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Great Lakes Water Quality Board

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Great Lakes Water Quality Board  
Report to the International Joint Commission

GD 22... IJC.60 83NS6

**1983 Report on Great Lakes Water Quality**

**Appendix**

**Dredging Subcommittee Report**

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1987 Report on Great Lakes Water Quality

Appendix

Dredging Subcommittee Report

August 1988  
Windsor, Ontario

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# Acknowledgement

The Dredging Subcommittee expresses its gratitude to the members of the Water Quality Programs Committee and the Water Quality Board for their continued support.

Also, the Subcommittee wishes to thank Dr. M. H. Sadar and Ms. Mary Ann Morin for their valuable contribution towards the completion of this report.

1. Evaluation of Dredged Material Disposal Options for Two Great Lakes Harbours Using the Water Quality Board Dredging Subcommittee Guidelines
2. Great Lakes Dredging in an Ecosystem Perspective—Lake Erie
3. Workshop on "Open-Tank Disposal Site Selection Criteria Development", and
4. Assessment of Toronto and Toledo Harbour sediments

In addition, the Subcommittee addressed in-pilot markets for beneficial uses of dredged materials and studied the impacts on wetlands from dredging activities in the Great Lakes. This report contains a summary of the major findings, conclusions and recommendations of the Dredging Subcommittee pertaining to the above-listed activities.

\*Copies of the reports pertaining to these two projects are available on request from the IJC Regional Office, Windsor, Ontario.

## I. Introduction

Since its inception in 1979, the Dredging Subcommittee of the Water Quality Board has either completed or initiated the following projects:

1. \*Guidelines and Register for Evaluation of Great Lakes Dredging Projects;
2. \*Evaluation of Dredged Material Disposal Options for Two Great Lakes Harbours Using the Water Quality Board Dredging Subcommittee Guidelines;
3. Great Lakes Dredging in an Ecosystem Perspective--Lake Erie;
4. Workshop on "Open-lake Disposal Site Selection Criteria Development"; and
5. Bioassessment of Toronto and Toledo Harbour sediments.

In addition, the Subcommittee addressed in-place pollutants, beneficial uses of dredged materials and updated the impacts on wetlands from dredging activities in the Great Lakes. This report contains a summary of the major findings, conclusions and recommendations of the Dredging Subcommittee pertaining to the above-listed activities.

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# 1. Introduction

Since its inception in 1972, the dredging Subcommittee of the Water Quality Board has either organized or initiated the following projects:

1. \*Guidelines and Register for Evaluation of Great Lakes Dredging Projects;
2. \*Evaluation of Dredged Material Disposal Options for the Great Lakes Harbours Using the Water Quality Board Dredging Subcommittee Guidelines;
3. Great Lakes Dredging in an Ecological Perspective—A Study;
4. Workshop on "Open-Lake Disposal Site Selection Criteria Development" and
5. Reassessment of Toronto and Toledo Harbour Sediments.

In addition, the Subcommittee addressed in-house pollutants beneficial uses of dredged materials and updated the impact on wetlands from dredging activities in the Great Lakes. This report contains a summary of the major findings, conclusions and recommendations of the Dredging Subcommittee pertaining to the above-listed activities.

\*Copies of the reports pertaining to these two projects are available on request from the I.R. Regional Office in Windsor, Ontario.

## 2. Guidelines and Register for Evaluation of Great Lakes Dredging Projects

The dredging register portion of this report contains information about the volumes of material dredged from the Great Lakes from 1975 to 1979. Loadings of volatile solids, PCBs, mercury, lead, copper, zinc, nickel, chromium, cadmium and total phosphorus in these dredged materials are given as estimates (based on total concentration) of the amounts of materials dredged. The register has been updated to include the 1980-1981 dredged material volumes. The updated data portion of the register is available on request from the IJC Great Lakes Regional Office in Windsor.

In the Guidelines, the Subcommittee reaffirmed the site-specific approach to the environmental review of dredging projects as recommended in the 1975 report of the International Working Group on Dredging. The conceptual approach taken in the Guidelines does not differ markedly from that presently used on the lakes and is similar to procedures followed in the ocean dumping legislation of the United States and Canada. The basic components of a project evaluation consist of a review of existing site-specific historical and ecological information, an assessment of the physical and chemical characteristics of the dredged material and an evaluation of dredged material disposal options. In keeping with site-specific approach the Dredging Subcommittee proposed chemical screening guidelines based on contaminant levels in the surface sediments of depositional zones of each lake.

Methods to determine and evaluate the biological significance of sediment contaminants are still in the developmental stages and further research is required in the field of toxic substances and sediment bioassessment.

The Dredging Subcommittee recommended that:

1. The principle of non-degradation should be considered as fundamental in the environmental assessment of dredging activities in the Great Lakes.
2. Significant sources of sediments and contaminants to the Great Lakes should be identified and quantified where possible such that the inputs due to dredging can be placed in an ecosystem perspective.
3. The implications and potential environmental impacts of dredged material disposal options should be fully assessed during project evaluation.
4. More research should be directed towards bioassessment procedures for determining the biological availability and impact of sediment contaminants.
5. Programs to identify and control sources of sediments and contaminants within watersheds should be encouraged.

# 1. Guidelines and Register for Evaluation of Great Lakes Dredging Projects

The dredging register portion of this report contains information about the volume of material dredged from the Great Lakes from 1975 to 1979. Loadings of volatile solids, PCBs, mercury, lead, copper, zinc, nickel, chromium, cadmium and total phosphorus in these dredged materials are given as estimates based on total concentrations of the various materials dredged. The register has been updated to include the 1980-1981 dredging season. The register is available in two volumes. The updated data portion of the register is available as a report from the IJC Great Lakes Regional Office in Windsor.

In the Guidelines, the Subcommittee reaffirmed the site-specific approach to the environmental review of dredging projects as recommended in the 1975 report of the International Working Group on Dredging. The committee approach taken in the Guidelines was an effort to identify the most sensitive areas on the lakes and to establish procedures followed in the ocean dredging legislation of the United States and Canada. The basic components of a project evaluation consist of a review of activities which affect historical and ecological information, an assessment of the physical and chemical character of the dredged material and an evaluation of disposal material disposal options. In keeping with the approach of the Guidelines, the Subcommittee proposed chemical analysis guidelines based on sediment levels in the surface sediments of representative areas of each lake.

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### 3. Toledo-Toronto Harbours Study

The Subcommittee, as requested by the Water Quality Board, assessed the practicality of the 1982 Guidelines through evaluation of dredging projects in the Toronto and Toledo harbours using available data. The details of the above study are given in the Dredging Subcommittee report entitled "Evaluation of Dredged Material Disposal Options for Two Great Lakes Harbours Using the Water Quality Board Dredging Subcommittee Guidelines".

As a result of this exercise, the Subcommittee concluded that:

1. The Guidelines provide a practical and feasible method for evaluating, on the basis of available information, dredged material disposal options within the Great Lakes system, including harbours and navigable channels.
2. The use of these Guidelines will lead to a greater degree of inter-jurisdictional uniformity and compatibility in evaluating dredged material disposal options.
3. Bioassessment is not currently a primary evaluation tool due to problems associated with standardization and reproducibility of some of these tests and also due to the high cost of performing these tests on a routine basis. In spite of these difficulties, bioassessment can be currently utilized to supplement the results and conclusions arrived at through bulk chemical characterization of sediment. Without sediment bioassessment, dredged material disposal options will be limited and bulk sediment contaminant criteria will remain largely unsubstantiated in terms of potential long-term ecosystem impacts. A further refinement and standardization of bioassessment techniques is, therefore, essential for identifying and recommending additional disposal options, particularly when the sediment chemistry cannot be considered as a decisive factor.
4. The site-specific use of these Guidelines could be considerably enhanced by having up-to-date information on surficial sediment contaminant concentrations on a lakewide and sub-basin basis.

The Dredging Subcommittee recommended that:

1. The Water Quality Board support the use of these Guidelines by the participating jurisdictions for the evaluation of dredged material disposal options in the Great Lakes system.
2. Further refinement and standardization of currently available elutriate test and sediment bioassessment techniques be undertaken and additional simplified and reliable but less expensive methods be developed.
3. A scheme for comprehensive and periodic monitoring of the lakewide and sub-basin surficial sediment concentrations of contaminants be developed and implemented.

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3. Dredging is not currently a primary evaluation tool due to problems associated with standardization and reproducibility of data of these tests and also due to the high cost of performing these tests on a routine basis. In spite of these difficulties, dredging can be evaluated on a limited basis to supplement the results and conclusions arrived at through bulk chemical characterization of sediment. Without sediment characterization, dredged material disposal options will be limited and less sediment containment criteria will result. Further refinement and standardization of dredging evaluation techniques is therefore essential for identifying and recommending suitable disposal options, particularly when the sediment chemistry cannot be considered as a decisive factor.
4. The site-specific use of these Guidelines could be considerably enhanced by having up-to-date information on available sediment containment concentrations on a Toledo and Toronto basis.

The Dredging Subcommittee recommended that:

1. The Water Quality Board support the use of these Guidelines by the participating jurisdictions for the evaluation of dredged material disposal options in the Great Lakes system.
2. Further refinement and standardization of currently available methods for test and sediment characterization techniques be undertaken and additional simplified and reliable but less expensive methods be developed.
3. A scheme for comprehensive and periodic monitoring of the Toledo and Toronto sub-basin sediment concentrations of contaminants be developed and implemented.

#### 4. Great Lakes Dredging in an Ecosystem Perspective - Lake Erie

This study which was completed under a contract, was meant to fulfill, in part, recommendation (2) in the Subcommittee's 1982 report, which reads as follows:

"Significant sources of sediments and contaminants to the Great Lakes should be identified and quantified where possible such that the inputs due to dredging can be placed in perspective."

As a result of this study and also its own deliberations, the Dredging Subcommittee has reaffirmed that when placed in the perspective of the total loading from all sources, dredging is a relatively minor, but among the more easily controllable, sources of contaminant loadings to Lake Erie. It is, however, of approximately the same magnitude as point source.

It is evident from the literature review that measurable dredging impacts are localized and probably have relatively minor impacts on the Lake Erie ecosystem as a whole. However, the need for monitoring or studies that concurrently address contaminants in water, sediments, and biota have been clearly indicated. With such an approach, understanding the dynamics of contaminants and their effects in the aquatic ecosystem is more probable.



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## 5. Open Lake Disposal Site Selection Guidelines

In its January 1982 Guidelines and Register for Evaluation of Great Lakes Dredging Projects, the IJC Dredging Subcommittee included a set of preliminary guidelines for selecting open lake disposal sites (p. 63) for dredged material. However, these initial guidelines did not provide detailed guidance on how to select open lake disposal sites.

Since an estimated 40% of the material from Great Lakes dredging (based on 1975-1979 volumes) is disposed of in the open lake, the Dredging Subcommittee was faced with the urgent task of providing further guidance on how to select disposal sites for dredged materials that were suitable for open lake disposal according to the IJC Dredging Subcommittee Guidelines. Open lake disposal as used in the following is defined as unconfined disposal in open water.

A workshop was held in Toronto, Ontario on April 19 and 20, 1983 to address the issues associated with this selection process.

The major objectives of the workshop were:

1. An evaluation of existing procedures and criteria for designating open water disposal sites.
2. An identification of information gaps affecting the site selection process.
3. Development of guidelines for designating environmentally sound open water disposal sites in the Great Lakes.

The Subcommittee considered the deliberations of the workshop and pertinent literature, especially the proposed United States Federal Section 404(b)(1) guidelines\*, in formulating the guidelines.

The following proposed guidelines for selecting an open lake disposal site should be used, bearing in mind the site-specific conditions, types and quantities of dredged materials and methods of transportation used. Some of the guidelines may seem to be contradictory at times when applied simultaneously and with equal weight to certain locations. The weight assigned to various factors in such situations will depend on site-specific conditions.

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\*Federal Register, Vol. 44, No. 182/Tuesday, Sept. 18, 1979/Proposed Rules. EPA, (40 cfr, Part 230)(FRL 1241-3).  
Guidelines for Specification of Disposal Sites for Dredged or Fill Material, pp. 54222-54251. "404(b)(1) Guidelines".

Open Water Disposal Sites Should Be Located So As To Avoid Adverse Impacts On:

1. Commerce and transportation, including commercial shipping, commercial fishing, pipeline and cable crossings and mineral and aggregate extraction.
2. Water intakes and outfalls.
3. Recreational uses and aesthetic values of the area.
4. Bottom topography so as not to adversely impact water circulation, current patterns, water level fluctuations, temperature regime, erosion and accretion patterns, and wave climate.
5. Sites of natural, cultural, archaeological, historical, and research significance.
6. Sanctuaries and refuges, breeding, spawning, nursery and feeding habitats, and passage areas for biota.
7. Species of special interest such as threatened and endangered species.

In Addition, Open Water Disposal Sites Should:

1. Be compatible with physical and chemical characteristics of the dredged material to the extent practicable.
2. Utilize the smallest practicable disposal area.
3. Use current and past dredged material disposal sites, if these sites meet the proposed guidelines.
4. Be selected to minimize the dispersal, erosion and slumping of the material to affect the smallest practicable part of the waterbody.

In applying the above-mentioned guidelines, the following considerations need to be addressed.

IMPACT ON VARIOUS COMMERCIAL ACTIVITIES

The use of open lake areas for the disposal of dredged material should not conflict with other high priority uses. The sites selected should not interfere with navigation, commercial fishing, submerged pipelines or cables, and sand, gravel, or mineral extractions.

Information regarding the navigation channels in the Great Lakes is available from the nautical charts issued by the U.S. National Oceanic and Atmospheric Administration (NOAA). Similar nautical charts are available from the Canadian Hydrographic Service. Except for long, buoyed navigation channels extending several kilometers from shore, open lake disposal sites have typically been located one to three kilometers away from navigation channels. It is believed that this distance is sufficient to prevent potential adverse impacts to the navigation channels. At locations where open

lake disposal sites may be near commercial navigation sailing courses, minimum depths at Low Water Datum should be maintained, where feasible, in order to avoid grounding of vessels. The minimum depth needed at any specific area should be at least equal to the greatest project depth which is charted at nearby navigation channels and harbors. The locations of other installations in the lake bottom such as cables, pipelines, well-heads and commercial fishing net stakes are identified on the nautical charts. The NOAA Coast Pilot #6 for the Great Lakes should be consulted for detailed descriptions of available navigation depths in the vicinity of potential disposal sites. In those cases where it may not be possible to maintain a minimum depth, open lake disposal areas should be identified on new charts so navigators can avoid them.

Published information is not generally available regarding the locations of sand, gravel, or mineral resources and extraction activities in many areas of the Great Lakes. The current national and local permitting processes for disposal activities consider potential conflicts between open lake dredged material disposal and sand, gravel, or mineral extraction.

#### WATER INTAKES AND OUTFALLS

Use of open water disposal site should not interfere with municipal, industrial or other types of water intakes and outfalls.

Deposition of dredged material close to a water intake may increase the suspended solids load to a water treatment facility resulting in additional filtration requirements and costs. In some cases material deposited in the vicinity of a water intake may not have an immediate effect, since most dumping occurs during calm periods. Such material, however, can be resuspended during storms and affect the quality of water entering the intake. Mounds of material adjacent to an intake may also affect the proper functioning of the intake port as a result of physical obstruction to the port. Such mounds of materials often serve as an attractant to certain species of fish which could be drawn into an intake.

Disposal of dredged material close to an effluent outfall may reduce the dispersion of the effluent. Thermal, sewage and stormwater effluents require adequate mixing and transport via currents to prevent local water quality degradation. Mounds of dredged material could impede water movement in the vicinity of outfalls. Deposition of material resulting in blockage of a diffuser port on multiport outfalls may result in hydraulic overloading in the outfall. This would result in the diffuser caps being lifted off causing pressure drops at the remaining ports. Disposal in the vicinity of an outfall must be well outside of a safe zone designated by appropriate regulatory agencies and the agency and operator responsible for the outfall.

#### RECREATIONAL USES AND AESTHETIC VALUES OF THE AREA

An open water disposal site should be removed from areas of recognized recreational value such as beaches, and wildlife areas. Disposal procedures should be designed so as to prevent or minimize any potential damage to the aesthetically pleasing features of the open water site, especially in regards to water quality. Disposal operations should be timed so as not to interfere with the peak recreational period.

## BOTTOM TOPOGRAPHY

Bottom topography influences the current patterns and water circulation and, therefore, plays a critical role in the ecology of lakes. Current patterns and water circulation, i.e. physical movement of water in the aquatic system, act to transport sediment and dilute dissolved and suspended chemical constituents. They also transport food and nutrients for aquatic communities, provide directional orientation to migrating species, and moderate extremes in temperature variations. Normal water fluctuations in a body of water affect water depth, water quality, and are critical during spawning and feeding season. Prevalent accretion and erosion patterns in an area determine the bottom movement of material. Similarly, alterations in the wave climate can severely affect or destroy populations of aquatic animals and vegetation, modify habitats, reduce food supplies, and change accretion and erosion patterns.

The dredged material should be deposited in a layer of suitable thickness at the disposal site to maintain natural bottom contours and elevation. In locations where mounding is an acceptable and ecologically desirable alternative, the shape and orientation of the mounds should be such that they will have a minimal impact on the prevailing current pattern and water circulation. The height and shape of mounds should be such as not to change existing depths and available fetches to adversely alter the wave climate of the area. The disposal of the dredged material should not result in enclosed areas of stagnant water, especially during low water cycles.

## SITES OF HISTORICAL SIGNIFICANCE

Open lake dredged material disposal sites should be located away from areas of historical significance. Areas which are designated for their natural, cultural, archaeological, historical or scientific significance should be preserved in their existing state and managed so as to ensure continued access.

Natural areas include important examples of natural history in the form of plant and animal communities, landforms or geological features. Natural areas are tracts of water so little modified by man's activity or sufficiently recovered that they contain native plant and animal communities believed to be representative of the presettlement landscape.

Historic and cultural resources include sites, areas, structures and objects of significance in history, architecture, archeology or culture, e.g. sunken ships at the bottom of the Great Lakes. Sites such as Fathom Five Underwater Park near Tobermory in Georgian Bay, are valuable because in their natural and undisturbed state, they contain useful scientific information. In many areas known historical sites are catalogued. Where such information does not exist, it is advisable to carry out a scuba diving or alternative survey to ensure that the potential disposal is not of historical significance.

## SANCTUARIES AND REFUGES, BREEDING, SPAWNING, NURSERY AND FEEDING HABITATS, AND PASSAGE AREAS OF BIOTA

The disposal of dredged material should not damage or destroy wetlands, sanctuaries, refuges or other areas designated and managed for the preservation of fish and wildlife. Improper disposal can reduce suitable habitats for many species of fish, wildlife and other biota, and interfere with spawning, migration or other life stage activities. Habitats can also be damaged by changes in water levels or circulation and by smothering. Appropriate surveys of the area should be conducted prior to dredged material disposal in such areas.

## POSSIBLE IMPACTS ON SPECIES OF SPECIAL INTEREST

Applicable State and Federal listings of species whose continued existence is considered to be in jeopardy (i.e. those species designated as "rare and protected", "threatened", "endangered", etc.) must be considered when selecting a disposal site. The disposal site must not adversely impact on or interfere with the continued survival, reproduction or movement of such species or with management efforts to protect and rehabilitate such species. In addition, the disposal site must not adversely impact on or interfere with management plans or efforts for other species of special interest such as those designated for intensive management or for introduction into the Great Lakes. Included in these considerations is protection of the forage base upon which these species are dependent.

## SEDIMENT COMPATIBILITY WITH SUBSTRATE AT DISPOSAL SITE

Compatibility of the dredged material with the substrate at the disposal site is desirable in order to maintain the physical, chemical and biological state of the site. Some allowance for temporary changes in the substrate immediately following disposal can be made but the major objective should be either an improvement or a quick return to predumping substrate at the disposal site.

"Sediment matching" has been used to minimize the impact of dredged material disposal on biota. This involves finding an area having substrate similar to that at the site to be dredged and disposing of the dredged material at that location. Sediment matching accomplishes two things:

1. It reduces the time required for re-colonization by biota because organisms from nearby areas should be adapted to conditions found in the dredged material; and
2. It minimizes the time required for the establishment of a 'stable' biological community. The more similar the dredged material are to the surrounding area, the less time will be required to reach equilibrium with respect to both chemical and physical characteristics.

For the above two reasons, sediment matching should be employed if at all possible. However, there are circumstances that preclude the use of sediment

matching. These include availability of substrate similar to the substrate to be dredged, economics and need or desire on part of resource managers to create a new habitat type in an area.

If sediment matching is not practical, then consideration must be given to the type of sediment to be dredged and its compatibility with substrate at the disposal site. From a biological (habitat) perspective, sediment can be conveniently divided into three types: coarse - gravel, cobbles, boulders (with some fines); medium - sand with some fines; fine - silt and clay. Each of these has characteristics that make it more or less valuable to different components of the biological community.

Coarse grained sediments provide valuable habitat for many species of invertebrates, including those that are considered to be valuable as fish food, and generally provide good habitat for fish spawning, rearing and feeding.

Medium grained sediments provide poor substrate for invertebrates, except for the few species that are capable of living in and on this unstable, nutrient poor medium. Sand should not be deposited on another substrate type unless absolutely necessary. In cases where sand is deposited in deep water over fine sediment, there may be a long period of time over which the substrate will be altered unless sand passes completely through the softer material.

Fine grained sediments provide good substrate for benthic invertebrates but are generally poor for fish spawning. If macrophytes growth occurs, then excellent habitat for spawning, rearing and foraging is provided for some species. Fine sediments, however, are usually nutrient rich and can cause or aggravate enrichment problems.

#### MINIMIZING THE SIZE OF DISPOSAL AREA

Use of a site for dredged material disposal will have at least some short-term impacts. In order to minimize the area affected, the size of the disposal area used should be kept to a minimum. The disposal area must be easy to locate by the ship or barge operator so the material can be placed inside the designated site. To facilitate this, the disposal area should be clearly marked. Accurate site location is particularly important if the deposited material is to be capped with other materials (to better match substrate, enhance habitat or help seal off pollutants). The capping material must be accurately placed over the previously deposited material.

#### USE OF CURRENT AND PAST DISPOSAL SITES

Current and past open water disposal sites were chosen after consideration of factors such as distance from dredging site, proximity to navigation channels, etc. They may already be in compliance with the guidelines. The use of existing sites is preferred for localizing impacts of disposal. If there are some unavoidable adverse impacts from disposal, it would be preferable to continue to use existing sites where degradation has already occurred rather than affecting other areas. Since these sites have been used in the past, surveys can be done to determine actual impacts from their use by comparison with surrounding lake bottom outside the disposal area.

## MINIMIZING DISPERSAL, EROSION AND SLUMPING OF DREDGED MATERIAL AT THE DISPOSAL SITE

Retention of dredged materials at disposal sites can be fostered by proper site selection, disposal methods and dredged material stabilization. Disposal sites should, therefore, have the following characteristics: 1) particle sizes as fine as or finer than the dredged materials, 2) bottom slopes should not be steep, 3) sites should not be adjacent to channels. Use disposal sites which have shown minimum dispersal, slumping or erosion of dredged materials in the past.

Disposal methods which would aid in dredged material retention are: 1) accurate placement of dredged materials 2) timing of disposal so that water levels and currents would permit maximum settling and compaction and 3) minimization of substrate elevations.

Retention of dredged materials on-site can be fostered by: 1) capping or surrounding materials of small particle sizes with coarser materials, and 2) establishing aquatic or semi-aquatic vegetation as soon as possible.



MINI-MANAGEMENT OF WASTE MATERIAL AT THE DISposal  
SITE

Retention of dredged materials at disposal sites can be fostered by proper site selection. Disposal methods and the physical characteristics of sites should be chosen to suit the disposal of materials. The disposal site should be located in an area where the disposal of materials will not be a problem. The disposal site should be located in an area where the disposal of materials will not be a problem. The disposal site should be located in an area where the disposal of materials will not be a problem.

Disposal methods which would aid in dredged material retention are: (1) accurate placement of disposal materials; (2) leveling of disposal materials; (3) leveling disposal materials with disposal materials; (4) leveling disposal materials with disposal materials; (5) leveling disposal materials with disposal materials.

Retention of dredged materials on-site can be fostered by: (1) capping or supporting materials of disposal materials with disposal materials; (2) establishing disposal materials with disposal materials; (3) establishing disposal materials with disposal materials; (4) establishing disposal materials with disposal materials; (5) establishing disposal materials with disposal materials.

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## 6. In-Place Pollutants

Contaminated sediments in the Great Lakes Basin have been addressed mainly from the point of view of dredging and disposal. Consequently, the Dredging Subcommittee of the Great Lakes Water Quality Board in 1982, under the Committee's terms of reference, provided guidelines for the evaluation of dredging projects in harbours and channels of the Great Lakes. These guidelines did not consider the problems posed by in-place pollutants, i.e. sediment-associated contaminants which have the potential to act as a pollutant source to the water column.

As with dredged materials, the primary concern with in-place pollutants is the long-term effect on the aquatic biota and possibly on human health. In the Great Lakes the role of sediments as a significant source of fish contaminants and their effects on human health has not yet been adequately investigated and/or demonstrated. To protect the biota of the Great Lakes a number of criteria should be used to evaluate the in-place pollutant problems once the contaminant source has been controlled and the nature and extent of in-place pollutants have been determined.

First, the effects of the contaminated sediments on the aquatic biota in the vicinity of the sediments and the overlying waters should be assessed. The community structure of the flora and fauna living in, on or adjacent to the contaminated sediments should furnish data as to the toxic conditions of the sediments. On-site fish toxicity or bioaccumulation studies should be undertaken to determine if toxic materials of concern are leaving the contaminated sediments. The potential for fish flesh tainting due to sediment bound substances might also be evaluated.

Once the biological impacts of in-place pollutants are determined, a management plan can be formulated either to retain the sediment in place or remove the sediments. In situations where contaminant loads remain uncontrolled, dredging and removal of contaminated sediments may be required to prevent lakeward movement of contaminants.

In some situations, natural processes will furnish uncontaminated sediments to bury the contaminated sediments, thus isolating them from the aquatic biota. In other situations contaminated sediments may require other actions to prevent the transport and release of sediment contaminants. These actions might include burial with clean dredged materials, redirecting currents, or surrounding the area of contaminated sediments with materials and structures that prevent erosion and sediment transport. The long-term fate of most toxic substances is binding to fine particulate matter in the ecosystem and transported to depositional areas. These sediments will be buried by less contaminated sediments once the discharge of contaminants is reduced. Hastening the burial of contaminated sediments in non-erosional areas of a water body can be an ecologically sound and economically viable method of managing contaminated sediments.

After considerable discussion of the "In-Place Pollutants" question, the Dredging Subcommittee concluded that the subject matter was of a very complex nature and is outside the scope of its present terms of reference.

The Water Quality Programs Committee concurred with the above conclusion and during its 20th meeting decided to solicit assistance from the Science Advisory Board for addressing this issue.

## 7. Great Lakes Wetlands-Legislation and Dredging Impacts

The extent to which dredge and fill activities have contributed to the loss of wetland habitat in the United States and Canadian Great Lakes is still not clearly known. Records and inventories have not been kept by most governments historically or even recently. Up-to-date inventories for most areas of the United States and Canada will not be available for at least several years. Any appraisal of loss for Great Lakes wetland habitat will require comprehensive wetland inventory and evaluation programs.

The following wetland activities and legislation have been reported to the Subcommittee since January 1982.

### UNITED STATES

#### Federal

In July 1982 the Army Corps of Engineers issued substantial amendments to its regulations for the Section 404 dredge and fill permit program. The Corps also changed and reissued the memorandum of agreement between the Corps and other agencies involved in permit review - the most important being the Environmental Protection Agency and the Fish and Wildlife Service. A number of states, environmental groups and other environmental organizations have been extremely concerned about the possible adverse impacts on wetlands that the changes may allow. On May 12, 1983, new draft regulations were published which proposed additional changes to the Section 404 Program. The public comment period lasts until the end of August 1983 for these proposed changes. A public hearing will be held before any action is taken to finalize the revised regulation.

#### Illinois

No report.

#### Indiana

No report.

#### Michigan

Michigan is currently in the process of mapping its wetlands under the National Wetlands Inventory. The purpose of this inventory underway since February of 1979 is to delineate and classify all wetlands visible on the aerial photography. The Department of Natural Resources has been contracted by the U.S. Department of Interior, Fish and Wildlife Service with 100% funding to conduct the aerial photo interpretation and field checking. Maps are produced on topographic base maps of the U.S. Geological Survey.

The mapping of wetlands in the State of Michigan is presently about 70% complete. Funding problems make it uncertain as to the date of actual completion but a target of sometime in 1984 is hopeful.

There have been some potential impacts to Great Lakes wetlands in Michigan resulting from dredging but severe impacts were either averted or mitigated. The Department of Natural Resources, when possible, actively seeks alternatives or requires mitigation for projects that are basically in the public interest but have some negative environmental effects that may be the result. In cases where the need, feasibility or public interest of the project is low, the application is denied with no mitigation alternative.

There are several benefits to coastal wetlands as a result of dredging activities but the primary benefit to the public good or public need is the first concern. These types of projects may be permitted even though some resource loss results. Wetland enhancement or creation may be used where conditions are favorable to offset resource losses. This not only serves to protect the public interest in these natural resources but allows progress to proceed.

#### Minnesota

No report.

#### New York

No report.

#### Ohio

The Ohio EPA is currently in the process of revising Ohio Administrative Code 3745-1 Water Quality Standards. Included in the revision is an addition to 3745-1-05 (the anti-degradation policy) to specifically mention wetlands. Wetlands are not currently listed. Denial or restriction of 401 water quality certification is based on establishing the specific wetland to be affected as an area of "exceptional ecological significance" then implementing 3745-1-05(C) which protects such waters.

In the past Ohio has run into some inconsistencies in the interpretation of this rule thereby justifying the need to specifically mention wetlands in the policy. Ohio is experiencing some difficulty in boundary limitations especially with regards to inland wetlands. Ohio standards only apply to "surface waters" which do not include presently owned isolated ponds or marshes. Hearings are scheduled for the fall of 1983. (In addition, Ohio EPA is looking into the possibility of legislating tax deductions for private property owners as an incentive to leave wetland areas intact.)

#### Pennsylvania

No report.

## Wisconsin

Recognizing the need to protect Wisconsin wetlands, the Natural Resources Board has modified Chapter NR 115 and is creating NR 117 of the Wisconsin Administrative Code to provide statewide uniform or local municipality regulation of wetlands in shoreline areas. By law, shorelands are defined as areas located within 1,000 feet of the ordinary high-water mark of a navigable lake, pond or flowage or within 300 feet of the ordinary high-water mark of a navigable river or stream (or to the landward edge of the floodplain whichever distance is greater).

The wetlands mapping program officially known as the Wisconsin Wetlands Inventory was mandated by the Wisconsin Legislature in 1978 to further conservation of wetlands. The program is producing state wetland maps covering each township. These maps will enable a landowner to identify wetlands that might be regulated under NR 115 or NR 117. The county or municipality will have six months to adopt shoreland-wetland zoning after it receives final inventory maps.

## CANADA

Recent wetland losses, especially in Ontario, have prompted the Federal government to undertake new initiatives in the area of wetland conservation and management. Seventy-five percent of all marshes fringing Lake Ontario have been lost on settlement, while 25% of the wetlands which existed at Lake St. Clair in 1965 were gone by 1980.

In order to respond to the current situation Environment Canada is developing, in cooperation with the Province of Ontario, a program which will assign priority to wetlands at risk in Ontario. The approach is based on the following actions:

1. Mapping. The first step of this exercise is mapping the extent of wetlands which one existed in southern Ontario and the area of wetlands still remaining. The Lands Directorate of Environment Canada is leading the mapping exercise through development of a mapping program using the Canada Land Inventory data base to delineate past and present wetland areas.
2. Evaluation. A wetland evaluation system for the southern portion of Ontario has been developed jointly with the Ontario Ministry of Natural Resources and under the guidance of the Canada-Ontario Steering Committee on wetland evaluations.
3. Direct Action. There are a number of direct actions that Environment Canada is undertaking to achieve wetland protection. Environment Canada is seeking voting status on various review boards such as the Eastern Ontario Drainage Petition Review Board which provides a review process for assessing drainage plans in eastern Ontario. Environment Canada is also working with the provinces to designate other important wetlands under the International Convention on Wetlands of International Importance. Additionally, Environment Canada is working on the strengthening of its own habitat program and is moving towards the establishment of a habitat trust fund.

Under the Federal-Provincial Flood Damage Reduction Agreement, lands judged to be subject to flooding are officially designated and federal and provincial subsidies for such areas are withheld. The official designation of critical wetlands in order to reduce government incentives for inappropriate wetland drainage or development is being considered.

4. Indirect Action. Several mechanisms for indirectly influencing wetlands conservation are being considered by Environment Canada. Although the provinces are responsible for regulating land use within their boundaries, policies and programs of federal agencies operating within the provinces often have significant effects on land use. In order to effectively deal with the impact of federal activity on land use, a new federal policy on land use has been created in order to promote the wise use in management of Canada's land resource.

Another mechanism with which the federal government can influence wetland conservation is the Environmental Assessment and Review Process (EARP). In support of EARP and with the intent to improve our understanding of the impacts of development, Environment Canada has initiated a baseline studies program to provide an in depth understanding of how sensitive ecosystems function. Environment Canada has just completed a series of baseline studies focussing on key areas of Ontario. The Hudson Bay Lowland study examined the ecosystem of the area and its importance to migratory birds. A second baseline study has been completed on the Oshawa Second Marsh.

## 8. Beneficial Uses of Dredged Material

The Dredging Subcommittee (1982) recommended that all practical alternatives to simple discharge of dredged materials back into the Great Lakes be evaluated for all dredging projects. A list of potential uses of these dredged materials were identified.

In the United States, the Corps of Engineers established the Productive Uses Project (PUP) within the Dredged Material Research Program (DMRP) in recognition of the importance of utilizing the resource potential of dredged material, and has published several technical reports on the subject. Although no such known research efforts have been undertaken on the Canadian side, one of the main considerations in the selection of disposal alternatives has been a thorough evaluation of economic re-use options within existing environmental quality objectives.

The direct beneficial use considerations of clean dredged material are, however, contingent upon many factors, principal among them being the following:

1. Environmental Acceptability - material must be acceptable for "unrestricted" disposal which includes meeting applicable guidelines for clean material. This aspect also takes into consideration public attitude to the project and socio-economic factors.
2. Engineering properties and technical considerations - sediment types must be considered, as well as operational mode, in view of dredging and disposal methods deployed.
3. Costs consideration - obviously, the primary consideration in the selection of a beneficial disposal mode as compared to the traditional disposal of dredged material at an open lake site.

There are also many indirect beneficial uses derived from the disposal of contaminated dredged material. This is generally in terms of potential commercial value of filled disposal sites which are usually located in the vicinity of major ports and harbours.

Various direct and indirect beneficial uses accruing from disposal of dredged material can be categorized as follows:



## I Recreational

- i) Dredged material containment areas, either alone or in combination with other developments have often been sites of waterfront parks.
- ii) Other common recreational uses of dredged material have been for the creation of lagoons, marinas and similar facilities.
- iii) Creation of new beaches or replenishing eroding beaches - beach nourishment. This option is strictly contingent upon suitability of grain size and compatibility with existing beach material.

## II Industrial and Commercial

Filled areas along the waterways and in vicinity of major ports and harbours provide sites for industrial and commercial developments.

## III Waterway Development

Expansion of harbour facilities such as docks and piers. This is by far the most common use of dredged material disposal facilities built adjacent to major harbour dredging sites.

## IV Land Reclamation and Improvement

In keeping with intended long and short-term recreational and commercial goals, dredged material has often been placed for reclamation of land on the waterfront sites.

## V Habitat Development

Dredged material disposal sites located in flyways of migratory waterfowl and other aquatic birds provide excellent avian sanctuaries and resting sites. Wetlands and fish spawning areas have also been created by judicious placement of dredged material.

A list of recent dredging projects in the Canadian Great Lakes (1975-80) where either immediate or potential long-term beneficial uses would be derived by the disposal of dredged material are included in Table 1.

In the United States Great Lakes, over 690,000 cubic metres of dredged materials have been used since 1981 as beach nourishment, beach erosion mitigation, shoreline nourishment, upland recreational site development, and repair of wildlife structures.

TABLE 1  
BENEFICIAL USE OF DREDGED MATERIAL (1975-1980)  
CANADIAN GREAT LAKES

LOCATION	DATE	VOLUME (CUBIC METRES)	BENEFICIAL USE
<u>Lake Superior</u>			
Thunder Bay Disposal Facility	1978-1998	5,000,000	A (i) (Future Waterfront park site)
<u>Lake Huron</u>			
Grand Bend	1975	10,000	A (iii)
Goderich	1979	72,800	A (i)
Port Elgin	1978	7,800	D
<u>Lake Erie (Lake St. Clair)</u>			
Little Current	1981	36,000	D (Confined disposal)
Kingsville	1978	39,732	D (Confined disposal)
Mitchell's Bay	1979	5,780	D
Pike Creek	1977	19,600	D
Port Stanley	1978	169,000	D (Confined disposal)
Port Stanley	1979	20,000	A (i) (Waterfront park)
Port Stanley	1980	55,000	A (iii) (Beach nourishment)
Puce River	1978	11,142	D
Ruscom River	1978	28,410	D
St. Clair Parkway Commission	-	30,000	D (Marina)
<u>Lake Ontario</u>			
Hamilton	1978	120,000	C (Pier 13)
Oshawa	1978	60,000	B
Oshawa	1979	40,000	B (Future development)
Port Credit	1976	4,700	D
Toronto	1970's-present	40,000-50,000/yr.	A, B, E
Whitby	1978	188,300	A, (ii), D
Trent-Severn Waterways	1980	10,000	E

The amounts used for each of the five categories include:

<u>Category</u>	<u>Description</u>	<u>Cubic metre material</u>
A	Beach Nourishment	407,775
B	Erosion Mitigation	202,301
C	Shoreline Nourishment	28,212
D	Upland Recreational Use	49,084
E	Repair of Wildlife Structures	3,975
TOTAL:		691,347

Table 2 provides an itemized listing of beneficial uses of dredged materials from the United States harbours from 1981 to the present.

In addition to the uses listed in Table 2, the Corps of Engineers has utilized dredged materials for environmental enhancement. Some of these uses are described below.

Dickenson Island. The Dickenson Island disposal area in the Detroit River, while confining the dredged material, provides an excellent example of environmental benefits through good planning. Biological studies during the planning phase identified four valuable biological features at the proposed disposal site. These were an oak grove, a venerable old green ash, an area of prairie fringed orchid, and a heron rookery. These features were also threatened by other human activities on the island. Final alignment of the disposal area dikes avoided damage to these features and helped to protect these valuable features from further human disturbance and developmental pressures.

To minimize adverse aesthetic impact of the project, dikes were set back from the edge of the island. In addition, the construction contractor was required to confine his work within the diked area to prevent disturbance of the terrain around the diked area.

Pointe Mouillee, Lake Erie. Pointe Mouillee marsh located at the west end of Lake Erie was historically one of the finest and most productive marshes in the Great Lakes region. In the mid 30's the marsh covered about 809 hectares. By 1977 the marsh covered about 81 hectares plus 148 hectares of diked wildlife refuge. There were many factors involved in the reduction of the marsh. Two important factors, however, were 1) the progressive loss (and inundation by high lake levels) of a natural barrier beach, and 2) the resultant lack of protection from the damaging wave and ice forces of Lake Erie. The Pointe Mouillee confined disposal area was designed to provide a man-made "barrier beach" to protect the marsh from these damaging wave and ice forces.

TABLE 2  
 RECENT BENEFICIAL USE OF DREDGED MATERIAL  
 UNITED STATES GREAT LAKES

LOCATION	DATE	VOLUME (CUBIC METRES)	BENEFICIAL USE
<u>Lake Superior</u>			
Grand Traverse	Sept. '82	9,100	B
Lac La Belle	Sept.-Oct. '82	2,750	A
Little Lake	Jul.-Sept. '82	16,500	A
	Jul.-Aug. '81	21,400	A
Ontonagon	Sept. '82	87,500	A
	May-June '82	109,100	A
<u>Lake Michigan</u>			
Arcadia Harbor	June '82	12,900	A
Grand Haven	Mar. '82	19,600	B (Section III)
Holland	Mar.-Apr. '81	16,700	B (Section III)
Kewaunee	Aug. '82	6,200	A (Demonstration)
Leland	June '82	19,100	A
Ludington	Mar. '82	60,000	B
	May '81	6,200	B (Section III)
Manistee	Jul.-Aug. '82	32,800	C (Section III)
	Dec. '81	4,100	C (Section III)
Pentwater	June '82	14,000	A (Mich. State Park)
	May '81	23,000	A (Mich. State Park)
Portage Lake	June '81	8,800	A
Saugatuck	Aug. '82	12,400	A
St. Joseph	May-Jun. '82	153,000	B (Section III)
	June '81		
Frankfort			
<u>Lake Huron</u>			
Saginaw River	Sept. '82	16,200	D
	July '81	48,000	D
<u>Lake Erie (Lake St. Clair)</u>			
West Harbor	May-Nov. '82	76,350	A
Cattaraugus Creek	Sept. '82	88,300	A
	Jan. '83		
Fairport Harbor	1983-84	50,000	A
St. Clair River	Aug. '81	5,200	D (Dike repair)

Sterling State Park, Monroe. This park has an area of about 400 hectares with a 100 hectare wildlife flooding, two modern campgrounds, swimming areas and a major day-use picnic area. A confined disposal facility (CDF) was created by the Corps of Engineers in the park utilizing about 20 hectares of Lake Erie bottom land and 14 hectares of wetland. Materials excavated from the CDF were used to raise the elevation of the park and prevent flooding while landscaping major portions of the park. The CDF will be graded to harmonize with the surrounding landscape when full. Construction of the CDF has expedited the further development of this major state park near the most populated area of Michigan and added to the recreational capacity of the park.

The Lost Peninsula, Lake Erie. The Lost Peninsula project in southeastern Munroe county is a private endeavour that includes extension of upland channels and widening and deepening the present channel. More than 400 boat docking sites will be constructed, in addition to launching facilities. Dredged materials are to be placed upland, graded and vegetated to create habitat and prevent erosion. More than 2,500 lineal metres of rock rip-rap will be placed along the lakeshore and entry channels. This should greatly reduce the effects of high lake levels and wave action which have eroded inland more than 250 metres in the recent past.

Times Beach, Buffalo, New York. The Times Beach confined disposal facility in Buffalo, New York, has resulted in an interesting and unexpected environmental success. The partially filled facility covers roughly 20 hectares. Inside the diked area, there is a dry land section with grasses, herbaceous plants, and some stands of trees and shrubs. The rest of the area consists of a mud flat, a shallow water area and a deeper water section with submerged vegetation. These features provide good habitats for a wide variety of birds and for some mammals. Since 1972, observers have sighted 145 species of birds in the disposal area, including several rare species. Local groups have requested that the Times Beach area be left in its present partially filled state and used as a nature educational facility. The Corps has agreed to preserve the Times Beach disposal area as a shoreline wildlife habitat, if at all possible.

As pointed out earlier, consideration of beneficial uses of dredged materials is not necessarily restricted to "clean" materials. Many of the engineered disposal facilities for the confinement of polluted dredged material also have potential economic benefits depending on the use of completed facilities. Unfortunately, very few studies have been conducted which compare costs incurred through creating facilities using dredged material with value of land or material acquired through other means. A brief account of potential cost benefits for three dredging projects are described below.

Fairport Harbor. In 1983, 55,810 cubic metres of sand were placed near the shoreline at Fairport Harbor, Ohio to replenish sand to the littoral system. Erosion along the southern shoreline has caused property owners to lose a significant portion of beach front property, partially due to lack of littoral transport of materials. Hopefully, dredged sand placed back into the system will help replenish material supply. No additional cost to the Corps of Engineers was incurred due to the shoreline placement. The total dredging project cost was estimated at \$175,000.

Private property owners in the vicinity of Fairport Harbor who wish to replenish their beach through the purchase of commercial sand can expect to pay from \$6.80 per cubic metre for sand containing a significant portion of fines to \$19.60 per cubic metre for high grade material. If all material used for beach nourishment ends up on private property, potential savings to the private sector could be in excess of \$380,000.

Harsen's Island, St. Clair River. This project involved hydraulic pump-out of sand from a hopper dredge onto dikes for dike reinforcement in a wildlife refuge area. The total cost of the operation was \$5.23 per cubic metre with about 76,455 cubic metres placed. The Detroit District, Corps of Engineers, estimates that this method of disposal was actually lower than conventional disposal because of the closer proximity of Harsen's Island due to cheaper transportation costs.

#### Proposed Projects

Pipe Creek, Sandusky Bay, Ohio. Filling of 5.6 hectares of wetland along this stream has been the most significant dredge and fill project since 1979. However, mitigation resulted in the creation of approximately 38.4 hectares of prime wetland habitat which is to be maintained for the life of the project.

Crow Island State Game Area, Saginaw River. An estimated 1.4 million cubic metres of dredged materials is to be placed in open water area along the river to form several low islands. These structures are designed to reduce wind fetch and currents, create nesting and resting areas for terrestrial wildlife and increase habitat diversity for aquatic organisms.

Quanicassee Wildlife Area, Saginaw Bay, Lake Huron. This project is in the preliminary planning stages but its primary purpose is to protect a shoreward area to permit the re-establishment of wetland habitat. Clean maintenance dredge materials would be used to construct a barrier island approximately 1,609 metres long, 91 metres wide by 2.7 metres high and parallel to the existing shoreline. This barrier island would function much as the Point Mouillee confined disposal facility although there would be no control over water levels.

Private property owners in the vicinity of Fairport Harbor who wish to  
relocate their property should be advised that the proposed project will  
be located on the east side of the road and will not affect the  
road or the property of any other owner. It is estimated that  
for each residential unit on a 1/2 acre property, an additional 100  
square feet could be in excess of 1000 sq. ft.

Hansen, 11111 22nd Street, Fairport Harbor, Ohio 44029  
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road. The total cost of the project is \$100,000.00. The project  
will be located on the east side of the road and will not affect the  
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owner. The project will be located about 10,000 cubic yards of  
material, the Detroit District, Ohio, and

## 9. Bioassessment Project

The Dredging Subcommittee of the Water Quality Board has concluded that an improved evaluation of dredged material disposal options requires results of sediment bioassessment in addition to bulk chemical analysis data. The Subcommittee has addressed the sediment bioassessment issue repeatedly in the past and has provided specific recommendations in its two reports entitled "GUIDELINES AND REGISTER FOR EVALUATION OF GREAT LAKES DREDGING PROJECTS - 1982" and "EVALUATION OF DREDGED MATERIAL DISPOSAL OPTIONS FOR TWO GREAT LAKES HARBOURS USING THE WATER QUALITY BOARD DREDGING SUBCOMMITTEE GUIDELINES".

During its 56th meeting, the Water Quality Board concurred with and fully endorsed the DSC recommendations contained in the latter report and approved the following measures for addressing the sediment bioassessment issue:

1. A joint Canada-United States project for doing bioassessment of sediment samples from Toronto, Ontario and Toledo, Ohio harbours.
2. A "Bioassessment Workshop" after the completion of the above project.

Although several bioassessment techniques are currently under development within various United States and Canadian agencies, the applicability of these techniques for evaluating the proposed dredge operations and disposal options has not been thoroughly tested. In order to gain the necessary information and help guide the Subcommittee in recommending appropriate bioassessment techniques, the Subcommittee proposed a co-operative program in order to: 1) relate the findings of algal fraction bioassays (AFB) of sediments to the conclusions reached in case of Toronto-Toledo Harbour Study which is based on bulk chemical analysis results only, and 2) compare results of other available bioassessment tests with those obtained from the AFB techniques.

As part of assessment of sediment samples from Toledo and Toronto Harbours using the algal fraction bioassay (AFB) technique, the Canada Centre for Inland Waters (CCIW) will collect, prepare, and split one sample from each of the harbours for shipment to other laboratories currently performing bioassessments of sediments using different methods. The anticipated recipients of these sediments (two samples to each laboratory) are the following laboratories:

1. U.S. Fish and Wildlife Service  
Great Lakes Fishery Laboratory  
Ann Arbor, MI
2. U.S. Army Corps of Engineers  
Waterways Experimental Station  
Vicksburg, MS



3. U.S. Environmental Protection Agency  
Environmental Research Laboratory  
Corvallis, OR

Each of the participant laboratories will conduct a bioassessment of the samples received using the technique under development at their respective laboratory. The CCIW will also conduct an assessment of the samples using the AFB technique. The results from each laboratory will be provided directly to the Secretary of the Dredging Subcommittee, Dr. M. H. Sadar of the IJC Great Lakes Regional Office.

## 10. Recommendations

1. The Dredging Subcommittee feels that it has met its Terms of Reference. The Subcommittee has provided compatible guidelines for evaluation of dredging projects in the Great Lakes Basin. The development of site-specific criteria for use in the areas of intensive and continued dredging activities requires updating of existing data and additional information. The guidelines, however, provide a basic framework for the development of such criteria.
2. After the completion of the "Sediment Bioassessment Project" and ensuing workshop, the Dredging Subcommittee should meet only on an ad hoc basis to ensure updating of the Dredging Register and to facilitate information exchange through various means.

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### U.S. Environmental Assessment Act Reauthorization

Each of the following is a common title...  
development of site-specific criteria for use in the areas of  
intensive and continued dredging activities requires updating of  
existing data and additional information. The guidelines, however,  
provide a basic framework for the development of such criteria.

5. After the completion of the "Sediment Assessment Project" and  
ensuing workshop, the Dredging Subcommittee should meet only on an ad  
hoc basis to ensure updating of the Dredging Register and to  
facilitate information exchange through various means.

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