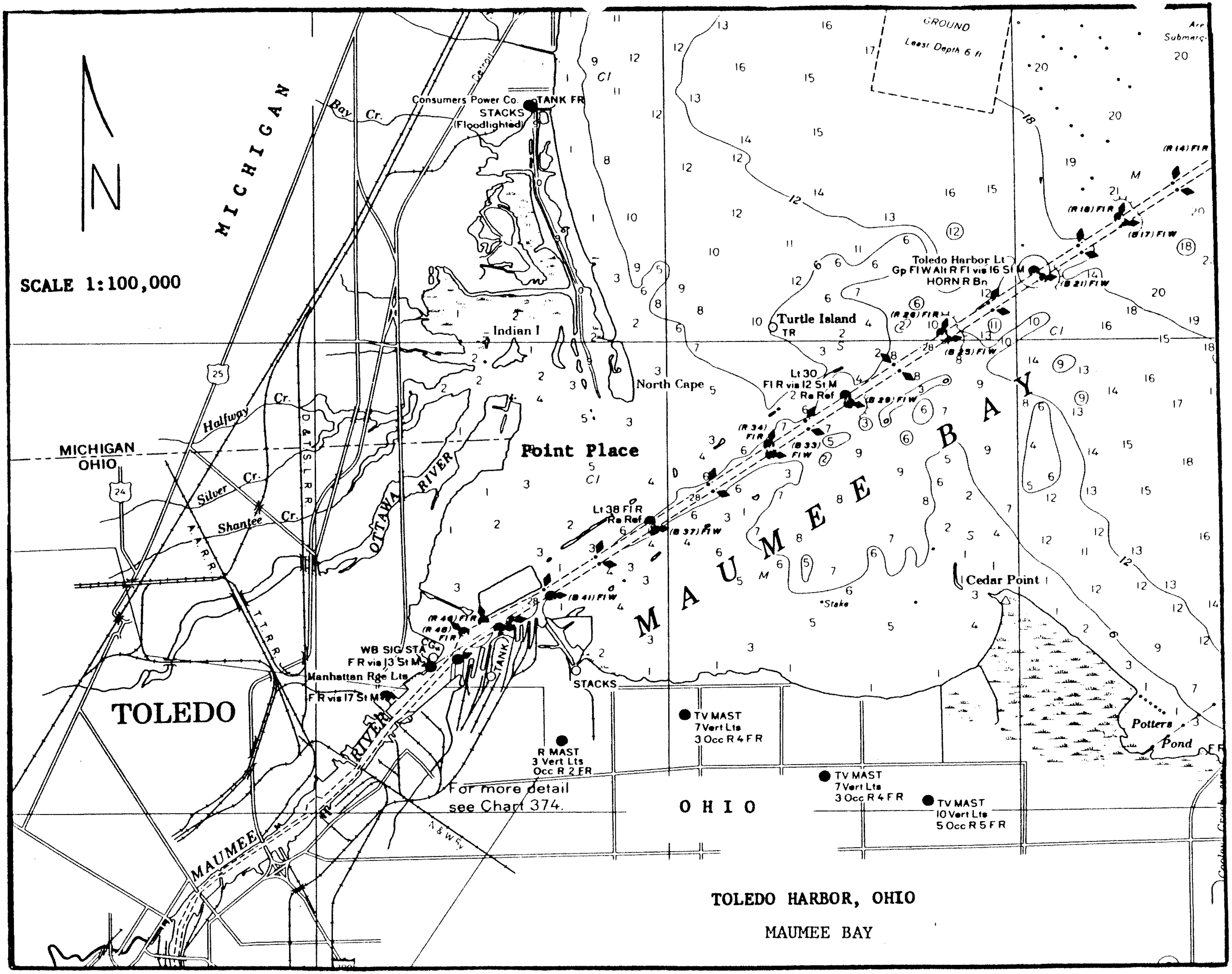
A - ARMOR - 1000 - 3000 LBS.
B - UNDERLAYER - 50 - 200 LBS.
C - CORE MATERIAL - PREPARED LIMESTONE.
E - CLAY - EXCAVATED FROM BOTTOM WITHIN ENCLOSED AREA.
d - PLASTIC FILTER CLOTH INSTALLED UNDER UNDERLAYER.

SCALE 1MM = 1FT

Plate EIS-10

TOLEDO
HARBOR
MICHIGAN
INDIANA
MICHIGAN
OHIO
8.
NORTH MAUMEE BAY
9.
SOUTH
MAUMEE
BAY
3.
TIFFIN RIVER
7. LOWER MAUMEE RIVER
1. ST. JOSEPH RIVER
6.
UPPER MAUMEE RIVER
5. BLANCHARD RIVER
4.
AUGLAIZE RIVER
2.
ST. MARYS RIVER
0 5 0 15 MILES
INDIANA
OHIO

Plate EIS-11


TOLEDO HARBOR, OHIO
MAUMEE BAY
SCALE 1:100,000
TOLEDO
MICHIGAN
OHIO
MAUMEE BAY
MAUMEE RIVER
OTTAWA RIVER
Point Place
Turtle Island
Cedar Point
North Cape
Indian I
Potters Pond
Consumers Power Co. STACKS (Floodlighted)
TANK FR
For more detail see Chart 374.
Toledo Harbor Lt
Gp Fl W Alt R Fl vis 16 St M
HORN R Bn
WB SIG STA
Manhattan Rge Lts
R MAST
3 Vert Lts
Occ R 2 FR
TV MAST
7 Vert Lts
3 Occ R 4 F R
TV MAST
10 Vert Lts
5 Occ R 5 F R
Lt 30
Fl R vis 12 St M
Lt 38 Fl R
Halfway Cr.
Silver Cr.
Shantee Cr.
Bay Cr.
GROUND
Least Depth 6 ft
STACKS
TANK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF

14 AUG 1986

5ME-14

Colonel Daniel R. Clark
District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Clark:

1. In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA), the Region V Office of the U.S. Environmental Protection Agency (USEPA) has reviewed the Draft Environmental Impact Statement (DEIS) on the Toledo Harbor Confined Disposal Facility (CDF) in Lucas County, Ohio. The Buffalo District of the Corps of Engineers (COE) proposes to construct the CDF to contain maintenance dredged material from the Federal deep-draft navigation channel in the portions of the Maumee River and Maumee Bay that form the majority of Toledo Harbor. The CDF would be constructed adjacent to an existing 242-acre Federal CDF and a privately-owned CDF, and would be approximately 162 acres in size. The capacity of the CDF would be approximately 8,764,000 cubic yards of consolidated dredged material, and would have a maximum effective lifespan of 21 years, based on current dredging and disposal volumes.

Alternatives Considered

2. It is indicated in Section EIS2.07 (page 8) of the DEIS that many alternative sites were considered for disposal of the dredged material from Toledo Harbor during the last 10 years. A study performed in 1974 examined the feasibility of discontinuance of maintenance dredging, open-water disposal, upland sites, and in-water sites. Many of these alternatives were eliminated from detailed consideration by COE on the basis of excess cost, distance from the dredging site, and adverse impacts on the circulation patterns and biological resources of Maumee Bay. Open-water disposal was not considered in detail because much of the material to be dredged is polluted, and therefore was determined to be unsuitable for this purpose.

3. It also is indicated that no feasible upland site was identified by COE, and that this alternative therefore was not considered further. Shore restoration at Woodtick Peninsula was eliminated on the basis of high cost. Although the concept of reuse of dredged materials presently contained in existing CDFs was considered, no detailed plans were developed because a practical reuse alternative was not identified. However, COE indicated in the DEIS that this option still is being considered for future activities, and could be included as part of the activities involved in the construction of the new CDF.

Response to U.S. Environmental Protection Agency
(14 August 1986)

1. No response necessary.

2. No response necessary.

3. Additional discussion of reuse alternatives has been included (paragraphs 2.2.8-2.2.19).

4. Four alternative courses of action were considered in detail during the preparation of the DEIS:

- No Action

  Continuation of present conditions. Approximately 876,000 cubic yards of sediments were dredged from Toledo Harbor in 1985. Approximately 308,633 cubic yards (about 40%) were considered to be heavily polluted, and were placed in the existing CDF. If this amount of sediment were placed in the CDF each year, the existing CDF would be full within 3 to 6 years. If no disposal space were available, dredging of the lake channels also could cease, because these channels only provide access to the river channel. Without maintenance dredging, recreational and commercial activity in Toledo Harbor would be adversely affected. The only feasible alternative would be emergency dredging and open-lake disposal of the dredged sediment, which would have adverse effects on the aquatic ecosystem.

- Elevate Walls of Existing CDF

  Elevation of the walls of the existing Federal CDF would increase its capacity. Two options were considered: raising the dike walls by 5 feet, and raising the walls by 10 feet. These alternatives were not considered in detail because such action would reduce the potential of the area for port expansion, would result in adverse aesthetic impacts, would extend the lifespan of the CDF only slightly (5.8 years for the 5-foot wall, and 11.4 years for the 10-foot wall), and would not have sufficient net benefits to qualify as the National Economic Development Plan.

- Construction of a New Confined Disposal Facility

  Seven different options were considered for construction of a new CDF. Most were eliminated from detailed consideration because of high costs and adverse effects on the aquatic ecosystem. Site 1, an area adjacent to the existing CDF, was examined in more detail. Three alternatives options, each with a different dike height, were assessed (1a, 1b, and 1c).

5. Alternative 1c was selected by COE as the preferred plan, primarily because it has the greatest annual benefits. This alternative would consist of construction of one new dike wall, approximately 4,265 feet long and 29.5 feet high, which would enclose a 162-acre area adjacent to the Federal navigation channel and landward of the existing Federal CDF. This alternative would have a capacity of 8,764,000 cubic yards, which would permit placement of consolidated dredged material from Toledo Harbor for 21.9 years. Because only one new dike wall would be constructed, the dike walls of the adjacent Federal CDF and the Toledo Edison Disposal Area, which would serve as two of the walls of the new CDF, would be reconstructed and raised to a height of 29.5 feet, along a distance of 3,412 feet, to allow Alternative 1c to be completed. The elevation of these walls would provide an additional 3,350,000 cubic yards of capacity.

4. No response necessary.

5. The proposed CDF would enclose 155 acres and an additional 14 acres would be occupied by the new dike. Although the height of the dike would be 29.5 feet (+23.5 LWD), it was assumed the dike would sink 1.5 feet into the lake bottom. A height of 28 feet and an area of 155 acres were used for the volume calculation (7,320,000 cubic yards). The existing Federal CDF wall would not be raised but the Toledo Edison Disposal wall would be raised to a height of 29.5 feet.

Previous USEPA Activities Related to the Proposed Project

USEPA has participated in various activities related to removal of the contaminated sediments from Toledo Harbor since the 1970s. We have commented on documents produced by COE prior to the current DEIS, such as the EISs for the construction of the existing Federal CDF (1974) and for maintenance dredging of Toledo Harbor (1976). We attended the Site Selection Committee meeting on April 9, 1980, and we submitted a letter stating our concerns
6. regarding the proposed Woodtick Peninsula marsh creation project on June 4, 1980. We continue to review the results of periodic sediment sampling performed in the project area. On May 28, 1986, we attended a meeting of the Memorandum of Agreement Committee that was formed to monitor activities surrounding the disposal of materials dredged from Toledo Harbor, and we commented on a proposed new open-water disposal site in our letter of July 16, 1986.

USEPA Concerns Regarding the Proposed Action

It appears that construction of the proposed CDF at the site preferred by COE (Alternative 1c) would have the least impacts on water quality of any of the other in-water sites considered. However, there is little documentation
7. of the reasons for rejection of any of the upland sites considered in previous studies. Approximately 162 acres of lake bottom habitat, about 1,600 feet of riprapped shoreline habitat, and areas of submergent aquatic vegetation and cobble habitat would be lost, yet no mitigation is proposed by COE for the loss of this habitat.

Additional information needs to be provided on the design and effectiveness of the CDF, particularly the structure and pollutant containment capability of the dike walls. It is indicated in the DEIS that an overflow structure and discharge pipeline will be constructed at the CDF, but there is no information given on the location of these structures. No plan is presented for monitoring the discharge or the seepage that is stated would occur
8. through the limestone dike walls. The amounts and types of pollutants that could be lost from the CDF by this or other routes are not identified. Although the DEIS indicates that emphasis will be placed on beneficial reuse of the sediments to be dredged and of sediments presently confined in existing CDFs in the Toledo Harbor area (if these sediments are suitable for such purposes), there is no detailed analysis of this alternative. The possibility and consequences of future changes in the pollutional classification of the sediments needs to be considered, and the options for ultimate use of the facility should be identified and described.

Due to the lack of this information, we are not able to adequately identify
9. and assess the impacts to human health and the environment that could occur if the proposed action were implemented. Our detailed discussion of these concerns is contained in the enclosure with this letter.

6. No response necessary.

7. Upland disposal was determined to be too costly; sites identified in previous studies were eliminated due to availability and cost. No viable upland site was identified in this study.

In conjunction with the USFWS, we have re-evaluated the affected fish and wildlife resources and the project impacts on habitat values at the proposed site and have determined that mitigation of these impacts would not be justified. The beneficial water and sediment quality impacts resulting from containment of "heavily polluted" Toledo Harbor sediments and the fact that the affected fish and wildlife resources do not meet Corps of Engineers criteria for significance, in that they are neither scarce nor unique within Maumee Bay, are the basis for this determination.

8. Para. 2.4.2 has been revised to provide additional information on the discharge pipeline and overflow structure. Like the existing Toledo CDF, the proposed CDF design permits the flow of water through the dike during the first one-third of the CDF life. During this time, the long detention times in the CDF and the filtering properties of the prepared limestone is adequate to settle and retain the polluted solids. Monitoring at other permeable dike CDF's (i.e., Buffalo, Huron, and Cleveland) indicate that no pollutants were detected leaking from these sites. In fact, shortly after the disposal operation has ceased, the water quality inside the disposal facility mirrors that of the reference site in the lake. These results reflect research by the Corps of Engineers' Waterways Experiment Station which indicate that the pollutants adhere tightly to the fine-grained sediments. In addition, laboratory leachate test performed for the Buffalo District on polluted material showed an indicated the release of an inconsequential amount of pollutants. Based on the Corps of Engineers studies-to-date, an impermeable dike is not necessary to adequately contain pollutants associated with dredged material. In order to build an impermeable dike of clay, the construction area would have to be dewatered, since clay cannot be compacted under saturated conditions. Dewatering would greatly increase the CDF construction cost. The Buffalo District contends that the existing dike design in Toledo is sufficient and additional cost to construct an impermeable dike is not warranted. A set of three water quality monitoring wells will be incorporated into the new CDF wall.

If conditions change and a greater percentage of the dredged material from the existing "heavily polluted" area becomes environmentally acceptable for open-lake disposal, the material would most likely be disposed of in the open lake provided the volume saved in the CDF is required for future "heavily polluted" dredged material. It is economically advantageous to contain the material from the existing "heavily polluted" area than to place it at an open-lake site, provided the sunk (construction) cost of the CDF is not included. At the other end of the spectrum, the CDF has sufficient capacity to accommodate all the material from the Toledo Federal Harbor, if necessary. As a result, by adding essentially one wall to a pre-existing semi-enclosed area, the existing plan provides sufficient flexibility to accommodate changes in the pollutional classification of the Toledo Federal Channel dredged material.

Alternatives regarding beneficial reuse of dredged material have been updated and expanded. See Section 3 for additional discussion regarding reuse alternatives.

9. Specific concerns are addressed below.

<u>Rating Assigned to Project</u>

Based on our review of the information provided, we have assigned a rating of EC-2 to the DEIS. This rating will be published in the <u>Federal Register</u>. The EC portion of the rating indicates that USEPA has environmental concerns regarding the implementation of the proposed action, because of the potential for adverse impacts on water quality, aquatic biota, and wildlife.

The numeral 2 signifies that we have rated the adequacy of the DEIS as Category 2 (Insufficient Information), because the information in the document is not sufficient for us to fully assess the impacts that should be avoided in order to fully protect the environment. The additional information required,
10 which is identified in the enclosed detailed comments, should be included in the Final Environmental Impact Statement (FEIS).

Thank you for the opportunity to review the DEIS. We are hopeful that the concerns we have expressed can be resolved in the near future, and we look forward to continuing to work with your agency, the U.S. Fish and Wildlife Service, and the State of Ohio to protect the water quality and biota of the Toledo Harbor environment. We would be willing to meet with you and with any other interested agencies to discuss our concerns. If you have any questions concerning our comments, please contact Ms. Kathleen Brennan of my staff at 312/886-6873 (commercial) or 886-6873 (FTS).

Sincerely yours,

William D. Franz

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

Enclosure

10. No specific response required.

U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE TOLEDO HARBOR CONFINED DISPOSAL FACILITY IN LUCAS COUNTY, OHIO

11. The U.S. Army Corps of Engineers has proposed to construct an in-water confined disposal facility (CDF) adjacent to an existing Federal CDF and a privatelyowned CDF in Maumee Bay near Toledo, Ohio. The CDF has been designed to contain a total of 8,764,000 cubic yards of consolidated dredged material, to to be removed from Toledo Harbor during approximately 21 years of future dredging operations. If a new CDF is not constructed, and disposal of maintenance maintenance dredged materials into the existing Federal CDF is continued at the present level of approximately 900,000 cubic yards per year, that CDF would be filled in three to four years. If a larger percentage of the dredged material is open-water disposed, as was the case in 1985, and approximately 500,000 cubic yards of sediment is placed in the CDF per year, the lifespan of the CDF could be extended to six years.

Identification of USEPA Concerns

12. Based on our review of the Draft Environmental Impact Statement (DEIS) for the proposed project, we cannot determine with certainty whether significant environmental impacts would occur from the construction and operation of the project. Further information is required to enable us to adequately identify and assess the impacts. This information should be included in the Final Environmental Impact Statement (FEIS). We have a number of concerns related to the assessment of alternatives to the proposed action, the loss of habitat that would occur, the design and effectiveness of the dike walls, the amounts and types of pollutants that would be lost from the facility, the monitoring and control of this loss, and the ultimate use of the facility. These concerns are discussed in detail in the following paragraphs.

Upland Site Alternatives

13. It is stated in Section EIS2.11 (page 9) that no feasible upland site was identified. However, little information is provided on the criteria on which the determination of feasibility was made, or on the specific reasons for rejecting each of the upland sites considered. The FEIS should include an analysis of all upland sites considered, as well as the reasons that each was determined to be infeasible. This information could be presented in a summary table, such as Table 2.1 (page 17a). USEPA prefers the selection of upland sites for disposal of contaminated dredged material, because it is easier to monitor and control any pollutants that may be released from such sediments at an upland site.

Loss of Aquatic Habitat

14. The information presented in Sections EIS4.05 (page 32) and EIS5.07 (page 39) indicates that approximately 162 acres of lake bottom habitat, 1,600 feet of riprapped shoreline habitat, relatively large areas of submergent vegetation, and an undetermined amount of sand, gravel, and cobble habitat on the sandbar and peninsula would be lost if the CDF is constructed at the preferred site.

Response to U.S. Environmental Protection Agency (Cont'd)
(14 August 1986)

11. No specific response necessary; estimates of capacities and lifespans have been updated in the Final EIS (para. 3.2.28).

12. Specific concerns are addressed below.

13. Paragraphs 2.2.10-2.2.19 present a discussion of alternative upland disposal sites evaluated during the course of the study.

14. In conjunction with the USFWS, we have re-evaluated the affected fish and wildlife resources and the project impacts on habitat values at the site and have determined the mitigation of these impacts would not be justified. The beneficial water and sediment quality impacts resulting from containment of "heavily polluted" Toledo Harbor sediments and the fact that the affected fish and wildlife resources do not meet Corps of Engineers criteria for significance, in that they are neither scarce nor unique within Maumee Bay, are the basis for this determination.

14. However, COE does not indicate what mitigation would be done to offset this loss. Reference is made to studies by the U.S. Fish and Wildlife Service (USFWS) that will be reviewed to "...help determine the relative significance of the habitat that will be lost and aid in formulating a final mitigation decision...." (page 40). The FEIS should specify the type(s) and location(s) of the mitigation measure (or measures) that will be taken to offset this loss.

Constituents of Dredged Sediments

15. It is stated in Section EIS4.05 (page 32) that dredged materials will contain "significant" contamination by several polycyclic aromatic hydrocarbons (PAHs). However, quantitative data are not presented to indicate what is meant by "significant". This information should be included in the FEIS. If possible, COE should estimate the quantity of PAH loadings that might be expected to leave the CDF by the various routes that would be available.

Beneficial Reuse of Dredged Sediment

16. USEPA is pleased that COE is actively considering beneficial uses for both newly dredged material and material in existing disposal facilities. We support and encourage these initiatives. However, the DEIS does not include an detailed analysis of a recycling alternative. The FEIS should address the proposed uses of dredged material, both the unpolluted and the dry consolidated material, in more detail, such as was presented in the letter to COE from the Toledo Metropolitan Area Council of Governments (TMACOG), dated January 3, 1985 (page A23). For example, it is indicated in Section EIS2.13 (page 9) indicates that, on an annual basis, 40,000 truckloads of material would need to be transported. The impacts of this activity were not identified, nor were appropriate mitigation or management measures, such as transportation of the material at off-peak hours. Additional assessment of this alternative should be provided in the FEIS, so that an accurate comparison of alternatives, and possibly combinations of alternative actions, can be made. Also, specific design features to facilitate the removal of sediments from the new CDF are not indicated on the figures in the DEIS. If COE intends to continue investigating the use of these sediments for beneficial purposes after dewatering, such features should be identified in the FEIS.

Dike Wall Components and Effectiveness

17. It is stated in Section 3.2.4 (page 7) of the 404(b)(1) evaluation that the proposed dike "...is expected to effectively retain sediment particulates and associated particulates within the CDF." It also states that the basic design of the CDF and the "...resultant clogging of the limestome during actual dredge material disposal is expected to render the dike walls impervious to solids." However, information on the ability of prepared limestone dike walls to contain particulates is not provided. Have performance tests been conducted to justify these statements? If so, how well do such limestone walls perform in retaining fine-grained suspended particulates? A recent study demonstrated that lead, copper, chromium, and zinc can readily adsorb on fine particles (those less than 13 micrometers in diameter; Mudroch, Alena and George A. Duncan, 1986. Distribution of Metals in Different Size Fractions of Sediment from the Niagara River. Journal of Great Lakes Research, Vol. 12, No. 2, pp. 117-126). It is these fine particles that would be most likely to seep through the dike walls.

15. Sediment quality test data for organic parameters has been included in Appendix EIS-D (Table EIS-D-2). As explained in paragraph 4.2.13, the leaching of significant quantities of pollutants, including PAH's, through the dike is not anticipated.

16. Since no viable beneficial reuse alternative was identified the amount of discussion presented in the Draft EIS was limited. The Final EIS, however, has been expanded to update the reviewer and provides a discussion of beneficial use alternatives (paragraphs 2.2.7-2.2.19).

17. See para. 4.2.13. The gradation of the prepared limestone proposed to provide for filtration in the dike would be as follows:

Percent by Weight Passing	U.S. Standard Sieve Size
100	6-1/2 inches
72-100	4 inches
50-80	2 inches
35-60	1 inch
22-42	3/8 inch
9-27	No. 10
0-16	No. 40
0-5	No. 200

This gradation has 15 to 30 percent of the material in the sand size range which would greatly increase removal of fines with attached pollutants. The prepared limestone and inner core would allow seepage of water through a decreasing dike surface area as the CDF is filled. Flow is expected to occur over the first one-third of the CDF's life (seven years). The movement of silt and clay-sized particles and attached pollutants through the dike is expected to be negligible over the life of the filling because of the filtration through the core and the graded limestone.

17. The FEIS should reference any performance studies conducted on a CDF of similar design as the one proposed for Toledo Harbor.

18. Based on Plate 2.7 (page 17) it appears that clay will be placed only as a cover on the prepared limestone core, not as a complete barrier wall in the dike. Therefore, it is possible that pollutants could migrate through the limestone lower portion of the wall, and enter the lake. The plastic filter cloth would provide only a limited amount of protection against this possibility; it may prevent movement of solids, but is easily damaged. The possibility of constructing the dike walls primarily of clay should be examined. If this is not possible, the feasibility of constructing a clay wall in the center of the dike, extending from the bottom of the CDF to the top, should be examined. Also, the components of the existing dikes for the Federal CDF and the Toledo Edison CDF are not indicated in Plate 2.7. If these dikes are not constructed in a similar manner, the clay to be added should extend down to the base of these dikes also.

Location of Overflow Structure and Monitoring of Effluent

19. It is stated in Section 2.6.3 of the 404(b)(1) evaluation that, after the dredged material settles, the supernatant will be returned to Lake Erie through a weir and a discharge pipe. It also is indicated that some of the supernatant would filter through the bottom of the dike walls. The location of the discharge is not identified, nor is there any mention of monitoring of the effluent. The discharge point should be sited to avoid short-circuiting of the drainage in the CDF. A monitoring program to determine the quality and quantify the effluent should be developed, and should be discussed in the FEIS. In addition, monitoring stations should be established at various locations on or in the dike wall, to determine if seepage is occurring through the bottom of the wall.

Sediment Classification

20. The last sentence in Section EIS3.2 (page 23) reads "The USEPA classification criteria for these sediments have changed several times." This statement should be replaced with the following: "There have been gradual improvements in sediment quality in the Federal project area during the last 10 years. This improvement is reflected in USEPA's changes in pollution classification of the sediments, which has resulted resulted in the designation of more material as suitable for unconfined in-lake disposal."

21. Section EIS3.13 (page 24) should be corrected to say that USEPA's classification was based on consideration of bulk chemistry, elutriate, and bioassay data. Table 3.3 (page 26) should then either contain all of the data considered (attached) or just the actual chemical values, rather than the classifications.

22. The FEIS should consider the possibility and consequences of future changes in the pollutional classification of the sediments. If sediment quality continues to improve, more of the sediments would be suitable for open-water disposal or beneficial use. However, if the results of studies currently underway indicate that these sediments would not be suitable for open-water disposal in Lake Erie due to the bioavailability of phosphorus, these sediments also would have to be placed in a CDF, or

18. See Response No. 17.

19. Para. 2.4.2(c) identifies the location of the proposed weir and discharge points. At a minimum, the proposed facility would offer the same level of environmental protection as the existing facility. The distance between the weir and the dredge discharge pipe would be maximized while minimizing dead zone areas within the CDF caused by short-circuiting. The total weir length incorporated into the proposed CDF would be longer than the existing weir such that the withdraw depth would be reduced, therefore minimizing suspended solids in the effluent. Management of the weir would help avoid botulism, produce a quality effluent, and fully utilize storage capacity of the CDF. Column leach tests using Toledo Harbor sediments have demonstrated negligible levels of pollutants dissolved in water that seeps through typical dike walls. A set of three water quality monitoring wells would be installed in the proposed dike wall.

20. Revised as suggested (para. 3.2.12).

21. Appendix EIS-D has been added to include the results of the bulk chemistry and elutriate analyses. Table EIS-7 displays the sediment bioassay test results.

22. If conditions change and a greater percentage of the dredged material from the existing "heavily polluted" area becomes environmentally acceptable for open-lake disposal, the material will most likely be disposed of in the open

22. used in a beneficial manner. Either of these situations would affect the benefit/cost ratio and the lifespan of the proposed CDF.

Effects on Wildlife

The FEIS should discuss in more detail the management techniques that
23. would be implemented to avoid outbreaks of botulism at the site. In addition to the control of the water level in the CDF, other applicable techniques, such as timing of disposal into the CDF, should be discussed.

Ultimate Use of Facility

It is indicated in Section 2.5.2 of the 404(b)(1) evaluation (page 5) that the CDF will be fertilized, seeded, and mulched after it is filled. However, there is little information on the ultimate use of the facility,
24. other than an indication in Section 2.6.3 of the 404(b)(1) evaluation (page 5) that it may be used for port expansion. If alternatives exist for the final use of the site, these should be identified and discussed in the FEIS.

lake provided the volume saved in the CDF is required for future "heavily polluted" dredgings. It is more economically advantageous to contain the material from the existing "heavily polluted" area than to place it at an open-lake site, provided the sunk (construction) cost of the CDF is not included. At the other end of the spectrum, the CDF has sufficient capacity to accommodate all the material from the Toledo Federal Harbor, if necessary. As a result, by adding essentially one wall to an existing semi-enclosed area, the recommended plan provides sufficient flexibility to accommodate changes in the pollutional classification of the Toledo Federal Channel dredged material.

23. Botulism would be minimized within the proposed CDF because of appropriate CDF design features, operational considerations, and readiness. Design features include a weir length that would permit rapid drawdown without significantly impacting the water quality, vehicle access on top of the dike and adequate inner dike erosion protection such that the water level in the CDF could be raised without jeopardizing the integrity of the dike. Operational considerations include scheduling dredging such that site conditions would not be favorable for botulism and surveying the CDF after each disposal operation to determine if site conditions might support botulism. Appendix EIS-E presents the botulism control plan for the proposed CDF.

24. There are no "final use plans" for the site at this time. After the proposed CDF has been filled, operation and maintenance of the facility would be transferred to the Toledo/Lucas County Port Authority. The ultimate development of the site would be the prerogative of the Authority subject to approval by the Corps of Engineers.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

OFC. MGMT. OAS
6 AUG 86 09 51

Response to National Oceanic and Atmospheric Adminstration
(4 August 1986)

August 4, 1986

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
ATTN: Mr. William F. MacDonald

Dear Sir:

1. This is in reference to your draft environmental impact statement for Confined Disposal Facility at Toledo Harbor, Ohio. Enclosed are comments from the National Oceanic & Atmospheric Administration.

We hope our comments will assist you. Thank you for giving us an opportunity to review the document.

Sincerely,

David Cottingham

David Cottingham
Ecology and Conservation Division

Enclosure

1. No response required.

EIS-64

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Washington, D.C. 20230

JUL 2_ 1986

TO: BF/ECD - David Cottingham

FROM: Nx1 - John J. Carey John J. Carey

SUBJECT: DEIS 8606.01 - Toledo Harbor, Ohio

The subject DEIS has been reviewed within the areas of the National Ocean Service's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

2. Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Chief, National Geodetic Information Branch (N/CG17), or Cdr. Melvyn C. Grunthal, Chief, Operations Branch (N/CG16), at 6001 Executive Boulevard, Rockville, Maryland 20852.

Response to National Oceanic and Atmospheric Administration (Cont'd)
(4 August 1986)

2. A review of the project site has confirmed that no geodetic control survey monuments currently exist in the area.

U.S. DEPARTME . OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES

Great Lakes Environmental Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

July 21, 1986 R/E/GL:BJE

MEMORANDUM FOR: PP2 - David Cottingham

FROM: R/E/GL - Frank H. Quinn

SUBJECT: DEIS 8606.01--Toledo Harbor, Ohio

3. The apparent need for increased dredge disposal area, as described in the reference document, can be accomplished by raising the walls of the existing facility, or by building a new addition to the existing facility (option 1C). The selection of any of these alternatives depends on perceived needs and available funds. The environmental impacts appear well researched and acceptable.

Response to National Oceanic an Atmospheric Administration (Cont'd)
(4 August 1986)

3. No response required.

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
175 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

July 29, 1986

ER-86/729

Colonel Daniel R. Clark
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Clark:

The Department of Interior (Department) has reviewed the Draft Environmental Impact Statement (EIS) for a Confined Disposal Facility (CDF) at Toledo Harbor, Ohio. Following are consolidated Department comments for your consideration during further project planning phases.

GENERAL COMMENTS

Several alternatives are presented for the project, but none would have a significant impact on minerals and/or mineral related industries.

1. Known mineral resources and mineral production in Lucas County include cement, sand and gravel (construction), and clays. Because the project is located in Maumee Bay at an existing disposal site near Toledo, Ohio, no conflict is anticipated between the mineral-related industries and the proposed project. The dredging of the channel may benefit the mineral industries (transshipment of coal, iron ore, petroleum products, stone, and sand and gravel) by providing a deeper channel for ships entering the port.

The proposed project could have an impact on Maumee Bay State Park which was acquired and developed with Land and Water Conservation Fund (L&WCF) assistance through Projects 39-00325, 39-00663, and 39-01022. It appears that Maumee Bay State Park is located on the bayshore. Although no dredge or fill is proposed for the parkland, the proposed activities in the bay may have an impact on water-oriented recreation in the park.

2. The project sponsor should consult with the official who administers the L&WCF program in the State of Ohio to determine potential conflicts with Section 6(f)(3) of the L&WCF Act (Public Law 68-578, as amended). Section 6(f)(3) states: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary (of the Interior), be converted to other than public outdoor recreation uses." The administrator of the L&WCF program for the State of Ohio is Mr. Joseph J. Sommer, Director, Department of Natural Resources, Fountain Square, Building D-1, Columbus, Ohio 43224.

Response to U.S. Department of the Interior
(29 July 1986)

1. No response required.

2. The Ohio Department of Natural Resources (ODNR) reported in a letter dated 8 September 1986 that the Department does not anticipate significant adverse impacts on Maumee Bay State Park, which received funding assistance through the Land and Water Conservation Fund Act (PL-88-578), due to the construction, operation or maintenance of the proposed CDF. Therefore, no Section 6(F) conflict should exist.

EIS-67

3. The Draft EIS is rather cursory in its treatment of some of the alternatives analyzed and in its description of the environmental setting. We also believe the document to be in error regarding some of the calculated dike lengths and volume estimates for various new CDF alternatives. However, these errors of omission and commission do not appear to be sufficient to modify the conclusion of the document that Alternative 1c presently represents the most cost effective and least environmentally damaging of the detailed plans that were analyzed to provide a large capacity containment area for polluted dredged materials.

SPECIFIC COMMENTS

Quantities of Dredged Materials:

4. Table 3.6 indicates that from 1975 through 1985, an average of 1,013,786 cubic yards of material was dredged annually from Toledo Harbor. An approximation of this figure is used several times in the document. However, on page ii of the Summary, the average dredging figure is given as 800,000 to 900,000 cubic yards.

Sediment Quality:

5. Paragraph 2.4.3 of the Section 404(b)(1) Evaluation indicates that the U.S. Environmental Protection Agency (EPA) classified the sediments between Stations R-5M and R-7M as acceptable for open-water disposal and the sediments between Stations L-2M and R-5M as polluted and not suitable for open-water disposal. These findings are in agreement with the pollution status of Stations L-2M through R-7M shown on Table 3.3 of the Draft EIS and Table 1 of the Section 404(b)(1) Evaluation. However, paragraph EIS 3.13 indicates that the EPA considers all the sediments from Stations L-2M through R-7M to be too polluted for open-lake disposal. Paragraphs EIS 1.01, 1.07, and 2.03 also indicate that all the sediments upstream of Station L-2M are "polluted" or "heavily polluted" and unsuitable for open-lake disposal. These discrepancies should be clarified. In their letter of November 29, 1984, the U.S. Fish and Wildlife Service (Service) requested that, until further sediment testing could be done, the sediments from Stations R-5M to R-6M should be confined in the Toledo CDF due to elevated levels of several Polynuclear Aromatic Hydrocarbons (PAHs) in these sediments. Any materials from the upper part of the Federal channel that are suitable for open-lake disposal should not be placed in a CDF for the sake of expediency.

Response to U.S. Department of the Interior (Cont'd)
(29 July 1986)

3. No response required; responses to specific concerns are provided below.

4. To remain consistent within the EIS and other project documents, the dredging quantity has been approximated at 1,000,000 cubic yards, which is the average dredged over an 14-year period. The report has been revised to reflect this quantity.

5. Stations R-5-M through R-7-M are not classified "heavily polluted" by USEPA standards. The U.S. Fish and Wildlife Service by letter dated November 29, 1984 requested that the sediments from Stations R-5-M to R-6-M be confined until further testing is conducted because of concerns regarding PAH's. The Corps of Engineers, consequently, decided to confine all sediments from Stations R-5-M to R-7-M due to its proximity (upstream) and the logistics of dredging. When more information becomes available regarding "standards" for PAH's and additional test data is available the Corps of Engineers will re-evaluate its decision.

Size and Capacity of Proposed New CDF (Alternative 1c):

6. Page 1 of Public Notice NCBPD-ER No. (37) indicates that the dike and enclosed area will occupy about 162 acres. Paragraph 2.2.1 of the Section 404(b)(1) Evaluation indicates that the proposed CDF will occupy approximately 162 acres of Maumee Bay. Paragraph EIS 4.05 indicates that construction of the CDF will result in the loss of approximately 162 acres of mud-bottom habitat. However, paragraph EIS 2.23 indicates that the CDF will enclose a 162-acre water area. As the CDF dikes will occupy at least 12 acres, a CDF occupying 162 acres will only provide an effective disposal area of about 150 acres.

If the CDF could be filled completely to the top of its design height of 29.5 feet, its capacity would be about 7,140,000 cubic yards. However, the average bottom elevation of the enclosed area is closer to -3 feet rather than -6 feet, as shown on Plate 2.7; thereby reducing the volume to about 6,413,000 cubic yards. If all of the clay to be used in the new dike and raised dike shown on Plate 2.7 came from the enclosed area, about 210,000 cubic yards of additional volume would be created; thereby increasing the total volume to 6,623,000 cubic yards. If consolidated dredged material in the CDF is equal to about 86 percent of its volume as measured "in situ" in the navigation channel, the calculated capacity of the CDF would be about 7,700,000 cubic yards of dredged material. This is considerably less than the 8,764,000 cubic yard capacity stated in the Draft EIS. We assume that the above figure from the Draft EIS refers to cubic yards of dredged material, measured "in situ", that can be held by the CDF and not to cubic yardage of consolidated material as incorrectly stated in the Abstract and in paragraph EIS 2.24.

Analysis of Non-Selected Alternatives:

7. Paragraph EIS 2.19 indicates that 25,000 feet of diking would be required to construct Alternative 4 and that 15,400 feet of diking would be required for Alternative 2. These measurements appear to have been taken from Plate 2.5. Unfortunately, the scale used on the Plate is incorrect. The scale should be approximately 2,300 feet per inch, not 4,500 feet per inch as shown. The correct dike lengths would then be about 12,700 feet for Alternative 4 and 7,700 feet for Alternative 2. A further reduction in dike length per given containment volume could be achieved by using a more rounded shape. A circular design somewhat flattened on the channel side could be used at the Alternative 4 site to create a 160-acre CDF with a dike of about 10,000 feet in length. Semicircular designs could be used at Alternative 2 site or along the northwest face of Grassy Island to create large capacity CDFs with minimal diking. However, many of the adverse environment effects described in paragraph EIS 2.19 probably could not be avoided even with these designs.

6. The CDF would enclose an area of 155 acres with a dike that would occupy approximately 14 acres. A total of 169 acres would be occupied by the CDF. Although the height of the dike would be 29.5 feet IGLD, it is assumed the dike would sink 1.5 feet into the substrate. A height of 28 feet and an area of 155 acres were used for the volume calculation of 7,320,000 cubic yards. However, an additional 150,000 cubic yards is available above the area occupied by the slope of the dike walls. If the lake depth is actually 3 feet instead of 4.5, the total volume available would be 7,080,000 cubic yards. These estimates are of total area, the capacity after consolidation would be approximately 14 percent greater.

7. Reproduction of the Draft EIS inadvertently reduced all plates and consequently changed all scales. The Final EIS has been corrected. The comment regarding circular-designed CDF's is noted.

8. A general methodology for calculating costs and benefits of various alternatives is given on the bottom of page 1 of the Draft EIS. First costs and net benefits (we assume them to be annual net benefits) are given in Section 2 for Alternatives 5a, 5b, la, lb, and lc. However, detailed data concerning amortization rates; costs for construction, operation, and maintenance of individual alternatives; costs of dredging; and other information necessary to calculate an annual cost are not provided. Neither is any detailed information provided concerning the data used to calculate annual benefits. While we can appreciate the Corps of Engineers' (Corps) attempts to minimize the size of the document, we believe that the detailed information upon which the Benefit/Cost (B/C) ratios are based should be presented.

Construction Design of New CDF:

9. Paragraph EIS 5.08 states that the slope of the existing (242-acre CDF) and proposed (Alternative lc) dike is 3 on 1. However, Plates 2.4 and 2.7 show that the slopes are 2 on 1.

Paragraphs 2.5.2 and 2.6.3 of the Section 404(b)(1) Evaluation and Plate 2.7 of the Draft EIS indicate that the base of the dike will consist of prepared limestone. No information is supplied concerning the size of this material, the reasons for its use in lieu of clay, or the expected flux rate of supernatant and fines through the material. Paragraph 3.6.2 indicates that no significant movement of solids through the pervious limestone base is expected. Has this design been tested sufficiently to substantiate this view?

Description of Existing Resources:

10. The Draft EIS fails to adequately assess the fishery value of Maumee Bay and the lower Maumee River. Paragraph EIS 3.09 lists approximately 14 species of fish and indicates that the list includes most of the fish found in studies of this area of Lake Erie. In fact, the list does not include such commonly found species as sauger, brown bullhead, white crappie, black crappie, trout-perch, and logperch. At least another 20 species are found on a less frequent basis.

Maumee Bay supports some of the highest densities of larval gizzard shad, white bass, and freshwater drum found in the Michigan and Ohio portions of the western basin of Lake Erie. Densities of larval yellow perch, emerald shiner, rainbow smelt, carp, logperch, walleye, and spottail shiner are also relatively high.

Paragraph EIS 2.09 states that the Maumee River appears to support a spawning run of walleye, but lake spawning areas appear to be significantly more important. While it is true that the reef and shoreline areas of the lake may support up to 90 percent of walleye spawning, the spawning runs of both walleye and white bass in the Maumee River are quite large. Estimates of the average number of fish of each

8. Future benefits were discounted and project costs were amortized at an interest rate of 8.375 percent. This allows a comparison of benefits and costs on an equivalent basis.

Construction costs were developed in detail and were included in the Letter Report at Table 1A (Plan 1A), Table 16 (Plan 1B), Table 17 (Plan 1C), and Table 18 (Plan 5A) and Table 19 (Plan 5B) (copy provided to USF&WS). In addition, typical cross-sections are provided as Figures 9, 10, and 11. Each plan has a specific operation and maintenance cost and reflects total length, width, and height of new dike walls required at each location. Unit costs per lineal foot of dike was used to estimate total annual costs for annual maintenance and also reflects typical expenses recorded at other Lake Erie CDF sites. Total annual costs included the sum of amortized construction costs and annual operation and maintenance expenses.

Additional costs for river dredging were also included in the estimate of annual costs. These costs are conceptually necessary since a CDF, by itself, cannot be functional unless dredging removes polluted material from Federal channels and places it into the diked disposal area. River dredging costs reflect unit costs of $4.59 per cubic yard for maintaining authorized depths in the Maumee River and estimated annual quantities of 400,000 cubic yards over the life of the containment alternatives.

Economic benefits were measured as the elimination of future shoaling expected to occur after all existing CDF locations now in use at the harbor are fully utilized. Authorized depths of -27 feet LWD (Maumee River) will diminish as sediment material is carried downstream by the river and deposited at various locations. Major commodities such as grain, coal and iron ore will be primarily affected in the future.

Shoaling rates were determined by examining before and after soundings for 1984. Changes in channel depths between dredging cycles indicate that initial shoaling may be as high as 1.3 feet/year. An equilibrium channel depth of -10 feet LWD may occur in the lower reaches of the river over the long term unless Federal maintenance dredging continues.

9. The slope of the proposed CDF dike would be 2H:1V.

See response to USEPA Comment No. 17, p. EIS-62 regarding the gradation and filtration capabilities of the prepared limestone core.

10. Paragraphs 3.2.5 through 3.2.10 have been revised to provide a more detailed analysis of the fish and wildlife resources of Maumee Bay.

species annually ascending the river are not available. However, creel census information from the Ohio Department of Natural Resources for the years 1978 through 1984 indicate that annual angler harvests ranged from 22,000 to 37,000 for walleye and from 87,000 to 172,000 for white bass.

Water Quality:

11 While we agree that water quality in the river and bay is poor when compared with the open lake, we believe that some of the data presented may be outdated. Paragraph EIS 3.21 indicates that dissolved oxygen levels in the lower river range in value from 2.20 to 5.26 parts per million (ppm). Recent data we have received from the City of Toledo, Environmental Services indicate values for April through July of 1986 ranged from 8.9 down to 5.4 ppm.

Impacts of Proposed Construction:

12 Page i of the Draft EIS Summary, and paragraphs 3.1.7 and 3.5.1 of the Section 404(b)(1) Evaluation indicate that the site of the proposed CDF is a relatively low value environmental site due, in part, to being heavily influenced by poor quality river water. While this may be true and may be one of the valid reasons for siting the proposed new CDF in this location, it does not lend validity to the argument of insignificant impacts to the aquatic environment necessitating mitigation as in paragraphs EIS 4.18, 5.08, and 5.09, and paragragh 3.7.1 of the Section 404(b)(1) Evaluation. It is important to remember that significant water quality degradation is directly attributable to construction of the existing 242-acre Federal CDF and the resulting reduction in water circulation at the proposed site.

13 Paragraph EIS 4.18 indicates that the loss of 162 acres is not significant considering the vast acreage of the bay. However, the proposed CDF, in combination with existing Federal and private CDFs in Maumee Bay, will occupy about 5 percent of the surface acreage of the bay.

14 Paragraph 3.5.5 of the Section 404(b)(1) Evaluation indicates that the proposed CDF will support birds commonly associated with wetlands. Paragraph EIS 4.27 states that CDFs add diversity to the open water nature of the bay and take on the appearance of islands occupied by a wide diversity of birds. It is likely that for the 20 or so years that the structure will be used for disposal, it will attract numerous birds. However, for the vast majority of its life expectancy, the CDF will more probably resemble a commercial port facility than a wildlife-supporting island. This possibility is discussed in paragraph EIS 4.19.

15 Paragraph EIS 5.08 indicates that the new CDF 4,265-foot long dike will provide about two acres of new underwater habitat in comparison to about 1.5 acres associated with the 6,100 feet of existing dikes to be lost. The difference is supposedly due to the greater depths to be expected at

11. Paragraph 3.2.23 has been revised to provide more recent dissolved oxygen data.

12. In conjunction with the USFWS, we have re-evaluated the affected fish and wildlife resources and project impacts on habitat values at the proposed site and have determined that mitigation of these impacts would not be justified. The beneficial water and sediment quality impacts resulting from containment of "heavily polluted" Toledo Harbor sediments and the fact that the affected fish and wildlife resources do not meet Corps of Engineers criteria for significance, in that they are neither scarce nor unique within Maumee Bay, are the basis for this determination.

In regard to water quality impacts caused by the existing 242-acre Federal CDF, it is not agreed that these impacts are a direct impact of the structure as suggested in this comment. Poor water quality in the bay or proposed CDF site is a direct result of poor water quality from the Maumee River not the existing CDF. It is agreed, however, that the CDF does influence and has probably changed water circulation and mixing zones.

13. Maumee Bay (shallow mud bottom section of the western basin) is a dynamic area which is continuously growing from the deposition of sediments from the Maumee River. To speculate on the percent of reduction of the bay area by CDF's, when in reality the bay is probably growing at an alarming rate, does not address the concern of whether or not overall degradation is occurring. Certainly, the function of containing and preventing the movement of polluted sediments from entering the bay exceeds the value of the site.

14. There are no definite plans regarding the ultimate use of the area. If beneficial reuse of the material becomes feasible, the area could continue to be used as a confinement facility for an extended period.

15. Recent information from our engineering and design Contractor indicates that the water along the proposed dike alignment is not as deep as expected. Current estimates indicate that the riprap created would be about equal to that lost. Table EIS-2 (see Table 2.1) has been revised.

the proposed dike compared to those at the existing dikes. A review of depth information from charts of the area and from our field surveys leads us to believe that, at best, these inundated areas of riprap will be about equal and, at worst, there will be a net loss of such habitat. This should be reflected in Table 2.1 of the Draft EIS. This table states that there will be a creation of 2.0 acres of rocky dike habitat but does not mention the offsetting loss of existing rock dike habitat.

16. In conclusion, we believe that the net long-term beneficial effects of the proposed 162-acre CDF do not exceed the foreseeable net adverse effects and that appropriate mitigation is warranted as part of the project. The Columbus, Ohio Field Office of the Fish and Wildlife Service will continue to work with the Buffalo Corps of Engineers to develop an acceptable mitigation plan.

MINOR CORRECTIONS

17.

EIS, page iii: Date should be provided for referenced Letter Report.

EIS 2.12: Woodtick Peninsula is approximately due north of the Toledo Harbor CDF, not northwest.

EIS 3.02: Little Cedar Point extends toward the northwest, not the northeast.

EIS 4.15: This paragraph appears not to agree with the fourth paragraph on EIS page i, which shows B/C ratios for Alternatives 5a and 5b to be greater than B/C ratio for Selected Plan 1c.

EIS 5.09: Surveys will be conducted of submergent vegetation, not emergent.

Section 404(b)(1) 3.5.5: Vegetated shallows (submergent beds referenced above) are present in the CDF site and would be destroyed.

Section 404(b)(1) 3.6.2.: "Pervious" limestone base, not "previous."

Sincerely yours,

Sheila Minor Huff

Sheila Minor Huff
Regional Environmental Officer

16. See Response No. 12.

17. The text has been revised to incorporate these minor corrections. The thoroughness of this review is appreciated.

DEPARTMENT OF HEALTH & HUMAN SERVICES — Public Health Service

Centers for Disease Control
Atlanta GA 30333

July 16, 1986

Mr. William F. MacDonald
District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. MacDonald:

We have reviewed the Draft Environmental Impact Statement (EIS) for a Confined Disposal Facility at Toledo Harbor, Ohio. We are responding on behalf of the U.S. Public Health Service and offer the following comments for consideration in preparing the final document.

The draft document addresses the issue of various pollutant levels in dredge spoils but does not include specific levels. Table 3.3 - "Pollution Status of Maumee River Sediments" provides a list of sediment pollutants and levels
1. according to three categories: highly polluted, moderately polluted, and
unpolluted. The report does not include information on numerical boundaries for these pollution level categories. In order to properly access the health and safety impacts of this project, information on sediment pollutant levels in necessary. The Final EIS should include a section detailing sediment pollutant levels.

We appreciate the opportunity to review this Draft EIS. Please send us a copy of the final document when it becomes available. Should you have any questions about our comments, please contact Mr. Chester L. Tate, Jr., P.E., at FTS 236-4556

Sincerely yours,

Jeffrey A. Lybarger, M.D.
Acting Chief, Environmental Affairs Group
Center for Environmental Health

25 JUL 86 10 43

Response to U.S. Department of Health and Human Services
(16 July 1986)

1. The Final EIS contains detailed sediment pollutant levels as suggested (Appendix EIS-D).

Response to Federal Highway Administration (18 June 1986)

US Department of Transportation
Federal Highway Administration

Region 5
Illinois Indiana Michigan
Minnesota Ohio Wisconsin

18209 Dixie Highway
Homewood Illinois 60430

OFC. MGMT. OAS
20 JUN 86 09 34

June 18, 1986

District Commander
U.S. Army Engineer District, Buffalo
1776 Niargara Street
Buffalo, N.Y. 14207

Attention: Mr. William F. MacDonald

Gentlemen:

1. The draft environmental impact statement for the construction of a dredged material confined disposal facility at Toledo Harbor, Lucas County, Ohio has been reviewed. The proposed project will apparently have no involvement with any Federal-aid highway system. We, therefore, have no comments to offer on the document.

Sincerely yours,

John O. Hibbs
Regional Administrator

E V Heathcock
By: E. V. Heathcock
Director, Office of Planning
and Program Development

cc: P-14
Sec.Rep.
HEV-11

1. No response required.

EIS-74

EIS-75

OAS
11 SEP 86 10 15

ODNR
OHIO DEPARTMENT OF NATURAL RESOURCES

Fountain Square
Columbus, Ohio 43224

September 8, 1986

Colonel Daniel R. Clark
District Engineer
Buffalo District, Corps of Engineers
U.S. Department of the Army
1776 Niagara Street
Buffalo, New York 14207

ATTN: Mr. William F. MacDonald

Dear Colonel Clark:

The Ohio Department of Natural Resources (Department) has completed a review of the Draft Environmental Impact Statement (DEIS) for the Toledo Harbor, Ohio, Confined Disposal Facility (CDF). Please excuse our lateness on submitting these
1. comments.

The Department supports consideration of the issues raised by the Ohio Environmental Protection Agency (OEPA) and the U.S. Department of Interior (USDI) in their letters of July 30, 1986 and July 29, 1986, respectively. We wish to emphasize several of these issues.

Based upon conversations with Corps personnel, we had the understanding that the new dike would be built to an average height of 29.5 feet from substrate level (23.5 feet above low water datum), the Toledo Edison dike would be raised 8 feet
2. and the existing federal dike was already at the desired height. The DEIS, however, states that the federal dike would be reconstructed and elevated (p. 16). The proposed reconstruction of existing dikes should be clarified. Also, the proposed construction methods, as discussed by OEPA, should be clarified.

The DEIS does not adequately analyze the fish and wildlife resources of Maumee Bay. The USDI has provided substantive comment on this issue, which we fully support.
3. The Corps should fully address the resources that would be affected by the proposed facility and design appropriate mitigation to offset these losses.

The Department remains concerned with the potential for botulism outbreaks at the Toledo CDF. It is imperative that the design and management of the new
4. facility prevent such occurences. Outbreaks have occurred at CDFs in Toledo and Cleveland and represent a substantial management problem if the facility is not properly designed and managed.

Richard F. Celeste, Governor

Response to Ohio Department of Natural Resources (8 September 1986)

1. No response required.

2. The Toledo Edison dike would be raised to 29.5 feet, which is the elevation of the existing facility and the proposed facility. The proposed construction method is described in the text of the Final EIS (paragraph 2.4.3) and in response to USEPA, USDI, and OEPA comments previously addressed.

3. Additional information on the fish and wildlife resources of Maumee Bay has been included (paragraphs 3.2.5-3.2.10). In conjunction with the USFWS, we have re-evaluated the affected fish and wildlife resources and project impacts on habitat values at the proposed site and have determined that mitigation of these impacts would not be justified. The beneficial water and sediment quality impacts of containment of "heavily polluted" Toledo Harbor sediments and the fact that the affected fish and wildlife resources do not meet Corps of Engineers criteria for significance, in that they are neither scarce nor unique within Maumee Bay, are the basis for this determination.

4. Botulism would be minimized within the proposed CDF because of appropriate CDF design features, operational considerations, and readiness. Design features include a weir length that would permit rapid drawdown without significantly impacting the water quality, vehicle access on top of the dike and adequate inner dike erosion protection such that the water level in the CDF could be raised without jeopardizing the integrity of the dike. Operational considerations include scheduling dredging such that site conditions are not favorable for botulism and surveying the CDF after each disposal operation to determine if site conditions might support botulism. Appendix EIS-E presents the botulism control plan for the proposed CDF.

Colonel Daniel R. Clark
September 8, 1986
Page -2-

5. The Department does not anticipate significant adverse impacts on Maumee Bay State Park, which received funding assistance through the Land and Water Conservation Fund Act (PL 88-578) due to the construction, operation or maintenance of the preferred action. Therefore, no Section 6(f) conflict should arise.

6. In conclusion, the Department wishes to work with the Corps of Engineers to develop acceptable mitigation of unavoidable adverse impacts of the proposed facility. With mitigative features included as part of the project, we would support the proposed construction of the facility to contain dredged sediments unsuitable for alternative disposal.

We appreciate the opportunity to provide these comments. If you have any questions, please contact John Rupert (614/265-6415) of the Environmental Review Section of this office.

Sincerely,

Michael D. Craden

Michael D. Craden, Ph.D., Chief
Office of Outdoor Recreation Services

MDC/JCR/cab

cc: Bob Strohm, Division of Wildlife
Kent Kroonemeyer, USFWS
Elmer Shannon, USEPA
Audrey Lynch, Ohio EPA
Bob Lucas, Office of Chief Engineer
Dick Bartz, Division of Water

Response to Ohio Department of Natural Resources (Cont'd)
(8 September 1986)

5. No response required.

6. Comment noted.

OhioEPA

State Of Ohio Environmental Protection Agency
P.O. Box 1049, 361 East Broad St., Columbus, Ohio 43216-1049
(614) 466-8565

OFC. MGMT. OAS
4 Aug 86 11 36

Richard F. Celeste, Governor

July 30, 1986

Daniel R. Clark
District Commander
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

ATTN: Mr. Phil Berkeley

Dear Colonel Clark:

1 We have reviewed the Draft Environmental Impact Statement (DEIS) for the Toledo Harbor, Ohio Confined Disposal Facility. By letter dated 29 May, 1986, your office requested water quality certification pursuant to Section 401 of the Clean Water Act. However, prior to issuance of certification by this Agency, several issues must be resolved.

Major concerns regarding the document include the lack of design features to facilitate the re-use of materials dredged from the navigation channel and the lack of mitigative components in the design for removing 162 acres of shallow water, wetlands, and spawning habitats from Maumee Bay. We also have several questions regarding the general design of the facility.

2 It is clear from past correspondence that the long range goal of this Agency is to maximize the potential for beneficial uses of materials dredged from the harbor. An Environmental Impact Statement for the construction of a new CDF affords a good opportunity to explore the possibility of incorporating re-use potential into the design prior to construction. Indeed, reference to beneficial use is found on Page 9 of the DEIS:

> "The re-use alternative has not been advanced as a detailed plan although it is still being considered as a possibility for future operations at Toledo Harbor, possibly in association with the construction of a new CDF."

Why not use the present opportunity to explore this possibility? Design features such as access, handling facilities and internal diking systems for drying materials are some suggestions for inclusion in the project design.

3 Regarding direct impacts of the CDF, the U.S. Fish and Wildlife Service in the Draft Fish and Wildlife Coordination Act Report of August 15, 1985, suggests that all habitat losses due to the construction of the CDF be fully mitigated. We fully support this recommendation and encourage the Corps to explore such mitigative measures. Section EIS5.08 in the DEIS references that mitigation does not appear to be necessary since "it has not been demonstrated that the fish and wildlife resources of the area are of any major significance." It also has not been demonstrated that the resources of the area are not of any major significance.

EIS-77

Response to Ohio Environmental Protection Agency
(30 July 1986)

1. No response required.

2. The entire perimeter of the proposed CDF has been designed to provide access for trucks and other vehicles. This would allow access to a staging area for drying, storage, and transport of dredged material in the event definite arrangements are made for large-volume dredged material utilization. The staging area and other features such as internal diking systems for drying materials are not included as part of initial CDF design or construction because definite arrangements for dredged material utilization have not been made. It would be less expensive and more efficient to use dredged material placed in the CDF to build these features. If external material were to be used, valuable CDF capacity would be lost.

The proposed Selected Plan (Alternative 1C) would also facilitate dredged material reuse since it can be used to receive effluent from the existing Corps of Engineers CDF thereby accelerating drying of material. The dried sediment from the existing CDF would then be available for reuse.

The Buffalo District will continue to cooperate with TMACOG, and local and State agencies in identifying users for dredged material. Special attention will be given to identifying and implementing a local entity for the distribution of dredged material if sufficient users are identified. Considerable efforts and progress has been made towards identifying and researching beneficial reuse alternatives. The Final EIS has been expanded to include an updated progress report (Page 11)

3. In conjunction with the USFWS, we have re-evaluated the affected fish and wildlife resources and project impacts on habitat values at the proposed site and have determined that mitigation of these impacts would not be justified. The beneficial water and sediment quality impacts of containment of "heavily polluted" Toledo Harbor sediments and the fact that the affected fish and wildlife resources do not meet Corps of Engineers criteria for significance, in that they are neither scarce nor unique within Maumee Bay, are the basis for this determination.

Colonel Clark
Page Two
July 30, 1986

Several questions regarding the construction of the CDF arose in reviewing the document:

4. 1) Plate 2.6 identifies the dikes as being constructed of prepared limestone, plastic filter cloth and armor stone, yet Section 2.4.1 of the 404(b)(1) evaluation identifies clay as material proposed for construction. What portion of the dike will be constructed of clay? It may be cheaper and more environmentally acceptable (i.e., secured from leakage) to use a clay core in lieu of prepared limestone.

5. 2) The location of the proposed overflow structure in the new facility is not identified. Since there is essentially one dike wall, care must be taken in locating the outfall to avoid short-circuiting the drainage. This could have disastrous effects to the water quality of the effluent and the efficiency of the CDF to contain the materials.

6. 3) The DEIS does not address the projected ramifications if the pollutional classification of the lakeward dredged sediments changes. The assumption in the Benefit/Cost ratios is that the life of the facility will be 21.9 years. The classification of the sediments currently disposed in the open lake is subject to change pending the results of several studies. The B/C would undoubtedly be affected if the new CDF must handle all dredged materials.

A decision on 401 certification will be made pending a response to the above concerns. If you wish to discuss any of the above questions or comments, please call me at (614) 466-6959.

Sincerely,

Audrey Lynch

Audrey Lynch
Section 401 Coordinator
DIVISION OF WATER QUALITY MONITORING
AND ASSESSMENT

0029S/22-23

cc: P. Flanigan, Director's Office
B. Manson, NWDO
E. Hammett, TMACOG
K. Kroonemeyer, U.S. FWS
M. Colvin, ODNR
E. Shannon, U.S. EPA

Response to Ohio Environmental Protection Agency
(30 July 1986)

4. Prepared limestone was used to construct the base of the existing dike because it readily compacts and provides a stable structure. The prepared limestone consisted of coarse aggregate, mainly ranging from 1-1/2 inches to 5 inches, and fine aggregate, mainly ranging from 3/8 inch to No. 100 sieve. Limestone was used and will be used because it compacts, even when placed in water. In order to compact clay, the placement must be done under a controlled moisture environment. This would require constructing temporary walls and dewatering. Costs would increase substantially if dewatering is required. Since the Buffalo District has not detected solids or significant pollutants escaping from any of its CDF's, the additional cost is not warranted. Laboratory leachate and settling column tests support the field results which indicate that only an inconsequential amount of pollutants can be expected to be released from the CDF.

5. At a minimum, the proposed facility would offer the same level of environmental protection as the existing facility. The distance between the weir and the dredge discharge pipe would be maximized while minimizing dead zone areas within the CDF caused by short-circuiting. The total weir length incorporated into the proposed CDF would be longer than the existing weir such that the withdraw depth would be reduced, therefore minimizing suspended solids in the effluent. Management of the weir would help avoid botulism, produce a quality effluent, and fully utilize storage capacity of the CDF.

6. If conditions change and a greater percentage of the dredged material from the existing polluted area becomes environmentally acceptable for open-lake disposal, the material would most likely be disposed of in the open lake provided the volume saved in the CDF is required for future polluted dredgings. It is economically advantageous to contain the material from the existing polluted area than to open-lake dispose, provided the sunk (construction) cost of the CDF is not included. At the other end of the spectrum, the CDF has sufficient capacity to accommodate all the material from the Toledo Federal Harbor, if the open-lake classification should change. As a result, by adding essentially one wall to a pre-existing semi-enclosed area, the existing plan provides sufficient flexibility to accommodate changes in the pollutional classification of the Toledo Federal Channel dredged material.

EIS-79

STATE CLEARINGHOUSE
State of Ohio - Office of Budget and Management

30 EAST BROAD STREET • 39TH FLOOR • COLUMBUS, OHIO 43266-0411 • (614) 466-0697 / 0698

Response to Ohio State Clearinghouse
(29 July 1986)

Date: 86-07-29

31 JUL 86 09 04 OFC. MGMT. OAS

U.S. DEPT OF THE ARMY, CORPS OF ENGINEERS
1776 NIAGARA STREET, BUFFALO DISTRICT
BUFFALO NY 14207-3199

Attention: WILLIAM F. MACDONALD Phone: (716)876-5454

RE: State Clearinghouse Intergovernmental Review-Application Clearance Letter
Project Description: DRAFT EIS, CONSTRUCT A DREDGED MATERIAL CONFINED DISPOSAL FACILITY AT TOLEDO HARBOR, LUCAS COUNTY, OHIO

SAI Number: OH860606-F873-36422
Proposed Federal Funding: $00

The State Clearinghouse (Single Point of Contact) has reviewed the application for the above identified project that is covered by the Intergovernmental Review Process (Presidential Executive Order 12372) and Gubernatorial Executive Order authorized under Ohio Revised Code, Section 107.18(A).

Following the guidelines of Presidential Executive Order 12372 and Ohio's Intergovernmental Review Process, this application has been simultaneously reviewed by the Impacted Area Clearinghouse(s) and other interested agencies.

As a result of our review we have determined that your application is consistent with State or local plans, programs, and objectives. Therefore you should proceed with your application to the appropiate funding agency.

1. A copy of this clearance letter should be attached to your application. In addition, the State Application Identifier (SAI) Number noted on the top of this form must appear as item number 3 on the Federal Standard Notification Form 424, which is a part of your application.

The results of this review are valid for one year. A continuation or renewal application must be submitted to the State Clearinghouse and Impacted Area Clearinghouse(s) annually. An application not submitted to the funding agency, or not funded within one year after completion of this review, must be resubmitted to receive a valid intergovernmental review.

Sincerely,

Leonard E. Roberts, Deputy Director
Office of Budget & Management

1. No response required; see TMACOG letter and response.

TOLEDO METROPOLITAN AREA COUNCIL OF GOVERNMENTS
123 MICHIGAN STREET
TOLEDO, OHIO 43624-1956
(419) 241-9155

DATE: July 16, 1986

AREAWIDE REVIEW NO. 86-117
SAI NO. ______

APPLICANT: U. S. Army Corps of Engineers (Buffalo District)

PROJECT TITLE: Draft Environmental Impact Statement for a Confined Disposal Facility at Toledo Harbor, Ohio

FUNDING AGENCY:

GRANT REQUEST:

Federal: ---

Non-Federal: ---

AREA AFFECTED: Toledo/Oregon, Ohio

APPLICANT CONTACT: William MacDonald--(716) 876-5454

SUMMARY OF APPLICATION: Major Conclusions and Findings:

The proposed project involves the construction of a Confined Disposal Facility (CDF) for the disposal of polluted sediments dredged from the Maumee River federal navigation channel at Toledo, Ohio. The existing 242-acre CDG was constructed under the authority of Section 123 of the 190 Rivers and Harbor and Flood Control Act (Public Law 91-611). Toledo Harbor is dredged on an annual basis using normal operations and maintenance authorities of the Corps of Engineers. Plans developed have been carefully evaluated to select planning objectives for all Corps planning studies. This will enhance the National Economic Development (NED) by increasing the value of the nation's output of goods and services and improving national economic efficiency. The primary goal of planning for this project is to evaluate alternative Confined Disposal Faci-
1. lities for polluted dredged material from Toledo Harbor and to develop a plan that is feasible, economically efficient, and "consistent with protecting the nation's environment pursuant to national requirements". Objectives associated with this primary goal include: maintain adequate depths for commerical and recreational navigation; provide safe handling and transport of heavily polluted sediments to a permanent, confined disposal site (or sites); minimize adverse impacts to aesthetics, and fish and wildlife values; protect water quality; and preserve significant cultural resources.

The selected plan utilizes a relatively low value environmental site adjacent to existing CDFs. It also uses the walls of the existing facilities to enclose over half of its perimeter making it highly cost efficient when compared against other facilities of equal or less life expectancy.

TOLEDO METROPOLITAN AREA
COUNCIL OF GOVERNMENTS
AREAWIDE REVIEW NO. 86-117
DATE: July 16, 1986
SAI NO.

The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies requires that feasible alternatives be evaluated to determine their efficiency in meeting the objectives of the plan formualtion process. Further, the Principles and Guidelines require the identification of a NED Plan in the evaluation process. The NED Plan represents the best return on the investment of economic resources needed for construction.

Benefit-Cost (B/C) ratios for project implementation utilizing single site Alternatives 1A, 1B, 1C, 5A, and 5B are 2.28, 2.22, 2.05, 2.36, and 2.26 respectively. (A, B, and C indicate various dike heights.) For alternatives which combine the two sites 5A/1A, 5A/1B, 5A/1C, 5B/1A, 5B/1B, and 5B/1C, B/C ratios are 2.18, 2.13, 1.97, 2.09, 2.03, and 1.88 respectively.

In calculating the B/C ratios the Buffalo District used cost for construction, amoritization, and dredging of the bay and river channels. Benefits were calculated as the difference in shipping costs that occur when the bay and river channels are not maintained.

A number of dredge material confinement alternatives, including reuse, were analyzed by the Buffalo District. The No Action Alternative was also considered throughout the planning process. The choice of a confinement plan was highly
1 dependent upon cost. Three confinement alternatives were evaluated in detail by the Buffalo District. They included: Alternative I--Construction of a new 162-acre CDF adjacent to the existing Federal CDF located east of the channel at the mouth of the Maumee River; Alternative 5B--raising the dike walls 10 feet on the existing CDF; and the No Action Alternative.

* Note: A copy of the Draft Environmental Impact Statement is available for input in the TMACOG offices during the normal business hours.

REVIEW & COMMENT: Parties contacted for comment were: Lucas County, Cities of Toledo and Oregon, Toledo-Lucas County Plan Commissions and the Village of Harbor View.

The Lucas County Commissioners support the project.

No comments were received from other parties contacted as of July 9, 1986. Any comments received after this date will be announced at the Executive Committee meeting on July 16, 1986, for incorporation in the minutes and forwarded to the Ohio State Clearinghouse and/or the appropriate agencies.

RECOMMENDATION: The Toledo Metropolitan Area Council of Governments remains concerned about the open lake dumping f dredged materials and strongly supports the reuse and/or upland disposal of these materials. The Council fully recognizes the need for maintenance dredging of Toledo Harbor and the importance of moving forward on all aspects of dredge disposal.

Response to Toledo Metropolitan Area Council of Governments
(16 July 1986)

1. No response required.

TOLEDO METROPOLITAN AREA
COUNCIL OF GOVERNMENTS
AREAWIDE REVIEW NO. 86-117
DATE: July 16, 1986
SAI NO.

We support the continuation of the design of the Toledo Harbor CDF with the following stipulations:

a) Reuse of the material will be a part of the design (an ultimate recycling confined disposal facility);

b) Upland disposal and/or reuse will be further considered as an alternative while planning is underway for the construction of the new CDF; and

2. c) The Corps of Engineers will strongly support the examination of upland disposal and/or reuse alternatives (such alternatives could include: agricultural land enhancement, topsoil, construction fill, Woodtick Peninsula restoration, winter sports hill, landfill cover, etc.).

We are not satisfied that the analysis of reuse or upland disposal alternatives contained in the Toledo Harbor CDF Study was sufficient to reject these alternatives. Therefore, this recommendation is intended to encourage the Corps and all other parties to move forward on all possibilities for the disposal and/or reuse of the dredged material in order that a best long-term solution can be identified that will protect the waters of Lake Erie and maintain the Port of Toledo.

ADDITIONAL COMMENTS RECEIVED: The City of Oregon responded that clearance of the project should be delayed.

The Toledo-Lucas County Plan Commissions responded with no comment.

Response to Toledo Area Council of Governments (Cont'd)
(16 July 1986)

2. The entire perimeter of the proposed CDF has been designed to provide access for trucks and other vehicles. This would allow access to a staging area for drying, storage, and transport of dredged material in the event definite arrangements are made for large-volume dredged material utilization. The staging area and other features such as internal diking systems for drying materials would not be included as part of initial CDF design or construction because definite arrangements for dredge utilization have not been made. It would be less expensive and more efficient to use dredged material placed in the CDF to build these features. If external material were to be used, valuable dike capacity would be lost.

The Selected Plan (Alternative 1C) would also facilitate dredged material reuse since it could be used to receive effluent from the present CDF thereby accelerating drying of material. The dried sediment from the current CDF would then be available for reuse.

A number of upland uses for dredged material are being evaluated. These include use as topsoil on golf courses and parklands and cover for landfills. The bulk chemical testing and column leachate tests discussed in the previous section indicates that there would not be a problem with land or water (surface and groundwater) contamination associated with upland uses of dredged material from Toledo CDF's. The major problems associated with upland use are drying of saturated dredged material from the existing CDF, logistics of handling and transport to potential users, and the costs associated with alternative uses. An expanded discussion of upland and reuse alternative is provided in the Final EIS (para. 2.2.8-2.2.19).

Limited study has been conducted on drying of the saturated dredged material in windrows. It has been observed that the wet material dries into a very hard mass which would be undesirable for top soil without breaking up this mass into a more suitable structured material. On the other hand, material which has been in place at CDF's for many years (7-10 years) such as at Island 18 and Penn 7 had dried to a depth of 5 feet and had favorable structure for top soil. It appears this material could be excavated and directly shipped as top soil.

The Buffalo District will continue to cooperate with TMACOG, and local and State agencies in identifying potential users for dredged material. Special attention will be given to identifying and implementing a local entity for the distribution of dredged material if sufficient users are identified. It should be noted that no viable use of the dredged material has been found to date.

CITY OF
OREGON
OHIO

August 21, 1986

Mr. William MacDonald
US Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Mr. MacDonald:

The City of Oregon is interested in knowing the status of the proposed Confined Disposal Facility in Maumee Bay off the Oregon shoreline. We would like copies of any comments sent to your office on the project.

Of particular concern are 1) The proposed raising of the
1. height of Facility 3 which would prevent the planned use as
an industrial park; and 2) The continuing need to take portions of the Bay to contain dredge material.

Keeping us updated and informed on this project in Oregon would be appreciated. We would like to receive copies of all correspondence.

Sincerely,

Sandy Bihn
Sandy Bihn
Environmental Coordinator

c.c. Mayor Haley

OREGON on the bay
5330 SEAMAN ROAD • P.O. BOX 7541 • OREGON, OHIO 43616-0541
CITY OF OPPORTUNITY

Response to City of Oregon
(21 August 1986)

1. Copies of all comment letters have been provided to the city of Oregon. The Final EIS and all future coordination will be provided. All concerns noted.

The University of Toledo

2801 W. Bancroft Street
Toledo, Ohio 43606

College of Arts and Sciences
Department of Biology
(419) 537-2065

July 24, 1986

Colonel Daniel R. Clark, District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

Re: Toledo Harbor, Ohio, Confined Disposal Facility
Draft Environmental Impact Statement

Dear Col. Clark:

1. Of the alternatives considered for the site of a new CDF, the selected plan (1c) appears to be the best following shore restoration at Woodtick Peninsula, in terms of productive use of the dredged material.

2. Relative to fish and wildlife values, I would like to support the recommendation of the U.S. Fish and Wildlife Service that if a CDF is constructed at site #1, "all habitat losses due to the construction be fully mitigated"(p. A-31). This seems reasonable since there appears to be no "firm data" showing that the site lacks fish and wildlife value (see EIS5.09).

3. I would also like to reiterate ODNR's concern regarding waterfowl botulism and support their recommendation that appropriate management procedures be implemented (p.A-17).

4. Relative to long-term management of dredged material disposal, I would like to support the efforts taken by you and others to find uses for this material. Considering dredged material as a potential asset, and not just a liability, provides the necessary perspective for developing the natural resource value of this material. Transforming dredged material from a waste into a resource would probably significantly enhance National Economic Development.

If you have any questions or concerns, please contact me.

Sincerely,

Peter C. Fraleigh

Peter C. Fraleigh, Ph.D.
Associate Professor of Biology

Response to Dr. Peter C. Fraleigh
(24 July 1986)

1. Comment noted.

2. In conjunction with the USFWS, we have re-evaluated the affected fish and wildlife resources and project impacts on habitat values at the proposed site and have determined that mitigation of these impacts would not be justified. The beneficial water and sediment quality impacts of containment of "heavily polluted" Toledo Harbor sediments and the fact that the affected fish and wildlife resources do not meet Corps of Engineers criteria for significance, in that they are neither scarce nor unique within Maumee Bay, are the basis for this determination.

3. See response to ODNR Comment No. 4.

4. The entire perimeter of the proposed CDF has been designed to provide access for trucks and other vehicles. This would allow access to a staging area for drying, storage, and transport of dredged material in the event definite arrangements are made for large-volume dredged material utilization. The staging area and other features such as internal diking systems for drying materials would not be included as part of initial CDF design or construction because definite arrangements for dredge utilization have not been made. It would be less expensive and more efficient to use dredged material placed in the CDF to build these features. If external material were to be used, valuable dike capacity would be lost.

The Selected Plan (Alternative 1C) would also facilitate dredged material reuse since it could be used to receive effluent from the present CDF thereby accelerating drying of material. The dried sediment from the current CDF would then be available for reuse.

A number of upland uses for dredged material are being evaluated. These include use as topsoil on golf courses and parklands and cover for landfills. The bulk chemical testing and column leachate tests discussed in the previous section indicates that there would not be a problem with land or water (surface and groundwater) contamination associated with upland uses of dredged material from Toledo CDF's. The major problems associated with upland use are drying of saturated dredged material from the existing CDF, logistics of handling and transport to potential users, and the costs associated with alternative uses. An expanded discussion of upland and reuse alternative is provided in the Final EIS (para. 2.2.8-2.2.19).

Limited study has been conducted on drying of the saturated dredged material in windrows. It has been observed that the wet material dries into a very hard mass which would be undesirable for top soil without breaking up this mass into a more suitable structured material. On the other hand, material which has been in place at CDF's for many years (7-10 years) such as at Island 18 and Penn 7 had dried to a depth of 5 feet and had favorable structure for top soil. It appears this material could be excavated and directly shipped as top soil.

The Buffalo District will continue to cooperate with TMACOG, and local and State agencies in identifying potential users for dredged material. Special attention will be given to identifying and implementing a local entity for the distribution of dredged material if sufficient users are identified. It should be noted that no viable use of the dredged material has been found to date.

FINAL ENVIRONMENTAL IMPACT STATEMENT
CONFINED DISPOSAL FACILITY
TOLEDO HARBOR
LUCAS COUNTY, OHIO

APPENDIX EIS-A
CORRESPONDENCE

APPENDIX EIS-A

CORRESPONDENCE

Key:

BD - Buffalo District, U.S. Army Corps of Engineers
DD - Detroit District, U.S. Army Corps of Engineers
ODNR - Ohio Department of Natural Resources
PCF - Peter C. Fraleigh, Ph.D.
TLCPA - Toledo-Lucas County Port Authority
TMACOG - Toledo Metropolitan Area Council of Governments
USEPA - U.S. Environmental Protection Agency, Chicago, Illinois
USFWS - U.S. Fish and Wildlife Service, Columbus, Ohio
SHPO - Ohio State Historic Preservation Office
NPS - National Park Service

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST
CHICAGO, ILLINOIS 60604

REPLY TO ATTENTION OF:

Mr. Phil McCallister
Chief, Engineering Division
U.S. Army Engineer District, Detroit
P.O. Box 1027
Detroit, Michigan 48231

4 JUN 1980

Dear Mr. McCallister:

At the April 9, 1980, western Lake Erie confined disposal facility (CDF) Site Selection Committee meeting, we were requested to write a letter stating our concerns regarding the proposal to use material dredged from the west Lake Erie sailing courses as a base for a marsh creation project lakeward of the Woodtick Peninsula. This letter is in response to that request.

Our primary concern is the objective evaluation of all project alternatives. This includes the positive and negative aspects of every disposal alternative that shows environmental, technical, and economic feasibility. Our letter of February 8, 1980, states that we believe the Pointe Mouillee expansion alternative and the Woodtick alternative possess all of these attributes. Unfortunately, the discussions thus far have been limited to the positive side of the Woodtick alternative while ignoring its negative side, and ignoring completely both sides of the Pointe Mouillee alternative. To make a site selection at this point, without full consideration of both the positive and negative aspects of each feasible alternative, would ultimately bias decision-making during the EIS process.

The Woodtick marsh creation proposal is an alternative worthy of further investigation. Its potential to create highly productive habitat and preserve an existing wetland presently being degraded by natural processes are positive aspects of the CDF which should figure into project benefits. In contrast, however, there are negative aspects of the project which must be considered as well. For example, the sediment that will be used to create the wetland is suspected of containing elevated levels of heavy metals. In a wetland system, metals may be readily available for bioaccumulation to potentially harmful levels. Additionally, a CDF at this location will encroach upon the existing shallow, open-water habitat. This area in its present condition may be, or have potential to be a valuable nursery or dispersal corridor for pelagic species.

Because the Woodtick marsh creation proposal has potential benefits associated with it, the investigation of this alternative along with other alternatives, should proceed; however, it should not proceed without the investigation of its potential adverse effects as well. The benefits associated with the project must be compared with the adverse effects and the trade-offs taken into account in decision-making. An analysis of this nature may show that there are environmentally preferable ways to dispose of the polluted sediment and environmentally preferable ways to protect the Woodtick Peninsula. Thus, in the interest of bettering decision-making for this project, we are recommending that two negative aspects of the marsh creation project be investigated in conjunction with the investigation of project benefits. The negative aspects are: the bioaccumulation potential of mercury in a wetland environment, and loss of existing Lake Erie nearshore, open-water habitat. These concerns are detailed on the attached pages.

Please contact Mr. James Hooper of my staff at 312/886-6694 if there are any questions concerning our comments on this matter.

Sincerely yours,

Barbara J. Taylor, Chief
Environmental Impact Review Staff
Office of Environmental Review

Attachments

Bioaccumulation Potential of Mercury (Hg)

The 1976 sampling of shoaled areas in the west Lake Erie Sailing Course indicated that the sediment contains elevated levels of heavy metals, specifically mercury, lead, zinc, manganese, nickel, arsenic, barium, and copper. Mercury is of particular concern because of its known adverse health effects. Mercury toxicity may be acute or chronic and its effects vary with the form of mercury and its mode of entry into living organisms. Several forms of mercury, ranging from elemental to dissolved organic and inorganic species, are expected to occur in the environment. Alkyl compounds are the derivatives most toxic to living organisms, producing physical abnormalities, irreversible neurological damage, or death from the ingestion of amounts in milligrams.

The creation of a wetland with mercury contaminated sediment will greatly increase the potential for mercury to enter the food web. The primary reasons for this are: 1) the wetland environment will expose the sediment to increased microbial activity, resulting in the conversion of inorganic mercury to methyl mercury; 2) the sediment will be exposed to disturbances by wetland fauna, resulting in the potential long-term release of mercury; and 3) mercury, as methyl mercury, is readily bioaccumulated.

The discovery that microorganisms have the ability to convert inorganic and organic forms of mercury to highly toxic methyl and dimethyl mercury has made any form of mercury potentially hazardous to the environment. Jensen and Jernelov (1967; 1968; 1969), Wood et al. (1968), Bisogni and Lawrence (1973), and Wood (1974) have demonstrated that, under naturally occurring conditions of pH and temperature, microbial activity is capable of converting originally inorganic mercury in bottom sediment into more mobile and toxic methylated forms. The rates of methylation are primarily related to the size of the microbial population (Saitoh and Cheam, 1975; Cooley and McCarty, 1976). Wetland environments, because of their high rates of production and decomposition, support large populations of microorganisms (Kuster 1968); thus, methyl mercury may be formed readily under these conditions.

Wolery and Walters (1974) considered the problem of long-term mercury release (by methylation) from sediment and concluded that there is a critical depth below which mercury concentrations become unavailable. They argued that bioturbation of sediment by tubificids extend the critical depth to 3 or 4 cm. Jernelov (1970) suggested that sediment disturbance by freshwater mussels may extend the critical depth to 9 or 10 cm. Wind and wave turbulence may resuspend sediment at shallow depth and may also increase the critical depth (Thomas 1974; Thomas and Jaquet 1976; Thomas 1976). While the establishment of vegetation will reduce the amount of sediment disturbance due to wind and wave action, the sediment will remain suseptible to disturbance by wetland inhabitants, such as carp, turtles, and muskrats. These organisms may extend the critical depth well beyond 10 cm. Additionally, the up-take of mercury by *Spartina alterniflora* has been shown to be an effective way of transferring mercury from sediments into the surrounding water and the food web (Rhan, 1973). Although *Spartina alterniflora* is a species of salt marsh ecosystems, freswater plants may be equally effective in mobilizing mercury.

Wood (1974) argued that whenever mercury in any form is added to the aquatic environment, a combination of microbially catalyzed reactions and chemical equilibrium systems is capable of leading to steady state concentrations of dimethyl mercury, methylmercuric ions, metallic mercury, mercuric ion, and mercurous ion. Therefore, the availability of the toxic alkyl forms of mercury is a function of the total mercury level present in the sediment and the water. Hannerz (1968), using 0.1 mg/l of several mercury compounds in ponds, concluded that algae and other aquatic plants accumulate mercury primarily by surface adsorption. This study also demonstrated that all of the mercury compounds used were taken up by fish both directly from the water and from food. The accumulation rate was shown to be fast, leading to concentration factors of 3000 fold and higher. According to McKim (1974), concentration factors by fish in excess of 10,000 times the amount of mercury in the surrounding water have been demonstrated.

McKinnon et al. (1975) suggest that aquatic organisms take up mercury premarily in the form of methyl mercury, and the rate of uptake is dependent upon the metabolic rate of an organism and independent of the pollutant's concentration in water and food. Additionally, the tissue retention time of methyl mercury is known to be longer than tissue retention times of inorganic forms of mercury (Huckabee and Goldstein, 1975). The long retention time of methyl mercury may be partially responsible for the high levels of mercury accumulation observed in the tissue of aquatic organisms exposed to sediment containing relatively low levels of the pollutant. In test periods of 20 to 48 weeks, McKim (1976) showed that several species of fish were able to accumulate more than 0.5 ug/g mercury in their tissues from a water habitat containing 0.018 to 0.030 ug/l methyl mercury. These represent concentration factors of 27,800 to 16,600. Tissue analyses on chironomids inhabiting sediment contaminated with mercury, indicate they are capable of concentrating mercury in their tissue to levels exceeding those found in the sediments (Bahnick el al. 1979). Helmke et al. (1976) investigated food chain bioconcentration of mercury. The study, although limited in scope, included an analysis of mercury levels in sediment, macroinvertabrates, and fish, and indicates the highest concentrations occur in animals at the top of the chain.

To summarize, mercury in the environment is potentially hazardous in any form because it can be converted by microbial activity into the readily available and toxic methyl mercury form. However, the question remains as to whether or not the levels present in the sailing course sediment are, in reality, hazardous in a wetland environment. Thus, in order to fully evaluate the environmental consequences of the Woodtick marsh creation alternative: a worst case situation should be assumed and the analysis of this alternative proceed weighing the tradeoffs between the merits and drawbacks of the project, and developing appropriate measures to mitigate the mercury problem; or, research should be conducted to determine the actual extent of the mercury problem.

Research Needed to Address the Problem

If it is elected to conduct further research, bioaccumulation studies should involve the construction of a small-scale, experimental wetland using sediments from the Lake Erie sailing course. In this procedure, the levels of mercury in the tissues of test organisms should be determined at the beginning and end of the testing period. A significant difference between values would indicate up-take of mercury.

The environment of the test chamber should simulate that of a wetland habitat during the summer (i.e., long photoperiod, warm temperature, microbial populations should be allowed to establish, vegetation should be established, and minor sediment disturbances should occur). Organisms used in the test should be indigenous to the western basin of Lake Erie and should represent different trophic levels. Representative organisms should include producers (preferably a species of algae, and several emergent and submerged vascular plants of known importance as wildlife food), primary consumers (preferably a grazing zooplanktor or snail, a detritvore or collector, and a herbivorous fish), and a secondary consumer (predator). The test should be conducted for a minimum of 60 days.

Analysis should include a comparison of mercury accumulation (sample mean - dry weight basis) in the tissue of each test species at the beginning of the experiment with that of the same species at the end of the experimental period. For statistical comparison the sample mean should be derived from at least 10 replicates of each test organism analyzed. The data should be subjected to an analysis of variance and the null hypothesis tested at the 0.05 level of significance. The level of total mercury in the sediment should be determined at the beginning and the end of the test period. The size of the microbial population also should be determined at the end of the test.

Loss of Natural, Open-Water Area Due to the Construction of an Artificial Wetland Lakeward of Woodtick Peninsula

Another major concern with the construction of a CDF in the nearshore, open-water habitat of the Woodtick Peninsula is the potential loss of spawning and nursery areas, and the possible interruption of larval dispersal of certain fish species. Data compiled by Organ et al. (1978) and Cole (1978) indicate that the Woodtick area is utilized by many species of fish including gizzard shad, lake whitefish, rainbow trout, carp, shiners, bigmouth buffalo, bullheads, white bass, yellow perch, walleye, and freshwater drum. Whether or not the area is used by these species specifically as a spawning ground, nursery area, or as a corridor for larval dispersal is unclear. Nonetheless, the area lakeward of the peninsula may be an important requirement for some stage of certain specie's life-histories.

Creation of a wetland lakeward of Woodtick Peninsula may also effect the balance of interspecific competition among sympatric species of fish. Carp, for example, spawn in vegetated areas. An unnatural increase in spawning area for this species may allow an increase in its population to the point where carp population dynamics significantly influence the survial of competing species. In addition to direct competition for food resources, large populations of carp may influence the survival of sympatric species through interference competition, the spread of disease, or by influencing the loss of rarer species to predators.

Research Needed to Address the Problem

A search of the existing literature on the fish (larval and adult), their life - history requirements, and their food resource in the area of the Woodtick Peninsula should provide adequate information concerning the ecological functions of the existing habitat.

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August 22, 1984 OFC. MGMT. DAS
27 AUG 84 09 26 9

Colonel Hardiman
District Engineer
Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hardiman:

On August 16, 1984, representatives from your office conducted a meeting in Toledo, Ohio regarding the potential alternatives for disposal of dredged materials in the Toledo harbor. I must note that this was one of the most concise and informative meetings I have ever attended regarding a subject matter of this nature. My experience has been that meetings involving a large group with diverse interests such as this generally drag on. Your staff is to be congratulated.

During the course of the meeting we were asked to send a letter to your office regarding our agency's preference in the matter discussed. For that reason, I am proceeding as follows:

The Toledo-Lucas County Port Authority strongly encourages the Corps of Engineers to find the most cost effective method of disposing of dredged material. We particularly applaud the investigation of "re-use" of the material in order to minimize construction of disposal areas. We would like to explore the "re-use" concept in depth with your agency! In addition, we believe you should explore the potential of using upriver disposal sites as alternatives, particularly between the Toledo Terminal Bridge and the Facility # 2 coal docks. The Port Authority offered our private C.D.F. to your contract dredges this year as a less costly alternative and were turned down by the Corps. Once again, we request that you explore this alternative in depth for cost effectiveness.

If, however, new construction is necessary, we prefer that an addition be made to the existing C.D.F. that would run from the Northwesterly corner of the Corps dike adjacent to the channel to the most northerly reach of the Toledo Edison water intake channel. We believe that this alternative, on a smaller but similar configuration, would be most effective from an operational viewpoint and from a practical viewpoint for future use by the Port Authority. In addition, our environmental consultants advise us that this would be the least harmful alternative, in their opinion.

TOLEDO-LUCAS COUNTY PORT AUTHORITY One Maritime Plaza • Toledo, Ohio 43604-1866 U.S.A. • (419) 243-8251

Colonel Hardiman August 22, 1984

Finally, recognizing that there will be a need for economic justification for any project of this nature, we offer our services for data colletion or other work that could assist the Corps in developing the proof necessary in this area.

Thank you for this opportunity to comment on a subject critical to the continued well-being of the Toledo area.

Sincerely,

Gary L. Failor
Seaport Director

GLF/mjb

cc: Ralph M. Hannon

The University of Toledo

2801 W. Bancroft Street
Toledo, Ohio 43606

College of Arts and Sciences
Department of Biology
(419) 537-2065

OFC. MGMT. OAS
10 SEP 84 09 14

September 4, 1984

Mr. Richard Leonard
Corps of Engineers
1776 Niagra Street
Buffalo, New York 14207

Dear Mr. Leonard:

At the recent meeting held at the Toledo-Lucas County Port Authority offices you indicated that base line studies were going to be conducted prior to any further construction involving the diked dredge disposal facility at Toledo Harbor. As director of the research group that conducted the two previous environmental quality studies of Maumee Bay (1974 and 1977 respectively), I wish to indicate this same team would like to contract with you and the Toledo-Lucas County Port Authority to carry out these studies again. Beside the expertise we have available, as documented by the previous reports and the cooperation we have shown both with the Corps and the Port Authority, we also can provide the scientific continuity which will make this next study both more significant and valuable.

We are quite prepared to alter our previous sampling sites and schedule to meet any requests made by you or the Port Authority. In addition, we have put together the attached task list which indicates those parameter which we believe will provide the data necessary to evaluate all dike expansion alternatives as well as evaluate the effect of overflow discharge from the present diked containment area. Please keep us informed as to your intentions regarding the Maumee Bay-Toledo Harbor study. We will be glad to prepare for you, at your request, a detailed proposal which will include, of course, a rationale for examining these parameters and a detailed budget.

I am also enclosing for your information the summary that Dr. Burnham presented at the August 16, 1984 meeting at the Port Authority of the 1974 and 1977 Water Quality Studies of Maumee Bay.

Dr. Burnham indicated that he was impressed by the cooperativeness expressed at that Port meeting. I hope we can work together in the future and I look forward to meeting you. Jeff asked me to have you pass on his regards to Larry Cabell.

Sincerely,

Peter C. Fraleigh

Peter C. Fraleigh, Ph.D.
Associate Professor

PCF/caz

cc: Mr. Gary Failor, Director
Seaport Operations
Toledo-Lucas County Port Authority

Dr. Jeffrey Burnham
Associate Professor
Department of Microbiology
Medical College of Ohio

SUGGESTED TASK LIST FOR A
1984-1985 STUDY EVALUATING
MAUMEE BAY WATER QUALITY,
THE EFFECT OF THE DIKED CONTAINMENT FACILITY, AND
AREAS PROPOSED AS SITES FOR EXPANSION

1) Biweekly monitoring, following the experimental design used in 1974 and 1975, involving biweekly sampling at 21 sites (12 dike area sites, 4 source water sites, and 5 control sites) from April through November (ice-out to ice-in) for 20 water quality and water mass mixing parameters (water temperature, Secchi depth, light transmission, specific conductance, dissolved oxygen, pH, total solids, dissolved solids, chloride, alkalinity, total phosphorus, orthophosphate, nitrate, ammonia, BOD-5, total bacteria, total coliforms, fecal coliforms, fecal streptococci, and chlorophyll a; with the following changes:

   a) addition of a second Lake Erie sampling site as our previous Lake Erie control site is now over the new open lake disposal site;

   b) addition of a sampling site near the discharge from the current confinement area;

   c) addition of a sampling site in the area to the west of the current facility, that is being considered as a possible site for development as a new containment facility (i.e., the area bounded by the current facility, the Bay Shore Power Plant intake, and the shipping channel); (the other area being considered for expansion, i.e., that to the northeast along the shipping channel, already has a sampling site within it);

   d) addition of one or two parameters which are characteristic of the discharge from the current confinement area.

   The objective of this monitoring is to:

   a) determine whether water mass mixing patterns have changed since 1977;

   b) determine the water quality around the containment facility and whether this has changed since 1977, and if so, whether the changes are related to discharge or possible leakage from the confinement area or are due to changes in water mass mixing patterns, in rate of river dischrage, in the characteristics of the source waters, or in bay-wide characteristics using methods developed in our 1977 study;

   c) determine water quality in the areas being considered as possible expansion sites.

2) Monthly (between April and September) measurement of fish (using trap nets and trawls), macrophytes, benthic invertebrates, and zooplankton in the two areas being considered as sites for possible expansion, at one site to the southeast of the current containment area (between the containment area and the Oregon shore), and at two control sites (one in the northwest area of Maumee Bay off Point Place and one in the southeast area of the Bay). The objective of this monthly monitoring is to determine the habitat characteristics of these five areas and to assess whether the areas proposed as sites for containment facilities are more or less suitable than other areas for fish and whether they have greater or fewer fish and zooplankton. Measurement of macrophytes, benthic invertebrates, and zooplankton is suggested because differences in these may be useful in explaining difference in fish abundance.

3) Weekly (between late April and late June) trawls for fish fry in each of the five areas sampled in 2 above to determine whether the areas proposed as sites for expansion are important fish fry habitats.

4) Study of walleye spawning during April and May on the dike face and in the areas proposed for possible expansion using "egg trees", as was done in our 1977 study, to determine if walleye spawning is occurring in these areas.

5) Investigation of sedimentation in the area to the southeast of the containment facility, which may have increased as a consequence of the protection provided by the current disposal facility, by measurement of water depth profiles and determination of sediment particle size distributions along transects extending out from the discharge point of the Bay Shore Power Plant.

6) Periodic (biweekly between April and Novermber and monthly between December and March) surveys of waterfowl numbers and usage in the current containment facility to determine the contribution or effect expansion of the facility would have on waterfowl, and to determine the effects of current management procedures on waterfowl populations, and whether alternative strategies are recommended.

Jeffrey C. Burnham, Ph.D.
August 16, 1984

THE MAUMEE BAY ENVIRONMENTAL QUALITY STUDIES OF 1974 AND 1977:
A SUMMARY REPORT TO THE TOLEDO-LUCAS COUNTY PORT AUTHORITY

1. Let me review for you briefly the study that we carried out. The research team composed of Dr. Peter Fraleigh, as Director, Dr. Gary Gronau, Mr. Tom Kovacik and myself examined the Bay in 1974 before the dike was constructed and again in 1977 after completion of the dike's perimeter. This two phase study was designed to determine whether the water quality changes were the result of the dike's presence or simply the result of changing environmental conditions between years.

2. The study involved biweekly monitoring of 21 sites from early spring until late fall and the following kinds of parameters were measured: Dissolved oxygen, pH, clarity, water chemistry, water biology, chlorophyll a levels and fish species distribution.

3. As you know the Bay is quite shallow and its overall water quality represents a mixing of the waters from the Maumee River and the Lake. Basically what the dike caused was the shift in the position of this mixing as well as changing rapidity of this mixing. Higher percentages of Maumee River water were found extending out into the Bay zones. At the time of this study the Maumee River water represented the major negative influence in water quality to this Bay area. As you will see from the statements that follow, the presence of the dike altered the mixing process, which is responsible for water quality improvement, less than expected.

4. The presence of the dike caused a significant increase in fecal coliforms around the diked facility apparently due to an increased transport of River water to the area surrounding the dike. However, these values were still significantly lower than the levels necessary to indicate a public health or pollution problem. My concerns with regard to bacteriology involve not average levels of pollution indicator bacteria found in this region but the spike levels. These were observed following major rainfall as a result of overflow discharges being transported more rapidly into the Bay regions. It is my understanding that recent construction and improvements in the sewer system are alleviating this situation.

5. Water chemistry and BOD parameters appeared related to variability of the control sites and the flow rates of the Maumee River, with the Toledo Edison Power Plant discharge contributing to mixing of River and Lake waters. As with bacterial levels, the presence of the dike extended the effect of low quality Maumee River water somewhat further into the Bay.

6. Algal densities (chlorophyll a levels) were higher in the Bay than in either the Lake or the River, as is typical of bay ecosystems, and were not affected by the presence of the dike. Our early fear that the "shadow zone" or the Southeast zone would become a stagnant region offering an ideal environemnt for algal proliferation was not realized because of the mixing provided in the region by the power plant.

7. The influence of the power plant on the Southeast zone is borne out by the water temperature data which, similar to the bacterial data, indicated that the dike caused a further rapid extension of the cooling water into the Bay zones. We are discussing a 1 to 1.5°C increase in water temperature in the channel and SE zone areas. Without further increase we do not see this as a major problem.

8. The presence of the dike appeared to directly affect the white bass fish population. In 1974 before the dike was constructed these fish were distributed quite uniformly across the Bay with nettings averaging 3.6 fish per 120 net/set. After construction in spite of the white bass population dropping to 1.2/net set in non-dike areas, the dike SE zone population rose to 17/net set. This effect is apparently due to the temperature data just reported and suggests some delay in the spawning activities of these fish while they escape this area and enter the River proper. This white bass result, surprisingly, was totally different from that for walleye, which appeared to be unaffected by the presence of the dike. Walleye avoided the thermal discharge area both before and after the disposal facility was constructed.

9. In summary, our study showed that the dike had little overall effect on the quality of the waters surrounding the dike or on the rest of the Bay. The negative effects recorded were with regard to the bacteriology and temperature parameters and these were slight enough not to raise major concerns in our opinion. Dr. Fraleigh believes as a result of continued visits to this area in recent years that sedimentation in the SE zone may turn out to be the major long term effect of this construction. This observation plus the data from our studies lead us to emphasize the importance of the Toledo Edison Power Plant discharge in controlling the water quality of the SE zone. With several ditch discharges from Oregon, as well as the discharge from the Oregon sewer treatment plant, the mixing provided by the power plant discharge is, in our opinion, essential in preventing the dike from having a significant impact.

ODNR
OHIO DEPARTMENT OF
NATURAL RESOURCES

Fountain Square
Columbus, Ohio 43224
614-265-6886

OFC. MGMT, OAS
26 SEP 84 10 21

September 21, 1984

Colonel Robert R. Hardiman
District Engineer
U.S. Corps of Engineers
Buffalo, NY 14207

Dear Colonel Hardiman:

We have monitored botulism related waterfowl mortality associated with the U.S. Corps of Engineers harbor dredge spoil containment cells in the Maumee Bay area since 1964. At that time, Division of Wildlife biologists met with Dr. Mary Ellen Cooper, a staff biologist, Detroit District, Corps of Engineers, to discuss techniques to alleviate this annual August-September outbreak of Type C-Botulism in these spoil deposition sites. Unfortunately, no action was taken from these proposals.

We are concerned with these annual losses of waterfowl and shore birds and particularly with the potential loss of local bald eagles, an endangered species, feeding upon botulism stricken waterfowl. The public has become aware of the problems on these areas through the newspapers and television. They share our concern.

The Corps of Engineers has congressional mandates (through Section 10 of the River and Harbor Act of 1899, Section 404 of P.L. 95-500 and Section 103 of P.L. 92-532) involving waterways and associated wetlands in the United States. We feel that the annual, ongoing botulism associated with harbor dredge spoil deposition cells in Maumee Bay is adversely impacting important natural resources (waterfowl and shore birds). We respectfully propose an engineering review with O.D.N.R., Division of Wildlife and U.S. Fish and Wildlife biologists, meeting with Corps of Engineers personnel, to formulate an annual, long-term management plan to terminate the botulism outbreaks in the spoil deposition cells.

Sincerely,

Myrl H Shoemaker

MYRL H. SHOEMAKER
Director

MHS:gh
cc: Harvey K. Nelson, Regional Director
U.S. Fish and Wildlife Service
Robert Lucas

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Columbus Field Office
Post Office Box 3990
Columbus, Ohio 43216-5000

November 15, 1984

Colonel Robert R. Hardiman
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Dave Heicher

Dear Colonel Hardiman:

As requested in your letter of September 18, 1984, the U. S. Fish and Wildlife Service has reviewed the September 4, 1984 letter from the University of Toledo regarding potential field studies to evaluate future expansion of the existing Toledo Confined Disposal Facility (CDF).

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.) 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.

Some potential alternative locations for expansion, as presented in your letter and/or discussed at the August 16, 1984 meeting at Toledo, are described below and shown on Figure 1:

Site 1. An area bounded by the navigation channel, the Federal CDF, and the Port Authority CDF.

Site 2. An expansion of the Federal CDF to the NE.

Site 3. An expansion of the Island 18 (Grassy Island) CDF (2 options are shown).

Site 4. An area detached from any of the existing CDF's. The configuration shown is one that we mentioned at the Toledo meeting that might provide some sheltering of eroding shoreline areas to the west of this suggested CDF location.

As part of our review, we reexamined the Maumee Bay Environmental Quality Studies of 1974 and 1977 by Fraleigh et al and the results of the Monitoring and Evaluation of Physical Impacts of Toledo Diked Disposal

Site in Maumee Bay conducted by Wapora, Inc. (1976). We also performed a more cursory review of some other pertinent data, including the results of nearshore fishery surveys by the Ohio Department of Natural Resources, the 316(B) demonstration at the Toledo Edison Company's Bay Shore Power Station, an impact assessment relative to commercial sand and gravel dredging in the Maumee River and Bay, and larval fish surveys sponsored by the U. S. Environmental Protection Agency.

We believe these studies, particularly those of Fraleigh and Wapora, already provide enough data to enable a preliminary assessment to be made of various alternative locations for CDF expansion.

One of the findings of the studies was that the construction of the 242-acre CDF caused a change in the mixing of the waters of the Maumee River and the Lake. Areas south of the CDF and to the west (Alternative CDF Site #1) became much more heavily influenced by river water, which is of much lower quality than the lake water. The construction of an expanded CDF at Site #2 would probably expand the area of river water influence to the south of the CDF. The construction of an expanded CDF at Site #3b would increase the river water influence in Site #1 and would push the mixing zone farther to the northeast of the CDF's. Alternative #3a would have a similar, but perhaps less severe, impact. A CDF at Site #4 might significantly reduce lake water mixing in the entire area to the west of the site. This area is under the influence of both the Maumee River and the Ottawa River and other smaller tributaries entering the North Maumee Bay area. A reduction of mixing in this area could have a significant detrimental impact on water quality. Even the construction of an expanded CDF at Site #1 would probably result in a slight movement of the mixing zone to the north and northeast. However, this alternative would probably have the lowest overall impact on water quality of the alternative sites shown on Figure 1.

In addition to water quality impacts, construction of a CDF at Sites #2, #3a, #3b, or #4 would cover some of the old side-cast gravel bars that are believed to provide important spawning and feeding sites for some of the fish species common to the bay. Even Site #1 contains a portion of such a bar projecting from the Port Authority CDF north dike. However, limited fishery surveys conducted by Wapora indicated that the average catch per unit effort in Site #1 was lower than at any survey station except for a station at the southeast corner of Grassy Island. The strong influence of the river water, with its lower overall water quality, is suspected of being the major factor in these lower catches. Unfortunately, the Fraleigh study of 1977 did not include any fishery work in the area of Site #1. Station 1513 of the 1974 study was enclosed by the new dike perimeter and no new station was established to the west or southwest of the old station for the 1977 study. Water quality station #22 was also dropped from the sampling schedule for the 1977 study.

Based on an examination of the aforementioned studies, it is our preliminary opinion that if a new CDF is required, the construction of the CDF at Site #1 would result in less environmental impact than the construction of a CDF at any of the other sites shown on Figure 1.

Admittedly, the data base generated by the aforementioned studies and upon which our preliminary opinion is based is not as complete as we might wish.

If it is your opinion that a more detailed data base is required for an adequate analysis leading to the selection of the CDF location, we believe that the suggested task list included in Dr. Fraleigh's letter would provide the basic framework for acquiring that data base. The final selection of sampling sites would, of course, be contingent upon a determination of which of the alternative CDF locations shown in Figure 1 (or other locations) should be carried forward for study. As we have already indicated, CDF construction at most of these alternative locations would probably result in an increase in the percentage of the bay experiencing degraded water quality due to modification of water mass mixing in the bay. Other factors, such as construction cost or interference with navigation, might also eliminate some of the alternative locations from consideration.

We offer the following comments or recommendations relative to the suggested task list:

Item 1.C. An additional sampling site should be established at the approximate center of each of the alternative CDF locations to be considered in the study. Sampling Site #9 appears to be located on what would be the outer edge of a possible CDF expansion to the northeast of the existing one.

Item 1. Objectives. One of the major objectives of monitoring water quality and water mass mixing parameters should be to provide sufficient data to facilitate assessment of the potential changes in water quality and water mass mixing that would occur in various areas of the bay as a result of constructing a CDF at any of the alternative locations under study. If the proposed experimental design used in 1974 and 1977 does not appear to be adequate to facilitate such an assessment, it should be supplemented or modified.

Item 2. Prior to the initiation of surveys for fish and other biota, each alternative CDF location to be studied should be carefully investigated to determine the types of substrate habitat available within the location. Old side-cast gravel bars or other features may provide important habitat for fish and benthic invertebrates. Trap netting efforts should be concentrated in any such areas of unique habitat. Pump systems should be utilized in such areas to collect benthic invertebrates if the substrate particle size is too large to allow collecting with Ponar or Peterson dredges. Pump systems might also be useful to survey benthos on CDF dike riprap.

Item 3. The developmental stage of all larvae should be reported to aid in determining the importance of each area as a spawning or nursery area. Sampling should be conducted at night, with three or four replicates per station. A survey protocol like that used by Dr. White for the proposed U. S. Steel site at Conneaut (sampling every four to five days when walleye and yellow perch begin to appear in samples) might be preferable to weekly sampling. The larvae of certain fish species may be inadequately sampled with conventional larval tow or push nets. Pumping systems could be utilized to survey larval fish use of the riprapped dikes of the CDF to determine the importance of such habitat relative to the type of habitat displaced by a CDF. A pumping system might also allow monitoring of fish egg deposition on the riprap to determine possible spawning use of such habitat.

Item 6. Survey should include all water birds, not just waterfowl, and should include all alternative CDF locations plus the power plant discharge area. Biweekly monitoring should begin at ice-out or earlier if early spring migrants are utilizing the power plant discharge area. Biweekly monitoring should be continued past November if late migrants are utilizing the power plant discharge area or other areas of the bay.

All of the preceeding discussion has concerned the selection of a site for future CDF expansion and possible studies that might be needed to aid in such a selection. We believe that equal effort should be given to finding beneficial uses of the material presently contained in the CDF in order to extend the useful life of the CDF. Such an extension would always be preferable to the continued loss of aquatic habitat due to CDF construction. It is our understanding that chemical analyses will be performed on the material in the CDF to determine what constraints might apply to upland uses of the material.

Another important area of information that should be addressed in the Draft EIS concerns the projected future pollution status of the sediments to be dredged from Toledo Harbor. Is the "heavily polluted" nature of certain of the sediments the result of specific point source discharges that can eventually be corrected by effluent limitations or is it the result of non-point sources that will prove to be difficult to correct in the foreseeable future?

We appreciate the opportunity to provide these comments and would be glad to review any further detailed study plans if you deem such studies necessary.

Sincerely yours,

Ken Multerer

for Kent E. Kroonemeyer
Supervisor

cc: Chief, Ohio Division of Wildlife, Columbus, OH
ODNR, Outdoor Recreation Service, Attn: M. Colvin, Columbus, OH
Ohio EPA, Attn: A. Lynch, Columbus, OH
U.S.EPA, Office of Environmental Review, Chicago, IL

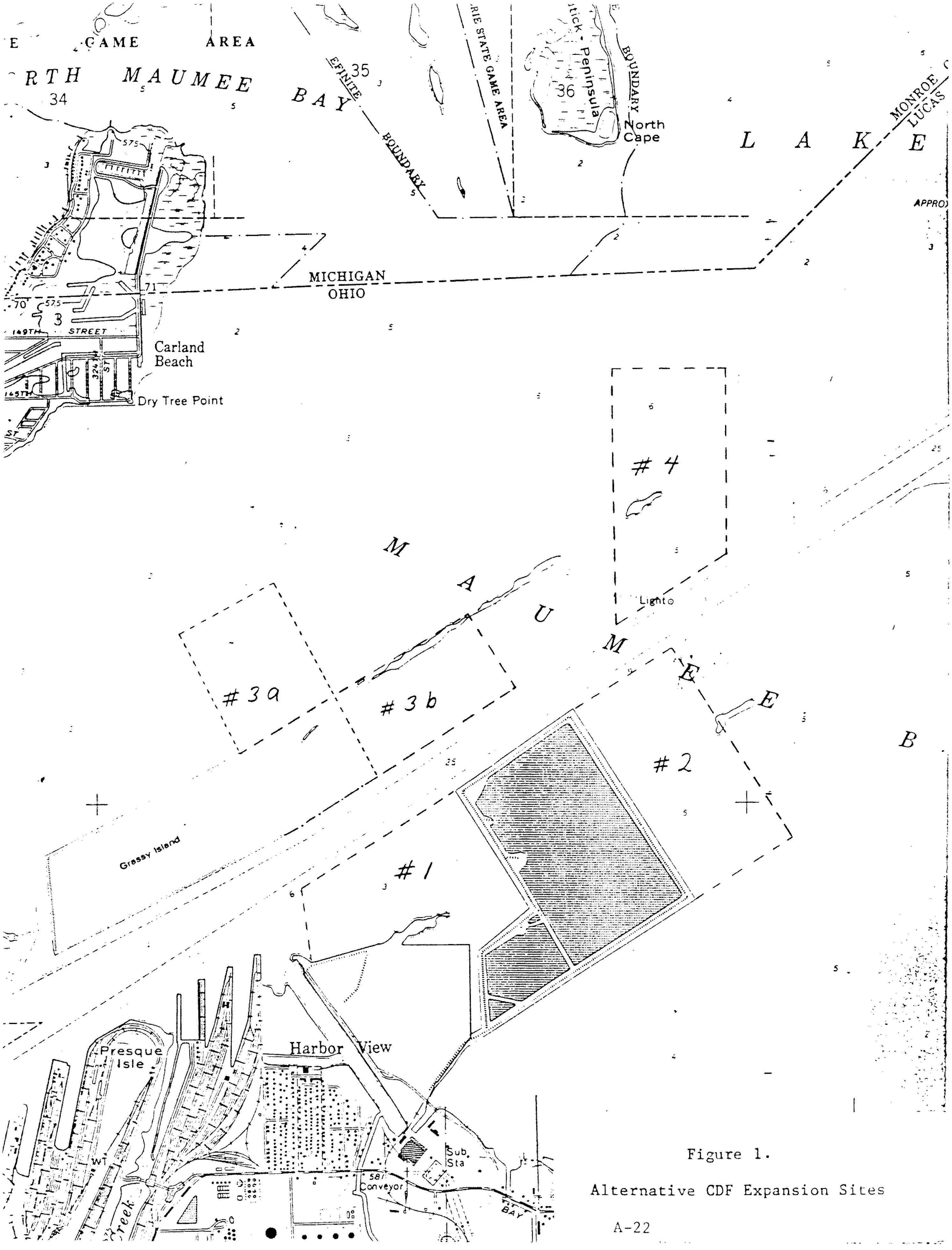


Figure 1.

Alternative CDF Expansion Sites

Toledc Metropolitan Area Cc.incil of Governments

123 Michigan Street Toledo, Ohio 43624-1996

January 3, 1985

Col. Robert R. Hardiman
District Commander
Buffalo District Corps of Engineers
1776 Niagra Street
Buffalo, NY 14207

ATTN: Mr. David Heicher

Dear Col. Hardiman:

Thank you for your prompt response to the concerns which we expressed in our letter of December 7, 1984.

This committee shares your concern that the Corps not build additional expensive structures designed to fill in the Bay. In addition, we see no rationale for the resuspension of dredged nutrients into the western basin. We believe the final disposition of dredged material needs to be addressed now--not in the indeterminant future.

Therefore, we would urge the Corps to examine a two-pronged strategy for 1985 and beyond. As we see it, there are two problems:

1. What to do with the dry consolidated material in the confined disposal area.

2. What to do with the "uncontaminated" sediment to be dredged this year.

We would suggest the following:

1) The dry material should be moved out as soon as possible. With a little thought and research, we have compiled the following list of places and quanitities for this material:

   a) Dura Landfill (final cover) - 210,000 cubic yards;
   b) Stickney Landfill (final cover) - 110,000 cubic yards;
   c) King Road Landfill (final cover) - 230,000 cubic yards;
   d) Browning Ferris, Inc. Landfill - 200,000 cubic yards;
   e) Buckeye Basin Project - 1,000,000 plus cubic yards;
   f) Maumee Bay State Park - 200,000 cubic yards;

   Total - 1,950,000 cubic yards

Phone (419) 241-9155

2) We have talked to the Michigan Department of Natural Resources about possible disposal sites for uncontaminated material to be dredged this year, and have learned that they are working with the Detroit Corps to stop shore erosion in the Wood Tick peninsula area adjacent to the shipping channel. Erosion in the area is a serious ongoing problem, which amounts to as much as 15' of shore recession a year. No doubt much of this material ends up in the shipping channel. Michigan is apparently interested in reducing erosion and restoring many of the island and peninsular areas. A potentially less expensive method for filling is to use quickly installed silt fence. However, Michigan lacks the fill material to build these areas up. We would urge the Corps to consider moving the dredged material west to these areas instead of north and east to the open lake. It makes much more sense to place this material where it's wanted and needed rather than dumping it in the open lake where nobody really wants it. The transportation distance appears to be much closer to the Wood Tick area than to the proposed open lake areas. However, shallower water will probably necessitate the construction of a channel or pipeline. We believe that this is more economical than double handling and hauling from the existing disposal area.

This committee is dedicated to finding beneficial uses for dredged spoil and will pledge our resources to helping facilitate local involvement and solutions. We are hopeful that the Corps will work with us toward this goal.

Yours truly,

Don Romes

Don Romes, Chairman
Areawide Water Quality Planning Council

jq

CC: Robert Maynard, Director
Ohio Environmental Protection Agency

Ohio Historic Preservation Office

1985 Velma Avenue
Columbus, Ohio 43211
614/466-1500

OHIO
HISTORICAL
SOCIETY
SINCE 1885

September 9, 1985

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
Attn: Mr. William MacDonald

Dear Sir:

Re: Consturction of a New Confined Disposal Facility
for Polluted Dredged Material, Toledo, Ohio

This is in response to your letter of August 13, 1985 concerning the project noted above. My staff has reviewed the information you have provided. On the basis of their evaluation it is my opinion that the project will have no effect on any property either listed in or eligible for the National Register of Historic Places. No further coordination with this office will be necessary unless the scope of the undertaking changes.

If you need any additional information or clarification, please contact Richard Boisvert or Catherine Stroup at 466-1500, ext. 470 or 480. Thank you for your cooperation.

Sincerely,

W. Ray Luce

W. Ray Luce
State Historic Preservation Officer

WRL/CAS:cs

September 26, 1985

Col. Daniel R. Clark
District Engineer
U. S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207

Dear Col. Clark:

The Toledo-Lucas County Port Authority strongly supports the construction of additonal confined disposal facilities for the Toledo harbor. In addition, the Port Authority would encourage this construction to be accomplished in the most long-term, cost-effective manner, which in our perception would require construction of a dike as shown on the enclosed drawing and labeled "Conceptual Design Line." We believe the height of this new dike should match the height of the existing confined disposal facility dike to which it will be attached.

The Port Authority is greatly concerned that this project go forward in an expeditious manner because we believe in the short term (3-5 years) there will be no confined disposal space left in the Toledo harbor. This lack of space is already beginning to cause conflict on the question of disposal in confined spaces versus the open lake. If the debate between confined disposal space and open lake dumping continues there will ultimately be a question raised regarding whether or not to dredge. As you know without appropriate dredging the Port of Toledo and its economic impact on the community will cease to exist.

Aside from all other questions, the port also recognizes that Congress is debating, at the present time, the question of cost sharing for any construction of this nature. Our support for this new construction should not be construed as an agreement to partially fund this new construction, but rather as a statement reflecting the need for the new construction to be planned and accomplished expeditiously.

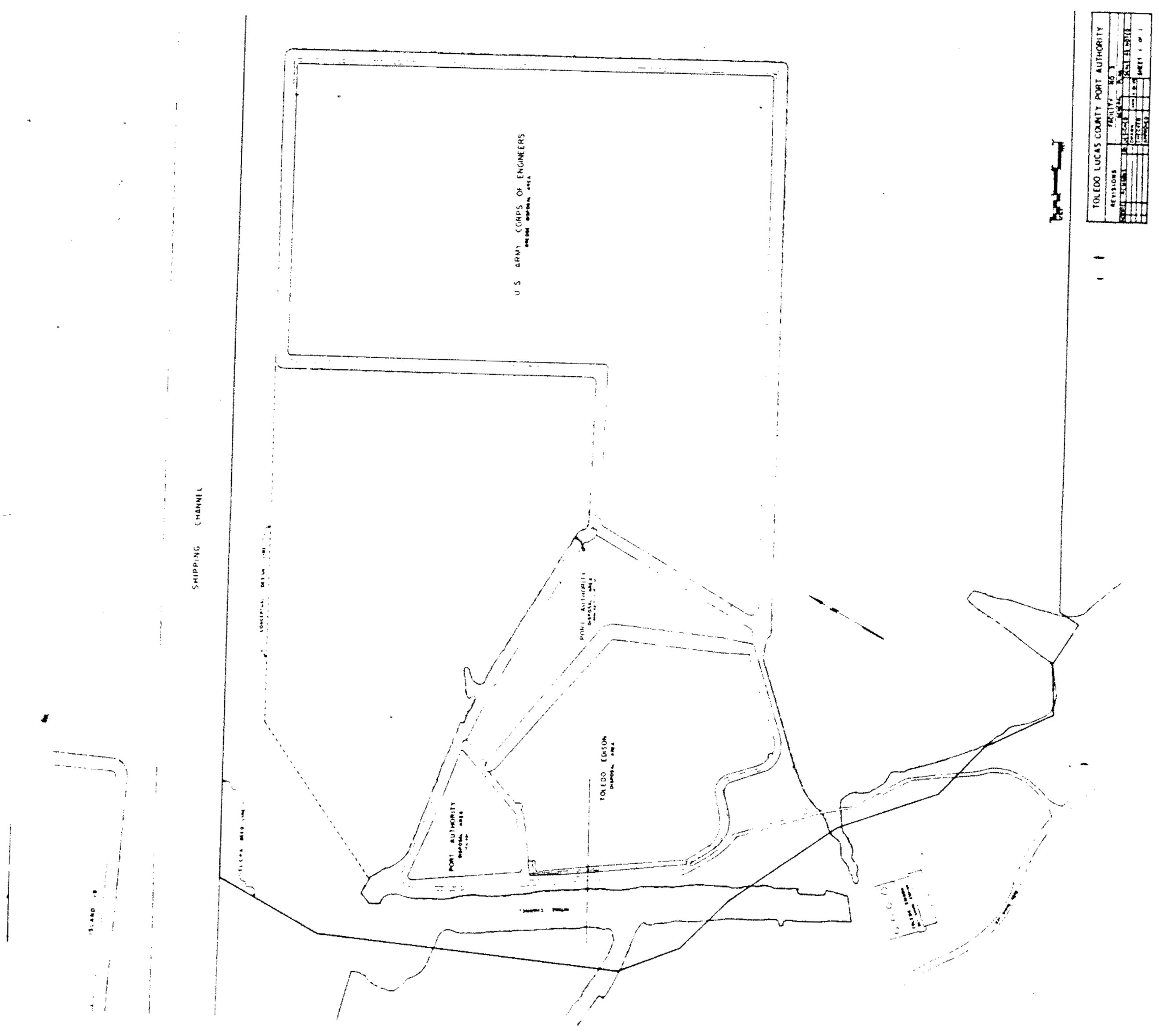
Sincerely,

Gary L. Failor

Gary L. Failor
Seaport Director

GLF/jk
Enclosure

TOLEDO-LUCAS COUNTY PORT AUTHORITY One Maritime Plaza • Toledo, Ohio 43604-1866 U.S.A. • (419) 243-8251


TOLEDO LUCAS COUNTY PORT AUTHORITY
U.S. ARMY CORPS OF ENGINEERS
SHIPPING CHANNEL
PORT AUTHORITY
TOLEDO EDISON
PORT AUTHORITY

November 15, 1985

Mr. Steve Yaksich
Chief, Water Quality Section
U.S. Army Corps of Engineers
Buffalo District Office
1776 Niagara Street
Buffalo, NY 14207

Dear Steve:

Per our telephone conversation of November 14, I am enclosing a xerox copy of the Port Authority agreement with the Corps of Engineers regarding our Facility No. 3. This facility, of course, is the existing CDF for the Toledo Harbor. In addition, I am enclosing a copy of a portion of the Port Authority's official plan which shows by exhibit the area known as Facility No. 3, and documents that our plan envisions the utilization of this area for wharves, piers and industrial uses related to waterborne cargo.

You will note from the plan that this future utilization of the facility requires that the elevation of the site be reasonable for the use proposed. Therefore, I would urge that raising the entire dike not be considered as an alternative to the extension of the CDF which is presently being planned.

Should you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Gary L. Failor
Seaport Director

GLF/atb

enclosures

TOLEDO-LUCAS COUNTY PORT AUTHORITY One Maritime Plaza • Toledo, Ohio 43604-1866 U.S.A. • (419) 243-8251

AMENDMENT AND EXTENSION OF PLAN BY TOLEDO-LUCAS COUNTY PORT AUTHORITY BOARD OF DIRECTORS 1968

This amendment and extension incorporates in the Plan additional backup land adjacent to Port Authority Facility No. 1 and the Ironville project of the City of Toledo Urban Renewal Agency. Also incorporated in the Plan is the newly proposed Port Authority Facility No. 3.

This amendment and extension was approved and adopted by the Board of Directors on March 1, 1968 and journalized April 11, 1968.

W. W. KNIGHT, Jr.
Chairman

Attested:

LOUIS C. PURDEY
Secretary

AMENDMENT AND EXTENSION OF THE PLAN OF THE TOLEDO-LUCAS COUNTY PORT AUTHORITY

The Toledo-Lucas County Port Authority, organized in 1955 pursuant to Chapter 4582 of the Ohio Revised Code, adopted the Plan of the Port Authority in 1957. The objectives of the Plan included establishment of the Port of Toledo as a major world port; promotion of foreign and domestic commerce within the area served by the Port; and encouragement of the development of new industries, enterprises, and commercial firms. At the time the Plan was adopted, the Board recognized that future development would require amendment and extension of the Plan to increase its scope and magnitude and to meet the demands of a growing port and the challenge of the future.

The development of the Port of Toledo has reached the point where berth facilities are crowded and will soon be inadequate to meet the future commerce requirements of the port. For example, during the last two months of the 1966 shipping season there was utilization of all eight berths at Port Authority Facility No. 1 with instances of vessels in the outer limits of the port waiting for wharf space.

Thorough investigation discloses there are no existing properties along the shores of the commercially navigable portion of the Maumee River which are available or adaptable for port facility development or port-oriented industrial development of the size required.

The Plan Committee of the Board of Directors has studied the continued growth of the port and the companion growth of port-oriented industry and has reported the necessity of amending and extending the Plan. In the preparation of this report consideration was taken of earlier studies and information, including the Bartholomew Report, the Hedden Report on Grain, and the Coverdale & Colpitts Report on Bulk Cargo including coal. Consideration was also given to various studies prepared by the staff of the Port Authority; the Corps of Engineers of the United States Army; and Parsons, Brinckerhoff, Quade & Douglas, consulting engineers to the Port Authority.

This Amendment and Extension of the Plan is designed to meet two distinct requirements for the growth and development discussed above.

1. First, the continuing need for increased and improved docks, wharves, warehouses, piers, container facilities, and other port, terminal, and transportation facilities and other facilities in and on the water and waterfront.

2. Second, pursuant to Section 13 of Article VIII of the Ohio Constitution and amendments to Section 4582.06 (E) of the Ohio Revised Code, to acquire, construct, enlarge, improve, equip, sell, exchange, and lease real property, plants, factories, offices, and other structures and facilities for industry, commerce, distribution and research, which will utilize facilities of or cause additional waterborne cargo to move through the Port of Toledo, and to make available sites therefor.

This Amendment and Extension of the Plan consists of three parts: Part 1—Facility No. 3; Part 2—Back-up Area for Facility No. 1; and Part 3—Ironville.

PART 1 — FACILITY NO. 3

The above stated purposes can be effectively achieved by the reclamation of an area of submerged lands from Maumee Bay, designated as Port Authority Facility No. 3. This facility will have several distinct advantages which in combination are unparalleled in any other available area of adequate size. It will be located along the existing navigation channel maintained by the Corps of Engineers of the United States Army, thereby providing an economic site for the disposal of the materials resulting from the required dredging and maintaining of channels of adequate depth. In addition, it will be located downstream from all bridges across the Maumee River. Ideal planning for facilities servicing or utilizing waterborne commerce demands utilization of areas below all of the six bridges which span the river.

The Ohio Revised Code (Sec. 123.03) vests title of the waters of Lake Erie, of which Maumee Bay is a part, and the soil under them in the State of Ohio, subject to the power of the federal government, the public rights of navigation and fishery and to the right of littoral owners to make reasonable use of the waters in front of their lands. Pursuant to legislation enacted August 1, 1967 and effective October 31, 1967, the Governor, Auditor of State, and Secretary of State have conveyed the area in Maumee Bay shaded green on Exhibit A to the Port Authority by deed, without cash consideration, to conserve and further navigation and commerce upon the waters of Lake Erie and to create jobs and employment opportunities and improve the economic welfare.

Much of the submerged land area of 3100 acres will be reserved for future development. The Port Authority plans to initially reclaim an area of eight hundred acres to be developed over a period of ten years. This area will be developed by the deposit of soil, sand, gravel, rock, and similar minerals and substances within diked areas. To accomplish this, it will be necessary for the Port Authority to have available in the port, dredging and other equipment for the creation of the land area and the maintenance of channels and approaches to the facilities.

It will be necessary to provide, across lands adjacent and nearby to the area shaded green on Exhibit A, utility services, rail and motor vehicle ingress and egress and other supporting services and this amendment to the Plan contemplates the use of so much of such adjacent and nearby lands as is necessary for such purposes.

The Plan of the Port Authority to develop a portion of Facility No. 3 as a general purpose cargo facility will require the installation of a bulkhead and wharf, utilities, rail access, roadways, and transit sheds, back-up warehouses, open storage areas, and all other facilities for the development of all types of general purpose cargo and bulk cargo. The balance of Facility No. 3 will be available as a site for plants, factories, offices, and other structures and facilities for industry, commerce, distribution and research, and the development of that portion will require installation of utilities and access roadways. In furtherance of the public purpose of Article VIII, Section 13 of the Ohio Constitution, the Port Authority will also acquire, construct, equip, sell, exchange, and lease real property, plants, factories, offices and other structures and facilities for industrial, commercial, distribution and research development which will cause additional cargo to move through the Port of Toledo or will utilize the facilities of the Port.

The Port Authority will continue to consult and cooperate with the Corps of Engineers of the United States Army in the development and maintenance of its facilities including the relocation of the harbor line necessitated by the development of Facility No. 3.

The Plan of the Toledo-Lucas County Port Authority is hereby amended and extended to include the area shaded green on Exhibit A and the additional areas required for purposes incidental to the development of the proposed site, and the program set forth herein for its development, all as hereinabove set forth.

PART 2 — BACK-UP AREA FOR FACILITY NO. 1

The original Plan adopted October 11, 1957 provided for the construction and expansion of the general purpose cargo facility, known as Port Authority Facility No. 1 (referred to in the original Plan as the Presque Isle Site). The Plan was amended and extended in 1962 and again in 1963 to provide for further construction and expansion of Port Authority Facility No. 1 and to include Port Authority Facility No. 2.

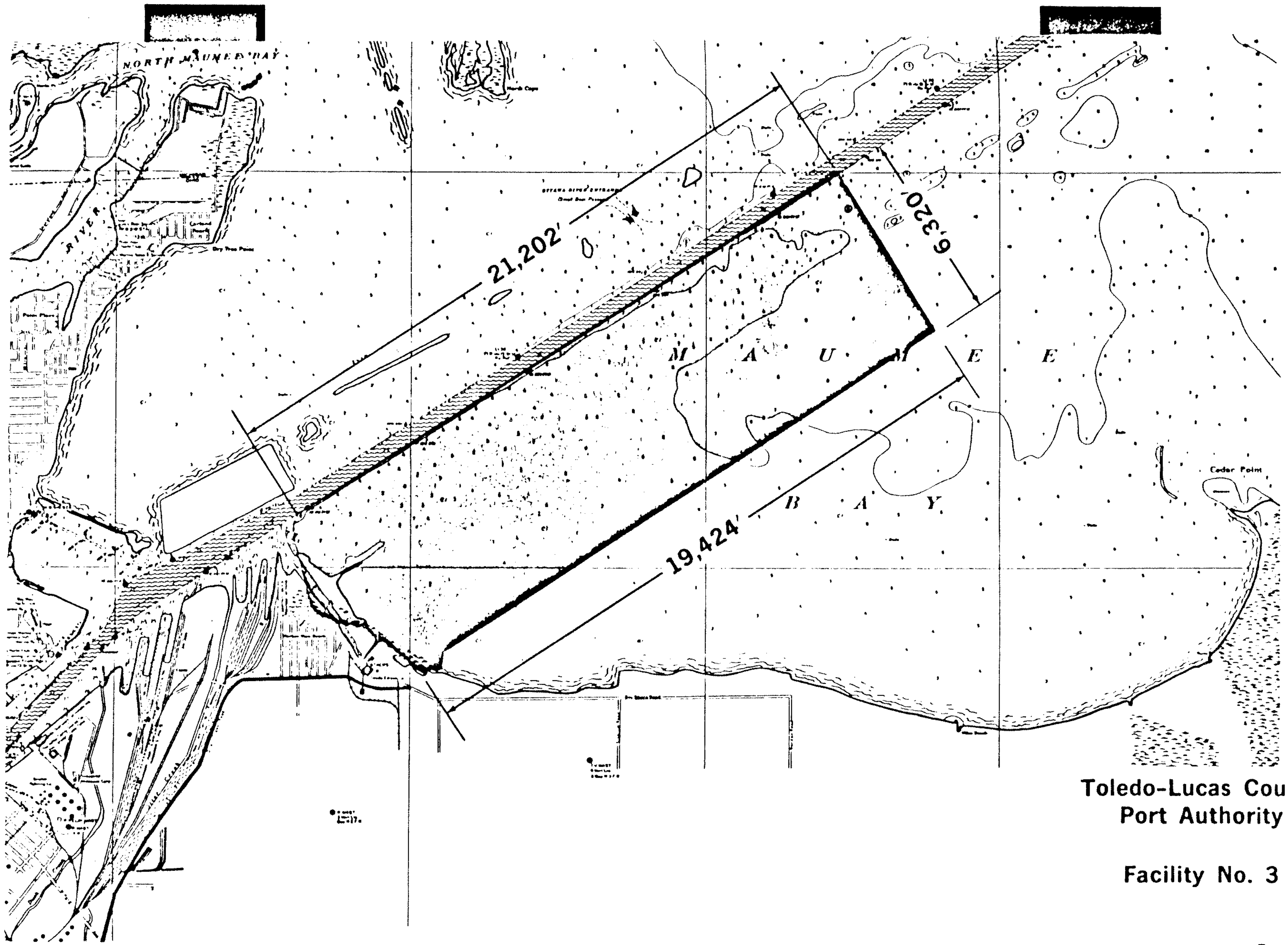
In connection with the most upstream portion of Facility No. 1 there is a need for additional back-up land for cargo storage and other general port use. Additional land is available for this purpose on the southerly side of St. Lawrence Drive, which land is shaded red on Exhibit B. The Plan of the Toledo-Lucas County Port Authority is hereby amended and extended to include such back-up land as a part of Facility No. 1.

PART 3 — IRONVILLE

The City of Toledo Urban Renewal Agency has recently completed the Ironville project. This makes available a tract of land, consisting of approximately 60 acres located in the immediate vicinity of Facility No. 1, which is designated under the urban renewal program as an industrial area. The size and proximity to the port area makes this site ideal for the location of port-oriented industries.

The Port Authority deems it advisable to include the Ironville area in its Plan for the Port of Toledo and intends to work with the City of Toledo and private interests in the development of port-oriented industry and port-related facilities on this property.

The Plan of the Toledo-Lucas County Port Authority is hereby amended and extended to include the Ironville urban renewal area which is shaded green on Exhibit B.



Toledo-Lucas County
Port Authority

Facility No. 3

EXHIBIT A

12/7/67

NCBPD-ER

23 DEC 1985

SUBJECT: Toledo, Ohio, Construction of a New Confined Disposal Facility for Polluted Dredged Material - Cultural Resources

Dr. Dan Linhart
National Park Service
Submerged Cultural Resources Unit
Santa Fe, NM 87501

Dear Dr. Linhart:

The purpose of this letter is to inform you of the Buffalo District's current study of alternative confined disposal facilities (CDF's) for polluted dredged materials from Toledo Harbor, Ohio. The existing CDF at Toledo Harbor (Enclosure 1) is rapidly being filled and has an expected lifespan of 3 to 6 years based upon present yearly amounts of polluted sediments dredged from Toledo Harbor. My current study is investigating numerous alternative dredged material disposal schemes, but it appears that the most feasible alternative will be to add a new wall to the existing CDF at Toledo creating a new CDF (Enclosure 1). I am presently investigating the possibility of cultural resources being located within this site.

By letter dated 13 August 1985, I contacted the Ohio State Historic Preservation Officer (SHPO) and described the proposed plan for construction of a new CDF at Toledo Harbor. The SHPO, Mr. W. Ray Luce, issued an opinion that the project will have no effect on any property either listed in or eligible for the National Register of Historic Places. However, further review with Ms. Cheryl Smith, Archeologist, Corps of Engineers, North Central Division Office, Chicago, indicated that you may have knowledge concerning the possibility of cultural resources being located at the proposed project site.

The site (Enclosure 1) is located in a highly impacted area on the south side of the Maumee River. Although it is difficult to determine any natural shorelines in the immediate area, the site appears to be located up to several hundred feet out in the bay. It is located about 350 feet from the Toledo Harbor shipping channel and bordered by existing CDF's on its remaining three sides. The area is very shallow averaging 1 to 3 feet below low water datum (568.6 IGLD) with a substrate consisting of firm lake clays overlain with 0-2 feet of loose deposits of silts and clay. An old dredge spoil shoal extends about 600 feet from the southeast side. Prior to the construction of the CDF located on its northeast side, the area was subjected to direct wave attack over a very long fetch (over 30 miles). No soil or

K//5//AD
12/19/85
R. 12/20/85

NCBPD-ER
SUBJECT: Toledo, Ohio, Construction of a New Confined Disposal Facility for Polluted Dredged Material - Cultural Resources

plant remains which may have developed during lower lake levels can be found in the area. Although the site's position in regard to the Maumee River would suggest the possibility of past occupancy or perhaps vessel abandonment specific site conditions appear to be limiting.

I have not uncovered any decisive information in regard to cultural resources at the site. If you have any information either confirming or negating the possible cultural value of the site, I would very much like to hear from you.

I would appreciate hearing from you within 30 days. Thank you for your anticipated interest.

My point of contact pertaining to this matter is Mr. William F. MacDonald of my Environmental Analysis Branch, who can be contacted by calling commercial number (716)876-5454, extension 2175 or by writing to:

District Commander
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
ATTN: Mr. William F. MacDonald

"The Buffalo District - Leadership in Engineering"

Sincerely,

Lawrence C. Cabell, LTC
Deputy District Commander
DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

1 Enclosure
as stated

Copy Furnished:
NCBED-HQ
NCBPD (reading file)
NCBPD-ER

cc: NCBED-HQ

MacDonald WFM 12/20
Bennett 12/23
Zorich 12/23
Cabell JC
Clark ________

United States Department of the Interior
NATIONAL PARK SERVICE
SOUTHWEST REGION
P.O. Box 728
Santa Fe, New Mexico 87501

IN REPLY REFER TO:

SWR-24(PCS)

January 31, 1986

District Commander
US Army Engineer District, Buffalo
1776 Niagra Street
Buffalo, NY 14207

Dear Mr. MacDonald:

This letter is to follow up on our telephone conversation of January 24.

You requested information on the presence of cultural resources within a proposed CDF in Toledo, Ohio. The Submerged Cultural Resource team is not aware of any cultural resources within the impact zone of the CDF. However, this does not discount the existence of such resources in that location. We are not engaged in compliance activities outside the National Park System and do not normally come in contact with information regarding cultural resources outside of National Park areas.

If we can be of further assistance, please feel free to contact us.

Sincerely,

Toni Carrell

Toni Carrell
Archeologist
Submerged Cultural Resources Unit

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Columbus Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068

July 16, 1987

Colonel Daniel R. Clark
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Bill MacDonald

Dear Colonel Clark:

Attached is the U. S. Fish and Wildlife Service's Final Fish and Wildlife Coordination Act (FWCA) Report on the Toledo Confined Disposal Facility (CDF) study in Lucas County, Ohio. The assistance and cooperation of your staff is appreciated

Sincerely yours,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: Chief, Ohio Division of Wildlife, Columbus, OH
ODNR, Outdoor Recreation Service, Attn: M. Colvin, Columbus, OH
Ohio EPA, Water Quality Monitoring & Assessment, Columbus, OH
U.S.EPA, Office of Environmental Review, Chicago, IL

TOLEDO CONFINED DISPOSAL FACILITY

A Final Fish and Wildlife Coordination Act Report

Submitted to:

Buffalo District
U. S. Army Corps of Engineers
Buffalo, New York

Prepared by:

Columbus Field Office
Division of Ecological Services
U. S. Fish and Wildlife Service
Columbus, Ohio

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Columbus Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068

July 15, 1987

Colonel Daniel R. Clark
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Bill MacDonald

Dear Colonel Clark:

This is our Final Fish and Wildlife Coordination Act (FWCA) Report on the Toledo Confined Disposal Facility (CDF) study in Lucas County, Ohio. Our comments on the proposed project are submitted 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.

The Ohio Division of Wildlife has been provided with a copy of our report for their review. A copy of their letter of concurrence dated May 26, 1987 is attached. In our letter of November 15, 1984, we provided preliminary comments regarding some of the potential alternative locations for CDF expansion. Our Draft FWCA Report, dated August 15, 1985, provided further input on alternative disposal options and provided data on the fish and wildlife resources of CDF Site #1. Copies of our 1984 letter and 1985 FWCA report are contained in the Draft EIS, dated May 1986. Our review comments on the Draft EIS are contained in the Department of Interior comments dated July 29, 1986 (see attached copy).

PROJECT DESCRIPTION

The purpose of the project is to select an economically feasible and environmentally acceptable site or method for the future disposal of dredged materials that are considered unacceptable for open-lake disposal. Such a site or method will be required within a two to five year period (depending upon the annual quantities of dredged spoil requiring confinement) when the existing active 242-acre CDF is filled to capacity. Disposal alternatives that have been mentioned for consideration include: upland use of the dredged material at Maumee Bay State Park, Buckeye Basin Greenbelt Parkway, and various old landfill sites; construction of a CDF along the east side of Woodtick Peninsula to prevent the continued erosion of the peninsula and provide some protection to the marshes, marinas, and other lands west of the peninsula; increasing the height of the dike around the active 242-acre CDF or around the old Island 18 (Grassy Island) CDF to increase disposal capacity; or constructing a new CDF at one of the four potential alternative locations adjacent to the navigation channel (see attached Figure 1).

The preferred action identified in the Draft EIS involves the construction of a new lakeshore CDF (Alternative 1C) bounded on the northeast and southeast sides by the existing 242-acre CDF, on the south side by the Port Authority CDF, and on the west and northwest sides by a 4,265-foot long dike to be built to a top elevation of 23.5 feet above the LWD elevation of 568.6 feet (IGLD, 1955). The new CDF would occupy about 176 acres of Maumee Bay and would provide about 162 acres of disposal area.

ASSESSMENT OF ALTERNATIVE LOCATIONS FOR NEW CDF

In our letter of November 15, 1984, we indicated that our preliminary review of the studies of Fraleigh et al. (1975) and Wapora (1976) led us to believe that a new CDF at proposed Sites #2, 3, or 4 would probably result in greater impacts on water quality in Maumee Bay than would a new CDF at Site #1. Further review of these studies and others has not modified that opinion. As long as the water quality of the lower Maumee River is significantly degraded, rapid mixing of river and bay waters appears to be important in minimizing the zone of influence of the river water in Maumee Bay. While we expect water quality in the lower Maumee River to continue to improve, we realize that the process will be a very gradual one. A new CDF at Sites #2, 3, or 4, or even an expansion of Grassy Island to the northwest would result in reduced mixing in the "shadow zone" of the CDF. Even the construction of a CDF at Site #1 will have some impact on mixing by eliminating the 176-acre embayment area as a mixing zone and shifting the mixing zone to the north of Site #1. Unfortunately, the Draft EIS provides very little dicussion or further analysis of the impacts of various CDF locations on water circulation other than brief references in paragraphs EIS 2.19, 4.05, 4.11, and 5.06. The latter three of these references consist of paraphrases of opinions expressed in our 1984 letter and our Draft FWCA Report.

Of course, we are fully aware that Site #1 was selected as the location of the preferred action primarily due to the fact that the amount of diking required, and thus the cost of construction of a new CDF, would be much lower at Site #1 than at any other location in Maumee Bay. Even the most efficient of designs for a 176-acre CDF at another location, such as an extended semi-circular CDF expansion on the northwest side of Grassy Island, would require a dike approximately 60 percent longer than the one proposed at Site #1. We realize that only the gravest of water quality impacts or the elimination of the most unique of fish and wildlife habitats might have precluded the selection of Site #1 for construction of a new CDF. As the water quality impacts of Alternative 1C should be relatively minor, and as the fish and wildlife resources of the site are significant but certainly not unique, we concur with your selection of Site #1 for the construction of a new CDF. Of course, we continue to support upland disposal of the dredged material in lieu of the continued proliferation of in-water CDF's.

RESOURCES OF SITE #1

Introduction

While we concur with your selection of Alternative 1C as the preferred action, we cannot accept your assessment that the fish and wildlife resources of Site #1 are insignificant and therefore do not require any mitigation for their permanent loss.

Our Draft FWCA Report describes in detail the variety of habitats found within Site #1 and provides extensive information on the fish community of the area. The report is included in Appendix A of the Draft EIS and is discussed in Section 5. However, no mention or use of the data was made in Sections 3 and 4 of the Draft EIS. Instead, these Sections provide only the briefest description of the aquatic resources of Maumee Bay and Site #1, painting an overly bleak picture of the existing aquatic environment of these areas and saying little about possible future conditions. Paragraph EIS 3.08 indicates, in part, that Maumee Bay and River are considered to be an eutrophic polluted environment represented by benthos (pollutant tolerant species such as oligochaete worms and dipteran larvae) of a very limited diversity. Paragraph EIS 3.09 indicates that a list of about a dozen fish species includes most of the fish found in Maumee Bay by Fraleigh et al. (1975) and other researchers, and that water and sediment quality of the river and bay tend to be poor and appear to limit the fishery value of the area. Paragraph 4.05 indicates that extensive studies conducted before and during construction of the 242-acre CDF by Fraleigh et al. (1975), and after its construction by Wapora (1976) did not note any specific ecological significance of Site #1.

The studies cited above were not designed to provide for comprehensive sampling or characterization of habitats within Site #1. The Fraleigh study included only one water quality sampling Station (#22) in Site #1 (in the extreme eastern corner) and two stations (#12 and 13) in the navigation channel along the northwest side of Site #1. One gill net station (#1513) was located just east of Site #1 in an area that is now the 242-acre CDF. Water quality sampling at Station #22 was done on eight days from April 11 thru July 30, 1974. Sampling of the station was then discontinued due to the dike construction schedule for the 242-acre CDF. Gill netting at Station #1513 was done on April 13-14/74 and April 20-21/74. No benthic sampling was done in the study. See attached Figure 2, which is a copy of Map 3, page 17, from Fraleigh et al. (1975) for sampling station locations. The Wapora (1976) study also included only one sampling station (#3) in Site #1, and again it was in the eastern corner of the site. Station #1 was located across the navigation channel from Site #1, at the southeast corner of Grassy Island. Water quality, bacteria, phytoplankton, zooplankton, macroinvertebrates, and fish were sampled. Macroinvertebrates were sampled using both artifical substrate (Hester-Dendy samplers) and Ponar grab samplers. See attached Figure 3, which is a copy of Figure III-1, page 15, from Wapora (1976) for sampling station locations.

Water Quality

Both studies indicate that water quality in the lower Maumee River is quite poor and affects water quality in the bay, with most impacts decreasing with increased distance from the mouth of the river. A simple numerical-sum ranking system for water quality (giving equal weight to each measured parameter) used by Wapora (1976) ranked the sampling stations as follows (lowest water quality to highest): 1, 3 and 4 (tied), 2, 5, 8, 7, and 6. However, it should be noted that the lowest dissolved oxygen (D.O.) reading recorded at Station #3 during the study was 4.2 ppm and occurred on July 22, 1975. An overall ranking of stations relative to water quality was not provided by Fraleigh et al. (1975). Station #22 had the second lowest yearly mean D.O. concentration of the 22 stations surveyed. The lowest D.O. reading recorded at Station #22 was 6.0 ppm and occurred on June 13, 1974. The D.O. reading on that date at Station #14, at the mouth of the river, was 5.1 ppm.

Of course, a valid analysis of the affected environment at Site #1 must view the site from a historical perspective, rather than just characterizing the site as it presently exists. A comparison of water quality data from Fraleigh et al. (1975) and Fraleigh et al. (1979) illustrates the influence of the construction of the 242-acre CDF on Site #1. Attached Table 1 presents the average D.O. concentrations for the summer months for a number of stations surrounding the 242-acre CDF. See attached Figure 2 for station locations. Note that in 1974, prior to construction of the 242-acre CDF, the D.O. concentration increased almost 4ppm between Station 14, at the river mouth, and Station 13, the next station bayward along the navigation channel. In 1977, after construction of the 242-acre CDF, the difference in average D.O. concentrations has dropped to about 2ppm. The "Summary" section of Fraleigh et al. (1979) also indicates that the construction of the 242-acre CDF appears to have altered the pattern of water mixing in areas adjacent to the CDF, resulting in water quality in these areas becoming more similar to conditions found in the lower river. Thus, at least a portion of the water quality degradation at Site #1 that the Draft EIS indicates may be a limiter of the fishery value of Maumee Bay can be directly attributed to a previous Corps project, the construction of the 242-acre CDF.

The impacts of this construction on Site #1 might be greater if it were not for two ameliorating factors. First, much of the river flow does not pass by Site #1 due to an average withdrawl rate of about 1149 cfs by the Toledo Edison Bayshore Power Plant, the mouth of whose intake canal is located at the southwest corner of Site #1 (Reutter et al., 1978). Comparing this average withdrawl rate to the discharge frequency data for the Maumee River at Waterville, as shown on attached Table 2 (U. S. Geological Survey, 1981), indicates that for the period of June through August, the river flow exceeds the power plant withdrawl rate less than 50 percent of the time. The actual river discharge rate near the mouth may be somewhat greater than measured at Waterville due to the input of about 139 cfs by the Toledo Sewage Treatment Plant located near River Mile 1. Thus, for perhaps half of the time during the summer months, water may be moving from the bay across the face of Site #1 to the power plant intake, rather than from the river into the bay area at Site #1. The second ameliorating influence is the additional water mass mixing produced by wind set-ups and seiches. Strong winds or large differences in barometric pressure across the surface of Lake Erie often result in rapid and extreme rises and falls in the water surface elevation at Toledo. The resulting movement of water masses can result in bay water moving several miles into the lower Maumee River, which stands at lake level for a distance of about 15 miles above the mouth. Thus, even when river flow rates substantially exceed the withdrawl rate of the power plant, Site #1 will often be under the influence of bay water due to a wind set-up or seiche induced movement of bay water up into the Maumee River estuary area. In their 316(b) study at the Bayshore Power Plant, Reutter et al. (1978) estimated that the intake was under the influence of bay water approximately 49 percent of the time during the period of mid-March through August. These estimates were based on conductivity, current, and water level measurements in the area of the water intake canal.

In addition to the need to more thoroughly discuss the influence of past actions on water quality at Site #1, the Draft EIS should also have discussed possible changes in water quality that could be expected in the future. It must be remembered that the loss of resource values at Site #1 will not be just for the operational life of the CDF (perhaps 21 years), but will continue for as long as the CDF remains in place (essentially an irretrievable loss). During this extended time frame, the water quality of the lower Maumee River and Site #1 is probably going to improve considerably. The lower Maumee River/Maumee Bay area has been identified by the Great Lakes Water Quality Board of the International Joint Commission as one of 42 Areas of Concern in the Great Lakes Basin, based upon problems with water quality. The Remedial Action Plan (RAP) for the area is presently being developed. We are encouraged by the strong show of local interest in the RAP and in other efforts to continue the progress in water quality improvements for the area. The Toledo Sewage Treatment Plant is presently being expanded and upgraded. Problems associated with combined sewer overflows are also being addressed. Impacts from agricultural activities may also be reduced as various forms of conservation tillage are adopted in the watershed. We understand that approximately 15 percent of the farmland in Wood County is already in conservation tillage. With improvements in water quality as a result of these and other actions, the resource value of Site #1 would almost certainly increase were the area not occupied by the proposed CDF.

In 1986, the Ohio EPA conducted an extensive biological and water quality survey of the lower Maumee River, with some additional fisheries surveys in Maumee Bay. The data are presently being analyzed by the agency. A preliminary data set that we received from the Ohio EPA indicates that surface and bottom D.O. readings were taken on 8 to 10 dates between July 14 and October 8, 1986. The combined mean for River Mile 1.0 is about 5.1 ppm(range 3.3 to 6.3 ppm), for River Mile 0.5 about 5.4 ppm (range 3.6 to 7.3 ppm), and for the mouth near Presque Isle about 5.5 ppm (range 3.1 to 7.5 ppm). These values are somewhat higher than values from earlier studies that are given in paragraph EIS 3.21 of the Draft EIS, indicating that some improvement in water quality has occurred between the early 1970's and the mid-1980's.

Sediment Quality and Benthos

While Site #1 has historically been influenced by the degraded water quality of the lower river, and this influence has been increased by the construction of the 242-acre CDF, the aquatic community of the site and of the rest of Maumee Bay is not the depauperate assemblage characterized by Sections 3 and 4 of the Draft EIS. Paragraph EIS 3.08 indicates that the macroinvertebrate populations are represented by pollutant tolerant species such as oligochaete worms and dipteran larvae. Certainly, the populations of some pollution sensitive organisms such as Hexagenia mayfly nymphs have declined dramatically in the bay. However, Wapora (1976) indicates that of the chironomid larvae collected in Ponar grab samples at sampling station #3 (see Figure 3), only one genus was characterized as pollution tolerant (T), one as tolerant/facultative (T/F), one as facultative (F), and two as facultative/intolerant (F/I). The majority of the larvae were of the facultative genus. Of chironomid larvae collected on Hester-Dendy artificial substrates, one genus was listed as T, two as T/F, four as F, four as F/I, and four as I. The order by total number of larvae per group was T, F/I, F, I, and T/F. When all sampling stations are ranked according to species diversity, the order (highest to lowest diversity) for the Ponar collections is 6, 4, 7, 3, 5, 2, 8, and 1; and for the Hester-Dendy collections is 6, 1, 2, 3, 8, 5, 7, and 4. It can be seen that the benthic diversity rankings of Station #3 do not reflect the water quality ranking, which was second lowest of the eight stations. Using the pollution classification of Wright (1955), Station #1 would be considered heavily polluted (more than 5,000 oligochaets/m^2); Stations #2, 3, and 4 moderately polluted (1,000 to 5,000 oligochaets/m^2); and Stations #5, 6, 7, and 8 lightly polluted (100 to 999 oligochaets/m^2). Figure 4 (attached) presents two figures from Pinsak and Meyer (1976) showing the number of oligochaets and diptera larvae per m^2 at a number of stations in and lakeward of Maumee Bay on May 9, 1975. The data are from an unpublished report by Lindsay and Meyer (1975). Note that the application of the pollution classification of Wright (1955) to the data indicates that the area southeast of the navigation channel is lightly polluted, the navigation channel and the area northwest of the channel is moderately polluted, and the area near the Toledo Sewage Treatment Plant discharge is heavily polluted.

The beds of sago pondweed found in Site #1 also support a significant community of epiphytic macroinvertebrates. In a cursory examination of some of the pondweeds, we noted large numbers of midge larvae along the stems and leaves. Fish and Wildlife Service studies of aquatic plant communities in the pools of the upper Mississippi River have reported standing crops of 4,730 to 16,348 invertebrates /m^2 lake surface for various species of submergent plants. Aquatic plant communities are also known to provide important spawning and nursery habitat for some fish species.

Just as we believe that the water quality in the bay has improved and will continue to improve, the sediment quality also appears to have improved significantly. A prime example would be that the dredged sediments from Lake Mile 2 to Lake Mile 8 are now considered suitable for open-lake disposal. Another indication of this change is the change in the benthic community of the bay. In 1930, 1961, and 1982, a series of stations throughout the western end of the western basin of Lake Erie were sampled for benthic macrofauna. From 1930 to 1961, the stations in and near Maumee Bay either remained at a high level of pollution or became much more polluted, as evidenced by the number of oligochaets/m^2 and by loss of pollution intolerant organisms such as Hexagenia mayfly nymphs. By 1982, it appears that the trend had dramatically reversed itself, at least concerning the numbers of oligochaets. The 1930 survey results are presented in Wright (1955) and the 1961 survey results in Carr and Hiltunen (1965). The 1982 data and attached Figure 5 and Table 3, comparing the data from the three surveys, are from an unpublished report provided to us by Dr. Bruce Manny, Great Lakes National Fisheries Center, Ann Arbor, Michigan. The 1982 data are preliminary, have not yet been statistically analyzed, and are subject to some modification. Note that while the density of oligochaets has decreased at stations in and near Maumee Bay, the densities at most stations further offshore have remained relatively the same or increased.

Juvenile and Adult Fish

There is no doubt that changes in water quality in the Maumee River and Bay resulting from urban, industrial, and agricultural development in the Maumee River Basin have had a dramatic impact on the fish community of the bay. The history of these changes is well documented by Trautman (1957) and others. Tables 1 and 2 (taken from Allison and Hothem, 1975) in our Draft FWCA Report, summarize the relative abundance, distribution, and probable future of the fish species of the Maumee River Basin. Attached Table 4 (Barnes, 1979) indicates the relative abundance of fishes in Maumee Bay before and after 1957. The table is based, in part, on tables in Pinsak and Meyer (1976), which tabularize the data from Trautman (1957), and on post-1957 data from various sources. Note that 50 species of fish are listed in Table 4 and that two of these, lake sturgeon and spotted gar, are indicated to have most likely been extirpated from the bay community. Table 3 in our Draft FWCA Report is a compilation of 62 species of fish that might occur in Maumee Bay, based upon information provided in the four referenced reports. A number of these species, including lake sturgeon, spotted gar, Americal 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. In summary, approximately 48 to 57 species of fish might reasonably be expected to occur in the existing fish community of Maumee Bay. Note that the majority of the species believed to have been extirpated from the community or in significant decline are species preferring clear water with clean gravel or rooted aquatic macrophytes for cover, feeding, and spawning habitat. Pinsak and Meyer (1976) list the primary causes of most of the declines as:

1. Increases in turbidity, siltation, and industrial waste.

2. Inability of fish to reach traditional spawning areas up Maumee River (above dams).

While these factors have resulted in major shifts in the structure of the Maumee Bay fish community, both the diversity and productivity of the fish community remain very high. Attached Table 5 combines the data for juvenile and adult fishes from Tables 4, 7, 8, 10, 11, and 12 of our Draft FWCA Report plus data from Fraleigh et al. (1979), Wapora (1976), Rawson and Johnson (1980), and Ohio Environmental Protection Agency (1987). At least 48 species of fish, exclusive of ichthyoplankton, have been collected by traditional sampling techniques from the waters of Maumee Bay since 1974. Forty-one of these species, plus an additional 11 species were also collected from the intake screens at the Bayshore Power Plant during the year-long impingement/entrainment study (Reutter et al., 1978). Thus, a grand total of at least 59 species of fish have been collected as juveniles and/or adults from the bay since 1974. The northern hog sucker and black redhorse are probably strays as these species are generally found further upstream in higher gradient habitat. The presence of threespine stickleback is possibly the result of releases of the fish by bait dealers or in ballast water, as the species is recorded by Hubbs and Lagler (1958) as occurring only in the Lake Ontario basin. Such releases may also explain the presence of mottled sculpin, which had previously been recorded for the Maumee River drainage only in smaller streams of the upper drainage area and for the western basin of the lake only in the vicinity of the Bass Islands. Chinook salmon, coho salmon, and rainbow trout (steelhead) are present as the result of stocking over the last two decades and are generally not able to maintain self-perpetuating populations. The remaining 52 species of fish represent a far more diverse and abundant fish community than the approximately fourteen species to be found in the bay according to Paragraph EIS 3.09 of the Draft EIS. In comparison, only 35 species of fish were collected by a combination of gill netting, trawling, and shore seining in the vicinity of the water intake and discharge of the Davis Besse Nuclear Power Plant from 1976 through 1980 (compiled from CLEAR, 1976 through 1980).

Forty-two of the total of 59 species collected from Maumee Bay have been found in the area of CDF Site #1. These species are indicated by a "+" symbol in the body of attached Table 5. Among these 42 species were found moderate numbers of sport species such as walleye, white bass, yellow perch, channel catfish, white crappies, and freshwater drum. Some species such as white crappie and channel catfish may find the area more conducive for spawning due to the shelter and/or habitat provided by construction of the riprapped dikes of the 242-acre CDF. While we did capture walleye and white bass in spawning condition in the area (see Table 10 in our Draft FWCA Report), the area may have provided better spawning conditions for these species prior to construction of the 242-acre CDF. Fraleigh et al. (1979) collected walleye eggs on the majority of the egg trees set on the rocky shoals that parallel the navigation channel. A 600-foot long remnant of such a shoal exists in Site #1. Construction of the 242-acre CDF may have increased the impacts of siltation on the cobble and gravel habitat of the shoal by reducing water circulation in Site #1. In their 1986 electrofishing surveys of six stations in Maumee Bay and two stations in the lower mile of the Maumee River, the Ohio EPA (1987) found the greatest number of fish species (24) at the station located within CDF Site #1. A station along the shoreline at Immergrun had 23 species and all other stations had 18 species or fewer.

Larval and Young-of-the-Year (Y-O-Y) Fish

In spite of obvious water quality problems in the lower Maumee River and in Maumee Bay, these areas serve as valuable nursery habitat and perhaps spawning habitat for white bass and other sport and commercial species such as walleye, yellow perch, freshwater drum, and channel catfish. Table 5 in our Draft FWCA Report summarizes the data regarding the relative abundance of larval fishes captured along the Michigan and Ohio shorelines of most of the western basin in 1977, as reported by Mizera (1981). Note that the average density of larval white bass in Maumee Bay was more than five times greater than the average density east of the bay and more than seven times greater than the average density north of the bay. A similar pattern was found for freshwater drum. For larval walleye, the density found in Maumee Bay was slightly greater than that north of the bay but considerably less than that east of the bay. The density of yellow perch larvae in the bay was high but was slightly below that of the other two areas. Heniken (1977) also found somewhat similar patterns of larval distributions in his summarization of data from 1975 and 1976 for the Ohio portion of the western basin.

Channel catfish larvae were collected in very low densities in all three survey areas by Mizera (1981). However, larval tow-nets are generally considered to be very ineffective collectors of "littoral" species such as catfish. Such species are sometimes more readily collected later in the season with small-mesh trawls. Table IX-6 in Wapora (1976) summarizes the catch of young-of-the-year (Y-O-Y) fish collected by trawling at the eight stations shown on attached Figure 3 during four sampling periods in late July, 1975. Channel catfish (Y-O-Y) were collected at all eight stations but were most abundant at Station #3, which is located in CDF Site #1. Station #3 was ranked second highest in number of Y-O-Y freshwater drum collected and fourth highest in total numbers of Y-O-Y fish collected from the eight stations.

Maumee Bay also appears to be a major spawning and/or nursery area for forage fish, particularly gizzard shad. Table 5 of our Draft FWCA Report shows that the average density of gizzard shad larvae in Maumee Bay in 1977 was over 640 larvae per 100 m^3 and was almost three times that of the areas east and north of the bay. Based on the larval surveys of 1975 and 1976, Heniken (1977) also indicates that gizzard shad production in the Ohio portion of the western basin appears to be centered mainly in Maumee Bay and that concentrations often exceeded 1,000 per 100 m^3. Herdendorf and Cooper (1975) report a concentration of almost 1290 gizzard shad larvae per 100 m^3 on July 25, 1975 at Station #43 near the southeast corner of Grassy Island. Herdendorf et al. (1976) report gizzard shad larval concentrations at Station #43 of 1,298 on June 1, 1976 and 2,170 on June 6, 1976.

Gizzard shad appear to remain in the Maumee River/Bay area as they mature, as indicated by the impingement data given in Table 7 of our Draft FWCA Report. More than eleven million gizzard shad, of an average weight of about 11 grams, were estimated to have been impinged at the Bayshore Power Plant during the year-long survey (Reutter et al., 1978). Table 12 in our

Draft FWCA Report shows the large number of Y-O-Y gizzard shad and other forage species that we collected from CDF Site #1 with a small (40') shore seine. Also note the large numbers of Y-O-Y white bass collected by seining. Gizzard shad are the most important forage species for walleye in the western basin of Lake Erie. The Y-O-Y shad are usually vulnerable to predation by Y-O-Y walleye until very early fall, by which time the shad have generally outgrown the gap size of the Y-O-Y walleye. The young walleye prey on shiners and other small forage fish until Y-O-Y shad are available again the following summer. As Y-O-Y shad increase in size through the late summer and early fall, they become prime forage for age class I and older walleye. Age class I shad are fed upon heavily by larger walleye, probably age class II and older. Over the past five years, the estimated population of fishable-sized walleye (age class II and older) in the western basin has varied from 20 million to 35 million fish. Walleye growth rates began to decline in the early 1980's, possibly as the result of very strong year classes in 1980 and 1982 and some moderate to weak year classes for gizzard shad and other forage species. Walleye year classes have been moderate to low in numbers in the last several years and growth rates increased in 1985 and 1986 (Ohio DNR, 1987 and Karl Baker, personal communication).

Resource Summary

In summary, available data indicate that water quality has improved in the lower Maumee River/Maumee Bay area and that continued improvement is likely. Sediment quality has improved, as has the benthic community associated with these sediments. Continued improvements in water quality should be reflected in the sediments and benthic community. Maumee Bay is an important spawning and/or nursery area for a number of sport and commercial fish species, and also for forage species critical to the maintenance of large populations of sport species such as walleye. The fish community is presently characterized by both a large number of indigenous and naturalized species (at least 52) and probably the highest productivity in the western basin of Lake Erie. At least 41 of these species, including important sport and forage species, have been collected in Site #1. Continued improvements in water quality may result in some reduction in total productivity of the fish community, but an improvement in diversity and percentage of higher-valued species.

HABITAT TYPES AND RESOURCE CATEGORIES

Site #1 presently consists of a variety of habitats, including about 6,100 linear feet of riprapped shoreline; over 600 linear feet of a shallowly inundated sand, gravel, and cobble shoal; a small triangular-shaped wetland peninsula about 150 feet in length and 75 feet along the base; a sand and gravel beach about 100 feet long , west of the peninsula; moderately dense beds of sago pondweed west of the peninsula and south of the 600-foot long shoal; and over 160 acres of presently unvegetated mud-bottom habitat. The wetland peninsula and the beds of sago pondweed (which constitute vegetated shallows) are listed as special aquatic sites in the U. S. EPA 404(b)(1) Guidelines. Equally important to the benthic and fish communities of Lake Erie is the habitat provided by the 600-foot long shoal. All three types of habitat are of high value to certain species of fish and wildlife in the project area. On September 17, 1985, we conducted an aerial survey of Maumee Bay and part of the lower Maumee River in an effort to determine the prevalence of submergent aquatic beds in the area. We observed seven areas containing small to moderate-sized beds along the Maumee Bay shoreline east of the Bayshore Power Plant discharge, a relatively large bed at the mouth and just upstream of Otter Creek, scattered beds northeast of the Cullen Park peninsula, large beds in the Cullen Park embayment and smaller beds in the embayment just upstream of Harrison Marina. Roger Thoma (Ohio EPA, personal communication) also observed beds in a large embayment on the north side of the river just upstream of the first railway bridge, and along the northwest side of Grassy Island. Thus, the beds in Site #1 are certainly not unique to the area but they are part of a habitat type that is relatively scarce in the area. An examination of lake charts, topographic maps, and aerial photography indicates that wetland habitat and the shoal habitat are also relatively scarce in the area. Due to their scarcity and to their high value to certain evaluation species, these three types of habitat fall within Resource Category 2 as defined in accordance with the U. S. Fish and Wildlife Service's Mitigation Policy, published in the Federal Register on January 23, 1981. The shoreline riprap habitat is becoming more common in the area and is of high value to certain species of benthos and fish, placing it in the high end of Resource Category 3. The rest of the habitats in Site #1 are of medium value and are relatively abundant, also placing them in Resource Category 3. The mitigation goal of Resource Category 2 is no net loss of in-kind habitat value, and the goal of Resource Category 3 is no net loss of habitat value while minimizing loss of in-kind habitat value. Recent applicants for Department of the Army permits for filling in the Maumee River/Bay area (such as Harrison Marina, Public Notice 86-003-10) have been required to provide appropriate mitigation for all such fills. We fail to understand why a Corps project, having impacts of a far greater magnitude, should be allowed to proceed without the development of appropriate mitigation.

POSTULATED MITIGATION VALUES OF CDF

It has been stated in the Section 404(b)(1) Evaluation attached to the Draft EIS that the construction of the CDF will allow for the continued dredging and confined disposal of polluted sediments from the Maumee River - an action that will improve the aquatic environment in the river and consequently improve the conditions in the bay. While it may be true that removal and confinement of polluted materials is beneficial, these same benefits could also be realized through the use of an upland CDF.

Paragraph 5.08 of the Draft EIS indicates that the slopes of the existing CDF dikes and of the proposed CDF dike are 3 on 1. However, Plate 2.4 of the Draft EIS shows that the slopes of the existing CDF are 2 on 1, and Plate 2.7 shows that the slopes of the proposed dike are also to be 2 on 1. Plate 2 of the Final EIS for the 242-acre CDF does show that the proposed slopes of the outer (lakeward) face of the dikes were to have been 3 on 1 below the elevation of LWD + 10' (U. S. Army Corps of Engineers, 1974). The above discrepancies should be resolved. Plate 2.7 of the Draft EIS shows that the slopes of the Port Authority CDF dikes are 2 on 1. This does agree with the proposed design for the dike reconstruction under Permit 80-001-6. Paragraph 5.08 of the Draft EIS also indicates that the existing 6,100 feet of riprapped shoreline in Site #1 provides about 1.5 acres of underwater habitat, while the proposed 4,265-foot long dike will provide about 2.0 acres of underwater habitat due to greater water depths. To generate these acreage differences, if the existing and proposed dike slopes were 2 on 1, the average water depth along the toe of the proposed dike would have to be about four feet greater than the average water depth along the toes of the existing dikes. A depth difference of about 2.5 feet would result in equal areas of underwater habitat. If all the dike slopes were 3 on 1, a depth difference of about 3 feet would be needed to produce the 0.5 acre difference, and about 1.8 feet to produce equal underwater areas. However, a review of the chart reproduced on Plate 2.5 of the Draft EIS and some data we obtained in our work at Site #1 leads us to believe that the average depth differences are even less than 1.8 feet and that there will be a net loss of underwater riprap habitat. Even if the slopes of the proposed dike are to be 3 on 1 and the slopes of the 242-acre CDF are 3 on 1 and the slopes of the Port Authority dike are 2 on 1, we do not believe that the depth differences are sufficient to produce a net gain in underwater riprap habitat.

Paragraph 3.5.5 of the Section 404(b)(1) Evaluation states that the proposed CDF will serve many valuable wetland functions such as feeding, nesting, and resting habitat for water birds during the life expectancy of the project. There is no doubt that during certain stages of their filling, CDF's are very attractive to waterfowl and other water birds. However, attracting birds to such areas has at least two negative aspects: botulism-related kills of water birds appear to be rather common during the latter stages of CDF filling, and birds feeding in CDF's are exposed to and may accumulate a variety of contaminants. However, a number of CDF's have proven to provide valuable nesting areas for certain colonial nesting birds such as common terns. Whatever net benefits the proposed CDF may provide to water birds will be for only a relatively small portion of the total life expectancy of the CDF. For most of its total life expectancy, the area will probably be part of a commercial port facility according to paragraph EIS 4.19 and to the August 22, 1984 letter from the Toledo-Lucas County Port Authority (page A-9 of Appendix A of Draft EIS). It is unlikely that the short-term increased utilization of the CDF area by water birds during the filling phase will outweigh the long-term loss of use of the existing 176 acres of Maumee Bay by herons, egrets, and particularly by diving ducks.

Paragraph EIS 4.27 of the Draft EIS states that CDF's add diversity to the open water nature of the bay and take on the appearance of islands. Obviously, the proposed CDF will neither take on the appearance of an island nor add diversity to the area. In fact, it will reduce the diversity that presently exists in the CDF peninsula, of which it will become a part, by reducing the shoreline length of the peninsula and eliminating a diversity of aquatic habitats found in the existing 176-acre embayment.

POSSIBLE MITIGATION MEASURES TO OFFSET HABITAT LOSSES AT SITE #1

The proposed CDF is but one in a series of CDF's that have been constructed in Maumee Bay and the lower Maumee River. With the construction of the proposed CDF, almost 5 percent of the surface area of Maumee Bay will be occupied by CDF's. The cumulative impacts have been significant and there has been no mitigation for the construction of any of these existing CDF's. The only way to fully meet the mitigation goals of Resource Categories 2 and 3 is to avoid the impacts by foregoing construction of an in-water CDF and using a suitable upland disposal area. If a CDF is constructed at Site #1, a combination of in-kind and out-of-kind mitigation can partially meet the mitigation goals, and such mitigation should be made a part of the project.

In-kind mitigation appears to be most feasible for the loss of the shoal and riprap habitat. The creation of an artificial rubble-reef of about four acres in surface area should provide approximately 1:1 replacement for the expected losses. In-kind replacement of the submergent aquatic beds is much more difficult to accomplish. A protected embayment could be partially filled to create a shallowly inundated area more conducive to the growth of submergent plants. However, even with seeding of the filled area with rhizomes or root stocks of certain submergent plant species, there is no guarantee that the plants would become well established. Additional acreage of artificial reef could be created as mitigation and would satisfy the mitigation goal for Resource Category 2 under the Exceptions Clause. The high value fish species in the area, such as walleye, white bass, and yellow perch, would probably receive more benefit from the creation of an artificial reef than from creation of a submergent aquatic bed. The replacement should be approximately 1:1. However, determination of the exact acreage of the existing beds is somewhat difficult. By the time we conducted our aerial survey on September 15, 1985, some of the beds that we had noted from our earlier on-water surveys had already started to break down and were barely discernible from the air. Our best estimate is that the beds do not exceed three acres in size in high-water years. We would expect the beds to be much more extensive in low-water years. Using the lower acreage estimate leaves over 160 acres of Resource Category 3 mud-bottom habitat, whose loss could also be most easily mitigated through the creation of additional acreage of artificial reef. Production of high quality benthos is probably several times greater on the proposed reef than on the existing mud bottom. Use of reef areas for spawning by species such as walleye and white bass increase the values of reef areas even more. The creation of one acre of reef habitat for every ten acres of mud-bottom habitat lost may be an over estimation of the value of reef habitat and an underestimation of the value of the existing mud-bottom habitat and its overlying water column. However, the Service would find the creation of 16 acres of reef (a replacement ratio of 1:10) acceptable.

Thus, a total of at least 23 acres of artificial reef would need to be created to approximately replace the values of the various habitats to be lost as a result of construction of a CDF at Site #1. The reef should probably be built to a height of at least 18 inches above the elevation of the surrounding bottom area. One or more construction areas would have to be selected that provide a firm substrate on which to place the reef-building material and where the reef would not be expected to be smothered by siltation. Dr. Bruce Manny of the Great Lakes National Fisheries Center has informed us that this year the Center will be reviewing artificial reef construction in the Great Lakes and should be able to provide assistance in reef design and location. Our preliminary thoughts are that it might be possible to laterally expand one or more of the existing shoal areas or create new reef areas on some of the sand knolls in or just lakeward of Maumee Bay. Before constructing a large reef in any selected location, it may be judicious to construct a small section of reef and observe siltation rates on the area for perhaps a year before committing to full-scale construction.

Another out-of-kind mitigation measure that might hold some promise would involve a reduction in the size of the proposed artificial reef by 8 to 10 acres and, in its stead, the enhancement of habitat to benefit waterfowl and colonial nesting birds. One area in which waterfowl habitat enhancement might be possible would be the diked wetland cells at the east end of of Maumee Bay State Park. The rehabilitation of dikes around the most easterly cell would allow for a renewal of marsh management in the cell and would provide additional protection to the adjacent unit of the Ottawa National Wildlife Refuge. Enhancement of colonial bird nesting habitat might be possible on Grassy Island. Such enhancement should be directed toward species such as the common tern and would require an understanding of factors favoring common tern nesting success over that of species such as the ring-billed gull. There would also have to be a long-term commitment to maintain such habitat and to minimize human disturbance of the habitat, particularly if future plans by the City of Toledo or others call for increased recreational use of Grassy Island.

In summary, we believe that the following mitigation measures have the greatest potential to replace, both in-kind and out-of-kind, the habitat values to be lost as a result of the construction and filling of a CDF at Site #1:

1. The creation of a 23-acre rubble-reef, or the creation of a smaller reef in combination with Measures 2 and/or 3.

2. The enhancement of waterfowl habitat in the Maumee Bay area.

3. The creation and maintenance of nesting habitat for colonial nesting birds, such as common terns.

SUMMARY

In conclusion, we believe that the environmental resource values of Maumee Bay and Site #1 have been seriously underestimated in Sections 3 and 4 of the Draft EIS, and that this negative characterization is supported neither by the studies referenced in the Draft EIS nor by those referenced in our Draft and Final FWCA Reports. Instead, we believe that the data show that Site #1 presently consists of a diversity of valuable aquatic habitats and that without the implementation of the proposed project, the value of these habitats would continue to increase with progressive abatement of water quality degradation in the lower Maumee River. In our opinion, the value of these resources is sufficient to qualify their loss as significant, and that loss should be appropriately mitigated though a combination of the measures previously described. In addition, we question whether the policy of providing mitigation only for the loss of resources deemed significant by the criteria set forth in the documents referenced in your letter of December 4, 1986 continues to be a valid policy. It is our understanding that the Water Resources Development Act of 1986 requires that reports submitted to Congress for authorization of any water resources project shall contain either:

1. A determination that the project will have negligible adverse impacts on fish and wildlife, or

2. A recommendation with a specific plan to mitigate fish and wildlife losses created by the project.

These guidelines were reiterated in the draft policy letter, dated February 18, 1987 from OCE to all Corps Districts (copy attached). We have been informed that the Toledo Harbor CDF Plan will require authorization only by the North Central Division and will not need Congressional Authorization. However, we do not believe that project authorization at a lower administrative level should relieve the Corps of their responsibility to appropriately mitigate the loss of resources we have outlined in this report. We look forward to your response and to working with you to finalize an acceptable mitigation plan.

We appreciate this opportunity to provide the above comments.

Sincerely yours,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: Chief, Ohio Division of Wildlife, Columbus, OH
ODNR, Outdoor Recreation Service, Attn: M. Colvin, Columbus, OH
Ohio EPA, Water Quality Monitoring & Assessment, Columbus, OH
U.S.EPA, Office of Environmental Review, Chicago, IL

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Table 1. Average dissolved oxygen (D.O.) concentrations at 14 stations in Maumee Bay during the summer months of 1974 and 1977*

	Average D. O. Concentrations (mg/l)	
Station**	1974 (7/2 to 8/27)	1977 (6/29 to 8/23)
14	4.23	3.30
13	8.20	5.20
12	8.50	6.26
11	8.53	6.92
10	8.83	7.64
9	9.13	8.40
8	8.55	8.40
7	9.40	9.16
6	8.85	9.18
5	8.18	7.26
3	8.48	5.46
2	9.20	8.66
1	7.88	5.28
16	9.48	9.20

* Original data from Fraleigh et al. (1975) and Fraleigh et al. (1979).

** See Figure 2 for location of sampling stations.

Table 2. Flow characteristics of Maumee River*

MAUMEE RIVER BASIN

04193500 Maumee River at Waterville, Ohio

LOCATION: Lat 41°30'00", long 83°42'46", Lucas County, Hydrologic Unit 04100009, on downstream side of second pier from left end of bridge on State Route 64 at Waterville, 3 mi downstream from Tontogany Creek, and 20.7 mi upstream from mouth.

DRAINAGE AREA: 6,330 mi^2.

TRIBUTARY TO: Lake Erie.

DISCHARGE DATA USED: October 1939 to September 1978.

REMARKS: Low flow slightly regulated by power plants upstream from station. Small diversion upstream from gage into Portage River basin.

SELECTED DISCHARGE CHARACTERISTICS: Average discharge: 4,922 ft^3/s (39 years).
Minimum daily discharge: 26 ft^3/s October 1964.

Magnitude and frequency of low flow for indicated periods

Period	Number of consecutive days	Discharge (ft^3/s) for indicated recurrence interval (years)				
		2	5	10	20	50
Apr.-Mar.	1	147	82	57	41	27
	7	201	124	95	74	56
	30	264	169	136	114	94
May- Nov.	1	147	82	57	41	27
	7	201	124	94	73	55
	30	268	170	136	113	93
June-Aug.	1	225	146	117	96	77
	7	298	197	158	133	109
	30	492	289	232	198	171
Sept.-Nov.	1	153	85	59	42	28
	7	207	124	93	73	55
	30	284	168	137	120	107
Dec.-Feb.	1	436	235	169	128	95
	7	527	282	205	158	119
	30	1220	466	279	183	113
Mar.- May	1	878	531	400	313	235
	7	1130	751	613	521	435
	30	3190	1770	1270	910	620

Duration of daily flow for indicated periods

Period	Discharge (ft^3/s) which was equaled or exceeded for indicated percent of time												
	98	95	90	85	80	75	70	60	50	40	30	20	10
Apr. - Mar.	140	190	250	310	390	490	610	960	1500	2300	3900	7000	14000
May - Nov.	120	160	210	250	300	360	420	580	810	1200	1800	3100	6300
June - Aug.	170	210	260	320	380	440	510	680	930	1300	1800	2800	5500
Sept.- Nov.	100	130	160	190	210	240	280	360	460	620	880	1500	3500
Dec. - Feb.	190	230	300	380	510	650	850	1400	2000	3200	5400	9900	19000
Mar. - May	660	890	1200	1600	2000	2300	2700	3900	5400	7400	11000	15000	22000

* From U. S. Geological Survey (1981)

Table 3. Density (no./m^2) of bottom organisms in Maumee Bay and open-lake area in 1930, 1961, and 1982 (these data are preliminary and are subject to change).*

Density (no/M^2) of bottom organisms in the Maumee River area (1982 data corrected for Ponar efficiency)

Station	Oligochaeta			Hexagenia			Tendipedidae			Sphaeriidae		
	1930	1961	1982	1930	1961	1982	1930	1961	1982	1930	1961	1982
1M	11310	9004	1971	2	0	0	*	378	336	*	0	**
2M	1040	7168	4094	37	0	5	92	797	230	961	108	201
3M	334	10300	610	34	0	0	*	675	2	*	81	32
4M	504	2781	2699	63	14	0	98	324	361	332	45	137
5M	7	1714	2045	402	0	0	*	216	230	*	135	135
6M	0	1984	2812	94	0	0	148	351	468	14	4	162
7M	0	4306	1534	270	0	0	68	256	296	14	4	147
8M	68	3010	2184	8	0	0	14	68	299	1134	14	39
Mean No.	1658	5033	2244	123	1.8	0.6	84	359	278	491	37	122

*No data

Density (no/M^2) of bottom organisms in the Open Lake area (1982 data corrected for Ponar efficiency).

Station	Oligochaeta			Hexagenia			Tendipedidae			Sphaeriidae		
	1930	1961	1982	1930	1961	1982	1930	1961	1982	1930	1961	1982
1L	0	1418	3385	94	4	0	0	662	206	162	675	54
2L	20	284	3032	634	0	0	*	72	69	*	31	10
3L	7	1876	2586	564	0	0	*	176	22	*	2524	10
4L	0	3105	1966	317	4	0	34	540	159	54	2120	113
5L	0	405	1307	358	0	0	20	216	91	14	243	86
6L	20	648	814	462	4	0	18	81	32	42	621	15
7L	*	729	931	*	0	0	*	216	52	*	419	44
8L	0	972	2626	310	0	0	0	675	560	14	972	125
9L	0	621	6117	411	0	0	*	432	146	*	148	204
10L	*	1269	853	*	0	0	*	297	100	*	819	52
Mean	6	1133	2361	394	1.2	0	14	337	143	57	857	71

*No data

* From unpublished report by B. A. Manny, Great Lakes National Fisheries Center, Ann Arbor, Michigan.

Table 4. Relative abundance of fishes in Maumee Bay before and after 1957.*

Family/Common Name	Status Before 1957	Status After 1957
Acipenseridae		
lake sturgeon	abundant before 1916, declined 1916-1950	probably absent
Lepisosteidae		
spotted gar	common before 1901, declined 1901-1950	probably absent
longnose gar	common	common but declining
Amiidae		
bowfin	common	uncommon
Esocidae		
northern pike	abundant before 1910, declined 1910-1950	uncommon
muskellunge	abundant before 1900, declined thereafter	rare
Hiodontidae		
mooneye	common before 1901, declined 1901-1950	rare
Clupeidae		
gizzard shad	common	abundant
alewife	rare	common seasonally
Salmonidae		
lake whitefish	abundant before 1900 sharp decline thereafter	rare
Catostomidae		
bigmouth buffalo	common	common
silver redhorse	common	uncommon

Table 4. (continued) Relative abundance of fishes in Maumee Bay before and after 1957.*

Family/Common Name	Status Before 1957	Status After 1957
Catostomidae		
shorthead redhorse	abundant before 1925	common
golden redhorse	common	common
greater redhorse	common before 1900	uncommon to rare
quillback	occasional	common
white sucker	common	common
Cyprinidae		
carp	increased after 1880	abundant
goldfish	increased after 1880	common
goldenshiner	common	decreasing
silver chub	common	rare
emerald shiner	common	common
redfin shiner	common	rare
spottail shiner	common	common
spotfin shiner	common	occasional
sand shiner	common	uncommon
bluntnose minnow	common	common
Ictaluridae		
channel catfish	common	common
brown bullhead	common	common
black bullhead	common	common
stonecat	common	occasional
Anguillidae		
American eel	occasional	occasional
Gadidae		
burbot	occasional	occasional
Percopsidae		
trout-perch	common	common
Atherinidae		
brook silverside	common	occasional

Table 4. (continued) Relative abundance of fishes in Maumee Bay before and after 1957.*

Family/Common Name	Status Before 1957	Status After 1957
Percichthyidae		
white bass	abundant	common
Centrarchidae		
white crappie	common	common
black crappie	common	uncommon
smallmouth bass	abundant	uncommon
largemouth bass	abundant	common
green sunfish	common	common
bluegill	common	common
pumpkinseed	common	common
Percidae		
sauger	common	rare
walleye	abundant	common
yellow perch	abundant	common
channel darter	common before 1924, declined 1924-1952	rare
logperch	common	common
johnny darter	common	common
Sciaenidae		
freshwater drum	common	abundant

* From Barnes (1979), based on Pinsak and Meyer (1976).

Table 5. Fish collected from Maumee Bay since 1974*

Reference Sources:	1	2	3	4	5	6	7	8	9	10
Silver lamprey *Ichthyomyzon unicuspis*										X
Sea lamprey *Petromyzon marinus*										X
Longnose gar *Lepisosteus osseus*		X					+			X
Bowfin *Amia calva*		X						+		X
Alewife *Alosa pseudoharengus*	X			X		X		+		X
Gizzard shad *Dorosoma cepedianum*	X	X	X	X	X	X	+	+	+	X
Mooneye *Hiodon tergisus*										X
Coho salmon *Oncorhynchus kisutch*										X
Chinook salmon *Oncorhynchus tshawytscha*										X
Rainbow trout *Salmo gairdneri*	X									
Rainbow smelt *Osmerus mordax*			X	X						X
Northern pike *Esox lucius*	X	X								X
Goldfish *Carassius auratus*	X	X	+	X			+	+	+	X
Common carp *Cyprinus carpio*	X	X	+	X	X	X	+	+	+	X
Silver chub *Hybopsis storeriana*								+		X
Golden shiner *Notemigonus crysoleucas*										X
Emerald shiner *Notropis atherinoides*			+		X	X	+	+	+	X

Table 5. Fish collected from Maumee Bay since 1974* (continued)

Reference Sources:	1	2	3	4	5	6	7	8	9	10
Spottail shiner *Notropis hudsonius*			+	X	X	X	+	+	+	X
Spotfin shiner *Notropis spilopterus*						X		+	X	X
Sand shiner *Notropis stramineus*							+			
Mimic shiner *Notropis volucellus*								+		
Bluntnose minnow *Pimephales notatus*							+		X	X
Fathead minnow *Pimephales promelas*							+	+	+	X
Quillback *Carpiodes cyprinus*	X	X					+	+		X
White sucker *Catostomus commersoni*	X	X					+	+		X
Northern hog sucker *Hypentelium nigricans*										X
Smallmouth buffalo *Ictiobus bubalus*									X	
Bigmouth buffalo *Ictiobus cyprinellus*							+		+	X
Black redhorse *Moxostoma duquesnei*							+			
Shorthead redhorse *Moxostoma macrolepidotum*						X			+	X
Black bullhead *Ictalurus melas*			X				+		+	X
Yellow bullhead *Ictalurus natalis*		X			X					X
Brown bullhead *Ictalurus nebulosus*		X				X	+	+	X	X
Channel catfish *Ictalurus punctatus*	X	X	+			X	+	+	X	X

Table 5. Fish collected from Maumee Bay since 1974* (continued)

Reference Sources:	1	2	3	4	5	6	7	8	9	10
Stonecat *Noturus flavus*							+	+		X
Tadpole madtom *Noturus gyrinus*							+			X
Brindled madtom *Noturus miurus*										X
Trout-perch *Percopsis omiscomaycus*			+				+			X
Brook silverside *Labidesthes sicculus*						X			+	X
Threespine stickleback *Gasterosteus aculeatus*										X
White perch *Morone americana*						X	+	+	+	
White bass *Morone chrysops*	X	X	+	X	X	X	+	+	+	X
Rock bass *Ambloplites rupestris*						X			+	X
Green sunfish *Lepomis cyanellus*							+		+	X
Pumpkinseed *Lepomis gibbosus*							+	+	+	X
Orangespotted sunfish *Lepomis humilis*							+	+	+	X
Bluegill *Lepomis macrochirus*							+		+	X
Smallmouth bass *Micropterus dolomieui*							+		+	X
Largemouth bass *Micropterus salmoides*							+		+	
White crappie *Pomoxis annularis*			X				+	+	+	X
Black crappie *Pomoxis nigromaculatus*							+	+	X	X

Table 5. Fish collected from Maumee Bay since 1974* (continued)

Reference Sources:	1	2	3	4	5	6	7	8	9	10
Johnny darter *Etheostoma nigrum*										X
Yellow perch *Perca flavescens*	X	X	+	X	X	X	+	+	+	X
Logperch *Percina caprodes*						X	+		+	X
Channel darter *Percina copelandi*									X	X
Sauger *Stizostedion canadense*		X	+				+	+		X
Walleye *Stizostedion vitreum vitreum*	X	X	+	X		X	+	+	+	X
Freshwater drum *Aplodinotus grunniens*	X	X	+	X		X	+	+	+	X
Mottled sculpin *Cottus bairdi*										X

* Common and scientific names follow nomenclature in Robins, C.R., chairman. 1980. A list of common and scientific names of fishes from the United States and Canada. 4th ed. Amer. Fish. Soc. spec. pub. no. 12. 174pp.

X indicates that species was collected in Maumee Bay but not in Site #1 during referenced survey.

\+ indicates that at least one individual of species was collected in Site #1 during referenced survey.

Reference sources listed on following page.

Table 5. Fish collected from Maumee Bay since 1974* (continued)

Reference Sources

1. Fish caught by gill nets between April 6 and June 1, 1974; from Fraleigh et al. (1975).

2. Fish caught by gill nets between March 27 and June 3, 1977; from Fraleigh et al. (1979).

3. Fish collected by electrofishing and trawling between May 19 and July 26, 1975; from Wapora (1976).

4. Fish caught at Station 43 between June 25 and October 18, 1975; from Herdendorf et al. (1975).

5. Fish collected offshore of Maumee Bay State Park by U. S. Fish and Wildlife Service biologists on June 26, 1979 with a 100'x6'x1/4" mesh bag seine.

6. Fish collected by Ohio Department of Natural Resources with electrofishing and gill nets; from Rawson and Johnson (1980).

7. Fish salvaged by Center for Lake Erie Area Research from Toledo-Lucas County Port Authority CDF #3 in June 1983 after reconstruction of north dike and dewatering of cell; unpublished data from J. M. Reutter (1985).

8. Fish collected by U. S. Fish and Wildlife Service with trap nets and seines from Site #1 between April 26 and July 30, 1985.

9. Fish collected by Ohio Environmental Protection Agency by electrofishing in 1986; unpublished data from Roger Thoma (1987).

10. Fish impinged at Toledo Edison Bayshore Power Plant from September 15, 1976 to September 15, 1977; from Reutter et al. (1978).

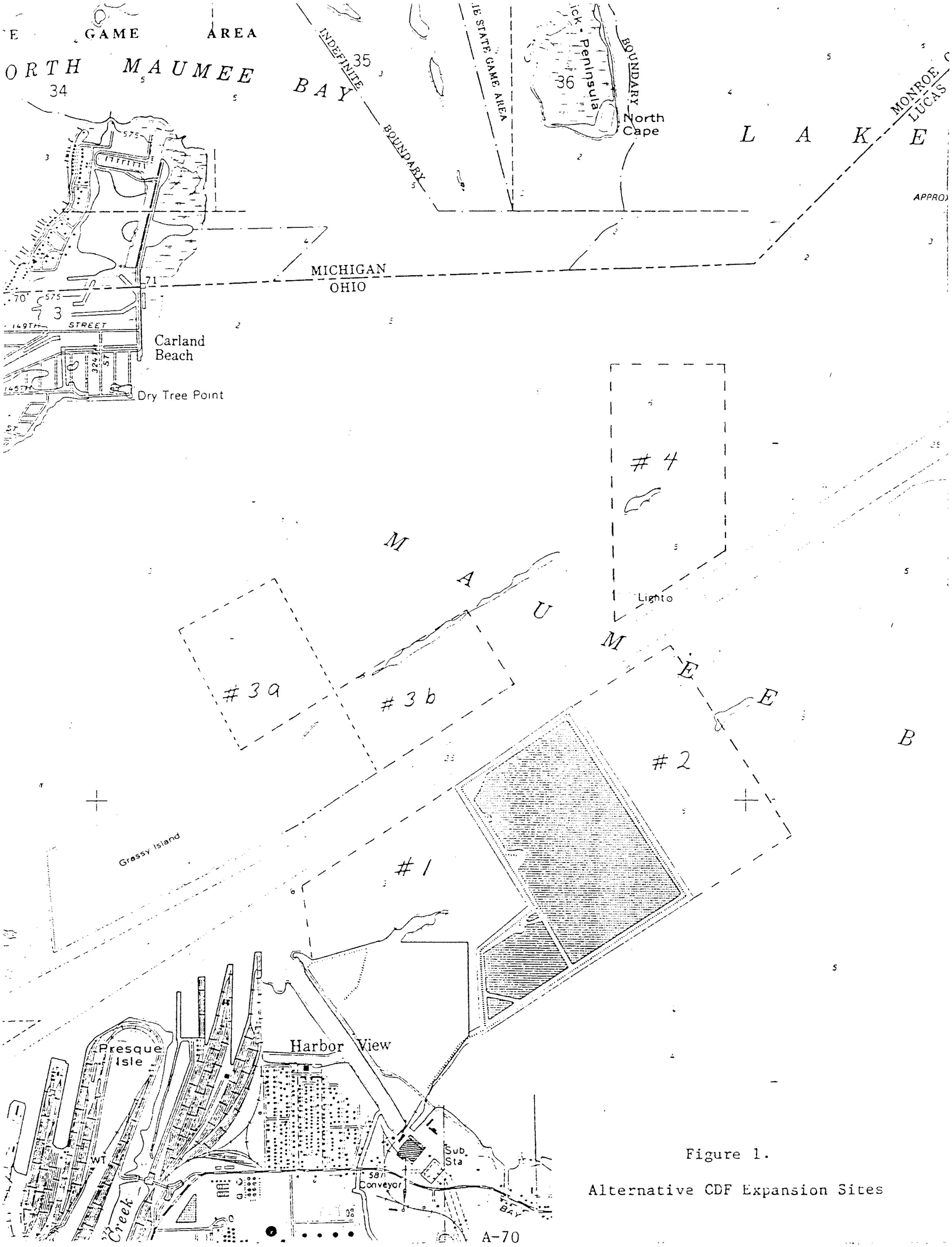


Figure 1.

Alternative CDF Expansion Sites

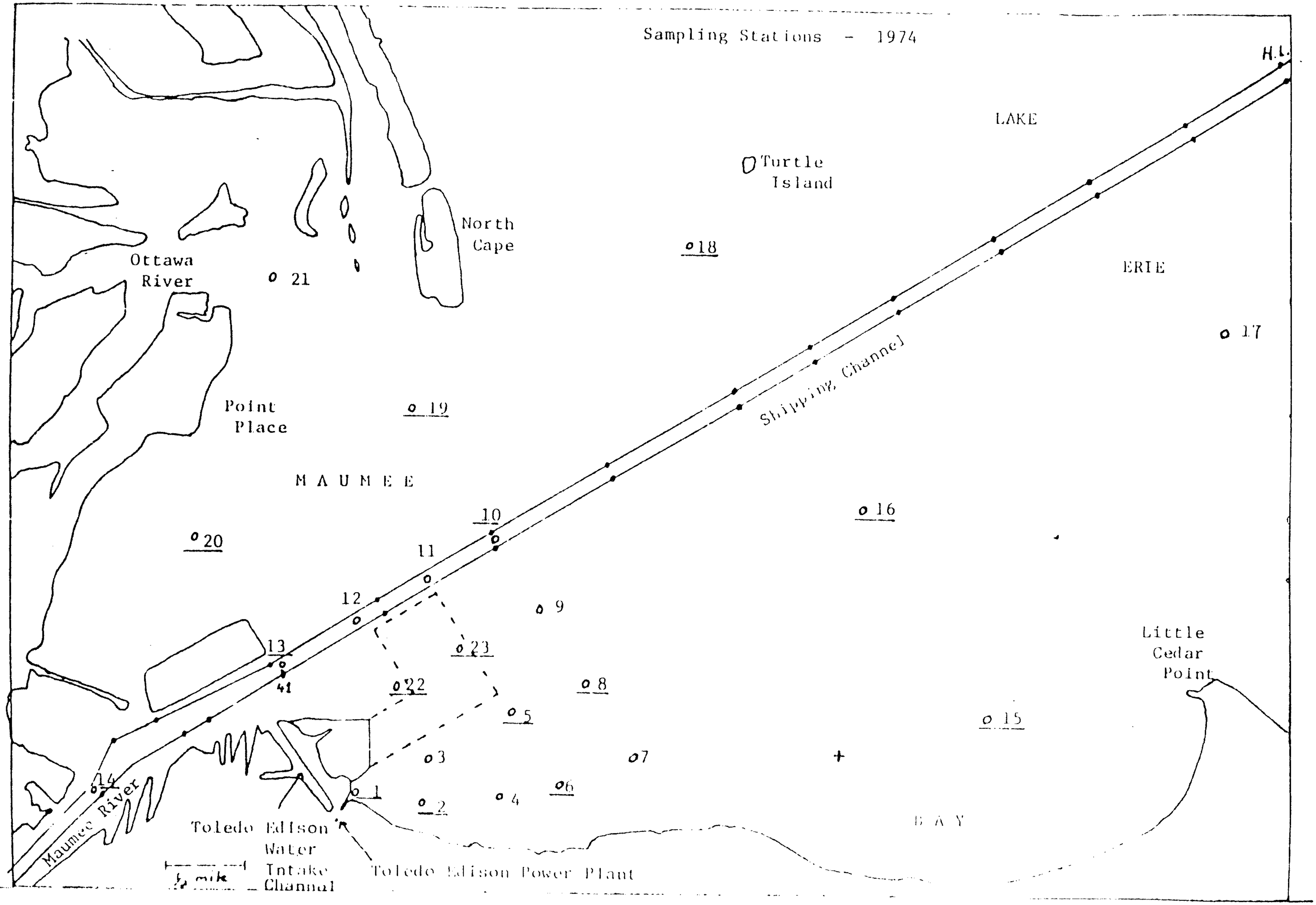


Figure 2. Locations of sampling stations for 1974 and 1977. From Fraleigh et al. (1975).

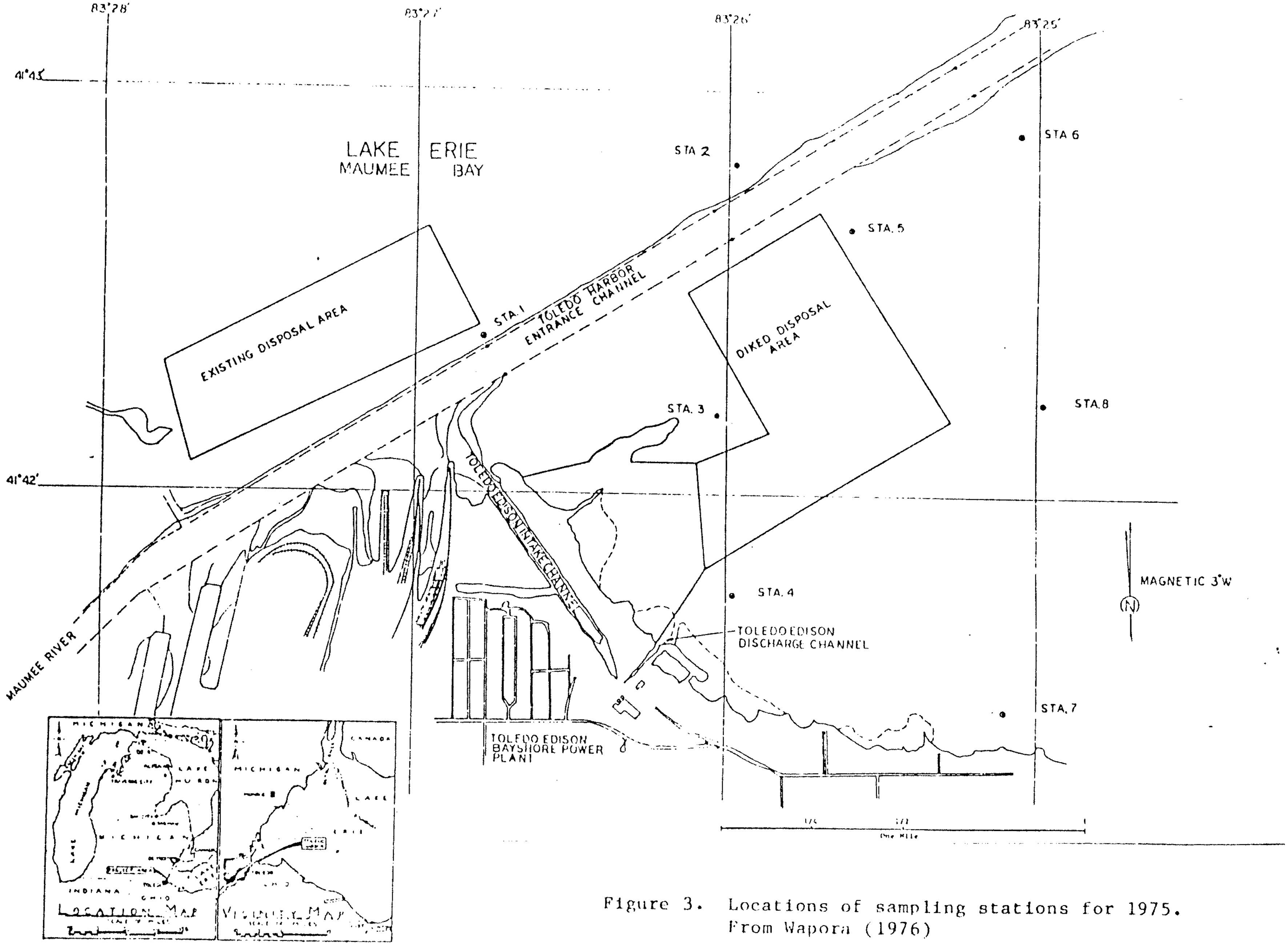
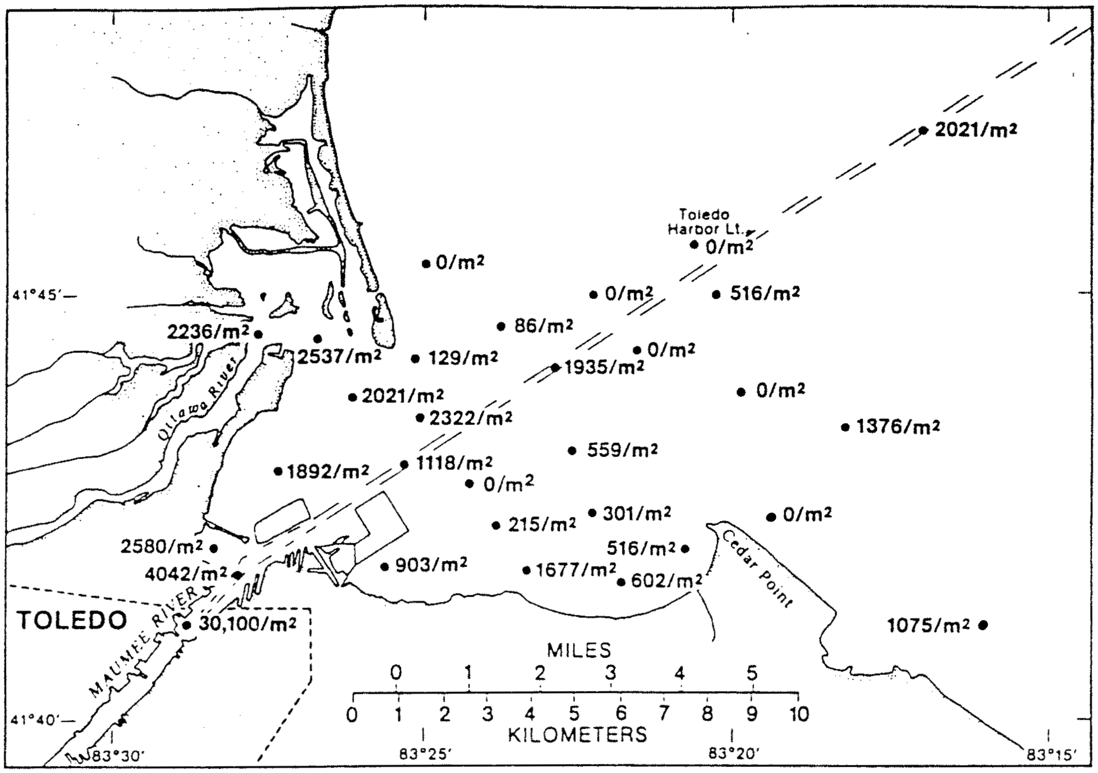
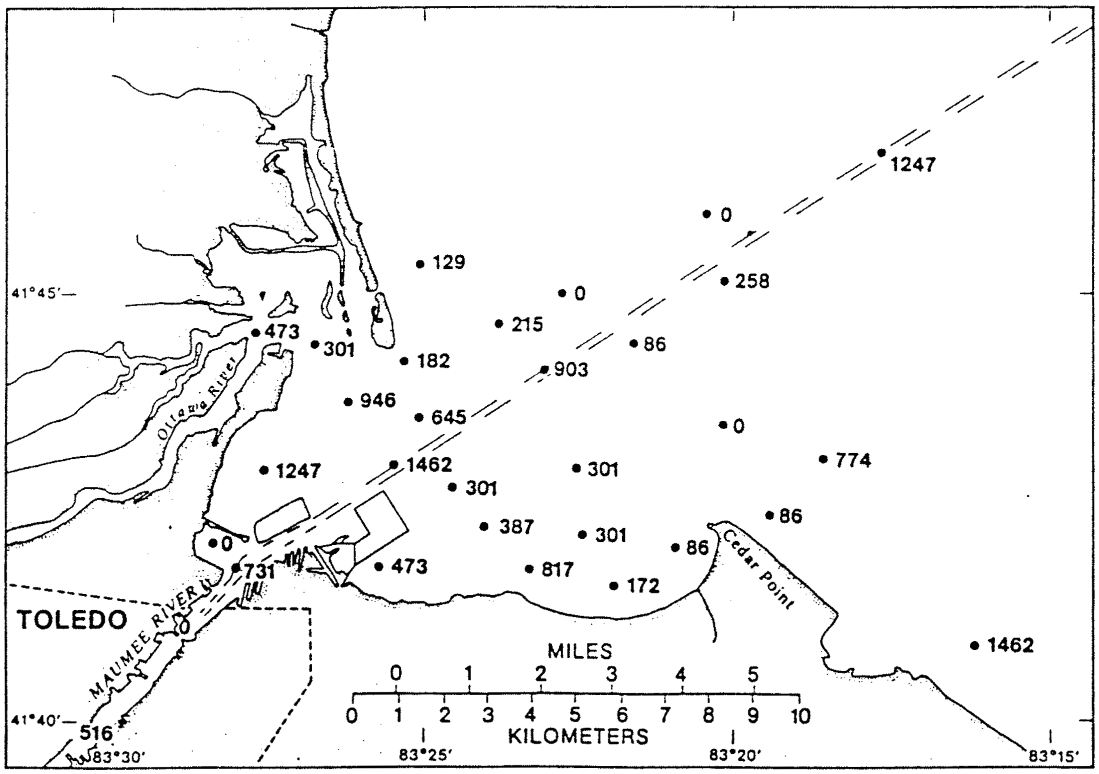


Figure 3. Locations of sampling stations for 1975. From Wapora (1976)



Oligochaeta in Maumee Bay, May 1975.



Diptera in Maumee Bay, May 1975.

Figure 4. Oligochaeta/m^2 and Diptera/m^2 in Maumee Bay area on May 9, 1975. From Pinsak and Meyer (1976)

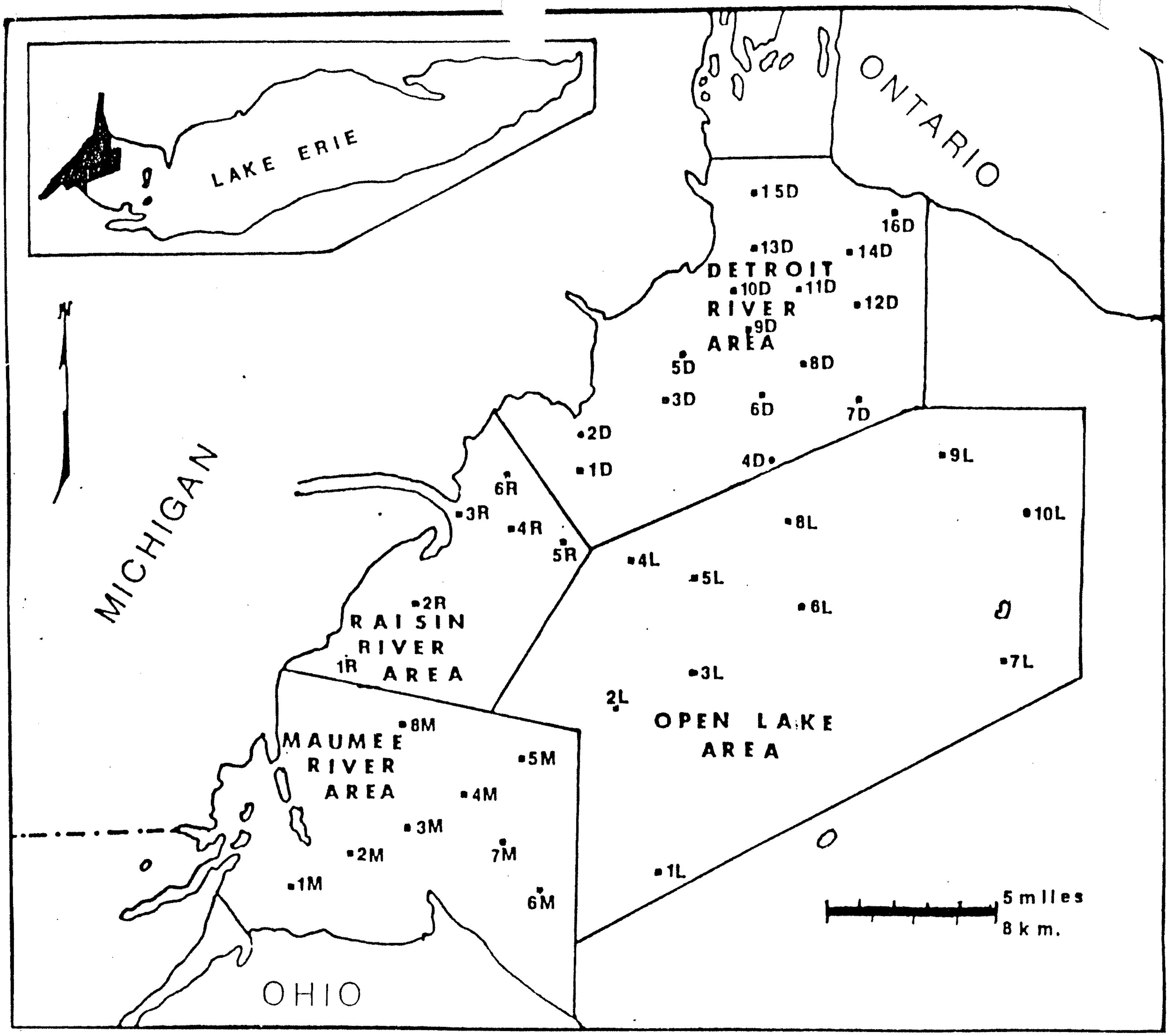


Figure 5. Locations of study areas and sampling stations in Western Lake Erie (preliminary data and subject to change). From unpublished report by B. A. Manny, Great Lakes National Fisheries Center, Ann Arbor, Michigan.

COFO

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
175 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604

July 29, 1986

ER-86/729

Colonel Daniel R. Clark
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Clark:

The Department of Interior (Department) has reviewed the Draft Environmental Impact Statement (EIS) for a Confined Disposal Facility (CDF) at Toledo Harbor, Ohio. Following are consolidated Department comments for your consideration during further project planning phases.

GENERAL COMMENTS

Several alternatives are presented for the project, but none would have a significant impact on minerals and/or mineral related industries.

Known mineral resources and mineral production in Lucas County include cement, sand and gravel (construction), and clays. Because the project is located in Maumee Bay at an existing disposal site near Toledo, Ohio, no conflict is anticipated between the mineral-related industries and the proposed project. The dredging of the channel may benefit the mineral industries (transshipment of coal, iron ore, petroleum products, stone, and sand and gravel) by providing a deeper channel for ships entering the port.

The proposed project could have an impact on Maumee Bay State Park which was acquired and developed with Land and Water Conservation Fund (L&WCF) assistance through Projects 39-00325, 39-00663, and 39-01022. It appears that Maumee Bay State Park is located on the bayshore. Although no dredge or fill is proposed for the parkland, the proposed activities in the bay may have an impact on water-oriented recreation in the park.

The project sponsor should consult with the official who administers the L&WCF program in the State of Ohio to determine potential conflicts with Section 6(f)(3) of the L&WCF Act (Public Law 68-578, as amended). Section 6(f)(3) states: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary (of the Interior), be converted to other than public outdoor recreation uses." The administrator of the L&WCF program for the State of Ohio is Mr. Joseph J. Sommer, Director, Department of Natural Resources, Fountain Square, Building D-1, Columbus, Ohio 43224.

The Draft EIS is rather cursory in its treatment of some of the alternatives analyzed and in its description of the environmental setting. We also believe the document to be in error regarding some of the calculated dike lengths and volume estimates for various new CDF alternatives. However, these errors of omission and commission do not appear to be sufficient to modify the conclusion of the document that Alternative 1c presently represents the most cost effective and least environmentally damaging of the detailed plans that were analyzed to provide a large capacity containment area for polluted dredged materials.

SPECIFIC COMMENTS

Quantities of Dredged Materials:

Table 3.6 indicates that from 1975 through 1985, an average of 1,013,786 cubic yards of material was dredged annually from Toledo Harbor. An approximation of this figure is used several times in the document. However, on page ii of the Summary, the average dredging figure is given as 800,000 to 900,000 cubic yards.

Sediment Quality:

Paragraph 2.4.3 of the Section 404(b)(1) Evaluation indicates that the U.S. Environmental Protection Agency (EPA) classified the sediments between Stations R-5M and R-7M as acceptable for open-water disposal and the sediments between Stations L-2M and R-5M as polluted and not suitable for open-water disposal. These findings are in agreement with the pollution status of Stations L-2M through R-7M shown on Table 3.3 of the Draft EIS and Table 1 of the Section 404(b)(1) Evaluation. However, paragraph EIS 3.13 indicates that the EPA considers all the sediments from Stations L-2M through R-7M to be too polluted for open-lake disposal. Paragraphs EIS 1.01, 1.07, and 2.03 also indicate that all the sediments upstream of Station L-2M are "polluted" or "heavily polluted" and unsuitable for open-lake disposal. These discrepancies should be clarified. In their letter of November 29, 1984, the U.S. Fish and Wildlife Service (Service) requested that, until further sediment testing could be done, the sediments from Stations R-5M to R-6M should be confined in the Toledo CDF due to elevated levels of several Polynuclear Aromatic Hydrocarbons (PAHs) in these sediments. Any materials from the upper part of the Federal channel that are suitable for open-lake disposal should not be placed in a CDF for the sake of expediency.

Size and Capacity of Proposed New CDF (Alternative 1c):

Page 1 of Public Notice NCBPD-ER No. (37) indicates that the dike and enclosed area will occupy about 162 acres. Paragraph 2.2.1 of the Section 404(b)(1) Evaluation indicates that the proposed CDF will occupy approximately 162 acres of Maumee Bay. Paragraph EIS 4.05 indicates that construction of the CDF will result in the loss of approximately 162 acres of mud-bottom habitat. However, paragraph EIS 2.23 indicates that the CDF will enclose a 162-acre water area. As the CDF dikes will occupy at least 12 acres, a CDF occupying 162 acres will only provide an effective disposal area of about 150 acres.

If the CDF could be filled completely to the top of its design height of 29.5 feet, its capacity would be about 7,140,000 cubic yards. However, the average bottom elevation of the enclosed area is closer to -3 feet rather than -6 feet, as shown on Plate 2.7; thereby reducing the volume to about 6,413,000 cubic yards. If all of the clay to be used in the new dike and raised dike shown on Plate 2.7 came from the enclosed area, about 210,000 cubic yards of additional volume would be created; thereby increasing the total volume to 6,623,000 cubic yards. If consolidated dredged material in the CDF is equal to about 86 percent of its volume as measured "in situ" in the navigation channel, the calculated capacity of the CDF would be about 7,700,000 cubic yards of dredged material. This is considerably less than the 8,764,000 cubic yard capacity stated in the Draft EIS. We assume that the above figure from the Draft EIS refers to cubic yards of dredged material, measured "in situ", that can be held by the CDF and not to cubic yardage of consolidated material as incorrectly stated in the Abstract and in paragraph EIS 2.24.

Analysis of Non-Selected Alternatives:

Paragraph EIS 2.19 indicates that 25,000 feet of diking would be required to construct Alternative 4 and that 15,400 feet of diking would be required for Alternative 2. These measurements appear to have been taken from Plate 2.5. Unfortunately, the scale used on the Plate is incorrect. The scale should be approximately 2,300 feet per inch, not 4,500 feet per inch as shown. The correct dike lengths would then be about 12,700 feet for Alternative 4 and 7,700 feet for Alternative 2. A further reduction in dike length per given containment volume could be achieved by using a more rounded shape. A circular design somewhat flattened on the channel side could be used at the Alternative 4 site to create a 160-acre CDF with a dike of about 10,000 feet in length. Semicircular designs could be used at Alternative 2 site or along the northwest face of Grassy Island to create large capacity CDFs with minimal diking. However, many of the adverse environment effects described in paragraph EIS 2.19 probably could not be avoided even with these designs.

A general methodology for calculating costs and benefits of various alternatives is given on the bottom of page 1 of the Draft EIS. First costs and net benefits (we assume them to be annual net benefits) are given in Section 2 for Alternatives 5a, 5b, 1a, 1b, and 1c. However, detailed data concerning amortization rates; costs for construction, operation, and maintenance of individual alternatives; costs of dredging; and other information necessary to calculate an annual cost are not provided. Neither is any detailed information provided concerning the data used to calculate annual benefits. While we can appreciate the Corps of Engineers' (Corps) attempts to minimize the size of the document, we believe that the detailed information upon which the Benefit/Cost (B/C) ratios are based should be presented.

Construction Design of New CDF:

Paragraph EIS 5.08 states that the slope of the existing (242-acre CDF) and proposed (Alternative 1c) dike is 3 on 1. However, Plates 2.4 and 2.7 show that the slopes are 2 on 1.

Paragraphs 2.5.2 and 2.6.3 of the Section 404(b)(1) Evaluation and Plate 2.7 of the Draft EIS indicate that the base of the dike will consist of prepared limestone. No information is supplied concerning the size of this material, the reasons for its use in lieu of clay, or the expected flux rate of supernatant and fines through the material. Paragraph 3.6.2 indicates that no significant movement of solids through the pervious limestone base is expected. Has this design been tested sufficiently to substantiate this view?

Description of Existing Resources:

The Draft EIS fails to adequately assess the fishery value of Maumee Bay and the lower Maumee River. Paragraph EIS 3.09 lists approximately 14 species of fish and indicates that the list includes most of the fish found in studies of this area of Lake Erie. In fact, the list does not include such commonly found species as sauger, brown bullhead, white crappie, black crappie, trout-perch, and logperch. At least another 20 species are found on a less frequent basis.

Maumee Bay supports some of the highest densities of larval gizzard shad, white bass, and freshwater drum found in the Michigan and Ohio portions of the western basin of Lake Erie. Densities of larval yellow perch, emerald shiner, rainbow smelt, carp, logperch, walleye, and spottail shiner are also relatively high.

Paragraph EIS 2.09 states that the Maumee River appears to support a spawning run of walleye, but lake spawning areas appear to be significantly more important. While it is true that the reef and shoreline areas of the lake may support up to 90 percent of walleye spawning, the spawning runs of both walleye and white bass in the Maumee River are quite large. Estimates of the average number of fish of each species annually ascending the river are not available. However, creel census information from the Ohio Department of Natural Resources for the years 1978 through 1984 indicate that annual angler harvests ranged from 22,000 to 37,000 for walleye and from 87,000 to 172,000 for white bass.

Water Quality:

While we agree that water quality in the river and bay is poor when compared with the open lake, we believe that some of the data presented may be outdated. Paragraph EIS 3.21 indicates that dissolved oxygen levels in the lower river range in value from 2.20 to 5.26 parts per million (ppm). Recent data we have received from the City of Toledo, Environmental Services indicate values for April through July of 1986 ranged from 8.9 down to 5.4 ppm.

Impacts of Proposed Construction:

Page i of the Draft EIS Summary, and paragraphs 3.1.7 and 3.5.1 of the Section 404(b)(1) Evaluation indicate that the site of the proposed CDF is a relatively low value environmental site due, in part, to being heavily influenced by poor quality river water. While this may be true and may be one of the valid reasons for siting the proposed new CDF in this location, it does not lend validity to the argument of insignificant impacts to the aquatic environment necessitating mitigation as in paragraphs EIS 4.18, 5.08, and 5.09, and paragragh 3.7.1 of the Section 404(b)(1) Evaluation. It is important to remember that significant water quality degradation is directly attributable to construction of the existing 242-acre Federal CDF and the resulting reduction in water circulation at the proposed site.

Paragraph EIS 4.18 indicates that the loss of 162 acres is not significant considering the vast acreage of the bay. However, the proposed CDF, in combination with existing Federal and private CDFs in Maumee Bay, will occupy about 5 percent of the surface acreage of the bay.

Paragraph 3.5.5 of the Section 404(b)(1) Evaluation indicates that the proposed CDF will support birds commonly associated with wetlands. Paragraph EIS 4.27 states that CDFs add diversity to the open water nature of the bay and take on the appearance of islands occupied by a wide diversity of birds. It is likely that for the 20 or so years that the structure will be used for disposal, it will attract numerous birds. However, for the vast majority of its life expectancy, the CDF will more probably resemble a commercial port facility than a wildlife-supporting island. This possibility is discussed in paragraph EIS 4.19.

Paragraph EIS 5.08 indicates that the new CDF 4,265-foot long dike will provide about two acres of new underwater habitat in comparison to about 1.5 acres associated with the 6,100 feet of existing dikes to be lost. The difference is supposedly due to the greater depths to be expected at the proposed dike compared to those at the existing dikes. A review of depth information from charts of the area and from our field surveys leads us to believe that, at best, these inundated areas of riprap will be about equal and, at worst, there will be a net loss of such habitat. This should be reflected in Table 2.1 of the Draft EIS. This table states that there will be a creation of 2.0 acres of rocky dike habitat but does not mention the offsetting loss of existing rock dike habitat.

In conclusion, we believe that the net long-term beneficial effects of the proposed 162-acre CDF do not exceed the foreseeable net adverse effects and that appropriate mitigation is warranted as part of the project. The Columbus, Ohio Field Office of the Fish and Wildlife Service will continue to work with the Buffalo Corps of Engineers to develop an acceptable mitigation plan.

MINOR CORRECTIONS

EIS, page iii: Date should be provided for referenced Letter Report.

EIS 2.12: Woodtick Peninsula is approximately due north of the Toledo Harbor CDF, not northwest.

EIS 3.02: Little Cedar Point extends toward the northwest, not the northeast.

EIS 4.15: This paragraph appears not to agree with the fourth paragraph on EIS page i, which shows B/C ratios for Alternatives 5a and 5b to be greater than B/C ratio for Selected Plan 1c.

EIS 5.09: Surveys will be conducted of submergent vegetation, not emergent.

Section 404(b)(1) 3.5.5: Vegetated shallows (submergent beds referenced above) are present in the CDF site and would be destroyed.

Section 404(b)(1) 3.6.2.: "Pervious" limestone base, not "previous."

Sincerely yours,

Sheila Minor Huff

Sheila Minor Huff
Regional Environmental Officer

bcc: ✓RD, FWS, Twin Cities
RD, NPS, Omaha
Environmental Affairs, GS
Chief, Intermountain Field
Operations Center, BM
Director, OEPR

DRAFT

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
WASHINGTON, D. C. 20314-1000

DAEN-CWR-P

Circular
No. 1165-2-XXX

18 February 1987

FISH AND WILDLIFE MITIGATION AND ENHANCEMENT;
BENEFITS AND COSTS ATTRIBUTABLE TO ENVIRONMENTAL MEASURES;
AND MITIGATION FUND

1. Purpose. This circular provides guidance for implementation of Sections 906, 907 and 908 of PL 99-662.

2. Applicability. This circular is applicable to all HQUSACE elements and all field operating activities having Civil Works responsibilities.

3. References.

a. PL 99-662, Water Resources Development Act of 1986
b. ER 1105-2-10
c. ER 1105-2-40
d. ER 1105-2-50
e. ER 1105-2-60
f. ER 405-1-12
g. ER 1130-2-400
h. ER 11-2-240
i. EC 11-2-152
j. EP 1165-2-1

4. Section 906 Fish and Wildlife Mitigation

a. Fish and Wildlife Mitigation Authority: After consultation with appropriate Federal and non-Federal agencies, the Secretary, or his designee, is authorized to mitigate damages to fish and wildlife, including the acquisition of lands or interest in lands, resulting from any water resources project under his jurisdiction consistent with the following provisions:

(1) Land Acquisition: The acquisition of lands, or interests therein, for mitigation purposes shall not be by condemnation if, as of 17 November 1986:

(a) the project was completed, or

(b) 10 percent of the physical construction on the project was completed.

(2) Water Rights: The acquisition of water, or interests therein, e.g. appropriation doctrine water rights, shall not be by condemnation.

(3) Reporting: District Commanders shall prepare a report for the Secretary to transmit to Congress, together with his recommendations, when it is determined that mitigation features associated with paragraphs 4a(1) & (2) require condemnation.

(4) Funding-Level Limitations:

(a) No more than $30,000,000 in any fiscal year may be obligated to study and implement fish and wildlife mitigation features associated with projects under this authority.

(b) This authority shall apply to mitigation features that cost less than $7,500,000 or 10 percent of project costs, whichever is greater. Mitigation features for a project which exceed these cost limitations will require specific Congressional authorization.

(c) Since the normal project authorization process would allow for specific Congressional authorization of mitigation features concurrently with other project features there is no need of a specific report to Congress concerning land acquisition, water rights, or funding level limits for projects in the planning phase. Where mitigation represents a new initiative under this authority the individual cost limitations, as discussed in paragraphs (4)(a) and (b) above and (5) below, would apply.

(5) Program Administration: Since normal feasibility phase activities undertaken subsequent to 17 November 1986 shall take into account mitigation planning along with other project purposes, it is only for new mitigation initiatives on projects where program administration/management will be required. Administration/management of this program will be similar to that under the Continuing Authorities Program; where funding for studies, reports, and implementation comes from designated funds. Further guidance will be issued at a later date.

b. Timing for Implementation of Mitigation: For all water resources projects, for which construction has not commenced as of 17 November 1986, authorized fish and wildlife mitigation features, including the acquisition of lands or interest in lands to mitigate losses to fish and wildlife, shall be undertaken or acquired either:

(1) before any construction of the project (other than such mitigation land acquisition) commences, or

(2) concurrently with the acquisition of lands and interests in lands for project purposes (other than mitigation of fish and wildlife losses);

whichever the Secretary, or his designee, determines is appropriate except that any physical construction required for the purpose of mitigation may be undertaken concurrently with the physical construction of such project.

For the purposes of paragraph 4b, any project authorized before 17 November 1986, on which more than 50 percent of the land needed for the project, exclusive of mitigation lands, has been acquired shall be deemed to have commenced construction.

c. Cost Allocation and Cost-Sharing of Fish and Wildlife Mitigation Features: Fish and wildlife mitigation costs shall be allocated among the authorized purposes which caused the requirement for mitigation, and shall be cost-shared to the same extent as project costs allocated to these purposes. However, no cost-sharing will be imposed without the consent of the non-Federal interests where contracts have previously been signed for repayment of costs. Costs for mitigation will be treated in accordance with Sections 101, 102 and 103 of PL 99-662.

(1) LERRD: Non-Federal interests shall be required to furnish lands, easements, rights-of-way, relocations and disposal areas (LERRD) where this is a requirement of the purpose which necessitates the mitigation. Except when Trust Fund appropriations are authorized for inland waterway navigation, non-Federal interests will be required to provide LERRD for mitigation measures unless the project authorization has no requirement for non-Federal interests to provide LERRD or the Congress provides an exception for a specific mitigation measure.

(2) Construction: Construction costs for mitigation will be treated the same as other project construction costs for cost sharing purposes.

(3) OMRR: Local interest will be responsible for operation, maintenance, rehabilitation, and replacement of mitigation measures covered by the act, or they will reimburse the Federal Government 100 percent of the cost of this work with the

following exceptions : (1) all inland navigation projects and harbor projects with depths less than 45 feet, which have no requirement for non-Federal sharing of these costs, (2) harbors with depths over 45 feet which require a 50 percent non-Federal share for these costs assigned to increments in excess of a 45-foot project, and (3) any legislated exceptions.

d. Recommendations on Fish and Wildlife Mitigation: Reports submitted to Congress for the authorization of any water resources project shall contain either:

(1) a determination that such project will have negligible adverse impacts on fish and wildlife, or

(2) a recommendation with a specific plan to mitigate fish and wildlife losses created by such project.

Such plans shall ensure that adverse impacts to bottomland hardwood forests are mitigated in-kind, to the extent possible. In this instance "to the extent possible" shall take into consideration the availability of manageable units of bottomland hardwood forests and the practicability and feasibility of implementing management measures to accomplish in-kind mitigation. In-kind does not necessarily mean acre-for-acre, but may be accomplished through the increased management of bottomland hardwood forest areas to compensate for the loss of biological productivity (habitat quality). Consultation with appropriate Federal and non-Federal agencies is required in complying with this requirement.

e. Cost-Sharing Associated with Recommended Fish and Wildlife Enhancement Activities:

(1) First Costs: The first costs of fish and wildlife enhancement activities shall be a Federal cost when any of the following apply:

(a) such enhancement provides benefits that are determined to be national, including benefits to species that are identified by the National Marine Fisheries Service as of national economic importance, species that are subject to treaties or international convention to which the United States is a party, and anadromous fish;

(b) such enhancement is designed to benefit species that have been listed as threatened or endangered by the Secretary of the Interior under the terms of the Endangered Species Act, as amended (16 U.S.C. 1531, et seq.), or

(c) such activities are located on lands managed as a national wildlife refuge.

when fish and wildlife enhancement benefits do not qualify as stated above, 25 percent of such first costs shall be provided by non-Federal interests during implementation.

(2) OM&R Costs. The non-Federal share of OM&R of all activities to enhance fish and wildlife resources shall be 25 percent.

5. Sec. 907. Benefits and Costs Attributable to Environmental Measures: In the evaluation of benefits and costs of a water resources project, the benefits attributable to measures included in a project for the purpose of environmental quality, including improvement of the environment and fish and wildlife enhancement, shall be deemed to be at least equal to the costs of such measures.

The purpose of Section 907 is to prevent the economic costs of measures included in a project for the purpose of environmental quality, including improvement of the environment and fish and wildlife enhancement, from depressing and distorting the benefit-cost ratio of a project, because benefits attributable to such measures are not easily ascertained in monetary terms. Section 907 does not change the principles and guidelines requirement for incremental analysis and justification of such measures or separable increment thereof. That is, the monetary and non-monetary value must equal or exceed the monetary and non-monetary costs before a measure or separable increment thereof will be recommended. In addition, Section 907 does not apply to measures for the mitigation of project-caused fish and wildlife losses.

6. Sec. 908. Mitigation Fund: When monies are appropriated for this fund, additional guidance will be issued by HQUSACE. The fund allows the Secretary to undertake mitigation, including the acquisition of lands and interests therein, prior to the first year of construction funding.

FOR THE COMMANDER:

JOSEPH T. LARREMORE
Colonel, Corps of Engineers
Executive Director of Civil Works

ODNR
OHIO DEPARTMENT OF
NATURAL RESOURCES

Fountain Square
Columbus, Ohio 43224
Division of Wildlife
614/265-6305

May 26, 1987

Kent E. Kroonemeyer, Supervisor
U.S. FISH & WILDLIFE SERVICE
Division of Ecological Services
Columbus Field Office
6950-H Americana Parkway
Reynoldsburg, OH 43068

Dear Mr. Kroonemeyer:

This letter provides the Ohio Division of Wildlife concurrence in the findings and recommendations of your Final Fish and Wildlife Coordination Act Report for the Toledo Confined Disposal Facility study in Lucas County, Ohio.

We strongly agree that a Corps project having adverse impact to fish and wildlife habitat of this magnitude demands a carefully designed mitigation plan. You have clearly demonstrated in your report the quality of environmental resources at Site #1. Certainly, degradation and/or loss of the habitat provided by Site #1 would be a significant loss to the fish and wildlife resources of the lower Maumee River.

We believe that development and implementation of a mitigation plan including the three measures outlined in your report would serve to mitigate losses associated with construction of the CDF, and should be considered the minimum elements of a successful mitigation plan. With reference to your proposed mitigation feature #3 (creation and maintenance of nesting habitat for colonial nesting birds), you should be aware that we are currently involved in a project of this nature at the Ottawa National Wildlife Refuge involving common terns. We are most interested in pursuing this mitigation option and offer our assistance in further design and implementation of this concept.

Thank you for the opportunity to review your report and to provide these comments. We would appreciate the opportunity to participate in the development and implementation of a plan to adequately mitigate the losses associated with this project.

Sincerely,

Clayton H. Lakes

CLAYTON H. LAKES
Chief

CHL:jaa

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115
(614) 469-6923

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

April 28, 1989

Colonel Hugh F. Boyd, III
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Bill Butler

Dear Colonel Boyd:

Attached is the U. S. Fish and Wildlife Service's Mitigation Planning Supplement to our Final Fish and Wildlife Coordination Act (FWCA) Report on the Toledo Confined Disposal Facility (CDF) Study in Lucas County, Ohio. The assistance and cooperation of your staff is appreciated. Mr. Lynn MacLean is the staff biologist who authored this report. Your staff is welcome to contact Mr. MacLean regarding this report at 614/469-6923.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: Chief, Ohio Division of Wildlife, Columbus, OH
ES:LAMacLean:ms-

TOLEDO CONFINED DISPOSAL FACILITY

Mitigation Planning Supplement

to

A Final Fish and Wildlife Coordination Act Report

April 28, 1989

Submitted to:

Buffalo District
U. S. Army Corps of Engineers
Buffalo, New York

Prepared by:

Reynoldsburg, Ohio Field Office
Division of Ecological Services
U. S. Fish and Wildlife Service
Reynoldsburg, Ohio

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115
(614) 469-6923

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

April 28, 1989

Colonel Hugh F. Boyd, III
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Bill Butler

Dear Colonel Boyd:

This report constitutes the Mitigation Planning Supplement to our Final Fish and Wildlife Coordination Act (FWCA) Report on the Toledo Confined Disposal Facility (CDF) Study in Lucas County, Ohio. Our 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.

The Ohio Division of Wildlife has been provided with a copy of our report for their review. A copy of their letter of concurrence and/or comments will be provided to you under separate cover. In our letter of November 15, 1984, we provided preliminary comments regarding some of the potential alternative locations for CDF expansion. Our Draft FWCA Report, dated August 15, 1985, provided further input on alternative disposal options and provided data on the fish and wildlife resources of CDF Site #1. Copies of our 1984 letter and 1985 FWCA report are contained in the Draft EIS, dated May 1986. Our review comments on the Draft EIS are contained in the Department of Interior comments dated July 29, 1986. Our Final FWCA Report was submitted on July 16, 1987.

PROJECT DESCRIPTION

The purpose of the Toledo CDF Study is to select an economically feasible and environmentally acceptable site or method for the future disposal of dredged materials that are considered unacceptable for open-lake disposal. Such a site or method will be required in the near future when the existing, active 242-acre CDF is filled to capacity. The preferred action identified in the Draft EIS involves the construction of a new lakeshore CDF (Alternative 1C) bounded on the northeast and southeast sides by the existing 242-acre CDF, on the south side by the Port Authority CDF, and on the west and northwest sides by a 4,265-foot long dike to be built to a top elevation of 23.5 feet above the LWD elevation of 568.6 feet (IGLD, 1955). The new CDF would occupy about 155 acres of Maumee Bay. See Figure 1 for approximate configuration of the proposed CDF.

OBJECTIVES OF MITIGATION PLANNING

Five major objectives were to be accomplished in this portion of the mitigation planning process:

1. Inventory and categorize fish and wildlife resources.

2. Determine net resource losses resulting from the proposed project.

3. Define mitigation planning objectives.

4. Identify and assess potential mitigation strategies.

5. Provide sufficient detail on each mitigation strategy to facilitate the development of cost estimates and an incremental cost schedule.

The water and sediment quality of the CDF site, and the fish and wildlife resources found at the site have been described in our previous FWCA Reports and have been summarized in the Corps' August 30, 1988 Progress Report on the Toledo CDF, Incremental Cost Analysis for Mitigation Measures.

Objectives 2 (Significant Net Losses) and 4 (Potential Mitigation Strategies) were also addressed in the August 1988 Progress Report. However, our original estimates of losses and our suggested mitigation strategies were not based on a rigorous, documentable process whose results could express the resource losses and gains in terms of a single common unit, such as a habitat unit. Such a process would facilitate incremental cost analysis of the various mitigation strategies, as well as allowing for comparisons of various in-kind and out-of-kind mitigation measures.

A process that meets the above criteria and that we selected for use in this planning effort is the Service's Habitat Evaluation Procedures (HEP). The steps involved in the application of HEP are outlined in the next section of the report.

The mitigation planning objectives outlined in the August 1988 Progress Report would remain but would be part of an overall objective of creating, through various mitigation measures, gains in habitat units that equalled or exceeded the number of habitat units that would be lost as a result of the construction of the CDF.

STEPS INVOLVED IN APPLICATION OF HEP TO CDF STUDY

1. Selection of Evaluation Species.

   Channel catfish, gizzard shad, walleye, white bass, yellow perch, lesser scaup, and mallard were selected for use as evaluation species in the study based upon the fact that they are common in the CDF site and Maumee Bay area and represent a broad range of feeding and reproductive guilds. Other factors considered in the selections included the availability of Habitat Suitability Index (HSI) models, public interest value, economic value, and ecological value.

2. Acquisition or Development of HSI Models.

   HSI models have been developed by the Service for all five species of fish selected as evaluation species. A wintering model has been developed for lesser scaup, which we believe is appropriate to characterize fall migration use on western Lake Erie. An HSI is a unitless number bounded by 0 and 1, where 0 indicates unsuitable habitat and 1 indicates optimum habitat. The formalized models used in this study are all mechanistic models that describe suitability index (SI) ratings for individual variables and aggregate those ratings into an HSI that is based on hypothesized causal relationships between variable values and habitat suitability. An SI rating (0 to 1) is determined for each variable from an SI graph. The SI ratings are aggregated via mathematical equations into life requisite components of the model, such as Food, Cover, Water Quality, and Reproduction. Finally, these life requisite components are aggregated into a species HSI equation that yields a single numerical description of habitat suitability. The HSI models used in the study are listed and described in Appendix A.

Appropriate models are not available for lesser scaup spring use, nor for any seasonal use by mallard in the western Lake Erie area. As a substitute for formalized HSI models, we developed generalized correlations between habitat variables, particularly percentages of submergent and emergent wetland vegetative cover, and seasonal habitat use by lesser scaup and mallard through discussions with State and Federal waterfowl biologists in northwest Ohio and through review of literature such as Bellrose (1976).

3. Determination of Values for HSI Variables in Baseline Year.

The values of HSI variables for the CDF site for the baseline year (year - 0) were calculated from our field data of 1985 and from historical data. Most values for the baseline year at the various possible mitigation sites were estimated from historical data. Values for percent coverage by submergent and emergent wetland vegetation were estimated from aerial photography we had taken on 9/17/85 and from discussions with biologists having knowledge of the sites. The majority of the sources used for historical data are the same as used for our FWCA Reports and are listed in the Reference Section. The most important of these include Fraleigh et al. (1975) and (1979), Herdendorf et al. (1975) and (1976), Mizera (1981), Pinsak and Meyer (1976), Reutter et al. (1978), and Wapora (1976).

4. Estimation of Habitat Conditions for Future Years.

While it is unlikely that the CDF site would ever be restored to its preconstruction condition subsequent to its having been filled, we limited the HEP analyses to a project life of 50 years. Many of the important habitat variables that were likely to change in this time period were estimated through a series of discussions with experts familiar with local conditions regarding water quality, phosphorus reduction plans, and non-point source pollution abatement in the Maumee River watershed. A more detailed description of some of these estimates are provided in the Discussion Section for the CDF site and for some of the alternative mitigation plans.

5. Calculation of HSI's.

After the value of each model variable has been determined for each species for each year (0, 1, 25, 50) without a project or management plan in place, and for each year with a project or management plan in place, the HSI for each species for each year without and with can be calculated or estimated for each site.

6. Form B's. Calculation of Habitat Units (HU's).

The habitat units for each species for each year without and with a project or management plan in place can be calculated for each site by multiplying the area of available habitat at each site by the HSI for each species at the site.

7. Form C's. Calculation of Average Annual Habitat Units (AAHU's).

The habitat units for each species at each site without and with a project or management plan in place can be annualized across the period of analysis (50 years) by use of the formula shown on the copy of Form C in Appendix B.

8. Form D's. Calculation of Net Changes in AAHU's.

The net impact of a proposed project or management plan for each evaluation species at a site is the difference between the AAHU's for the species with the proposed action and the AAHU's without the proposed action.

9. Selection of Compensation Goal.

If all the evaluation species used in the study were considered to be of equal value in terms of socio-economic, ecological, and other criteria, the net impact of the proposed CDF construction and of each of the alternative mitigation plans would be equal to the sum of the net changes in AAHU's for the evaluation species at each site. Form H could then be used for each alternative mitigation plan to calculate the area needed to be modified under each plan to provide "equal replacement" compensation (equal trade-off) for the HU's lost as a result of construction of the CDF. However, it does not appear reasonable to believe that all of the evaluation species are of equal value in terms of most criteria that might be used as the basis for such value judgements. Calculation of Relative Value Indices (RVI's) appeared to be warranted to aid in trade-off decisions that would be required in the consideration of alternative mitigation plans. The compensation goal would then be one of "relative replacement" (relative trade-off).

Calculation of RVI values involves:

a) Selecting a set of criteria, b) defining the perceived significance of the criteria, c) rating each evaluation species against each criterion, and d) transforming the perceived significance of each criterion and each evaluation species rating into a RVI.

10. Selection of RVI Criteria.

The six RVI criteria used are:

Abundance or scarcity
Vulnerability
Replaceability
Non-consumptive value
Management efforts
Harvest (consumptive) value

The definitions of the criteria and the range of values are contained in Appendix B along with a copy of the rest of the HEP forms.

11. Form E. Defining the Perceived Significance of the RVI Criteria.

The perceived significance or weight of each criterion is established through a pairwise comparison which compares each criterion to every other criterion.

12. Form F. Determination of RVI's for Each Evaluation Species.

The RVI values are determined by combining the relative weights for ranking criteria from Form E with the relative importance of each ranking criterion to each evaluation species.

13. Form G-1. Calculation of Net Changes in Relative AAHU's.

The net change in AAHU's calculated in Form D for each evaluation species at a site is multiplied (weighted) by the RVI for that species to produce a relative AAHU. The sum of the net changes in relative AAHU's for all evaluation species under a proposed action (CDF construction or mitigation plan) is a measure of total impact of the proposed action weighted by the value judgements incorporated into the development of the RVI's. The sum total for the CDF site is the total of net resource losses that must be fully offset to achieve "relative compensation" through implementation of one or more of the alternative mitigation plans.

14. Form H. Calculation of Area Needed for Relative Compensation.

For each alternative mitigation plan, the total area required to achieve "relative compensation" is calculated by multiplying the size of the management area by the ratio of the net change in relative AAHU's due to the proposed action (CDF construction) to the net change in relative AAHU's due to the management (mitigation) plan.

DETERMINATION OF NET HABITAT LOSSES AT CDF SITE

In order to determine the values of HSI model variables for the CDF site, we first divided the site into depth zones at one-foot contour intervals, based upon the recent soundings your staff provided to us. The depth contours (relative to LWD) are shown on Figure 1. The acreage for each depth zone is presented in Table 1. For most calculations we assumed a spring/summer water level of about +3 feet (571.6' IGLD). This is higher than the long-term mean for the spring/summer period, but considerably lower than the mean for this period from 1972 through 1987 (see Table 2). Three models (gizzard shad, walleye, and white bass) contained variables related to water level fluctuations during the spawning season. In the western basin of Lake Erie, short-term drops in water level due to strong southwest winds can be substantial and could reduce the spawning success of fish using relatively shallow spawning areas. In order to determine values for the variables in the three models, we calculated the maximum short-term water level decrease at the Toledo gauge for each month from April through July for the years 1979 through 1988. A compilation of this data is provided in Table 3. Note that for most years, the maximum decreases are less than 0.5 meter during the months of May, June, and July. In order to establish the general dates of spawning for the fish species, we backdated from the dates of larval occurrence for each species as shown in Mizera (1981) and Reutter et al. (1978). The data are presented in Table 4.

One of the more critical habitat features for most of the evaluation species is the percentage of vegetative cover. Aquatic plants are important not only for the cover they provide to fish, but also for the fact that they generally support large numbers of invertebrates, a major food resource for a number of fish species. The plants and associated invertebrates also serve as an important food resource for waterfowl, including both puddle ducks and diving ducks. In order to estimate the possible percentage cover by submersed macrophytes in the without project scenario for years 25 and 50, we first needed to estimate the concentrations of suspended solids and total dissolved solids for these years. From our discussions with Dr. Peter Fraleigh of the University of Toledo, Dr. Larry Antosch of the Ohio Environmental Protection Agency, Dr. David Baker of Heidleberg College, and Dr. Terry Logan of the Ohio State University, we concluded that a 30 percent reduction in suspended solids might be possible in 25 years and a 50 percent reduction in 50 years. There should also be some decrease in total dissolved solids, particularly in the nutrient portion. A reduction in both these parameters should lead to an increase in the transparency of the water column, with a resulting increase in the depth at which submersed macrophytes could become established. There should also be a significant expansion of existing submersed beds in the shallower water areas as transparency increases.

In order to estimate the increases in transparency (secchi disk depths) resulting from the projected decreases in suspended solids concentrations, we analyzed the correlation between these two parameters for the 1977 data from Fraleigh et al. (1979). A graph of the correlation is provided on Figure 2. From these transparencies, we then calculated the theoretical maximum depth of angiosperm colonization using the regression equation for lakes with low color from Chambers and Prepas (1988). See Table 5 for the equation used and the results of the calculations. We then compared the theoretical maximum depth of angiosperm colonization with actual depths determined from our 1985 field work, and with depths determined from comparisons of our 1985 aerial photographs with navigation charts. The actual colonization depth of plants found in the field and estimated for the photos was at least equal to and sometimes slightly greater than the theoretical maximum depth. Based upon the above results, we then estimated the percent coverage of each depth zone at the CDF site for years 25 and 50 for the without project scenario.

Other types of cover that are important in some of the fish models include: boulders, rubble, gravel, and sand. The outer face of the proposed CDF dike will provide about 1.6 acres of boulder habitat, compared to about 1.95 acres of such habitat on the existing dike faces that will enclosed in the CDF. In order to save computation time, we used HSI's of zero for all species for years 1, 25, and 50 of the with project scenario. In order to compensate for the fact that this would have discounted the habitat value of the 1.6 acres of boulder habitat on the outer face of the dike, we reduced the habitat index values in appropriate fish models for the without project scenario by an equivalent amount. The zero HSI's for both duck models for with project years 1 and 25 reflects the earlier agreement we had reached with your staff that the obvious waterfowl use that CDF's receive during certain stages of their being filled may be offset by the fact that the waterfowl experience increased exposure to contaminants and botulism.

The most important variable in the lesser scaup (wintering) model is the presence of appropriately sized pelecypods at concentrations exceeding approximately $200/m^2$. We found only one reference to concentrations of fingernail clams in the CDF site. Wapora (1976) reported a concentration of $223/m^2$ at sampling station #3, located in the eastern portion of the site. If approximately 45 percent of the site had concentrations of $200/m^2$ or more, the HSI for the baseline year would be 0.9. At approximately 25 percent, the HSI would be 0.5. We believe that the latter estimate seems more reasonable in light of waterfowl survey data we received in discussions with biologists of the Ohio Division of Wildlife. We estimated that the HSI would increase to about 0.7 by year 50 of the without project scenario based upon expected improvements in water quality and increased amounts of submergent vegetation. We estimated the mallard HSI for the baseline years to be about 0.1, due to the low percentage of aquatic vegetation, and that it would increase to about 0.2 in year 50 with the expected increase in vegetation.

The completed data entry forms, the HSI's, some intermediate life requisite computations, and the HEP forms for the CDF site are contained in Appendix C. Note on Form G-1 that the total of the net changes in Relative AAHU's for the seven evaluation species at the CDF site is -346.76. The goal of all of the alternative mitigation plans to be described in the following section is to produce a total positive net change in Relative AAHU's equal to or exceeding 346.76.

ALTERNATIVE MITIGATION PLANS (SITES)

Reef Construction or Enhancement

In our Final FWCA Report, one of the suggested mitigation options was the construction of an "artificial" reef of up to 23 acres in size. Upon subjecting this mitigation plan to a HEP analysis, it is immediately apparent that the plan would provide little or no increase in habitat value for lesser scaup and mallard. There would also be little or no change in habitat value for gizzard shad, as vegetation is the only cover type important to the species and considered in the HSI model. The addition of boulder, rubble, and gravel substrate to the bay would result in increases in HSI's for the other four fish evaluation species.

The general concept of this mitigation alternative was to add boulder, rubble, and gravel material to one or more existing reef or crown areas in or near Maumee Bay. The primary areas considered for this alternative are the old side-casted rocky shoals/islands that lie parallel to and about 1700 feet either side of the Federal Navigation Channel. Material would be added only to those areas having bottom elevations no lower than about LWD -4 feet and no higher than about LWD. See Figure 3 for the locations of the possible mitigation sites.

The management area was set at 100 acres, with an estimated existing 1 acre of boulders, 5 acres of rubble/gravel, and 4 acres of sand. Two acres of boulders and 10 acres of rubble/gravel would be added. A layer of bedding stone (2" to 10" diameter) would be added to any of the areas having appropriate depths and a firm, stable substrate but currently lacking good rubble/gravel habitat. At least half of the area of bedding stone would then be covered with medium-sized gravel (1/4" to 2" diameter). Armor stone (boulders) would be added to the perimeter of each reef area to provide some protection to the reef area. The finished elevation of the boulder portion should be lower than the original top elevation of the shoal in order to minimize navigation problems (see Figure 4).

The completed data entry forms, HSI's, and HEP forms are contained in Appendix D. Note on Form H that the net change (gain) in Relative AAHU's for the plan is 36.93, but that the area needed for relative compensation is shown as 939 acres. This is the area based on the originally selected management area of

100 acres, only 12 acres of which is actually to be modified. The acres of reef habitat to actually be created or enhanced is 112.7: approximately 19 acres of boulders and 94 acres of rubble and gravel.

Reef Construction Combined with Breakwaters

A slightly different variation of the previous mitigation plan is to enhance or construct a reef area and use segmented breakwaters to partially shelter it from high wave energies and ice damage. The site selected for this plan was the area along the northeast face of the existing 242-acre CDF. See Figure 5 for the location of the site and the proposed configuration of the reef and segmented breakwaters. An approximate cross section of the breakwaters is provided on Figure 6. This design is the smaller of the breakwater designs provided to us by your staff from the Presque Isle, Pennsylvania Project. This variation reduces the chances of storms and/or shove ice jeopardizing the integrity of the reef, provided that the breakwater design is adequate. The ideal design provides sufficient height and narrow enough gaps between segments to provide protection to the rubble/gravel portions of the design. However, there also needs to be sufficient water circulation through the gaps to prevent significant build up of silt on the reef. Each breakwater segment in the design shown in the referenced figures is a total of 400 feet long (measured from outer toe to one end of segment to outer toe at the other end). The gaps between the segments are 100 feet in the southeast arm of segments, and 150 feet in the north arm of segments (measured between adjacent outer toes). The total area of boulder habitat provided below 571.6 feet IGLD is approximately 9.5 acres. The rubble/gravel reef area to be enhanced around the existing island/rocky shoal would be approximately 47 acres in size (2,800 feet long by 730 feet wide). The reef portion would consist of a layer of bedding stone (2" to 10" diameter), with at least half of the area capped with medium-sized (1/4" to 2") gravel. The total area sheltered by the breakwaters is approximately 185 acres.

Separate HSI's and HEP analysis were not run for this variation. Based upon the first variation, the boulder and rubble/gravel habitat added to the area would result in a total net gain in relative AAHU's of about 173.6, half of that needed to compensate for the loss of habitat at the CDF site. Due to the fact that most of the area between the proposed reef area and the proposed breakwaters has a bottom elevation between LWD -4' and LWD -6', it is unlikely that the increased sheltering of the area by the breakwaters would result in much, if any, growth of submersed macrophytes. The increased sheltering and the amount of boulder habitat higher in the water column may provide some benefits to both fish and waterfowl beyond that of the standard reef habitat that have not been factored into the models. It may be reasonable to increase the figure for total net gain in relative AAHU's by about 10 percent to approximately 190.

Grassy Island Breakwaters

If a segmented breakwater system were to be constructed in a shallower water area already supporting some submersed macrophytes, the additional sheltering should lead to a significant expansion of the macrophyte beds. The HSI's of all evaluation species should increase due to the addition of boulder cover and/or the expected increase in vegetative cover.

The first area in which we examined this mitigation alternative was along the northwest face of Grassy Island (Island 18), an older CDF. See Figure 7 for the location and proposed configuration of the breakwaters. The two breakwater sections forming the northeast side of the system would probably need to be designed much like the ones shown in Figure 6, due to the fact that the highest wave energies will be experienced on this side of the system. Existing bottom elevations along the area in which these two sections would be constructed vary between about 2 and 3.5 feet below LWD. If the breakwater bedding stone layer is 3 feet thick and the armor stone layer on the structure toes is also 3 feet thick, the surface of the completed structure toes will be near or above the average spring/summer water level of about 571.6 feet IGLD. There would still be some fish use in the interstices of the armor stone layer, but overall fish use would probably be reduced compared to use on breakwater toes that have a foot or more of water over them. In the final design of all the breakwater segments, the height of the structure toes should be kept as low as possible without compromising structural integrity.

The crest elevations and toe elevations of the breakwater segments forming the northwest and southwest sides of the system can probably be designed at least 2 feet lower than for the northeasterly segments due to the fact that expected maximum wave heights along these sections should be much lower than those on the northeasterly section.

Along the entire inner edge of each breakwater segment we designed an 8-foot wide shelf of smaller stone should be constructed. Each shelf consists of a 24-inch thick layer of bedding stone, with approximately half of this layer then being capped with medium-sized gravel. The gravel and rubble provide spawning habitat for walleye and white bass, while the boulders provide spawning areas for channel catfish. All three types of rock habitat should provide for enhanced production of benthic macroinvertebrates. The proposed design should provide about 4.75 acres of additional boulder habitat, plus about 0.55 acres of additional rubble and gravel habitat.

The breakwater configuration shown in Figure 7 would shelter an area of about 45 acres: about 5 acres between the shoreline and a bottom elevation of LWD - 2', about 20 acres between LWD -2' and -3', and about 20 acres between LWD -3' and -3.5'. The majority of the gaps between the breakwater segments were set at 50 feet in the design in an effort to provide a well sheltered area that would be conducive to the maximum growth of a submersed macrophyte community while still trying to provide for good water circulation. We estimate that submersed macrophytes presently cover about 1.5 acres of the 45 acres that would be sheltered by the breakwaters. Without any sheltering other than that presently provided by Grassy Island and by some of the old side-casted rocky shoals/islands, we estimate that the coverage would only increase to about 2 acres in year 25 and 2.5 acres in year 50. With the construction of the breakwaters, we project that the coverage would be about 5.5 acres in year 1, 12 acres in year 25, and 17 acres in year 50. As in the computations for the CDF site, these estimates are aggregates of estimates for each of the previously described depth zones, with the percent coverage decreasing with increasing depth.

The completed data entry forms, HSI's, and HEP forms for the Grassy Island mitigation alternative are contained in Appendix E. Note on Form H that the net change (gain) in Relative AAHU's for the plan is 75.23, but that the area needed for relative compensation is shown as 460.79 acres. This is the acreage based upon the originally selected management area of 100 acres, only 45 acres of which is actually to be modified by the plan. The area of shallow-water habitat that would actually need to be sheltered would be about 207.4 acres, utilizing breakwaters totaling about 17,480 feet in length.

If the section of the breakwater system parallel to Grassy Island were moved further to the northwest from its originally designed distance of about 600 feet to a distance of about 830 feet, the area sheltered by the system could be increased to about 60 acres. The aggregate length of all the breakwater segments needed would only be about 250 feet more than needed to protect the originally proposed 45-acre area. Additionally, about half of the segments would need to be increased in crest elevation by about 0.5 feet due to the slightly deeper water in which the segments would be constructed.

The net gain in Relative AAHU's per acre for this additional 15 acres of sheltered habitat would not be as great as for the original 45 acres due to the fact that: (1) only about 0.5 acres of additional boulder habitat and about 0.03 acres of rubble/gravel habitat would be added with the increases in breakwater length and height, and (2) the projected percent coverage by submersed macrophytes in the additional 15-acre area (bottom elevations of 3' to almost 4' below LWD) would be lower than in the original 45 acres. The coverage would probably not exceed 20 percent by year 50. A reasonable rough estimate of net gain in Relative AAHU's for this additional 15 acres of habitat (no separate HSI's calculated nor HEP analysis performed) would be about 12, resulting in a total net gain for the 60 acres of about 87.

Cullen Park Causeway Breakwaters

The same type of segmented breakwater protection proposed for the northwest face of Grassy Island could be utilized in the shallow-water zone northeast of the old causeway projecting to the southeast from Cullen Park. The location and proposed breakwater configuration is shown on Figure 8.

The bottom elevations along most of the proposed breakwater alignment vary between 2 and 2.5 feet below LWD. Maximum expected wave heights reaching these breakwaters may be somewhat greater than those reaching the northwest section of the proposed Grassy Island breakwater system and may necessitate the use of slightly larger (higher) structure toes and greater crest elevations. The aggregate length of the segments is 2850 feet. The breakwaters would provide about 3.2 acres of boulder habitat and about 0.45 acres of rubble/gravel habitat. The system would shelter an area of about 60 acres: about 12 acres between the shoreline and a bottom elevation of LWD -1', about 20 acres between LWD -1' and -2', about 20 acres at LWD -2', and about 8 acres between LWD -2' and -2.5'. Again, the gap design width is 50 feet to promote maximum development of submersed macrophytes. Sufficient sheltering might also allow for the development of a narrow band of emergent hydrophytes along portions of the shoreline. The average depth in this 60-acre area is almost 1.4 feet less than that of the 60 acres northwest of Grassy Island. The shallower depths should result in more vegetative growth here than was projected for the Grassy Island area. However, the plume of turbid river water that is usually seen flowing through the gap between the end of the old causeway and Grassy Island may negatively influence this area even more than it does the Grassy Island area.

We did not calculate HSI's for this area nor perform a separate HEP analysis. Based upon the 60-acre Grassy Island area analysis, combined with the possibility of a somewhat higher percentage cover by submersed macrophytes but a lower acreage of boulder and rubble/gravel habitat, it might be reasonable to expect a net gain in Relative AAHU's of at least 100 for the 60-acre area.

Maumee Bay State Park Breakwaters

The same type of segmented breakwater system proposed for the Grassy Island and Cullen Park Causeway areas could be used in the nearshore zone along part or all of the western half of Maumee Bay State Park. If the presently proposed beach restoration project at the park were not to be constructed, a breakwater system could be built along the entire western half of the park as shown in Figure 9. The system consists of eight breakwater segments, each about 500 feet long, plus a 650-foot long groin at the east end of the system. The gaps between segments are about 140 feet in width. The bottom elevations along most of the proposed breakwater alignment range between LWD -2.3' and -2.9'. In order to maximize the depth of water over the structure toes, their design should hold them to the lowest practical height. The cross section of the breakwaters would probably be about like that shown in Figure 6 with perhaps slightly lower structure toes. Along the inside edge of each segment and along the inside edges of the distal half of the proposed groin, a 12-foot wide by 18-inch thick layer of bedding stone would be placed. About half of the bedding stone layer would then be covered with medium-sized gravel. The proposed structures would provide about 4 acres of boulder habitat and about 1 acre of rubble/gravel habitat.

The breakwater configuration shown in Figure 9 would shelter an area of about 100 acres: about 20 acres between the shoreline and a bottom elevation of LWD +1', about 30 acres between LWD +1' and -1', about 30 acres between LWD -1' and -2', and about 20 acres between LWD -2' and -2.9'.

There is presently little or no aquatic vegetation in the 100-acre site. Hopefully, the 140-foot wide gaps are sufficiently narrow to provide enough sheltering effect to promote the growth of submersed macrophytes. We estimate that colonization will take more time than at the previously described sites and that the percentage cover will be lower: 4.5 acres in year 1, 15.5 acres in year 25, and 22 acres in year 50.

The completed data entry forms, HSI's, and HEP forms are contained in Appendix F. Note on Form H that the net change (gain) in Relative AAHU's for the plan is 109. The area needed for compensation is shown as 594.27 but is based on the originally selected management area of 300 acres, only 100 of which would be modified by the proposed plan. The actual area needed for compensation is 318.09 acres.

If the beach restoration project is to be built, it would probably be best to restrict the breakwater system to the area west of the beach as shown in Figure 10. This system of breakwaters and groin would shelter an area of about 50 acres and should produce a net change in Relative AAHU's of about 54.

Woodtick Peninsula Breakwaters

Another area in which we were requested to develop a possible mitigation plan is the Woodtick Peninsula area in Monroe County, Michigan. A system of segmented breakwaters might work to retard recession rates on the peninsula and possibly allow for expansion of the emergent and submergent aquatic plant communities.

If an offshore segmented breakwater system can be designed that will effectively prevent further erosion of the peninsula and perhaps act to slowly accrete sand, the majority of the mitigation value of the system will come from preserving the presently existing habitat values of the peninsula and the areas to the west that it shelters. In order to determine these habitat values, we had to first determine the present configuration of the peninsula and the anticipated configurations in years 25 and 50 without a management plan in place. We determined the existing configuration from a 7/3/88 aerial photograph obtained from the Michigan Department of Natural Resources, from two aerial slides provided to us by your staff, and from a 1979 baseline map contained in a report by the U. S. Army Corps of Engineers (1982). The location and configuration of the peninsula in 1988 is presented in Figure 11. Using the predicted shoreline recession rates for the period 1979-1985 (U. S. Army Corps of Engineers, 1982), with some modifications based upon comparisons of the 1979 baseline map and our 1988 mapping, we mapped the predicted shoreline configurations for years 25 and 50 without a management plan in place. These maps are provided in Figures 12 and 13. Using these three maps, we then estimated the acreages for years 0, 25, and 50 of the various types of habitats at the site, including: islands, protected shallows, emergent hydrophytes, and submersed hydrophytes (see Table 6). Note that only the area east of the easterly edge of the J. R. Whiting Power Plant intake channel was used for analysis of the mitigation plan. It is very likely that a successful mitigation plan would also have a positive impact on the areas west of the intake channel. However, estimates of the future of these areas in the without project scenario were much more speculative than for the area east of the intake channel. Accordingly, the analysis was confined to the 1,000-acre area east of the channel.

Figure 14 shows the proposed offshore segmented breakwater system designed to prevent further erosion of Woodtick Peninsula. Each breakwater segment is about 520 feet long and is separated from the next segment by a 50-foot gap. The total length of the system is about 15,910 feet. The existing bottom elevations along the proposed breakwater alignment range between about 1 and 2 feet below LWD. We assumed that the final design of the segments would be about like that shown in Figure 6. About 8.25 acres of boulder habitat would be provided by the breakwaters. If accretion of sand is appreciable, some of this habitat will progressively be lost. Because of possible sand accretion, the design does not include any rubble/gravel shelf areas. By far the most important habitat components of this mitigation plan are the islands, wetlands, and shallow-water areas protected or enhanced by the sheltering provided by the breakwater system. The final figures presented in Form H are premised upon the assumption that a breakwater system can be designed to prevent further erosion of the peninsula and perhaps to slowly increase the size of some of the islands through accretion of sand. The acreages shown in Table 6 for the with project scenario reflect this assumption. If the proposed system would be effective with wider gaps between segments, the habitat unit gains would remain about the same and the cost would be reduced. The converse would be true if the proposed design is inadequate.

The HSI's for lesser scaup and mallard were estimated by first estimating HSI's for each major type of habitat area in the 1,000-acre candidate management area: barrier islands and protected areas to west, and the unprotected zone lakeward of the islands for the without project scenario; and the barrier islands and protected areas to west, protected shallow-water zone between the islands and the breakwater, and the unprotected area lakeward of the breakwater for the with project scenario. These HSI's were then aggregated into a final HSI for each species on an acre-weighted basis. The data are presented in Table 7.

The completed data entry forms, HSI's, and HEP forms are provided in Appendix G. Note that the net change (gain) in Relative AAHU's is 612.13. The area needed for compensation is 566.46 acres, based upon the original management area of 1,000 acres. Construction of the most northerly 17 segments of the breakwater would provide the area needed to fully compensate for the habitat losses at the CDF site. Due to the high value of the various habitats associated with the peninsula and to its continuing rapid shoreline recession, the construction of the remaining southerly portion of the breakwater system (11 segments) should be considered a worthy candidate for an "enhancement" project.

Maumee Bay State Park Wetlands Management

The last mitigation alternative to be examined involves not the bay or lake, but wetland/old field habitat located primarily above the OHW plane of the lake in the east end of Maumee Bay State Park. A copy of the Maumee Bay State Park Wetland Management Plan, along with preliminary cost estimates, was provided to us by the Ohio Department of Natural Resources. A copy of this material was passed on to your staff in our meeting of February 8, 1989. Figure 15 shows the location and acreages of the wetland cells in which management would be initiated or maintained through the construction or rehabilitation of dikes, and the installation of water control pumps and structures.

Several years ago, the dikes around Cell A were rehabilitated and a water control structure installed in the southwest corner by the Ohio Department of Natural Resources, partly in response to concerns of the Manager of the Ottawa National Wildlife Refuge. It was feared that uncontrolled water levels in the cell during a prolonged period of high lake levels would result in significant erosion of the common dike between Cell A and the refuge cell to its east and northeast. Recently, staff members of several Divisions of the Ohio Department of Natural Resources have indicated that the Ohio Department of Natural Resources would continue to maintain Cell A, but that they were interested in seeing the other cells in the complex rehabilitated and managed as part of the CDF mitigation plan. Therefore, we developed a mitigation plan based upon expected increases in waterfowl habitat values with management of Cells B through F. Total acreage for these cells is about 274. There would be little fish use expected in the area. Table 8 presents the estimated HSI's for lesser scaup and mallard for each cell for each year without and with a management plan in place.

The results of the HEP analysis are provided in Appendix H. Note on Form H that the net change (gain) in Relative AAHU's for the plan is 295.2. The area needed for compensation is 321.85 acres.

SUMMARY

The results of the HEP analyses for all of the alternative mitigation plans and for the CDF site are summarized in Table 9. Table 10 summarizes the net changes in Relative AAHU's for each evaluation species at each site. Note that the range of values for the CDF site is relatively narrow when compared to any of the proposed mitigation sites. Also note again that for the Reefs Plan, all of the mitigation is directed toward fish, while for the Maumee Bay State Park Wetlands Management Plan, all of the mitigation is directed toward waterfowl. When viewing this data, one possible bias in the study strategy suggests itself. The bias is most obvious in those plans where the habitat unit losses for all species are to be compensated for by the management of habitat for only one "group" of species, either fish or waterfowl. While the RVI's have been used in an effort to try to weight the habitat unit losses or gains for each species by our judgement of the relative value of the species, the unequal number of evaluation species from each "group" can certainly bias the outcome of some of the analyses. Obviously, if only three or four species of fish had been used, the compensation acreage required in the Reefs Plan would increase while that in the Maumee Bay State Park Wetlands Management Plan would decrease. It could be argued that the ratio of 5 fish species : 2 waterfowl species is appropriate as 45 to 55 species of fish may utilize the CDF site and the ratio may be fairly accurate in reflecting the relative use of the CDF site by the two "groups" of organisms. Of course, it could also be argued in the case of the Wetlands Management Plan that many species of waterfowl, wading birds, shorebirds, and song birds will benefit in addition to the two waterfowl evaluation species. If it is decided that it is appropriate to mitigate the loss of boulder, rubble, gravel, and submersed macrophyte habitat in the CDF site with wetland habitat improvement such as that proposed in Maumee Bay State Park, some of the possible bias in the study strategy could be eliminated by recalculating the losses and gains in Relative AAHU's for "groups" of organisms rather than for individual species. This would be done by averaging gains and losses for the 5 fish species and for the 2 waterfowl species, and comparing plans on the basis of the sums of these averages. Table 11 presents the results of these recalculations for all of the mitigation plans analyzed in the study.

In comparing the compensation acreage required for each alternative in Tables 9 and 11, note that for most plans, the results do not change more than about 20 percent. However, as anticipated, the acreage requirement for the Reefs alternatives increased substantially (about 44 percent), while that of the Wetlands Management Plan decreased substantially (about 43 percent). Under this "group averaging" scenario, about 185 acres of managed wetlands (Cells B, C, and D) would provide the compensation area required to offset the habitat losses at the CDF site.

The Ohio Department of Natural Resources has expressed strong interest in seeing that the Maumee Bay State Park Wetlands Management Plan is selected as the mitigation plan to be incorporated into the Toledo CDF Construction Project. We support that position for several reasons.

First, the Plan ties in with the North American Waterfowl Management Plan (NAWMP) and the Plan will have a very positive impact on the Lake Erie Marshes Focus area of the Lower Great Lakes - St. Lawrence Basin Joint Venture Area. This Focus Area has been identified as a Flagship Project, at least in part due to its having been nominated by the Ohio Division of Wildlife. This designation means that the Focus Area is a priority work area under the NAWMP. While all of the other proposed mitigation plans, except for the reef-type of alternatives, do provide some benefit to waterfowl, the Wetlands Plan maximizes these benefits. The selection of this plan would also be in keeping with the spirit and intent of the January 23, 1989 Cooperative Agreement Between the Department of Interior and Department of the Army Regarding Waterfowl Habitat Conservation Opportunities Associated with Corps of Engineers Civil Works Projects and Activities Consistent with the NAWMP. Pertinent sections of the Agreement are I. Purpose; IV Responsibilities and Procedures B.4, and C.3.

Second, we believe that the proposed improvement of wetland habitat under this plan meets the Service's Mitigation Policy goal (published in the Federal Register on January 23, 1981) for mitigating the loss of Resource Category 2 habitat. In our Final FWCA Report, we had indicated that we considered the beds of submersed macrophytes, the rubble/gravel shoal, and the small wetland peninsula area in the CDF site to all be Resource Category 2 habitats based upon their high value to certain evaluation species and to their relative scarcity in the area. The proposed management plan would provide in-kind replacement for the small wetland peninsula, but out-of-kind replacement for the aquatic beds and shoal. We believe that this out-of-kind replacement would satisfy the Exceptions Clause for Resource Category 2 as the improved wetland habitat and many of the species that utilize it are of greater value than the aquatic bed and shoal habitats and many of the species that utilize them. Of course, most of the other proposed mitigation plans also meet the Resource Category 2 goal. The reef-type alternatives do not meet the goal for replacement of aquatic bed or wetland habitat but would be appropriate if combined with one or more of the other mitigation plans and limited in size as to contribute no more than half of the Relative AAHU's needed for compensation.

Third, the selection of the Wetlands Management Plan may facilitate long-term maintenance of the mitigation area or structures. In order to provide legitimate mitigation, the Corps and/or a local cooperator must maintain and/or manage the selected mitigation plan (structure) for the serviceable life of the CDF, i.e. for as long as the CDF occupies the 155-acre area of the bay. The Ohio Department of Natural Resources would maintain the proposed structures and manage the wetland areas included as part of the Wetlands Management Plan.

Fourth, this alternative should have some beneficial impacts to the Federally endangered bald eagle. The improved wetlands should receive use by wintering bald eagles during mild winters when open water areas would be present. These open water areas would attract migratory birds upon which the bald eagles could feed. Also, the bald eagles could take fish from some of the deeper water areas.

If the Maumee Bay State Park Wetlands Management Plan is selected as the mitigation plan for the Toledo CDF Project, both the Service and the Ohio Division of Wildlife recommend that any portion of the plan for Cells B through F that is not included as part of the area needed for "compensation," be considered for funding as part of an "enhancement" plan as provided for under Section 906(e) of the Water Resources Development Act of 1986. Under the "group average" calculations, the "enhancement" areas would probably include Cells E and F.

Sincerely,

Kent E. Kroonemeyer
Kent E. Kroonemeyer
Supervisor

cc: Chief, Ohio Division of Wildlife, Columbus, OH
ES:LAMacLean:ms-

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Table 1. Acreages of CDF project site subtended by one-foot depth contours.* (See Figure 1.)

Total Acres of CDF Site		Difference = Acres Between Contours
Below -4' contour	20	
Above -4' contour	135	
	....	55
Above -3' contour	80	
	....	40
Above -2' contour	40	
	....	20
Above -1' contour	20	
	....	10
Above 0' contour	10	
	....	6
Above +1' contour	4	
	....	3.5
Peninsula	0.5	

Total CDF area = approximately 155 acres

* Contours are referenced to LWD elevation of 568.6 feet IGLD and were generated from sounding data supplied by Buffalo District, U. S. Army Corps of Engineers.

Table 2. Monthly mean water levels in feet (IGLD, 1955) at Cleveland, Ohio for primary boating months

	May	June	July	Aug	Sept
Long-term Mean (1900-1978)	570.89	571.02	570.99	570.79	570.51
Mean (1969-1978)	572.35	572.40	572.35	572.14	571.88
1979	572.12	572.20	572.17	572.06	572.01
1980	572.45	572.56	572.42	572.54	572.28
1981	571.94	572.19	572.25	572.03	571.92
1982	572.32	572.38	572.22	571.80	571.39
1983	572.52	572.57	572.57	572.54	572.01
1984	572.22	572.52	572.44	572.27	571.97
1985	573.28	573.18	573.00	572.66	572.42
1986	573.43	573.70	573.66	573.37	572.96
1987	572.87	572.78	572.82	572.51	572.22
1988	571.76	571.59	571.34	571.14	570.72

Table 3. Maximum short-term Lake Erie water level decreases as measured at Toledo, Ohio gauge during spawning season (date of occurrence).*

	April	May	June	July
1979	9.0' (4/06)	1.0' (5/03)	2.1' (6/11)	1.0' (7/28)
1980	2.3' (4/14)	1.2' (5/31)	1.5' (6/20)	1.0' (7/22)
1981	2.3' (4/04)	0.8' (5/12)	1.9' (6/22)	1.1' (7/26)
1982	6.3' (4/03)	0.7' (5/20)	1.5' (6/15)	1.2' (7/28)
1983	1.5' (4/17)	1.6' (5/02)	0.9' (6/07)	1.2' (7/29)
1984	5.2' (4/30)	3.3' (5/01)	1.4' (6/27)	0.9' (7/07)
1985	4.4' (4/06)	1.9' (5/31)	1.5' (6/01)	1.3' (7/14)
1986	1.4' (4/11)	1.6' (5/01)	1.4' (6/13)	1.0' (7/14)
1987	3.0' (4/02)	1.0' (5/30)	1.2' (6/28)	0.8' (7/20)
1988	2.3' (4/27)	1.1' (5/16)	0.9' (6/25)	1.2' (7/11)

* Table compiled from daily mean water level data from U. S. Department of Commerce, NOAA, NOS Rockville, Maryland

Table 4. Approximate dates of occurrence of larval fish in 1977 in lower Maumee River* and in western basin of Lake Erie**.

Walleye	*	April 21 to May 15, peaks April 25 and May 11
	**	April 20 to June 4, peak May 2
Yellow perch	*	April 25 to June 4, peak May 15
	**	April 25 to June 19, peak May 5
White bass	*	May 15 to June 16, peak May 19
	**	May 12 to July 9, peak June 16
Gizzard shad	*	May 19 to June 12, peaks May 31 and June 4
	**	May 12 to July 8, peak June 4
Channel catfish	*	July 7 to August 11
	**	No dates

* Reutter et al. (1978)

** Mizera (1981)

Table 5. Correlations between suspended solids, transparency, and maximum colonization depth of submersed macrophytes in Maumee Bay, Lake Erie.

Suspended Solids (ppm)*	Secchi Disk Transparency (D)	Maximum Depth of Colonization (Zc)**
50	0.20 m	1.63 m / 5.35'
35	0.25 m	1.81 m / 5.94'
27	0.30 m	1.96 m / 6.43'
24.5	0.32 m	2.00 m / 6.56'
20.5	0.35 m	2.08 m / 6.82'
17.5	0.38 m	2.16 m / 7.09'
16	0.40 m	2.20 m / 7.22'
13	0.45 m	2.31 m / 7.58'

* Correlations between suspended solids concentrations and secchi depths from Figure 2.

** Maximum depth of angiosperm colonization from regression equation for lakes with low color, from Chambers and Prepas (1988).

$$(Zc)^{0.5} = 0.69 \log (D) + 1.76$$

Table 6. Estimated acreages of various types of habitat at Woodtick Peninsula site, Monroe County, Michigan (total management area 1,000 acres).*

Woodtick Peninsula WITHOUT project

	ACRES		
	Year 0	Year 25	Year 50
Area of unprotected shallow water	600	850	970
Area of islands, vegetation, and protected waters	400	150	30
Area of islands	75	40	10
Area of emergents	30	10	5
Area of submergents	50	20	5
Area of unvegetated shallow water	215	60	10
Area of deeper unvegetated water (below -2')	30	20	0

Woodtick Peninsula WITH project

	ACRES		
	Year 1	Year 25	Year 50
Area of unprotected shallow water east of breakwaters	300	300	300
Area of shallow water between breakwaters and barrier islands	300	300	300
Area of islands, vegetation, and protected waters	700	700	700
Area of islands	75	80	85
Area of emergents	35	50	70
Area of submergents	60	85	100
Area of unvegetated shallow water interior to islands	200	155	115
Area of deeper water (below -2') interior to remaining islands	30	30	30

* Only areas east of the eastern edge of the J. R. Whiting Power Plant intake channel were considered in the 1,000-acre management area.

Table 7. Estimated HSI's for lesser scaup and mallard at Woodtick Peninsula site, Monroe County, Michigan for all years without and with a management (mitigation) plan in place, based on 1,000-acre management area.

Woodtick Peninsula WITHOUT project

		Year 0	Year 25	Year 50
		Area / HSI	Area / HSI	Area / HSI
Lesser scaup	(Area 1)*	400 / 0.25	150 / 0.30	30 / 0.30
	(Area 2)	600 / 0.10	850 / 0.10	970 / 0.10
Total / Average		1000 / 0.16	1000 / 0.13	1000 / 0.11
Mallard	(Area 1)	400 / 0.30	150 / 0.35	30 / 0.40
	(Area 2)	600 / 0.02	850 / 0.02	970 / 0.02
Total / Average		1000 / 0.13	1000 / 0.07	1000 / 0.03

Woodtick Peninsula WITH project

		Year 0	Year 25	Year 50
		Area / HSI	Area / HSI	Area / HSI
Lesser scaup	(Area 1)*	400 / 0.30	400 / 0.35	400 / 0.40
	(Area 3)	300 / 0.15	300 / 0.20	300 / 0.25
	(Area 4)	300 / 0.10	300 / 0.10	300 / 0.10
Total / Average		1000 / 0.20	1000 / 0.23	1000 / 0.27
Mallard	(Area 1)	400 / 0.35	400 / 0.45	400 / 0.50
	(Area 3)	300 / 0.03	300 / 0.03	300 / 0.03
	(Area 4)	300 / 0.02	300 / 0.02	300 / 0.02
Total / Average		1000 / 0.16	1000 / 0.20	1000 / 0.22

* (Area 1) Islands and areas to west.
(Area 2) Area lakeward of islands.
(Area 3) Area between islands and breakwaters.
(Area 4) Area lakeward of breakwaters.

Table 8. Estimated HSI's for lesser scaup and mallard at Maumee Bay State Park wetlands for all years without and with a management (mitigation) plan in place.

Lesser Scaup		HSI's (w/o)			HSI's (w/)	
	Area (ac)	Yr-0	Yr-25	Yr-50	Yr-1	Yrs 25 & 50
Cell B	13	0	0	0	0.35	0.40
Cell C	58	0	0	0	0.55	0.60
Cell D	107	0	0	0	0.55	0.60
Cell E	48	0.40	0.15	0.1	0.60	0.60
Cell F	48	0.20	0.08	0.06	0.55	0.60
Average HSI's over 274 acres		0.11	0.04	0.03	0.55	0.59

Mallard		HSI's (w/o)			HSI's (w/)	
	Area (ac)	Yr-0	Yr-25	Yr-50	Yr-1	Yrs 25 & 50
Cell B	13	0.03	0.03	0.03	0.75	0.80
Cell C	58	0.10	0.10	0.10	0.75	0.80
Cell D	107	0.10	0.10	0.10	0.75	0.80
Cell E	48	0.60	0.20	0.15	0.80	0.80
Cell F	48	0.30	0.20	0.15	0.75	0.80
Average HSI's over 274 acres		0.22	0.13	0.11	0.76	0.80

Table 9. Summary of net changes in Relative AAHU's and compensation acreage required for all mitigation alternatives in Toledo CDF Study.

	Acres Modified/Base Acreage	Net Changes in Relative AAHU's	Compensation Acreage Required
CDF	155 / 155	-346.76	
Reefs	12 / 100	36.93	112.7
Reefs + Breakwaters	56.5 / 100	190±	103±
Grassy Island Breakwaters	45 / 100	75.23	207.4
	60 / 100	87±	240±
Cullen Park Breakwaters	60 / 100	100±	208±
Maumee Bay State Park Breakwaters	100 / 300	109	318.1
	50 / 300	54	321±
Woodtick Breakwaters	1000 / 1000	612.13	566.5
Maumee Bay State Park Wetland Management	274 / 274	295.2	321.9

Table 10. Summary of net changes in relative AAHU's for each evaluation species at each site in Toledo CDF Study.

	CDF (155 Ac.)	Reefs (12 Ac.)	Grassy Is. (45 Ac.)
Channel catfish	- 48.34	4.45	4.45
Gizzard shad	- 34.69	0.00	7.99
Walleye	- 29.33	14.14	20.78
White bass	- 85.42	2.17	0.72
Yellow perch	- 47.70	16.17	30.37
Lesser scaup	- 78.26	0.00	3.99
Mallard	- 23.02	0.00	6.93
	-346.76	36.93	75.23

	M.B.S.P.-NS	Woodtick	M.B.S.P. Wetlands
Channel catfish	4.45	9.90	0.00
Gizzard shad	10.77	61.97	0.00
Walleye	23.69	182.87	0.00
White bass	10.29	1.82	0.00
Yellow perch	36.87	152.72	0.00
Lesser scaup	7.35	84.15	120.99
Mallard	15.58	118.70	174.21
	109.00	612.13	295.20

Table 11. Recalculation of net changes in Relative AAHU's and compensation acreage required for all mitigation alternatives in Toledo CDF Study, using group averages for fish and for waterfowl.

Site or Plan	Averages of Rel. AAHU's for Fish	Averages of Rel. AAHU's for Waterfowl	Totals of Averages	Compensation Acreage Required
CDF	- 49.10	- 50.64	- 99.74	
Reefs	7.39	0.00	7.39	162.0
Reefs + Breakwaters	38.±	0.00	38.±	148±
Grassy Island (45 Ac.)	12.86	5.46	18.32	245.0
(60 Ac.)	14.9±	6.3±	21.2±	282±
Cullen Park	17.1±	7.3±	24.4±	245±
M.B.S.P.-NS Breakwaters	17.21	11.47	28.68	347.8
Woodtick	81.86	101.43	183.29	544.2
M.B.S.P. Wetlands	0.00	147.60	147.60	185.2

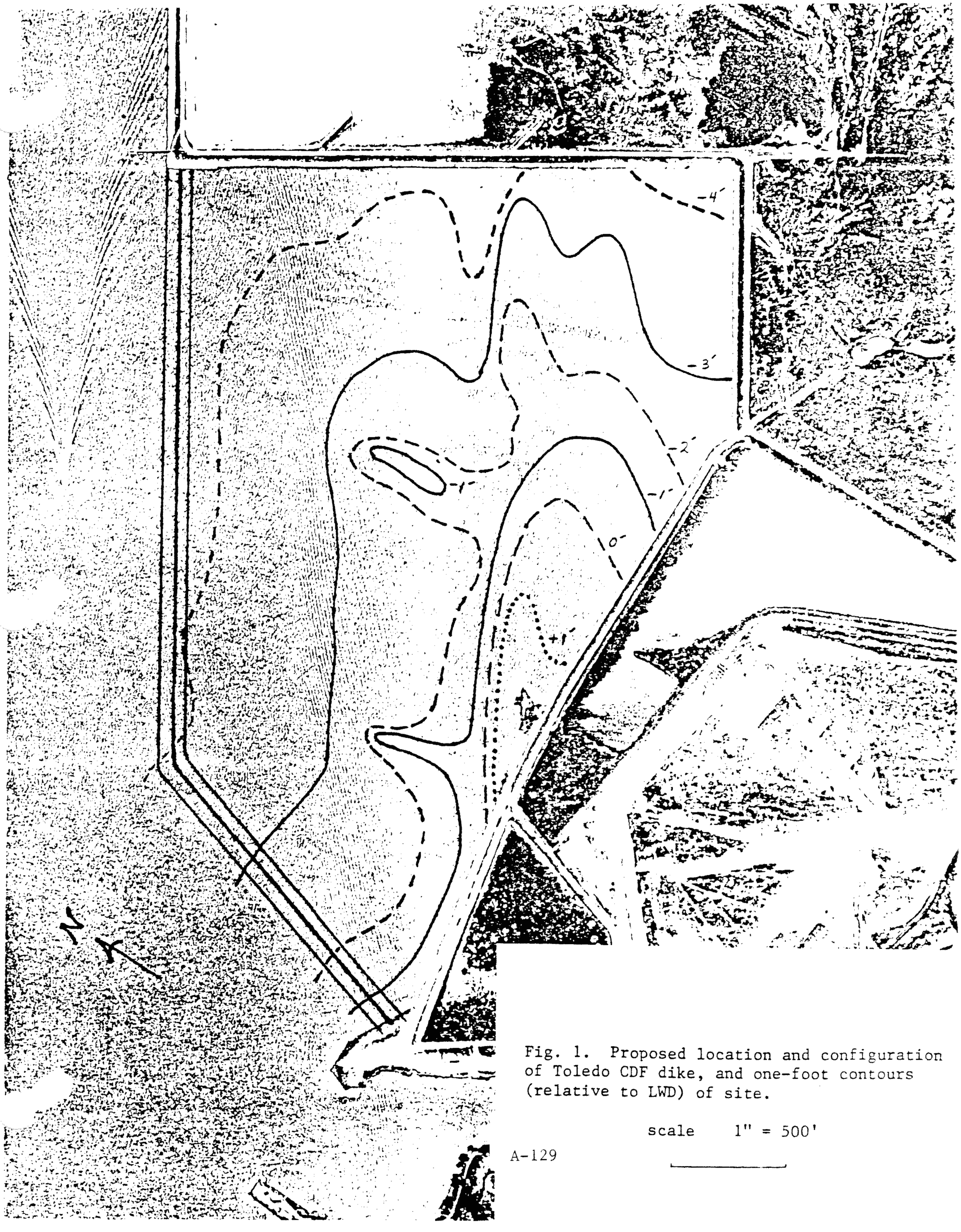

Fig. 1. Proposed location and configuration of Toledo CDF dike, and one-foot contours (relative to LWD) of site.

scale 1" = 500'

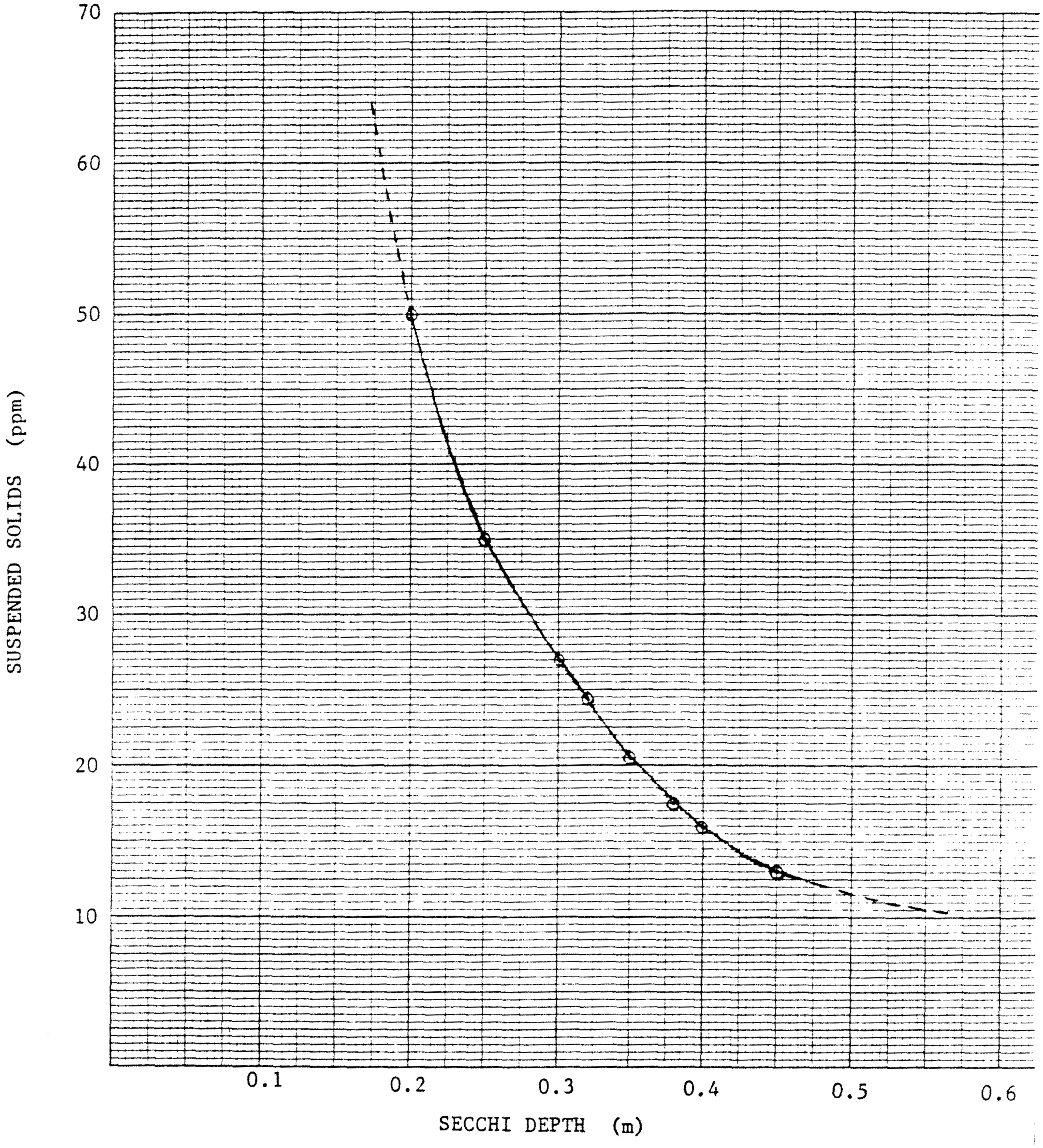

Fig. 2. Graph of correlation between suspended solids and Secchi depth in Maumee Bay (original data from Fraleigh et al.,1979).

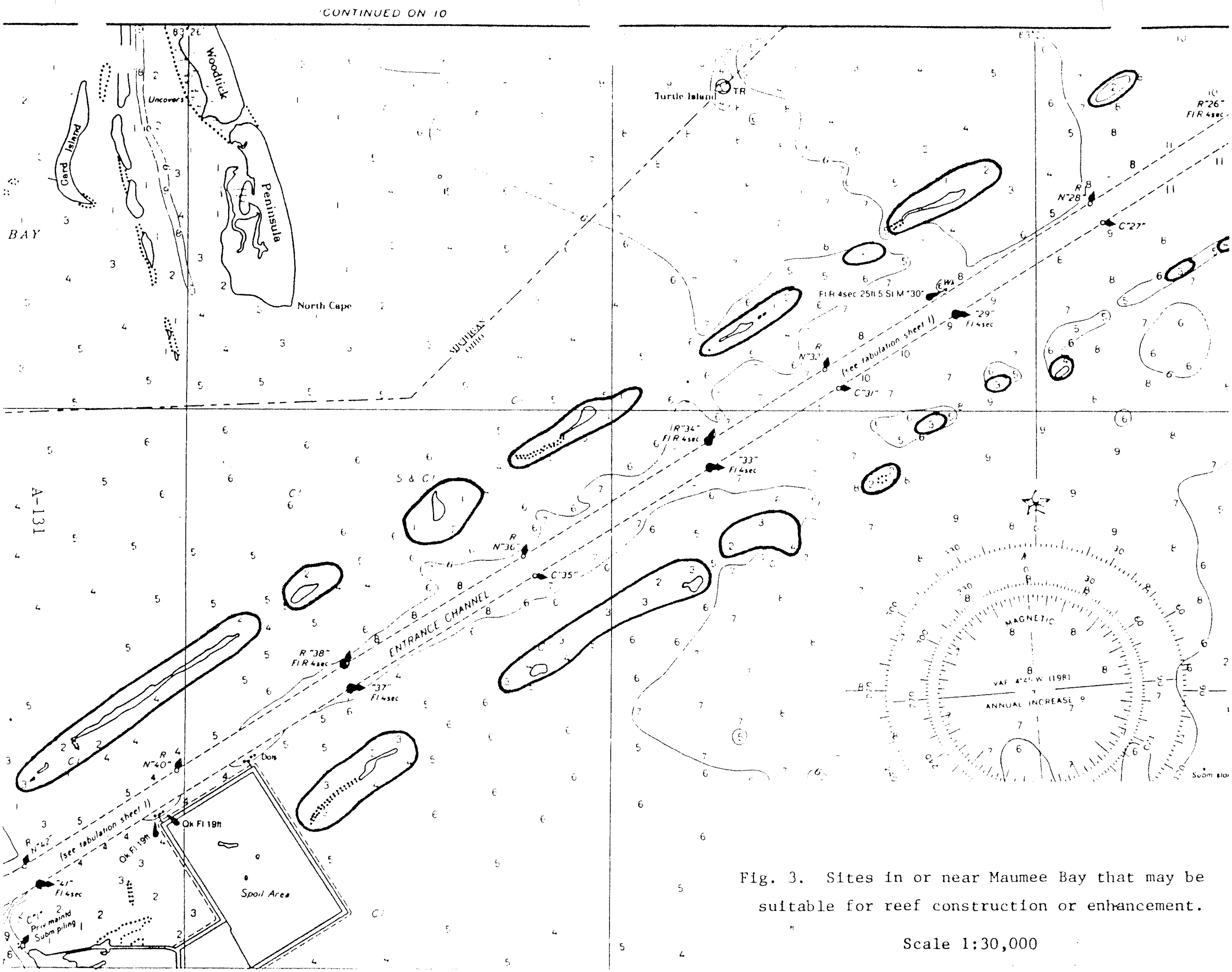

Fig. 3. Sites in or near Maumee Bay that may be suitable for reef construction or enhancement.

Scale 1:30,000

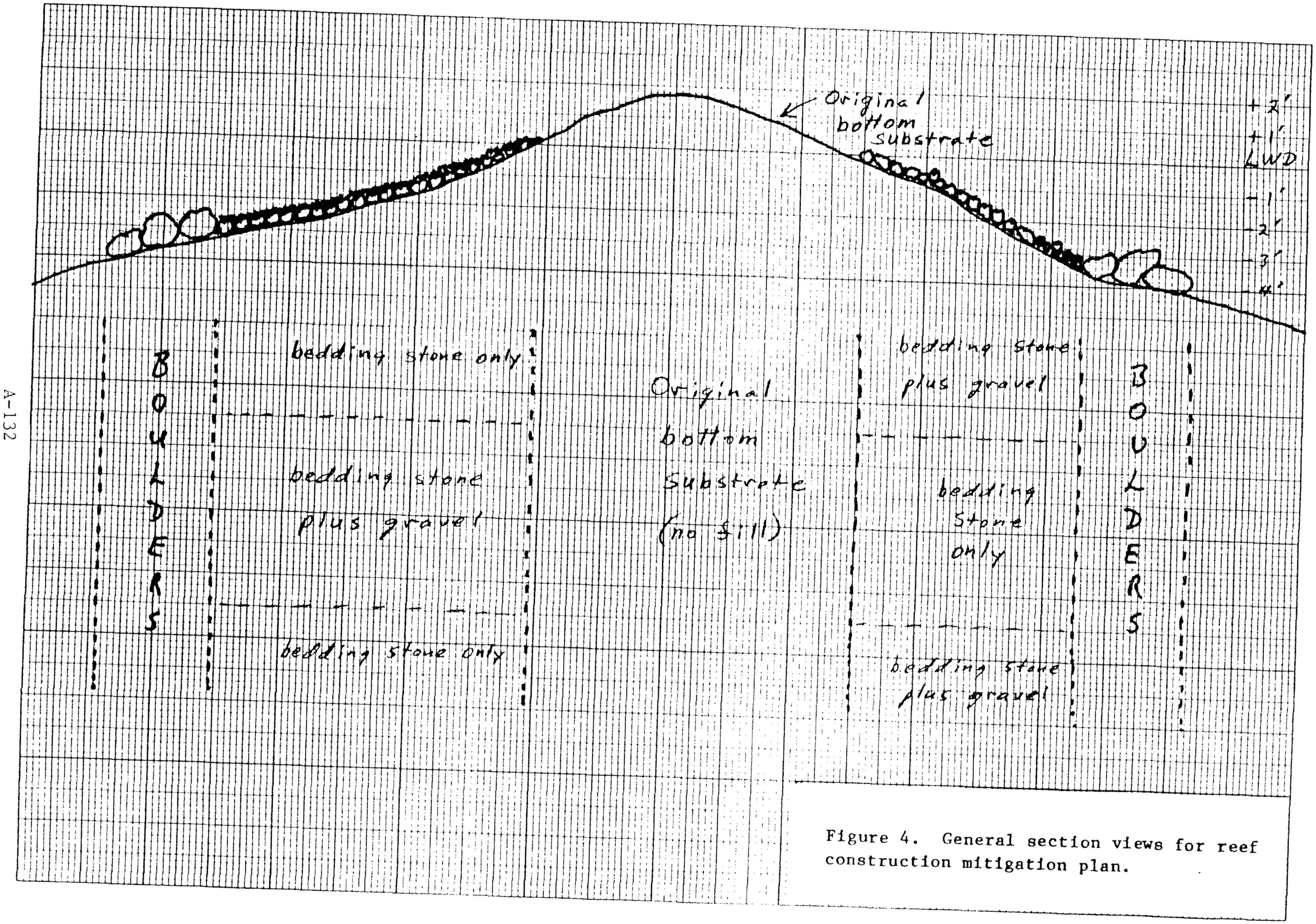

Figure 4. General section views for reef construction mitigation plan.

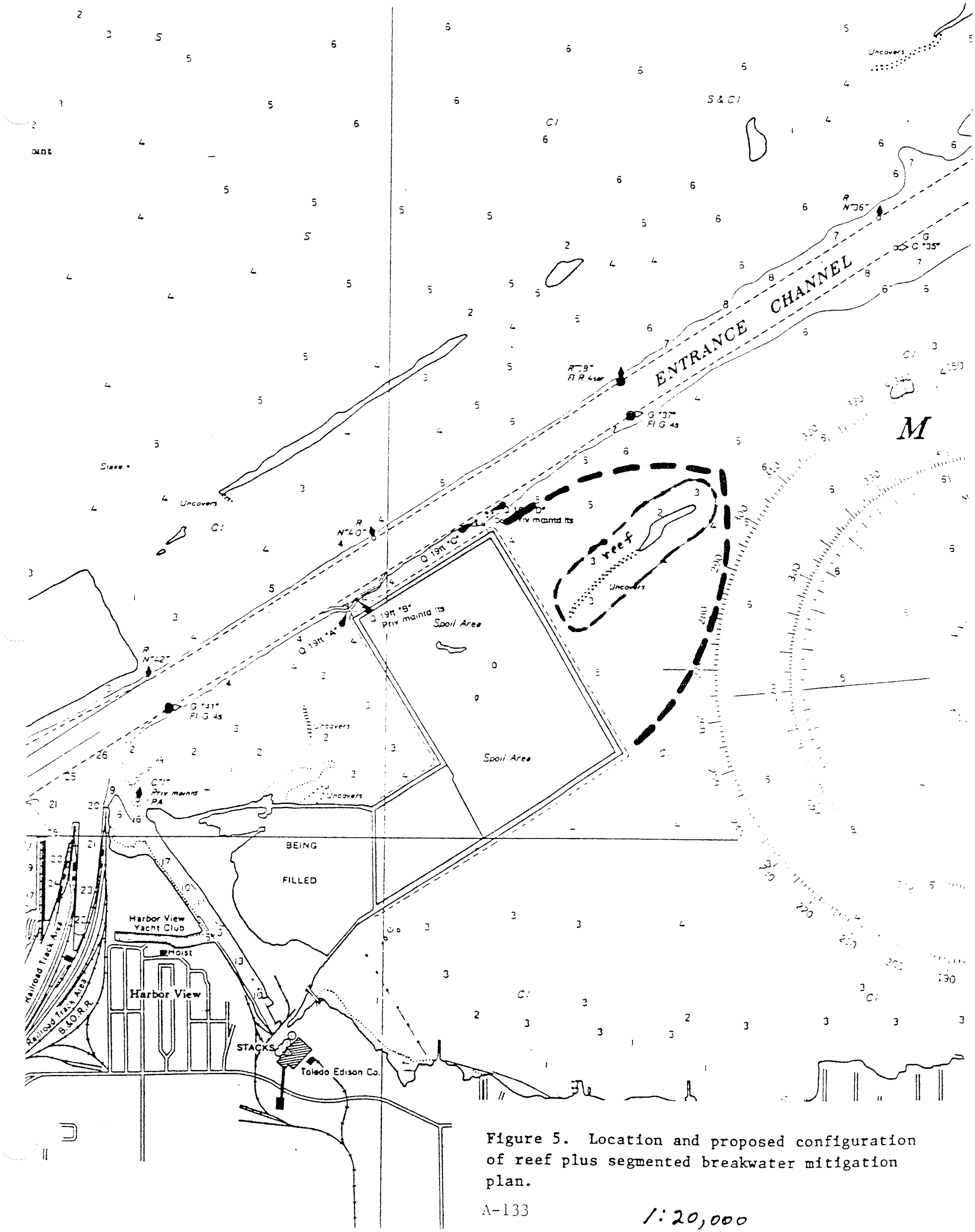

Figure 5. Location and proposed configuration of reef plus segmented breakwater mitigation plan.

1:20,000

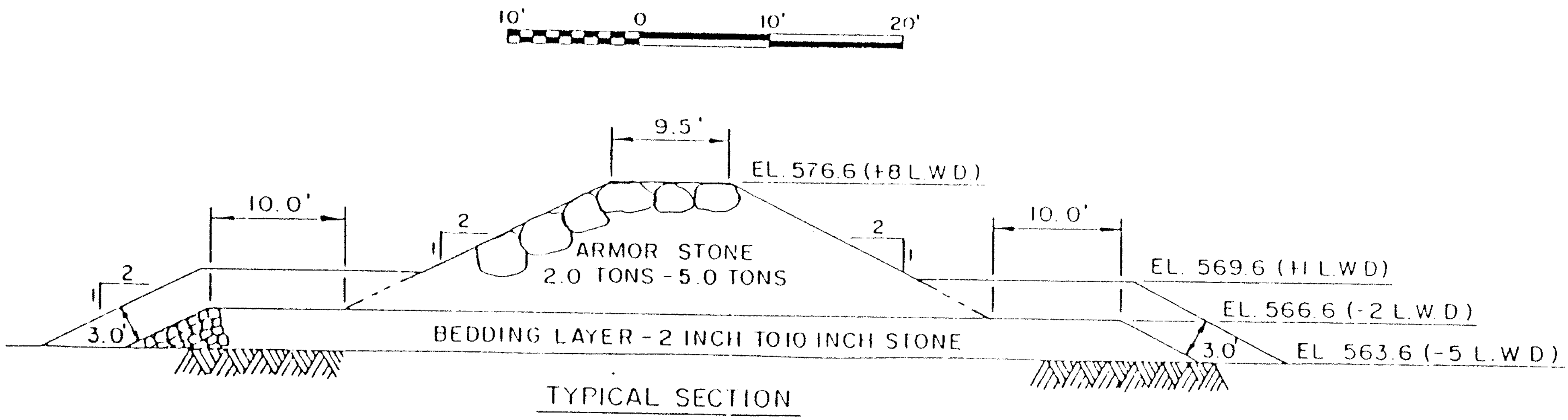

Figure 6. Estimated typical section view of breakwater designed to protect artificial reef northeast of 242-acre CDF in Maumee Bay.

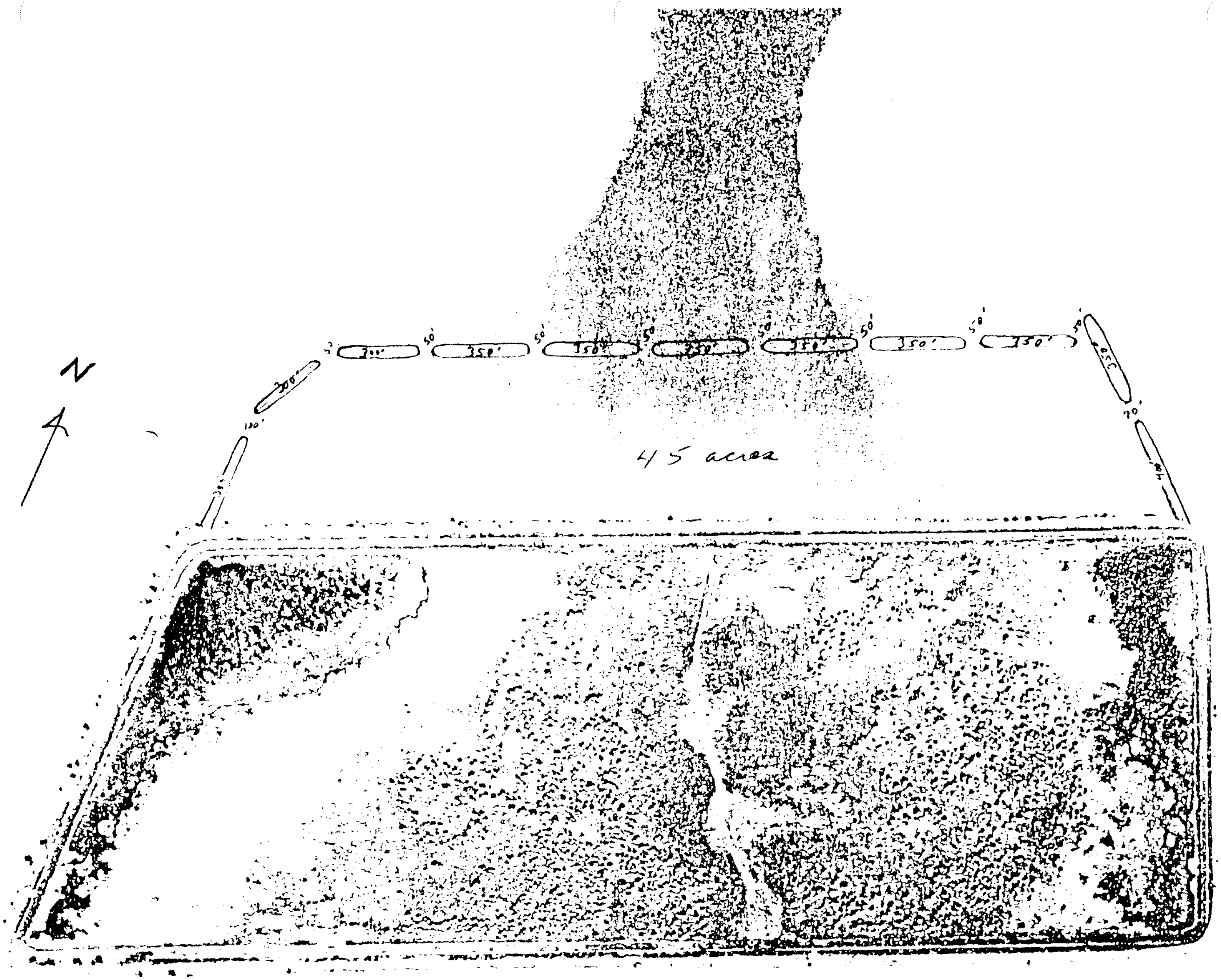

Figure 7. Proposed location and configuration of offshore segmented breakwater system designed to protect 45-acre area on northwest side of Grassy Island (1" = 500').

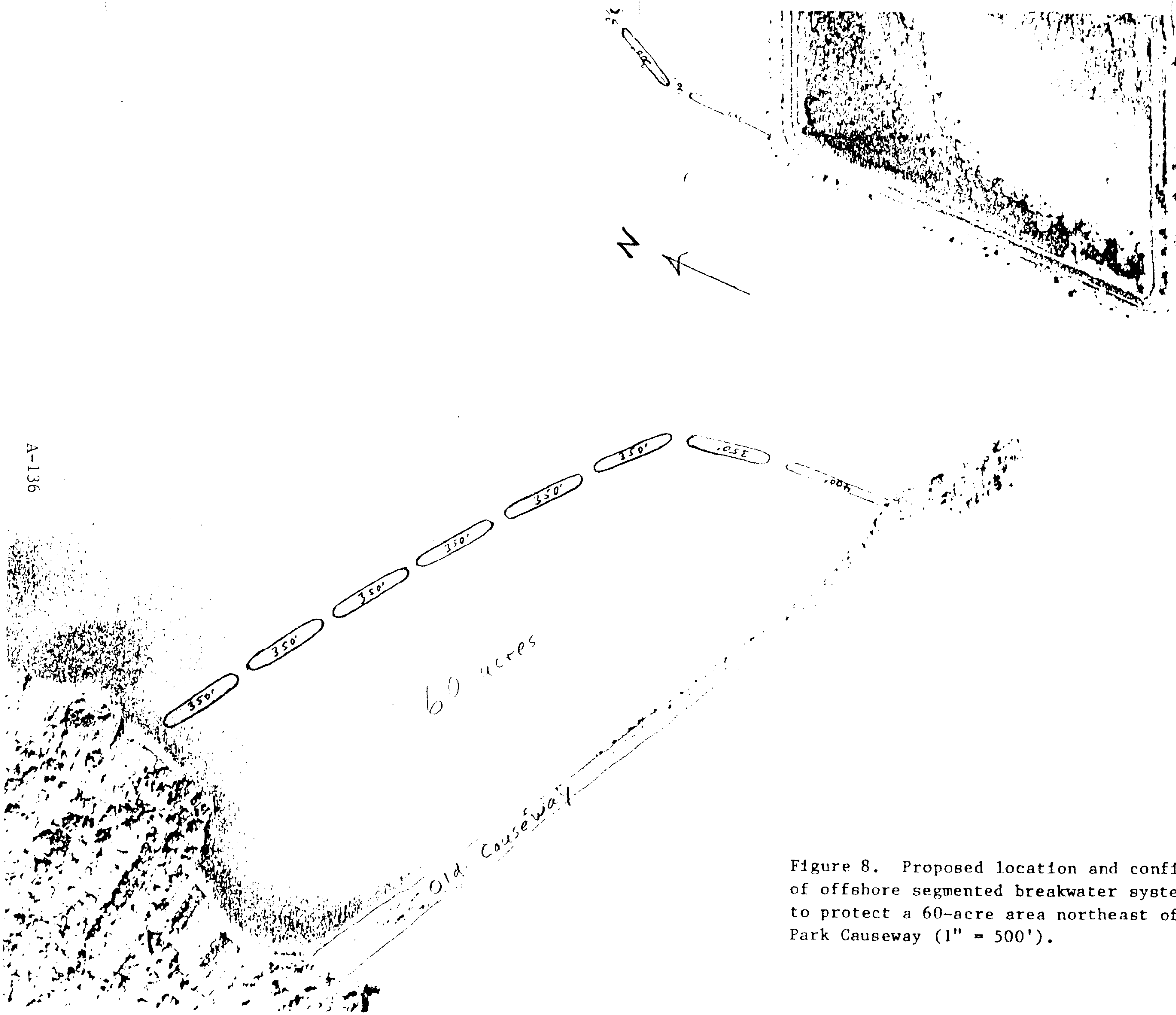

Figure 8. Proposed location and configuration of offshore segmented breakwater system designed to protect a 60-acre area northeast of Cullen Park Causeway (1" = 500').

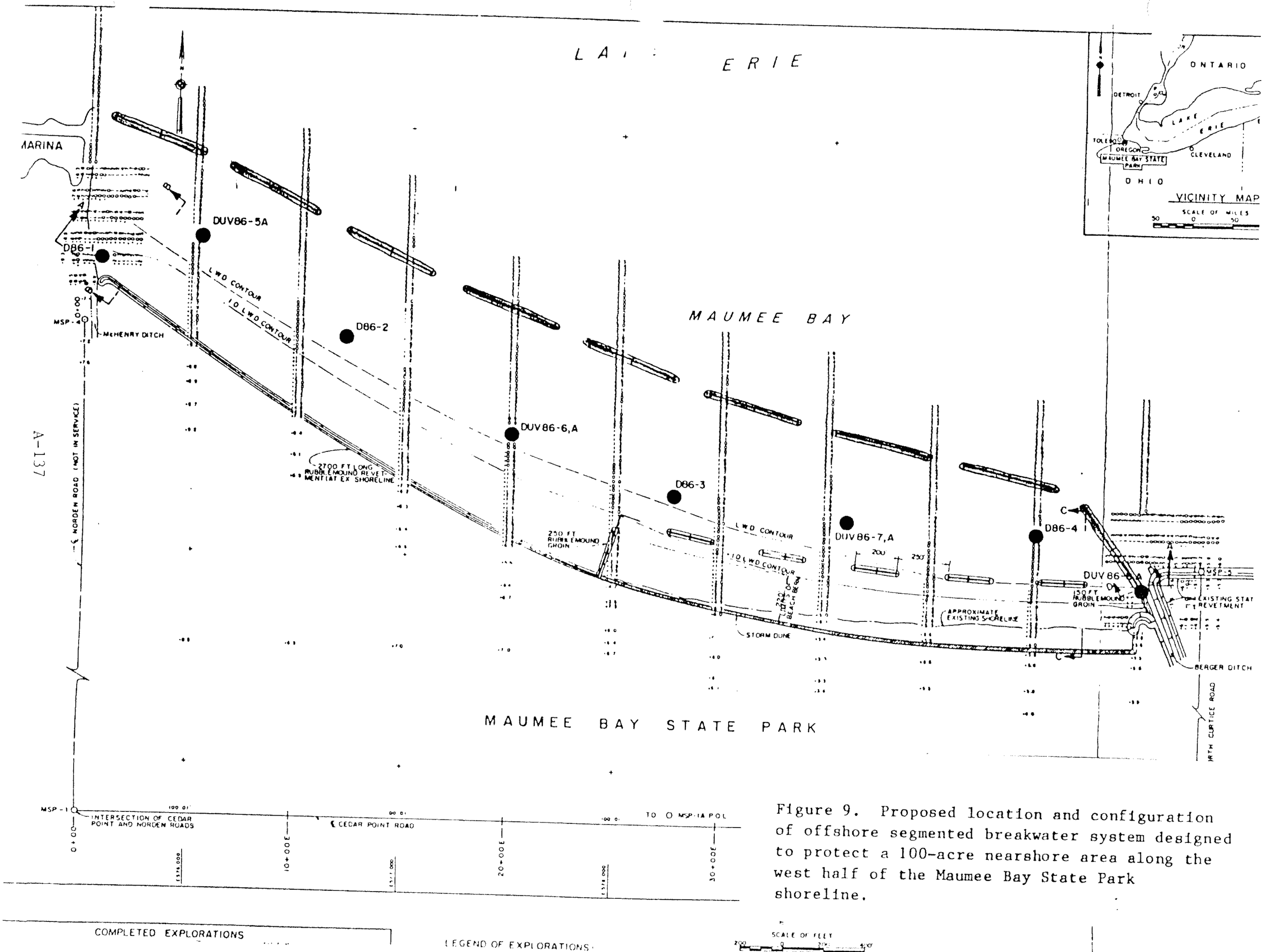

Figure 9. Proposed location and configuration of offshore segmented breakwater system designed to protect a 100-acre nearshore area along the west half of the Maumee Bay State Park shoreline.

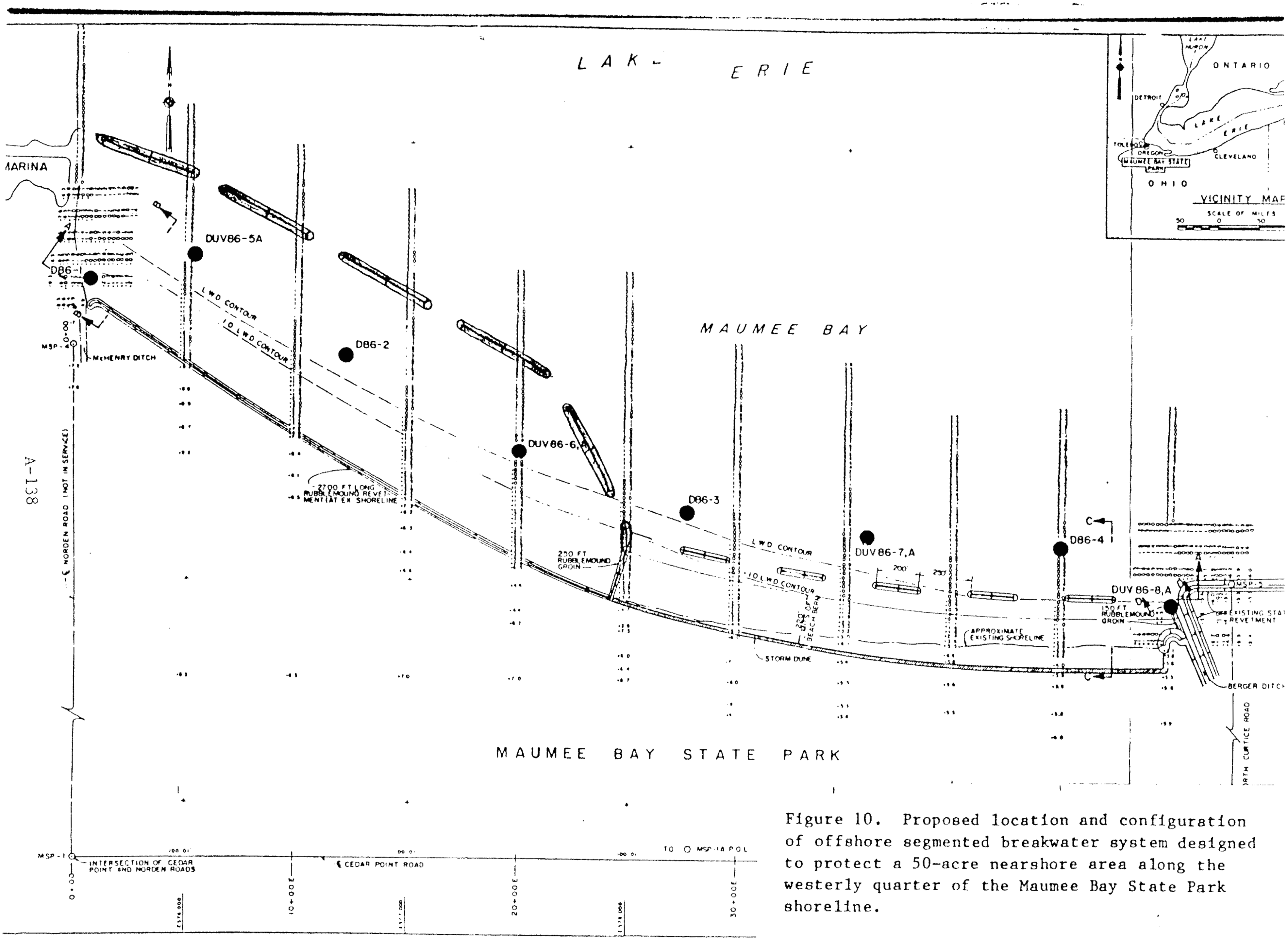

Figure 10. Proposed location and configuration of offshore segmented breakwater system designed to protect a 50-acre nearshore area along the westerly quarter of the Maumee Bay State Park shoreline.

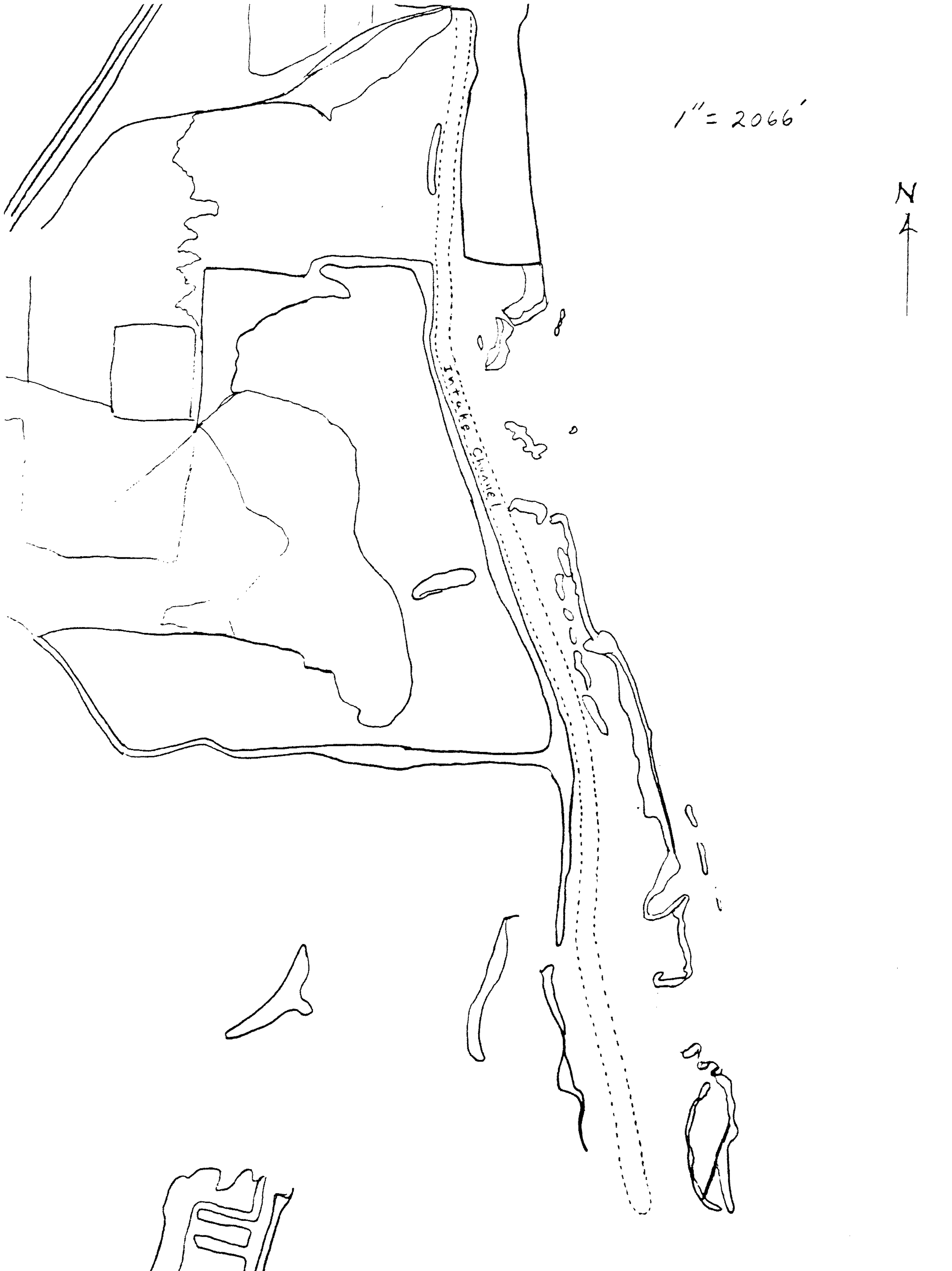

Figure 11. Location and approximate shoreline configuration of Woodtick Peninsula, Monroe County, Michigan in 1988.

Figure 12. Estimated shoreline configuration of Woodtick Peninsula in year 25 (2013) without a management plan in place (shown in red over the 1988 baseline map).

Figure 13. Estimated shoreline configuration of Woodtick Peninsula in year 50 (2038) without a management plan in place (shown in red over the 1988 baseline map).

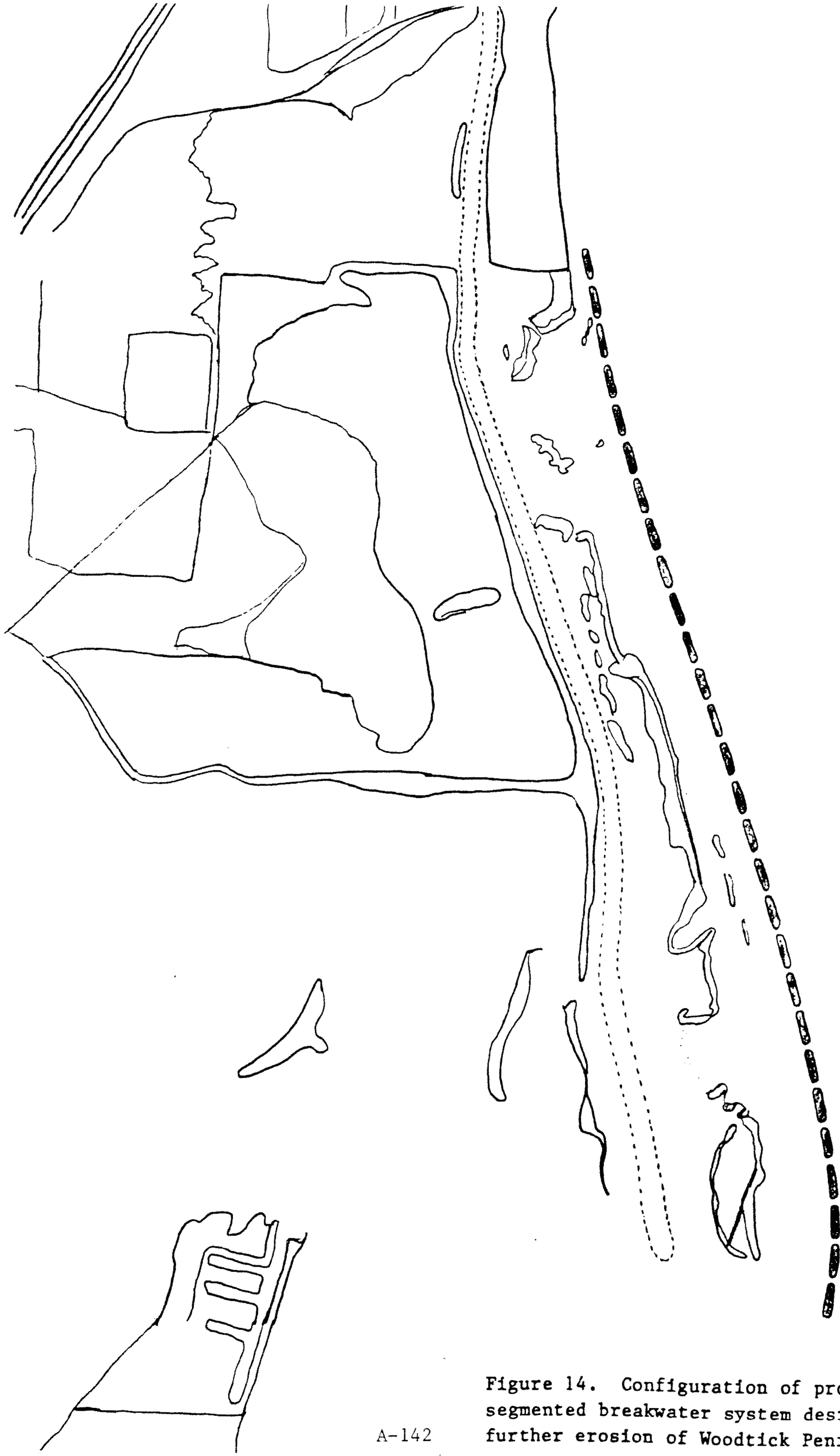

Figure 14. Configuration of proposed offshore segmented breakwater system designed to prevent further erosion of Woodtick Peninsula.

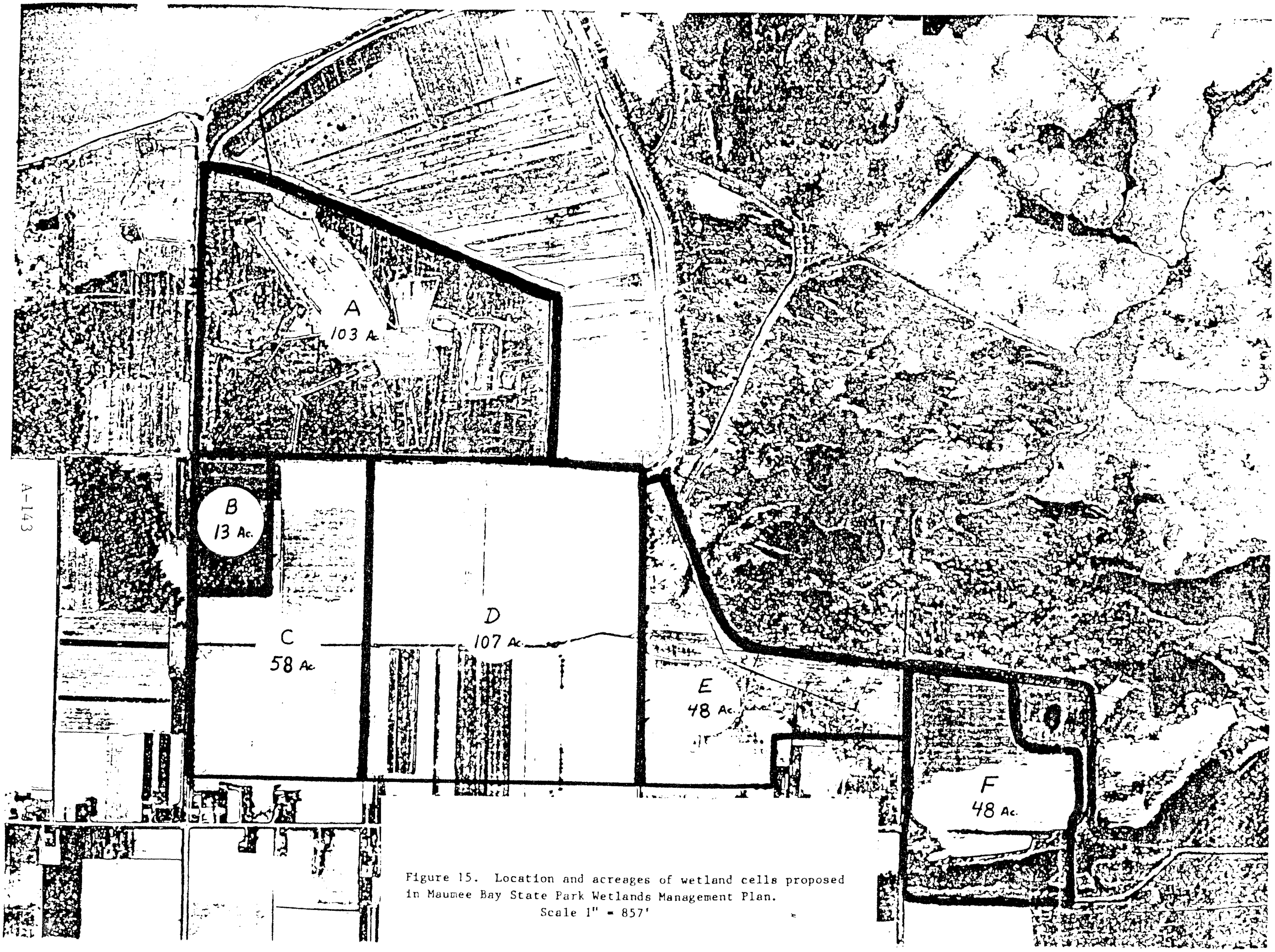

Figure 15. Location and acreages of wetland cells proposed in Maumee Bay State Park Wetlands Management Plan.
Scale 1" = 857'

APPENDICES ARE AVAILABLE

UPON REQUEST

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Reynoldsburg Field Office
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4115
(614) 469-6923

TAKE PRIDE IN AMERICA

October 6, 1989

Colonel Hugh F. Boyd, III
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Bill Butler

Dear Colonel Boyd:

We have carefully reviewed the questions and comments contained in your letter of June 23, 1989 responding to our April 28, 1989 Mitigation Planning Supplement (hereafter referred to as Supplement) for the proposed expansion of the Confined Disposal Facility at Toledo Harbor, Ohio. Hopefully, the following comments will clarify the three major points of concern raised in your letter.

1. Suspended solids: projections for future conditions and influence on habitat suitability indices (HSI's) and habitat units (HU's).

   It should be noted that prior to using the projected values for various water quality parameters, we discussed them with John Adams of your staff. We coordinated with your staff in an effort to avoid the type of recalculations you are now asking us to perform. The only concern he expressed to us was that the dissolved oxygen values we were using might be too low. We decided to use these original conservative estimates for dissolved oxygen, resulting in the HSI's and HU's for several fish species being somewhat lower than they would have been with the use of less conservative estimates. We continue to believe that there will be gradual reductions in suspended solids levels in the Maumee River as a result of a number of factors, including increasing use of "no till" or "conservation tillage" in the watershed. We also understand that there is some data to suggest that as the contribution of suspended solids to the bay decreases, the amount of in-place material subject to potential resuspension in the bay will also decrease.

While we believe that the possibility of no appreciable improvement in water quality parameters, particularly suspended solids, in the bay over the next 50 years is very remote, we will address the impacts of such a scenario in the following discussion. Our initial review of these impacts convinces us that they are relatively minor when viewed in the overall context of a study of this type, which incorporates a number of relatively subjective decisions. We do not believe that the time and expense involved in a full rerunning of the HSI and HEP computer analyses with the modified data would be warranted.

The influence of suspended solids on HSI's and HU's for the selected evaluation species is a rather complicated one. First, there is the direct use of suspended solids data in HSI calculations. Such use occurs for only one of the species - channel catfish. Maximum monthly average turbidity during summer is one of the variables (V7) used in calculating the Water Quality Life Requisite. However, the suitability index (SI) for V7 is 1.0 for all turbidities below 100 ppm. Existing values for V7 at the CDF site are approximately 35 ppm. Thus, the SI's for all years with or without a projected decrease in suspended solids will be 1.0.

Second, there is the use of variables that are directly influenced by suspended solids. Again, only one species is involved - walleye. Average transparency (Secchi depth) during summer is one of the variables (V1) used in calculating two Life Requisites - Food and Cover. There is relatively good correlation between transparencies and suspended solids in Maumee Bay. That correlation is discussed on page 9 and illustrated in Figure 2 of the Supplement. The values for V1 used in the HSI calculations for years 25 and 50 are taken from Figure 2. The walleye HSI is equal to the lowest SI value of the four Life Requisite components. The Reproduction Life Requisite was the limiting component for the walleye HSI for all years at the CDF site. Due to the fact that major spawning areas exist adjacent to the CDF site, it would have been legitimate to have disregarded the Reproduction SI and to have based the HSI on the lowest SI value from the other three Life Requisites. However, we had some reservations about the equation used to calculate the Cover SI and felt that while the use of the

Reproduction SI resulted in a lower HSI, the correlation between the Reproduction SI values and habitat components at the site was better. Using the existing (year 0) values for suspended solids and transparency in years 25 and 50 does not appear to reduce the SI values for the Food and Cover components to the point that one of these components would become the limiting factor controlling the walleye HSI.

Third, there are the variables that are more indirectly influenced by suspended solids. These include:

Gizzard shad	V7	percent of area vegetated and less than 2m deep during spawning season
Walleye	V3	percent of water body with cover (includes submerged vegetation)
White bass	V7	substrate index (includes dense vegetation)
Yellow perch	V3	percent cover (includes vegetation)

The SI values for all of these variables should increase if there is a projected increase in the percentage of the CDF site covered by submersed aquatic vegetation. The HSI values for lesser scaup and mallard also increase as the amount of vegetation is projected to increase. Thus, the projected percentage of vegetative cover at the CDF site is one of the most important factors in determining the HSI's for all species except channel catfish for "without project" years 25 and 50. The theoretical relationship between decreasing suspended solids concentrations and an increasing abundance of aquatic vegetation is explained on page 9 of the Supplement. The estimated percent coverage of each depth zone by aquatic vegetation at the CDF site used for all years of the "without project" scenario is shown in attached Table 1.

The 10% coverage in years 0 and 1 is based upon our estimation that there were approximately three acres of submersed aquatic vegetation in the CDF site during our 1985 field surveys. Most of the vegetation was found in the 0 feet to -2 feet depth zone. Some vegetation was found in shallower areas. However, differences in substrate and the action of ice in the shallower areas may somewhat limit plant colonization in these shallower zones. There was also a small amount of vegetation in the -2 feet to -3 feet depth zone. Obviously, the turbid nature of the site limits the colonization of aquatic vegetation in these deeper zones. Our year -25 and -50 estimates for percent coverage are based upon a combination of projected increases in the transparency of the water column with decreasing suspended solids loads in the Maumee River, and an anticipated return of lake levels to levels more closely approximating the long-term spring/summer mean of about 571 feet IGLD. Water levels in the spring and summer of 1985 averaged over 573 feet IGLD. The average for this season from 1969 through 1984 was over 572.3 feet (see Table 2 of the Supplement for more detail). As stated on page 8 of the Supplement, we used a level of about 571.6 feet IGLD (LWD + 3 feet) for most calculations, reflecting the fact that the long-term average water level may be increasing. Attached Table 2 shows the actual water depths in each of the depth zones of the CDF site for the average spring/summer water level in 1985 of 573.1 feet and for a level of 571.6 feet. Attached Table 3 is a condensation of Table 5 from the Supplement, showing the values for suspended solids and Secchi depth (transparency) used in the CDF site calculations. The values for the maximum depth of angiosperm colonization from the regression equation of Chambers and Prepas (1988) for lakes with low color are also provided. In reviewing these two tables, note that a drop in lake levels from the levels of 1985 to a level of about 571.6 feet (a difference of 1.5 feet) has a greater impact on the amount of the CDF site available for angiosperm colonization than does the projected 50% decrease in suspended solids at the site (a difference of 1.15 feet).

In light of the data presented in Tables 2 and 3, we believe that the estimated percent coverages shown in Table 1 and used in the HSI calculations for the CDF site are very conservative. In fact, the average vegetative coverage of the CDF site over the 50-year project life that would result from a drop in lake levels to approximately 571.6 feet in the next few years, with no projected decrease in suspended solids, would be almost as great as the average coverage shown in Table 1. A drop in lake levels to approximately 571.6 feet, combined with a decrease in suspended solids of 25 to 30% over 50 years would probably result in an average vegetative coverage even greater than shown in Table 1. Therefore, while the projected decreases in suspended solids of 30 percent in 25 years and

50 percent in 50 years may be somewhat optimistic, the actual percentages of vegetative cover from Table 1 that were used in the calculations of HSI's and HU's for the CDF site "without project" scenario for years 25 and 50 were much more conservative and may, in fact, be underestimates of probable future conditions.

The only scenario that would actually produce a much lower average estimate of vegetative coverage than that shown in Table 1 would be one in which lake levels remained high (572.3 to 573 feet) over the next 50 years and suspended solids did not show any appreciable decrease. The results of this scenario can be approximated by using the calculated HSI's and HU's for year 0 for all future "without project" years at the CDF site. Of course, this scenario also assumes that there are no improvements in other water quality factors such as dissolved oxygen. The net changes in relative AAHU's for each evaluation species at the CDF site over the 50-year project life, assuming a continuation of existing conditions, are provided in Table 4. The total of these changes is -291.64 units. The originally calculated total for the CDF site was -346.76 units (see Form G-1 in Appendix B of the Supplement). The new total represents a 15.9% reduction from the originally calculated total. If group averages are used for fish and waterfowl, the new total represents a 17.4% reduction over the original group average total. Of course, it should be remembered that at least half of these calculated reductions can be attributed to the projection of high lake levels for the 50-year project life and not to the projection of suspended solids to remain at baseline (year 0) levels. Thus, the use of more conservative suspended solids level projections (i.e., no decrease over the 50-year project life) would result in a reduction of habitat unit losses at the CDF site of no more than 8%. As was previously discussed, the actual reduction would be even less, and perhaps non-existent, due to the original conservative estimates of percent vegetative coverage at the CDF site for years 25 and 50.

Another way to separate the impacts of suspended solids and water levels would be to assume that over the next several years, the lake level fell to a level of about 571.6 feet IGLD and remained at that level for the 50-year project life, and that suspended solids levels remained at existing levels for the project life. The actual percentage of vegetative cover at the CDF site by year 5 would probably be equal to or slightly greater than the estimate shown for year 25 in attached Table 1 and would remain that way for the rest of the 50-year project life. A table similar to attached Table 4 could then be constructed using the AAHU's originally calculated for the CDF "without project" year 25 in the "AAHU's w/o Action" column. The "New Total" of net changes in Rel. AAHU's is then -342.76 for years 5 through 50. If this figure is then adjusted to reflect a linear change from a total of -291.64 in year 0 to -346.76 in year 5, the result is an adjusted "New Total" of -340.3 Rel. AAHU's over the entire 50-year project life. This represents less than a 2% reduction from the "Original Total" of -346.76.

The degree to which the use of more conservative projections of future suspended solids levels would affect HSI's and HU's for the various proposed mitigation alternatives is more difficult to determine. Again, the most important factor influenced by a change in projected suspended solids levels will be the percent coverage by aquatic vegetation. Only in the "reefs" type of mitigation was vegetation not a factor. For all the other alternatives, projections of percent vegetative cover had to be made for both the "without" and "with project" (management) scenarios. The estimated percentages used in the three variations of the Grassy Island Alternative are presented in attached Table 5. Those used in the Maumee Bay State Park Breakwater Alternatives are presented in attached Table 6. The estimated acreages of emergent and submergent vegetation projected for the Woodtick Peninsula Alternative are presented in Table 6 in the Supplement. For all of these alternatives, we made a conscious effort to be a bit more liberal in the estimated percentages of cover for future years in the "with project" scenario than we had been in the CDF "without project" scenario. We did this to try to insure that we did not overestimate the required compensation acreage for these mitigation alternatives.

As pointed out in your letter, the suspended solids levels are a combination of river input and resuspended materials. We believe that the ratio between these two factors is dependent on the location of the site. The CDF site is more heavily influenced by the river input, while the Maumee Bay State Park site is more subject to turbidity due to resuspension. The Grassy Island sites tend to be more like the CDF site. We have tried to reflect these differences in the estimated percentages of cover at each depth zone at each site. Obviously, one of the most important factors limiting plant growth in these mitigation sites in the "without project" scenarios is the lack of sheltered, shallow-water habitat. The proposed breakwaters at these sites need to be designed to provide adequate sheltering to enhance plant growth, while maintaining good water circulation in the sheltered areas. The increase in vegetative cover in each depth zone will depend upon the amount of sheltering provided and the transparency of the water column. If suspended solids levels in the future were to remain essentially unchanged from existing conditions, the projected percentages for vegetative cover would probably be somewhat lower for both the "without" and "with project" scenarios. It is likely that the impact would be greatest on the "with project" percentages, resulting in a decrease in the gains in Rel. AAHU's and an increase in the required compensation area for each of these mitigation alternatives.

In summary, we believe that the "without project" HSI's and HU's calculated for the CDF site are very conservative estimates and would actually change very little if recalculated with no change in suspended solids levels over the 50-year project life. On the other hand, the calculations for the mitigation alternatives were less conservative. Recalculations for the breakwater alternatives at Grassy Island, Cullen Island, Maumee Bay State Park, and Woodtick Peninsula based upon a continuation of existing suspended solids levels would probably result in decreases in Rel. AAHU's (particularly for the "with project" scenarios) and corresponding increases in the required compensation acreage for each alternative.

2. Proposed reef areas: need for bedding stone (2 - 10 inches diameter) in areas to be surfaced with medium-sized gravel (1/4 - 2 inches diameter).

The reef enhancement was recommended to be done in relatively shallow areas having firm, stable substrates but currently lacking good rubble/gravel habitat. We assume that such areas are kept relatively free of finer sediments by the action of currents and waves. We recommended that a layer of bedding stone be used under the gravel layer in an effort to insure that there would not be significant translocation of the gravel by the action of currents, waves, and other forces common to the reef areas. We believe that without the use of a stabilizing matrix of bedding stone, much of the gravel will be displaced and the projected habitat values in these portions of the reef areas will be lost in a short time.

3. Recalculation of Relative AAHU's for groups of organisms (fish and waterfowl), rather than for individual species: rationale for possible use in determining compensation acreages required for mitigation alternatives.

In our meeting at your office on February 8, 1989, a member of your staff suggested that the compensation acreage required to offset the habitat losses at the CDF site would be dependent upon the number of evaluation species used in the HEP analysis. We considered this comment further over the next few weeks as we completed our calculations of Relative AAHU'S and compensation acreage requirements for each of the mitigation alternatives. The number of species initially selected for use in a HEP analysis does not inherently bias the magnitude of the required compensation; provided that the mitigation areas to be considered are similar to the area for which habitat unit losses must be offset, in that some habitat enhancement is provided for each of the evaluation species at each mitigation area. As the habitat similarity between the proposed mitigation areas and the project area decreases, the number of evaluation species selected may have a significant influence on the size of the compensation area required. This is most obvious where a proposed mitigation area cannot provide enhanced habitat values for all of the evaluation species, especially for an entire group of evaluation species. An examination of Table 10 of the Mitigation Planning Supplement reveals that two of the proposed mitigation alternatives provide compensation for only one of the two groups of organisms represented by the evaluation species. The Reefs Plans (Reefs and Reefs + Breakwaters Alternatives) provide compensation by the enhancement of habitat only for the fish species. The Maumee Bay State Park Wetlands Alternative provides compensation by the enhancement of habitat only for the waterfowl species. The ratio of the number of fish selected as evaluation species to the number of waterfowl selected becomes important in these alternatives. As the ratio of fish to waterfowl evaluation species decreases, the compensation acreage for mitigation alternatives directed toward fish will increase while that directed toward waterfowl will decrease.

This may be most easily understood if a mitigation alternative such as the Maumee Bay State Park Wetland Alternative is separated into two components: fish and waterfowl. Table 7 presents the summary of net changes in relative AAHU's for each evaluation species at the CDF site and at the Maumee Bay State Park wetlands site, plus totals and averages of the AAHU's at each site for fish and waterfowl as separate groups. Table 8 presents the formula for calculating the compensation area required for a proposed mitigation plan using a compensation goal of relative replacement (see step 9 on page 6 of the Supplement). Calculations of required compensation areas for the Maumee Bay State Park Wetland Alternative are also provided. Separate calculations have been done for fish and for waterfowl, using the "standard" method and the "group average" method. Note that when the waterfowl habitat losses at the CDF site are mitigated by waterfowl habitat gains at the Maumee Bay State Park wetlands using the "standard" method, 94.01 acres are required. When the fish habitat losses at the CDF site are mitigated by waterfowl habitat gains at the Maumee Bay State Park wetlands using the "standard" method, 227.85 acres are required. The total acreage required for mitigation under the "standard" method is 321.86 acres. If fewer fish species had been selected as evaluation species, the sum of the net changes in relative AAHU's for fish at the CDF site would have been lower resulting in a lower compensation acreage required when the fish habitat losses at the CDF site are offset by waterfowl habitat gains at the Maumee Bay State Park wetlands. Essentially, the habitat losses for five fish species must be offset by the habitat gains for only two waterfowl species using the "standard" method. We believe that the compensation area required using this 5:2 ratio might be larger than biologically justified.

The rationale for the selection of the five species of fish and two species of waterfowl is explained on page 3 of the Supplement. During the selection of the evaluation species, there was no effort made to create a ratio of fish and waterfowl species that would somehow be representative of the relative importance of the CDF site to each group of organisms. As explained on page 21 of the Supplement, it could be argued that the ratio of 5 fish species: 2 waterfowl species may fairly accurately reflect the relative use of the CDF site by the two groups of organisms. We estimate that between 45 and 55 species of fish presently utilize the site. Obviously, waterfowl or water birds other than lesser scaup and mallard also utilize the site. While the majority of the habitat value at the CDF site may be related to its use by fish, the number of avian species that may utilize enhanced wetland habitat such as that at the Maumee Bay State Park wetlands may be even greater than the number of fish species utilizing the CDF site. One way to try to more accurately determine the habitat value of the proposed Maumee Bay State Park wetland enhancement would be to select additional target species for which significant habitat gains would be realized as part of the mitigation alternative. The list of target species for a mitigation alternative can differ from the list of evaluation species for a project site when the compensation goal is relative replacement (see Chapter 7 of HEP, ESM 102). However, the use of additional target species would involve trying to find species that met as many of the species selection criteria as possible (see page 3 of the Supplement). Unfortunately, we presently lack HSI models that characterize habitat use by waterfowl during spring and fall migration. Additionally, all of the RVI's would have to be recalculated (see pages 6 and 7 of the Supplement). Another method that appeared to be feasible for minimizing the effect of the disparity between the number of species in each of the two groups involves averaging the net changes in relative AAHU's for each group of species and then calculating the required compensation acreage for the mitigation alternative based upon these group averages. The bottom part of Table 8 presents the calculation of compensation acreage for the Maumee Bay State Park Wetland Mitigation Alternative using the "group average" method. Note that the 94.01 acres required to offset waterfowl losses with waterfowl gains is the same as when using the standard calculation method shown in the upper part of Table 8. However, the acreage required to offset fish losses with waterfowl gains has decreased from 227.85 acres with the "standard" method to 91.15 with the "group average" method. The total acreage required for the plan using the "group average" method is 185.16 acres. The use of the "group average" method is essentially the same as adding three additional waterfowl evaluation species to the list of target species and assuming that the HSI's and RVI's for these species will be equal to the averages for lesser scaup and mallard, which are quite high. As such, the 185.16 acres represents the absolute minimum amount of compensation acreage required under the plan.

The choice of whether to use the standard calculation method (5:2 ratio) or the "group average" method (1:1 ratio) or some ratio between the two is a subjective one. The choice has to be guided by the factors previously discussed, such as relative use of project and mitigation areas by each group of species. It has to be remembered that the relative importance of each species has already been factored into the calculations by use of the RVI's. The relative value of the habitat to each species is, of course, the HSI. Attached Table 9 is a consolidation of Tables 9 and 11 from the Supplement and provides a summary of net changes in Rel. AAHU's and compensation acreage required for mitigation alternative using both the "standard" and "group average" methods of calculation for relative compensation. The use of the "group average" method may be most appropriate for the Maumee Bay State Park Wetland Mitigation Alternative. It is probably inappropriate for the two reef-type alternatives as the mitigation of the waterfowl habitat with enhanced fish habitat would not meet the mitigation goal for Resource Category 2 habitat (from Fish and Wildlife Mitigation Policy). See the middle paragraph on page 22 of the Supplement for a further discussion of this point. For the reefs plans it may be best to view them entirely as directed toward fish habitat mitigation and calculate the compensation acreages accordingly. The losses at the CDF site for fish habitat (-245.48 Rel. AAHU's) would be offset by the gains for fish habitat under the two plans (+36.93 Rel. AAHU's for Reefs, and +190± Rel. AAHU's for Reefs + Breakwaters). The compensation acreages required to offset only the fish habitat losses at the CDF site would then be about 79.8 acres and 73 acres respectively for the two plans. One or more of the other mitigation alternatives would have to be used to offset the losses of waterfowl habitat at the CDF site. All of the other proposed mitigation alternatives would meet the mitigation goal for Resource Category 2 provided that the size of the area enhanced is sufficient to produce gains in the acreage of submersed macrophytes or other types of wetland habitat that equal or exceed the projected average acreage of such habitat at the CDF site in the "without project" scenario. All of these plans would meet this goal with the compensation acreage figures calculated under either the "standard" or "group average" methods. However, the breakwater-type mitigation plans for Grassy Island, Cullen Island, and Maumee Bay State Park actually derive most of their gains in Rel. AAHU's from gains in Rel. AAHU's for fish and not for waterfowl. Even with the increase in compensation acreage calculated using the "group average" method, none of these plans fully offset the loss of waterfowl Rel. AAHU's at the CDF site with gains in waterfowl Rel. AAHU's at the mitigation sites. The differences are offset by the excess gains in Rel.

AAHU's for fish. To reduce the need for this out-of-kind mitigation if one of these plans is selected for construction, it would be preferable to use the higher acreage requirements calculated using the "group average" method, or to enhance sufficient acreage with the plan to offset the fish losses and then offset any needed additional waterfowl losses with enhancement of waterfowl habitat using the Maumee Bay State Park Wetlands Plan or the Woodtick Plan.

When some cost estimates are available for each of the plans, we can meet with you and more fully discuss the advantages and disadvantages of each of the mitigation plans. In addition to the trade-offs between in-kind and out-of-kind mitigation already discussed above, factors such as the degree of assurance of long-term viability for each mitigation alternative should probably be considered. For instance, the probability that enhanced wetland habitat at Maumee Bay State Park will function adequately through the 50-year project life may be greater than the probability that reef habitat will remain relatively free of fine sediments and thus function as planned for the 50-year project life.

If there are any additional questions or comments regarding either the Supplement or this letter, please do not hesitate to contact us.

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.

We appreciate this opportunity to provide the above comments.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

cc: Chief, Ohio Division of Wildlife, Columbus, OH

DATA USED FOR "WITHOUT PROJECT" SCENARIO AT CDF SITE.

Table 1. **Estimated percentage of vegetative cover by depth zone.**

Depth Zone (rel. LWD)	Acres in Depth Zone	Percent Coverage Yr 0 & 1	Yr 25	Yr 50
0' to -2'	30	10%	20%	30%
-2' to -3'	40	-	10%	20%
-3' to -4'	55	-	-	10%
	Total Acres	3	10	22.5

Table 2. **Actual depth of water column for high and mean lake stages in IGLD.**

Depth Zone (rel. LWD)	Depth of Water Column Level = 573.1'	Level = 571.6'
0' to -2'	4.5' to 6.5'	3' to 5'
-2' to -3'	6.5' to 7.5'	5' to 6'
-3' to -4'	7.5' to 8.5'	6' to 7'

Table 3. **Estimated suspended solids, transparency, and maximum colonization depth of submersed macrophytes.**

Project Years	Suspended Solids	Secchi Disk Transparency	Maximum Depth of Colonization
0 & 1	35	0.25 m	1.81 m / 5.94'
25	24.5	0.32 m	2.00 m / 6.56'
50	17.5	0.38 m	2.16 m / 7.09'

Table 4. Summary of net changes in relative AAHU's for each evaluation species and for group averages at CDF site assuming a continuation of existing conditions; and differences between original and new calculations.

	AAHU's With Action	AAHU's w/o Action	Net Change in AAHU's	RVI	Net Change in Rel. AAHU's	Group Averages
Channel catfish	0.96	96.10	- 95.14	0.50	- 47.57	
Gizzard shad	0.87	86.10	- 85.93	0.33	- 28.36	
Walleye	0.25	24.80	- 24.55	0.84	- 20.62	Fish
White bass	1.16	116.25	-115.09	0.73	- 84.02	-42.10
Yellow perch	0.43	43.40	- 42.97	0.71	- 30.51	
Lesser scaup	0.77	77.50	- 76.73	0.85	- 65.22	Waterfowl
Mallard	0.16	15.50	- 15.34	1.00	- 15.34	-40.28
				New Totals =	-291.64	-82.38
				Original Totals =	-346.76	-99.74
				Differences =	- 55.13	-17.36
				Reductions =	15.9%	17.4%

Table 5. Estimated percentage of vegetative cover by depth zone at Grassy Island site for "without" and "with" project (mitigation) scenarios.

WITHOUT PROJECT

Depth Zone (rel. LWD)	Acres in Depth Zone	Percent Coverage Yr 0	Yr 1	Yr 25	Yr 50
Above -2'	5	10%	10%	20%	30%
-2' to -3'	20	5%	5%	5%	5%
-3' to -3.5'	20	-	-	-	-
	Total Acres =	1.5	1.5	2	2.5

WITH PROJECT

Depth Zone (rel. LWD)	Acres in Depth Zone	Percent Coverage Yr 0	Yr 1	Yr 25	Yr 50
Above -2'	5	10%	30%	60%	80%
-2' to -3'	20	5%	15%	30%	40%
-3' to -3.5'	20	-	5%	15%	25%
	Total Acres =	1.5	5.5	12.0	17.0

Table 6. Estimated percentage of vegetative cover by depth zone at Maumee Bay State Park nearshore area for "without" and "with" project (mitigation) scenarios.

WITHOUT PROJECT

Depth Zone (rel. LWD)	Acres in Depth Zone	Percent Coverage Yr 0	Yr 1	Yr 25	Yr 50
Above +1'	20	-	-	-	-
+1' to -1'	30	-	-	5%	10%
-1' to -2'	30	-	-	-	5%
-2' to -3'	20	-	-	-	-
	Total Acres =	0	0	1.5	4.5

WITH PROJECT

Depth Zone (rel. LWD)	Acres in Depth Zone	Percent Coverage Yr 0	Yr 1	Yr 25	Yr 50
Above +1'	20	-	-	5%	10%
+1' to -1'	30	-	10%	30%	40%
-1' to -2'	30	-	5%	15%	20%
-2' to -3'	20	-	-	5%	10%
	Total Acres =	0	4.5	15.5	22

Table 7. Summary and averages of net changes in relative AAHU's for "fish group" and "waterfowl group" at CDF site and Maumee Bay State Park (MBSP) wetlands.

	CDF (155 Ac.)	MBSP wetlands (274 Ac.)
Channel catfish	- 48.34	0.00
Gizzard shad	- 34.69	0.00
Walleye	- 29.33	0.00
White bass	- 85.42	0.00
Yellow perch	- 47.70	0.00
	-245.48 / 5 = -49.10	0.00 / 5 = 0.00
Lesser scaup	- 78.26	120.99
Mallard	- 23.02	174.21
	-101.28 / 2 = -50.64	295.20 / 2 = 147.60

Table 8. Calculations of required compensation area for Maumee Bay State Park Wetlands Mitigation Alternative using **"STANDARD"** and **"GROUP AVERAGE"** methods for relative compensation.

$$\text{Compensation Area required} = \frac{\text{Rel. AAHU's for proposed project}}{\text{Rel. AAHU's for proposed mitigation}} \times \text{Size of mitigation area}$$

"STANDARD" Method

$$\frac{\text{Waterfowl Rel. AAHU's for CDF site}}{\text{Waterfowl Rel. AAHU's for MBSP wetlands}} = \frac{101.28}{295.20} \times 274 = 94.01 \text{ acres}$$

$$\frac{\text{Fish Rel. AAHU's for CDF site}}{\text{Waterfowl Rel. AAHU's for MBSP wetlands}} = \frac{245.48}{295.20} \times 274 = 227.85 \text{ acres}$$

Total Compensation Required = 321.86 acres

"GROUP AVERAGE" Method

$$\frac{\text{Waterfowl Rel. AAHU's for CDF site}}{\text{Waterfowl Rel. AAHU's for MBSP wetlands}} = \frac{50.64}{147.60} \times 274 = 94.01 \text{ acres}$$

$$\frac{\text{Fish Rel. AAHU's for CDF site}}{\text{Waterfowl Rel. AAHU's for MBSP wetlands}} = \frac{49.10}{147.60} \times 274 = 91.15 \text{ acres}$$

Total Compensation Required = 185.16 acres

Table 9. Summary of net changes in Relative AAHU's and compensation acreage required for all Mitigation Alternatives in Toledo CDF Study, using "STANDARD" and "GROUP AVERAGE" methods for relative compensation.

	Acres Modified / Base Acreage	Sum of Net Changes in Rel. AAHU's for all Evaluation Species	Sum of Net Changes in Rel. AAHU's for the 5 Fish Species (Average)	Sum of Net Changes in Rel. AAHU's for the 2 Waterfowl Species & (Average)	Sum of Averages of Rel. AAHU's for Fish and Waterfowl Groups	Compensation Acreage Required Using "STANDARD" Method (5:2 ratio)	Compensation Acreage Required Using "GROUP AVERAGE" Method (1:1 ratio)
CDF	155 / 155	-346.76	-245.48(-49.10)	-101.28(-50.64)	- 99.74	N/A	N/A
Reefs	12 / 100	36.93	36.93(7.39)	0.00(0.00)	7.39	112.7	162.0
Reefs + Breakwaters	56.5 / 100	190±	190± (38±)	0.00(0.00)	38±	103±	148±
Grassy Island	45 / 100	75.23	64.31(12.86)	10.92(5.46)	18.32	207.4	245.0
Breakwaters	60 / 100	87±	74.5±(14.9±)	12.6±(6.3±)	21.2±	240±	282±
Cullen Park Breakwaters	60 / 100	100±	85.5±(17.1±)	14.6±(7.3±)	24.4±	208±	245±
Maumee Bay State	100 / 300	109	86.07(17.21)	22.93(11.47)	28.68	318.1	347.8
Park Breakwaters	50 / 300	54	42.6±(8.5)	11.4±(5.7±)	14.2±	321±	351±
Woodtick Breakwaters	1000 / 1000	612.13	409.28(81.86)	202.85(101.43)	183.29	566.5	544.2
Maumee Bay State Park Wetland Management	274 / 274	295.2	0.00(0.00)	295.20(147.60)	147.60	321.9	185.2

FINAL ENVIRONMENTAL IMPACT STATEMENT
TOLEDO HARBOR, OHIO
CONFINED DISPOSAL FACILITY

APPENDIX EIS-B
SECTION 404(a) PUBLIC NOTICE
AND
SECTION 404(b)(1) EVALUATION

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO ATTENTION OF

Environmental Analysis Section

PUBLIC NOTICE

CONFINED DISPOSAL FACILITY (CDF)
TOLEDO HARBOR
LUCAS COUNTY, OHIO

This Public Notice has been prepared and distributed pursuant to Section 404(a) of the Clean Water Act (33 USC 1344). Its purpose is to specify what fill materials will be discharged into waters of the United States by implementation of the proposed project. This notice provides an opportunity for any person who may be affected by such discharge to submit comments or request a public hearing.

The U.S. Army Corps of Engineers, Buffalo District, proposes to construct a new Confined Disposal Facility (CDF) adjacent to the currently utilized CDF, which is expected to be filled in approximately 5.5 years. The Toledo Harbor CDF is located 355 feet southeast of the Toledo Harbor Navigation Channel and is adjacent to the Toledo Edison Company's Bay Shore Station. The facility is boot-shaped and covers an area of about 242 acres.

The new facility would be constructed by enclosing the cove area located to the west of the existing facilities with a stone rubblemound dike (see Plates EIS-8 and EIS-9 of the Final Environmental Impact Statement (EIS)). The dike and enclosed area would occupy about 169 acres. This facility would be constructed to confine material dredged from the Maumee River which is determined to be too polluted for open-lake disposal.

Maps showing the existing Federal project at Toledo and the Toledo CDF are included as Plates EIS-1, EIS-2, and EIS-3 of the Final EIS. The areas shoreward of the work sites are primarily urban, commercial, and/or industrial.

About 400,000 cubic yards of material would be placed in the Toledo CDF annually by Corps of Engineers' Contractors. This material consists primarily of silts and clays, mixed with a limited amount of fine sand. The material has been classified as "heavily polluted" and unacceptable for open-water disposal (U.S. Environmental Protection Agency, Region V Guidelines, 1977).

Public and private interests may apply for Department of the Army (DA) permits to dredge areas adjacent to the Federal channel and to dispose of these materials at the proposed CDF. The attached Section 404(b)(1) Evaluation will also apply to DA permits for the placement of polluted material dredged from the Toledo area into the proposed CDF. Separate evaluations will be performed for permit requests involving the placement of material at other sites.

Department of the Army permit records indicate that about 400,000 cubic yards were dredged annually by public and private interests at Toledo during 1978-1983. None of this material was placed in the currently used Federal CDF. Most of the material was placed at the upland sites or in private confined disposal sites located closer to the dredging areas. The relatively high dike walls at the present Federal CDF make it difficult for private interest to effectively use the facility and will make it difficult to use the proposed CDF. However, due to the scarcity of private disposal sites in the Toledo area, some future use of the existing Federal facility and the proposed CDF by private interests may occur.

The latest published version of the National Register of Historic Places has been consulted. There are no registered properties listed as being eligible for inclusion therein that would be affected by this project. By this Notice, the National Park Service is advised that currently unknown archaeological, scientific, prehistoric, or historical data may be lost or destroyed by work to be accomplished.

Based on the review of available environmental data, we have determined that the proposed work would not affect a species proposed or designated by the U.S. Department of the Interior as threatened or endangered nor would it affect the critical habitat of such species. Therefore, unless additional information indicates otherwise, no formal consultation pursuant to Section 7 of the Endangered Species Act Amendments of 1978 will be undertaken with the U.S. Fish and Wildlife Service.

By this Notice, the Buffalo District is requesting issuance or a waiver of State Water Quality Certification under Section 401 of the Clean Water Act.

The proposed CDF has not been designated by the Administrator, USEPA.

Designation of this site for receipt of dredged and fill material associated with construction and operation of this Federal project shall be made through the application of Guidelines promulgated by the Administrator, USEPA in conjunction with the Secretary of the Army. If these Guidelines alone prohibit the designation of this proposed disposal site, any potential impairment to the maintenance of navigation, including any economic impact on navigation and anchorage which would result from the failure to use this disposal site, will also be considered. Preliminary assessment of the impacts of the project (as discussed in the Section 404(b)(1) Evaluation applying the guidelines for specification of disposal sites for dredged or fill material in 40 CFR 230) concludes that the proposed work would not cause unacceptable disruption to water quality uses of the affected aquatic ecosystem.

A Section 404(b)(1) Evaluation for the construction and operation of the proposed CDF and associated discharges of dredged material has been prepared and the effects of constructing and operating a new CDF facility at Toledo Harbor are discussed in the Final Environmental Impact Statement, Confined Disposal Facility for Toledo, Ohio, 1990, prepared by the U.S. Army Corps of Engineers, Buffalo District.

Any interested parties and/or agencies desiring to express their views concerning the proposed work may do so by filing their comments, in writing, no later than 4:30 p.m., 30 days from the date of issuance of this Notice. A lack of a response will be interpreted as meaning that there is no objection to the proposed work.

Any person who has an interest which may be affected by the disposal of this dredged material may request a public hearing. The request must be submitted to the District Commander within 30 days of the date of this Notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity.

Correspondence pertaining to this matter should be addressed to the District Commander, U.S. Army Engineer District, Buffalo, 1776 Niagara Street, Buffalo, NY 14207-3199, ATTN: Mr. William Butler. If you have any questions or require additional information, please contact Mr. Butler of my Environmental Analysis Section at (716)879-4175.

Hugh F. Boyd III

HUGH F. BOYD III
Colonel, U.S. Army
Commanding

NOTICE TO POSTMASTER: It is requested that the above notice be conspicuously displayed for 30 days from the date of issuance.

SECTION 404 (b)(1) EVALUATION
CONFINED DISPOSAL FACILITY (CDF)
TOLEDO HARBOR
LUCAS COUNTY, OH

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SECTION 404 (b)(1) EVALUATION
CONFINED DISPOSAL FACILITY (CDF)
TOLEDO HARBOR
LUCAS COUNTY, OH

1. INTRODUCTION

Section 404(b)(1) of the Clean Water Act (33 USC 1344) states that each disposal site for dredged or fill material to be discharged into the navigable waters of the United States shall be specified through the application of Guidelines developed by the Administrator of the U.S. Environmental Protection Agency (USEPA) and the Secretary of the Army. This Section 404(b)(1) Evaluation addresses the construction and operation of a U.S. Army Corps of Engineers confined disposal facility (CDF) at Toledo, OH. The evaluation includes all aspects of the facility which involves the discharge of fill and dredged material into waters of the United States.

2. PROJECT DESCRIPTION

2.1 Location.

2.1.1 Toledo, OH, is located at the western end of Lake Erie about 100 miles west of Cleveland, OH, and 60 miles south of Detroit, MI. The Toledo Federal project consists of a channel and turning basins in the lower 7 miles of the Maumee River, with the channel extending northeast more than 16 miles into Lake Erie.

2.1.2 The existing Toledo Federal CDF is located 355 feet southeast of the Toledo Harbor Navigation Channel and adjacent to the Toledo Edison Company's Bay Shore Station. The Toledo-Lucas County Port Authority's CDF borders the present CDF and the proposed site. The Federal facility is boot-shaped and covers an area of about 242 acres. The proposed facility is located to the west of the existing Federal and Port Authority facilities. Maps showing the limits of the existing and proposed CDF's are included as Plates EIS-3, EIS-8, and EIS-9 in the Final Environmental Impact Statement (EIS).

2.2 General Description.

2.2.1 The recommended plan would include the following features:

a. New Dike. Placement of prepared limestone base, clay dike, and limestone slope protection in the water adjacent to the existing Corps of Engineers CDF to form a 4,260 foot long dike enclosing approximately 155 acres. A set of three water quality monitoring wells would be installed in the proposed dike. Clay embankment material could be obtained from the proposed CDF and/or Toledo Edison CDF or from adjacent or off-site areas.

b. Existing Dike Modification. Placement of clay and protective limestone on the existing Toledo-Lucas County Port Authority dikes thereby modifying them to match the height and width of the new dike.

c. Overflow Weirs. Construction of four 8-foot by 10-foot rectangular overflow weirs of fabricated steel panels with adjustable wood stop logs, outfall pipes, and access walkways. The overflow stucture would be located at the approximate midpoint of the proposed CDF's northwest dike. A new discharge pipeline would extend from the existing pumpout No. 1 platform, then along the existing Corps of Engineers CDF, to four separate discharge points spaced along these dikes.

d. Existing Pumpout Facility Modification. Extend existing pumpout platform, replace damaged round timber piles with steel H-piles, add additional 24-foot diameter steel pipeline for discharges to the proposed CDF.

e. Access-Haul Road (Optional). Regrading 450 feet of haul road to provide an access ramp at the southwest terminus of the proposed CDF. The work would involve regrading the slope and surface to the section required to provide a 16-foot wide gravel roadway and ramp, in stages, as dike construction proceeds to its final grade at elevation +23.5 feet LWD. The roadway would be maintained and retained in place upon completion of the CDF. Both sides of the roadway would be provided with a protective turf.

f. Topsoil, Fertilizing, Seeding, and Mulching. All exposed clay surfaces of the interior dike slope and all other disturbed turf areas would be covered with four inches of topsoil, fertilized, seeded, and mulched. The dike slopes would be seeded with crown vetch (Coronilla varia) and tall fescue (Festuca arundinacea); other disturbed areas would be seeded with creeping red fescue (Festuca rubra), perennial ryegrass (Lolium perenne), and Kentucky bluegrass (Poa pratensis). Dredged material from the adjacent CDF could be used for topsoil on the interior dike slope. The most likely vegetation succession during the life of the CDF would be submerged aquatic vegetation--emergent vegetation (e.g., bulrush, cattail, common reed)--scrub/shrub (e.g., willow, dogwood)--forested wetland/upland (e.g., mature willow, cottonwood). The climax vegetation of the site would be ultimately impacted by the to-be-determined final use of the CDF.

2.2.2 Annual maintenance dredging is performed to remove sediment deposited by the Maumee River in the Toledo Federal navigation channel. From 1976 to the end of 1983, about 7.4 million cubic yards of sediments dredged from the Federal project have been placed in the existing Toledo CDF, which has a design capacity of 11.1 million cubic yards. Under the currently proposed plans, the life of the CDF could be extended from 1989 to 1993, when the area would be filled to capacity. The proposed CDF would occupy approximately 169 acres of Maumee Bay and have a capacity of 7,474,000 cubic yards.

2.2.3 Past disposal sites used by the Corps of Engineers include the Riverside Park, Penn 7, and Penn 8 CDF's which are located in the Maumee River. The Toledo Island 18 Disposal Site was also used by the Corps of Engineers, and is located north of the Federal Channel in Maumee Bay.

2.2.4 An average of about 1,000,000 cubic yards of material are annually dredged from the Toledo Federal project. In recent years, about 60 percent of this material was placed at open-lake sites. The remainder was classified as "heavily polluted" and was placed in the CDF.

2.2.5 The results of 1983 sediment sampling indicated that a greater proportion of the sediments dredged at Toledo are suitable for disposal at the open-lake sites. Current plans call for about 66 percent of the material to be placed in the open lake, and about 34 percent to be placed in the Toledo CDF. The location of the proposed CDF and its approximate boundary is shown on Plates EIS-8, and EIS-9 of the Final EIS.

2.3 Authority and Purpose.

2.3.1 The purpose of this Section 404(b)(1) Evaluation is to assess the impacts of constructing a confined disposal facility in Maumee Bay and of disposal of polluted material into that facility. This Evaluation has been performed using current USEPA Guidelines 40 CFR part 230 and considers placement of dredged and fill material. This evaluation will also apply to Department of the Army permit applications for the placement of polluted dredged material into the proposed Toledo CDF.

2.4 General Description of Dredged and Fill Material.

2.4.1 The proposed confinement dike would be constructed of clay, plastic filter cloth and various size stone up to armor size material. All construction material with the possible exception of the clay would be trucked or transported over water from a commercial quarry. This material would be clean and free of contaminants in other that trace amounts. The Contractor would have the options of using clay material from the construction site if it is structurally suitable. This material is of a contaminant quality comparable to surrounding substrate sediments.

2.4.2 The location and quantity of material dredged from the Federal channel and disposed in the Toledo area are discussed in Section 2.2. Recent testing of Toledo Harbor sediments was performed by T.P. Associates International in June 1988. Particle size analyses, bulk chemical analyses, elutriate tests, and bioassays were performed. Copies of the final sediment test report are available from the Buffalo District on request.

2.4.3 Based on the referenced sediment test results, the U.S. Environmental Protection Agency (USEPA) sent the Buffalo District a letter dated 25 November 1988 in which they classified the sediments lakeward of Stations L-2-M and those upstream of Stations R-6-M (see Plates EIS-1, and EIS-2 of the Final EIS) as acceptable for open-water disposal. Sediments between Stations L-2-M and R-6-M are classified as "heavily polluted." The USEPA recommends that these polluted sediments be disposed of in some manner other than into the open waters of Lake Erie. These sediments are the subject of this report and planned to be disposed in the proposed CDF. In addition, sediments upstream of Station R-6-M are also being confined due to elevated levels of polynuclear aromatic hydrocarbons (PAH's).

2.4.4 Table 1 summarizes those inorganic parameters which fall into the "heavily polluted" category for bulk sediment chemistry at the sampling points. The sector between Stations L-1-M and R-4-M is classified as "heavily polluted" in many more categories than the other two sectors. The sediment test report also shows significantly higher concentrations of PAH's in this sector. Additional information is provided in the Final EIS (para. 3.2.12-3.2.18).

2.4.5 Bulk sediment chemistry showed cyanide and arsenic to be in the "heavily polluted" range at all sampling sites using USEPA Region V guidelines.

Table 1 - "Heavily Polluted" Parameters, Toledo Entrance Channel and Maumee River (T.P. Associates International, Inc., 1988)

Station	Parameter	Proposed Open-Lake Disposal	Proposed Dike Disposal
L-7-M	CN, As, Ba, P	X	
L-6-M	CN, As, Ba, P	X	
L-5-M	CN, As, Ba, P	X	
L-4-M	CN, As, Ba, P, COD	X	
L-3-M	CN, As, Ba, P	X	
L-2-M	CN, As, Ba, P, COD		X
L-1-M	CN, As, Ba, COD, P		X
O-M	CN, As, Ba, Cu, NO_3-N, Fe, COD, NH_3-N TKN, P		X
R-1-M	CN, As, Ba, Cu, Zn, Fe, COD, TKN, P, Oil and Grease, Residue (Total Volatile)		X
R-2-M	CN, As, Ba, Mn, Fe, COD, NH_3-N, P		X
R-3-M	CN, As, Ba, COD, Cu, Fe, P, TKN		X
R-4-M	CN, As, Ba, P		X
R-5-M	CN, As, Ba, COD, P, TKN, Residue (Total Volatile)		X
R-6-M	CN, As, Ba, P		X
R-7-M	CN, As, Ba, P		X

Table 2 - Bioassay 96-Hour Acute Toxicity (Average) (T.P. Associates International, Inc., 1988)

Station	Hexagenia %	Daphnia %	Pimephales %
L-7-M - L-2-M	24.2	4.3	2.2
L-1-M - R-4-M	46.2	7.8	4.4
R-5-M - R-7-M	23.3	2.3	3.9

2.5 Description of Discharge Site.

2.5.1 General plans for the Toledo CDF are shown on Plates EIS-8 and EIS-9 of the Final EIS. The area which would be occupied by the CDF is typical of other shallow water areas in Maumee Bay with the exception that it is sheltered by the present Corps of Engineers CDF on the northeast and the Toledo Edison disposal site on the southeast. The construction of a CDF at this site would result in the loss of approximately 169 acres of shallow water habitat which includes submergent aquatic vegetation, and a submerged shoal consisting of sand, gravel and cobble. The unconsolidated shoal extends northeast from the Toledo Edison dike beginning as an old side-cast island dominated by a variety of water tolerant plants before becoming inundated and gradually tapering into a mud bottom. The emergent section is triangular in shape with a base about 75 feet wide and extending about 150 feet in length. The submerged shoal section reportedly extends 600 feet. This shoal is typical of other remnant shoals which were formed from side-cast material during past dredging of the channel. These shoals which once existed as islands before being eroded away are found parallel to and approximately 1,000 feet from the channel and extend from the river mouth to approximately 7 miles into the bay. These shoals reduce water circulation (Fraleigh et al., 1975) and are believed to provide valuable fish habitat (Fraleigh et al., 1975; Wapora, 1975). Sediment samples were taken in the area of the proposed CDF and analyzed for nutrients, metals, and extractable organic contaminants. The complete results of these analyses are on file in a report available for examination at the Buffalo District Office. Contaminant levels were generally very similar to samples taken from the shipping channel adjacent to the site. Arsenic, chromium, nickel, iron, and chemical oxygen demand were, however, significantly lower in this area. Ammonia and total kjeldahl nitrogen showed significantly greater contamination. With regard to organics, there were no measurable concentrations of the nitromatics, nitro phenols, nitrosamines, PCB's, pesticides, phthalates, chloro or alkyl substituted benzenes, or unsaturated chlorinated alkyl compounds. Only the lower PAH's showed significantly greater contamination than the adjacent river channel area. This is probably due to the proximity of the site to coal unloading facilities.

2.5.2 The rubblemound dike surrounding the containment area would have a bottom width of approximately 144 feet and a top width of 16 feet. The base and lower slopes of the dike would consist of limestone and armor stone, with a plastic filter cloth incorporated into the lower dike slopes. The upper portion of the dike would consist of clay which would be fertilized, seeded, and mulched. Aggregate surfacing would be placed on the top of the dike to permit use by inspection vehicles. The height of the dike would be about 23.5 feet above low water datum (LWD) (Plate EIS-8 of the Final EIS).

2.5.3 Pumpout facilities would be constructed so that dredged material could be pumped into the facility from the channel side (west). The pumpout facility would be connected to discharge pipelines which are capable of discharging material at several locations within the CDF.

2.6 Description of the Disposal Method (Including Timing and Duration of the Discharge).

2.6.1 The CDF would be constructed by water and land-based equipment. It is anticipated that the Contractor would use both a barge-mounted crane and a land-based truck-operated crane to construct the facility. Stone of increasing size would be placed to form the dike. The heavier armor stone would be placed last on the bay slope of the western enclosing wall.

2.6.2 The equipment used to maintain the Federal Channel has in the past consisted primarily of U.S. Army Corps of Engineers hopper dredges. However, due to retirement of the U.S. Army Corps of Engineers Great Lakes dredge fleet, all future dredging would be performed by private firms contracted by the Corps of Engineers.

2.6.3 The method of disposal within the CDF would be determined by the Corps of Engineers Contractor. However, due to the anticipated height of the dike, the most likely method for placement into the CDF would be pumping through the pumpout facilities. Material would be pumped into the CDF, allowed to settle, and the supernatant returned to Lake Erie through a weir and discharge pipe. Weir design and CDF operating procedures would insure that the effluent returned to Maumee Bay would have a total suspended solids concentration of no greater than 100 ppm. Some of the supernatant would also filter through the bottom of the dike walls and return to Lake Erie in this manner. After filling to capacity, the facility may be developed for port expansion, although long-term plans for the area have not been finalized. The facility could be used with the existing CDF to serve as holding or preparation areas for possible beneficial re-use alternatives.

2.6.4 The timing and duration of the disposal operations would also in part be controlled by the Corps of Engineers Contractor and the limitation imposed by his dredging and disposal equipment. Annual maintenance dredging at Toledo Harbor generally begins in early spring and continues through late fall.

3. FACTUAL DETERMINATIONS

3.1 Physical Substrate Determinations.

3.1.1 Substrate Elevation and Slope - The proposed CDF site consists of a generally flat substrate with a bottom elevation of 0 to 4 feet below low water datum of 568.6 IGLD. An exception to its general flat sloping nature is a man-made sand and gravel bar which extends about 600 feet from the Toledo Edison private CDF to the north. Construction of the dike wall on the west would raise the bottom elevation to about 23.5 feet above LWD. Filling of the site with dredged material would eventually raise the bottom elevation to the elevation of the wall. During the filling phase, the substrate would vary in both elevation and slope depending upon where dredged material is discharged into the facility and the physical properties of the discharge, i.e., percent water, sediment size, etc. Dewatering would result in consolidation of the dredged material and in the gradual conversion of the area to dry land.

3.1.2 Sediment Type - The composition of the material to be used in the construction of the CDF and of the dredged material to be discharged into the facility is discussed in Sections 2.2 and 2.4.

3.1.3 Dredged/Fill Material Movement - Any movement of dredged material at the CDF would be confined to the interior of the diked area. During disposal, the CDF would serve as a settling basin for the deposition of suspended sediments. As the area is filled, dredged material would spread throughout the remainder of the containment area. Further settling would occur as the material is allowed to consolidate.

3.1.4 Physical Effects on Benthos - Construction of the CDF would destroy existing benthos in the area which would be directly covered by the dike. Submerged portions of the new dike walls would provide partial replacement for existing dike walls. Various voids between the stone units would be available for a diverse habitat for rapid recolonization by benthic organisms.

3.1.5 The most significant benthic impacts would occur within the CDF where all benthic habitat would ultimately be destroyed. After burial with dredged material, some upward movement of surviving benthic organisms may occur and benthos within the dredged material would be expected to recolonize the area. Based on observation of shore birds feeding on exposed dredged material substrates, productivity appears to be relatively high since these areas are popular feeding areas.

3.1.6 Other Effects/Comments - Since the CDF would be protected by a containment structure, the effects of current patterns, water circulation, and wind and wave action on the movement of dredged material in this site should be minor. The discharge of material in the CDF should cause no significant changes in substrate elevation or slope, sediment type, or benthic populations outside the CDF. The containment structure has been designed as a permanent facility able to withstand the force of ice, wind, and waves normally occurring at the project site.

3.1.7 Actions Taken to Minimize Impacts - Submerged armor stone along the outside perimeter of the proposed CDF would provide diverse habitat for benthic organisms.

3.2 Water Circulation, Fluctuation, and Salinity Determinations.

3.2.1 Water Salinity, Chemistry, Including pH, Clarity, Color, Odor, Taste, Dissolved Gas Levels, Nutrients, Eutrophication, Temperature, and Others as Appropriate - Salinity determinations are not applicable to this Section 404(b)(1) Evaluation since the discharge sites are not located in marine waters. Recent chemical testing of sediments from navigation channels in the Toledo area is summarized in Section 2.4 of this evaluation.

3.2.2 No significant alterations in pH are expected. Some temporary alterations in dissolved gas levels may occur within the CDF during disposal. As the area in the CDF is filled, the reduced volume of water would be subject to somewhat more rapid seasonal changes in water temperature and greater algae growth.

3.2.3 Temporary alterations in water color, odor, and taste would occur during disposal in the CDF.

3.2.4 In summary, impacts to Lake Erie water quality are expected to be temporary during the construction phase and should cause no significant, long-term water quality problems. The proposed dike is expected to effectively retain sediment particulates and associated pollutants within the CDF. Although eutrophication would be accelerated within the CDF, no significant increase in eutrophication outside this area is expected due to the proposed discharges.

3.2.5 Current Patterns and Circulation - The proposed site is close to the mouth of the Maumee River in an area which is currently restricted in flow. Any reduction in circulation would only be minimal in this area and no significant change in current patterns would be expected. No significant impacts to current patterns and flow, velocities, stratification, or hydraulic regimes outside the CDF would be expected.

3.2.6 Normal Water Level Fluctuations - Water levels within the CDF may be raised and lowered as material is discharged into the site and excess water either filters through the dike or passes through the discharge weir. Water levels would cease to fluctuate as the area is filled to capacity and converted to dry land. No significant changes in normal water level fluctuations outside the CDF would occur due to any of the proposed disposal operations.

3.2.7 Salinity Gradients - As stated previously, salinity determinations are not applicable to this evaluation.

3.2.8 Actions Taken to Minimize Impacts - The proposed CDF has been sited in a location which would avoid adverse impacts to water circulation which is a critical factor in regard to the aquatic environment of Maumee Bay. The CDF has been designed specifically to retain sediment particulates and associated pollutants within the disposal facility.

3.3 Suspended Particulate/Turbidity Determinations.

3.3.1 A discussion of the expected changes in suspended particulates and turbidity levels is included in Section 3.2 of this evaluation. Disposal methods are discussed in Section 2.6. In summary, disposal operations would be conducted in a manner which would maximize the retention of particulates in the CDF and minimize impacts outside the CDF. This would be accomplished by constructing a discharge weir in a location which would avoid short-circuiting of the drainage in the CDF. At a minimum, the proposed facility would offer the same level of environmental protection as the existing facility. The distance between the weir and the dredge discharge pipe would be maximized while minimizing dead zone areas within the CDF caused by short-circuiting. The total weir length incorporated into the proposed CDF would be longer than the existing weir such that the withdraw depth would be reduced, therefore minimizing suspended solids in the effluent. Management of the weirs would help avoid botulism, produce a quality effluent ($\leq$ 100 ppm of total suspended solids), and fully utilize storage capacity of the CDF.

3.3.2 Like the existing Toledo CDF, the proposed CDF design permits the flow of water through the dike during the first one-third of the CDF life. During this time, the long detention times in the CDF and the filtering properties of the prepared limestone would be adequate to settle and retain the polluted solids. Monitoring at other Buffalo District's permeable dike CDF's (i.e., Buffalo, Huron, and Cleveland) indicate that no pollutants were detected leaking from the site. In fact, shortly after the disposal operation had ceased, the water quality inside the disposal facility mirrored that of the reference site in the lake. These results reflect research by the Corps of Engineers' Waterways Experiment Station which indicate that the pollutants adhere tightly to the fine grain sediments. In addition, laboratory leachate test performed for the Buffalo District on polluted material showed the release of an inconsequential amount of pollutants. Based on the Corps of Engineers studies-to-date, an impermeable dike is not necessary to adequately contain pollutants associated with dredged material. In order to build an impermeable dike of clay, the construction area would have to be dewatered, since clay cannot be compacted under saturated conditions. Dewatering would greatly increase the CDF construction cost. The Buffalo District contends that the existing dike design in Toledo is sufficient and additional cost to construct an impermeable dike is not warranted.

3.3.3 Effects on Chemical and Physical Properties of the Water Column (Light Penetration, Dissolved Oxygen, Toxic Metals and Organics, Pathogens, Aesthetics, and Others as Appropriate - Discussions of chemical and physical impacts on the water column are included in Section 3.2. Temporary decreases in light penetration and dissolved oxygen levels would occur during CDF filling and, to a lesser extent, during its construction. Conditions conducive to botulism outbreaks and waterfowl mortality may exist during the latter stages of CDF filling. Conditions favorable to the botulism bacteria (Clostridium botulinum) include warm shallow, anaerobic decomposition, and fairly clear water. The bacteria produces a toxin which can be ingested by water-associated birds ultimately resulting in death. Temporary aesthetic impacts may be associated with the operation of machinery, the increase in turbidity, and the possible release of odors associated with disposal. However, since the CDF operations would be performed away from significant human activity, most aesthetic impacts should be relatively minor.

3.3.4 Effects on Biota (Primary Production, Photosynthesis, Suspension/Filter Feeders, and Sight Feeders - The area which would be occupied by the proposed CDF would no longer serve as an aquatic environment similar in function to existing conditions. The discharge of material to construct the dike walls and the discharge of dredged material within the CDF would cause the elimination of biota which currently exist at the site. This site has been identified and reviewed during the preparation of the Draft EIS (1985) and determined to be an environmentally preferable site when considered against other methods and aquatic sites in the Maumee Bay area.

3.3.5 Actions Taken to Minimize Impacts - Weir design and CDF operating procedures would insure that the effluent returned to Maumee Bay would have a total suspended solids concentration of no greater than 100 ppm. To minimize the effects of possible outbreaks, a botulism control plan has been developed for the proposed CDF. This plan is outlined in Appendix EIS-E.

3.4 Contaminant Determinations.

3.4.1 The term "contaminant" is defined by USEPA Guidelines 40 CFR 230.3 (e) as "a chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment, and includes but is not limited to the substances on the 307(a)(1) list of toxic pollutants promulgated on 31 January 1978 (43 FR 4109)". Contaminants identified in Toledo Harbor sediments in 1988 included arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, zinc, cyanide, phenols, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, napthalene, di-n-octyl phtalate, fluorene, benzo(a) phrene, benzidine, and bis (2-ethylhexyl) phtalate. A discussion of contaminant levels is included in Section 2.4. In general, the material proposed for confinement in the CDF is classified as "heavily polluted;" the material to be used in the construction of the dike walls would be clean and uncontaminated.

3.4.2 Within the CDF, the toxic effects of contaminants may cause the death of some organisms. Some uptake of contaminants by organisms may also occur. However, plant bioaccummulation tests performed by the Corps of Engineers' Waterways Experiment Station (WES) on sediments from the Times Beach Disposal Site at Buffalo, NY, the existing CDF at Toledo, OH, and Diked Disposal Site 12 at Cleveland, OH, indicated that plant uptake of heavy metals and priority organic pollutants was of little consequence (Folson, 1982). Water quality impacts by contaminants are discussed in Section 3.2.

3.5 Aquatic Ecosystem and Organism Determinations.

3.5.1 Effects on Plankton - The area would be diked off from the remainder of the bay and filled with dredged material. All plankton associated with this specific site would ultimately be destroyed. Generally, the mean algal crop increases from the Maumee River out into the channel (Fraleigh 1975). During the operation of the CDF, planktonic populations would be cyclic and influenced by dredged material disposal operations.

3.5.2 Effects on Benthos - The construction of the CDF and discharge of dredged material within the facility would result in the unavoidable destruction of immobile benthic organisms. Although the submerged portions of the dike walls would provide diverse substrate conducive to rapid recolonization by benthic organisms, the eventual elimination of the north and southwest walls of the existing CDF's accompanying the filling of the proposed CDF would negate this beneficial impact.

3.5.3 Effects on Nekton - Construction of the proposed project would result in the loss of 169 acres of aquatic habitat including spawning, nursery, and feeding habitat for several fish species. In addition, construction activities would cause the resuspension of predominantly fine-grained bottom sediments at the site. The resultant turbidity increases would impel adult fish to temporarily avoid the area.

3.5.4 Effects on Aquatic Food Web - The elimination of 169 acres of aquatic habitat would contribute to a reduction in planktonic and benthic production and consequently forage fish (e.g., gizzard shad) and predator species (e.g., walleye). Except for waterfowl and other birds using the CDF, aquatic biota in the proposed confinement area would be isolated from aquatic food webs in Lake Erie. The site would serve valuable functions in regard to life cycle requirements for waterfowl, shore birds, and gulls during its years of operation. Also see Section 3.5, Aquatic Ecosystem and Organism Determination.

3.5.5 Effects on Special Aquatic Sites - The proposed discharges would result in no significant adverse impacts to existing sanctuaries and refuges, mud flats, coral reefs, or riffle and pool complexes. Approximately 3 acres of vegetated shallows (sago pondweed) would be destroyed by CDF construction. Some wetland vegetation has colonized a peninsula which was formed by side-cast material from past channel dredging. The peninsula is less than 0.25 acres in size and does not appear to serve any unique function. The proposed CDF would serve many valuable wetland functions such as feeding, nesting, and resting habitat for birds commonly associated with wetlands during the anticipated life expectancy of the project.

3.5.6 Threatened and Endangered Species - No Federally or State-listed threatened or endangered species are known to exist at the CDF site. No impacts to threatened or endangered species should occur.

3.5.7 Other Wildlife - The proposed CDF is located in a heavily industrialized and commercialized area. No significant impacts to wildlife beyond those identified in Section 3.5 are anticipated.

3.5.8 Actions Taken to Minimize Impacts - The following actions would be taken to minimize the adverse effects of the discharge of dredged material.

a. The disposal site would allow the continued dredging and confinement of polluted sediments from the Maumee River and, thereby, reduce the contamination of natural resources in the Maumee Bay-Lake Erie ecosystem.

b. The disposal site is located adjacent to existing disposal sites.

c. The disposal site would be confined to limit any significant movement of dredged material.

d. The disposal site would be constructed to an elevation of 23.5 feet above low water datum to maximize capacity in a relatively small area.

e. The discharge of supernatant would be managed to confine and minimize the release of suspended particulates.

f. The discharge site has been located in an area which would minimize changes in water current and circulation patterns.

3.5.9 As many fish as practical (all species and sizes) would be removed from the completed or nearly completed diked disposal area and released into the surrounding waters.

3.6 Proposed Disposal Site Determinations.

3.6.1 Mixing Zone Determination - The mixing zone for the CDF discharge should generally be considered to be the area within the containment dike. The facility would be operated in a manner which would maximize the retention of pollutants and particulate matter within the CDF. The following factors were considered in determining the acceptability of the mixing zone as required by USEPA Guidelines:

Factor	Relevant Comments
Water Depth	In the CDF site, depths vary from 0 feet at the southwest portion to about 4 feet below 568.5 feet IGLD in the northern portion.
Current Velocity, Direction, & Variability	Water movement at the CDF site is negligible, except as provided by wind action and the influence of the Maumee River flow.
Degree of Turbulence	During the construction phase and during CDF filling.
Stratification	Not applicable except for the fact that water quality at the top of the water column near the proposed weir in the CDF would be significantly better than water quality entering the CDF from dredge pump-out.
Discharge Vessel	Not applicable.
Rate of Discharge	Discussed in Sections 2.2 and 2.6.
Ambient Concentration of Constituents of Interest and Dredged Material Characteristics	Discussed in Sections 2.4, 3.1, 3.2, 3.3, and 3.4.
Number of Discharge Actions Per Unit Time	Variable, depending on the transport times, dredging conditions, and equipment used as discussed in Section 2.6.
Other Factors Affecting Rates and Patterns of Mixing	Water circulation, water level fluctuation, and disposal site operation were considered previously in this evaluation.

3.6.2 Determination of Compliance With Applicable Water Quality Standards - Ohio Environmental Protection Agency (OEPA) water quality standards for the proposed work areas are described in Chapter 3745*1 of the Ohio Administrative Code. Maumee Bay is designated as an excepted area, while the Maumee River from the Interstate Route 75 bridge to its mouth is considered limited warmwater habitat. During discharge, compliance with individual water quality standards would not be expected within the CDF. However, due to the retention of particulates and associated pollutants, no violations of water quality standards would be expected outside the CDF. Although the CDF dike would be constructed with a pervious limestone base (Final EIS, Plate EIS-8), no significant movement of solids is expected. The limestone base would be placed over the existing silt and clay substrate and a clay core would be placed on top. Clay from below and above the limestone is expected to ooze into the limestone voids reducing permeability. In addition, filter cloth would be used on the inside of the dike which would reduce the movement of solids through the dike. The combination of these design factors and the resultant clogging of the limestone during actual dredge material disposal is expected to render the dike walls impervious to solids. If suspended solids do initially move through the dike, no significant water quality impact is expected due to the fact that the quantity and mixing zone area would be small and the quality of the sediments outside the CDF are basically identical to the dredged material inside the CDF. Monitoring at other Buffalo District's permeable dike CDF's (i.e., Buffalo, Huron, and Cleveland) indicate that no pollutants were detected leaking from the site. In fact, shortly after the disposal operation has ceased, the water quality inside the disposal facility mirrors that of the reference site in the lake. These results reflect research by WES which indicate that the pollutants adhere tightly to the fine-grained sediments. In addition, laboratory leachate tests performed for the Buffalo District on polluted material showed the release of an inconsequential amount of pollutants. Based on the Corps studies-to-date, an impermeable dike is not necessary to adequately contain pollutants associated with dredged material. In order to build an impermeable dike of clay, the construction area would have to be dewatered, since clay cannot be compacted under saturated conditions. Dewatering would greatly increase the CDF construction cost. The Buffalo District contends that the existing dike design in Toledo is sufficient and additional cost to construct an impermeable dike is not warranted.

3.6.3 Potential Effects on Human Use Characteristics - Construction and discharge operations are expected to have no significant impact on municipal or private water supplies. No significant impacts on recreational and commercial fishing, water-related recreation, or aesthetics are expected to occur. No parks, national or historic monuments, national seashores, wilderness areas, research sites, or similar preserves would be adversely affected.

3.7 Determination of Cumulative Effects on the Aquatic Ecosystem.

3.7.1 The construction of the CDF would enable the continued dredging and confined discharge of "heavily polluted" sediments from the Maumee River, thereby, improving the aquatic environment in the river and consequently conditions in the bay. The regular annual discharge of dredged material into the containment area would result in a gradual progression from shallow aquatic to wetland to upland habitat types.

3.8 Determination of Secondary Effects on the Aquatic Environment.

3.8.1 As discussed in paragraph 3.7.1, the construction of the CDF would contribute to the continued clean-up of polluted sediments in the Maumee River.

3.8.2 Botulism-related waterfowl mortality associated with Maumee River dredged material confinement has been a problem since 1964. The new proposed CDF would incorporate intake (dredged material disposal) and discharge (supernatant) structures designed specifically to allow management flexibility to eliminate conditions conducive to botulism growth (Appendix EIS-E).

3.8.3 After the proposed CDF has been filled, operation and maintenance of the facility would be transferred to the Toledo/Lucas County Port Authority. The ultimate development of the site would be the prerogative of the Authority subject to approval by the Corps of Engineers.

FINDING OF COMPLIANCE

CONFINED DISPOSAL FACILITY
TOLEDO HARBOR
LUCAS COUNTY, OHIO

4.1 No significant adaptations of the USEPA Guidelines were made relative to this evaluation.

4.2 Various alternatives were again reviewed during the preparation of the EIS for the proposed CDF and the construction of a new CDF at the proposed site was identified as a viable solution based on environmental and economic considerations.

4.3 The planned discharges of dredged and fill material should not contribute to a violation of State water quality standards outside the localized mixing zones. The fill and discharge operations would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4.4 The proposed discharge site would not jeopardize the continued existence of any species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or result in the likelihood of the destruction or adverse modification of their critical habitat. The proposed discharges would not violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under the Marine Protection, Research, and Sanctuaries Act of 1972.

4.5 The proposed discharge operations would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on the life stages of aquatic life and other wildlife dependent on aquatic systems would not occur. The discharge would have no significant adverse effects on aquatic ecosystem diversity, productivity, and stability, or on recreational, aesthetic, and economic values.

4.6 Appropriate steps to minimize potential adverse impacts of the discharges on aquatic systems include the following:

- operating the CDF in a manner which would cause the maximum retention of particulates and associated pollutants in the CDF.

- operating and managing the CDF in a manner which would avoid physical conditions conducive to botulism growth.

- removal of fish entrapped in the CDF containment area and their release into Maumee Bay.

4.7 On the basis of the Guidelines, the proposed CDF is specified as complying with the requirements of these Guidelines, with the inclusion of appropriate and practical conditions to minimize pollution and adverse effects on the aquatic ecosystem.

FINAL ENVIRONMENTAL IMPACT STATEMENT
CONFINED DISPOSAL FACILITY
TOLEDO HARBOR, OHIO

APPENDIX EIS-C
CULTURAL RESOURCES ASSESSMENT

CULTURAL RESOURCES ASSESSMENT

CONFINED DISPOSAL FACILITY
TOLEDO HARBOR, LUCAS COUNTY, OHIO

1. INTRODUCTION

1.1 Project Description. The proposed project involves construction of a new Confined Disposal Facility (CDF) at Toledo Harbor, Ohio, to contain "heavily polluted" materials dredged from navigation channels at the harbor. The plan would involve construction of an enclosing dike from the northwest corner of the existing Toledo CDF to the most northerly reach of the Toledo Edison Water Intake. The new CDF would be about 169 acres in size and would have a capacity of about 8,764,000 cubic yards of dredged material. The Selected Plan would involve the construction of a new dike wall, about 4.260 feet in length and 29.5 feet in height, to enclose a 155-acre shallow water area adjacent to the Federal Channel and existing Corps of Engineers CDF. In addition, the dikes of the existing Corps of Engineers CDF and Toledo Edison Disposal Area would be reconstructed and elevated to a height of 29.5 feet along a distance of 3,412 feet to complete the proposed CDF. The Selected Plan is illustrated on Plate EIS-9 and cross sections of the new dike and elevated dike walls are shown on Plate EIS-8 of the Final EIS.

1.2 Authority. Toledo Harbor was constructed in stages under the authority of a number of River and Harbor Acts since 23 June 1866 which authorized the deepening and widening of the 7.5-mile long natural channel through Maumee Bay. The existing CDF at Toledo Harbor was constructed under the authority of Section 123 of the 1970 Rivers and Harbors and Flood Control Act (Public Law 91-611). Construction of a new CDF at Toledo Harbor would be accomplished under normal operations and maintenance authorities of the Corps of Engineers.

1.3 In accordance with Corps of Engineers Regulation ER 1105-2-50, Chapter 3, Cultural Resources, and a number of laws related to the protection and preservation of historic properties and archaeological remains (most notably the Archaeological and Historical Preservation Act, as amended, and the National Historical Preservation Act of 1966, as amended), the Corps of Engineers is required to evaluate potential project impacts on historic properties and known and unknown archaeological remains. The purpose of this assessment is to evaluate the impact of the proposed plan for construction of a new CDF on significant cultural resources.

2. METHODOLOGY

2.1 The National Register of Historic Places (NRHP) lists numerous structures and historic districts in the city of Toledo. However, none of these properties or districts on the NRHP are in close proximity to the project area and should not be affected by the construction or use of the CDF. The following three harbor-related properties are also on the Register.

- Toledo Yacht Club, Bay View Park

- West Sister Island Light (U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes)

- Toledo Harbor Light (U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes).

2.2 The West Sister Island Light is located on West Sister Island in Maumee Bay about 15 miles from Toledo Harbor. The Toledo Harbor Light is located adjacent to the Toledo Harbor Entrance Channel and is also about 7 miles lakeward of the proposed CDF. The Toledo Harbor Yacht Club is located along the Toledo Harbor channel about 1 mile riverward of the proposed CDF. None of these properties would be affected by construction or use of the proposed CDF at Toledo Harbor.

2.3 In a letter dated 13 August 1985, the Buffalo District contacted the Ohio State Historic Preservation Office (SHPO) and described the proposed plan for construction of a new CDF at Toledo Harbor. The SHPO, in a 9 September 1985 response (Appendix EIS-A) indicated the project would not have any effect on any property listed in the National Register of Historic Places or eligible for the register. Additionally, local cultural resource experts and the National Park Service have been contacted to solicit their comments in regard to the value of the site (Appendix EIS-A, letters dated 23 December 1985 and 31 January 1986). All pertinent data in regard to this site has been reviewed and no further investigations are required at this time.

2.4 The Corps of Engineers does not know of any previous cultural resources investigations of the study area that might provide information on properties or archaeological remains that might be eligible for inclusion in the National Register of Historic Places. However, based upon the overall nature and degree of impacts of the project and the highly disturbed state of the area of CDF construction, potential project impacts on cultural resources appear to be insignificant.

3. CONCLUSIONS.

3.1 Impact of the Project on Cultural Resources. The project involves filling a 169-acre area adjacent to existing CDF's on the south side of the mouth of the Maumee River. The shoreline in this area has been severely disturbed by natural and man-made change. Due to artificial cuts and fills, it is difficult to determine the location of the natural shoreline (Final EIS, Plates EIS-2 and EIS-9). The proposed site is located over several hundred feet from the existing shoreline in a very shallow (1 to 3 feet below LWD) section of the bay. A man-made shoal consisting of dredged material is located in the center section of the site and runs parallel to the harbor entrance channel. Prior to the construction of the CDF located to the northeast, the area was exposed to a lake fetch which extended over 30 miles. The existing substrate at the site consists of firm lake clay deposit overlayer with river silts and clay. No soil or plant remains which may have developed during lower lake periods are evident at the site. Although the site location in regard to the Maumee River would lend itself to possible past occupancy, or perhaps ship abandonment, specific site conditions appear to significantly reduce its value. Local cultural resources experts have been contacted, but no information pertaining to the site was discovered.

3.2 Conclusions. The Corps of Engineers, as a result of this assessment, has made a determination that the Selected Plan for CDF construction at Toledo Harbor is highly unlikely to have any significant impact on cultural resources. Consultation with known experts in the project area has not contradicted this determination.

FINAL ENVIRONMENTAL IMPACT STATEMENT
CONFINED DISPOSAL FACILITY
TOLEDO HARBOR
LUCAS COUNTY, OHIO

APPENDIX EIS-D

SEDIMENT QUALITY AND GUIDELINES
FOR THE POLLUTIONAL CLASSIFICATION OF THE
GREAT LAKES HARBOR SEDIMENTS

GUIDELINES FOR THE POLLUTIONAL CLASSIFICATION OF GREAT LAKES HARBOR SEDIMENTS

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION V

CHICAGO, ILLINOIS

April 1977

Guidelines for the evaluation of Great Lakes harbor sediments, based on bulk sediment analysis, have been developed by Region V of the U.S. Environmental Protection Agency. These guidelines, developed under the pressure of the need to make immediate decisions regarding the disposal of dredged material, have not been adequately related to the impact of the sediments on the lakes and are considered interim guidelines until more scientifically sound guidelines are developed.

The guidelines are based on the following facts and assumptions:

1. Sediments that have been severely altered by the activities of man are most likely to have adverse environmental impacts.

2. The variability of the sampling and analytical techniques is such that the assessment of any sample must be based on all factors and not on any single parameter with the exception of mercury and polychlorinated biphenyls (PCB's).

3. Due to the documented bioaccumulation of mercury and PCB's, rigid limitations are used which override all other considerations.

Sediments are classified as heavily polluted, moderately polluted, or nonpolluted by evaluating each parameter measured against the scales shown below. The overall classification of the sample is based on the most predominant classification of the individual parameters. Additional factors such as elutriate test results, source of contamination, particle size distribution, benthic macroinvertebrate populations, color, and odor are also considered. These factors are interrelated in a complex manner and their interpretation is necessarily somewhat subjective.

The following ranges used to classify sediments from Great Lakes harbors are based on compilations of data from over 100 different harbors since 1967.

	Nonpolluted	Moderately Polluted	Heavily Polluted
Volatile Solids (%)	<5	5-8	8
COD (mg/kg dry weight)	<40,000	40,000-80,000	80,000
TKN (mg/kg dry weight)	<1,000	1,000-2,000	2,000
Oil and Grease (Hexane Solubles) (mg/kg dry weight)	<1,000	1,000-2,000	2,000
Lead (mg/kg dry weight)	<40	40-60	60
Zinc (mg/kg dry weight)	<90	90-200	200

- West Sister Island Light (U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes)

- Toledo Harbor Light (U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes).

2.2 The West Sister Island Light is located on West Sister Island in Maumee Bay about 15 miles from Toledo Harbor. The Toledo Harbor Light is located adjacent to the Toledo Harbor Entrance Channel and is also about 7 miles lakeward of the proposed CDF. The Toledo Harbor Yacht Club is located along the Toledo Harbor channel about 1 mile riverward of the proposed CDF. None of these properties would be affected by construction or use of the proposed CDF at Toledo Harbor.

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2.4 The Corps of Engineers does not know of any previous cultural resources investigations of the study area that might provide information on properties or archaeological remains that might be eligible for inclusion in the National Register of Historic Places. However, based upon the overall nature and degree of impacts of the project and the highly disturbed state of the area of CDF construction, potential project impacts on cultural resources appear to be insignificant.

3. CONCLUSIONS.

3.1 Impact of the Project on Cultural Resources. The project involves filling a 169-acre area adjacent to existing CDF's on the south side of the mouth of the Maumee River. The shoreline in this area has been severely disturbed by natural and man-made change. Due to artificial cuts and fills, it is difficult to determine the location of the natural shoreline (Final EIS, Plates EIS-2 and EIS-9). The proposed site is located over several hundred feet from the existing shoreline in a very shallow (1 to 3 feet below LWD) section of the bay. A man-made shoal consisting of dredged material is located in the center section of the site and runs parallel to the harbor entrance channel. Prior to the construction of the CDF located to the northeast, the area was exposed to a lake fetch which extended over 30 miles. The existing substrate at the site consists of firm lake clay deposit overlayer with river silts and clay. No soil or plant remains which may have developed during lower lake periods are evident at the site. Although the site location in regard to the Maumee River would lend itself to possible past occupancy, or perhaps ship abandonment, specific site conditions appear to significantly reduce its value. Local cultural resources experts have been contacted, but no information pertaining to the site was discovered.

The pollutional classification of sediments with total PCB concentrations between 1.0 mg/kg and 10.0 mg/kg dry weight will be determined on a case-by-case basis.

a. Elutriate Test Results.

The elutriate test was designed to simulate the dredging and disposal process. In the test, sediment and dredging site water are mixed in the ratio of 1:4 by volume. The mixture is shaken for 30 minutes, allowed to settle for 1 hour, centrifuged, and filtered through a 0.45 ų filter. The filtered water (elutriate water) is then chemically analyzed.

A sample of the dredging site water used in the elutriate test is filtered through a 0.45 ų filter and chemically analyzed.

A comparison of the elutriate water with the filtered dredging site water for like constituents indicates whether a constituent was or was not released in the test.

The value of elutriate test results are limited for overall pollutional classification because they reflect only immediate release to the water column under aerobic and near neutral pH conditions. However, elutriate test results can be used to confirm releases of toxic materials and to influence decisions where bulk sediment results are marginal between two classifications. If there is release or nonrelease, particularly of a more toxic constituent, the elutriate test results can shift the classification toward the more polluted or the less polluted range, respectively.

b. Source of Sediment Contamination.

In many cases, the sources of sediment contamination are readily apparent. Sediments reflect the inputs of paper mills, steel mills, sewage discharges, and heavy industry very faithfully. Many sediments may have moderate or high concentrations of TKN, COD, and volatile solids yet exhibit no evidence of man-made pollution. This usually occurs when drainage from a swampy area reaches the channel or harbor, or when the project itself is located in a low-lying wetland area. Pollution in these projects may be considered natural and some leeway may be given in the range values for TKN, COD, and volatile solids provided that toxic materials are not also present.

c. Field Observations.

Experience has shown that field observations are a most reliable indicator of sediment condition. Important factors are color, texture, odor, presence of detritus, and presence of oily material.

Color - A general guideline is; the lighter the color, the cleaner the sediment. There are exceptions to this rule when natural deposits have a darker color. These conditions are usually apparent to the sediment sampler during the survey.

Texture - A general rule is; the finer the material, the more polluted it is. Sands and gravels usually have low concentrations of pollutants while silts usually have higher concentrations. Silts are frequently carried from polluted upstream areas, whereas, sand usually comes from lateral drift along the shore of the lake. Once again, this general rule can have exceptions and it must be applied with care.

Odor - This is the odor noted by the sampler when the sample is collected. These odors can vary widely with temperature and observer and must be used carefully. Lack of odor, a beach odor, or a fishy odor tends to denote cleaner samples.

Detritus - Detritus may cause higher values for the organic parameters COD, TKN, and volatile solids. It usually denotes pollution from natural sources. NOTE: The determination of the "naturalness" of a sediment depends upon the establishment of a natural organic source and a lack of man-made pollution sources with low values for metals and oil and grease. The presence of detritus is not decisive in itself.

Oily Material - This almost always comes from industry or shipping activities. Samples showing visible oil are usually highly contaminated. If chemical results are marginal, a notation of oil is grounds for declaring the sediment to be polluted.

d. Benthos.

Classical biological evaluation of benthos is not applicable to harbor or channel sediments because these areas very seldom support a well-balanced population. Very high concentrations of tolerant organisms indicate organic contamination, but do not necessarily preclude open-lake disposal of the sediments. A moderate concentration of oligochaetes or other tolerant organisms frequently characterize an acceptable sample. The worst case exists when there is a complete lack or very limited number of organisms. This may indicate a toxic condition.

In addition, biological results must be interpreted in light of the habitat provided in the harbor or channel. Drifting sand can be a very harsh habitat which may support only a few organisms. Silty material, on the other hand, usually provides a good habitat for sludgeworms, leeches, fingernail clams, and perhaps, amphipods. Material that is frequently disturbed by ship's propellers provides a poor habitat.

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SEDIMENT ANALYSIS
TOLEDO HARBOR
LUCAS COUNTY, OHIO

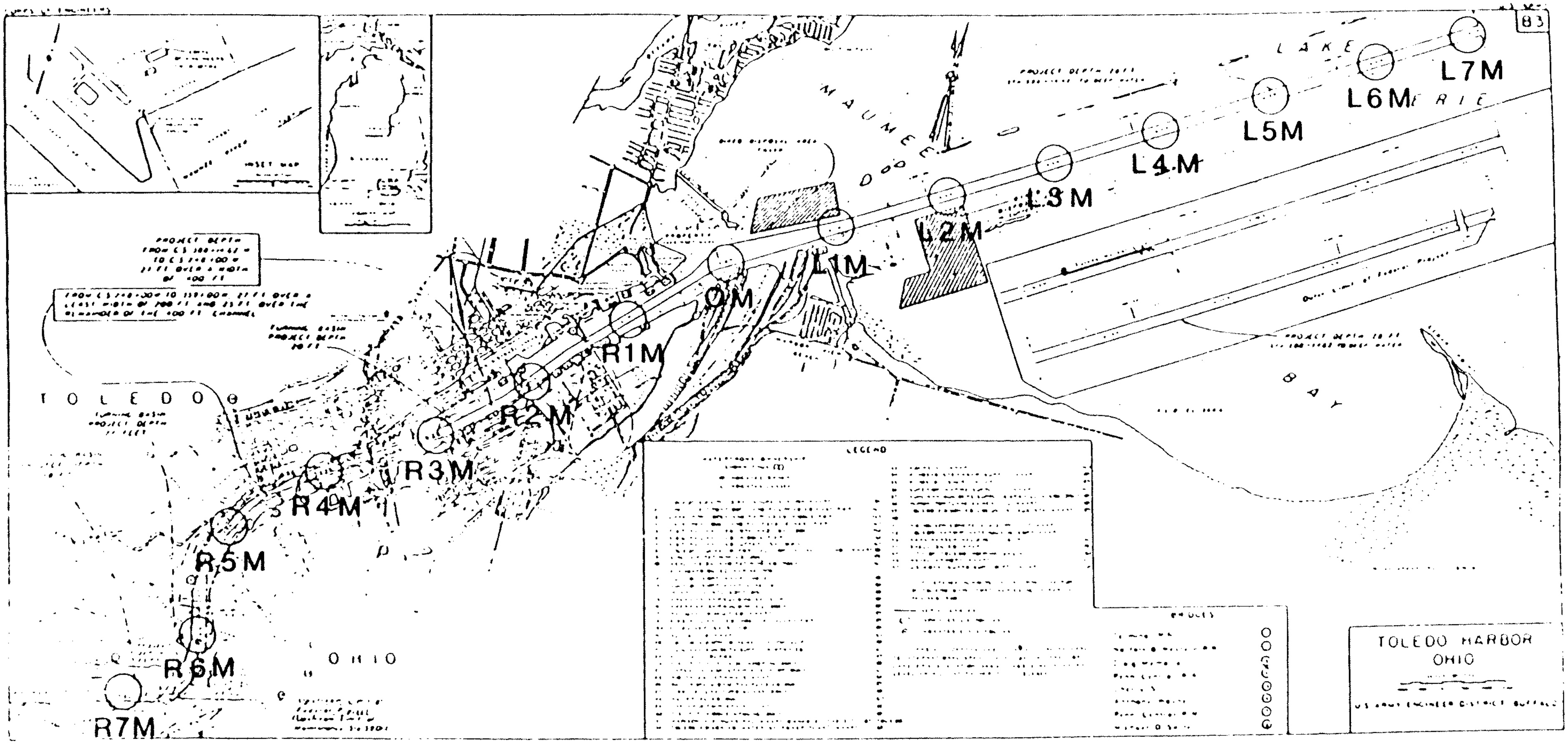

Figure 1. Toledo Harbor/Maumee River Sampling Locations.

Table EIS-D-1 - Bulk Chemical Analysis, Inorganic Parameters - Toledo Harbor (T.P. Associates International, Inc. 1988)

Parameter	Sampling Location				
	L-2-M	L-1-M	O-M	R-1-M	R-2-M
Total Solids, %	36.9	37.6	42.3	36.8	37.0
T. Volatile Solids, %	7.16	7.58	6.63	8.84	7.45
Cyanide	0.7	1.5	0.52	1.58	0.67
Phenols	0.39	0.23	0.21	0.69	0.29
Arsenic	20	22	20	21	22
Barium	92	110	100	120	120
Cadmium	2.0	2.0	2.0	2.0	2.0
Chromium	23	24	31	57	39
Copper	33	37	38	52	39
Lead	29	26	34	52	29
Mercury	0.1	0.1	0.2	0.4	0.2
Nickel	30	32	33	46	33
Zinc	120	150	140	330	170
Iron	22,900	24,900	27,200	31,500	29,000
Manganese	470	460	390	420	530
COD	86,000	97,000	83,000	120,000	84,000
Ammonia N	200	180	270	870	210
Nitrate N	<10	<9	<9	<10	<10
Oil/Grease	680	900	1,300	3,900	1,100
TKN	1,420	1,870	1,700	2,620	1,630
Total P	980	1,100	1,200	3,500	1,400

All results reported in mg/kg unless otherwise noted.

Table EIS-D-1 - Bulk Chemical Analysis, Inorganic Parameters - Toledo Harbor (Cont'd)
(T.P. Associates International, Inc. 1988)

Parameter	Sampling Location				
	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
Total Solids, %	37.6	54.7	41.5	46.6	47.6
T. Volatile Solids, %	7.29	4.29	10.0	4.25	7.47
Cyanide	0.98	<0.3	0.5	<0.6	<0.3
Phenols	0.16	0.13	0.17	0.13	0.12
Arsenic	23	12	22	18	16
Barium	120	70	110	82	65
Cadmium	2	2	1	0.9	2
Chromium	24	14	20	16	13
Copper	36	27	40	26	23
Lead	32	23	41	19	16
Mercury	0.1	0.2	0.2	0.1	0.2
Nickel	31	19	27	23	23
Zinc	160	93	150	97	82
Iron	30,600	13,900	24,500	19,900	13,200
Manganese	470	320	440	340	335
COD	87,000	46,000	82,000	58,000	61,000
Ammonia N	150	88	150	91	89
Nitrate N	<10	<6	<9	<7	<8
Oil/Grease	710	340	980	270	430
TKN	2,860	1,630	2,750	1,690	1,980
Total P	1,100	840	1,100	820	735

All results reported in mg/kg unless otherwise noted.

Table EIS-D-2. Organic Parameters - Toledo Harbor (T.P. Associates International, Inc., 1988)

Parameter	L-2-M	L-1-M	O-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M
Sediments, Purgeable Halocarbons										
Bromoform	<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
Carbon Tetrachloride	<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
Chloroethane	<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
Chloroform	<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
1,2-Dichlorobenzene	<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
1,4-Dichlorobenzene	<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
1,2-Dichloroethane	<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
1,2-Dichloropropane	<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
Methyl Chloride	<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
Tetrachloroethene	<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
1,1,1-Trichloroethane	<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
Trichloroethene	<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
Vinyl Chloride	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sediments, Polynuclear Aromatic Hydrocarbons										
Acenaphthene	<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
Anthracene	<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	1.21	<0.30	<0.30	1.01	<0.30	<0.30
Benzo(a)Pyrene	<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
Benzo(ghi)Perylene	<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
Chrysene	<0.20	1.05	<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
Fluoranthene	0.46	0.41	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	0.71	<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
Naphthalene	<0.30	<0.30	0.65	0.57	0.61	<0.30	<0.30	<0.30	<0.30	<0.30
Phenanthrene	0.53	0.67	0.77	1.57	2.99	0.81	0.85	1.53	0.44	0.26
Pyrene	0.87	0.88	1.20	2.44	2.24	1.50	1.98	2.40	0.78	0.36
Sediments, Phthalate Esters										
Bis(2-ethylhexyl)Phthalate	<0.30	1.76	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
Di-n-butyl Phthalate	<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
Dimethyl Phthalate	<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	1.79	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Sediments, Organochlorine Pesticides and PCB's										
α-Endosulfan	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
β-Endosulfan	<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	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
α-BHC	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
β-BHC	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
γ-BHC (Lindane)	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
δ-BHC	<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	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02
Dieldrin	<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	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
4,4'-DDD	<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	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.04
Endrin	<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	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
Heptachlor	<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	<0.03	<0.03	<0.06	<0.03	<0.03	<0.03	<0.03	<0.06
Chlordane	<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	<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
Aroclor 1221	<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
Aroclor 1242	<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
Aroclor 1254	<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

All results reported as mg/kg (dry weight basis).

Table EIS-D-3. Elutriate Data - Toledo Harbor (T.P. Associates International, Inc., 1988)

Parameter	L-2-M	L-1-M	O-M	R-1-M	R-2-M	R-3-M	R-4-M	R-5-M	R-6-M	R-7-M	R-7-M RPT.
ARSENIC, TOTAL, AS, UG/L	7	8	5	8	11	11	14	18	12	16	12
BARIUM, TOTAL, BA, UG/L	170	190	190	230	150	180	200	200	140	190	190
CADMIUM, TOTAL, CD, UG/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHROMIUM, TOTAL, CR, UG/L	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
COPPER, TOTAL, CU, UG/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
CYANIDE, TOTAL, CN, MG/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
IRON, TOTAL, FE, UG/L	250	400	110	450	110	230	110	100	92	180	110
LEAD, TOTAL, PB, UG/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MANGANESE, TOTAL, MN, UG/L	1400	1400	410	690	580	1200	830	640	670	1000	1100
MERCURY, TOTAL, HG, UG/L	11.0	3.0	<2.0	<2.0	<2.0	<2.0	22	4.0	3.0	<2.0	<2.0
NICKEL, TOTAL, NI, UG/L	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
NITRATE N, MG/L	<0.08	<0.08	0.43	<0.08	0.36	0.14	0.39	0.29	0.32	0.11	0.18
NITROGEN, AMMONIA, N, MG/L	8.38	8.02	8.03	27.5	6.70	6.37	4.04	5.14	3.49	4.41	4.10
OIL/GREASE, MG/L	1	<1	<1	4	4	<1	<1	1	<1	1	<1
PHENOLS, 4-AAP, MG/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PHOSPHORUS, TOTAL, P, MG/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.18	0.23	<0.10	0.11	<0.10
TOTAL KJELDAHL N, MG/L	8.80	8.60	8.50	30.6	7.20	6.60	4.80	5.40	3.70	5.30	5.00
ZINC, TOTAL, ZN, UG/L	34	37	41	51	27	29	44	52	28	46	47

TOLEDO HARBOR
CONFINED DISPOSAL FACILITY (CDF) EXPANSION
LUCAS COUNTY, OHIO

BOTULISM CONTROL MANAGEMENT PLAN

1. GENERAL

1.1 Botulism becomes a concern at CDF's when dredged material forms shallow ponds or is raised slightly above the water level. These shallow ponded areas provide an attractive food source for waterfowl and shorebirds. When the invertebrate organisms in dredged material die due to a change in the water regime (flooding or drying) and higher temperatures exist, the process of bacterial growth begins. This can occur with freshly deposited dredged material or previously deposited material. When the conditions necessary for bacterial growth occur in a CDF, the potential for botulism outbreak is established. In developing the Botulism Control Management Plan for the proposed Toledo Harbor CDF, consideration was given to a data collection phase, early action phase, long-range operation phase, and coordination.

2. DATA COLLECTION PHASE

2.1 Site visits:
- Once every two (2) weeks from 15 April through 31 May.
- Once every week from 1 June through 15 September.

2.2 Monitoring team: At least one person from the Corps of Engineers (COE) and one person from the Ohio Department of Natural Resources (ODNR). Personnel will walk access roads along the CDF dikes to make field observations.

2.3 COE will provide a boat, if needed.

2.4 COE will provide equipment to measure air and water temperature, dissolved oxygen (DO), and pH. Water temperature, DO, and pH measurements will be made in areas where there is accessible ponded water.

2.5 Inspectors should indicate on a map of the CDF (using a new map each week) the following:

a. Time/date of observation
b. General weather conditions
c. Location of birds:
   1. Numbers and types (species) estimated.
   2. Condition of birds.
d. Note on map - mud areas, ponded water, mud crack areas, dry-firm areas.
e. Vegetated areas.
f. Other general comments (should be noted either at the

bottom of the map <u>or</u> attached to the map).

2.6 The COE Site Inspector will take Polaroid photographs during each field inspection showing the general condition within the CDF facility. Each photograph will be labeled to include: title of photo (Toledo CDF Expansion)); date photo was taken; approximate location; and viewing direction.

3. <u>EARLY ACTION PHASE</u>

3.1 If the monitoring team identifies sick or dead birds - or other individuals report sick or dead birds - the COE and ODNR Site Inspectors will immediately notify (by telephone) the following:

Chief
Toledo Field Office
US Army Corps of Engineers, Buffalo District
Bay View Park
3900 Summit Street
P.O. Box 5002
Toledo, Ohio 43611
Telephone Number: 419-259-6480

Supervisor
Crane Creek Wildlife Experiment Station
Ohio Department of Natural Resources
13229 West State Route 2
Oak Harbor, Ohio 43449
Telephone Number: 419-898-0960

Field Supervisor
Reynoldsburg Field Office
US Fish and Wildlife Service
6950-H Americana Parkway
Reynoldsburg, Ohio 43069
Telephone Number: 614-469-6923

3.2 Sick and dead birds will be collected and provided to the ODNR Site Inspector. ODNR laboratories will make the determination as to whether or not botulism is present in the affected birds. THE RESPONSE WILL INCLUDE AN INCREASE IN FIELD VISITS TO TWO OR MORE TIMES PER WEEK TO REMOVE DEAD BIRDS.

3.3 If botulism is found by ODNR to be the problem, the COE will expeditiously initiate a contract to implement use of noise-making devices (i.e., carbide cannons) to scare aquatic birds from the CDF area as much as possible.

3.4 Additionally, a determination would be made as to whether or not operational changes should be made as a response. These changes could include:

3.4.1 Stopping dredging and discharge.

3.4.2 Pumping more fresh water after each dredge load discharge.

3.4.3 Prompt seeding of unvegetated mudflat areas with a tall growing grass mixture (possibly by hydroseeding), in order to make the such areas less desirable as habitat for aquatic birds such as waterfowl and shorebirds.

4. LONG-RANGE OPERATIONAL PHASE

4.1 On the basis that water management practices within the disposal site are the key to the successful control of the toxin-producing botulism bacteria (Clostridium botulinum), this plan includes the following:

4.1.1 Timing of the Discharge

a. Place material into the CDF as late in the year as practicable. Cool weather (<68 degrees Fahrenheit) inhibits production of the toxin. Not discharging into the CDF will keep sediments dry, thereby inhibiting bacterial growth.

b. Placement of dredged material during cooler weather has an added advantage of holding back the protein substrate (i.e., organic matter in the dredged material which the bacteria need), until after it is too late in the year for the bacteria to grow.

4.1.2 Planned Distribution of Dredged Material Within the CDF

a. Place dredged material directly into the low areas during dredging operations. This would allow mud flat areas to dry out and keep a water layer over the most recently placed material.

4.1.3 Drying of Sediments Within the CDF

a. Evaporative drying will remove water from the upper few inches of the dredged material by capillary resupply of the soil, resulting in crust formation. This aids precipitation runoff via dessication cracks.

b. Evaporative drying is accelerated by good surface drainage, rapid removal of precipitation, and prevention of ponding by surface water. Surface drainage would be accomplished by construction of drainage trenches in the disposal area.

c. A perimeter trench (using either a dragline or backhoe) would be excavated approximately 10 to 15 feet inside the dike walls. The perimeter trench would be about 6-8 feet wide and two feet deep. Operations would normally begin at the weir, digging a sump pit extending into the disposal area using the maximum reach of the dragline or backhoe. The excavated material would be side-cast to form a low berm inside the CDF along the interior side of the perimeter trench.

d. Interior drainage via trenches would be initiated when perimeter trenching decreases the fluid consistency of dredged material below the thin drying skin, to allow trench construction and, when the support capacity of the soil allows conventional low-ground pressure construction equipment (utilizing mats, if needed) safe entrance onto the disposal area to construct drainage trenches. Surface trenching and drying not only decrease the chance for botulism, but help prevent mosquito problems and firm up the soil in the facility. Drying the sediments also increases CDF capacity.

5. COORDINATION

5.1 Consultation

5.1.1 Maintain coordination with the U.S. Fish and Wildlife Service and ODNR on status of conditions at the site.

5.1.2 Maintain coordination with research biologists at the COE Waterways Experiment Station Staff at Vicksburg, Mississippi, to obtain further recommendations and, to arrange site visits that would provide the basis for immediate advice and possibly longer range study of disposal area management to minimize outbreaks of botulism.

FINAL ENVIRONMENTAL IMPACT STATEMENT
CONFINED DISPOSAL FACILITY
TOLEDO HARBOR
LUCAS COUNTY, OHIO

DRAFT RECORD OF DECISION (ROD) AND COMMENTS/RESPONSES ON THE FINAL ENVIRONMENTAL IMPACT STATEMENT
AND
FINAL RECORD OF DECISION

D R A F T

RECORD OF DECISION

TOLEDO HARBOR CONFINED DISPOSAL FACILITY

LUCAS COUNTY, OHIO

I have reviewed the Corps of Engineers Final Environmental Impact Statement addressing the need for maintaining authorized depths of Federal navigation channels and confining "heavily polluted" harbor sediments at Toledo Harbor, Ohio. Based on this review and the views of interested agencies and the concerned public, I find the recommended plan to be the least costly, environmentally acceptable alternative which is consistent with established engineering requirements. The purpose of this Record of Decision is to complete the procedural requirements of the National Environmental Policy Act.

The recommended plan includes the following features:

- construction of a 4,260-foot long limestone and clay dike enclosing approximately 155 acres. Three water quality monitoring wells would be installed in the dike. The facility, with an estimated useful life expectancy of 21 years, would confine approximately 7.4 million cubic yards of "heavily polluted" dredged material.

•existing Toledo-Lucas County Port Authority dikes adjacent to the new CDF would be raised and widened to match the dimensions of the new dike.

•construction of an overflow weir in the new dike.

•placement of a new discharge pipeline extending from the existing pump-out platform to four separate discharge points.

•extension of the existing pump-out platform and replacement of damaged timber piles with steel H-piles.

•construction of a 450-foot long haul road at the southwest terminus of the proposed facility (optional).

In addition to the Selected Plan, the following alternatives were considered in detail:

(1) No Action

(2) Elevating Existing CDF Walls

In accordance with the Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (March 10, 1983), evaluation of the effects of these alternative plans as based on four accounts - national economic development, environmental quality, regional economic development, and other social effects - and the degree to which each plan would satisfy the established planning objectives. On the basis of these accounts, an evaluation of the Selected Plan has concluded that the benefits to be gained with its construction outweigh its adverse effects.

During the coordination process, the US Fish and Wildlife Service, US Environmental Protection Agency, and Ohio Department of Natural Resources recommended the implementation of mitigation measures to compensate for the unavoidable loss of 167 acres of protected nearshore shallow water habitat. We have assessed the need for fish and wildlife mitigation by determining if construction of the CDF would result in a significant net adverse environmental impact or if the project would affect significant resources. Construction of the CDF would result in substantial net beneficial impacts since "heavily polluted" Toledo Harbor sediments would be removed and effectively isolated from the aquatic ecosystem. An evaluation of existing and future without-project conditions of the CDF site has concluded that the aquatic resources of the site are neither scarce nor unique in Maumee Bay. Therefore, the inclusion of separable mitigation features is not justified.

We have considered all applicable laws, executive orders, regulations, and local government plans in evaluating the alternatives and have adopted all practicable and justifiable means to avoid or minimize adverse environmental effects of the Selected Plan. In compliance with the Clean Water Act, Section 401 Water Quality Certification for the project was issued by Ohio Environmental Protection Agency (OEPA) on October 5, 1990. As a condition of this certification, the Buffalo District was required to submit a mitigation plan to OEPA prior to commencement of construction. Although the inclusion of separable mitigation features is not justified as noted above, the Buffalo District submitted a plan to OEPA identifying those project features designed to minimize adverse environmental impacts resulting from project construction. We are currently awaiting OEPA's comments on this plan.

JUDE W. P. PATIN

Brigadier General, USA

Commanding

DATE: ______________

United States Department of the Interior

TAKE PRIDE IN AMERICA

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

AUG 15 1990

ER 86/729

Colonel Hugh F. Boyd
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Boyd:

The Department of the Interior has reviewed the final environmental statement for the Toledo Harbor Confined Disposal Facility, Ohio. We have the following comments and recommendations.

The final statement addresses many of the concerns identified in our review of the draft statement. The Corps included an expanded discussion of possible upland disposal and reuse alternatives for dredged materials. The description of the existing aquatic resources and the effects of each alternative has been improved in the final statement. However, because the Corps does not acknowledge future improvements in water quality and aquatic habitat conditions in the project area without the project, the final statement does not include an adequate mitigation plan.

The Corps has based their decision not to mitigate aquatic habitat losses on the existing habitat values rather than future habitat conditions. However, the Fish and Wildlife Service's (FWS) Reynoldsburg, Ohio, Field Office prepared a Fish and Wildlife Coordination Act Report and Mitigation Planning Supplement (Supplement) that included a habitat evaluation procedure with analyses that documents significant existing and future habitat values. The probable future habitat conditions scenario is that both water and sediment quality at the site will improve over the years. In addition, a greater area of submerged aquatic vegetation is projected than the approximately three acres currently found in the proposed construction site for the facility. These changes will result in a substantial increase in the habitat values. The gravel/cobble shoal and beds of submerged aquatic vegetation that are principle components of the habitat at the site are relatively scarce in Maumee Bay and in the western basin of Lake Erie. We believe the effected area, particularly when viewed in terms of the FWS estimates for future "without project" conditions, meets the criteria used by the Corps to determine significance (i.e., scarce or unique resources).

Since publication of the draft statement, new information indicates that the Ohio Environmental Protection Agency will not permit open lake dumping after the year 1991. If Federal facilities are used for the disposal of materials that can no longer be dumped in the open lake, the life of the proposed facility could be reduced by as much as sixty percent. Such a reduction in usable life of the proposed facility will require the construction of additional facilities resulting in the destruction of more habitat without adequate mitigation.

The Water Resources Development Act of 1986 requires reports submitted for authorization of any water resources project to have negligible adverse impacts on fish and wildlife and include a specific plan to mitigate losses. In our opinion, significant fish and wildlife be lost as a result of this project and should, therefore, be fully mitigated.

The FWS developed a mitigation plan that would be implemented in Maumee Bay State Park. The Ohio Department of Natural Resources, Ohio Environmental Protection Agency, and U.S. Environmental Protection Agency fully support the need for adequate mitigation and our proposed plan. These agencies have requested a meeting in late August to discuss the mitigation issue with the Buffalo District and North Central Division Corps of Engineers. Any final action on this project should be delayed until the agencies have met. If, however, satisfactory resolution does not occur, the mitigation issue may be raised to the Corps Washington office.

Sincerely,

Jonathan P. Deason
Director
Office of Environmental Affairs

OCT 17 1990

MAILROOM
CENCD-IM-S
17 Oct 90 09 54

Environmental Analysis Section

SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

Mr. Jonathan Deason
Director
Office of Environmental Affairs
U.S. Department of the Interior
Washington, DC 20240

Dear Mr. Deason:

We have reviewed your August 15, 1990 letter which provides your comments on the Final Environmental Impact Statement for the proposed construction of a confined disposal facility (CDF) at Toledo Harbor, Ohio. The following information addresses your concerns.

We base our rationale for our position regarding the U.S. Fish and Wildlife Service's (USFWS) recommended fish and wildlife mitigation measures on the net environmental impact of the proposed project and the significance of the affected resources. Before consideration may be given to providing mitigation measures, the Corps of Engineers must first give full credit to the beneficial aspects of the project. If the project has negative environmental impacts or if a significant fish and wildlife resource is adversely affected, then the evaluation of mitigation measures would be appropriate. In effect, when a project involves the expenditure of Federal funds, clear and convincing evidence must show that on balance the project has negative impacts or significant resources would be adversely affected. Our current assessment of the proposed project does not show such evidence.

The Corps of Engineers bases the significance of fish and wildlife resources on both their monetary and non-monetary values. Monetary values are quantifiable and may be incorporated into a project economic evaluation. Non-monetary values are admittedly subjective and are based on technical, institutional, and public recognition of the ecological, cultural, and aesthetic attributes of the affected fish and wildlife resources. Corps of Engineers criteria for determining significance include, but are not limited to, the scarcity or uniqueness of the resource from a national, regional, State, or local perspective.

Environmental Analysis Branch
SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

The dredging and containment of "heavily polluted" Toledo Harbor sediments are the major beneficial environmental effects of the project. The removal of these sediments and their constituents of concern (i.e.; heavy metals, organic chemicals, pesticides, phosphorus, etc.) from the Federal navigation channel and their effective isolation from the aquatic ecosystem significantly contribute to the overall environmental improvement of Maumee Bay. In our evaluation of the environmental effects of the project, we contend that the segregation of these pollutants in the proposed dredged material containment area is a significant beneficial impact.

The U.S.-Canada International Joint Commission has designated the Maumee River and Bay as one of 43 Areas of Concern (AOC) where pollution problems may affect the Great Lakes ecosystem. The 1987 amendments to the U.S.-Canada Great Lakes Water Quality Agreement specify requirements for Remedial Action Plans (RAP) for each AOC. The Ohio Environmental Protection Agency (OEPA) is responsible for ensuring development of the RAP and the Toledo Metropolitan Area Council of Governments (TMACOG) has been contracted to write it. Effective implementation of the Maumee River RAP may reduce both point and nonpoint sources of pollution and pollutant inputs into the system. As polluted sediments are annually removed from the Toledo Harbor channel through our annual dredging program and incoming pollutant levels are reduced, the net result is projected to be a gradual improvement in bottom sediment quality. Not only does this removal improve the substrate for benthic organisms within the channel, but it also reduces the quantity of pollutants resuspended into the water column and available for subsequent transport to other areas of the bay.

We disagree with your statement that the Corps of Engineers does not acknowledge future improvements in water quality and aquatic habitat conditions in the project area without project construction. The Buffalo District was involved throughout the course of USFWS's modified HEP (Habitat Evaluation Procedures) analysis of existing and future without-project habitat values of the proposed CDF site and various alternative mitigation plans. We reviewed and concurred with USFWS's water quality projections which were subsequently incorporated into the calculation of habitat suitability indices and habitat units. Our position is that the beneficial effects of confining over 7,400,000 cubic yards of "heavily polluted" harbor sediments are key to future water quality and aquatic habitat improvements in the project area and sufficiently offset the physical loss of habitat in Maumee Bay.

Environmental Analysis Branch
SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

We reviewed USFWS's Fish and Wildlife Coordination Act Report and Mitigation Planning Supplement. On the basis of these reports, and confinement of 7.4 million cubic yards of contaminated material and resulting improvement of the bay, we conclude that separable mitigation features are not warranted.

You expressed concern that the life of the proposed CDF may be shortened if open-lake disposal of unpolluted/moderately polluted dredged material is no longer permitted and this material is placed in the proposed facility. The facility is planned and designed strictly for the confinement of heavily polluted materials. If open-lake disposal is suspended after 1991, other disposal options must be implemented or Toledo Harbor dredging may cease. To address this possibility, the Toledo-Lucas County Port Authority and TMACOG are currently studying alternative dredged material disposal/re-use options.

USFWS, OEPA, Ohio Department of Natural Resources, and the Corps of Engineers met on September 25, 1990 in Columbus, Ohio, to discuss the mitigation issue. Each agency presented their views regarding the relative significance of the affected fish and wildlife resources at the CDF site. The meeting indicated that there are differing opinions among the agencies regarding the values attributable to affected resources and the level of significance assigned to the site. We will prepare a draft Record of Decision for our Division Commander's signature which will document these alternative viewpoints, the Corps of Engineers' decision on the project, and all the factors which were considered in making this decision.

Thank you for your comments on the proposed project. Our point of contact pertaining to this matter is Mr. William Butler of the Environmental Analysis Section who may be contacted by calling telephone number 716-879-4175 or by writing to his attention at the above address.

Sincerely,

MAJ Plank

John W. Morris
Colonel, U.S. Army
Commanding

CF:
CENCB-PP-PM
CENCB-PE-P
CENCB-PE-PR

Concur:
CENCB-PE-HQ KAL 10/18
CENCB-CO-MO
CENCB-PE-S 10/11
CENCB-PP-PM BT 10/11
CENCB-OC

Butler WDB 10/10
Bennett Acdg for 10/10
Zorich
Brooks 10/11
Plank
Morris

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

17 AUG 1990

REPLY TO ATTENTION OF:

Major David P. Plank
Acting District Commander
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Major Plank:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Region 5 Office of the U.S. Environmental Protection Agency has reviewed the Final Environmental Impact Statement on the Toledo Harbor Confined Disposal Facility (CDF) in Lucas County, Ohio. The Buffalo District proposes to construct the CDF to contain maintenance dredge material from the Federal deep-draft navigation channel in the Maumee River and Maumee Bay. The CDF is to be constructed adjacent to the existing 242 acre Federal CDF and the Toledo Edison CDF. The new CDF is to be approximately 155 acres in size with a capacity of 7,320,000 cubic yards. We provided comments on the Draft EIS on August 14, 1986. In those comments, we indicated our environmental concerns regarding the proposed development. Our concerns focused on the design and the effectiveness of the CDF to minimize or prevent the release of fine particles through the dike wall and the need to mitigate for the loss of 155 acres of lake bottom and shallow water habitat.

It is proposed that three monitoring wells will be incorporated into the design. These monitoring wells are to provide the opportunity to check water quality of the water migrating through the dike walls. Also periodic monitoring of the overflow weir would be done to assure water quality was achieved. Specific monitoring plans need to be developed prior to construction of the CDF. These monitoring plans should include the frequency of sampling and the specific parameters to be measured. This would be for both the overflow weirs and the monitoring wells in the dike wall. Target concentrations for each pollutant parameter should also be specified. If these concentrations were detected, mitigation or treatment measures would need to be implemented. These target concentrations should be set to protect public health and welfare and to achieve compliance with applicable water quality standards.

In regard to the mitigation Plan. The Final EIS indicates that specific measures would not be provided. The rationale for this decision was based upon two factors, the action of dredging and confining the material was determined to be mitigation for water quality impacts, and secondly the lake bottom and shallow water habitat did not constitute a scarce or unique habitat. While we may agree that the dredging of the contaminated sediments is beneficial, the loss of 155 acres of shallow water habitat needs to be mitigated is some manner. The requirement to mitigate for this loss remains. Your agency should propose measures which are feasible mitigation options to be included in the record of decision.

Based upon our review of the Final EIS, we continue to have concerns regarding the environmental impacts with this proposal. We believe these concerns can be resolved without much difficulty. We are willing to meet to discuss our concerns. If you have any questions, or desire to arrange a meeting, please contact Jennifer Brown of my staff at 312/886-6873.

Sincerely yours,

William D Franz

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

OCT 16 1990

16 Oct 90 09 38

Environmental Analysis Section

SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

Mr. William D. Franz, Chief
Environmental Review Branch
Planning and Management Division
U.S. Environmental Protection Agency, Region 5
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Franz:

We have reviewed your August 17, 1990 letter which provides your comments on the Final Environmental Impact Statement for the proposed construction of a confined disposal facility (CDF) at Toledo Harbor, Ohio. The following information addresses your concerns.

My Water Quality Section has developed a water quality monitoring plan to evaluate the effectiveness of the proposed CDF in limiting the release of pollutants through the dike wall. The details of this plan are outlined in Enclosure 1.

We base our rationale for our position regarding your recommendation for fish and wildlife mitigation measures on the net environmental impact of a project and the significance of affected resources. Before consideration may be given to providing mitigation measures, the Corps of Engineers must first give full credit to the beneficial aspects of the project. If the project has negative environmental impacts or if a significant fish and wildlife resource is adversely affected, then the evaluation of mitigation measures would be appropriate. In effect, when a project involves the expenditure of Federal funds, clear and convincing evidence must show that on balance the project has negative impacts or significant resources would be adversely affected. Our current assessment of the proposed project does not show such evidence.

I concede that the question of "significance" is a value judgment. The Corps of Engineers bases its determination of significance of fish and wildlife resources on both their monetary and non-monetary values. Monetary values are quantifiable and may be incorporated into a project economic evaluation. Non-monetary values are admittedly subjective and based on technical, institutional, and public recognition of the ecological, cultural, and aesthetic attributes of the affected

Environmental Analysis Branch
SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

fish and wildlife resources. Criteria for determining significance include, but are not limited to, the scarcity or uniqueness of the resource from a national, regional, State, or local perspective.

In order to help evaluate the project impacts and significance of the fish and wildlife resources at the CDF site, the Buffalo District used the U.S. Fish and Wildlife Service's (USFWS) Fish and Wildlife Coordination Act Report to provide additional information on the site's habitat values. After reviewing USFWS's assessment and weighing it against the beneficial impacts associated with the confinement of 7.4 million cubic yards of "heavily polluted" harbor sediments, we conclude that the net impacts would be beneficial and there are no significant resources in the project area. Therefore, the inclusion of separable mitigation measures into the construction of the proposed project is not justifiable.

Thank you for your comments on the proposed project.

Our point of contact pertaining to this matter is Mr. William Butler of the Environmental Analysis Section who may be contacted by calling telephone number 716-879-4175 or by writing to him at the above address.

Sincerely,

SIGNED
John W. Morris
Colonel, U.S. Army
Commanding

Enclosure

CF:
CENCB-DP
CENCB-PE-P
CENCB-PE-PR

Concur:
CENCB-PE-HQ RAL
CENCB-PE-S RT 10/11
CENCB-PP-PM BT 10/11
CENCB-OC

Butler/bb WB 10/10
Bennett
Zorich 10/11
Brooks 10/12
Plank ________
Morris ________

CDF EXPANSION
TOLEDO HARBOR
LUCAS COUNTY, OHIO

WATER QUALITY MONITORING PLAN

The Buffalo District will monitor the quality of water discharged over the weir and through the dike of the expanded Toledo Harbor CDF. This will be performed during the annual three-month period in which dredged materials are placed in the facility. Water is not expected to be discharged over the weir until about the 10th year of operation; accordingly, weir monitoring will not commence until then. Any significant contaminants will be associated with total suspended solids (TSS) in the effluent. Therefore, TSS in the weir overflow will be monitored during the three month-period.

During the first three days of the monitored period, TSS will be sampled twice a day to assure that they are not above the target level (100 mg/l). If TSS are below the target level, a sample will be taken once a week over the three-month monitoring period to confirm the levels. If the target level is exceeded, twice daily samples will be collected until the TSS concentrations are less than or equal to 100 mg/l. Detention times and/or dredging schedules, or CDF effluent locations will be adjusted to achieve the stated goal.

Three monitoring wells will be incorporated into the north face of the new dike. These will be monitored during disposal operations to detect the possible movement of contaminants through the dike. In order to ascertain if changes in water quality outside the dike are related to dike seepage, a background sampling site will be located at least 500 feet from the dike. Samples will also be taken approximately 50 feet outside of the dike perimeter to detect possible contamination from dike seepage.

Monitoring wells and bay sampling sites will be monitored at the beginning of each disposal season and on at least three other occasions during annual disposal operations. Wells will be monitored for the following parameters: TSS, total metals (i.e., Copper, Zinc, Lead, Mercury, Cadmium, Chromium, Arsenic, and Nickel), dissolved metals (i.e., those passing a 0.45μ filter), Phosphorus, and PAH's. Metals, Phosphorus, and PAH's are historical contaminants of concern at Toledo Harbor.

The objective of monitoring seepage through dikes is to determine if there is an adverse affect of seepage on ambient bay water quality. Based on previous seepage monitoring efforts at other similarly constructed CDF's on Lake Erie (i.e., Cleveland, Ohio and Buffalo, New York), adverse effects are not anticipated and are highly unlikely. However, if adverse influences on bay water quality are detected, measures will be taken to control any contaminant movement through the dike. These include temporary divider dikes and alteration of dredge disposal schedules. The Ohio Environmental Protection Agency will be notified if target levels are exceeded.

ODNR
OHIO DEPARTMENT OF
NATURAL RESOURCES

Fountain Square
Columbus, Ohio 43224

SEP 4 3 1

SEP 4 12 51 PM '90 MAILROOM SHRIM-S

August 31, 1990

Major David Plank
Acting District Commander
Buffalo District, Corps of Engineers
U.S. Department of the Army
1776 Niagara Street
Buffalo, New York 14207-3199

RE: Final Environmental Impact Statement
Toledo Harbor Confined Disposal Facility

Dear Major Plank:

The Ohio Department of Natural Resources (ODNR) has reviewed the Final Environmental Impact Statement (FEIS) for the Toledo Harbor Confined Disposal Facility (CDF). The proposed CDF would contain polluted dredge material from the federal deep-draft navigation channel in the Maumee Bay and River. It would be constructed adjacent to the existing Port Authority CDF and federal CDF. The new CDF would be approximately 155 acres in size and hold 7,320,000 cubic yards of dredged material.

These comments were generated by an inter-disciplinary review in consultation with the Divisions of Wildlife, Geological Survey, Natural Areas and Preserves, Soil & Water Conservation, and Water. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act and other applicable laws and regulations.

Our major concern on this proposed project has been and continues to be the permanent loss of approximately 155 acres of aquatic habitat as a result of the construction of the CDF. The FEIS does not adequately address this loss and appropriate mitigative measures.

On July 16, 1987, the U.S. Fish and Wildlife Service submitted their Final Fish and Wildlife Coordination Act (FWCA) Report on the Toledo CDF to Colonel Clark, Buffalo Corps of Engineers. In a letter dated May 26, 1987, ODNR concurred with the findings and recommendations contained in that report.

On April 28, 1989, the U.S. Fish and Wildlife Service submitted their Mitigation Planning Supplement to the FWCA Report to Colonel Boyd, Buffalo Corps of Engineers. In a letter dated May 2, 1989, ODNR concurred with the findings and recommendations included in that supplement.

It is the judgement of ODNR that the loss of the estimated 155 acres of aquatic habitat constitutes the loss of a significant fish and wildlife resource within Maumee Bay. This loss justifies the incorporation of adequate mitigative measures as previously proposed in the FWCA Report and the Supplement and supported by ODNR. We, therefore, oppose the construction of this CDF without full mitigative measures as contained in the FWCA Report and the Supplement being incorporated into the final plan. We are fully prepared to work with you and the other resource agencies on this issue.

Paragraph 2.5.1 of the section 404(b)(1) evaluation mentions the presence of a sand and gravel shoal at the project site. This shoal is described as being a triangular area 75 feet wide by 150-600 feet long (the navigation chart for the harbor shows a much larger area). The volume of granular material contained in the shoal is estimated to be at least 1000-5000 cubic yards, based upon information provided in the text. Given the paucity of sand and gravel in Maumee Bay, we recommend that this shoal be dredged and used for beach and/or fish habitat enhancement.

In addition, paragraphs 2.2.15 - 2.2.19, pages EIS-8 and 9 discuss possible uses of dredged material. One potential use identified was 1,000,000 cubic yards for the Buckeye Basin Project. While it was indicated that no viable use for the dredged material has been found, we think it inappropriate for the Corps of Engineers to discuss (and thereby indirectly promote) the use of material dredged from a Corps of Engineers project for wetland fill for the non-water dependent uses proposed for the Buckeye Basin. In our opinion, this constitutes a violation of Executive Order No. 11990 which directs agencies to "minimize the destruction, loss or degradation of wetlands".

We appreciate the opportunity to provide these comments. If you have any questions or need additional information on this project, please call Mr. Dave Bergman, Environmental Review Coordinator at (614) 265-6410.

Sincerely,

for Michael D. Craden, Chief
Office of Outdoor Recreation Services

MDC/DB:ag
cc: Brigadier General Jude Patin, North Central Division, Chicago
Kent Kroonemeyer, USFWS
Colleen Crook, Ohio EPA
William D. Franz, Chief, Environmental Review, USEPA, Chicago
Bob Lucas, Office of the Chief Engineer
John Marshall, Division of Wildlife
Don Guy, Lake Erie Office, Division of Geological Survey
Dick Bartz, Division of Water

Environmental Analysis Section OCT 15 1990

SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

Dr. Michael D. Craden
Chief
Office of Outdoor Recreation Services
Ohio Department of Natural Resources
Fountain Square
Columbus, Ohio 43224

Dear Dr. Craden:

We have reviewed your August 31, 1990 letter which provides your comments on the Final Environmental Impact Statement for the proposed construction of a confined disposal facility (CDF) at Toledo Harbor, Ohio. The following information addresses your concerns.

We base our rationale for our position regarding recommended fish and wildlife mitigation measures on the net environmental impact of a project and the significance of affected resources. Before consideration may be given to providing mitigation measures, the Corps of Engineers must first give full credit to the beneficial aspects of the project. If the project has negative environmental impacts or if a significant fish and wildlife resource is adversely affected, then the evaluation of mitigation measures would be appropriate. In effect, when a project involves the expenditure of Federal funds, clear and convincing evidence must show that significant resources would be adversely affected. Our current assessment of the proposed project does not show such evidence.

The Corps of Engineers bases the significance of fish and wildlife resources upon both their monetary and non-monetary values. Monetary values are quantifiable and may be incorporated into a project economic evaluation. Non-monetary values are admittedly subjective and based on technical, institutional, and public recognition of the ecological, cultural, and aesthetic attributes of the affected fish and wildlife resources. Criteria for determining significance include, but are not limited to, the scarcity or uniqueness of the resource from a national, regional, State, or local perspective.

Environmental Analysis Section
SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

The dredging and containment of "heavily polluted" Toledo Harbor sediments are the major beneficial environmental effects of the project. The removal of these sediments and their constituents of concern (i.e.; heavy metals, organic chemicals, pesticides, phosphorus, etc.) from the Federal navigation channel and their effective isolation from the aquatic ecosystem significantly contribute to the environmental quality of Maumee Bay. In our evaluation of the environmental effects of the project, we contend that the segregation of these pollutants in the proposed dredged material containment area is a significant beneficial impact.

The U.S.-Canada International Joint Commission has designated the Maumee River and Bay as one of 43 Areas of Concern (AOC) where pollution problems may affect the Great Lakes ecosystem. The 1987 amendments to the U.S.-Canada Lakes Water Quality Agreement specify requirements for Remedial Action Plans (RAP) for each AOC. The Ohio Environmental Protection Agency (OEPA) is responsible for ensuring development of the RAP and the Toledo Area Council of Governments (TMACOG) has been contracted to write it. Effective implementation of the Maumee River RAP may reduce both point and nonpoint sources of pollution and pollutant inputs into the system. As polluted sediments are removed from the Toledo Harbor channel annually through our dredging program and incoming pollutant levels are reduced, the net result is a gradual improvement in bottom sediment quality. Not only does this removal improve the substrate for benthic organisms within the channel, but it also reduces the quantity of pollutants resuspended into the water column and available for subsequent transport to other areas of the bay.

The Buffalo District was involved throughout the course of the U.S. Fish and Wildlife Service's (USFWS) modified HEP (Habitat Evaluation Procedures) analysis of existing and future without-project habitat values of the proposed CDF site and various alternative mitigation plans. We reviewed and concurred with USFWS's water quality projections which were subsequently incorporated into the calculation of habitat suitability indices and habitat units. Our position is that the beneficial effects of confining over 7,400,000 cubic yards of "heavily polluted" harbor sediments are key to future water quality and aquatic habitat improvements in the project area and sufficiently offset the physical loss of habitat in Maumee Bay.

Environmental Analysis Section
SUBJECT: Toledo Harbor, Ohio, Confined Disposal Facility

We reviewed the USFWS's Fish and Wildlife Coordination Act Report and Mitigation Planning Supplement. On the basis of the information contained in these reports, and confinement of 7.4 million cubic yards of contaminated material and resulting improvement of the bay, we conclude that separable mitigation features are not warranted.

Regarding the sand and gravel shoal at the CDF site, I am amenable to its excavation and use as beach fill and/or fish habitat enhancement. The cost of this measure could be included in the overall project costs since removal of the shoal would result in an increase in the capacity of the CDF. I will explore this proposal further and have my staff coordinate with your Division of Wildlife to assess candidate sites for shoal relocation.

TMACOG identified the Buckeye Basin Greenbelt as a potential dredged material re-use site for material which could be removed from Toledo area CDF's to increase their capacity (Hull Consulting, "Preliminary Report of Alternate Dredge Disposal Methods for the Toledo, Ohio, Harbor", March 18, 1987). I do not consider this option a viable alternative to the construction of the proposed CDF and will not support the use of dredged material as fill if wetland areas are involved.

Thank you for your comments on the proposed project.

Our point of contact pertaining to this matter is Mr. William Butler of the Environmental Analysis Section who may be contacted by calling 716-879-4175 or by writing to his attention at the above address.

Sincerely,

SIGNED

John W. Morris
Colonel, U.S. Army
Commanding

CF:
CENCB-DP
CENCB-PE-P
CENCB-PE-PR

Concur:
CENCB-PE-HQ KPL 10/10
CENCB-CO-MO
CENCB-PE-S 10/11
CENCB-OC
CENCB-CO-S
CENCB-PP-PM BT 10/11

Butler/bb/ls WOB 10/10
Bennett RFB Acts for 10-10
Zorich 10/11
CA Brooks 10/12
MAJ Plank
COL Morris

OhioEPA
State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020 Fax (614) 644-2329

Richard F. Celeste
Governor

October 5, 1990

Re: Lucas County
City of Toledo
401 Certification - Grant
Construct A 155 Acre Confined Disposal
Facility in Maumee Bay

Colonel John W. Morris
U.S. Army Corps of Engineers,
Buffalo District
1776 Niagra Street
Buffalo, New York 14207-3199

Dear Colonel Morris:

Pursuant to Section 401 of the Federal Water Pollution Control Act, Public Law 95-217, the Director of the 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:

Within 90 days from the date of this letter, the U.S. Army Corps of Engineers shall submit a mitigation plan to the Director of the Ohio EPA. Written approval for the mitigation plan from the Director of the Ohio EPA is required prior to commencement of construction of the confined disposal facility.

The Corps shall monitor the effluent quality from the proposed confined disposal facility during weir overflow events. During the first three days of discharge associated with the dredging operations, total suspended solids (TSS) shall be monitored twice daily. Should the TSS concentrations exceed 100 mg/l, steps shall be taken to modify the detention times and dredge material disposal operations in order to meet an effluent TSS concentration of 100 mg/l. Twice daily grab samples shall continue until the effluent TSS concentrations is less than or equal to 100 mg/l, after which TSS shall be monitored by a weekly grab sample.

The Corps shall notify the Ohio EPA Section 401 Coordinator in the event that the effluent TSS concentration exceeds 100 mg/l. The Corps shall provide the Ohio EPA with the operation modification implemented to achieve the 100 mg/l TSS.

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 at the following address:

Environmental Board of Review
236 East Town Street, Room 300
Columbus, Ohio

Sincerely,

Richard L. Shank

Richard L. Shank, Ph.D.
Director

RLS/cc

cc: Don Schregardus, Deputy Director, Ohio EPA
Joseph Sommer, Director, Ohio Department of Natural Resources
Kent Kroonemeyer, U.S. Fish and Wildlife Service, Reynoldsburg
Lynn Lewis, U.S. Fish and Wildlife Service, Twin Cities
William Franz, U.S. EPA, Region V
DWQPA

NOTE: SUBSTANTIAL SUBSEQUENT COORDINATION OCCURRED PERTAINING TO MITIGATION REQUIREMENTS.

RECORD OF DECISION
TOLEDO HARBOR CONFINED DISPOSAL FACILITY (CDF)
LUCAS COUNTY, OHIO

I have reviewed the Final Environmental Impact Statement for dredging the Federal navigation channel and confining contaminated harbor sediments at Toledo Harbor, Ohio. Based on this review and the views of interested agencies and the concerned public, I have selected the least costly, environmentally acceptable plan.

The selected plan would occupy 167 acres of lake bottom, with an estimated disposal life of 21 years for confining 7.4 million cubic yards of heavily polluted dredged material. The plan includes the following:

a. Construction of a 4,260-foot long limestone and clay dike.

b. Raising and widening the Toledo-Lucas Port Authority CDF dikes.

c. Construction of an overflow weir.

d. A new discharge pipeline to four discharge points.

e. Construction of a 450-foot access road.

In addition to the selected plan, the alternatives considered include no action, elevating the existing Corps of Engineers' CDF, and reuse of the dredged material. The selected plan is the environmentally preferred alternative, because it is designed to effectively isolate heavily polluted Toledo Harbor sediments from the aquatic ecosystem and minimize adverse impacts on water quality and circulation.

The U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and Ohio Department of Natural Resources recommended mitigation measures to compensate for the unavoidable loss of 167 acres of shallow water habitat. In response to these recommendations, I have assessed the need for fish and wildlife mitigation. Discharge of the contaminated sediments in the CDF would result in substantial net beneficial impacts, since it would effectively remove these sediments from the aquatic ecosystem. In addition, there are no significant resources impacted at the site. Therefore, I have concluded mitigation is not justified.

RECORD OF DECISION
TOLEDO HARBOR CONFINED DISPOSAL FACILITY (CDF)
LUCAS COUNTY, OHIO (cont)

The Section 401(a) Water Quality Certification for the project was issued by the Ohio Environmental Protection Agency to the project sponsor, Toledo-Lucas County Port Authority, on March 20, 1992. I have considered all other applicable laws, executive orders, regulations, and local government plans. I have adopted all practicable and justifiable means to avoid or minimize adverse environmental effects of the selected plan.

Russell L. Fuhrman

Russell L. Fuhrman
Brigadier General, U.S. Army
Commanding General and
Division Engineer

DATE: 14 May 92