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OPERATION AND MAINTENCE, VERMILION HARBOR, ERIE COUNTY, OHIO.(U)
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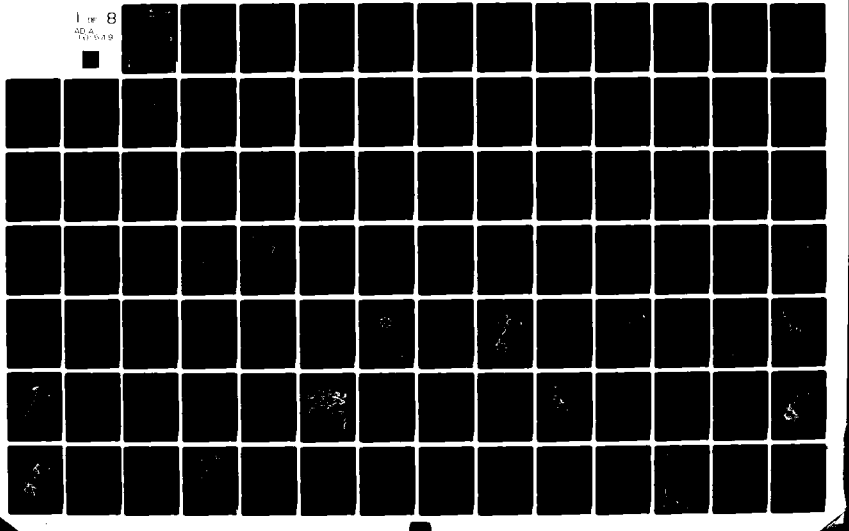

LEVEL II

(12)

(6) FINAL
ENVIRONMENTAL IMPACT STATEMENT,
OPERATION AND MAINTENANCE

1A

5C

VERMILION HARBOR
ERIE COUNTY, Ohio.

(12) 127

Prepared By
U. S. Army Engineer District, Buffalo
Buffalo, NY 14207

(11) Mar[illegible]76

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STATEMENT OF FINDINGS

Operation and Maintenance
Vermilion Harbor, Erie County, OH

INTRODUCTION

I have reviewed and evaluated, in light of the overall public interest, documents and other information concerning the proposed action, as well as the stated views of other interested parties relative to the various practicable alternatives in accomplishing the operation and maintenance of Vermilion Harbor, Erie County, OH. The possible consequences of these alternatives have been analyzed with respect to environmental, social well-being, and economic impacts as well as engineering feasibility.

BACKGROUND

Authorization

The existing Federal project for commercial and recreational navigation at Vermilion Harbor was authorized by several River and Harbor Acts between 1836 and 1958, and was constructed in stages. Work authorized by the 1958 Act was completed in 1973. Harbor navigation project features include a lake approach channel (consisting of a 12-foot east lake approach channel and an 8-foot west lake approach channel) a 12-foot entrance channel, an 8-foot river channel, parallel east and west piers, and a detached breakwater. The harbor is maintained by the Buffalo District, Corps of Engineers.

Coordination and Public Involvement

Extensive coordination was maintained during the preparation, distribution, and review of the Draft Environmental Impact Statement (EIS) for the operation and maintenance of Vermilion Harbor. During the preparation of the Statement, six public land use planning agencies were contacted to determine the relationship of the proposed action to land use plans. No objections were expressed by responding agencies. In addition, the U. S. Department of the Interior, National Park Service, and the Ohio State Historic Preservation Officer were contacted to identify potential impacts of the proposed action on cultural resources. Neither agency indicated objections to the proposed action. The U. S. Department of the Interior, Fish and Wildlife Service and the Ohio Department of Natural Resources also were requested to identify significant fish and wildlife resources that should be considered in planning harbor maintenance activities. Responses from these agencies were used in developing a maintenance schedule that will result in the least possible disruption to significant fish spawning activities at Vermilion Harbor. The U. S. Environmental Protection Agency (USEPA),

Region V provided harbor sediment quality data that was used in determining environmentally acceptable methods for disposing of materials to be maintenance dredged. The Draft EIS was distributed for review and comment to Federal, State and local Government agencies and private organizations and individuals. Copies of the Draft EIS were also sent to local newspapers. A news release was issued stating the availability of the Draft EIS for review and comment by the general public. Comments on the Draft EIS from coordinating agencies, groups and individuals were carefully considered in evaluating the proposed action. Copies of all coordinating and commenting correspondence relative to the project are included in Appendices A and F of the Final EIS. Major issues related to harbor maintenance operations that were identified in the Draft EIS comments are as follows:

a. The U. S. Department of the Interior indicated that the Draft EIS proposal to dispose of restricted disposal sediments in the harbor's authorized Lake Erie disposal zone was environmentally unsound due to the reintroduction of potentially harmful constituents into the water column. This proposal was originally suggested in the July 1975 USEPA report to the Buffalo District on Vermilion Harbor sediment quality. The proposal included dredging and open-lake disposal of restricted disposal sediments, as classified by USEPA, and then dredging and open-lake disposal of sediments suitable for open-lake disposal in order to cover the moderately polluted materials with unpolluted materials. In view of the Interior Department's reservations about the proposal, and since no maintenance dredging is expected to be required in the entrance channel zone that USEPA designated as having restricted disposal sediments (due to river scouring of the zone), the proposal was eliminated as a feature of the maintenance project. If it is necessary to remove sediments from the restricted disposal zone, such materials will be disposed of in the Site 1 confined disposal facility at Huron Harbor, OH.

b. The alternative disposal practice of using unpolluted sediments as beach nourishment materials, instead of open-lake disposal of such sediments, was suggested by the U. S. Department of Commerce, the U. S. Department of the Interior, and several summer residents of the Linwood Park development. Long-term updrift disposal at beach areas east of the harbor would be much more costly than downdrift disposal at westward beaches. Furthermore, updrift disposal is not practical under existing conditions since nourishment materials would tend to be transported back into the navigation channels by the lake's east-to-west flowing littoral current. Downdrift (westward) disposal is economically feasible. However, the presence of the municipal water intake, a public beach, valuable fish habitat, and other environmental factors along the shoreline immediately west of the harbor are critical factors that must be evaluated with respect to each maintenance dredging operation. Therefore, should appropriate local interests express an interest in

in downdrift disposal for a particular operation, a separate environmental assessment of the proposal will be prepared and an appropriate course of action will be taken.

c. The Linwood Park Company and several summer residents of the Linwood Park development expressed opposition to the Draft EIS proposal of a summer maintenance dredging schedule (any six-week period between 15 June and 1 October) due to the potential temporary, indirect effect of dredging activities on water quality at beach areas immediately adjacent to the harbor. In view of these local concerns and revised harbor fishery information from the Ohio Department of Natural Resources, the maintenance dredging schedule was changed to a six-week period between 15 September and 15 December. The fall maintenance schedule was coordinated with the Ohio Department of Natural Resources which had no objections to the fall period.

d. The alternative of removing the existing detached breakwater as a means of reducing shoaling in the outer harbor and the resulting need for maintenance dredging was suggested by the Ohio Environmental Protection Agency, the Sierra Club-Northeast Ohio Group, and several summer residents of the Linwood Park community. While the removal of the breakwater would achieve some reduction in outer harbor shoaling and the scope of maintenance dredging, this action would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating qualitative benefits that the Vermilion Port Authority attributed to the presence of the structure in its November 1975 report to the Vermilion City Council. These benefits include a reduction of river surge, helping to control harbor water levels during north to northeast winds, providing a safer harbor entrance during storms, preventing windrowed ice from jamming at the pier heads, allowing ice to flow from the harbor during northeast winds, obligating the Corps to maintain the harbor up to the Liberty Avenue Bridge, and providing a protected sportfishing area behind the breakwater. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable.

In addition to comments on harbor maintenance activities, Draft EIS commenting letters from the Linwood Park Cottage Owners Association and summer residents of the Linwood Park development expressed concern over the potential effect of the detached breakwater on the local environment. One of the local interests' primary concerns is about

the potential relationship of the breakwater on shoreline erosion east of the harbor. On 6 October 1975, the District Engineer met with Mr. George W. Grossman, a resident of the Linwood Park community, in order to explain the Buffalo District's Section 111 Study of shoreline changes that have been attributed to the Federal navigation project. The study report, dated 21 January 1976, concludes that it is not now possible to differentiate between shoreline changes to the east that may be caused by high lake levels and those that may be attributed to the detached breakwater. The report recommends that a five-year monitoring program be undertaken to evaluate the effect of the detached breakwater, particularly during a period of more normal lake levels. A supplemental Section 111 Study will be prepared in 1981 based on the results of the five-year monitoring program.

Other concerns of the Linwood Park residents include the possible adverse effects of the detached breakwater on the public water supply, increased beach water pollution, ice formation in the harbor, increased ice jam flooding potential, increased flood potential, increased shoaling in the Federal and private lagoon navigation channels, land use changes and resultant changes in occupancy and property values, and increased navigation hazards. The Buffalo District will investigate these concerns in an Adverse Impact Study. The objectives of this study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the October 1975 Corps draft Environmental Guidelines to "review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Appropriate recommendations for further action to resolve the community's concerns will be based on the study conclusions, which will be available in 1977.

There have been no public meetings or workshops conducted on the actual operation and maintenance of the harbor. On-going public involvement will be achieved in compliance with the regulation described in 33 CFR 209.145. Future maintenance dredging operations in Vermilion Harbor will be preceded by the issuance of a public notice as required by this regulation. The public notice will describe the proposed maintenance, and will be distributed to all potentially interested parties that may desire to comment on maintenance activities. In the event that the commenting parties identify any significant, adverse environmental impacts, the proposed work will be reevaluated and a course of action will be taken that is in the best overall interest of the public.

SELECTED PLAN

The selected plan of action is the operation and maintenance of Vermilion Harbor, which is described in detail in the Final EIS. The harbor's authorized navigation channels will be periodically surveyed with a survey launch to determine the amount of shoaling and sediment deposition in the authorized maintained channels. After the navigation channels have been surveyed, a dredge, and attendant scows and tugs, will be used to remove, transport, and dispose of channel bottom shoals and sediment deposits that have decreased channel depths below the authorized project depths. Maintenance dredging in the 120-foot east lake approach and lake entrance channels will be accomplished by one of the Buffalo District's smaller hopper dredges whenever it is feasible to do so. The U. S. Dredge HOFFMAN, which has a light draft of 9 feet, 8 inches and is based at Cleveland, will be used in these channels if it is available during the harbor's dredging season. Maintenance dredging in other portions of the harbor will be performed for the Corps by a private Contractor, using a shallow-draft dredge other than a hopper dredge, or by a Corps derrickboat equipped with a clamshell bucket. Based on the District's past experience in maintenance dredging at shallow-draft harbors similar to Vermilion, channel maintenance will probably be conducted with either a clamshell, dipper (or backhoe), or cutterhead dredge. These three dredge types are usually available for maintenance work on the Great Lakes and are suitable, to varying degrees, for efficient and economical work. Dredging operations will be accomplished only in those sectors of the navigation channels where significant sediment deposits have accumulated. Dredging operations will continue until the navigation channels have been cleared to authorized project depths. Upon completion of dredging, the harbor will be resounded to determine depths in the maintained channels. A final channel survey will be conducted with a sweep float to locate large navigation obstructions, such as stone from the harbor structures, that were not removed during dredging. Identified obstructions will be removed by a derrickboat and placed on a barge for transport from the project area. Routine maintenance dredging is expected to entail the removal of approximately 24,800 cubic yards of shoal material on a frequency of about once every three years. Each routine dredging operation will take about six weeks to complete, and will be conducted in the fall between about 15 September and 15 December whenever possible.

USEPA has classified bottom sediments in the lakeward section of the entrance channel and the lake approach channel suitable for open-lake disposal. Therefore, a total of approximately 20,000 cubic yards of dredgings that will be removed from these channels during each three-year routine operation will be disposed of in the harbor's authorized open-lake

dump zone in Lake Erie. USEPA has classified sediments in the river channel unsuitable for open-lake disposal. Approximately 4,800 cubic yards of dredgings that will be removed from this channel during each routine operation will be deposited in the Huron Harbor Site 1 diked disposal facility. USEPA has classified sediments in the inner section of the entrance channel as suitable for restricted open-lake disposal. The restricted disposal zone is usually kept free of shoals by the natural scouring action of the Vermilion River. Therefore, no maintenance is expected to be required in this zone, and no restricted disposal sediments are expected to require removal and disposal. However, if shoaling does occur and it is necessary to dredge restricted disposal sediments, such materials will be deposited in the Huron Harbor Site 1 diked disposal facility. A Final Environmental Impact Statement for Huron Site 1 was filed with the Council on Environmental Quality on 19 November 1973.

The harbor piers and detached breakwater are periodically inspected to determine the need for repair work. The need for repair results from structural damage or failure, usually caused by wave and ice action. A derrickboat, barge and tug vessel will be used to accomplish structural repair and maintenance work. Structural maintenance will be performed as needed, and will be accomplished during the summer months of the year.

The selected plan for the operation and maintenance of Vermilion includes several operational features that have been developed to minimize potentially adverse effects of maintenance activities on the natural and human environments. For example, the removal, transport, and disposal of harbor dredgings will be controlled to minimize the impacts of these operations on water quality and aquatic habitat in affected areas. The 15 September through 15 December dredging period will avoid interference with peak activity seasons for recreational boating, swimming at adjacent lakeshore beaches, and significant local fish spawning activities. Environmental protection features of the selected plan are described in detail in the Final EIS.

ALTERNATIVES

Eight other operation and maintenance alternatives were considered:

No Action

This alternative would result in the termination of navigation channel and structural maintenance activities at Vermilion Harbor. Although

this alternative would eliminate temporary adverse ecological effects of maintenance activities, the impact of this course of action would be to initially restrict, and eventually prohibit, navigation in and out of the harbor. This would have a most significant adverse effect on harbor-related recreation and associated local and regional employment and business at Vermilion.

Maintaining Alternative Channel Dimensions

The scope of maintenance dredging at Vermilion Harbor could be reduced by dredging the authorized channels to lesser depths or widths. Such operations would be technically feasible to accomplish and, depending on the alternative dimensions considered, would probably reduce maintenance costs due to a reduction in materials dredged. Since less material would be removed, short-term adverse effects of dredging on water quality, aquatic ecology, and harbor recreation and related businesses would be reduced to a level commensurate with reduced dredging time and area. However, any reduction in authorized channel dimensions would seriously affect the harbor's operational viability for safe navigation by small craft, which would have long-term adverse effects on employment, businesses, service and retail sales, public revenues, and other factors indirectly related to recreational boating.

Alternative Dredging Schedules

Summer, early winter, and early spring dredging periods were considered as alternative three-year dredging schedules. Dredging during any of these periods is technically feasible. Costs for summer dredging would be about equal to those for the selected fall dredging period, while costs for the other two periods would be substantially higher due to contingencies for inclement weather and related hazardous navigation conditions. Early spring dredging would generally result in the same environmental impacts associated with the selected period, while early winter operations would result in the least disruption of seasonal environmental factors. The feasibility of early spring and early winter dredging is highly questionable due to the likelihood of inclement weather and ice formation. Summer operations would adversely affect all harbor-related recreational and business activities during peak activity seasons, and is opposed by local interests as previously described. Dredging schedules of shorter duration could be implemented if the frequency of dredging was increased to annual operations. However, annual dredging would involve mobilization and demobilization costs three times greater than dredging with a frequency of once every three years. Furthermore, environmental effects that can be expected

to occur regardless of dredging season, duration, or frequency (such as turbidity and disruption of benthic habitat) would occur more often if dredging was conducted annually.

Land Disposal

Materials removed from Vermilion Harbor during maintenance dredging could be deposited in abandoned strip mines, quarries, or sand and gravel pits or used for agricultural purposes. The cost of using dredgings for these purposes is generally prohibitive due to the equipment and operational costs that would be incurred by transporting dredged material over extensive land distances. An upland site used to contain new work dredgings in 1973 has been filled, graded, seeded, and planted with trees and is not available for further disposal operations. Two other upland disposal sites in the Vermilion vicinity have been rejected due to their location adjacent to a streambed and the potential leaching problems that could result from their use. Therefore, at this time, there are no known viable on-land disposal sites in the Vermilion area.

Use of Unpolluted Dredged Material for Beach Nourishment

The Corps of Engineers has authority to place unpolluted dredge materials on beach areas if the cost of this action does not exceed the cost associated with open-lake disposal, or if local interests will bear any additional costs associated with this action. Beach nourishment disposal may be technically and economically feasible to accomplish using the harbor's unpolluted dredgings (about 20,000 cubic yards per routine operation) from the lake approach and entrance channels. As previously discussed, long-term updrift disposal at beach areas east of the harbor is neither economical nor practical under existing conditions due to the tendency for updrift materials to be littorally transported back into the navigation channels. Deposition in downdrift, littoral areas west of the harbor is more practical since nourishment materials would be littorally transported away from the harbor. Downdrift disposal would have short-term localized, adverse effects on aquatic ecology but would have long-term, beneficial effects on shoreline erosion and beach areas. There have been no specific requests from appropriate downdrift beach interests regarding investigation of the use of unpolluted dredgings from Vermilion Harbor as downdrift beach nourishment material. However, should appropriate local interests express an interest in the implementation of a beach nourishment program using suitable maintenance dredgings, the Corps will analyze the engineering and economic feasibility of the specific proposal, and a separate environmental assessment of the action will be prepared.

Modification of the Harbor Structures

Structural modifications of the Vermilion Harbor breakwater and east pier were suggested by local interests as means of reducing the scope of maintenance. In its November 1975 report, the Vermilion Port Authority suggested storing additional stone atop the east pier in order to trap some of the sand that is presently transported over the pier by wind and wave action (particularly during northeast and east storms) at the beach area east of the pier. While this alternative would probably result in some short-term reduction in shoaling in the outer section of the entrance channel, it would eventually result in shoaling in the east lake approach channel and along the entire length of the entrance channel as the build-up east of the pier initially moved around the added stone and finally overtopped it. In the long run, this would increase maintenance dredging requirements. As previously discussed, the alternative of removing the detached breakwater in order to reduce outer harbor shoaling was suggested by State and local interests. In addition, the Vermilion Port Authority's report suggested removing a submerged section of the breakwater to permit a more direct flow of river discharge into the lake. Either of these breakwater modifications would be expected to reduce outer harbor shoaling and the scope of channel maintenance activities. However, as previously discussed, modification or removal of the structure would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost, the alternative of modifying the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable.

Control of Erosion

Control of erosion from sources in the harbor's watershed, along the harbor shoreline, and along the lakeshore would reduce sediment loading. Erosion control would involve programs to improve agricultural practices, construction regulations, and land use management. The construction of lakeshore groins east of the harbor was suggested in the Vermilion Port Authority's November 1975 report and in Draft EIS comments from local interests. While the aforementioned practices would be expected to achieve some reductions in harbor shoaling, they would not completely eliminate the need for future dredging in Vermilion Harbor. Establishment of erosion control measures would require a lengthy period of time to implement and would be costly. This alternative is not within the

authority under which the operation and maintenance of the harbor is performed.

Control of Sediment Pollutants

Treatment of sediments by chemical means to allow for the open-lake dumping of dredged material, while technically feasible for small amounts of material, is economically unrealistic at this time for the quantities of polluted sediment to be removed from Vermilion Harbor. A long-range goal to control pollutants would be the implementation of pollution abatement measures throughout the Vermilion region to reduce the addition of toxic and nutritive constituents to harbor sediments. Such measures are required by both Federal and State laws and could include upgrading of sewage treatment plants and use of settling basins for stormwater discharges. These long-term programs are the responsibility of local municipalities and industries and are beyond the authority under which the operation and maintenance of Vermilion Harbor is accomplished.

EVALUATION

In evaluating the selected plan, the following points are considered pertinent:

Environmental Considerations

The presence of maintenance vessels in Vermilion Harbor will result in temporary localized adverse effects on aquatic ecology, water quality, and air quality. Maintenance dredging will be conducted in a manner that minimizes such environmental effects by confining dredging to shoaled portions of authorized, essential navigation channels and preventing overflow spillage of dredgings between the dredging area and disposal sites. Fall dredging will eliminate potential interference with late-spring and summer fish spawning in the harbor area. Open-lake disposal of unpolluted dredgings will result in some temporary turbidity and siltation of aquatic habitat. Disposal operations of unpolluted materials will be controlled to minimize adverse environmental effects related to the open-lake disposal of unpolluted materials. Polluted sediments will be disposed of in the Huron Harbor Site 1 diked disposal facility in order to eliminate adverse water quality effects associated with the open-lake disposal of such materials.

Social Well-Being

Operation and maintenance of Vermilion Harbor will insure the continued use of the harbor for the more than 10,000 commercial fishing vessels

and recreational boats that use the harbor annually. Adverse social impacts associated with dredging, such as interference with boating, are short-term and infrequent. Fall dredging will eliminate interferences during the local peak seasons for recreational navigation and swimming activities at adjacent beach areas. Social benefits accrue because of the importance of harbor-generated business, employment, and public revenues to communities and regions economically linked to Vermilion Harbor. The estimated average annual wholesale value of fish expected to be landed at Vermilion Harbor over the next three years is $650,000. The operator of the Vermilion City Water Plant will be specifically notified of proposed maintenance operations so that mitigative plant procedures can be formulated and operational as the situation may warrant. No cultural resources will be impacted by maintenance activities.

Engineering Considerations

The use of various types of maintenance equipment at Vermilion Harbor was considered in terms of practicability, cost effectiveness, and availability. The shallow-draft dredge and support vessels were found to be the most favorable plant for channel maintenance, and the derrick-boat and attendant vessels the best suited for structural maintenance. A small Corps hopper dredge is suitable for operations in the 12-foot channels. Maintenance dredging and structural repairs will be performed only when it is necessary to achieve authorized project depths or to restore the physical integrity of the existing harbor piers and detached breakwater.

Economic Considerations

Maintenance and repair costs are dependent upon the nature of shoaling in navigation channels, the extent of structural repairs, and funding constraints; therefore, costs can be expected to vary from year to year. Future routine maintenance dredging will cost approximately $188,000 per operation, or $62,700 annually. These cost estimates can be expected to vary with the extent and nature of future channel shoaling. Future structural repair costs will also vary with the condition of the harbor structures.

CONCLUSION

In conclusion, I find that the determination to operate and maintain Vermilion Harbor in the manner described is based upon a thorough analysis and evaluation of the various practicable alternatives to the proposed action. Wherever adverse effects are found to be involved,

they cannot be avoided by following reasonable alternative courses of action which would achieve the purposes specified by the Congress. Accordingly, it is my decision that the public interest would best be served by the operation and periodic maintenance of Vermilion Harbor, Erie County, OH.

Date: 25 March 1976

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

STATEMENT OF FINDINGS

Operation and Maintenance
Vermilion Harbor, Erie County, OH

I concur with the preceding Statement of Findings.

26 Apr 76.
DATE

ROBERT L. MOORE
Brigadier General, USA
Division Engineer

I concur with the preceding Statement of Findings.

22 Jun 1976
DATE

DRAKE WILSON
Brigadier General, USA
Deputy Director of Civil Works

(12)

SUMMARY
OPERATION AND MAINTENANCE
VERMILION HARBOR, ERIE COUNTY, OH

( ) Draft (X) Final Environmental Statement

Responsible Office: U. S. Army Engineer District, Buffalo
1176 Niagara Street
Buffalo, NY 14207
(716) 876-5454

1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Action: Dredging of about 24,800 cubic yards of sediment from the Vermilion Harbor area approximately once every three years and maintenance of existing harbor structures. Harbor dredgings suitable for open-lake disposal will be deposited in a designated open-lake site in Lake Erie. Dredgings not suitable for open-lake disposal will be transported approximately 10 miles to Huron Harbor, OH, and deposited in a diked disposal area. It is estimated that for each maintenance operation an average of 20,000 cubic yards will be suitable for open-lake disposal and 4,800 cubic yards will require containment.

3. a. Environmental Impact: Continued safe navigation in the harbor for recreational craft and commercial fishing vessels, Continued participation in harbor related outdoor recreation, Continued growth potential for water-related commerce in the Vermilion area, Temporary disturbance of manmade facilities within the harbor and lagoons areas.

b. Adverse Environmental Impacts: Disturbance of benthic communities within the dredged channels and in the open-lake disposal areas, Temporary resuspension of potentially harmful substances and increased turbidity levels during maintenance procedures, Temporary disturbance of fish populations, Temporary interference and the generation of noise, odors and dust and air pollutants due to the presence of maintenance plant. Temporary effects on air quality, aesthetics, and aquatic and terrestrial organisms at the Huron diked disposal facility during disposal operations.

4. Alternatives:

a. Discontinue Operation and Maintenance Activities (No Action)
b. Maintaining Alternative Channel Dimensions
c. Alternative Dredging Schedules

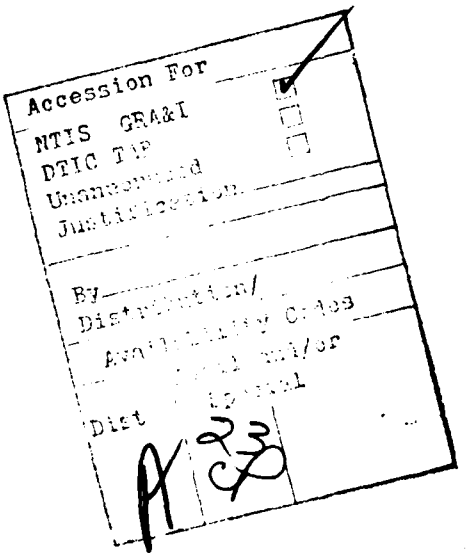
d. Land Disposal
e. Use of Unpolluted Material for Beach Nourishment
f. Modification of the Harbor Structures
g. Control of Erosion
h. Control of Sediment Pollutants

5. Comments Received:

Advisory Council on Historic Preservation
Linwood Park Company
Linwood Park Cottage Owners Association
Northwest Ohio-Great Lakes Research Center
Ohio Department of Natural Resources
Ohio Environmental Protection Agency (including comments from the Ohio Department of Natural Resources and the Ohio Department of Economic and Community Development)
Sierra Club, Northeast Ohio Group
U. S. Department of Agriculture, Forest Service
U. S. Department of Agriculture, Soil Conservation Service
U. S. Department of Commerce
U. S. Department of the Interior
U. S. Department of Transportation, Federal Highway Administration
U. S. Environmental Protection Agency
Vermilion Yacht Club
Berns, Mr. David T. and Ms. Roberta A.
Boas, Mr. Raymond A.
Cook, Mr. Murray
Cramer, Ms. Hazel
Cramer, Mr. Stuart P.
Dearth, Mr. William E.
Forbes, Mr. Benjamin F.
Fussner, Mr. Fred W.
Galovich, Mr. Fred S.
Grossman, Mr. George W.
Herrold, Mr. Dean A.
Holub, Mr. Frank J.
Johnson, Dr. Franklin P.
Johnson, Mrs. Lois W.
Koppin, Mr. Dean M.
Kreps, Mr. D. H.
Ludwig, Mr. L.L.
Meckel, Ms. Esther S.
Moelter, Ms. Lois R.
Morgan, Mr. Gary F.
New, Dr. John A.
Persons, Mr. George F.
Peterka, Ms. Ruth E.
Peters, Mr. Edward A. and Ms. Virginia R.

Prestel, Mrs. Carl
Prochaska, Mr. Robert
Pugsley, Mr. Hugh J.
Rutledge, Mr. J. W.
Thomas, Mrs, George M.
Waite, Mr. Walter C.
Wakefield, Mr. Theodore
Wilde, Mr. Redge A.
Wilde, Mr. W. Craig
Anonymous

6. Draft Statement to CEQ: 11 September 1975
Final Statement to CEQ: JUN 22 1976



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1. PROJECT DESCRIPTION

Location

1.01 Vermilion Harbor is located on the south shore of Lake Erie at the mouth of the Vermilion River, approximately 10 miles west of Lorain, OH, and 10 miles east of Huron, OH. The harbor, as it presently exists, consists of parallel piers, a detached breakwater, and lake approach, entrance, and river channels, all of which are maintained by the Federal government. A location map of the harbor is shown on Plate 1.1.

Authorization and Project History

1.02 The work under consideration in this Environmental Impact Statement is the recurring future maintenance of the completed channels and structures that comprise the shallow-draft navigation project for Vermilion Harbor, OH. The project was authorized by the River and Harbor Acts of 1836, 1875, 1905, and 1958 and was constructed in stages. Harbor improvements authorized by the 1958 Act (described in House Document 231, 85th Congress, 1st Session), including the breakwater construction and new work dredging of the river and lake approach channels, were initiated in June 1973 and completed in December 1973. The existing project is complete.

1.03 The following section provides a brief history of Federal construction and maintenance operations at Vermilion Harbor. Some of the project history was extracted from unpublished records which are on file at the Buffalo District Office. Other, published sources which were consulted include the Annual Report of the Chief of Engineers, volumes from 1867 through 1973 pertaining to civil works activities in the Buffalo District; House Document 231 (85th Congress, 1st Session), "Vermilion Harbor, OH, Letter from the Secretary of the Army...."; the Vermilion Harbor Ohio General Design Memorandum (U. S. Army Engineer District, Buffalo: August 1971); and the "Preliminary Report on Section 111 Study of Vermilion Harbor, OH" (U. S. Army Engineer District Buffalo: 21 January 1976). All of these publications are on file at the Buffalo District Office and may be reviewed for additional details of the project history.

1.04 Construction of the harbor project at the mouth of the Vermilion River was undertaken by the Federal Government in 1836 as authorized by the River and Harbor Act of that year. At that time there was less than two feet of water over a sand bar at the mouth of the river. The original project consisted of parallel piers, 125 feet apart extending into the lake to the 10-foot contour, and an 8-foot deep entrance channel between the piers. Construction of the original project was completed in 1839. Maintenance dredging of 2,216 cubic yards of rock in the entrance

CORPS OF ENGINEERS

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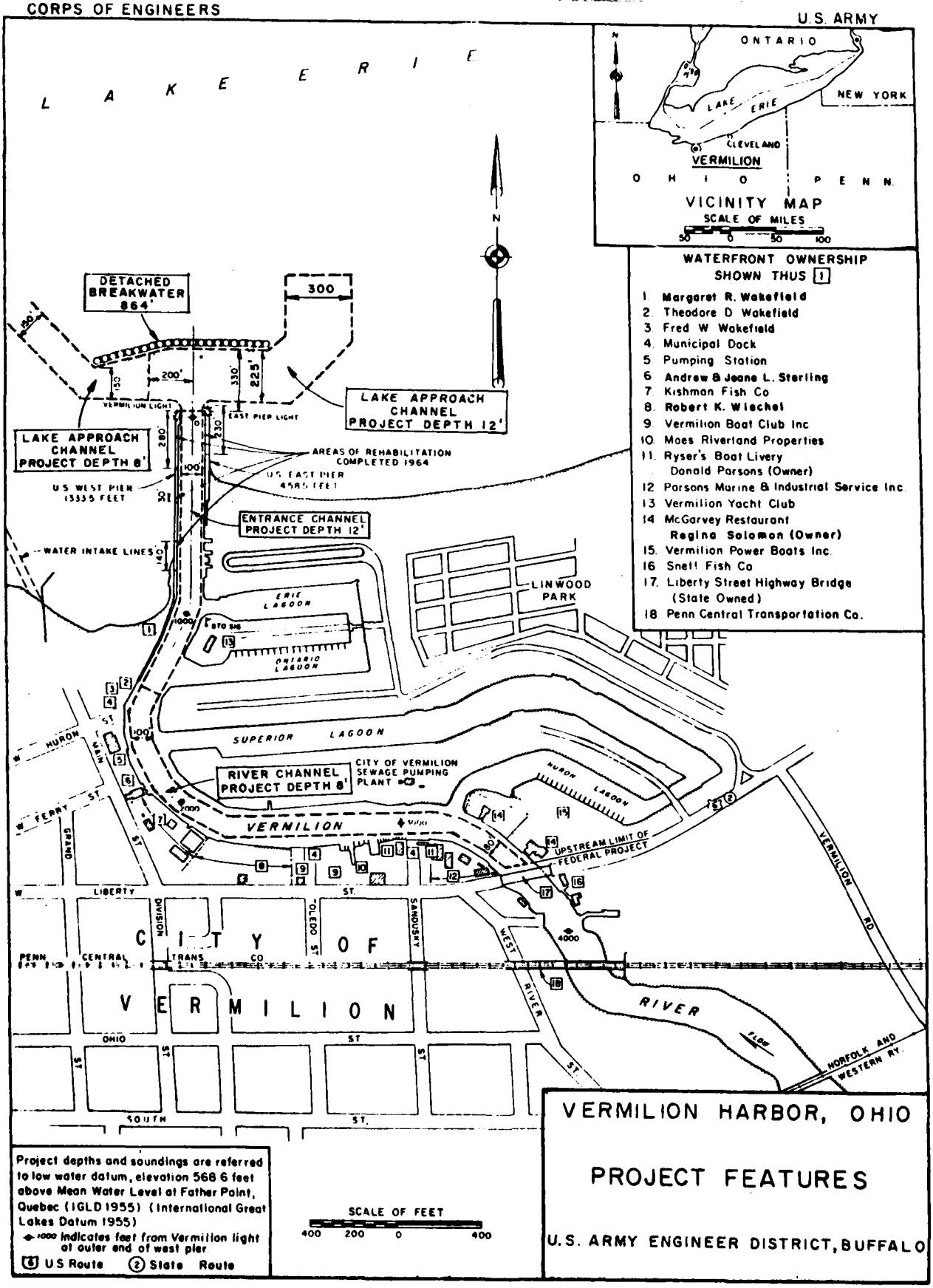


Project depths and soundings are referred to low water datum, elevation 568 6 feet above Mean Water Level at Father Point, Quebec (IGLD 1955) (International Great Lakes Datum 1955)

1000 indicates feet from Vermilion light at outer end of west pier

[6] US Route (2) State Route

VERMILION HARBOR, OHIO

PROJECT FEATURES

U.S. ARMY ENGINEER DISTRICT, BUFFALO

channel was conducted in 1873. During the following year, the piers were extended to the 12-foot lake contour. No further lakeward extensions of the piers have been made since that time.

1.05 The River and Harbor Act of 1875 authorized an increase in the original project depth in the entrance channel to 12 feet. The project then provided for a 12-foot entrance channel extending from the 12-foot contour upstream for a distance of about 1,335 feet from the outer end of the entrance piers. The channel deepening was completed in 1878 except for a small rock area near the inner limits of the entrance channel. The River and Harbor Act of 1905 authorized pier repairs and replacement of the piers' timber superstructures with heavy stone. This work was accomplished between 1906 and 1914. In 1915, the U. S. Dredge MAUMEE removed 10,530 cubic yards of rock materials from the entrance channel ($2,821 total cost) and local interests partially dredged a channel upstream from the Federal project limit.

1.06 Buffalo District permit records indicate that the river between the upstream end of the Federal project and the vicinity of the Liberty Street Bridge was dredged by the Wells Realty Company between 1930 and 1937. The dredging of a system of four private lagoons for recreational vessels on the east river bank near the mouth, and the leveling of adjacent land, was completed by local interest in 1933. In 1935, 7,591 cubic yards of shoal material were removed from the Federal entrance channel. This operation was accomplished by a private dredging contractor at a cost of $4,332. Maintenance dredgings were disposed of in the harbor's open-lake disposal zone. No additional project maintenance was accomplished until the 1960's. Pier repairs were made in 1964 under a minor rehabilitation program, and emergency repairs were made on the shoreward end of the west pier after a flood in July 1969.

1.07 Construction of the harbor modifications authorized by the 1958 River and Harbor Act, including the lake approach and river channels and the detached breakwater, was accomplished in 1973. Dredging of about 12,000 cubic yards from the lake entrance channel and about 23,000 cubic yards from the river channel was conducted by a contract clamshell dredge between September and December 1973. The river sediments, which were classified as unsuitable for open-lake disposal by the Federal Water Pollution Control Administration (now the U. S. Environmental Protection Agency), were deposited in an upland disposal site, located about 3.5 miles south of Vermilion, which was made available for that specific disposal operation by the Vermilion Fish and Game Commission. Sediments from the lake approach channel were classified as suitable for open-lake disposal and were deposited in the harbor's open-lake dump zone. The existing entrance channel was not dredged during the new work operations. The detached breakwater was constructed between June and October 1973. The existing T-type breakwater arrangement was selected over an arrowhead configuration as a result of model studies conducted by the Corps'

Waterways Experiment Station (WES) in 1968 through 1969. The WES studies showed that the arrowhead breakwater plan did not provide sufficient protection for full use of the harbor. The single T-type breakwater, generally parallel to shore and about 300 feet lakeward of the outer end of the east pier, was finally selected as the more effective and economical alternative.

1.08 Three emergency dredging operations have been conducted in the lakeward section of the harbor since the existing project was completed in 1973. These emergency operations were required due to extensive shoaling in the entrance and lake approach channels that occurred as a result of storm activities during a period of high lake levels. Removal of the shoals was determined to be necessary in order to prevent potential ice jams and subsequent flooding in the harbor. It is important to note that each of the emergency operations discussed in the following paragraphs was accomplished due to critical conditions that existed at a particular time. None of these operations is considered typical of a routine maintenance dredging operation and therefore should not be used as a basis for projecting the scope of future work. It is expected that as lake levels gradually decrease, storm-related shoaling and the need for maintenance dredging will also decrease.

1.09 During the first emergency operation in June 1974, approximately 5,900 cubic yards were dredged from the east side of the entrance channel and disposed of on the west side of the west pier. Disposal over the west pier was recommended by the Ohio Department of Natural Resources (DNR). The U. S. Environmental Protection Agency (USEPA) analyzed the entrance channel sediments and concurred in the disposal method prior to dredging. The June 1974 operation cost about $24,000, or about $4.00 per cubic yard dredged. In February 1975, emergency dredging was again performed in the entrance channel. Approximately 3,000 cubic yards were removed from the east side of the channel and deposited in the same area used for the June 1974 emergency operation. The Ohio DNR and the USEPA concurred in this emergency dredging and disposal operation. The February 1975 operation cost about $10,300, or about $3.50 per cubic yard dredged. Both the June 1974 and February 1975 emergency dredging operations were accomplished by private contractors using a clamshell dredge for excavation and disposal.

1.10 A third emergency dredging operation was conducted in November-December 1975 by Corps dredging plant. The operation plan was coordinated with USEPA, Ohio DNR, and the U. S. Fish and Wildlife Service prior to the initiation of dredging. In November, the U. S. Derrickboat TONAWANDA, equipped with a clamshell excavation bucket, dredged 2,350 cubic yards from the east side of the entrance channel. Dredged materials were deposited in a barge, transported upriver, transferred into dump trucks, and trucked to the edge of a bluff at the east end of Nakomis Beach (located along the lakeshore approximately 3,500 feet east of the east pier).

The dredgings were dumped over the bluff onto Nakomis Beach. This disposal method was suggested by local interests in Vermilion as a means of replenishing beach materials east of the harbor. After the available beach nourishment materials had been dredged from the entrance channel, the U. S. Dredge HOFFMAN completed the emergency operation in December by removing 8,550 cubic yards of silt-sized material from the east (12-foot) lake approach channel. Dredgings were transported by the HOFFMAN, which is a hopper dredge, to the harbor's open-lake dump zone for disposal. The total cost of the November-December 1975 emergency dredging operation was $53,200, or about $4.90 per cubic yard.

1.11 The only recorded permit dredging in Vermilion Harbor since the 1930 Wells Company operation was in 1973, when the Vermilion Boat Club applied for a permit to construct a bulkhead and floating docks and dredge about 650 cubic yards from the river. Numerous permits have been filed for bulkheads, docks, groins, and other structures built by private interests in the Vermilion Harbor area.

Harbor Navigation Project Features

1.12 Maintenance activities at Vermilion Harbor consist of dredging authorized navigation channels to maintain authorized project depths and the repair of harbor structures. Maintained features of the existing harbor navigation project are:

a. Lake approach channel: An east lake approach channel, varying in width from 300 feet to 225 feet, 12 feet deep, extending from the 12-foot lake bottom contour lakeward of the breakwater to about 140 feet west of the outer end of the west pier. A west lake approach channel, 8 feet deep, varying in width from 150 feet to 225 feet, extending from the lake to the east lake approach channel. The total lake approach channel occupies about 6.5 acres.

b. Entrance channel: 100 feet wide and 12 feet deep; approximately 1,300 feet in length, extending from the lake approach channel to a point near the south shore of the Ontario Lagoon; about 3.0 acres in size.

c. River channel: 8 feet deep; approximately 2,250 feet in length extending from the entrance channel to the Liberty Street Bridge; 100 feet wide for 1,800 feet south from the entranch channel, thence narrowing to 80 feet width in 100 feet, and thence 80 feet wide for 350 feet to the bridge; about 4.9 acres in size.

d. East pier: Timber-crib, stone-filled, capped construction with riprap stone along the submerged channel and lake sides; 458.5 feet in length; 6.5 feet above low water datum (LWD) in height. Parallel to and 125 feet apart from the west pier. Several large structural stones have been stored on top of the east pier since July 1974.

e. West pier: Timber-crib, stone-filled, capped construction with riprap stone along the submerged channel and lake sides; 1,333.5 feet in length; 6.5 feet above LWD in height.

f. Detached breakwater: Cellular steel sheet pile construction; 864 feet in length; 10 feet above LWD in height; perpendicular to, and 330 feet north of the outer end of the east pier.

1.13 The locations of the maintained channels and structures at Vermilion Harbor are shown on Plate 1.1. Cross-section views and structural data relative to the dimensions and material composition of harbor structures are shown on Plate 1.2.

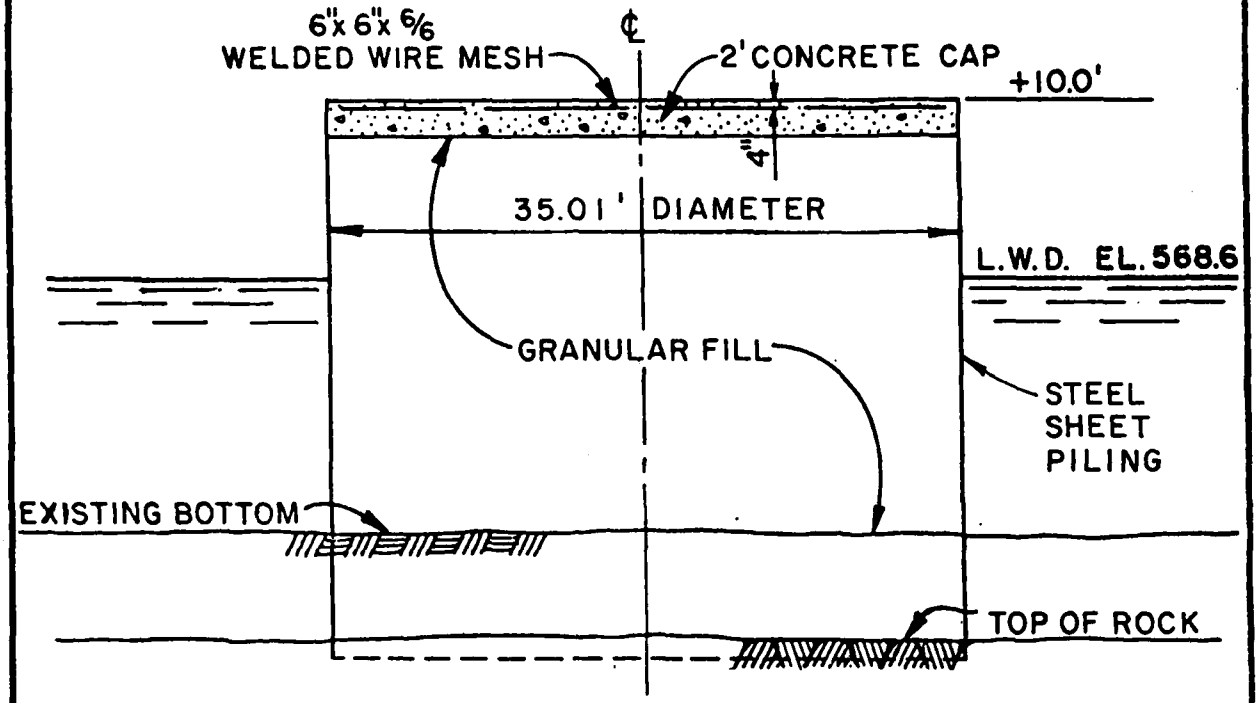
Maintenance Activities

General

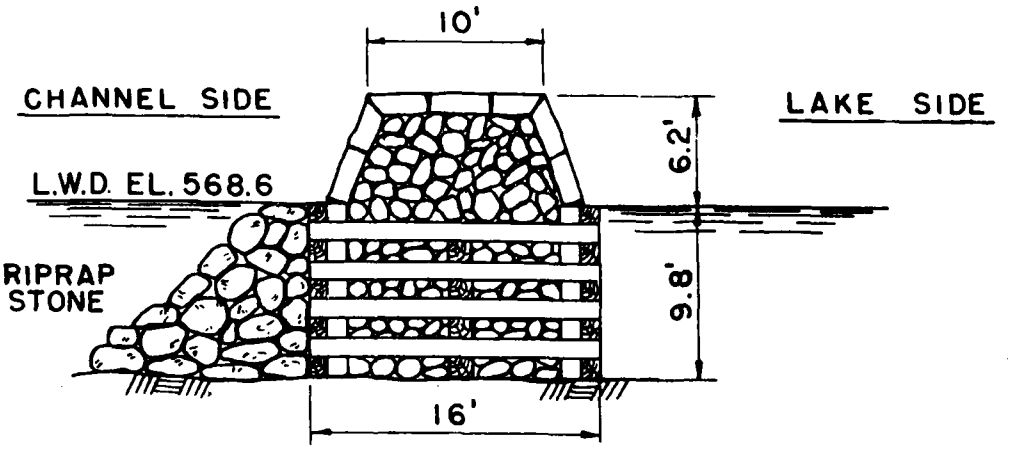
1.14 Based on the Buffalo District's past experience at Vermilion Harbor, and experience at similar Great Lakes' shallow-draft harbors, it is expected that future maintenance activities at Vermilion Harbor will consist of various, standard maintenance tasks performed with the objectives of maintaining project depths in the authorized navigation channels and the structural integrity of the existing harbor structures. The following sections generally describe harbor maintenance equipment and methods that can be expected to be used at Vermilion Harbor. Detailed descriptions of the various maintenance vessels and operations that may be employed at Vermilion are presented in Appendix D, Maintenance Equipment and Methods.

Channel Maintenance

1.15 The need for channel maintenance arises from the periodic buildup of shoal areas in authorized navigation channels that decrease channel depths to levels that are less than project depths. At the present time, much of the sediment deposited in Vermilion Harbor originates from land erosion in the river watershed and along the lake shoreline, and from municipal wastes. Based on the District's past experience at Vermilion, it has been observed that shoal areas have tended to build up in the entrance channel at the river mouth adjacent to the east pier, on the south side of the east lake approach channel, and in the upstream section of the river channel. Visual examination of harbor sediments prior to the November-December 1975 emergency dredging operation indicated that the shoal between the piers was comprised of poorly-sorted, silty, gravelly sands. Offshore material between the jetties and the breakwater was generally much finer, consisting of clayey-silts with some pockets of silty-sands with traces of gravel. The clay and organic detritus content indicated that the bulk of the outer harbor sediment was probably material brought down by the Vermilion River. The finer portion of littoral material that is normally carried in



SECTION OF DETACHED BREAKWATER
BUILT 1973



SECTION OF EAST PIER
(WEST PIER SIMILAR BUT OPPOSITE HAND)
BUILT 1836 - 1839, REBUILT 1906 - 1914

REHABILITATION OF 400 FEET OF WEST PIER AND 150 FEET OF EAST PIER INITIATED IN JUNE 1964 AND COMPLETED IN OCTOBER 1964. (TOP ELEVATION RAISED TO 6.5 FEET ABOVE L.W.D. AND RIPRAP STONE PLACED ON LAKE SIDE.)

VERMILION HARBOR, OHIO

STRUCTURE
CROSS - SECTIONS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 1.2

suspension probably settled out in the relatively quiet water behind the breakwater and also contributed to this deposit. Further, some of the beach material which has washed over the east pier and deposited in the entrance channel is probably carried by the Vermilion River during periods of high discharge into the lake approach channel, where the gravels and sands quickly settle out in isolated pockets. The deposits between the piers and behind the breakwater represent a combination of littorally and fluvially transported material. The relative influence of each source varies with location, river discharge, and wave conditions (141).

1.16 Channel maintenance consists of a series of specific operations that are conducted in order to identify and remove materials that have entered the authorized project channels. A sounding survey is periodically conducted to determine the location and amount of channel shoaling; and, depending on weather conditions, the survey generally takes about one week to complete. Shoaling information is gathered by sounding equipment on a survey launch boat, and the recorded information is used to prepare harbor maps that display channel depths in the project area. Harbor maps showing the results of past sounding operations at Vermilion Harbor are available for review at the Buffalo District Office. Sounding operations at Vermilion Harbor are performed by Buffalo District personnel.

1.17 After the navigation channels have been surveyed, dredging activities are conducted to remove channel shoals that have decreased channel depths to levels that are less than the authorized depths. Large, deep-draft, commercial harbors that are maintained by the Buffalo District, such as the Cleveland Outer Harbor and Lorain Harbor, are dredged by the Corps using a Corps hopper dredge. As previously discussed, the hopper dredge HOFFMAN successfully operated in the Vermilion Harbor east (12-foot) lake approach channel in late 1975, and it could probably also operate in the 12-foot lake entrance channel in calm weather conditions. However, the 8-foot authorized channel depth in the west lake approach channel and river channel precludes the use of the smaller Buffalo District hopper dredges (which have loaded drafts of about 12 feet, 9 inches) for maintenance dredging in these channels. Generally, there are no other suitable Government dredges available on the Great Lakes to accomplish this work in an efficient and economical manner. Therefore, in order to accomplish maintenance dredging throughout the harbor, it is expected that future, routine maintenance operations will either be performed for the Corps by a private contractor, using a shallow-draft dredge other than a hopper dredge, or by a Corps derrickboat equipped with a clamshell excavation bucket. The exact circumstances of each proposed dredging operation will be carefully evaluated in order to determine the most effective type of dredge plant to be used at a particular time. Criteria that will be used in such a determination include the location and nature of shoaling, criticality of dredging, availability of funds, and availability of contract or government dredging plant.

1.18 Maintenance dredging may be accomplished using one of a number of different types of dredging plant. However, based on the District's past experience in contract dredging at Vermilion and similar shallow-draft harbors, channel maintenance is generally conducted with either a clamshell, dipper (or backhoe), or cutterhead dredge. These three dredge types are usually available for maintenance work on the Great Lakes and are suitable, to varying degrees, for efficient and economical work. The clamshell dredge, which is the most widely used plant by Great Lakes dredging contractors, is a mechanical dredge that excavates shoal material by means of a clamshell-type bucket suspended by cables from a forward-extending boom. A dipper dredge is also a mechanical dredge, and excavation is accomplished by the operation of a dipper bucket on a forward-extending boom. A backhoe-type dipper dredge excavates in the same manner as the regular dipper dredge except that the bucket moves toward the dredge when digging, whereas the regular dipper dredge bucket moves away from the dredge. The cutterhead is a hydraulic-type dredge that removes shoal material by drawing the material up through a submerged forward-extending suction line in an action similar to that of a vacuum cleaner. Surrounding the intake end of the suction line is a revolving head, consisting of a set of blades that cut through and loosen shoal material. General characteristics of each of these three dredge types, including typical dimensions, vessel mobility, dredging suitability, means of dredging, and typical dredging capacities and costs, are presented in Tables D.1 through D.3 of Appendix D, Maintenance Equipment and Methods.

1.19 The equipment and physical construction of a Corps derrickboat is basically the same as that of the aforementioned clamshell dredge. The major difference between the two is in the apparatus suspended from the vessels' forward extending booms, which is an excavation bucket on a dredge and a stone hook or other device on a derrickboat. The Buffalo District's derrickboats can be converted to clamshell dredges by temporarily replacing the stone-handling apparatus with a clamshell bucket. Excavation of shoals can then be accomplished in the manner of a clamshell dredge. The U. S. Derrickboat TONAWANDA is the most suitable Buffalo District derrickboat (in terms of vessel dimensions and proximity of home port) for clamshell dredging operations at Vermilion Harbor, and would therefore be expected to be used in future Corps clamshell dredging as required.

1.20 Neither the Corps derrickboats nor contract dredge plant that is generally in use on the Great Lakes is typically equipped with hoppers or other means for the on-board containment of harbor dredgings. Therefore, dredged material is deposited in a dump scow directly from the excavation bucket on clamshell (or modified derrick-boat) and dipper dredges, or through a discharge line on a cutterhead dredge. The filled scow is transported to the disposal site for material deposition. Open-lake disposal is accomplished by opening doors in the scow's hull to release dredgings. Deposition in a confined site may be accomplished by either installing a pump and pipeline system

between the scow and the disposal site, or by transferring material from the scow into the site with a clamshell bucket on a dredge or derrickboat. The dredging and disposal process continues until the shoaled navigation channels have been cleared to the authorized channel depths.

1.21 Maintenance dredging in the 12-foot east lake approach and lake entrance channels will be accomplished by one of Buffalo District's smaller hopper dredges whenever it is feasible to do so. A hopper dredge is a hydraulic dredge that removes sediment accumulations by drawing material up into the vessel, through a suction line, by means of an onboard pumping system. It differs from a pipeline hydraulic dredge in that it is equipped with internal hoppers for the onboard containment of dredgings. The most common type of hopper dredge is the trailing suction hopper drege, which is equipped with one or two suction lines that extend from the pumps to the channel bottom. As the dredge navigates over shoal areas, the suction lines trail behind the dredge and loose bottom material is drawn through the line and into the hoppers. Upon accumulation of an economical load in the hoppers, the pumps are shut down and the dredge travels to the disposal area. Open-lake disposal is accomplished by opening doors in the bottom of the hoppers to release dredgings in the designated lake disposal zone. Disposal in a diked containment facility can be accomplished by pumping dredgings, through a connecting pipeline, directly from the hoppers into the diked area. The hopper dredge's advantage over other dredge types stems from its mobility, in that it is a self-propelled ship and dredging is conducted while the vessel is underway. It is unencumbered during operations with connecting pipelines or attendant plant, such as tugs and barges. The hopper dredge has a capability for dredging shallow deposits of soft bottom materials that are characteristic of maintenance dredging, and transporting the removed material several miles economically. A detailed description of hopper dredge characteristics and operations is presented in Appendix D, Maintenance Equipment and Methods.

1.22 The Buffalo District currently has two trailing suction hopper dredges with relatively shallow drafts in service on the Great Lakes. The U. S. Dredge HOFFMAN and the U. S. Dredge LYMAN are both about 216 feet in overall length, and have maximum light keel drafts of 9 feet, 8 inches, and 9 feet, 11 inches, respectively. While neither of these dredges could enter the 8-foot river or west lake approach channels, they could operate in the 12-foot east lake approach and entrance channels if shoaling has not reduced depths to any less than about 10 feet. The HOFFMAN's success during its December 1975 operation demonstrated the economic and technical feasibility of using a shallow-draft hopper dredge to maintain the 12-foot channels at Vermilion Harbor. Since the HOFFMAN, which is based at Cleveland, is usually scheduled for operations in commercial harbors on Lake Erie (Huron, Lorain, Ashtabula, etc), its availability during the work season will be an important factor in determining its

use at Vermilion. The LYMAN generally operates at Lake Ontario harbors and therefore would probably not be used at Vermilion. Other factors that will be considered for hopper dredge operations include the volume of sediment to be removed, the location of shoals, criticality of dredging, and funding constraints.

1.23 Upon completion of dredging activities, the channels are resounded to check post-work channel depths. Finally, a sweep survey, using a sweep float, is undertaken to locate large objects, such as displaced stones, that may have been deposited in project channels. Should the sweep survey reveal any large obstructions that cannot be removed by the operating dredge, the identified obstructions are removed by a derrickboat and placed on a barge for transport from the project area. The frequency and duration of a clearing operation is dependent upon the number and type of objects removed; however, the process is generally completed within a week. Post-dredging sounding, sweep, and clearing operations at Vermilion Harbor are performed by the Buffalo District using Corps maintenance plant.

1.24 It is expected that future routine maintenance dredging at Vermilion Harbor will be required approximately every three years, and will involve the removal of about 24,800 cubic yards of material during each dredging operation. Shoaling rates, environmental considerations, and funding may affect dredging volumes and frequency in the future. The duration of dredging operations will be dependent upon the nature and location of material to be removed, the type of dredge available, location of the disposal site, and other factors. Dredging could take up to six weeks if polluted sediments, which will be deposited in a diked disposal site at Huron Harbor, OH, are removed.

1.25 Future maintenance dredging at Vermilion Harbor will be conducted during the fall season of the year, starting after about 15 September and finishing about 15 December. The three month period should allow sufficient time for an expected average six-week routine dredging operation to be performed. The following operational constraints and environmental characteristics of Vermilion Harbor were considered in making this scheduling determination:

a. While the earliest opening date of the available work season for construction and maintenance on Lake Erie was, in recent years, 2 March, contract dredging is usually initiated about 1 April due to lake ice conditions that tend to inhibit safe operations until that time. The latest work season closing date was 30 December, although lake storms have occasionally hindered efficient operations in November and December. Therefore, routine maintenance dredging must be accomplished between about 1 April and 30 December.

b. In letters dated 6 June 1975 to the U. S. Department of the Interior, Fish and Wildlife Service and the Ohio DNR, the Buffalo District requested that these agencies identify any significant fish and

wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. In response to this request, the Fish and Wildlife Service, in a letter dated 18 June 1975, indicated that, "since the river does serve as a spawning area for smallmouth bass, we recommend that no dredging be conducted during the period May 1 through June 15." A reply from the Ohio DNR, dated 24 June 1975, recommended, "that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be done during October and November when salmon are moving "through the harbor area." Based on this information, the Buffalo District proposed conducting maintenance dredging operations between 15 June and 1 October in the Draft Environmental Impact Statement on the operation and maintenance of Vermilion Harbor (Statement dated September 1975). However, in February 1976, District personnel were informed of an error in the critical fishery periods identified in the Ohio DNR's 24 June 1975 letter. In a telephone conversation between District personnel and the Ohio DNR, Division of Wildlife on 27 January 1976, a representative of the Division indicated that no dredging should be conducted between 1 May and 15 June, due to a smallmouth bass spawning migration from Lake Erie into the Vermilion River, or in late June or July, when channel catfish, bullheads, and shovelhead (flathead) catfish may enter the river to spawn. In a 29 January 1976 letter to the Director, Ohio DNR, the District Engineer stated that, in view of the revised harbor fishery information, and in order to avoid potential interference with the harbor's critical fishery activities, the Corps will "conduct future routine maintenance dredging operations in the authorized Federal channels at Vermilion Harbor between 15 September and 15 December." In a letter of reply dated 5 February 1976, the Director, Ohio DNR indicated that, "We have no objection to your proposed Fall dredging of the Vermilion Harbor from 15 September through 15 December." Copies of the above discussed correspondence relating to fish and wildlife scheduling considerations are included in Appendix A, Letters of Coordination.

c. In letters of comment on Draft Statement (copies in Appendix F), the Linwood Park Company and several private citizens from Vermilion expressed opposition to maintenance dredging during the 15 June through 1 October period proposed in the Draft Statement. Opposition was based on the unavoidable adverse effect of dredging on water quality, which could have an indirect, adverse effect on water quality at public and private beaches located along the lakeshore immediately east and west of the harbor. Based on these comments, it was determined that it would be more environmentally acceptable, from the viewpoint of the local swimming population, to accomplish dredging either before the Memorial Day holiday when the peak swimming season usually begins (about 30 May) or after the Labor Day holiday when the peak swimming season generally ends (about 15 September).

1.26 In view of the above operational constraints and environmental characteristics of Vermilion Harbor, the 15 September through 15 December period has been selected for conducting maintenance dredging. Although this period extends into the later part of the lake work season, it should allow for sufficient time (about thirteen weeks) in which to complete a six-week operation and to compensate for any working time that may be lost due to inclement weather conditions or other unexpected circumstances. This period will avoid potential interference with significant harbor fish activities that have been identified by the U. S. Fish and Wildlife Service and the Ohio DNR. In addition, the fall schedule will avoid major interference with peak recreational seasons for swimming and small boating activities. It is important to note that future maintenance dredging operations may be required during a time period other than the fall season described above. This situation was true for the emergency dredging operations in June 1974 and February 1975. If it is anticipated that an alternative work period will be necessary, the appropriate agencies will be consulted to formulate plans to mitigate identifiable adverse effects that may result from dredging operations.

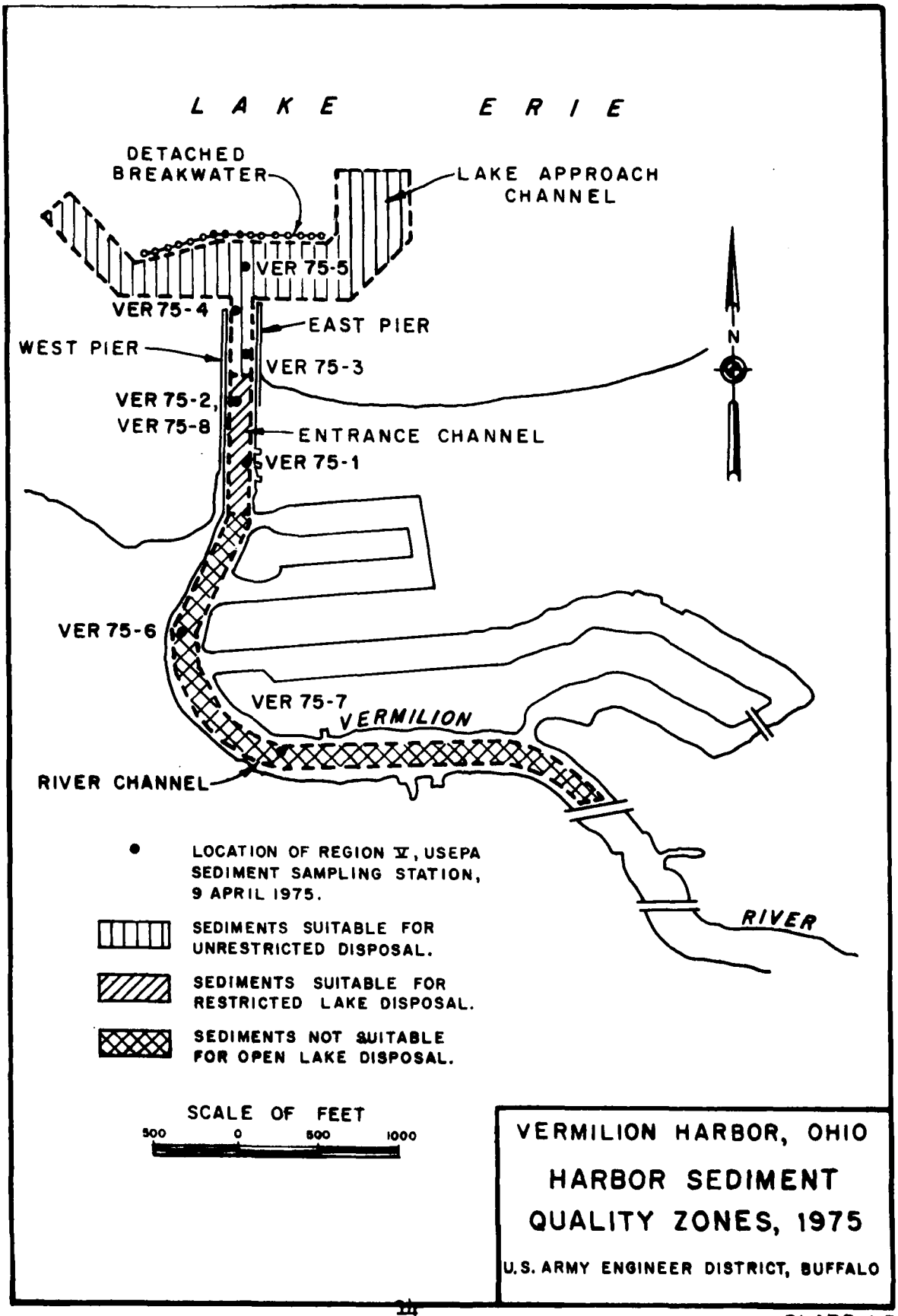
1.27 The means of deposition for Vermilion Harbor dredgings is dependent upon the chemical quality of the harbor's sediment as determined by the USEPA. Sediment in the maintained Vermilion project channels was sampled by USEPA, Region V on 9 April 1975. In a letter to the Buffalo District dated 15 July 1975, the USEPA, Region V delineated the following sediment quality zones in Vermilion Harbor, which are shown on Plate 1.3:

a. Suitable for open-lake disposal: Including all sediment in the lake approach channel, and sediment in the entrance channel north of line approximately parallel to the lake shoreline east of the east pier.

b. Suitable for restricted open-lake disposal: Sediment in the entrance channel south of a line approximately parallel to the lake shoreline east of the east pier, and north of a line approximately parallel to the north shoreline of the Erie Lagoon.

c. Not suitable for open-lake disposal: Including all sediment in the river channel, and sediment in the entrance channel south of a line approximately parallel to the north shoreline of the Erie Lagoon.

Based on these determinations, the Buffalo District has estimated that of the 24,800 cubic yards that are expected to be removed during each future maintenance dredging operation, approximately 20,000 cubic yards will be suitable for open-lake disposal, and approximately 4,800 cubic yards will not be suitable for restricted open-lake disposal. The section of the entrance channel in which USEPA, Region V has designated sediments as suitable for restricted open-lake disposal is usually kept free of shoals by the natural scouring action of the Vermilion River. October 1975 soundings indicate that river scouring has maintained



VERMILION HARBOR, OHIO

HARBOR SEDIMENT QUALITY ZONES, 1975

U.S. ARMY ENGINEER DISTRICT, BUFFALO

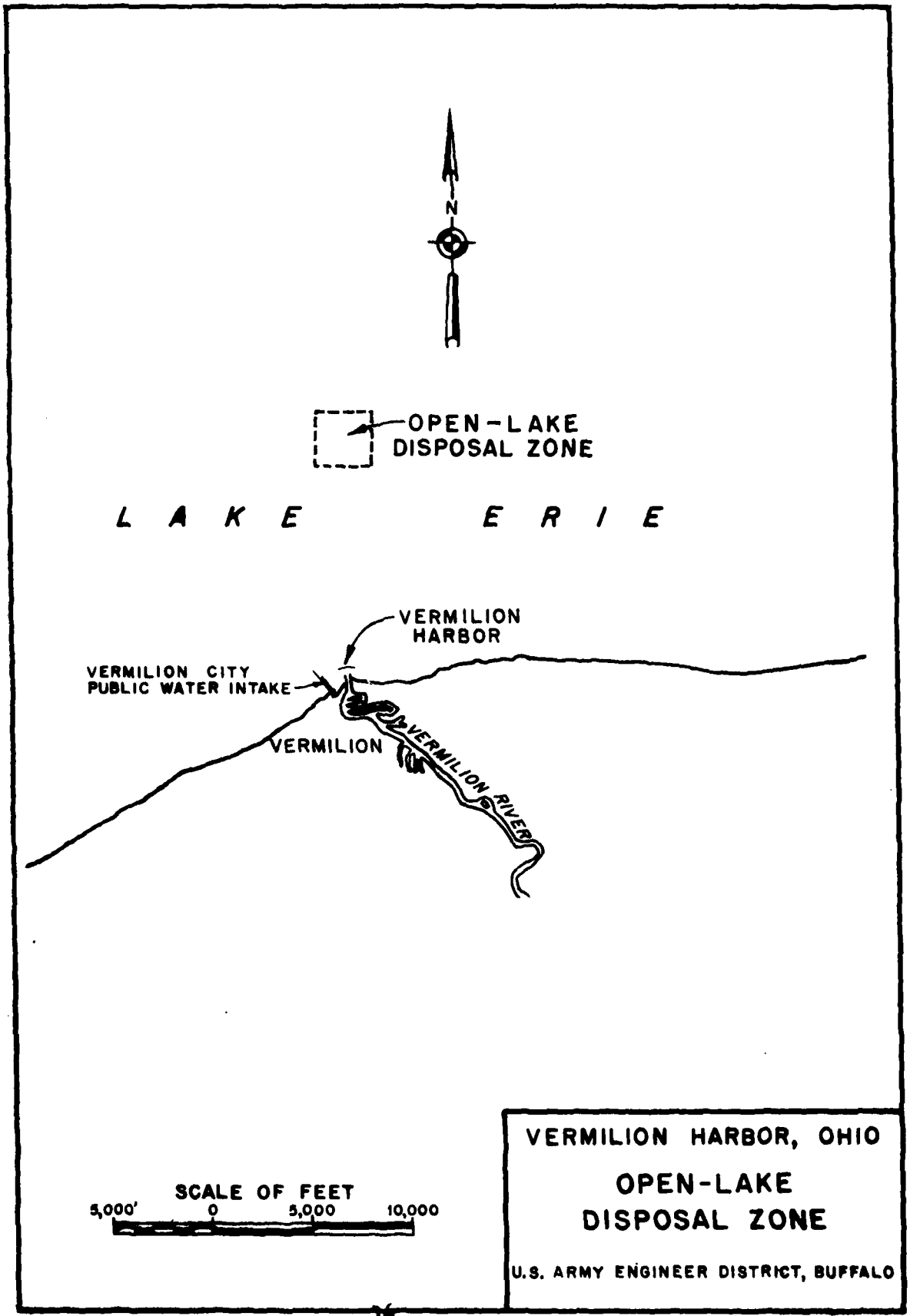
PLATE 1.3

depths at or below the 12-foot project depth in this zone. Therefore, no maintenance is expected to be required in the polluted-restricted disposal area, and no materials are expected to require removal and disposal. A further discussion of the harbor's sediment quality is presented in Chapter 2 of this Environmental Statement. Copies of correspondence between the Buffalo District and USEPA, Region V relative to Vermilion Harbor sediment quality are included in Appendix A, Letters of Coordination.

1.28 All harbor maintenance dredgings removed from authorized channels in the area suitable for open-lake disposal will be deposited in the harbor's open-lake disposal site in Lake Erie which is shown on Plate 1.4. The Vermilion Harbor open-lake disposal area is located 2.0 miles north of the outer end of the east pier and has a minimum depth of 32 feet below low water datum (LWD). It is approximately 0.5 mile square and has been used in the past for the disposal of routine maintenance and new work dredgings. Harbor charts indicated that the site has been in use since the 1930's. The site has sufficient capacity for the foreseeable future without impending navigation. Open-lake disposal will be accomplished by dumping harbor dredgings from the transporting scow while the scow is stationary over the site or directly from on-board hoppers if a hopper dredge is used.

1.29 Harbor maintenance dredgings removed from authorized channels with sediments not suitable for open-lake disposal will be transported approximately 10 miles to Huron Harbor, OH, and deposited in the diked disposal facility located at the area designated Site 1, which is shown on Plate 1.5. Disposal in the confined site at Huron will be accomplished by pumping dredgings from the scow or on-board hoppers on a hopper dredge through a connecting pipeline into the site, or by transferring material from the scow into the site with a clamshell dredge. A Final Environmental Impact Statement for Huron Site 1 was filed with the Council on Environmental Quality on 19 November 1973.

1.30 As previously discussed, the Buffalo District does not anticipate the need to dredge that section of the entrance channel in which USEPA, Region V has designated sediments as suitable for restricted open-lake disposal. However, if shoaling does occur and it is necessary to dredge restricted disposal sediments, these materials will also be deposited in the Huron Site 1 confined disposal facility described above. This method of disposal represents a change from the disposal method proposed in the Draft Statement, which was to dredge and open-lake dump the restricted disposal material prior to the dredging and open-lake disposal of sediments suitable for unrestricted open-lake disposal. This practice, which was suggested in the USEPA, Region V report on the harbor's sediment quality (copy in Appendix A), was questioned on environmental grounds in the U. S. Department of the Interior's letter of comment on the Draft Statement (copy in Appendix F). In view that agency's environmental reservations about open-lake disposal of restricted disposal sediments, and since there is little anticipated need to dredge and dispose of such materials, the materials will be deposited in Site 1 as required.

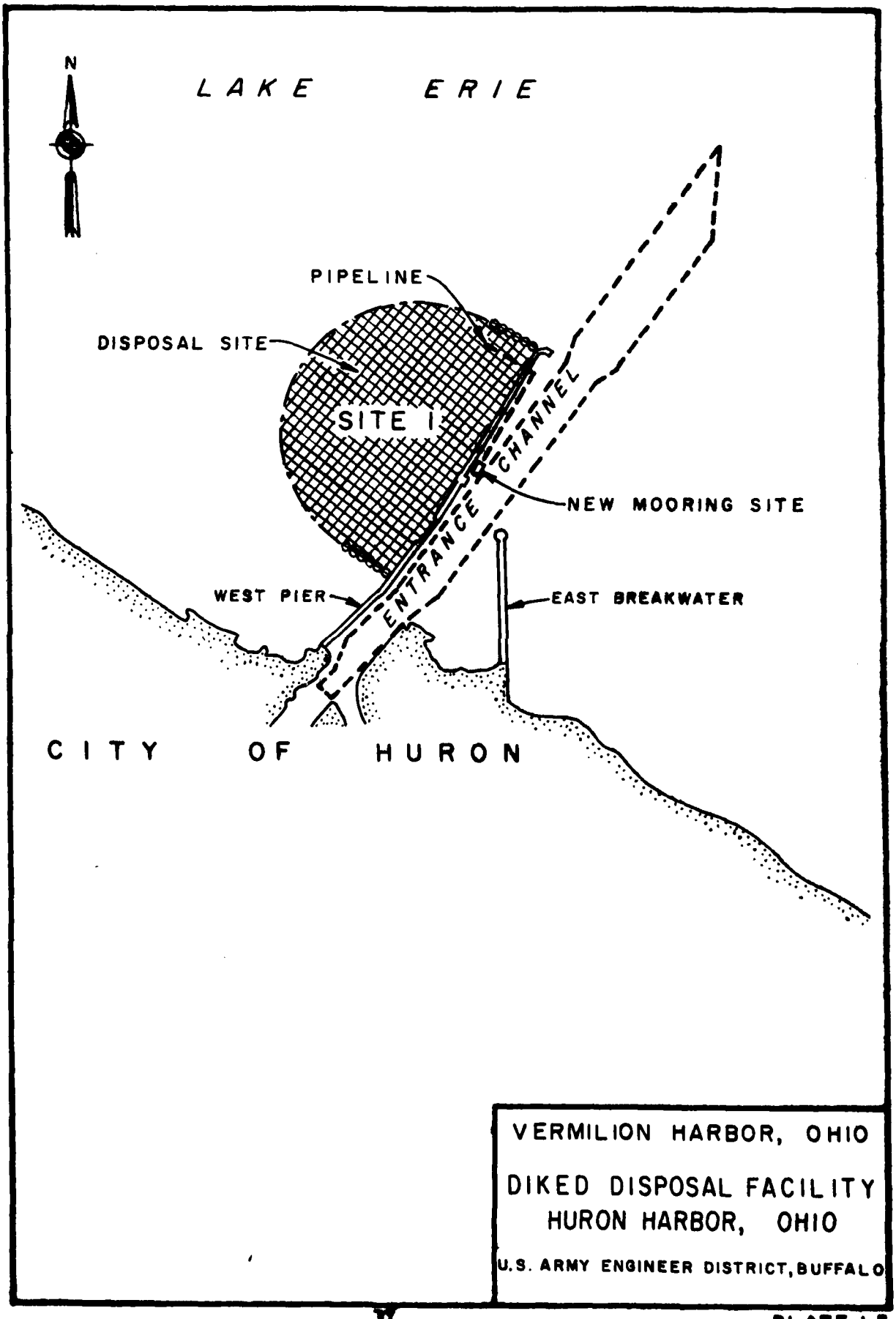


VERMILION HARBOR, OHIO

OPEN-LAKE DISPOSAL ZONE

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 1.4



VERMILION HARBOR, OHIO

DIKED DISPOSAL FACILITY
HURON HARBOR, OHIO

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 1.8

Structural Maintenance

1.31 The need for the repair of the harbor structures is a result of either damage caused to the structure or structural failure. Wave and ice actions are often responsible for moving structure stones out of position. Freeze-thaw cycles may cause stones to crack and fragment. Internal structural failures, such as the settling of base and core material or toe stone slippages may also result in the need for repair work. The harbor structures are periodically inspected and, if it is determined that repairs are required, a plan is developed to effect the necessary maintenance.

1.32 Repair materials, such as stone and concrete supplies, are often transported to the damaged structure on a deck barge, and are lifted from the barge and placed on the damaged structure by a derrick-boat. Because the piers are accessible from the shore, repair materials may be transported to the work site by truck and repairs on the shoreward ends could be accomplished by a land-based crane.

1.33 Structural maintenance at Vermilion Harbor is conducted on an as-needed basis and is usually accomplished during the summer months of the year. The duration of maintenance operations varies and is dependent upon the nature and extent of required repairs. Use of the above mentioned equipment is the most feasible method of structural maintenance in the harbor at this time.

Environmental Protection

General

1.34 In an effort to minimize potentially adverse environmental effects of maintenance operations at Vermilion Harbor, the maintenance contractor will be required to abide by contract specifications on protection of the environment, and to comply with all applicable Federal, state, and local laws and regulations concerning environmental pollution control and abatement. Many of the specific environmental guidelines are outlined in the "Civil Works Construction Guide Specification for Environment Protection" (CE-1300, June 1973). Prior to the commencement of work, the contractor must submit in writing his proposals for implementing environmental protection specifications. In addition, the contractor must meet with Corps representatives to develop mutual understandings relative to compliance with, and administration of, a maintenance environmental program. During the course of maintenance work, a Corps inspector will be present to insure that all contract specifications, including those pertaining to environmental protection, are met. If the inspector determines that the specifications are being violated, the contractor will be notified of observed violations, and immediate corrective actions must be taken. Maintenance operations by

Corps plant will a so be in compliance with the aforementioned environmental guidelines. General requirements for mitigating possible detrimental impacts on the natural and human environments are highlighted in the following sections.

Protection of the Natural Environment

1.35 Dust, smoke, fumes, odors, noise, and other potential forms of air pollution will be controlled during maintenance operations. Dust control will be performed by approved means, such as sprinkling, as work proceeds and whenever a dust nuisance or hazard occurs. All Corps and contract vessels are in compliance with USEPA standards for the control of smoke and fume emissions. If, during the course of maintenance activities, it is determined that objectionable, maintenance-related, odors are adversely affecting the adjacent community, appropriate measures will be implemented to modify or eliminate such odors. Similar actions will be taken to control objectionable noises that may result from operations.

1.36 Harbor maintenance operations consist primarily of activities under or on the surface of harbor waters, and, as such, usually do not include any work that would directly affect natural terrestrial areas adjacent to the harbor. However, in the event that an operation may require work in a shoreline area, every effort will be made to prevent landscape defacement. No ropes, cables, or guy wires will be fastened or attached to a shoreline tree for anchorage unless specifically authorized by the Corps. Where such special emergency use is permitted, the tree trunk will be adequately wrapped with a sufficient thickness of burlap or rags over which softwood cleats will be tied before any line is attached. Any trees, shrubs, or other landscape features that may be unavoidably scarred or damaged will be restored as nearly as possible to their original condition. If a shoreline area is unavoidably, extensively disturbed, the affected area will be graded, seeded and planted to prevent erosion and restore habitat in an effort to reestablish the original condition to the maximum feasible extent.

1.37 Special attention will be given to preventing or mitigating potential impacts on the aquatic environment during harbor maintenance. All Corps and contract vessels meet U. S. Coast Guard requirements for non-polluting discharge systems for the treatment of onboard wastes, and measures are taken to prevent any waste materials from entering public waters. Maintenance plant is required to have water-tight equipment, including coamings, which must be maintained in order to prevent spillage of oils and dredged materials. Provisions for the control and elimination of accidental waste material spills are provided by the U. S. Coast Guard.

1.38 Every effort will be made to minimize the effects of dredging operations on water quality. In order to reduce the resuspension of

potentially detrimental chemical constituents in dredged sediments, dredging of sediments not suitable for open-lake disposal will be confined to shoaled portions of previously dredged essential navigation channels, and non-essential project areas will not be dredged. During the transport of dredged material to either the open-lake or diked disposal sites, care will be taken to prevent the spillage of dredgings. Open-lake disposal will be strictly confined to dumping grounds previously used for this purpose. Materials will be released in the open-lake site only when the transporting scow or hopper dredge is stationary over the disposal area to minimize sediment dispersal, and washout will be performed only as necessary and only while stationary over the site. Finally, open-lake disposal will be conducted in such a way that the environmental impact upon the aquatic habitat peripheral to the lake zone will be minimized. Wind and wave conditions will be ascertained prior to disposal to insure that suspended sediments remain within the confines of the open-lake disposal site. This procedure is also expected to prevent the violation of water quality standards outside the limits of the authorized open-lake dump zone. The transfer of sediments between the transporting vessel and the confined disposal facility will also be carefully conducted to prevent dredgings from spilling into adjacent waters.

1.39 In addition to mitigating adverse water quality conditions, the above described actions will also mitigate potential adverse effects on the environment of aquatic flora and fauna by minimizing and confining disturbances. Another measure designed to protect aquatic resources is the scheduling of maintenance activities to avoid possible interference with fish spawning and migrating activities in the harbor. As previously discussed, maintenance dredging between 15 September and 15 December will avoid any potential interference with the project area's fisheries' activities. However, should an unexpected problem develop during actual maintenance operations that would endanger spawning areas or migrating fish species, work will be suspended and appropriate consultation initiated regarding the development of further mitigation measures.

Protection of the Human Environment

1.40 Maintenance vessels will be operated to avoid major interference with navigation by commercial and recreational craft that may be present in the harbor during the course of maintenance work. The U.S. Coast Guard will be requested to provide aids to navigation where warranted. Maintenance activities may be scheduled to avoid potential conflict with a major harbor event, such as a regatta, if the Corps receives a sufficiently early notice of the time of the event and no significant operational or other environmental conflicts will result. However, since maintenance dredging will be conducted during the 15 September

through 15 December period, major interference with the peak summer season for harbor events and recreational boating will be avoided.

1.41 Since the proposed fall dredging season will be after the peak local swimming season, no specific operational measures to mitigate potential impacts on water-contact recreation are expected to be required. However, if it is necessary to dredge during the local swimming season, the appropriate public health agencies will be consulted to determine if any additional mitigation measures may be required.

1.42 Maintenance operations include the removal of recently accreted shoals in authorized navigation channels and the repair of existing structures; and, as such, do not entail any new work dredging or construction activities that would affect previously undisturbed offshore areas. Therefore, neither maintenance dredging nor structural repair are expected to affect any unidentified cultural resources that may exist beneath authorized channel depths or the harbor structures. However, if maintenance personnel discover any items having an apparent historical or archaeological interest, the discovery will be left undisturbed and immediately reported so that proper authorities may be notified.

1.43 Correspondence from the Ohio State Historic Preservation Officer has indicated that maintenance of Vermilion Harbor will have no adverse effect upon properties listed in the National Register of Historic Places, or other cultural resources, in the project area. Similarly, the U. S. Department of the Interior, National Park Service has indicated that harbor maintenance activities will not affect any National Landmark Program sites. In view of these agencies stated opinions, no further cultural resources mitigation measures are planned for the Vermilion Harbor maintenance project. Further discussions of this correspondence are presented in Chapters 4 and 9 of this Final Statement. Copies of coordinating correspondence are included in Appendix A.

1.44 The previously described operational procedures that will be conducted to mitigate potential impacts on the aquatic environment will also mitigate potential effects on the human environment. By preventing spillage of dredgings during transport to a disposal site, and minimizing and confining the effects of open-lake disposal, potential impacts on lakeshore facilities, such as municipal and industrial water intakes and beaches, will be minimized if not totally eliminated. Control of open-lake disposal operations will also mitigate possible interference with commercial fishing activities that may periodically occur in the disposal zone vicinity. Issuance of a public dredging notice at least 30 days prior to the initiation of maintenance activities will inform commercial and recreational navigation interests, as well as other potentially affected users, of proposed operations. The operator of the Vermilion City Water Filtration Plant will be specifically notified of proposed maintenance operations so that mitigative

plant operations, such as adjusting chemical additions and filtration rates, can be formulated and operational as the situation may warrant.

Public Participation

1.45 While there have been no public meetings or workshops conducted in relation to the operation and maintenance of Vermilion Harbor, on-going public involvement in the maintenance of the harbor has been and will be achieved in compliance with the regulation described in 33 CFR 209.145. This regulation prescribes policies, practices and procedures to be followed by the Corps in Federal projects which involve the disposal of dredged material in navigable waters or the transport of dredged material for the purpose of dumping in ocean waters. In accordance with the regulation, future maintenance dredging operations will be preceded by the issuance of a public notice at least 30 days before routine maintenance dredging is initiated. The public notice will describe the proposed maintenance and will be distributed to all potentially interested parties that may desire to comment on dredging activities. In the event that the commenting parties identify any significant, adverse environmental impacts, the proposed dredging and disposal work will be reevaluated and a course of action will be taken that is the best overall interest of the public. Dredging notices for emergency operations will be issued as soon as possible before dredging is initiated.

Maintenance Costs

1.46 Maintenance and repairs costs are dependent upon the nature of shoaling in navigation channels, the extent of necessary structural repairs, and funding constraints; therefore, costs vary from year to year. Recent costs of maintenance activities at Vermilion Harbor have been $116,850 for the west pier structural repairs in 1969, $24,000 for the June 1974 emergency dredging, $10,300 for the February 1975 emergency dredging, and $53,200 for the November through December 1975 emergency dredging.

1.47 Future maintenance dredging is estimated to cost about $188,000 per operation, or about $62,700 annually. These costs are based on maintenance dredging by contract plant and can be expected to be less if operations are conducted by Corps vessels. Furthermore, the cost estimates can be expected to vary with the extent and nature of future channel shoaling. Future structural repair costs will also vary with the condition of the harbor structures.

Other Corps Studies of Vermilion Harbor

1.48 The Buffalo District is presently in various stages of investigation on two studies of the Vermilion Harbor area. Section 111 of

the River and Harbor Act of 1968 (Public Law 90-483, approved 13 August 1968) states that "The Secretary of the Army, acting through the Chief of Engineers, is authorized to investigate, study and construct projects for the prevention or mitigation of shore damages attributable to Federal navigation works." An initial reconnaissance Section 111 Study of shore damages attributable to navigation works at Vermilion Harbor was requested by the Director, Ohio DNR in December 1974 and completed by the District in January 1976. The purpose of the investigation was to determine whether the Federal navigation improvements at Vermilion have caused or increased the erosion of the shore in the vicinity and, if so, to determine what measures are justified to mitigate the damages. The results of the study are contained in the "Report on Section 111 Study of Vermilion Harbor, OH," dated 21 January 1976. Briefly, the report recommends the following (141):

"a. No action be taken at this time under Section 111 to prevent or mitigate shore damages in the vicinity of the Vermilion Harbor since it cannot be determined whether the recent shoreline changes are due to abnormally high lake levels or the detached breakwater.

"b. A monitoring program be accomplished over the next five-year period" to determine the extent of shoreline changes east and west of the harbor.

"c. A supplemental Section 111 study be prepared in 1981 based on the results of the five-year monitoring program."

The Section 111 Study Report has been approved by the Office of the Chief of Engineers. The complete report is included as Appendix G of this Final Statement and should be consulted for more detailed information.

1.49 The Buffalo District will also investigate other possible adverse effects of the existing Vermilion Harbor navigation project. This action was initiated in response to the expressed concerns of local interests about the effect of the detached breakwater on the harbor environment and the Corps maintenance program at Vermilion. Concerns about the breakwater that have been identified by local interests include:

a. Periodic contamination of the municipal water supply.

b. Diversion of river water into, and pollution of, adjacent recreational swimming areas.

c. Increased ice formation in the calm waters behind the breakwater at the harbor entrance.

d. Increased probability of ice jam flooding.

e. Increased flood potential for a floodplain due to raising the riverwater profile.

f. Rapid silt accumulation upstream in the Vermilion River, causing increased sedimentation in adjacent private lagoons.

g. Shoaling at the channel mouth from beach sand accumulated behind the breakwater, thus causing drastically increased dredging costs.

h. Substantial erosion of beaches to the east of the Vermilion channel, including the complete loss of Nakomis Beach, a public beach.

i. Destruction of land area which will result in undesirable change of occupancy and declining property values.

j. Increased navigation hazards due to traffic congestion at the mouth of the entrance channel and blind corners.

The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of alleged adverse effects that local interests have attributed to the project (particularly by the presence of the detached breakwater) and, as appropriate, identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes."

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

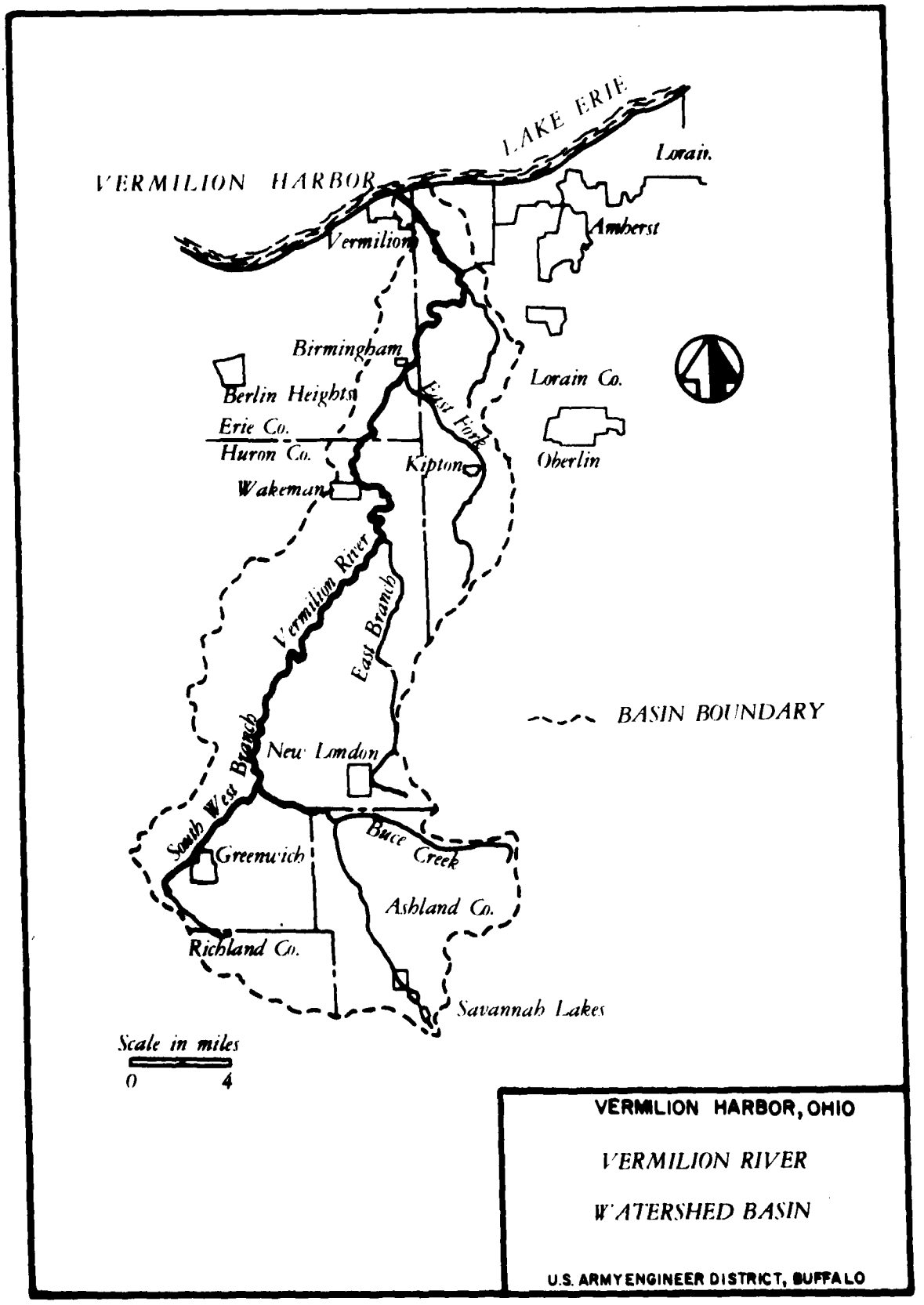
Introduction

2.01 Vermilion, OH is located on the south shore of Lake Erie at the mouth of the Vermilion River, about 37 miles west of Cleveland, OH and 21 miles east of Sandusky, OH. The source of the Vermilion River is 59 river miles south in the Savannah Lakes, and drains a watershed of some 272 square miles. The watershed configuration is illustrated in Plate 2.1. The river valley is relatively flat, with slopes averaging less than eight feet per mile. Bedrock in the vicinity is composed of shale and is approximately 480 feet thick. At some places in the lake and river this rock is very close to the surface or is exposed; in other locations, it is covered by a thin mantle of sand, clay and gravel of medium density (02). Fish populations in the river and in Lake Erie for a distance of several miles of the harbor are important in both sport and commercial fishing, with yellow perch, white bass, catfish, and sheepshead being the most prevalent species sought. Climate of the area is characterized by warm summers and cold winters, with some moderation during both seasons due to the immediate presence of Lake Erie.

2.02 The city of Vermilion is located in Erie and Lorain Counties, and the harbor is located in the western (Erie County) section of the city. In 1970, the city's population was 9,872. Principal employers of Vermilion residents include the Ford Truck Plant in Lorain and the ITT Wakefield Plant in Vermilion, and many of the city's residents commute to the Cleveland area to work. The primary land use in Vermilion is residential. The harbor is a center of recreational, occupational and cultural resources and is responsible for a large increase in population during the summer months. Twelve marinas and yacht clubs and a commercial fishing company have access to the harbor area and generate over 100,000 recreational, sport fishing and commercial fishing trips per year. Prime recreational activities enjoyed in the harbor area and adjacent waters of Lake Erie include boating, fishing and swimming. Vermilion's cultural background has a definite nautical flavor, as evidenced by two annual water-related festivals, the Great Lakes Historical Museum and downtown Vermilion's "Harbour Town 1837" concept.

Historic Environments

2.03 The beginnings of the sedimentary rock in the present Vermilion Harbor area can be traced to the Paleozoic Era, which ranged from approximately 600 million to 230 million years ago. Northern Ohio was submerged during much of this period, and thick deposits of marine sediments were laid down until uplift exposed the sea floor to weathering and erosion. During the latter periods of the Paleozoic Era, the northern Ohio area underwent alternate flooding and draining as changes in subsurface pressures caused the land surface to be raised and lowered periodically. Shales, siltstones and sandstones were the most



Source: (03)

PLATE 2.1

common sediments deposited in the region. Late in the Paleozoic Era, the sea withdrew as the Appalachian Mountains were formed, and this area has remained above sea level since that time (04).

2.04 The Mesozoic (230 to 70 million years ago), and Cenozoic (60 million years ago to present) eras followed the Paleozoic, but the geologic remnants from this time have been obliterated by the multiple glaciation stages of the Pleistocene epoch (approximately 1 million to 10,000 years ago). This epoch is characterized by four glacial stages: the Nebraskan, which began about 1,000,000 years ago; the Kansan, ending about 700,000 years ago; the Illinoian, ending 500,000 years ago; and the Wisconsin, ending 10,000 years ago. Each of these stages were of relatively short duration, of the magnitude of 50,000 years. The Great Lakes began forming during the Pleistocene epoch glaciation and deglaciation, and the drainage of glacial meltwaters and placement of bedrock formations were important factors in the present configuration of the landscape (04).

2.05 With the final retreat of the ice margin, a complex series of moraines were formed which blocked the southward flow of the glacial meltwater and caused the formation of Lake Maumee in the present day Lake Erie Basin. Initially water flowed out of the lake via the Maumee River, but the further retreat of the glacier caused the lake levels to drop and eventually the Niagara gorge was opened to permit the northward flow from early Lake Erie. The valley of the Vermilion River traverses beds of shale and sandstone, which were harder and less susceptible to glacial erosion. There was little buildup of alluvial deposits, so drainage in the valley resumed its pre-glacial course and the river valley became a significant element in the physical environment of the Lake Erie region (04).

2.06 Preglacial vegetation in the Vermilion area was very likely a deciduous forest which dominated most of North America, Europe and Asia (05). The periodic advance and retreat of the Pleistocene glaciers caused numerous vegetational changes as the climate and physiography of Ohio were altered. The exact chronology and composition of the vegetation during this time is unknown. However, there is evidence that as the Wisconsin glacial stage came to a close, a coniferous forest dominated by spruce and white pine established itself. This was succeeded by a hemlock association which was, in turn, replaced by hardwood forests dominated by oak, hickory, beech and maple (06). The hardwood association (beech-maple) remains in undisturbed areas in the uplands along southern Lake Erie (07)(08).

2.07 Faunal associations prior to and during the glacial age were dominated by large mammals such as mastodon and giant beaver (09).

At the close of the Pleistocene, the North American fauna changed and expanded with the climatic changes. Much of the natural flora and fauna of the Vermilion Harbor area have been replaced by residential housing in the last century. A few naturally occurring, tree species do, however, remain despite the loss of natural habitat (see Terrestrial Vegetation). Lake Erie's central basin has undergone dramatic faunal changes since 1950. The introduction of large quantities of available phosphorous is held responsible for the increase in Cladophora along the littoral zone, the increase in midge (Chironomus) populations and the decline of mayflies (Hexagenia), and the increase in yellow perch (Perca flavescens) and a decline in walleye (Stizostedion vitreum) numbers (10).

2.08 During the Pleistocene epoch, a primitive, hunting people lived along the southern limits of the massive glacier, leaving implements and relics in ice-formed terraces. Archaeologic evidence indicates that a mound building people occupied the area around 6000 B.C. (11). Based on discoveries of ceremonial and effigy mounds, hilltop fortifications, art, tools, utensils and fabrics, eight major prehistoric cultures have been identified as having lived in the north-central Ohio region (12).

2.09 In the early 1700's, an Erie Indian settlement on the east side of the Vermilion River consisted of long houses, fortifications and burial grounds and covered about 80 acres. In the mid seventeenth century, the Iroquois overpowered the Eries in a battle for control of the fur trading market with the Europeans. This event was recorded by French Jesuit missionaries who attempted to prevent the uprising (11). Additional Indian tribes migrated to the area including the Hurons from Canada and the Ottawas and Chippawas from the west (11). The Ottawa Indians were responsible for naming the Vermilion River at whose mouth the settlement of Vermilion was founded (13). Originally called "Oulanie Thepy", it was translated by an Indian Commissioner in 1760 as Vermillion Creek, and did not lose the second "l" until some time after 1900 (13).

2.10 In 1772, an Indian mission was established in northern Ohio by David Zeisberger and John Heckewalder (14). In 1782, a group of frontiersmen destroyed the mission and 90 Indians died (14). Numerous retaliatory acts against the frontiersmen followed (14). By 1794, the Indians had joined forces to defend their territory against advancing settlement. They were defeated at the Battle of Fallen Timbers and the Treaty of Greenville was signed in 1795 (11). By the late 1820's, the Indians had left the Vermilion area, having moved north and west seeking refuge (11).

2.11 William Hoddy, the first recorded European settler of the Vermilion River Valley, arrived in 1808. The natural harbor, the

steeply sloped west bank and the availability of timber constituted an ideal environment for building and launching ships, and in 1812, Vermilion's first schooner, the "Friendship" was launched by William Austin. Thus, Vermilion was afforded a means of both marketing its merchandise and importing its necessities from eastern markets, including Buffalo, NY (11).

2.12 At the close of the Napoleonic Wars, German immigrants arrived, settling in the outlying areas of Vermilion (11). Their crops were the initial mainstay of the economy and exports included grain, pork, beef, tallow, hides and dairy products. The shipbuilding industry created a need for numerous saw and planing mills. The most important, marketable natural resource was iron ore. This industry flourished in the 1830's and 1840's, and by 1850, 80 percent of Vermilion's exports were iron-related products (13). The second most valuable export during the 1840's and 50's was cut stone. By the 1870's, this had become Vermilion's major industry, supplying stone for the reconstruction of the fire-devastated City of Chicago (13).

2.13 The town proper progressed concurrently with industrial progress. In 1814, the first school house was built, and in 1821, a literary society was formed. The first Congregational Church was constructed in 1828, followed in 1831, by a Methodist Church. By this date, many other structures had appeared including a post office, general store, ferry landing and taverns (13). The construction of Vermilion's transportation system began relatively early. In the 1830's, two major state roads were built to service the outlying agricultural areas. During this time period, plans were initiated for the Vermilion and Ashland Railroad Company. In addition, $10,000 was appropriated by the River and Harbor Act of 1836 for the development of the harbor (13).

2.14 In 1859, Bradley and Cobb, (the two men most responsible for the development of Vermilion's shipbuilding industry), moved their business to the vicinity of Cleveland, OH. As a result, Vermilion lost not only a major source of income, but also many of its residents who were employed by this company and who chose to move. Prior to this action, in 1846, the Ohio State Legislature had withdrawn its support of the Vermilion and Ashland Railroad resulting in Vermilion's loss of a vital transportation link. An attempt to obtain Federal funds for harbor improvement failed in 1847, forcing the harbor to be maintained by dwindling private funds (13). By the early 1860's and 70's Vermilion had begun to lose pace with the other ports of Lake Erie. The iron ore industry closed in 1865, having suffered a great loss by fire seven years earlier. Lumbering ceased due to the lack of secondary trees. By 1870, only stone was being exported from Vermilion via the east-west railroad (13).

2.15 Harbor damage resulting from spring storms impaired the harbor. Although the damage from such storms was estimated at $42,856 in 1864, the Federal government decided local commerce was not sufficient enough to warrant reconstruction. By 1872, silt and sand build-up in the river necessitated dredging. In 1873, money was allocated by Congress to redredge the river and to extend the piers. As part of the Federal government improvement plan, a permanent lighthouse was built on the outer end of the west pier in 1877 to replace the temporary beacon previously maintained by Vermilion residents (13).

2.16 Due to gradual shoreline erosion resulting from Lake Erie, Vermilion was developed to the south. Although two fires occurred (one in 1875 and one in 1876) and the original business district was destroyed in the latter, Vermilion was rebuilt after each incident. In 1883, the Linwood Park community was founded as a religious meeting place. In the early 1930's, four lagoons were constructed by a local realty company in what was previously a swampy area near the Lake Erie shore. Subsequently, about 150 single family residences, restricted to Cape Cod architecture, were built on land bordering the lagoons (15). The city's waterfront lacks the visual disadvantages of industry and Vermilion's simplicity and fishing opportunities lend themselves well to tourism. With this in mind, a program known as "Harbour Town 1837" was initiated in 1967 by businessmen and Vermilion residents. The plan calls for the renovation of 43 acres of the city's historical central section in an 1800's atmosphere.

Existing Natural Environment

Climate

2.17 The climate of Vermilion may be defined through a consideration of the various components which are used to describe the long-term weather patterns experienced in the area, including temperature, precipitation, wind, and the extent of cloudiness and sunshine. Vermilion's climate tends to regulate the types of recreational and commercial uses of harbor facilities experienced in various seasons of the year. Vermilion's location on the Lake Erie shore at the mouth of the Vermilion River serves to influence several climatological features of the area, including the frequency and intensity of storms, lake winds and ice conditions, as well as precipitation patterns. All of these features affect the project schedule and activities.

2.18 The climate along the Lake Erie shore in the vicinity of Vermilion is marked by large annual and day-to-day changes in temperature ranges. Temperature extremes have ranged from 105° to -15°F during the period of record from 1936 to 1965. Although temperatures are warm during the summer, weather is moderated by

lake breezes. Winters are cold with considerable cloudiness, but, again, there is some moderation due to Lake Erie. Sub-zero temperatures are experienced three winters out of five. Although there is no climatological summary available specifically for Vermilion, it is expected that Sandusky, OH would experience the same type of weather due to its close proximity to Vermilion (approximately 20 miles west) and its location on Lake Erie (i.e., same temperature modifications as a result of lake breezes). As shown in Table 2.1, July is the warmest month, and January the coldest. The growing season averages 198 days, with the first freeze occurring on 29 October and last freeze on 14 April (16).

2.19 Annual precipitation averages 34.15 inches, with more rain occurring during summer than winter. Winter snows average 29 inches per year, and much of the time winter precipitation is in the form of rain. Thunderstorms occur about 35 days per year and are most common from April through August (16). Cloudiness varies seasonally, as illustrated by the fact that the percentage of possible sunshine varies from 70 percent from June through August to 30 percent in December. Prevailing wind direction for the year is southwest, as illustrated in Plate 2.2. Fog is most frequent from mid October to mid April. Damaging winds associated with thunderstorms are most common during the spring and summer (16). Although tornadoes occur infrequently in the area, one did strike the South Shore Shopping Center in Vermilion in August 1972 (17).

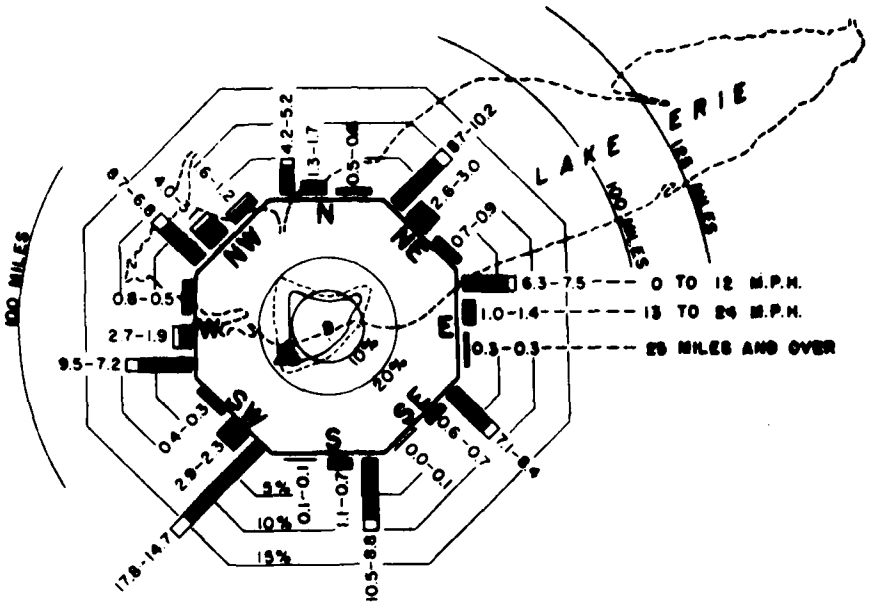
2.20 Historical records show that the Vermilion Harbor area is subject to freezing from approximately 15 December to 15 March, and at least some freezing of the harbor occurs during 90 percent of the time in winter. During an average winter, the harbor area is frozen from three to five weeks, not necessarily continuously. Ice depths average .4 to 6 inches, with a maximum depth of 18 inches (17). During a normal winter, ice formation on Lake Erie will begin between 15 January and 25 January. The areas of the lake which first produce an extensive ice cover are the shallow western basin and the inner bay at Long Point to the east. During the mid-season (1 to 10 February), extensive sections of the central basin, especially adjacent to the north and south shores, experience partial ice coverage. At this time, 70 percent to 90 percent of the open lake north of Vermilion becomes covered with ice, although the area close to shore does not freeze as quickly. During the time of maximum ice cover in a normal winter (20 to 28 February), greater than 95 percent of the lake surface may be frozen to depths ranging from 10 to 18 inches. The area of Vermilion is subject to wind row ice, which can accumulate to depths of 20 feet or more. During the early decay period (25 February to 5 March), open water may appear in the lake north of Vermilion, but the shoreline in the vicinity of Vermilion may

TABLE 2.1
CLIMATOLOGICAL SUMMARY
SANDUSKY, OH, 1936-1965
(MEANS AND EXTREMES)

	Temperature (°F)													Precipitation Totals (Inches)														
	Means				Extremes							Mean Number of Days Max.			Min.							Snow, Sleet						Mean Number of Days			
Month	Daily Maximum	Daily Minimum	Monthly	Record Highest	Year	Day	Record Lowest	Year	Day	Mean Degree Days **	90° and Above	32° and Below	32° and Below	0° and Below	Mean	Greatest Monthly	Year	Greatest Daily	Year	Day	Mean	Maximum Monthly	Year	Greatest Daily	Year	Day	.01 or More	.10 or More	.50 or More	1.00 or More
Jan	34.4	20.9	27.6	78	50	25	-15*	63	24	1153.	0	13	27	1	2.40	6.58	37	2.03	59	21	7.2	17.7	57	5.8	56	30	13	5	1.1	.3
Feb	36.2	22.1	29.1	72	44	26	- 7*	63	22	1010.	0	10	24	0	2.19	4.53	50	1.87	50	13	6.3	15.3	62	5.2	60	25	11	5	.8	.3
Mar	44.5	29.5	37.0	84	38	22	0	43	8	864.	0	4	20	0	2.88	5.23	64	2.01	48	21	5.8	12.6	60	7.9	60	3	13	7	1.6	.3
Apr	57.3	40.0	48.6	90	42	30	19	64	1	496.	0	0	4	0	2.23	7.19	61	1.77	59	28	1.1	12.0	57	4.5	57	8	13	7	2.0	.3
May	69.5	51.1	60.3	93*	62	20	34*	63	1	196.	0	0	0	0	3.41	9.04	43	3.83	38	19	.0						12	7	2.1	.5
Jun	79.4	61.0	70.2	101	52	26	42	47	4	29.	4	0	0	0	4.11	12.51	37	5.63	37	25	.0						11	7	2.6	1.0
Jul	83.4	65.4	74.4	105	36	14	51*	47	20	1.	6	0	0	0	3.62	9.71	43	2.92	61	19	.0						9	6	2.2	1.1
Aug	82.1	64.1	73.1	102	36	22	45	46	30	5.	4	0	0	0	3.23	6.96	56	2.72	54	14	.0						8	5	2.2	.8
Sep	75.4	56.7	66.0	90	53	1	34	56	21	79.	2	0	0	0	2.80	7.72	50	3.45	61	1	.0						8	5	1.7	.5
Oct	64.3	46.6	55.5	93	53	3	25*	66	31	311.	0	0	1	0	2.02	4.91	54	1.77	59	6	.0	.1	37+	.1*	39	28	8	4	1.1	.3
Nov	49.6	35.0	42.3	82	50	1	3	58	30	679.	0	1	11	0	2.22	4.89	50	1.49	62	10	2.5	19.8	50	12.3	50	25	11	5	1.2	.2
Dec	37.5	24.9	31.2	69	41	4	- 7	60	23	1043	0	9	23	0	2.04	5.74	51	1.68	40	29	6.1	20.2	51	7.0	62	7	11	5	.9	.2
Year	59.4	43.1	51.2	105	36	Jul 14	-15	63	Jan 23	5866.	16	37	110	1	34.15	12.51	Jun 37	5.63	Jun 37	25	29.0	20.2	Dec 51	12.3	Nov 50	25	128	68	20.	6.

*Also on earlier dates, months, or years
**Base 65°F

Source: (15)



NOTES

INDICATES DURATION FOR ICE-FREE PERIOD (MAR. TO DEC. INCL.) IN PERCENT OF TOTAL DURATION.

INDICATES DURATION FOR ICE PERIOD (JAN. TO FEB. INCL.) IN PERCENT OF TOTAL DURATION.

INDICATES PERCENT OF TOTAL WIND MOVEMENT OCCURRING DURING ICE-FREE PERIOD.

INDICATES PERCENT OF TOTAL WIND MOVEMENT OCCURRING DURING COMBINED ICE AND ICE-FREE PERIODS.

FIGURES AT ENDS OF BARS INDICATE PERCENT OF TOTAL WIND DURATION FOR ICE FREE PERIOD AND COMBINED ICE-FREE AND ICE PERIODS, RESPECTIVELY.

WIND DATA BASED ON RECORDS OF THE U.S. COAST GUARD AT LORAIN HARBOR, OHIO FOR PERIOD 1 JAN. 1938 - 31 DEC. 1967

▲ *Vermilion*

VERMILION HARBOR, OHIO

WIND DIAGRAM FOR

LORAIN HARBOR, OHIO

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Source: (02)

PLATE 2.2

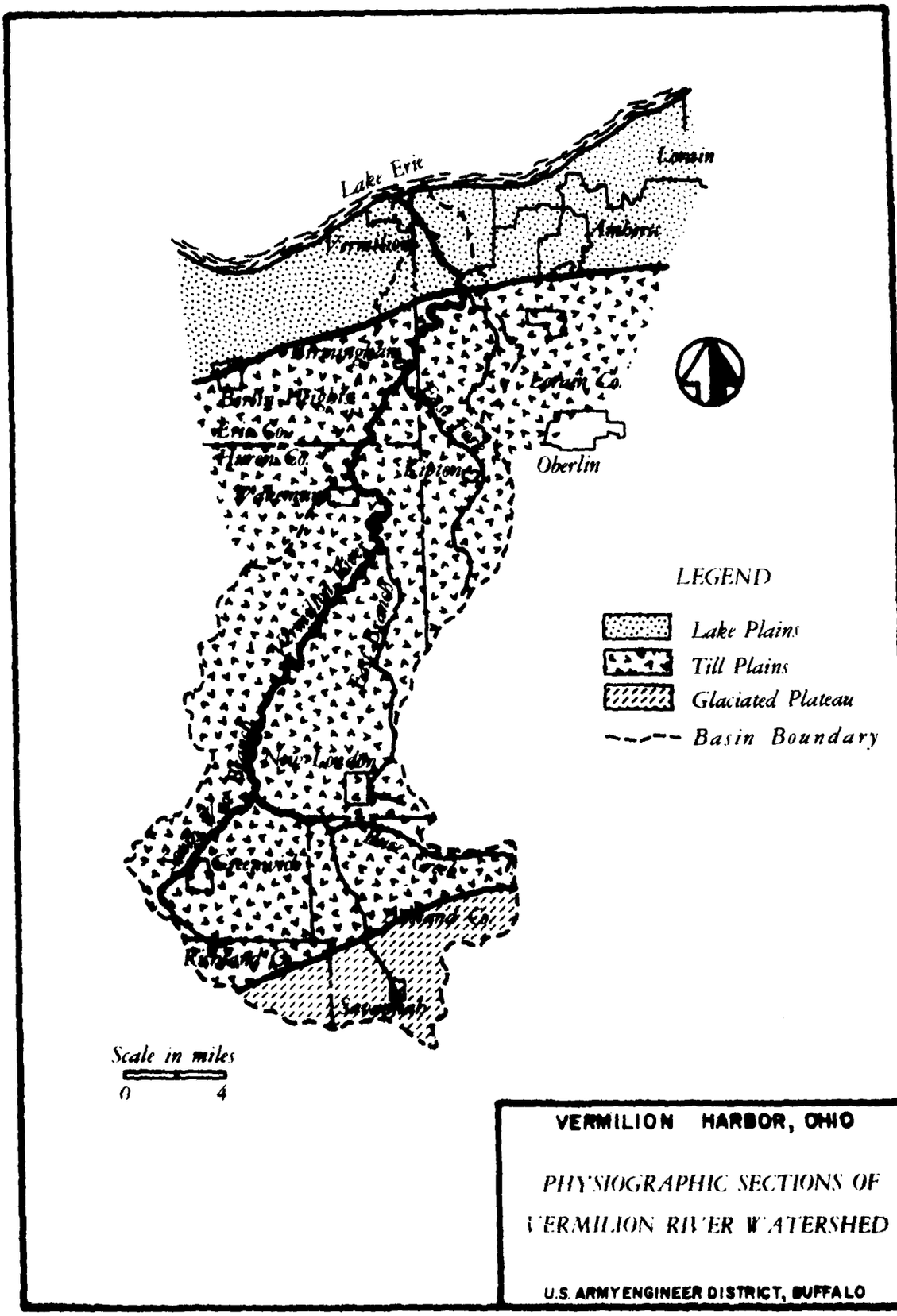
stay frozen until 15 March (18). Ice breaking operations in Vermilion Harbor are conducted by the U. S. Coast Guard in the approach and entrance channels, and by local commercial fishing interests, marina operators, and private Contractors in the river channel (136).

Physiography and Topography

2.21 Physiography relates the structure of plains, valleys, mountains and shorelines to the historic processes of erosion, glaciation and sedimentation; physiographic features influence runoff patterns and sediment production characteristics in the project area. Topography describes the spatial configuration of hills and valleys, including slopes, relative elevations and relief; topography affects access to the project area, directions from runoff sources, runoff velocities, erosion rates, available terrestrial habitat and land use in the project area.

2.22 The city of Vermilion is located in northern Ohio along the south shore of Lake Erie, in the lake plains section of the Central Lowlands physiographic province. The area around Vermilion is part of the Lake Erie plain that extends inland from the lake shore two to ten miles, and rises about 220 feet above the lake elevation of 570.4 feet above mean sea level (msl) (19). The lowlands comprise a nearly undissected lacustrine plain developed on littoral deposits of the post-glacial lakes impounded between the receding Wisconsin ice sheet and the end moraines left by the glacier to the south. The ancient shorelines of these lakes are evident as beach ridges, with relief ranging from 20 to 40 feet (03). The physiographic sections of the Vermilion River watershed are illustrated in Plate 2.3. Most of the upland portions of the watershed are in the till plains section. This section is characterized by broken ridges formed as end moraines that were deposited by the retreating glaciers. These ridges may be several miles wide and 10 to 50 feet high. Although they are relatively minor features, the end moraines control surface drainage patterns. The extreme southern portion of the watershed lies in the glaciated plateau section (03).

2.23 Vermilion Harbor is comprised of the lower 3,600 feet of the Vermilion River, four artificial lagoons and an entrance channel. The relief is moderate, having gradual elevation changes, with the lower river flowing through a relatively broad valley for about one mile prior to emptying into Lake Erie at a river bottom elevation of approximately 556.0 feet on United States Coast and Geological Survey (USCGS) datum (02) (03). Above this last stretch, the valley walls broaden out and disappear. The Vermilion River's tributaries generally flow through broad but well-defined valleys. The surrounding land is nearly flat with slight relief. The land elevation increases moderately along the river from the mouth toward



Source: (03)

PLATE 2.3

the well-defined beach ridges whose elevations are between 750 and 800 feet (USCGS) (20).

Geology

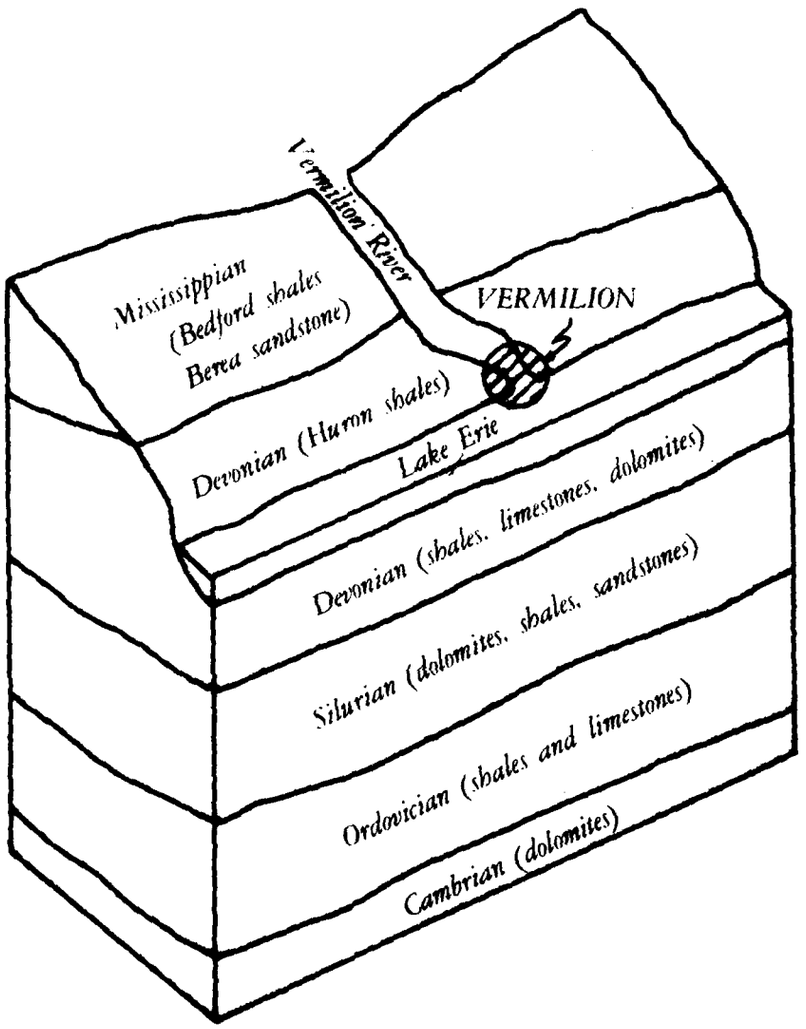
2.24 Geology includes the stratigraphy, bedrock, surface deposits and seismicity characteristics of the project area. Geology is an integral part of the project area environment because the stability and lifetime of the harbor-related structures such as piers and breakwaters, are dependent upon the supporting geologic formations and the tendency for seismic activities.

2.25 The Vermilion region is characterized by relatively undisturbed, nearly horizontal sedimentary rocks ranging in age from the Cambrian to the Devonian (600 million years ago to 350 million years ago). The rocks are interbedded limestones, dolomites, sandstones, and shales; and cover a basement complex of granite, marble and other igneous and metamorphic rocks. A generalized, geologic cross section of the Vermilion area is shown in Plate 2.4.

2.26 The upper formations of bedrock in the immediate Vermilion area consist of Huron shales from the Upper Devonian period. These shales form blue-gray to black outcroppings along the lake shoreline and are exposed on the lake bottom in the vicinity of Vermilion. Bedrock layers in the region dip at low angles to the southeast. Approximately one mile inland from the lake, Cleveland shale formations are exposed in layers overlying the Huron shale. Cleveland shale is distinguished by cone-in-cone limestone structures, which are absent from Huron shale. Further inland, Bedford shales and Berea sandstones from the Lower Mississippian period are found over the Devonian shales (21).

2.27 The shales of the Upper Devonian period are underlain by limestones, dolomites, shales, and sandstones of the Lower Devonian, Silurian, and Ordovician systems. The Lower Devonian rocks are limestones of the Columbus series and dolomites of the Detroit River group. The rocks of the Silurian age, in descending order, are the Bass Island group (dolomites), the Niagara group (dolomites, shales), the Clinton group (limestones, shales) and the Medina group (sandstones, shales). The Ordovician age consists of calcareous shales with interbedded limestones of the Richmond, Maysville, Eden, and Utica groups, plus limestones and dolomites of earlier groupings (22). The mineral resources located within the Vermilion River watershed include sand and gravel deposits near Greenwich, located about 35 miles south of Vermilion Harbor in the southern portion of the basin. There are no known deposits of oil or gas in the watershed or near the lake disposal site.

2.28 The surficial materials in the vicinity of the project are unconsolidated clay, sand, and gravel deposits laid down either by the



Note: Map not to scale

VERMILION HARBOR, OHIO

GENERALIZED GEOLOGIC SECTION

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Source: (21)

PLATE 2.4

Wisconsin ice sheet or in glacial lakes preceding Lake Erie. South of the present shoreline, beach deposits of four glacial lake stages are recognized: Lake Maumee, the oldest, at an elevation of 760 to 780 feet; Lake Whittlesey at 735 feet; Lake Warren, the youngest, at 665 to 680 feet; and Lake Wayne at 660 feet (all elevations are USCGS datum). While lacustrine deposits are found in areas adjacent to Lake Erie, gently rolling ground moraines consisting of glacial till materials are located further inland. In the project vicinity, the boundary between the lacustrine and the till deposits varies from near the lake shore to two miles inland (21). Typical subsurface soil profiles for five borings in the river channel are presented in Plate 2.5; Plate 2.6 shows the boring locations.

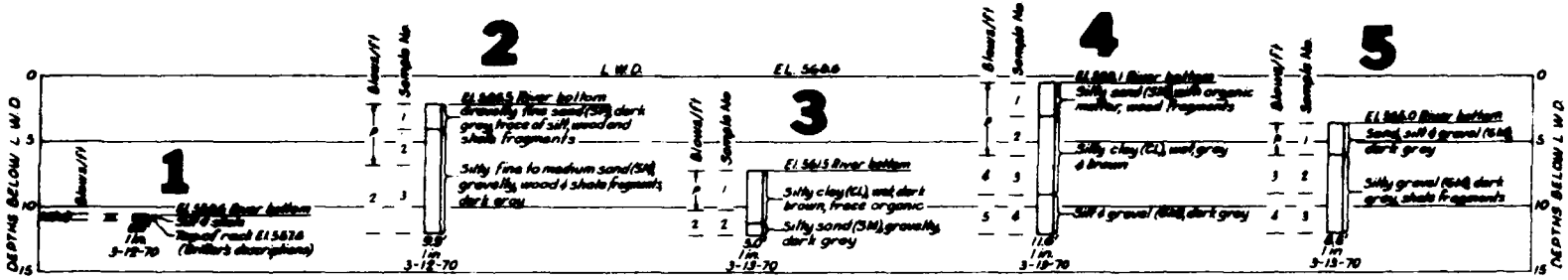
2.29 Vermilion is located in a minor seismic risk area, as defined by the National Oceanic and Atmospheric Administration. Earthquakes originating in the Vermilion region were recorded in 1928, 1943, 1955 and 1961; and all were measured at an intensity level of five on the Modified Mercalli Intensity Scale (23). Most of the seismic activity in the region occurs in bedrock formations deep below the surface, and consequently surface faulting in the overlying alluvial soils is rare.

Soils

2.30 Soils vary according to parent material, particle size, nutrient abundance, drainage characteristics and erodability. The importance of soils to the project activities stems from factors such as erodability and land use capability.

2.31 Four soil associations exist in the vicinity of the project area. Soils immediately to the east and west of the harbor entrance belong to the Marsh and Beaches association. The Del Ray-Lenawee and the Allis-Fries associations encompass the harbor area and most of the incorporated area of Vermilion; the Mahoning-Bogart-Haskins-Jimtown association is found over most of the remainder of the watershed. The relative locations of the four soil associations are illustrated in the general soils map in Plate 2.7.

2.32 The Marsh and Beaches association within the Vermilion area consists of layers of sand of various sizes and of fine gravel. The sand extends to a depth of more than 60 inches with average slopes of two to six degrees. These soils are used for recreational purposes. The granular nature of these soils causes them to be highly susceptible to erosion. The Del Ray-Lenawee association consists mostly of nearly level soils but has some gently sloping to very steep soils along the sides of stream valleys. Soils in this association generally do not have severe erosion problems. The soils were formed in high lime silt and clay lacustrine deposits. Del Ray soils comprise 60 percent of the association, Lenawee soils 30 percent and minor soils the remaining 10 percent. Soils in this association support agricultural crops including corn, soybeans, wheat, tomatoes, beets, peas, lima beans and cabbage (24).



DETACHED BORINGS ALONG CHANNEL

GENERAL BEDROCK DESCRIPTION

CLEVELAND SHALE - VERMILION FACIES:

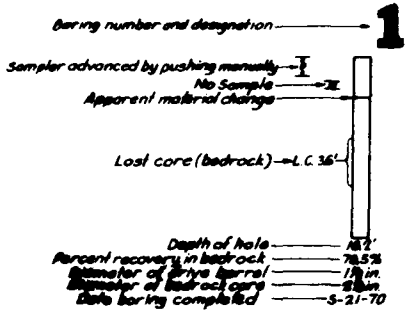
SHALE LAMINATED, CONTAINS OCCASIONAL LIMESTONE NODULES, PYRITE MINERALIZATION THROUGHOUT, ALSO PYRITE ALTERED TO LIMONITE THROUGHOUT, MODERATELY HARD, CONTAINS VERY SOFT CLAY PARTINGS AND BANDS (0.02" TO 0.08" THICK), AIR SLAKES READILY (WET - DRY CYCLES); CORE BROKEN INTO LENGTHS OF 0.02 FT. TO 0.25 FT., DARK GRAY.

ABBREVIATIONS

abd - broken by drilling	L.C. - lost core
cl(y) - clay (clayey)	L.W.D. - LOW WATER DATUM
frac - fractures, fractured	op - open
frag - fragments, fragmenten	ptg(s) - parting (partings)
ha - high angle	SH - shale
hor - horizontal	so - soft
jt(s) - joint (joints)	st - stain, stained
la - low angle	v - very

NOTES: (Soils)

1. APPROXIMATE LOCATIONS OF BORINGS SSC-701@11, SSC-701@12 AND SS-701@13 ARE SHOWN ON PLATE 2.
2. APPROXIMATE LOCATIONS OF BORINGS PS701@1A THRU PS701@1B ARE SHOWN ON PLATE 3.
3. SOIL SAMPLES FROM BORINGS SSC-701@11 THRU SS-701@13 WERE OBTAINED WITH A 1 1/2 I.D., 2 I.D. STANDARD SPLIT SPOON SAMPLER ADVANCED BY A 140 LB. HAMMER FALLING 30 INCHES.
4. SAMPLES FROM BORINGS PS701@1A THRU PS701@1B WERE OBTAINED WITH A 3" I.D. PISTON SAMPLER ADVANCED BY A 25 LB. HAMMER, MANUALLY OPERATED.
5. ROCK WAS CORED WITH A NW AND AN EX (EXT) DIAMOND BIT.
6. BLOW COUNTS INDICATE THE RELATIVE RESISTANCE OF THE SOIL TO PENETRATION BY THE SAMPLER.
7. SOIL DESCRIPTIONS ARE BASED ON VISUAL AND MANUAL EXAMINATION OF THE SAMPLES.



UNIFIED SOIL CLASSIFICATION SYSTEM

(SP) - SAND OR GRAVELLY SAND, POORLY GRADED
(SM) - SAND, OR GRAVELLY SAND, SILTY
(GC) - GRAVEL OR SANDY GRAVEL, CLAYEY
(GM) - GRAVEL OR SANDY GRAVEL, SILTY
(CL) - CLAY, SILTY CLAY OR GRAVELLY CLAY, LEAN, INORGANIC, LOW TO MEDIUM PLASTICITY

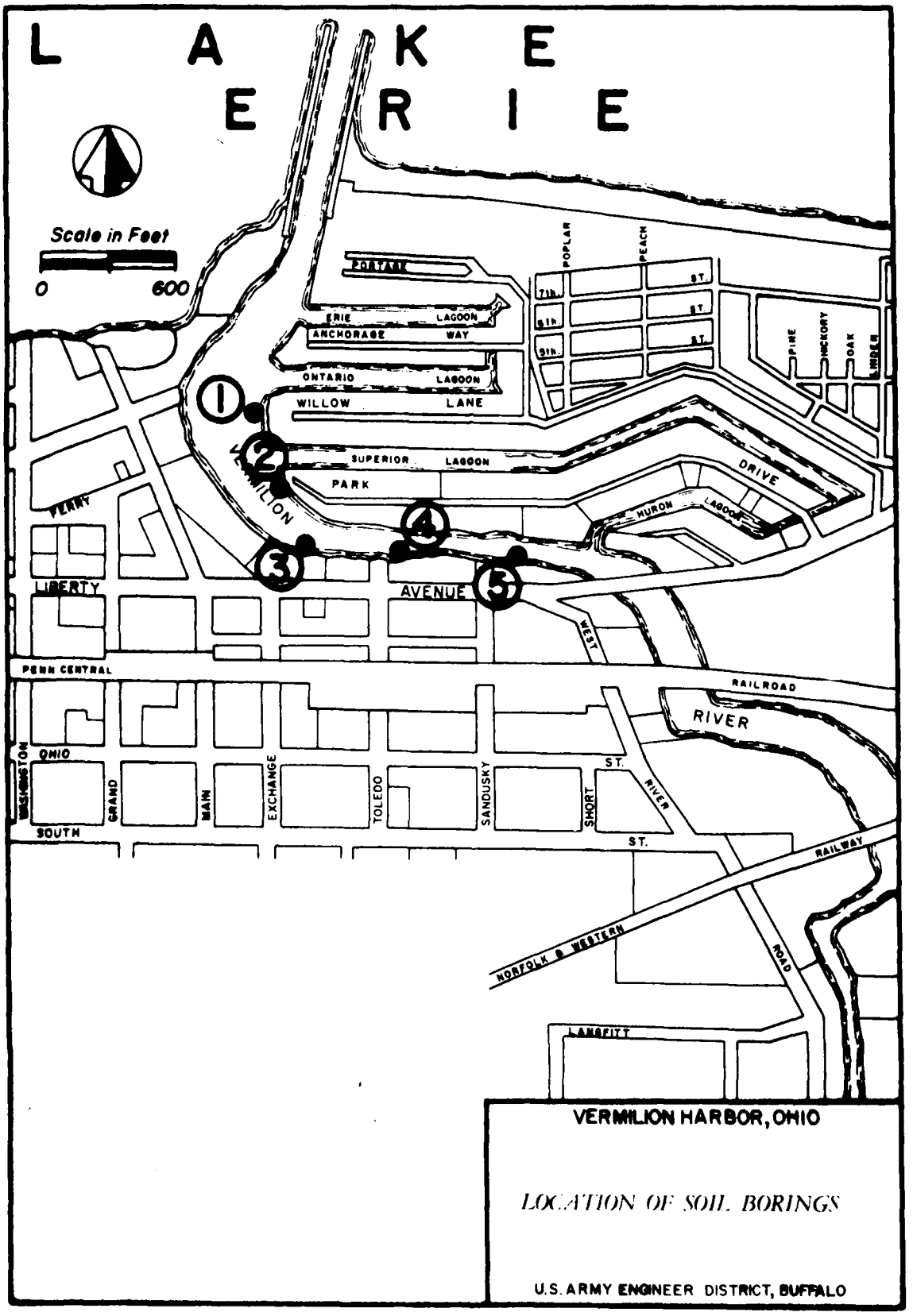
VERMILION HARBOR, OHIO

SUBSURFACE SOILS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

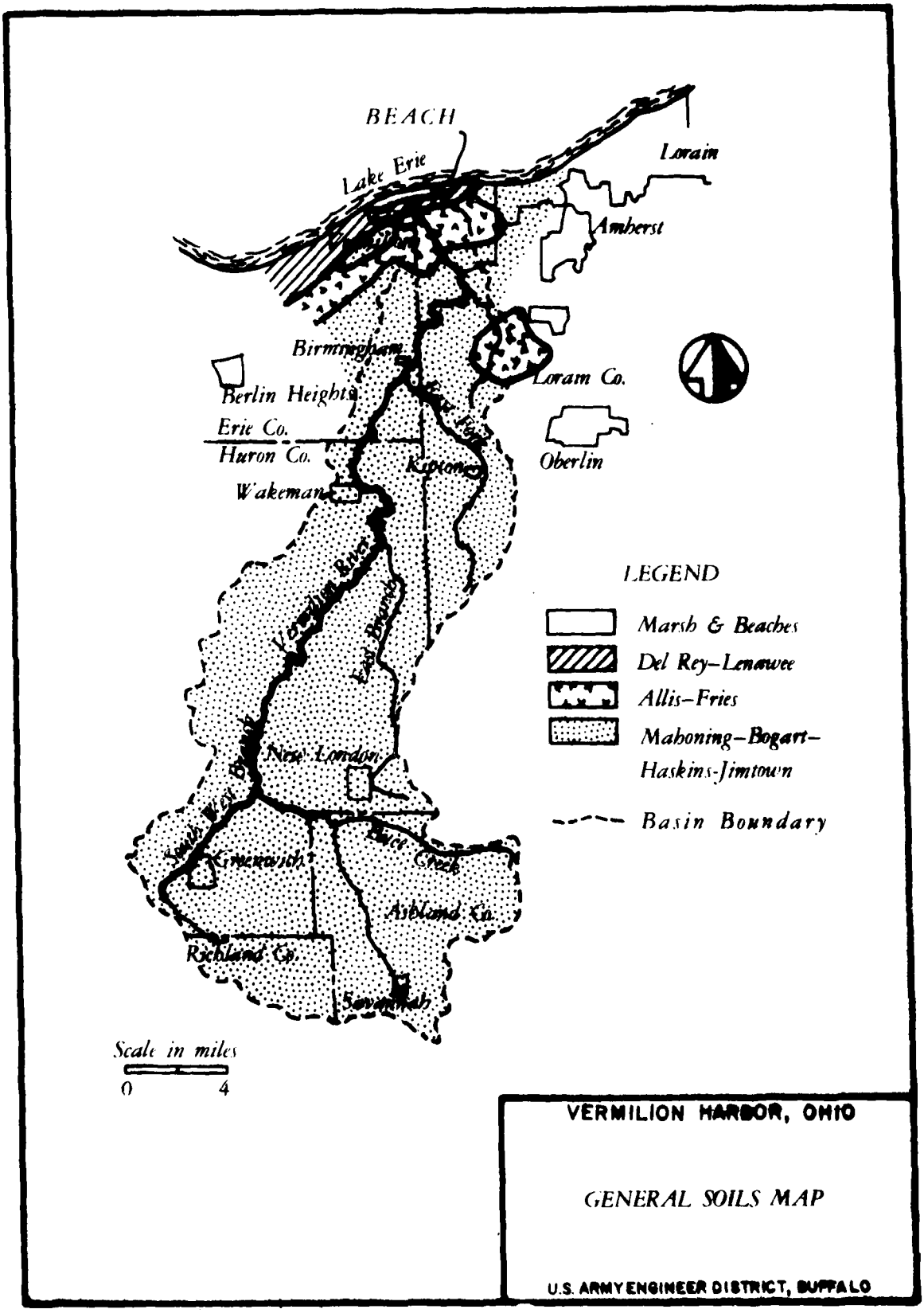
Source: (02)

PLATE 2.5



Source: (02)

PLATE 2.6



Source: (24)(25)

PLATE 2.7

2.33 Soils of the Allis-Fries association are mostly level with some gently sloping areas along drainageways, ridges of shale outcrop and gravelly beach ridges. The soils were formed in thin glacial deposits underlain by shale. A portion of the area covered by this association is susceptible to erosion. About 70 percent of the associations' soil is Allis, 20 percent Fries, and 10 percent minor soils. Soil depths are less than 40 inches for Allis and from 20 to 40 inches for Fries. Most of the soils in this association are either wooded or idle. The soils are generally poorly suited for field crops and overall productivity is low (24). The Mahoning-Bogart-Haskins-Jimtown association is comprised of level to gently sloping soils with some very steep slopes occurring along stream valleys and beach ridges. The association contains about 40 percent Mahoning, 15 percent Bogart, 10 percent Haskins, 10 percent Jimtown soils and about 25 percent minor soils. Approximately 70 percent of the association is utilized as cropland with corn, wheat, oats and meadow being the important crops. The soils are moderately productive but require lime to achieve optimum response from fertilizer (24). Portions of the area covered by this association are susceptible to erosion. Engineering properties of the principal soil series found in the vicinity of the project area are listed in Table 2.2. The location of each soil series in the Vermilion Harbor area is shown in Plate 2.8.

Terrestrial Vegetation

2.34 Terrestrial vegetation consists of plant life found on land masses such as beaches, piers and the residential areas of the project area. It serves as habitat for wildlife, ground cover (by restricting erosion) and food for animals, and it increases the aesthetic value of the area.

2.35 The project features include the breakwall and piers which are used as resting areas for the water-related birds of the project area, such as terns, gulls and ducks. The piers consist of large stone blocks which have limited herbaceous vegetation growing between the cracks. A site survey by the Corps of Engineers in August, 1975 (26) found the following species on the piers: yarrow (Achillea sp.), Joe-pyeweed (Eupatorium, sp.), night shade (Solanum, sp.), golden rod (Solidago sp.), evening primrose (Oenothera sp.), burdock (Arctium minus), Vervain (Verbena sp.) and cockleburr (Xanthium sp.). Various species of grasses are among the pioneer species that periodically establish themselves along the piers during summer months depending on wave action and available substrate between the cracks.

2.36 The climax community of the Vermilion Harbor area is beech-maple deciduous forest (07)(08)(27). Only remnants of the original forest areas are left. Red maple (Acer rubrum), sugar maple (Acer saccharum), cottonwood (Populus sp.), ash (Fraxinus sp.), hickory (Carya sp.), red oak (Quercus rubra) and white oak (Quercus alba) are

TABLE 2.2
SOIL SERIES - ENGINEERING PROPERTIES

Association	Soil Series	Map* Symbol	Parent Material	General Characteristics: Depth to Bedrock (Ft.)	Depth to Seasonal High Water Table (Ft.)	Depth from Surface (Typical Profile)(In.)	Dominant USDA Texture	Permeability (Inches/Hr.)	Reaction (pH)	Engineering Classification Unified
3	Allis	AlA AlB* AcA*	Glacial till or lake-bed deposits underlain by shale bedrock	1 1/2-3 1/2	< 1	0-4 4-12 12-24 24-40 40-60	Silty clay loam Silty clay loam Silty clay Silty clay loam and soft shale Shale bedrock	0.2-0.63 0.063-0.2 < 0.063 0.2-0.63 --	5.1-5.8 4.6-4.8 4.6-4.8 4.6-4.8 --	CL, CH MH - CH MH, CH MH, CH --
1	Beaches	Bc	Layers of sand and fine gravel	>5	6+	0-3 3-60	Medium sand Coarse sand	12.0+ 12.0+	6.6-7.4 Calcareous	SP or SM SP, SM
4	Berks	BrD*	Deposits weathered from sandstone underlain by broken sandstone and shale	1 1/2-3	1-1 1/2	0-6 6-30 30-60	Channery silt loam Channery silt loam Sandstone	2.0-6.3 2.0-6.3 -	5.6-6.0 5.1-5.5 -	ML or GM GM --
4	Bogart	BtaA BtB*	Beach ridges consisting of sandy and gravelly glacial outwash	>5	3-4	0-14 14-26 26-60	Loam Gravelly clay loam Gravelly sandy loam	2.0-6.3 2.0-6.3 6.3+	5.6-6.5 6.1-6.5 6.1-6.5	ML or SM, GM SM or SC SM, SC
3 & 14	Chili	ClB* ClC*	Formed in sandy and gravelly glacial outwash	>5	6+	0-7 7-16 16-26 26-60	Loam to gravelly sandy loam Gravelly loam Gravelly sandy clay loam Stratified gravelly loam & gravelly sandy loam to sand & gravel	2.0-6.3 2.0-6.3 2.0-6.3 >12.0	4.5-5.0 4.5-5.5 5.1-5.5 5.1-5.5	SM or ML ML or SM SL GW or GW-GM, SW, or SW-SM
3	Colyer	CyC* CyB*	Formed from weathered shale, underlain by shale bedrock	1 1/2	3+	0-11 11-17 17-60	Shaly silt loam Weathered shale Shale bedrock	0.63-2.0 - -	4.5-5.0 4.5-5.0 4.5-5.0	GM -- --
4	DeKalb	DkD*	Formed in sandy beach deposits, underlain by sandstone bedrock	1 1/2-3 1/2	3+	0-8 8-24 24-28 28-60	Fine sandy loam Fine sandy loam Stony fine sandy loam Sandstone	6.3-12.0 6.3-12.0 6.3+ -	6.1-6.5 5.6-6.0 5.6-6.0 -	SM or ML SM or ML SM --
2	Del Rey	DmA DmB*	Formed in lakebed deposits, silt loam or silty clay loam textured	>5	< 1 1/2	0-10 10-40 40-60	Silt loam or loam Silty clay loam Clay loam	0.63-2.0 0.2 -0.63 0.2 -0.63	6.1-6.5 6.6-7.4 Calcareous	ML CL CL
4	Ellsworth	EllB EllC1* EllD2*	Formed in clay loam glacial till	>5	2-3	0-7 7-18 18-28 28-60	Silt loam Silty clay loam Clay loam Clay loam	0.63-2.0 2.0 -0.63 <0.2 <0.2	5.1-5.5 5.1-5.5 6.6-7.3 Calcareous	ML CL CL CL

TABLE 2.2
(CONTINUED)

Association	Soil Series	Map ** Symbol	Parent Material	General Characteristics: Depth to Bedrock (Ft.)	Depth to Seasonal High Water Table (Ft.)	Depth from Surface (Typical Profile) (In.)	Dominant USDA Texture	Permeability (Inches/Hr.)	Reaction (pH)	Engineering Classification Unified
3	Fries	Fr* Fs*	Formed in thin lakebed deposits or thin layers of till, underlain by shale bedrock	1 1/2, 3 1/2	< 1	0- 8	Silty clay loam	< 0.2	6.1-6.5	CL
						8-25	Clay	< 0.2	4.5-5.5	CH or CL
						25-48	Weathered shale	—	-	—
						48-60	Shale bedrock	—	-	—
4	Haskins	HsA*	Formed partly in outwash & partially in glacial till of clay loam texture	>5	< 1 1/2	0-13	Loam	0.63-2.0	6.1-6.5	ML, CL
						13-18	Silt loam	0.63-2.0	6.1-6.5	ML
						18-28	Clay loam	0.63-2.0	6.1-6.5	CL
						28-36	Stratified sandy clay loam, and sandy loam	0.63-2.0	7.3-8.4	SC or ML
3 & 4	Jimtown	JtA*	Formed in acid, sandy and gravelly glacial outwash	>5	< 1 1/2	0-14	Loam	0.63-2.0	5.6-6.5	ML
						14-27	Sandy loam to gravelly sandy clay loam	0.63-2.0	5.1-6.5	ML
						27-40	Very gravelly loam	2.0-6.3	5.1-6.5	SM
						40-60	Gravelly sandy loam	6.3-12.0	5.1-6.5	SM
2 & 4	Lenawee	La*	Formed in lakebed deposits	>5	< 1	0- 8	Silty clay loam	0.63-2.0	6.6-7.4	CL, ML-CL
						8-40	Silty clay loam to silty clay	0.2 -0.63	6.6-7.4	CL, ML-CL
						40-60	Silty clay loam	0.2 -0.63	Calcareous	CL, ML-CL
4	Loudonville	LoA* LoC*	Formed in glacial till of clay loam textures, underlain by sandstone bedrock	1 1/2-3 1/2	3+	0- 8	Loam	0.2-0.63	5.6-6.0	ML
						8-20	Clay loam	0.2-0.63	5.6-6.0	CL, ML-CL
						20-24	Channery loam	0.2-0.63	5.1-5.5	ML
						24-60	Sandstone	-	-	—
NA	Made land no estimate of properties	Ma	Usually fill material of variable origin							
2 & 4	Mahoning	MgA* MhA* MlA*	Formed in clay loam glacial till	>5	< I 1/2	0-14	Silt loam to loam	0.2-0.63	5.5-6.5	ML, ML-CL
						14-22	Clay	0.063-0.2	5.1-5.6	CL or ML-CL
						22-30	Clay loam	0.063-0.2	6.6-7.4	CL
						30-60	Clay loam	< 0.063	Calcareous	CL
2 & 4	Metea	MrA	Sandy soils underlain by finer texture materials	>5	2-3	0-24	Loamy fine sand	6.23-12.0	6.6-7.3	SM
						24-32	Silty clay loam	0.63-2.0	6.6-7.3	CL
						32-60	Silty clay loam stratified in lower part	0.2-0.63	Calcareous	CL
4	Miner	MlO*	Formed in silty clay loam glacial till	>5	< I	0- 8	Silty clay loam	0.2 -2.0	5.6-6.0	CL
						8-28	Silty clay	0.063-0.2	6.1-6.5	CH
						28-60	Silty clay loam.	0.063-0.2	6.1-6.5	CL
NA	Orrville	Or	Formed in recent alluvium deposited by flooding streams	>5	< I 1/2	0-30	Silt loam	0.63-2.0	5.6-6.0	ML
						30-40	Loam	0.63-2.0	6.1-6.5	ML
						40-60	Sandy loam	2.0 -6.3	6.1-6.5	SM

TABLE 2.2
(CONTINUED)

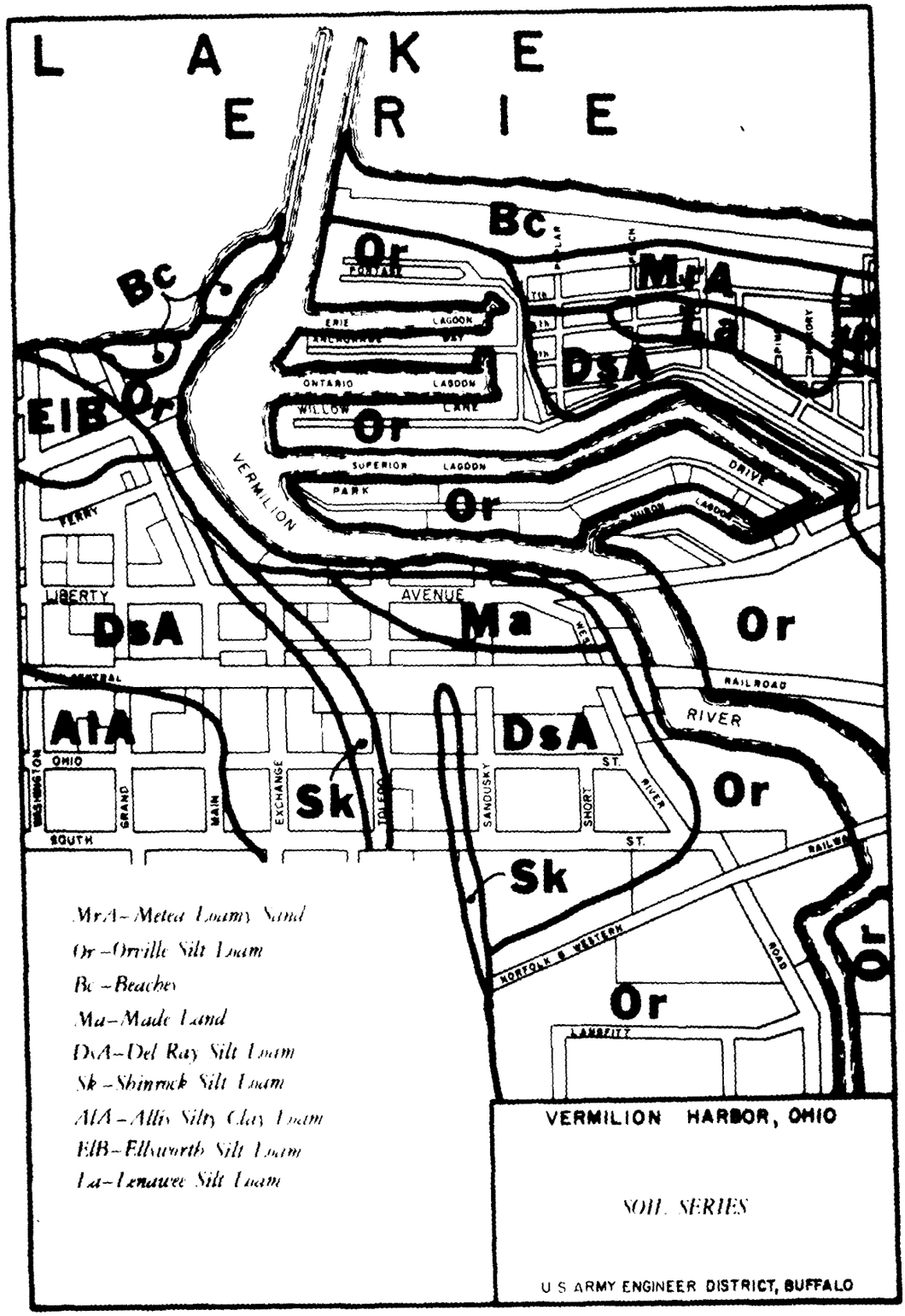
Association	Soil Series	Map** Symbol	Parent Material	General Characteristics: Depth to Bedrock (Ft.)	Depth to Seasonal High Water Table (Ft.)	Depth from Surface (Typical Profile) (In.)	Dominant USDA Texture	Permeability (Inches/Hr.)	Reaction (pH)	Engineering Classification Unified
3	Prout	PnA*	Formed from a mixture of weathered shale or lakebed deposits, underlain by shale bedrock	1 1/2-3 1/2	< I 1/2	0-10	Loam or very sandy loam	0.63-2.5	5.1-5.3	ML
						10-24	Silty clay loam	0.2 -0.63	4.5-5.0	CL, ML-CL
						24-30	Weathered shale	0.2 -0.63	4.5-5.0	—
						30-60	Shale bedrock	-	4.5-5.0	—
2	Shinrock	SkA	Formed in limey lakebed deposits of silt loam to silty clay loam in texture	>5	2-3	0- 9	Silt loam	0.63-2.0	6.1-7.3	ML
		SkB*				9-27	Silty clay loam	0.63-2.0	6.1-7.3	CH
		SkCZ*				27-42	Silty clay loam	0.2 -0.63	Calcareous	CL
		SkDE*				42-60	Stratified clay loam, & very fine sand	0.2 -0.63	Calcareous	CL, CH

NA = Not placed in an association

*Soil series located upstream of project area (not shown on Plate 2.8)

**See Plate 2.8 for location of soil series

Source: (24) (25)



Source: (24)

PLATE 2.8

the dominant remaining tree species scattered throughout the residential areas. Linwood Park and the lagoons east of the harbor support mature tree species with very limited undergrowth due to the highly residential nature of the area. Oak and hickory trees are important species since they are utilized as food, shelter and den sites by the harbor area's mammals and birds. The west harbor area is also primarily commercial and residential with vegetation similar to that of Linwood Park and the lagoons. South of the project area is a marshy area bordering a sewage disposal plant. This constitutes the only other available natural habitat in the project area's vicinity.

Terrestrial Wildlife

2.37 Terrestrial wildlife refers to the vertebrate species of animals which occupy terrestrial habitats. This group is comprised of reptiles and amphibians (collectively called herptiles), birds and mammals, and are important to the project area from an economic, aesthetic, ecological, commercial and recreational viewpoint. Primary use periods for most forms in the project vicinity are warmer months when activity is greater, the harbor is free of ice, and migratory species are passing through the area.

2.38 The scattered trees and lack of undergrowth in the harbor area afford relatively poor habitat for mammals. Only those species which are tolerant of man can exist in the harbor area. The house mouse (Mus musculus) and Norway rat (Rattus norvegicus) are present. Such ubiquitous mammals as the opossum (Didelphis marsupialis) and raccoon (Procyon lotor), which can make their dens under porches and in brush piles, occur in the harbor area (28). In addition to the natural habitat afforded by the trees, opossum and raccoons can utilize the man-made breakwaters, piers and lagoons to hunt for food (29). Due to the habitat which is available, their occurrence in the project area is likely, but unverified at this time. Eastern cottontail (Sylvilagus floridanus) and fox squirrel (Sciurus niger) are found to a limited extent in the harbor area. It is possible that the endangered Indiana bat (Myotis sodalis) occurs here also (30)(31) although there are no sightings on record.

2.39 Limited areas for cover, reproduction and feeding explain the low number of species of birds which are residents in Vermilion Harbor. Such species as starling (Sturnus vulgaris), house sparrow (Passer domesticus), rock dove (Columba livia), nighthawk (Chordeiles minor), and chimney swift (Chaetura pelagica) utilize the natural flora as well as house tops, eves, chimneys, rain gutters and other man-made structures as breeding sites (28)(32). The most apparent faunal elements of Vermilion Harbor are the water-associated birds.

Gulls (Larus sp.), terns (Sterna sp.), sandpipers (Calidris sp.), plovers (Pluvialis sp.) and rails (Rallus sp., Porzana sp.) utilize the man-made piers, lagoons and breakwaters to rest and feed. These structures serve as habitat for many invertebrate species which are known as important food items for water-associated birds. In addition to foraging, these birds also scavenge fish and other available sea food from the fishermen in the harbor area (32)(33)(29). The entire south shore of Lake Erie is on a migratory flyway. Vermilion Harbor is part of the Mississippi flyway which is the largest and most heavily used migration corridor in the continental United States (34). Twenty-five species of waterfowl migrate through the Vermilion area including such diving ducks as redhead, canvas back and scaup (all genus Athya); dabbling ducks such as mallard, gadwall, widgeon, pintail, teal and shoveler (all genera Anas); merganser (Mergus sp.), ruddy duck (Oxyura jamacensis), wood duck (Aix sponsa), Canada geese (Branta canadensis), and grebe (Podiceps sp., Podilymbus sp.) (32)(34)(33)(29). These birds utilize the harbor during migration as a stopover to rest, feed and preen. The majority of the waterfowl remain in the open waters and only move into the harbor during stormy weather. Mallards are the main exception to this, freely moving in and out of the harbor and lagoons to scavenge. Mallards and gulls are year-round residents of the harbor area. Raptors such as the peregrine falcon (Falco peregrinus), sharp-shinned hawk (Accipiter striatus), and bald eagle (Haliaeetus leucocephalus) rarely migrate through the Vermilion Harbor area (33); however, these raptors, as well as the upland sandpiper (Bartramia longicauda) and common tern (Sterna hirundo) which do utilize the harbor area, are listed by the State of Ohio as endangered wildlife as of August 1974 (30).

2.40 The residential and commercial nature of the harbor contributes to the small amount of undergrowth habitat available to sustain populations of reptiles or amphibians. This limited resource in addition to the lack of suitable breeding areas explains the low species diversity and the general scarcity of the herptilian community. Only such species as the American toad (Bufo americanus) and the racers (Coluber sp.) which are adept at utilizing minimal cover and moisture may occur in the harbor habitats (35)(30), although their existence in the immediate harbor area is unsubstantiated.

Hydrology

2.41 Hydrology encompasses the study of the behavior of water as it occurs in the atmosphere, on the surface of the ground and underground. The amount and characteristics of water within the project vicinity affect floods, recreational and commercial navigation, and municipal water supply.

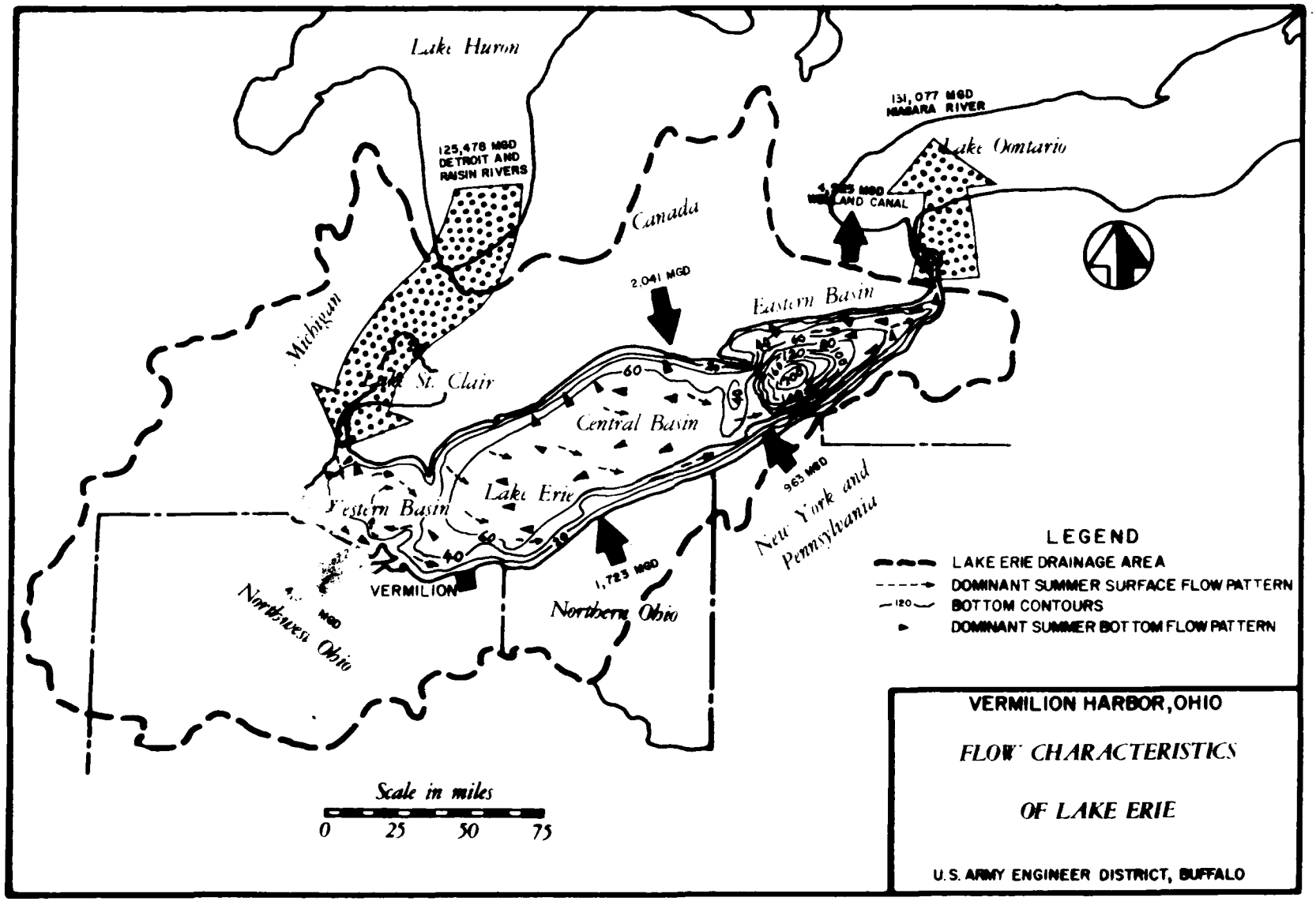
2.42 Lake Erie is the shallowest of the Great Lakes with over 90 percent of its total area being less than 80 feet deep. It is the only lake with its entire water mass above sea level, it contains the smallest volume of water (116 cubic miles) and is subject to the widest fluctuations in water level. The lake proper covers an area of 9,910 square miles with an average depth of 60 feet and a maximum depth of 210 feet. The total drainage area is 33,500 square miles, including 9,910 square miles of water surface area. The lake is 241 miles long and has a maximum width of 57 miles. The lake is defined by three basins: western, central and eastern as shown in Plate 2.9. Table 2.3 provides additional statistics for each basin and for the entire lake (36).

2.43 Vermilion is located in the central basin which extends along the northeast Ohio shore and is the largest of the three, covering approximately 6,300 square miles. Its average water depth is 60 feet with a maximum of about 80 feet. The shores are generally high clay banks with narrow beaches. Although the basin receives more than 90 percent of its water supply from western basin drainage, its water is considerably less turbid and less biologically productive. However, productivity is high along the south shore (36).

2.44 Water temperatures are uniformly decreasing, from top to bottom, from fall until late spring. In winter much of the basin is occasionally ice-covered with greater than 95 percent ice cover being recorded during three of the past eleven winters (18). The ice cover is usually present from December to April (36).

2.45 Due to the basin's large cross-section, its flow-through current is immeasurably slow and circulation is controlled by the wind. Although reversals are common with wind shifts, the predominant surface water movement is eastward, angling away from the north shore toward the south shore due to the prevailing southwest winds (see Plate 2.9). The predominant bottom water flow is southwestward (36). Within a half mile of the south shore, the flow is toward the east at all depths (36) while the littoral currents in the Vermilion area are from east to west.

2.46 Water levels generally do not fluctuate greatly with the wind in the central basin. Wave activity during storms is often violent, a danger to boating, and causes rapid shore erosion as well as fast longshore currents at several locations. Based on data taken at the Cleveland water level gage the following average lake levels were determined. The highest and lowest average monthly levels on Lake Erie generally occur in June and February, respectively. The average lake level normally varies from about 570 feet in winter to 571 feet in late spring and early summer. The lowest average monthly recorded level was 567.5 feet in February 1936 (36). The average level is 570.39 feet above msl (Great Lakes Basin Commission) (29). The highest average monthly water level on Lake Erie was 573.5 feet in June 1973.



Source: (36)

PLATE 2.9

TABLE 2.3

MORPHOMETRY OF LAKE ERIE

	Western Basin	Central Basin	Eastern Basin	Entire Lake
Maximum length, miles	50.0	132.5	85.0	241.0
Maximum breadth, miles	40.0	57.2	47.5	57.0
Maximum depth, feet	67.0	84.0	210.0	210.0
Mean depth, feet	24.2	60.7	79.9	60.7
Maximum depth/mean depth	2.8	1.4	2.7	3.4
Area, square miles	1,265.0	6,246.0	2,408.0	9,910.0
Volume, cubic miles	5.8	71.8	36.4	116.0
Shoreline, miles	268.3	373.3	263.3	844.9
Percent of area	12.8	62.9	24.3	100.0
Percent of volume[1]	5.1	63.0	31.9	100.0
Percent of shoreline[2]	31.7	37.1	31.2	100.0
Development of volume	1.2	2.2	1.1	0.9
Development of shoreline	2.3	1.3	1.7	2.1
Longitudinal axis bearing	N 67° W	N 67° E	N 67° E	N 67° E

[1]Development of volume is the ratio of the volume of the lake to that of a cone of basal area equal to area of the lake and a height equal to the maximum depth of the lake.

[2]Development of shoreline is the ratio of the length of the shoreline to the length of the circumference of a circle of area equal to that of the lake.

Source: (36)

2.47 The Vermilion River has its source in the Savannah Lakes of Ashland County and flows generally north for a distance of nearly 59 miles into Lake Erie. The watershed has a maximum width of just over 16 miles and a maximum length of about 34 miles (see Plate 2.1). The Vermilion River picks up the tributaries of Clear Creek from the west and Buck Creek from the east in Ashland County. In Huron County, the Southwest Branch and Indian Creek enter from the west and the East Branch enters the river from the east. The East Fork enters the river from the east in Erie County. No major tributaries enter the river in Lorain County (37).

2.48 The river has a relatively flat slope throughout its length, averaging less than eight feet per mile. All of the tributaries, with the exception of the East Fork are characterized by relatively broad, although well-defined, valleys. The Vermilion River also flows through a relatively wide valley section throughout most of its length. In the upper 15 miles within Ashland County, the valley is defined by moderately sloping sides up to 100 feet or more above the stream bed. The central 23 miles of the river within Huron County, are less well-defined and the adjacent high ground averages only 50 feet above the stream bed. Near the village of Wakeman, about 21 miles upstream of the mouth, the river starts a meandering course to the lake through a gorge averaging 100 feet in depth and ranging from 200 feet to 2,000 feet in width. The valley walls broaden out and disappear about one mile upstream of the river mouth at a point just upstream of the principal development of the City of Vermilion (37).

2.49 The average discharge of the Vermilion River at the gauging station (4.5 miles upstream from the mouth), was 234 cubic feet per second (cfs) for the period 1950 through 1973. The maximum discharge for this period was 40,800 cfs in July, 1969, while the minimum discharge was no flow which was recorded at various times during numerous years. River discharge varies in a cyclic pattern each year, with the maximum monthly discharge generally occurring in March and the minimum in September (38).

2.50 Floods in the project area are most severe in the low-lying areas located east of the harbor and north of Liberty Avenue. Floods on the Vermilion River are often accompanied by ice jams; as a result, flood stages are higher than those which would occur from river discharge alone (37). Groundwater supplies in the Vermilion area are limited due to the thin clay drift layers overlying the impermeable shale bedrock. Sand and gravel layers in the region are few in number and of limited areal extent (21). Wells in the Vermilion area generally yield less than five gallons per minute at depths ranging from 30 to 80 feet, and hence are poorly suited for all but restricted uses (39).

There are no water supplies obtained from wells within the city of Vermilion (40). Locations and production rates of aquifers in the project area's vicinity are shown in Plate 2.10.

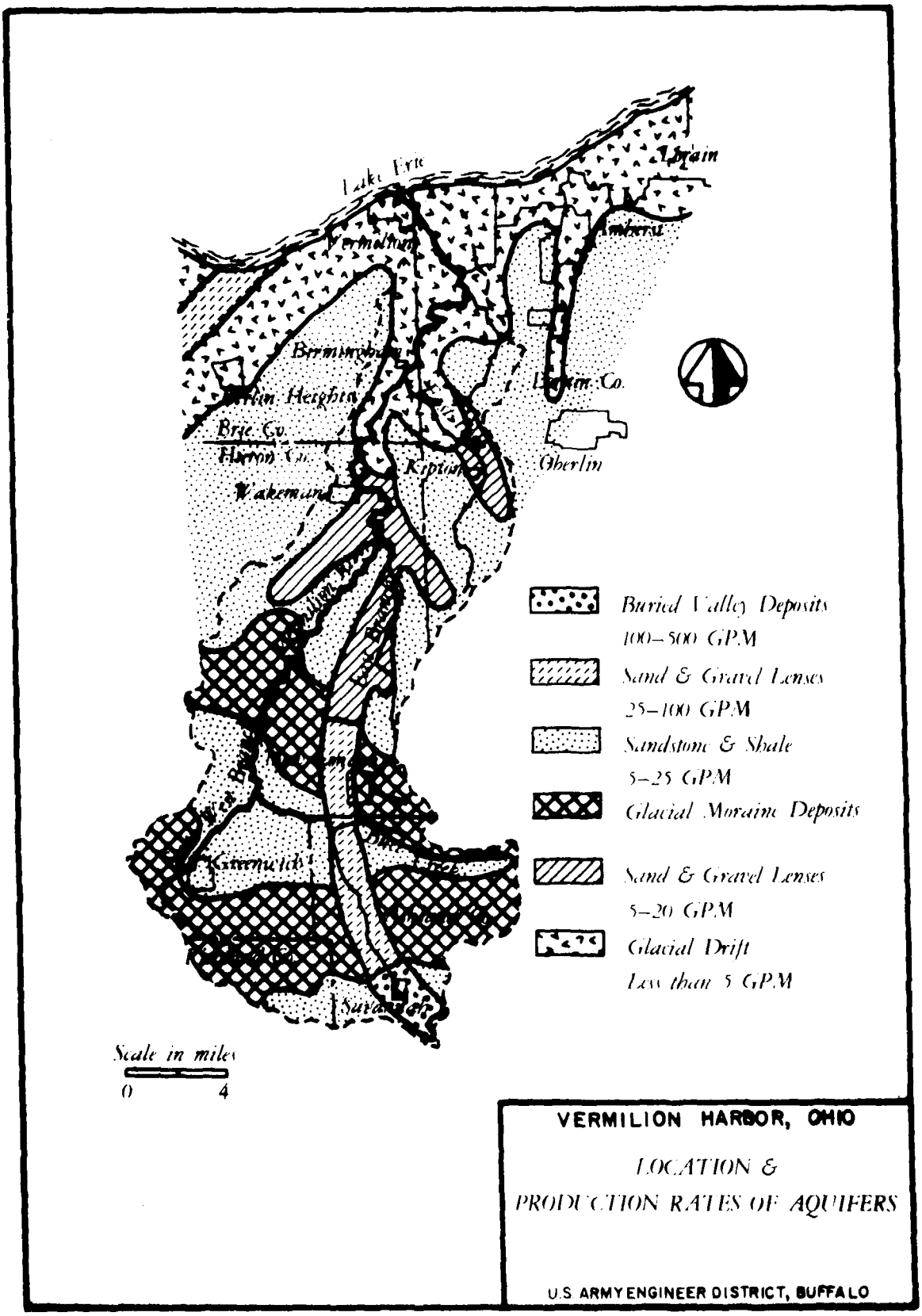
Sediment

2.51 Sediment is studied to determine particle size distribution and chemical composition. Sediment materials removed during dredging may be suitable for beach fill, may be placed in open-lake disposal areas, or may be unsuited for lake disposal and require special disposal measures. Degree of sedimentation directly affects the frequency of required maintenance dredging operations.

2.52 Four primary sources of sediment exist in the Vermilion Harbor area: settleable solids discharged from sewage treatment plants; eroded soil transported by the Vermilion River; bluff and shoreline erosion updrift of the harbor area; and material carried by littoral currents. During 1974, the average concentration of suspended solids in the Vermilion wastewater treatment plant discharge was 17 mg/l, at an average flow of .93 million gallons per day (MGD) (42). The resulting load on the river is approximately 25 tons per year, or approximately 50 cubic yards per year. Even if all of this suspended solid material were to settle in the project area, the accumulations are small in comparison with the eroded soil transported by the river (133,000 tons per year) (03). The general locations of soils throughout the Vermilion River watershed which are susceptible to erosion are shown in Plate 2.11.

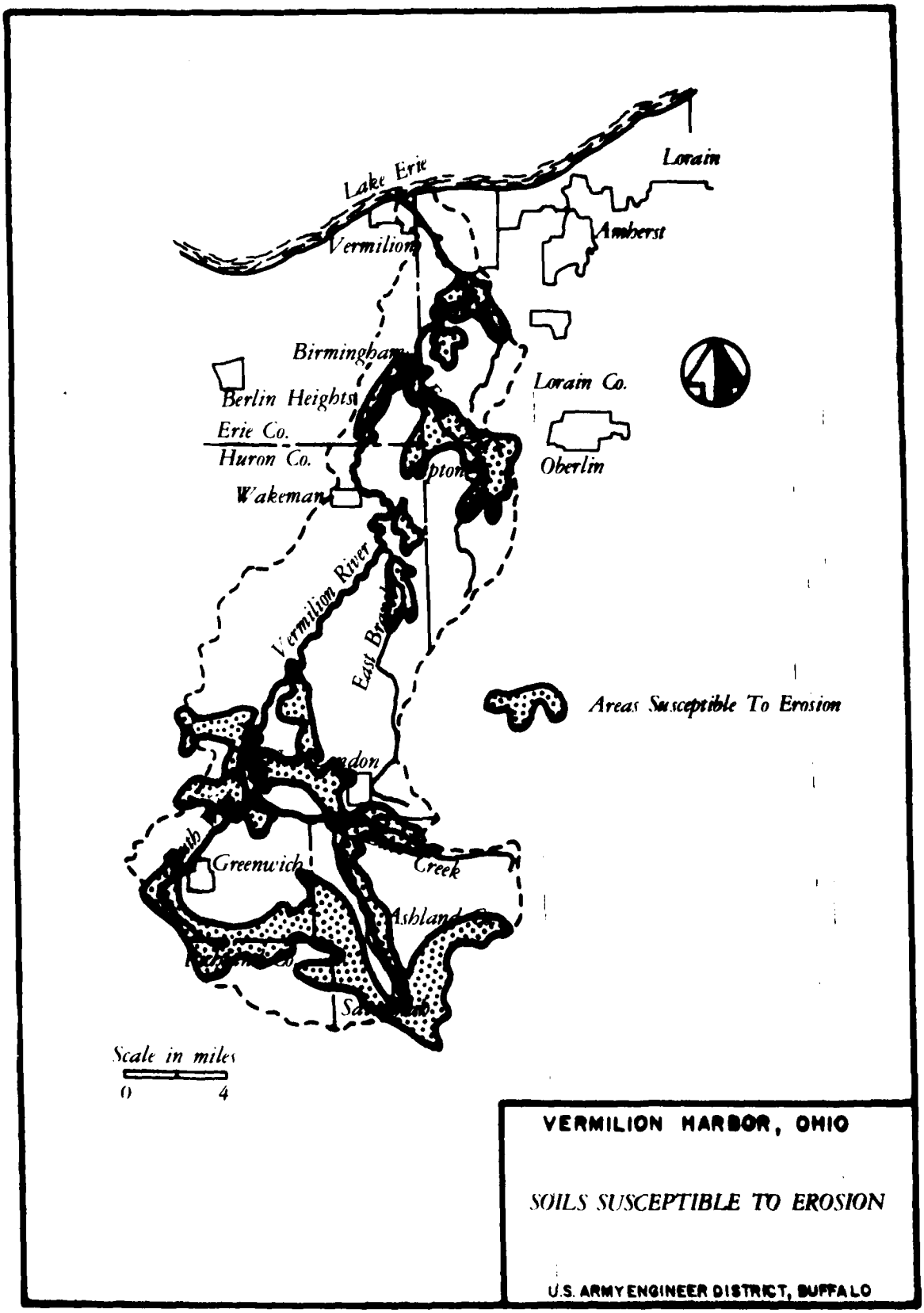
2.53 Six observations of suspended sediment loads were made during 1973 at the United States Geological Survey gauging station 4.5 miles upstream from the mouth of the Vermilion River (43). Sample concentrations ranged from 14 to 941 mg/l, with the highest concentrations occurring during peak discharges. A discharge of 3,430 cfs contained the maximum concentration, yielding 8,720 tons per day (43). The analysis of particle size distributions revealed that higher discharge rates transported larger particles. Settling of the larger soil particles is induced in the project area where river velocities are low due to increased channel capacity. The Vermilion River is a primary source of sediment in the harbor area as evidenced by the fact that sediment samples collected in 1975 by the EPA in the river channel 2,000 to 3,000 feet south of the Vermilion lighthouse at the outer end of the west pier were composed primarily of silt (44).

2.54 Little sediment material comes from bluff erosion or near shore lake bottom sources in the immediate harbor area. This is due to the shale bedrock composition of these potential sediment sources. As evidenced by the EPA analysis of sediments collected in the river channel near the end of the piers and in the lake approach



Source: (41)

PLATE 2.10



Source: (03)

PLATE 2.11

areas, and by the large buildup of sandy sediments just east of the east pier, much of the sediment in this portion of the harbor is composed of sand. Materials carried in littoral drift (generally east to west in the Vermilion area), are the source of these sandy sediments which are generated from updrift areas in Lake Erie located to the east of Vermilion (44).

Aquatic Vegetation

2.55 Aquatic vegetation is generally classified as either emergent, submergent or floating species. Most types are normally found in shallow, shoreline areas. Aquatic plants are considered important in the maintenance and natural aging of normal aquatic communities. Although photosynthesis is a primary role of aquatic vegetation, many forms of life including insects, fish, birds and mammals use it for cover, protection and feeding areas. High nutrient levels stimulate growth while turbidity and pollution may reduce growth of many species. Shoreline erosion problems are frequently attributed to the lack or non-existence of aquatic vegetation.

2.56 The change in environmental conditions of Lake Erie over the years is indicated by the apparent loss of aquatic vegetation from the bays and shallow water zones. In a June 1975 survey of the Vermilion area no emergent, floating or submergent species of aquatic vegetation were observed (28). Siltation and turbidity which result in a lessening of light penetration and the covering of plants with a layer of silt have been noted as the primary causes of the lack of vegetation. The loss of this aquatic vegetation has resulted in an increased turbidity (and, hence, an even greater rate of erosion) as well as the reduction of wildlife including many fish species which use areas of aquatic vegetation for feeding, spawning and protection (45). Cladophora glomerata, an attached algae type, was observed to be present in a June 1975 field survey of the Vermilion Harbor area (28). The algae is very common in the western Lake Erie shoreline region (46). It attaches to bottom materials to depths as great as five meters. Since it requires firm attachment it is often found at the waterline on breakwalls, boulders and bedrock where wave action prevents the accumulation of silt. Various invertebrates are commonly found in these algal growths. Omnivorous fish species may feed on both phytoplankton and invertebrates in the algal growth areas.

Plankton

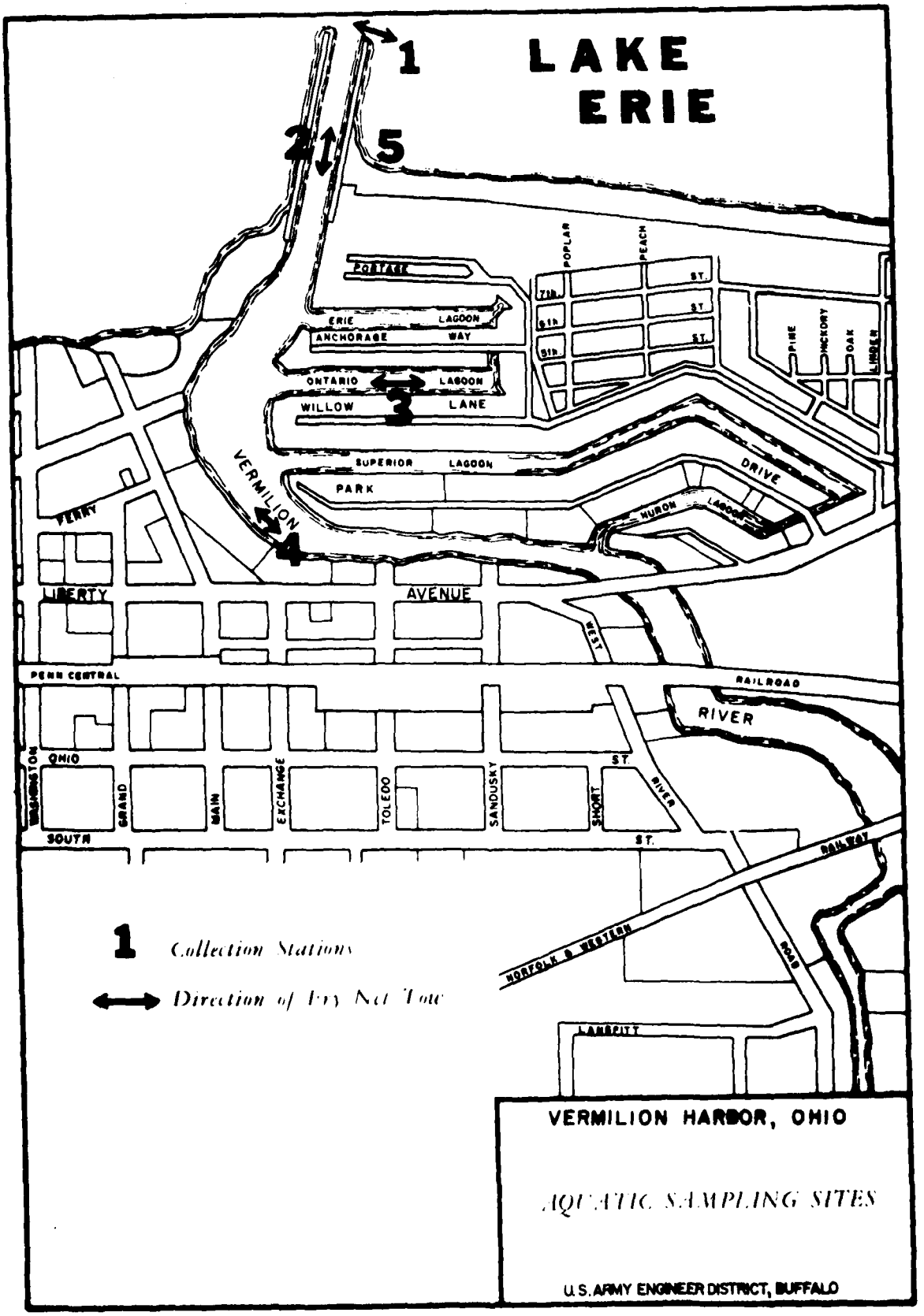
2.57 Plankton are commonly divided into two types: phytoplankton and zooplankton. The plant form, phytoplankton, is frequently an algae and is normally distributed as deep as light penetrates. Its movements are usually dependent upon currents and it serves as the basic food of the aquatic ecosystem. Zooplankton are small microinvertebrate

primary consumers, capable of limited movement and frequently feed on phytoplankton. Both phytoplankton and zooplankton are fed upon by larger consumers such as fish. Physical and chemical factors such as turbidity and nutrient levels influence the abundance and community structure of both phytoplankton and zooplankton. An analysis of samples taken by the Ohio EPA (47) at the open lake Vermilion intake surveillance station in 1972 indicates the presence of zooplankton species on a year-round basis. The location of this intake is shown in Plate 1.4. Cladocerans appear to be predominant in mid-winter and again in late spring, while copepods and rotifers increase in relative abundance in mid-spring and reach population peaks by late spring (48).

2.58 Phytoplankton data for the Vermilion off-shore area of Lake Erie were gathered by the Ohio EPA in seven feet of water at the water intake surveillance site, approximately 1,000 feet offshore and almost directly north of Vermilion, (see Plate 1.4) (47). Differences in factors such as depth, turbidity, nutrient levels and water quality preclude precise description of the community structure of the dredged disposal site. However, with this surveillance site being an open water zone, it is likely that most plankton species encountered at the surveillance intake will also be found at the open water dredged disposal site. The trend at this surveillance site has been towards an overall decline in the average yearly phytoplankton concentrations from 1968 to 1972.

2.59 On July 3, 1975, the Cleveland Environmental Research Group (CERG) collected plankton inside and outside the harbor entrance (40). Zooplankton were collected inside (Station 2) and outside (Station 1) the harbor entrance and phytoplankton were collected at Station 2 only. Collection stations are indicated on Plate 2.12. A comparison of CERG phytoplankton data (49) collected in the harbor area and Ohio EPA phytoplankton (47) data collected in open water show similar results for summer collection periods. Centric diatoms (mostly Stephanodiscus sp.) and green algae species (mostly Pediastrum and Coelastrum) were in the greatest abundance. In addition to the phytoplankton counts, the following, larger colonial forms were also collected and identified at both Station 1 and Station 2: Anabaena flos-aquae and Aphanozomenon flos-aquae. The Ohio EPA reports that on a yearly average, Cyclotella, Stephanodiscus and pennate diatoms are predominant, particularly during the winter and early spring months. Diatom species often become replaced in relative abundance by green algae species followed by blue-green algae species as fall approaches. A number of genera contribute to the green algae pulse including: Cosarium, Scenedesums, Pediastrum and Oocystis. Blue-greens in autumn include: Oscillatoria species (48).

2.60 Zooplankton collected by CERG (49) indicates various species of copepods, cladocerans, and rotifers are present both inside and



Source: (49)

PLATE 2.12

outside the harbor. The cladoceran (Bosmina coregoni), was collected in the greatest relative abundance at both sites. Those species of phytoplankton and zooplankton and their relative abundance collected by CERG on July 3, 1975 are presented in Table 2.4 and Table 2.5, respectively.

Aquatic Invertebrates

2.61 Various aquatic invertebrates including fly larvae, snails, clams and aquatic worms are commonly found in most aquatic ecosystems, living in or resting on bottom substrates or attached to rocks and debris. They are commonly referred to as benthos and are primary macroconsumers feeding on living plants and plant remains. Many are the preferred food of fish and, when viewed as a community, may give insight on the nature of the aquatic ecosystem.

2.62 The aquatic invertebrate community structure of the Vermilion Harbor area has been characterized by the Ohio EPA as consisting of scuds (Amphipoda), caddisflies (Trichoptera), mayflies (Ephemeroptera), flatworms (Turbellaria), midges (Chironomidae), and aquatic worms (Tubificidae) (47). Based on their benthic collection data, CERG (49) reports the aquatic invertebrate community within the harbor sediments as consisting of mostly aquatic worms (Limnodrilus sp.) and midge larvae (Procladius sp.). The benthic macroinvertebrates collected by CERG July 3, 1975 are listed in Table 2.6.

2.63 Although species identification and quantitative seasonal population data are necessary for critical interpretation of this benthic community, it is possible to draw some conclusions regarding the fitness of the aquatic environment. The presence of scuds, caddisflies, and mayflies generally indicates moderate to good water quality. Flatworms, midges, and freshwater worms are commonly regarded as pollution tolerant forms, although certain species prefer clean water (50). The Vermilion area, therefore, might be characterized as slight to moderately polluted based upon the benthic macroinvertebrate community known to be present (49). Aquatic organisms may be found either attached to rocks and debris or living in bottom sediments. They make up the bulk of the diet of many fishes. Principal food items of some of the more common fish species in Lake Erie near Vermilion are presented in Table 2.7.

Fisheries

2.64 Fish are frequently classified as forage, commercial or sport species. They often serve as the ultimate consumer within the complex structure of the aquatic food web. Many fish species prefer the deeper, open waters, while some are more commonly found in shallow water areas. Certain species are normally found only in the swift, oxygen-rich waters of streams. The presence or absence of

TABLE 2.4

PHYTOPLANKTON - VERMILION, OHIO, HARBOR ENTRANCE (SITE 2)*

JULY 3, 1975

Organism	No. Cells/Liter
Green Algae	
Pediastrum simplex	1200
Pediastrum duplex	3600
Pediastrum boryanum	1000
Pediastrum tetras	1100
Coelastrum sp.	2700
Scenedesmus sp. (few each of several species)	700
Quadrigula sp.	200
Other Colonial Green Algae (Colonies in Matrix or other Coat)	4900
Desmids	
Staurastrum sp.	1300
Cosmarium sp.	500
Closterium sp.	100
Closteriopsis longissima	100
Diatoms	
Centric Diatoms (Mostly Stephanodiscus Niagarae)	3200
Tabellaria fenestrata (cells)	700
Fragilaria sp. (mm of colony)	250
Other Algae	
Ceratium hirundinella	100
Cryptomonas ovata and other small flagellates present in large numbers	

*See Plate 2.12 for site location

Source: (49)

TABLE 2.5
ZOOPLANKTON
VERMILION HARBOR, JULY 3, 1975

Organism	Harbor Entrance (Station 2-inside)* No./Liter	Harbor Entrance (Station 1-outside)* No./Liter
Copepods		
Cyclopoid	8	
Calanoid	1	
Nauplius	6	4
Cladocerans		
Bosmina coregoni	35	60
Bosmina longirostris	1	3
Daphnia galeata	0.5	
Daphnia pulex[1]		
Diaphanasoma leuchtenburgianum	5	
Ceriodaphnia sp.	0.5	1
Leptodora kindtii[1]		
Rotifers		
Polyarthra vulgaris	10	8
Polyarthra euryptera		2
Trichocerca sp.	8	9
Keratella cochlearis	2	3
Kellicottia longispina	0.5	0.5
Brachionus sp.	0.5	
Asplanchna sp.	1	2
Monostyla sp.		1
Trochosphaera aequatorialis		0.5

*See Plate 2.12 for site location

[1]Present but not quantified

Source: (49)

TABLE 2.6
AQUATIC INVERTEBRATES
VERMILION HARBOR, JULY 3, 1975

Station 1[1]*

Taxon	Density (No./m^2)	Relative Abundance (%)
Tubificidae		
immature without capilliform chaetae	151	
Limnodrillus sp.	113	17
Peloscolex sp.	19	13
Chironomidae		
Procladius sp.	548	63
Chironomis sp.	38	4

Station 2[2]*

Taxon	Density (No./m^2)	Relative Abundance (%)
Tubificidae		
Limnodrillus sp.	76	44
Hirudinea		
Helobdella sp.	19	12
Chironomidae		
Procladius sp.	38	22
Gasteropoda		
Physa integera	38	22

[1]Sediment composition: principally clay and sandy materials

[2]Sediment composition: principally plant detritus

*See Plate 2.12 for site location

Source: (49)

TABLE 2.7

PRINCIPAL FOOD ITEMS OF
EIGHT LAKE ERIE FISH
IN THE VERMILION RIVER AREA

FOOD ITEMS	Smelt	Yellow perch	Sheepshead	White bass	Channel catfish	Walleye	Alewife	Gizzard shad
Aquatic worms (Oligochaeta)			X					
Leech (Hirudinea)			X					
Water fleas (Cladocera)	X*	X	X	X*	X		X	X
Copepods	X*	X	X*				X	X
Seed shrimps (Ostracoda)								X
Scuds (Amphipoda)		X	X	X				
Mayflies (Ephemeroptera)		X	X		X			
Caddisflies (Trichoptera)		X	X		X			
Flies, Midges (Diptera)	X	X*	X*	X	X*			
Fish	X	X	X	X*	X	X*		
Algae								X*

*Highest frequency in all fish stomachs sampled

Note: prefered food items may vary as fish age

Source: (51)

preferred habitat such as aquatic vegetation, tends to determine the relative abundance and community structure of fish populations. During the breeding season, many species will migrate from deeper water to shallow water zones where a particular type of habitat or substrate is present. The absence or presence of a fish species in an aquatic community serves as an ecological indicator.

2.65 Lake Erie has provided a valuable commercial fishery during the last hundred years. The fisheries have changed considerably as a result of pollution, over fishing, and introduction of alien species. Commercial fishing, however, still plays a significant economic role in the Vermilion area. A 17 percent increase in commercial fishing in the Ohio waters of Lake Erie from 1973 to 1974 has been reported (52). Over eight million pounds of fish were taken by commercial methods in 1974 from the Ohio waters of Lake Erie. The Huron to Fairport District (which includes the Vermilion Harbor area), contributed over one million pounds with yellow perch, Perca flavescens, the predominant catch (52). The most productive commercial fishing periods usually occur March through June (52). Commercial landings of fish in the Huron to Fairport District and the Ohio waters of Lake Erie for the years 1972 to 1974 are presented in Table 2.8. Lake Erie has also been divided into commercial fishing grids. Grid 1007 covers the Vermilion offshore area that includes the harbor's open-lake disposal site. A map showing the location of grid 1007 is presented in Plate 2.13. Following is a summary of commercial fish pounds caught in 1973 and 1974 in grid 1007:

Species	1973	1974
Yellow perch	69,137	76,950
Sheepshead	23,202	1,125
Carp	3,420	672
White bass	18,525	5,232
Catfish	0	104
TOTAL POUNDS:	114,294	84,083

Source: (55)

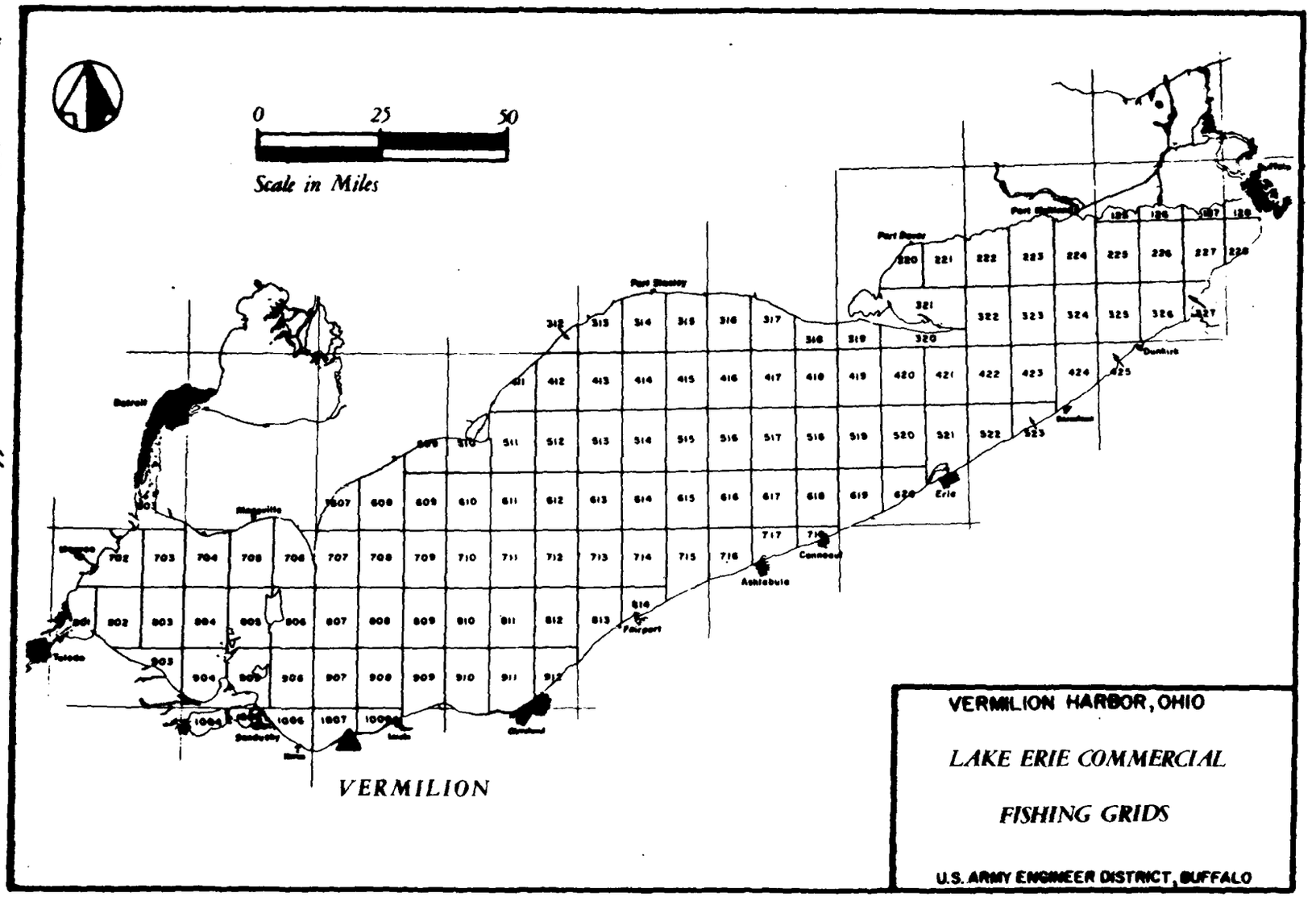
2.66 Sport fishing in the Vermilion area may be characterized as seasonal with the months of June through October rated by local fishermen as being the most productive (53). Those species most frequently caught include catfish (Ictalurus spp.), white bass

TABLE 2.8

COMMERCIAL FISH CATCHES
HURON TO FAIRPORT (DISTRICT 2) AND OHIO WATERS OF LAKE ERIE
1972-1974

Species	1972			1973			1974		
	District 2 Total lbs.	Lake Erie Total lbs.	District 2 % by wt.	District 2 Total lbs.	Lake Erie Total lbs.	District 2 % by wt.	District 2 Total lbs.	Lake Erie Total lbs.	District 2 % by wt.
Buffalo (Ictiobus sp.)	24	14,340	0.2	122	16,489	0.7	70	31,850	0.2
Bullhead (Ictalurus sp.)	207	27,232	0.8	748	21,193	3.5	370	27,375	1.4
Carp (Cyprinus carpio)	16,548	2,986,639	0.6	31,160	2,135,545	1.5	7,893	2,829,276	0.3
Codfish (Ictalurus sp.)	44,146	672,501	6.6	8,039	243,028	3.3	7,107	300,131	2.4
Freshwater drum (Aplodinotus grunniens)	187,519	895,792	21.0	217,039	950,258	22.8	92,300	667,636	13.8
Goldfish (Carassius auratus)	—	41,985	—	—	—	—	6,500	64,968	10.0
Quillback (Carpiodes carpio)	1,298	45,077	2.9	2,422	56,846	4.3	385	61,833	0.6
Smelt (Osmerus mordax)	999	1,022	97.7	252	272	92.6	4,849	4,944	98.0
Suckers (Catostomus sp.)	19,352	113,520	17.0	27,749	113,588	24.4	14,710	88,376	16.6
White bass (Morone chrysops)	115,046	699,129	16.4	110,395	2,364,213	4.7	66,015	2,894,806	2.3
Yellow Perch (Perca flavescens)	834,848	1,597,990	52.2	770,271	1,482,418	52.0	1,010,046	1,711,672	59.0
Walleye (Stizostedion vitreum)	—	—	—	1,399	13,629	10.3	—	—	—
TOTAL	1,219,987	7,094,227	17.2	1,169,596	7,429,857	15.7	1,210,255	8,728,211	13.9

Source: (52)



Source: (55)

PLATE 2.13

(Morone chrysops), crappie (Pomoxis annularis), yellow perch (Perca flavescens) and freshwater drum (Aplodinotus grunniens). Occasionally salmonid species and walleye (Stizostedion vitreum) are taken. Questionnaires completed by sport fishermen in June, 1975 (53) show that the preferred areas to fish are outside the immediate harbor area in the vicinity of the breakwater.

2.67 The Ohio Department of Natural Resources (Ohio DNR), conducts a continuing fish inventory program in the Ohio waters of Lake Erie. Methodology for capturing fish varies but the most common methods are trawling and gill nets. An analysis of the fish data collected in the Ohio waters of Lake Erie during the fall of 1970 and 1972 shows that some of the most common fishes of the Vermilion Harbor and dredge disposal area include gizzard shad (Dorosoma cepedianum), suckers, channel catfish, white bass, crappie, yellow perch and freshwater drum. This data is generally more representative of commercial methods since smaller fish (Cyprinids) are seldom taken by trawling or gill nets (54). In addition, the absence of most smaller species of fish in the open water dredged disposal area is to be expected since suitable habitat in the form of aquatic vegetation and other natural cover is not available.

2.68 A July, 1975 survey (49) found many of the same fish species collected by the Ohio DNR to be present in the Vermilion Harbor and river channel area. Minnow and sunfish species which prefer the harbor and river area habitat were also collected using seines and fry net tows. Those fish species collected or expected to occur in the Vermilion Harbor area are presented in Table 2.9.

2.69 Various other fish species (although not documented as existing in the Vermilion Harbor vicinity during the Ohio DNR fall sampling periods) (52), probably do exist at times because of seasonal migrations from the open lake area to shallow water spawning areas adjacent to and in the Vermilion River. The Ohio DNR and the U. S. Fish and Wildlife Service report species such as coho salmon (Oncorhynchus kisutch), chinook salmon (Oncorhynchus tschawytscha), walleye (Stizostedion vitreum) and smallmouth bass (Micropterus dolomieui) may be expected to migrate into the river during the spring, early summer and fall and will spawn provided the water quality and substrate are suitable. Copies of letters received from these agencies are included in Appendix A. Species such as channel catfish, bullheads and flathead catfish enter the river to spawn later in July and August (56).

2.70 Collections of adults and fry, discussions with local residents, and a cursory evaluation of the habitat present were made during July, 1975 (49). This survey indicates that there is a limited amount of habitat diversity in the project area. The main river is

TABLE 2.9

FISH SPECIES COLLECTED OR EXPECTED TO OCCUR
VERMILION HARBOR AREA, JUNE 1975

Common Name	Scientific Name	River/Harbor	Lake	Comments
Spotted gar	*Lepisoteus oculatus*	x^2	x^3	Endangered - no recent collection data from area
Alewife	*Alosa pseudoharengus*	x^0	x^1	Common - lake - forage
Gizzard shad	*Dorosoma cepedianum*	x^0	x^1	Extremely abundant - ubiquitous - forage
Mooneye	*Hiodon tergisus*	x^2	x^3	Endangered - lake - no recent records for area
Coho salmon	*Oncorhynchus kisutch*	x^0	x^1	Seasonally common - lake - sport
Chinook salmon	*Oncorhynchus tshawytscha*	x^0	x^2	Seasonally common - lake - sport
Rainbow trout	*Salmo gairdneri*	x^0		Uncommon - stream - sport
Rainbow smelt	*Osmerus mordax*	x^3	x^1	Seasonally abundant - lake - commercial forage
Quillback carpsucker	*Carpoides cyprinus cyprinus*	x^0	x^1	Rare - lake - commercial
White sucker	*Catostomus commersoni*	x^0	x^1	Abundant - ubiquitous - commercial
Lake chubsucker	*Erimyzon sucetta*	x^2	x^3	Endangered - rare - lake
Spotted sucker	*Minytrema melanops*	x^0		Rare - stream
Golden redhorse	*Moxostoma erythrurum*	x^0	x^1	Common - ubiquitous - commercial
Goldfish	*Carassius auratus*	x^0	x^1	Abundant - lake - commercial
Carp	*Cyprinus carpio*	x^0	x^1	Abundant - ubiquitous - commercial
Silver chub	*Hybopsis storeriana*	x^2	x^3	Endangered - lake - forage
Emerald shiner	*Notropis atherinoides*	x^0		Abundant - ubiquitous - forage
Striped shiner	*Notropis chrysocephalus*	x^0		Abundant - stream - forage
Spottail shiner	*Notropis hudsonius*	x^0		Uncommon - lake - forage
Pugnose minnow	*Notropis emiliae*	x^2		Endangered - rare - stream
Yellow bullhead	*Ictalurus natalis*	x^0	x^2	Common - ubiquitous - sport
Brown bullhead	*Ictalurus nebulosus*	x^0	x^1	Common - ubiquitous - sport
Channel catfish	*Ictalurus punctatus*	x^0	x^1	Common - ubiquitous - commercial - sport
Stonecat	*Noturus flavus*	x^3	x^1	Common - ubiquitous - forage
Flathead catfish	*Pylodictis olivaris*	x^2	x^3	Rare - lake
White bass	*Morone chrysops*	x^0	x^1	Abundant - ubiquitous - commercial
Rock bass	*Ambloplites rupestris*	x^0	x^1	Common - ubiquitous - sport

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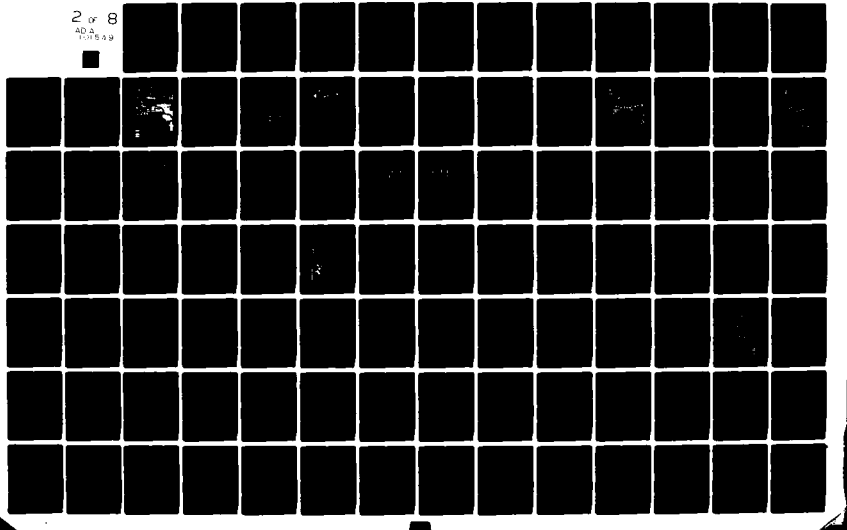


TABLE 2.9
(CONTINUED)

Common Name	Scientific Name	River/Harbor	Lake	Comments
Smallmouth bass	Micropterus dolomieui	$x^{0,1}$	$x^{1,2}$	Uncommon - ubiquitous - sport
Largemouth bass	Micropterus salmoides	x^{3}		Common - ubiquitous - sport
Bluegill	Lepomis macrochirus	x^{0}		Common - stream - sport
Pumpkinseed sunfish	Lepomis gibbosus	x^{0}		Abundant - ubiquitous - sport
White crappie	Pomoxis annularis	x^{0}	x^{1}	Common - ubiquitous - sport
Yellow perch	Perca flavescens	x^{0}	x^{1}	Abundant - ubiquitous - sport - commercial
Walleye	Stizostedion vitreum	x^{0}	x^{1}	Rare - lake - sport - commercial
Freshwater drum	Aplodinotus grunniens	x^{0}	x^{1}	Abundant - lake - sport - commercial

LEGEND:

x^{0} = Collected in harbor area July 1975.

x^{1} = Collected by Ohio Dept. of Natural Resources 1970 and 1972.

x^{2} = Reported to exist in area by Ohio Dept. of Natural Resources 1975.

x^{3} = No collection data available but expected to occur in area due to wandering.

Extremely abundant = Present in huge concentrations; utilizing proper technique, they are normally extremely easy to collect and comprise a major percentage of most collections.

Abundant = Present in fairly large concentrations; occurring in most collections, sometimes in considerable numbers.

Common = Sufficiently numerous to be present, at least in some numbers, in almost every collection.

Uncommon = Usually present in small numbers, at least a few individuals in some collections.

Rare = Present in only a very few collections and then represented by only one or a few individuals.

Source: (57) (58) (56) (52) (61) (59) (60) (49) (62)

channeled and bounded by vertical bulkheads of wood and steel which is habitat that can support very little spawning of most game species. The most valuable habitat present is that of the rock-lined channel, the breakwater and the sand beaches east and west of the harbor entrance. The protected, quieter, waters of the lagoons offer habitat for some species and are utilized as a nursery area.

2.71 Collections of fry at four sites in the harbor and river vicinity were made during July, 1975 by towing a fry net behind an outboard motorboat (49). One site (Site 5) was seined for collection purposes. Collections were adjusted to indicate the number of fry of each species per one minute of tow. Collection sites and the direction of tow are indicated in Plate 2.12; the results of this survey are presented in Table 2.10.

2.72 Species diversity and relative abundance of fishes change seasonally along the shoreline near the Vermilion River area due to the seasonal use of this area. Diversity, therefore, tends to be the highest during spring spawning periods and is lowest in late summer (July through August). The species composition in the harbor and marina areas does not vary significantly during the year. Sunfish and minnow species may be collected in these areas during all seasons of the year (45). The river channel appears to be the area least utilized for fishing purposes (49).

Quality of the Natural Environment

2.73 The quality of the natural environment is monitored and regulated with regard to air, water, sediment and rare and endangered species. Federal, state, and local agencies conduct the monitoring and administer maintenance or improvement programs. As a general directive, the agencies implement programs to prevent any deterioration in environmental quality, and in most cases to improve environmental quality. Knowledge of the natural environmental quality allows an evaluation of the potential impacts resulting from the project.

2.74 Federal air quality standards summarized in Table 2.11 are the same as those for the State of Ohio (63). The nearest air quality monitoring stations to Vermilion are operated by the Ohio EPA in and near Lorain, OH, approximately 10 miles east of Vermilion. Although no quantitative data is available for Vermilion at this time, it is expected that concentrations of most pollutants would be lower in Vermilion than in Lorain due to: the industrialized nature of Lorain; its distance from Vermilion; and the lack of heavy industrial air pollutant sources in Vermilion. As shown in Table 2.11, of the seven stations monitoring total suspended particulates in Lorain and Avon Lake, one station exceeded the primary annual geometric mean

TABLE 2.10

FISH FRY COLLECTED BY CEBG AT VERMILION HARBOR - JULY 3, 1975

Station*	Species	Fry per minute	
1	Fish eggs	12.0	
	Emerald shiner	2.0	= 14.8
	Eastern gizzard shad	0.4	
	Unidentified	0.4	
2	Emerald shiner	0.8	
	Eastern gizzard shad	107.6	= 110.0
	Unidentified	0.8	
3	Alewife	40.0	
	Eastern gizzard shad	702.0	= 742.8
	Unidentified	0.8	
4	Alewife	5.3	
	Eastern gizzard shad	445.4	= 458.7
	Unidentified	8.0	
5 (fry seine used)	Emerald shiner	Several thousand	
	Spottail shiner	Few hundred	

*See Plate 2.12 for site location

Source: (49)

TABLE 2.11
AIR QUALITY DATA, 1974

Federal Air Quality Standards* (micrograms per cubic meter)

Primary Standards	SO_2	Particulate Matter
Annual (arith. mean)	80	
(geom. mean)		75
24-hr. max.	365	260
Secondary Standards (where different from primary)		
Annual (arith. mean)	60	
(geom. mean)		60
24-hr. max.	260	150
3-hr. max.	1300	

*Published by USEPA, April 30, 1971

Source: (63) (64)

Total Suspended Particulates (μg/cubic meter)

Station	No. of Observations	No. of Daily Obs. Exceeding 24-hour Std.		Highest 24-hour Values		Annual Geom. Mean
		Sec.	Primary	1st	2nd	
216 Miller Avon Lake	48	1	1	261	129	66
31760 Walker Rd. Avon Lake	44	0	0	94	80	52
20 Moore Rd. Avon Lake	47	0	0	108	94	51
Palm Ave. and 31st St. Lorain	61	0	0	129	113	74
G St. Lorain	54	2	1	274	155	79
329 10th St. Lorain	10	0	0	114	72	65
2270 E. 42nd St. Lorain	59	1	0	168	102	68

Sulfur Dioxide, (μg/cubic meter)

Station	No. of Observations	Maximum 24-hour	Annual Arith. Mean
200 W. Erie Lorain	41	46.4	18.4
300 Longfellow Park Lorain	57	38.6	13.0
Palm Ave. and 31st St. Lorain	18	34.0	9.0
329 10th St. Lorain	7	28.0	4.0

standard, and 24-hour samples exceeded primary or secondary standards only on rare occasions. As indicated, the four stations monitoring sulfur dioxide are all well within standards. Although data quantifying concentrations of oxidants, hydrocarbons, or nitrogen oxides is not available, it is suspected that there would be no air pollution problems concerning these constituents (63).

2.75 Water quality standards are prescribed by the Ohio EPA and are variable within the state's waters. Different standards are applicable to the Vermilion River, the near-shore lake waters of the harbor, and the off-shore lake waters at the open-lake disposal area. Near-shore and off-shore standards are presented in Table 2.12, together with water quality data at the Vermilion water intake before treatment. No data characterizing water quality at the open-lake disposal area is available. Water quality at the intake is partially dependent on weather conditions at the mouth of the harbor. The combination of heavy rains flushing sediment and debris into the river and east winds carrying river flows out of the harbor toward the water intake pipe can cause isolated incidents of poor water quality characterized by high turbidity (65). Water quality samples collected in July, 1975 at sites in the harbor entrance channel and just east of the east pier indicate abundant dissolved oxygen concentrations in water at these locations (49). Water quality data from samples collected 600 yards upstream of the wastewater treatment plant on the Vermilion River is presented in Table 2.13, together with standards applicable to the river. Water quality violations may occur in this area during critical low flow conditions (66). At the treatment plant, BOD concentrations are very high on occasion and thus may cause considerable oxygen depletion at low river flow. In addition, high concentrations of ammonia and residual chlorine may cause potential toxicity problems to stream organisms including migratory fish (66). A summary of effluent characteristics at the treatment plant is presented in Table 2.14.

2.76 The lack of sewer lines in southeast sections of Vermilion may have a detrimental effect on the area's groundwater quality. This is especially true of the area along the east bank of the Vermilion River, north of Routes 2 and 6 for approximately 4 miles, where there is a high density population using septic tank disposal which has the potential for causing poor well water in the area (70).

2.77 The Ohio EPA has made recommendations as to the maximum allowable total coliform bacteria content of water, for both recreational and potable water uses (71). For recreational uses (swimming, boating, skiing, etc.), the number of total coliforms per 100 ml is not to exceed: 1,000 as a monthly geometric average; 1,000 in 20 percent of samples analyzed; or 2,400 on any day. For public water supplies,

TABLE 2.12
WATER QUALITY STANDARDS AND OBSERVATIONS AT WATER INTAKE LOCATION
VERMILION, 1975

Parameter	Units	Number of Observations	Mean	Standard, Maximum Daily Near-Shore	Standard, Maximum Daily Off-Shore	Maximum Observation	Period of Record Begin	Period of Record End
Chlorides	mg/l	272	24.24	30	30	240	7-5-68	9-27-74
Hardness ($CaCO_3$)	mg/l	2159	130.48	130	130	203	7-1-68	9-30-74
Sulfates	mg/l	286	34.38	40	40	280	7-21-68	9-26-74
pH	S.U.	11	7.94	7.0-8.8	6.7-8.5	7.8-8.0	4-17-74	9-1-74
Total Phosphorus	mg/l	24	0.057	0.025	0.015	0.15	1-5-72	12-11-72
Total Nitrogen	mg/l	18	0.61	0.30	0.30	1.30	1-8-73	12-18-73
Dissolved Solids	µg/l	None	—	*200*	*180*	—	—	—
Arsenic	µg/l	9	9.5	5	1	10.0	5-17-71	12-11-72
Barium	µg/l	27	230.30	1	1	1300	7-17-72	12-18-73
Cadmium	µg/l	20	0.5	5	0.5	10.0	8-5-68	12-2-71
Chromium	µg/l	2	0	50	3	*0*	12-9-70	6-1-72
Copper	µg/l	2	0	10	5	0	12-26-73	1-8-74
Iron	µg/l	9	17.78	300	300	100.0	12-9-70	1-8-74
Lead	µg/l	2	0	50	50	0	12-26-73	1-8-74
Manganese	µg/l	10	5	50	50	20	12-9-70	1-8-74
Mercury	µg/l	28	.35	0.3	0.1	1.8	6-17-71	12-18-73
Nickel	µg/l	2	0	50	50	0	12-26-73	1-8-74
Silver	µg/l	2	0	1.0	0.2	0	12-26-73	1-8-74
Zinc	µg/l	2	0	50	15	0	12-26-73	1-8-74
COD	mg/l	68	13.56	12	7	50.1	8-5-68	12-18-73
Cyanide	µg/l	3	0	0.5	0.5	0	11-1-71	12-2-71
Fluoride (dis.)	mg/l	18	0.18	0.15	0.15	0.96	6-25-68	12-11-72
Oil and Grease	mg/l	None	—	0.05	0.05	—	—	—
Phenols	µg/l	None	—	0.5	0.5	—	—	—

Source: (67) (68)

TABLE 2.13
WATER QUALITY STANDARDS AND OBSERVATIONS
VERMILION RIVER, JANUARY - MAY, 1975
(600 YDS. ABOVE THE VERMILION WASTEWATER TREATMENT PLANT)

Parameter	Units	No. of Observations	Max.	Min.	Mean	Standard, Maximum Allowable
Suspended Solids	mg/l	21	482	2	84	-
Dissolved Oxygen	mg/l	21	13.8	6	11.4	4.0 (minimum)
BOD_5	mg/l	19	9.6	2	4.5	-
pH	-	21	7.5	7.1	7.2	6.0-9.0
Fecal Coliform	colonies per 100 ml	19	490	4	188	400 or more in less 10%
Oil and grease	mg/l	None	-	-	-	5
Mercury	µg/l	None	-	-	-	0.5
Lead	µg/l	None	-	-	-	40
Zinc	µg/l	None	-	-	-	500
Total phosphorous	mg/l	None	-	-	-	1
Phenols	µg/l	None	-	-	-	10
Arsenic	µg/l	None	-	-	-	50
Cadmium	µg/l	None	-	-	-	5
Chromium	µg/l	None	-	-	-	300

Source: (67)

TABLE 2.14
EFFLUENT QUALITY SUMMARY
VERMILION SEWAGE TREATMENT PLANT, 1974

Flow (Millions of Gallons)		Suspended Solids, Avg/day, (mg/l)		5-Day BOD, Avg.		Dissolved Oxygen, mg/l	Thousands of Gallons of Sludge Hauled
Per Month	Per Day	Raw	Final	Raw	Final	Final	Per Month
28.364	0.929	166	17	208	33	4.8	75

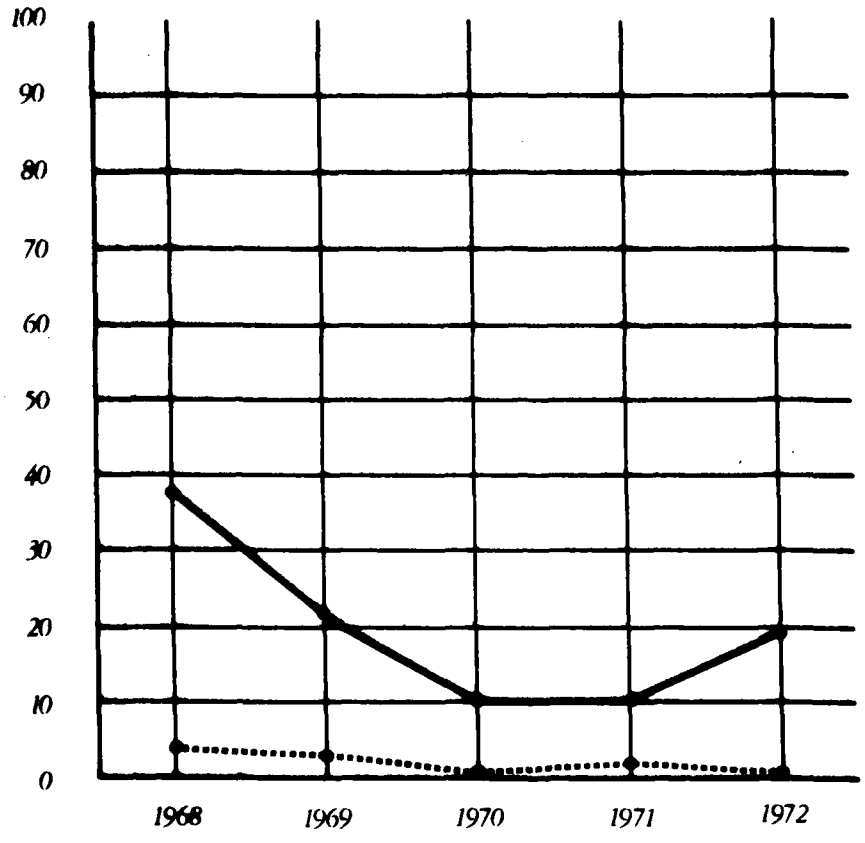
Source: (57)

coliforms should not exceed: 5,000 as a monthly geometric average; 5,000 in 20 percent of the samples analyzed; or 20,000 in 5 percent of the samples analyzed.

2.78 As illustrated in Plate 2.14, total coliform counts have changed since 1968. This water quality improvement coincides with the beginning of operation of the sewage treatment plant in 1968. Even though levels have remained within criteria limits, coliform counts have been reduced by 50 percent. Violations of the daily count criteria limits have remained well under the 20 percent limit for public water supply usage. Since 1968, violations of the recreational standard decreased from 37 percent to 10 percent from 1968 to 1971, then increased to 19 percent in 1972. During 1972, 14 percent of the readings violated the daily maximum of 2,400. The majority of the high values were observed during October, November and December of 1972 (71). A limited amount of data indicates that coliform counts have continued to decrease to the present time. Thirty five samples collected at five beaches in or adjacent to Vermilion in July and August of 1974 and June of 1975 were all well within all recreational and water supply standards (70). However, there have been several isolated periods in recent years during stormy weather conditions in early summer months when the Erie County Health Department has temporarily suspended swimming activities at the city beach due to high coliform counts (130). Total phytoplankton counts of samples taken at the Vermilion treatment plant dropped steadily every year from 1968 to 1972 (71).

2.79 Chemical constituents present in sediment samples taken in the Vermilion Harbor on April 9, 1975 are listed in Table 2.15. The locations from which these samples were taken are shown on Plate 1.4. The data indicates that sediment quality in the harbor area is highly variable and progressively poorer upstream of the mouth of the Vermilion River. Sediments collected in the lake and within the last 400 feet of the river entrance channel are primarily composed of sand. Concentrations of zinc at this point exceed the USEPA limitations slightly, but according to the USEPA, this sediment is suitable for unrestricted disposal. Sediment samples collected within the river entrance channel 500 to 1,400 feet from the mouth of the channel are composed of silt, and in some cases gravel, and have high concentrations of organics. This sediment was deemed suitable for restricted open-lake disposal by the USEPA. Sediment samples collected in the river 1,400 feet or more from the mouth are primarily silts, and have high concentrations of organics, zinc, ammonia, phosphorus and iron. According to the USEPA, these sediments are not suitable for open-lake disposal. The 1975 Vermilion Harbor sediment quality report from the USEPA is included in Appendix A, Letters of Coordination.

2.80 The Smithsonian Institution's 1975 report (72) lists 15 plants as threatened or endangered in the State of Ohio. However, none of these species are known to occur in the Vermilion Harbor area. The threatened Indiana bat (Myotis sodalis) is listed as endangered by the



% violation of 1,000 coliforms per 100 ml for recreation usage

% violation of 5,000 coliforms per 100 ml for public water supply usage

VERMILION HARBOR, OHIO

CHANGES IN COLIFORM COUNTS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Source: (71)

PLATE 2.14

TABLE 2.15
BULK SEDIMENT RESULTS
VERMILION HARBOR, APRIL 9, 1975*[1]

Sample Site

Parameter	Standard	VER-75-1	VER-75-2	VER-75-3	VER-75-4	VER-75-5	VER-75-6	VER-75-7	VER-75-8
Total Solids	N.S.	46.0	45.0	44.6	60.0	61.8	37.6	43.5	56.9
Volatile Solids	6%	6.5	5.7	4.0	4.7	3.3	7.5	7.4	4.9
Chem. Oxy. Demand	60,000	72000	71000	48000	43000	36000	80000	76000	55000
T. Kjel. Nitrogen	1000	1700	1800	1000	1100	740	2200	2400	1400
Oil-Grease	1500	< 500	700	< 500	< 200	400	700	900	< 500
Mercury	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead	50	29	27	29	22	16	28	34	22
Zinc	50	125	150	135	110	120	165	240	140
T. Phosphorus	N.S.	520	640	440	380	370	860	900	490
Ammonia Nitrogen	N.S.	87	170	46	90	60	200	350	120
Cyanide	N.S.	< 1.0	--	--	--	< 1.0	--	--	--
Phenols	N.S.	< 2	--	--	--	2	--	--	--
Manganese	N.S.	340	440	540	430	390	390	450	400
Nickel	N.S.	39	41	46	37	32	45	68	41
Arsenic	N.S.	15	17	16	12	11	19	16	12
Barium	N.S.	90	110	130	100	71	110	150	120
Cadmium	N.S.	< 1	< 1	2.2	< 1	< 1	< 1	2.3	< 1
Chromium	N.S.	28	41	25	27	27	62	52	34
Magnesium	N.S.	4600	6800	7900	6700	7900	5300	5500	4700
Copper	N.S.	21	30	31	23	21	29	38	21
Iron	N.S.	23,900	27,700	26,200	20,400	19,600	31,100	38,800	24,200

*All values mg/kg dry weight unless otherwise noted
NS denotes No Standard

[1]See Plate 1.3 for sampling sites

Source: (44)

U.S. Department of Interior (76) and by the State of Ohio DNR (75). During fall, this bat moves into large caves which it uses for hibernating purposes, preferring the cooler parts under low, over-hanging ledges where there is a draft and running water. In the spring it moves to smaller caves. Little is known about its summer habits; however, presumably during this season it uses various retreats other than caves (31)(73).

2.81 Five rare and endangered birds are listed by the State of Ohio as occurring in the project area: the sharp-shinned hawk (Accipiter striatus velox); the common tern (Sterna h. hirundo); the upland sandpiper (Bartramia longicauda); the American peregrine falcon (Falco peregrinus anatum); and the bald eagle (Agliaeetus leucocephalus). Of these, the latter two are also found on the Federal list. The peregrine falcon is listed by Ohio as a very rare migrant. It has been extirpated as a breeding bird east of the Rocky Mountains in the United States, but it ranges throughout the State of Ohio as a migrant (74). Lack of suitable habitat has contributed to the bald eagle's extirpation as a breeding bird in the project area; however, it is seen every year in the project area (56) although its numbers are generally decreasing in North America (74). As a migrant, it ranges as far north as southeastern Canada. The bald eagle's main habitat is near water, especially lakes, larger rivers and the seas, due to its dependence on fish for food.

2.82 The sharp-shinned hawk (Accipiter striatus velox) is reportedly found in the area; however, nesting has not been documented (56). Raptors are unprolific breeders; one or two unsuccessful nesting periods can cause significant change in a population's status. The common tern (Sterna h. hirundo) is listed as occurring in the harbor (33). It nests near sparse, low vegetation on the open sandy or gravelly beaches of islands. The upland sandpiper (Bartramia longicauda) nests and feeds in dense grass and is state listed as very rarely occuring in the project area (56). No rare or endangered herptiles are found in the project area (56). Ten species of fish listed as endangered by the State of Ohio, may be present in the estuary portion of the Vermilion River or the open-lake dump zone. These include the silver lamprey (Ichthyomyzon unicuspis), lake sturgeon (Acipenser fulvescens), spotted gar (Lepisosteus oculatus), mooneye (Hiodon tergisus), cisco (Coregonus artedii), muskellunge (Esox m. masquinongy), lake chubsucker (Erimyzon sucetta), silver chub (Hybopsis storeriana), pugnose minnow (Notropis emiliae), and burbot (Lota lota) (56). Endangered species in the Vermilion Harbor area are listed in Table 2.16.

Existing Human Environment

Land and Water Uses

2.83 Land and water use can be defined as a two-fold framework for visualizing a particular area: first, in terms of the activity

TABLE 2.16

ENDANGERED SPECIES - VERMILION HARBOR

Common Name	Scientific Name	Status	Agency	Range	Habitat	Notes
Indiana bat	Myotis sodalis	Endangered	1,2	U.S. (midwest, east)	Caves, open areas**	Possible transient in project area, no caves in project area (28)(30)
Sharp-shinned hawk*	Accipiter striatus velox	Endangered	1	U.S., Canada	Woodlands	Possible transient in project area, no nesting (30)
Common tern*	Sterna h. hirundo	Endangered	1	U.S. (midwest, east) Canada	Lakes, coastal areas**	Occurs in harbor (33)
Upland sandpiper	Bartramia longicauda	Endangered	1	U.S. (east, midwest)	Grassland	Rare in project area (30)
American peregrine falcon	Falco peregrinus anatum	Endangered	1,2	U.S., Canada	Woodlands	Rare migrant (30)
Bald eagle*	Haliaeetus leucocephalus	Endangered	1,2	U.S., Canada	Woodlands,near water	Transient, no nesting (30)
Silver lamprey	Ichthyomyzon unicuspis	Endangered	1	U.S. (midwest, east)	Lakes**	Commercially collected in area, abundance unknown (61)
Lake sturgeon	Acipenser fulvescens	Endangered	1	U.S., Canada (northeast)	Lakes**	No recent records from area, possible transient (61)
Spotted gar	Lepisosteus oculatus	Endangered	1	U.S. (east, midwest)	River, streams**	Possible transient (30)
Mooneye	Hiodon tergisus	Endangered	1	U.S. (northeast)	Ubiquitous**	Possible transient (56)
Cisco	Coregonus artedii	Endangered	1,2	U.S. (northeast), Canada	Lakes**	No recent records in area, possible transient (61)
Muskellunge	Esox m. masquinongy	Endangered	1	U.S., Canada (east)	Lakes, streams**	No recent records in area, possible transient (61)
Lake chubsucker	Erimyzon sucetta	Endangered	1	U.S. (east)	Lakes**	Possible transient (56)
Silver chub	Hybopsis storeriana	Endangered	1	U.S. (midwest, east)	Lakes**	Possible transient (56)
Pugnose minnow	Notropis emiliae	Endangered	1	U.S. (midwest, east)	Stream**	Possible transient (56)
Burbot	Lota lota	Endangered	1	U.S., Canada	Lakes**	No recent records in area, possible transient (61)

1. State of Ohio (75)
2. U.S. Dept. of Interior (76)

* Sighted or collected in project area or open lake site (30)
** Habitat occurs in project area or open lake site

Source: (30)(56)(33)(75)(76)(61)(74)(28)

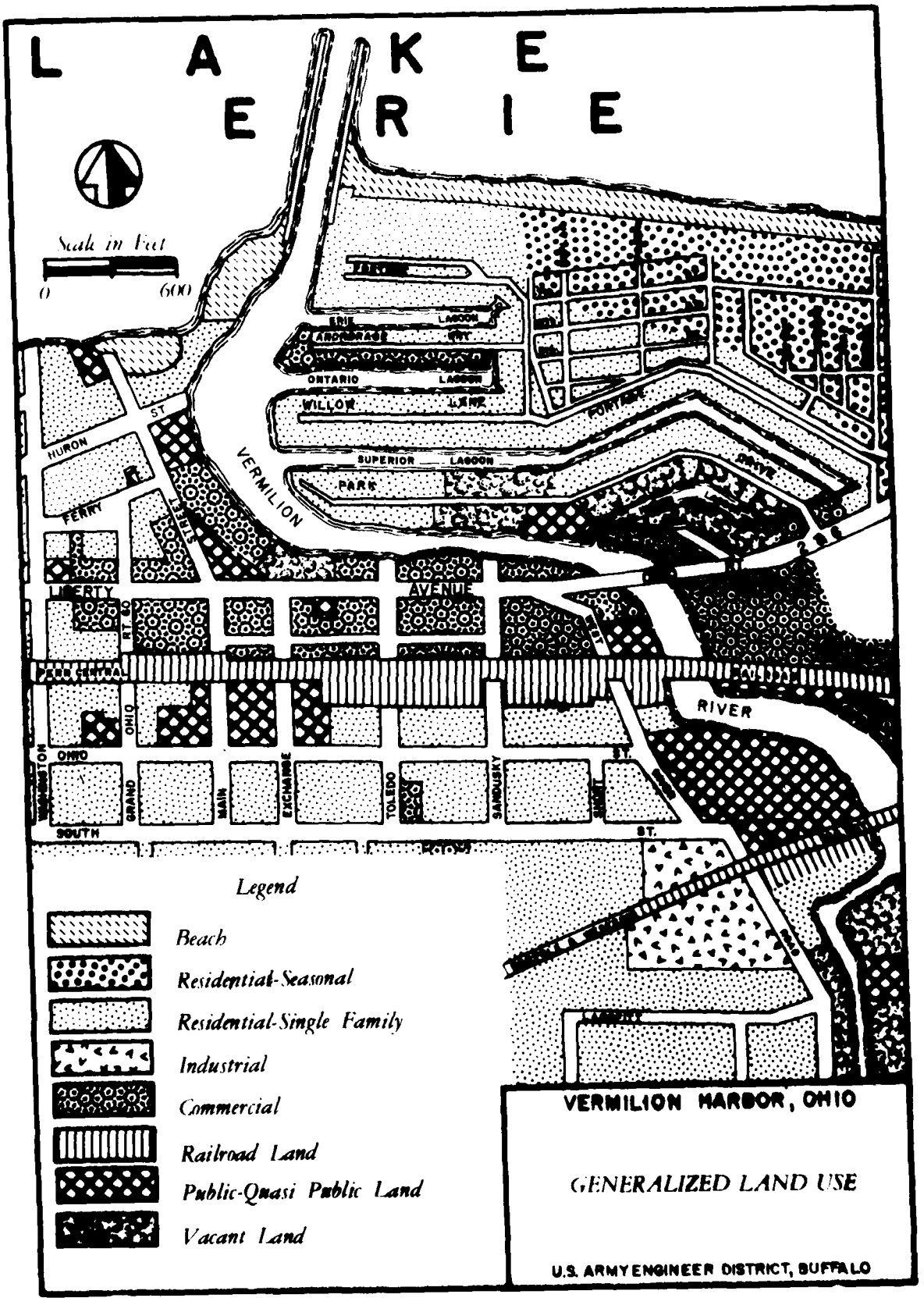
patterns of people in a given setting; and second, in terms of physical facilities or improvements to the land (or water area) which are made to accommodate these activities. Consideration of land and water use patterns is helpful in determining the type and magnitude of impacts resulting from project activities.

2.84 Land use in the harbor area is illustrated in Plate 2.15. Residential land use is found on both sides of the Vermilion River in the harbor vicinity. On the west bank, residential properties occupy the area north of the Main Street and Ferry Street intersection. On the east bank, a residential development has utilized four man-made lagoons (Erie, Ontario, Superior, and Huron) to provide direct water access to each tract. The harbor area is accessible from local streets in Vermilion. Municipal boat launching facilities are maintained at Huron Street, Toledo Street and Sandusky Street. Vehicular parking is available at small lots associated with the marina facilities and on city streets. The Vermilion River, north of the Liberty Avenue bridge, and the lake entrance navigation channel serve as waterborne routes of transit and recreation areas for small boats in the harbor.

2.85 Approximately half of the area near Vermilion Harbor is devoted to marine-related commercial enterprises. The Vermilion Yacht Club is located on the east side of the Vermilion River between the Erie and Ontario lagoons immediately inside the harbor entrance. Upstream where the river bends to the east is the Kishman Fish Company, located between the river and Main Street, north of Liberty Avenue. Further east on Liberty Avenue at the Toledo Street intersection is the Vermilion Boat Club. Ryser's Boat Livery has facilities on either side of Sandusky Street north of Liberty Avenue west of the Liberty Avenue bridge and adjacent to the river is Parson's Marine and Industrial Service. Across the river is the McGarvey Restaurant, and behind the restaurant adjacent to the Huron lagoon is Vermilion Power Boats Inc. Immediately upstream from the Liberty Avenue bridge on the east bank is the Snell Fish Company.

2.86 Most of the land in the City of Vermilion beyond the harbor area is agricultural or undeveloped. The city's incorporated area contains 12,602 acres, with 80.4 percent of this total being undeveloped agricultural lands (78). Residential land occupies 4.7 percent of the city's area, and is concentrated in two locations: the area immediately adjacent to the harbor (east, south and west of the harbor); and the area two miles east of the harbor (formerly known as Vermilion-on-the-Lake). The remaining land uses in the city are distributed as follows: commercial uses, 0.5 percent; manufacturing, 0.1 percent; transportation, 3.8 percent; utilities, 0.1 percent; public uses, 1.5 percent; and quasi-public open space, 8.9 percent.

2.87 Water uses in the vicinity of Vermilion Harbor include recreational boating, fishing (sport and commercial), swimming,



Source: (77)

PLATE 2.15

transportation (private and commercial), public drinking water, waste disposal, waterskiing, scuba diving, canoeing, ice skating, ice hockey, snowmobiling and sightseeing. Table 2.17 indicates the location and time of occurrence of each water use activity.

Transportation

2.88 A comprehensive view of Vermilion's regional and local transportation networks as well as its transportation facilities indicates the relative importance of transportation modes within this city and its accessability to other cities. Local water traffic counts relate the harbor's importance to commercial and recreational activities; whereas vehicular traffic counts serve to indicate the city's prime-exposure areas due to their proximity to commercial or recreational facilities.

2.89 Commercial fishermen and recreational sailors, boaters, and fishermen occasionally use the open-lake disposal area, but, according to the Chairman of the Vermilion Port Authority, the disposal area does not experience a high volume of boat traffic and is not located within any commercial shipping lanes (17). Pedestrian traffic along the harbor area occurs on sidewalks along Main Street in the vicinity of the water plant, the L'auberge du Port Restaurant, and the Kishman Fish Company. Pedestrians have access to the harbor along Liberty Avenue at the foot of Sandusky Street. The detached breakwall is accessible only by boat. Pedestrian access to both the east and west piers is blocked by private property.

2.90 The regional transportation network for the Vermilion area is shown in Plate 2.16. As illustrated, U. S. Route 6, Ohio Route 2 and the Ohio Turnpike (I-80-90) are the major east-west routes. Primary north-south routes in the vicinity of Vermilion include S.R. 58 and S.R. 60. As shown in Plate 2.15 (which also illustrates the local transportation network for the harbor vicinity), Liberty Avenue (U.S. Route 2 and 6) is the major east-west route through Vermilion. Traffic counts at various points in Vermilion in 1968 are presented in Table 2.18.

2.91 Additional transportation facilities serving the Vermilion area include: two rail lines (the Penn Central Transportation Company and the Norfolk and Western Railway); the Cleveland Hopkins International Airport (35 miles east of Vermilion) and the Lorain County Airport (10 miles southeast) which is open for commercial flights only (87); and the Greyhound Bus Line.

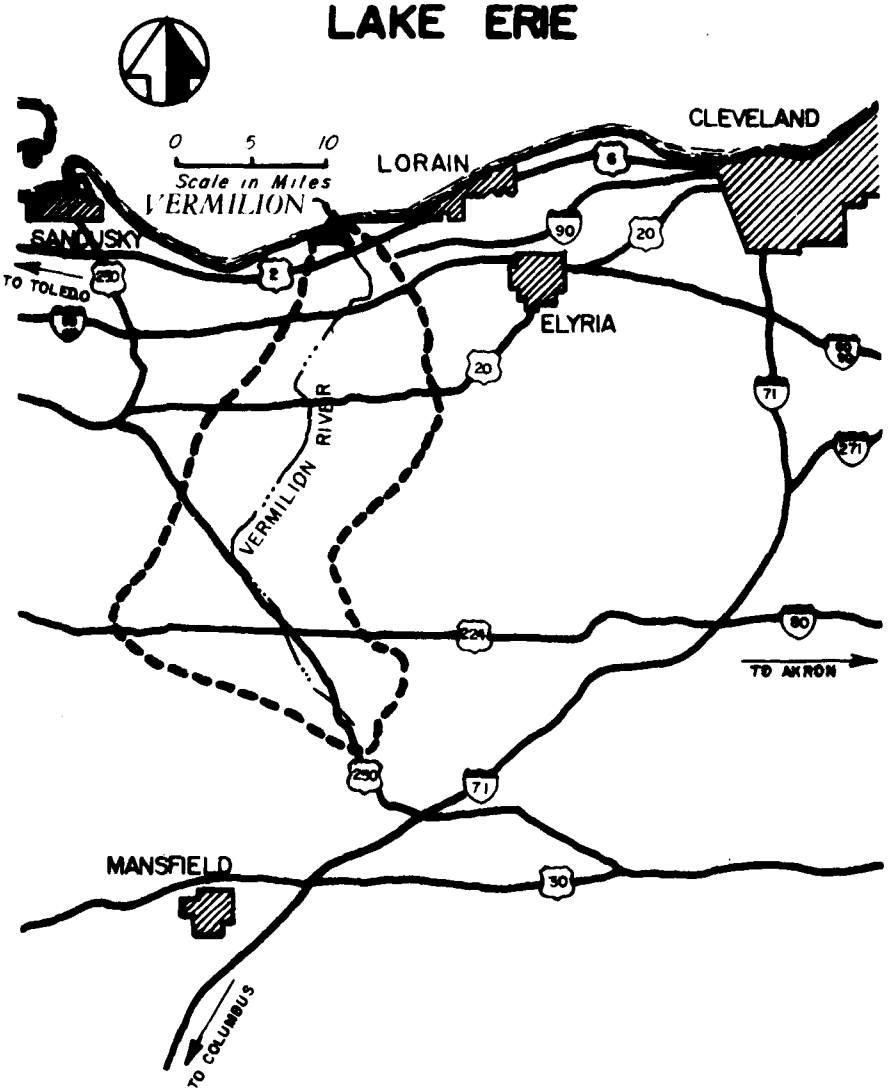
2.92 Vermilion Harbor is an important component in the transportation network. The 12 marinas and boat clubs in the Vermilion area are either located on the harbor channel or have direct access to it via

TABLE 2.17
WATER USE
VERMILION HARBOR

Activity	Portion of the Harbor Used in the Course of the Activity: Breakwater	Piers	Lagoons	River Channel	Lake Approach Channel	Open Lake	Beaches	Months During Which Prime Use Occurs	Sources of Information
1. Sailing			●	●	●	●		June-September	(17) (80)
2. Recreational Boating			●	●	●	●		June-September	(80) (81)
3. Recreational Fishing	●*	●*	●	●	●	●	●	June-October	(81) (82) (83)
4. Commercial Fishing Operations				●	●	●		March-December	(84)
5. Swimming, Sunbathing	●*	●*	●	●			●	June-September	(85)
6. Scuba Diving	●*	●*	●	●		●	●	June-September	(80) (81)
7. Ice Skating, Hockey			●					December-March	(80)
8. Snowmobiling				●				December-March	(80)
9. Walking		●*					●	All Year	(17)
10. Boat Dockage and Launch			●	●				April-November	(81) (85)
11. Water Skiing						●		June-September	(80) (81)
12. Water Intake						●		All Year	(86)
13. Army Corps Maintenance of Harbor Facilities	●	●		●	●	●		June-September	(01)
14. Wastewater Disposal				●				All Year	(69)
15. Sightseeing, Photography		●*	●	●	●	●	●	All Year	(28)
16. Canoeing			●	●				June-September	(17)

*Activity only occasional due to limited access

Source: (01)(17)(28)(69)(86)(80)(81)(85)(84)(82)(83)



VERMILION HARBOR, OHIO

REGIONAL TRANSPORTATION NETWORK

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Source: (79)

PLATE 2.16

TABLE 2.18

TRAFFIC COUNTS[1]
VERMILION AREA, 1970

Location	Day of Week	May	Aug.	Sept.
U.S. 6-S.R. 2(east and west)				
at Main St.	Wednesday	20,455		
at Highbridge Road	Friday		31,056	
at Sunnyside Road	Friday (10 a.m. - 1 p.m.) Monday (1 p.m. - 6 p.m.)		32,504	
at Elberta Road	Thursday		33,688	
at Washington St. (light rain)	Wednesday			16,432
at River Street	Tuesday			32,730
North-South Arterials				
at U.S. 6 - S.R. 2				
Main Street		4,166		
Highbridge Road			465	
Sunnyside Road			637	
Elberta Road			490	
Washington Street				1,033
River Street				3,468
East-West Arterials				
at S.R. 60				
South Street (west)				1,911
South Street (east)				3,541
Others				
S.R. 60 (south) at South St.				3,745

(1) Traffic counts are for a typical 24-hour day except where noted; figures include all types of vehicles.

Source: (78)

man-made lagoons. As shown in Table 2.19, recreational transportation has increased steadily over the last 35 years. A boat traffic count taken the hour preceding dusk at a weekday evening during June, 1975 showed 146 boats leaving and entering Vermilion Harbor (28).

2.93 Commercial transportation in Vermilion Harbor is restricted almost completely to that which is generated by the fishing industry. As shown in Table 2.20, trips made by commercial fishing vessels decreased with the amount of fish being caught in the late 1960's and early 1970's. However, 1975 figures, although incomplete, show a marked increase in total tonnage caught (84). From 15 March to 10 December 11 commercial fishing boats operate with Vermilion as a home base. Five boats are operated by the Kishman Fish Company and six are operated by independent fishermen. They operate in areas both east and west of Vermilion, from one-half mile to several miles off-shore, and on occasion, frequent the lake disposal area (84). No passenger service is provided in the Vermilion Harbor area by commercial vessels.

Structures and Utilities

2.94 An evaluation of the ages, condition, types of occupancies and the monetary values of structures bordering the immediate project area can be a valuable tool both in assessing the harbor's current usefulness as a recreational and commercial asset, and in determining the long-term effects the project may have on structures adjacent to the project area. It is also essential that public utilities in the area, such as water purification plants, wastewater treatment plants and electrical operation facilities, be located and their operations be discussed in order to accurately evaluate the degree to which their normal operation will be influenced by the proposed project.

2.95 The locations of the various commercial and recreational structures adjoining the harbor area are illustrated in Plate 2.17. Structures bordering the project area along the Vermilion River's west bank include: six private residences near the Lake Erie shore; L'auberge du Port restaurant; several structures belonging to the Kishman Fish Company; the Riverview Nursing Home; the Vermilion Boat Club; Moes Marine Service; Ryser's Boat Livery; and Parson's Marine and Industrial Service. The U.S. Route 6 bridge is a man-made structure crossing the Vermilion River, with a clearance for river traffic of 8.5 to 9 feet. McGarvey's Boat Drive-In Restaurant is located immediately across from Parson's on the Vermilion River's east bank. Due to their prime location on the harbor, with potential for significant growth, land lots in the harbor area have high values.

2.96 Immediately east of the Vermilion River and south of Lake Erie is a series of four man-made lagoons (Erie, Ontario, Superior and

TABLE 2.19
ESTIMATED USE BY PLEASURE CRAFT
VERMILION HARBOR, 1941-1971

	Local Based Craft		Visiting Craft		Total	
Year	Number of Vessels	Trips	Number of Vessels	Trips	Number of Vessels	Trips
1941	177	4,836	510	1,640	687	6,476
1948	375	14,500	1,060	4,500	1,435	19,000
1950	481	18,800	1,385	6,070	1,866	24,870
1955	660	25,850	1,910	8,910	2,570	34,860
1965	1,750	52,500	5,100	24,350	6,850	76,850
1969	2,400	72,000	7,350	35,760	9,750	107,760
1971	2,650	-	8,100	-	10,750	-

Source: (17)

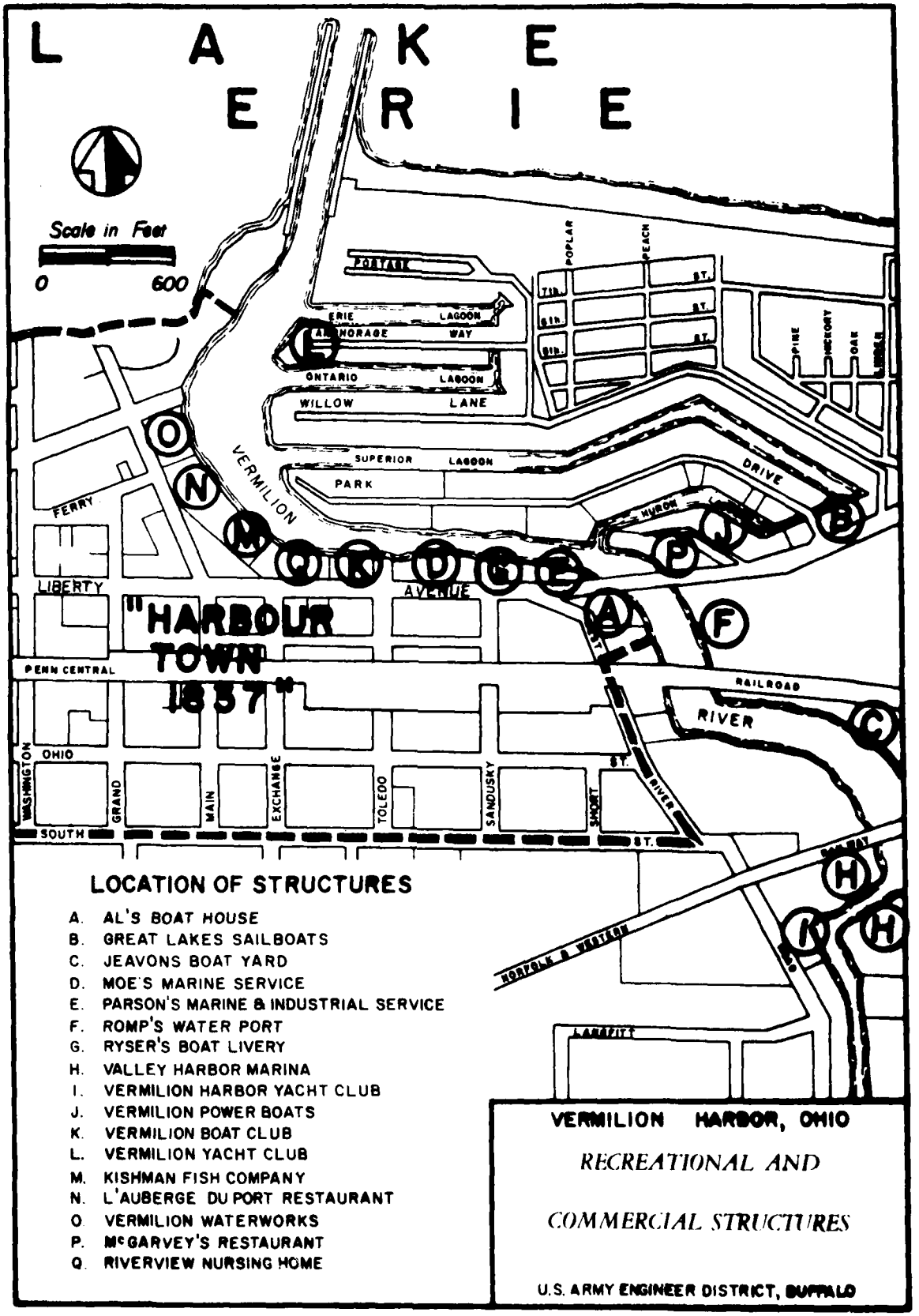
TABLE 2.20
COMMERCIAL TRANSPORTATION
VERMILION HARBOR, 1964-1975

Year	Commodities Transported	Tons	Vessel Trips
1964	Fresh fish and products	530	1708
1965	Fresh fish and products	498	656
1966	Fresh fish and products	408	1330
1967	Fresh fish and products	442	1016
1968	N.R.		
1969	Fresh fish	389	682
1970	Fresh fish	369	706
1971	Fresh fish	409	790
1972	Fresh fish	221	700
1973	Fresh fish	262	826
1975*	Fresh fish	425	N.R.

*As of 20 June 1975

N.R. - Not reported

Source: (84) (88)



Source: (79)

PLATE 2.17

Huron), constructed where there was once a marsh. The Vermilion Yacht Club is located at the end of Anchorage Way between Erie and Ontario lagoons. Vermilion Power Boats and Great Lakes Sailboats are located on Huron Lagoon adjacent to West Liberty Avenue (U.S. 6), east of the bridge. Several other marinas are located adjacent to the river and man-made lagoons immediately outside the project area.

2.97 Bordering these lagoons are about 150 year-round, single family residences of Cape Cod architecture, with 1975 property values ranging from approximately $40,000 to $150,000. All homes except six have boat slips adjoining their property (80). Linwood Park, immediately east of the lagoons, is composed of 149 single family cottages, most constructed of wood and 18 of which are used for year-round residency. Cottages in Linwood Park have a 1975 market value of $16,000 to $30,000, and are sometimes rented by their owners for $115 to $230 per week (89). In a letter of comment on the Draft Statement (letter dated 9 November 1975, copy in Appendix F) from the Linwood Park Cottage Owners Association (LPCOA), it was indicated that the LPCOA "represents the leasees who maintain property in the park. Our membership includes people from across the Untied States."

2.98 Within the entire City of Vermilion, there are approximately 3,200 residential structures. More than 90 percent are single family dwellings, and more than 1,400 have been constructed since 1960. The average value of owner-occupied homes in 1970 was $18,400 (90). The Valley View subdivision, south of downtown and along the Vermilion River, is composed of newer ranch homes with 1975 market values of $20,000 to $25,000. The Vermilion-on-the-Lake area (about 1.5 miles east of Linwood Park), is composed of older homes (some of which are deteriorating), with property values averaging approximately $15,000 (91). South Shore Acres Mobile Park (along U.S. 6 about two miles west of downtown Vermilion), currently has 40 permanent mobile homes, with a capacity of 240 (70).

2.99 Other structures within Vermilion house 93 retail commercial establishments and 63 service establishments (78). Additional structures include: 15 churches; 6 schools; 11 motels providing more than 100 rooms for tourists (87); and the South Shore Shopping Center on Liberty Avenue which was opened in 1972.

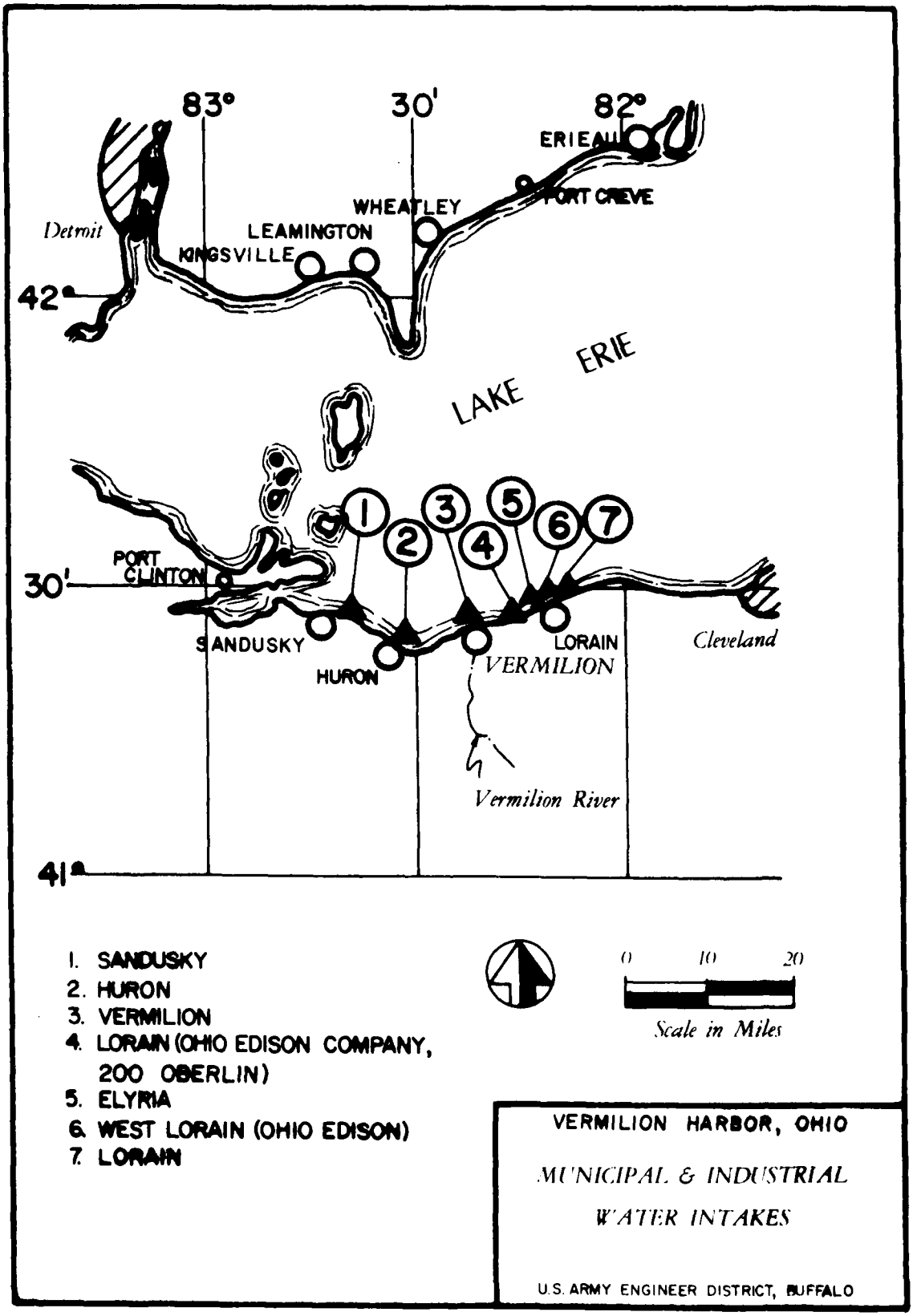
2.100 Residential and business facilities in Vermilion are provided utility service through the Columbia Gas Company and the Lorain Telephone Company. Electric power is provided by the Ohio Edison Company, which operates two plants in the vicinity. An intake at the Edgewater plant in Lorain extends 50 feet northwest into Lake Erie, and flows vary from 105,000 to 158,000 gpm. A discharge at the shoreline is shared with the City of Lorain, with discharge flows

approximately equal to intake volumes. At the West Lorain plant, flow volumes are much less because of a closed system involving cooling towers, and intakes vary from 1,200 to 3,360 gpm. There is no discharge at this plant (92). The five municipal and two industrial water intake facilities located in the Vermilion area are shown in Plate 2.18. Data concerning physical characteristics of these intakes is given in Table 2.21.

2.101 Vermilion's water is supplied through the city water department. Two intake pipes (only one of which is operational), extend northwest from the foot of Main Street approximately 1,000 feet northwest into the lake, at a depth of approximately 7 feet. Intake capacity is rated at 3.5 MGD. Treatment is accomplished through application of fluoride, chlorine, alum, and lime and treatment capacity is 2.0 MGD. A 250,000-gallon storage tower is located near the Vermilion River on West River Road. Water is supplied to much of the town, but inadequate distribution lines prohibit distribution to southeast sections of the town where cisterns are used. Water is also sold to Erie County for use by approximately 1,000 residents outside Vermilion (65).

2.102 Sewage treatment is accomplished through a modified activated sludge plant built in 1968 and located at 799 West River Road. The digested sludge is removed and disposed of on various farms within a four-mile radius of the plant. The effluent (approximately 1.0 MGD), is chlorinated and discharged into the Vermilion River at an outfall adjacent to the treatment plant. Approximately 80 percent of Vermilion Township is served by sewage lines which are generally in need of renovation since a great deal of inflow occurs during rainy weather (65)(69). Approximately 20 percent of the township's residents depend on septic tank disposal of wastes. Approximately 30 trailer parks, motels and small businesses operate septic tanks which discharge or leach into Lake Erie along the shore west of Vermilion (40), and numerous residential septic tanks discharge or leach into the Vermilion River in a four-mile stretch immediately south of the city (70).

2.103 An abandoned 1-1/4 inch submarine power cable, reputedly owned by the Ohio Edison Company, may cross the river channel at the foot of Sandusky Street. Through previous investigations, it was unable to determine whether this cable had been removed some time in the past (02). A 10-inch water line at the foot of Huron Street and two 8-inch sewer lines at the foot of Sandusky Street cross the river below the authorized project grade, but in some places these pipelines may be less than 3 feet below project grade (02). Sewage pump stations are located in the lagoons on Park Drive; one is adjacent to Showse Park, with an overflow into Lake Erie; and the other is located across the river from the treatment plant (69).



Source: (71)

PLATE 2.18

TABLE 2.21
SUMMARY OF WATER INTAKES ON LAKE ERIE
VERMILION VICINITY, JUNE 1975

Municipal (40)

Municipality/ Business	Map Location*	Latitude	Longitude	Total Depth (ft.)	Intake Depth (ft.)	Intake Line Diameter (in.)	Intake Line Type**	Distance From Shore (ft.)	Distance From Vermilion Harbor (miles)	Distance From Open-Lake Disposal Area (miles)
Sandusky	1	41°27'51"	82°38'50"	21	16	42	S	2,900	18.0	18.5
Huron	2	41°24'23"	82°33'24"	15	10	36	C	2,100	10.0	11.0
Vermilion	3	41°25-42"	82°22'09"	11	7	18	S	1,200	—	2.0
Elyria	5	41°27'26"	82°13'15"	20	11	42	I	1,200	11.0	10.0
Lorain	7	41°28'21"	82°11'41"	24	11	48	I	1,100	11.0	10.0

Industrial (92)

Ohio Edison 200 Oberlin Lorain	4	N/A	N/A	N/A	N/A	N/A	N/A	50'	11.0	10.0
Ohio Edison West Lorain	6	N/A	N/A	N/A	N/A	N/A	N/A	At Shore	8.7	8.0

* See Plate 2.18 for location
** C - Concrete
I - Iron
S - Steel

N/A = Not available

Sources: (40) (92)

Public Services and Facilities

2.104 Government agencies are responsible for providing many public services to Vermilion residents. The extent to which these services are supported by harbor-related commercial and recreational enterprises may be quantified by examining the revenue these enterprises generate through various taxes and assessments.

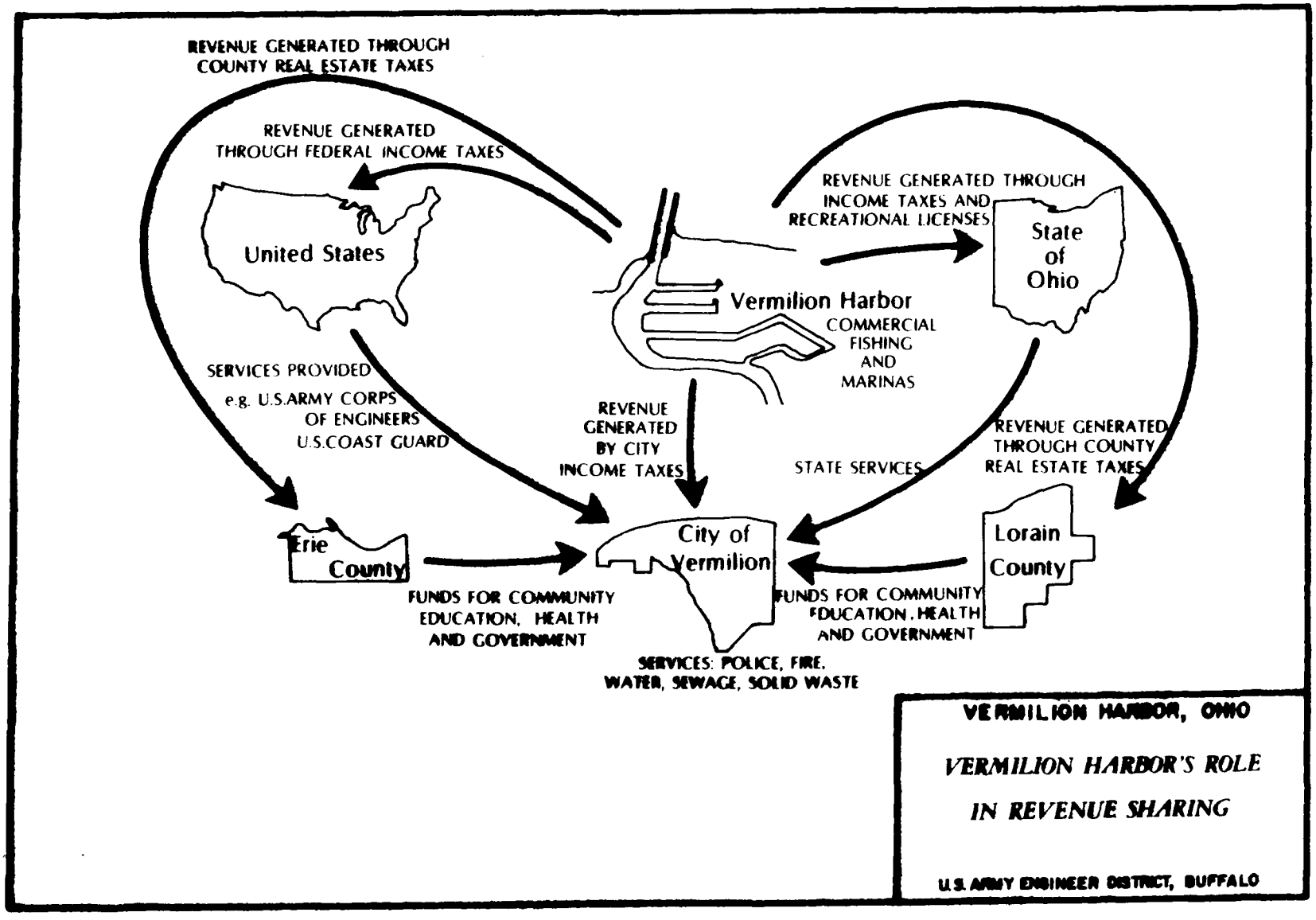
2.105 The role of the Vermilion Harbor in the generation of revenue on the city, county, state and Federal Government levels is illustrated in Plate 2.19. As shown in Table 2.22, the harbor is directly responsible for the generation of at least about $300,000 per year on the various levels. In turn, this revenue supports a wide range of services provided by the governments which benefits the entire City of Vermilion. An example of such services is the harbor maintenance activities implemented by the Buffalo District of the Army Corps of Engineers. In addition, the State of Ohio contributes $5,000 annually to a local safe boating program (93).

2.106 Vermilion's educational system is comprised of three public and one parochial elementary schools, one public junior high school and one public high school (87). Police protection is provided by the Vermilion Police Department (which employs 15 full-time and 8 part-time officers), the Ohio State Police, and the Erie and Lorain County Sheriffs; a police boat patrols the harbor area (87). Vermilion's fire department has a staff of 50 volunteer firemen; firehouses are located on Ohio Street and Overlook Road (87)(85). The city services director is responsible for water supplies, sewage, solid waste disposal, and street maintenance. Solid waste disposal is provided to city residents by Erie County through a contractor; waste is hauled to a landfill on the outskirts of Huron. The Vermilion Post Office is located on West Liberty Avenue and operates six city and two rural routes. The city library is also located on West Liberty and has over 30,000 volumes (98).

2.107 As of January 1, 1970, the total tax valuation for the City of Vermilion was $25,390,000. The real estate tax rate in the city is $51.60 for Erie County and $60.60 for Lorain County per $1,000 of assessed evaluation. Assessed value is 40 percent of market value in both counties; the last appraisal was made in 1970. The city has an income tax of one percent (87)(99).

Industry and Business

2.108 The industry and business activities of the harbor area serve as an indicator of the economic characteristics of the area. In addition, interrelationships between the harbor environment and uses of that environment, such as recreational, commercial and



Source: (79)

PLATE 2.19

TABLE 2.22

SOME ESTIMATED ANNUAL HARBOR-GENERATED REVENUES
VERMILION, 1974

City income tax (93)	
Marina employees	
Full-time - 25[1]	$ 2,861
Part-time - 30[2]	1,143
Commercial fishing company employees	
Full-time - 27[1]	3,090
Part-time - 23[2]	1,316
County property taxes (94)	
Marinas[3]	8,423
Commercial fishing company	921
State sales taxes (81) (84)	
Marinas[4]	92,000
Commercial fishing company[5]	50,000
State income taxes (95)	
Employees of marinas	
Full-time - 25[1,6]	1,850
Part-time - 30[1,7]	480
Commercial fishing company employees	
Full-time - 27[1,6]	1,998
Part-time - 23[1,7]	368
State recreational licenses (81) (82) (96)	
Boating and motor licenses - 2,000 @ $7.50 each	15,000
Fishing licenses	
Resident, season - 2,875 @ $4.00 each	11,500
Non-resident, season - 68 @ $10.00 each	680
Non-resident, 7-day - 290 @ $4.00 each	1,160
Federal income taxes (97)	
Marina employees	
Full-time - 25[1]	41,000
Part-time - 30[2]	12,210
Commercial fishing company employees	
Full-time - 27[1]	44,280
Part-time - 23[2]	9,361

[1] Based on an average annual income of $11,444.

[2] Based on an average annual income of 1/3 x $11,444.

[3] Partial - includes only Vermilion Boat Club, Al's Boat House, Romp's Water Port, Ryser's Marina, Parson's, and Moes Marine Service.

[4] Based on a projection of sales taxes collected at Romp's Water Port.

[5] 4% of 1974 sales, approximately $1,250,000.

[6] Average taxes of $74 per year.

[7] Average taxes of $16 per year.

Source: (97) (81) (82) (96) (84) (94) (95)

project activities, can be correlated through the use of economic indicators associated with industry and/or business activities located in the harbor vicinity. A detailed discussion of industrial and business concerns that are located within the harbor area, and how these concerns are financially dependent upon the harbor's continued use, is essential to completely assess the degree to which the economics of the community may be influenced by the project.

2.109 The harbor area is a focal point of business activity in the City of Vermilion. Two restaurants, a retail fish market, and five marinas border the immediate project area:

a. L'auberge du Port, French restaurant, 555 Main Street; one of Ohio's finest restaurants.

b. McGarvey's Boat Drive-in Restaurant, on the east bank of the Vermilion River at the U.S. 6 bridge; recently remodeled; seating capacity of over 200.

c. Kishman Fish Company, 5328 Liberty Avenue; retail outlet of Vemilion's commercial fishing company.

d. Moes Marine Service, 5336 Liberty Avenue; docking facilities; repair and maintenance services; winter storage facilities; valued at approximately $175,000 (100).

e. Ryser's Boat Livery, 636 Sandusky; limited dockage for sailboats; fishing boat rentals; fuel; caters primarily to fishermen; largest bait dealer and fishing license distributor in Vermilion (92).

f. Parson's Marine and Industrial Service, 5260 Liberty Avenue; dockage and winter storage facilities; repair and maintenance service; primarily for sailboats (96).

g. Al's Boat House, 655 West River Road; slip capacity of 22; caters strictly to power boat dockage; complete facilities valued at more than $150,000 (101).

h. Romp's Water Port, 5055 Liberty Avenue; harbor's second largest marina; slip capacity of 250; repair services; recreational facilities; marine supplies; sleeping accommodations; winter storage; boat sales (81).

2.110 The commercial fishing season on Lake Erie begins on 15 March and continues until 10 December. Peak catch periods occur during the spring and fall seasons, with up to 65 percent of the annual catch being taken in the spring. The summer season is generally the least productive period. Yellow perch and some white bass are the primary summer catches. Most commercial species are taken by trap netting; the lake area near Cedar Point and the area between Vermilion-on-the Lake and

Lorain are the major areas for trap netting operations. Yellow perch is the main species taken by gill netting operations which are limited to lake areas east of Huron. While the average distance from shore for commercial fishing operations tends to vary seasonally, summer operations are usually conducted in deep water lakeward from spring and fall fishing areas. The only other commercial concern bordering the Vermilion project area is the Kishman Fish Company plant at 573 River Street, established in 1880. The company operates a fleet of four trap-net boats and one gill-net boat in areas of Lake Erie to the east and west of Vermilion, at least one-half mile off shore and ranging several miles from the harbor entrance. The plant processes and freezes fish caught by its fleet as well as that caught by eight independent operators operating 11 boats, 6 of which are based in Vermilion. The 1974 catch was approximately 0.9 million pounds, with yellow perch, white bass, sheepshead, and catfish species in descending order of importance. Sales in 1974 were approximately $1,250,000, a peak year for the firm (84, 133).

2.111 The twelve marinas and boat clubs within the city of Vermilion have a total slip capacity of approximately 944. At the time of a survey taken June 1975 (28) these facilities were more than 95 percent full. At an average rate of $225 per slip, boat dockage provides more than $200,000 in direct annual revenue to the marina operators. Most marina operators supplement this income with boat sales or marine services, as indicated in Table 2.23. Locations of marinas are identified in Plate 2.17.

2.112 With the exception of the Kishman Fish Company, most industrial concerns in Vermilion are located outside the immediate harbor area. The ITT Wakefield Lighting Fixture and Art Metal Division plant is Vermilion's largest industry. A summary of major industries in Vermilion is given in Table 2.24. In 1969, the gross sales volume of the 92 retail sales establishments amounted to an estimated $18,736,330 (78). Table 2.25 categorizes the number of establishments and gives a breakdown of their annual sales. The number of retail establishments has increased since 1969 with the growth of the community and the construction in 1972 of the South Shore Shopping Center (housing approximately 20 retail establishments). As indicated in Table 2.25, there were 63 service businesses in the city of Vermilion in 1969 with gross sales of $16,278,345. A rectangular commercial dredging area, 44 square miles in size, is located in Lake Erie six miles north of the lake shore between Vermilion and Lorain. Sand and gravel materials are periodically removed from this area primarily by commercial dredging concerns from Lorain and Sandusky. The Vermilion open-lake disposal zone is about four miles south of the commercial dredging area.

2.113 Many retail and service businesses such as marinas, restaurants and motels, are highly seasonal and depend on 1 April and generally end by 10 November (81). June, July and August are the peak

TABLE 2.23
MARINA CHARACTERISTICS
VERMILION, JUNE, 1975

Marina/Address/Owner	Map Location**	Total Slip Capacity	Total Slip Occupancy	Slips Available for Transients	Maximum Boat Size Capacity: Length	Beam	Draft	Height	Slip Rental Period and Charges: Season	Month	Week	Day	No. of Slips Rented to Out of Towners	Services Available: Ice Dock	Boat Sales	Boat Rentals	Fuel	Water	Ice	Repairs	Information	Ride & Weather	Electricity	Marine Supplies	Parking	Showers	Garbage Collection	Credit Card Privileges	Groceries	Restaurant	Phone Connection	Bait and Tackle	Transportation	Mail Service	Laundry	Swimming Pool	Bar	Sundries	Dry Cleaning	Package Goods	Sleeping Accommodations	Lounge	Lockers	Recreational Facilities	Housekeeping Service	Launch Ramp
Al's Boat House 655 West River Road Vermilion, Ohio Al Galinke	A	22	18	4	23'	9'	8'	9'	$95-110				2		●	●		●		●			●	●	●	●				●	●															●
Great Lakes Sailboats 5024 Liberty Avenue Vermilion, Ohio Bill & Terry Jeavons	B	3	3	0	100'	20'	3'	50'	$ 8 per foot				3		●	●	●		●		●		●	●	●		●							●									●			
Jeavons Boat Yard 710 Vermilion Road Vermilion, Ohio J. H. Jeavons	C	85	85	0	35'	8'	6'	9'	$200				70		●	●					●			●		●		●																		●
Moss Marine Service 5336 Liberty Avenue Vermilion, Ohio Julius Moss	D	22	20	2	36'	12'	3'	U	$230			15¢/ foot	19		●		●	●		●			●	●	●		●	●			●			●											
Parson's Marine & Industrial Service 5260 Liberty Avenue Vermilion, Ohio Rich & Don Parsons	E	28	28	0	32'	10'	5'	U	$225 Avg.				14		●						●			●	●	●						●														
Bemp's Water Port, Inc. 5055 Liberty Avenue Vermilion, Ohio Bemp's Water Port, Inc.	F	250	240	10	35'	12'	6'	8 - 9'	1/2 $150-310	$100	$25	$6	180		●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●					●	●			●		●		●	●
Ryser's Boat Livery 636 Sandusky Street Vermilion, Ohio Don & Karen Parsons	G	8	8	0	25'	10'	5'	U	N/A				0				●	●	●													●														

TABLE 2.23
(CONTINUED)

Marina/Address/Owner	Map Location**	Total Slip Capacity	Total Slip Occupancy	Slips Available for Transients	Maximum Boat Size Capacity: Length	Beam	Draft	Height	Slip Rental Period and Charges: Season	Month	Week	Day	No. of Slips Rented to Out of Towners	Services Available: Dry Dock	Boat Sales	Boat Rentals	Fuel	Water	Ice	Repairs	Information	Tide & Weather	Electricity	Marine Supplies	Parking	Showers	Garbage Collection	Credit Card Privileges	Groceries	Restaurant	Phone Connection	Bait and Tackle	Transportation	Laundry	Mail Service	Swimming Pool	Bar	Sundries	Dry Cleaning	Package Goods	Sleeping Accommodations	Lounge	Lockers	Recreational Facilities	Houseboating Service	Launch Ramp
Valley Harbor Marina 1295 West River Road Vermilion, Ohio George Phillips	H	400	400	0	40'	13'	6'	9'	$13/ foot			$3	340	●	●		●	●	●	●		●		●	●	●	●	●		●		●			●	●											
Vermilion Harbor Yacht Club 1295 West River Road Vermilion, Ohio George Phillips	I	*	50	0	40'	13'	6'	9'	*													●			●	●	●								●						●					
Vermilion Power Boats, Inc. 5054 Liberty Avenue Vermilion, Ohio V. F. Fussner, President	J	75	75	0	48' (28' minimum preferred)	15'	6'	U	80c/ sq. ft.			30c/ foot	75	●			●	●	●	●				●	●	●	●	●			●												●		●			
Vermilion Boat Club 5416 Liberty Avenue Vermilion, Ohio Commodore Douglas Keith	K	12	1	11	U	U	8'	U	No seasonal rentals			$6	1	●				●				●		●	●	●	●					●			●	●					●		●			
Vermilion Yacht Club 5440 Anchorage Way Vermilion, Ohio Frank Hauschildt, Proprietor	L	39	39	12	60'	19'	8'	U	N/A				20				●	●	●			●		●		●	●	●		●	●			●							●		●		
TOTALS:		944	917										724																																

KEY: U - Unlimited
N/A - Information not available
* - The Vermilion Harbor Yacht Club rents space from the Valley Harbor Marina to its members
● - Service available
** - See Plate 2.17 for marina locations

TABLE 2.23
(CONTINUED)

Marina/Address/Owner	Map Location**	Number of Employees: Year-Round, Full-Time	Year-Round, Part-Time	Seasonal, Full-Time	Seasonal, Part-Time	Date of Initial Operations	Number of Power Boats Docked	Number of Sailboats Docked
Al's Boat House 655 West River Road Vermilion, Ohio Al Galinha	A	2				1950	18	0
Great Lakes Sailboats 5804 Liberty Avenue Vermilion, Ohio Bill & Terry Jaszkeski	B	1				1971	0	3
Jeavons Boat Yard 710 Vermilion Road Vermilion, Ohio J. B. Jeavons	C	1	1			1946	85	0
Moss Marine Service 5336 Liberty Avenue Vermilion, Ohio Julius Moss	D	2				1938	17	3
Parsons's Marine & Industrial Service 5200 Liberty Avenue Vermilion, Ohio Rich & Don Parsons	E	2		1		1957	4	24
Remy's Water Port, Inc. 5055 Liberty Avenue Vermilion, Ohio Remy's Water Port, Inc.	F	6	3	5	1	1956	240	0
Rymar's Boat Livery 636 Sandusky Street Vermilion, Ohio Don & Karen Parsons	G	2			2	N/A	0	8
Valley Harbor Marina 1295 West River Road Vermilion, Ohio George Phillips	H	4	3			1965	400	0

TABLE 2.23
(CONTINUED)

Marina/Address/Owner	Map Location**	Number of Employees: Year-Round, Full-Time	Year-Round, Part-Time	Seasonal, Full-Time	Seasonal, Part-Time	Date of Initial Operations	Number of Power Boats Docked	Number of Sailboats Docked
Vermilion Harbor Yacht Club 1295 West River Road Vermilion, Ohio George Phillipe	I				T	1955	* (50)	0
Vermilion Power Boats, Inc. 5054 Libery Avenue Vermilion, Ohio V. F. Fuessner, President	J	4			3	1956	68	7
Vermilion Boat Club 5416 Liberty Avenue Vermilion, Ohio Commodore Douglas Keith	K		2		9	1913	1	0
Vermilion Yacht Club 5440 Anchorage Way Vermilion, Ohio Frank Hauschildt, Proprietor	L	1				1932	24	15
TOTALS:		25	9	6	15+		857	60

KEY: N/A - Information not available.
* - The Vermilion Harbor Yacht Club rents space from the Valley Harbor Marina to its members.
T - Temporary employees are hired for club functions.
** - See Plate 2.17 for marina locations

Source: (28) (53)

TABLE 2.24
SUMMARY OF INDUSTRY
VERMILION, 1975

Industry	Address	Number of Employees	Products
Bettcher Industries	Route 60 at the turnpike	70	Meat processing equipment
Crow Lumber Co.	666 West River Road	15	ARCRO Homes, MINI Barns
Firelands Originals	1091 Sunnyside Road	5-10	Hand-made furniture
Gentry, International	993 State St.	18	Seasonings, spices, food, beverage mixes
ITT Wakefield-Lighting Fixture Div. Art Metal Div.	850 W. River Road	250	Industrial lighting fixtures
Kishman Fish Co.	573 River Road	27-50	Retail & wholesale fresh and frozen seafood
Klingshirn Builders	4550 Liberty	N/A	N/A
Masonry Seal Corp.	5499 Liberty	N/A	Concrete masonry sealer
SAMCO	5520 Mill St.	N/A	Truck bodies
South Shore Packing Co.	5117 South St.	50	Imported olives
Wonder Color Co.	1030 Douglas St.	12	Color pigments
Vermilion Engineering Co.	4165 Liberty	N/A	Welding and prefabricating

N/A = Not available

Source: (87)

TABLE 2.25

NUMBER, TYPE AND SALES OF BUSINESS ESTABLISHMENTS
VERMILION, 1969

Type of Business	Number	1969 Sales
Retail		
Building materials, hardware	10	$ 4,421,500
General merchandise group stores	2	1,000,000
Food stores	10	N/A
Automotive dealers	8	3,482,500
Gasoline service stations	12	1,164,200
Apparel and accessory stores	3	616,500
Shoe stores	2	N/A
Furniture, home furnishings and equipment stores	6	1,493,500
Eating and drinking places	24	5,270,500
Drug stores and proprietary stores	2	N/A
Miscellaneous retail stores	13	1,287,630
Total	92	$18,736,330
Service		
Insurance	4	N/A
Loan companies	1	N/A
Banks and savings	4	N/A
Real estate	5	3,360,000
Doctors	11	571,000
Lawyers	3	
Beauty shops	6	228,000
Barber shops	4	
Car wash - laundry - dry cleaners	6	
Motel	3	
Utilities	2	12,119,345
Storage	2	
Construction	1	
Miscellaneous services	11	
Total	63	$16,278,345

N/A = Not available
Source: (78)

months for this business. As shown in Table 2.23, 724 of 944 slips, or approximately 77 percent, are rented to people who do not reside in Vermilion. Motel operations are also highly seasonal, with June to September being the peak months. It is estimated that 10 percent of Vermilion's annual revenue can be attributed to the city's recreational advantages (78).

Employment and Income

2.114 The economic status of the community and the degree to which harbor-related activities are related to the city's economy may be evaluated through a consideration of the employment and income of Vermilion's residents. In particular, the number of people employed in businesses bordering the harbor or in businesses which are in some way dependent on the harbor, and the income of these employees, indicates the importance of the harbor as an economic resource.

2.115 Vermilion's labor force of 3,545 persons includes 2,583 men and 962 women (102). The largest single employer of Vermilion residents is the Ford Truck Plant (approximately 5 miles east of the city), employing between 500 and 1,000 Vermilion residents. A significant percentage of Vermilion's work force commutes to the Cleveland area. The largest employer within the city of Vermilion is the ITT Wakefield plant which employs 250 persons (87). The number of employees at this as well as at other industries in Vermilion is provided in Table 2.25. A breakdown of occupational types among residents of Vermilion is found in Table 2.26. Males are employed primarily as craftsmen, repairmen, machine operators and foremen; females in the work force are employed primarily as clerical workers, service workers and teachers. Very few Vermilion residents are employed in the farm industry (102). In 1970, 3,050 of the 3,545 persons on the work force were employed by private concerns; 368 were employed by the government; 118 were self-employed; and 9 were unpaid family workers (102).

2.116 The primary occupational groups affected by the location of the harbor in Vermilion are service and sales groups. Many of the cleaning and food service jobs (193 people are employed in these categories) are attributable to recreational visits to the Vermilion area. Twenty-five full-time and more than 30 part-time or seasonal employees are employed at the 12 marinas and boat clubs in Vermilion (28). Twenty-seven people are employed full-time by the commercial fishing company, with a season peak of 50. There were 2,479 families in Vermilion in 1970. The median family income was $11,444 and the per capita income was $3,355. Self-employed persons earned substantially less than persons salaried by private companies (102). A breakdown of family incomes in 1970 is presented in Table 2.27.

TABLE 2.26
OCCUPATION OF EMPLOYED RESIDENTS*
VERMILION, 1970

Category	Subcategory	Number	Percentage
Total employed		3,545	100.0
Professional, technical and kindred		523	14.8
	Health workers	70	2.0
	Teachers	180	5.1
Managers and administrators		326	9.2
	Salaried	278	7.8
	Self-employed in retail trade	29	0.8
Sales workers		213	6.0
	Retail trade	99	2.8
Clerical and kindred		438	12.3
Craftsmen, foremen and kindred		662	18.7
	Mechanics and repairmen	149	4.2
	Construction craftsmen	154	4.3
Operatives (except transport)		715	20.2
	Manufacturing	611	17.2
	Non-manufacturing	104	3.0
Transport equipment operators		216	6.1
Laborers (except farm)		122	3.4
Farmers and farm managers		10	0.3
Farm laborers and foremen		7	0.2
Service workers		305	8.6
	Cleaning and food service	193	5.4
	Protective	21	0.6
	Personal and health service	78	2.2
Private household workers		8	0.2

*16 years of age or older.

Source: (102)

TABLE 2.27
FAMILY INCOMES
VERMILION, 1970

Category	Number	Percent
Total	2,479	100.0
Less than $1,000	32	1.3
$1,000 to 1,999	24	1.0
$2,000 to 2,999	81	3.3
$3,000 to 3,999	56	2.2
$4,000 to 4,999	58	2.3
$5,000 to 5,999	52	2.1
$6,000 to 6,999	75	3.0
$7,000 to 7,999	108	4.3
$8,000 to 8,999	219	8.9
$9,000 to 9,999	198	8.0
$10,000 to 11,999	466	18.8
$12,000 to 14,999	473	19.1
$15,000 to 24,999	529	21.3
$25,000 to 49,999	84	3.4
$50,000 or more	24	1.0

Source: (102)

Recreation

2.117 Recreational patterns in the harbor area are prime indicators of the harbor's importance to the community. The number of boaters, fishermen or other recreational users of the harbor helps gauge the importance of recreational trade in the overall commerce and business present in the city and the potential impacts of water-associated project activities. Recreational opportunities in a city represent a basic resource which may stimulate future growth and development.

2.118 Recreational activities in Vermilion and its vicinity are highly seasonal and quite diversified. During the summer, boating (a prime activity within the project area) begins at dawn and reaches a peak an hour before dusk (28). Weekends and Wednesdays are peak boating days. The boating season begins in April and ends by November (81), with June through September being the peak months. Each year approximately 2,000 boating licenses are sold in Vermilion by the largest distributor (81). The majority of boaters using Vermilion Harbor are not from Vermilion but rather from areas where docking facilities are insufficient or non-existent (i.e., Cleveland, Elyria and Mansfield). An estimate of total annual harbor usage by recreational boaters is given in Table 2.28. Recreational boating includes the use of both power boats and sailboats, with the former predominating (see Table 2.23 for more detailed information). Average-sized sailboats require a draft of 4 to 5 feet, and the largest (approximately 70 feet long) require a draft of up to 8 feet. From mid-June to August, the Vermilion Boat Club conducts a sailing camp for both children and adults (17).

2.119 A second prime recreational activity in and near the project area is sport fishing, often practiced in conjunction with boating. The fishing season starts in April and extends into late October. Since 1970, annual license sales in Vermilion have increased approximately 75 percent (82). Of the sport fishing licenses sold in Vermilion in 1974, 2,875 were sold to Ohio residents and 68 season licenses and 290 7-day licenses were sold to non-residents (81)(82). Approximately 85 percent of the licenses are sold to Ohio residents; 30 percent are sold to Vermilion residents (96). Questionnaires completed by sport fishermen in July 1975 indicated that primary fishing locations are: the areas just offshore, both east and west of Vermilion; the beaches off Sherod and Showse parks; the park adjacent to the treatment plant off West River Road; and the marina docks. There is little fishing off the breakwater (since access to it is limited to boats) or off the piers (since access to the east and west piers is limited by private property). Primary species taken by sport fishermen in the Vermilion Harbor area include yellow perch, white bass, catfish, walleye, crappie, smallmouth bass and, occasionally, a salmonid species. Sport fishermen reported varied degrees of success, catching between 0 and 100 fish per trip (an average trip lasts 2 to 5 hours) (53).

TABLE 2.28
HARBOR USAGE BY RECREATIONAL BOATERS (ESTIMATED)
VERMILION, 1975

Power boats permanently docked at marinas and boat clubs (28)	857
Sail boats permanently docked at marinas and boat clubs (28)	60
Boats permanently docked at lagoons (28) (estimate)	100
Boats in dry storage in Vermilion, used at least once per year (17)	1,017
Boats owned by non-residents of Vermilion, launched in Vermilion at least once per year (81)	2,000
Annual visitors whose trips originate in other ports (81)	2,000
Total, annual number of boats which use Vermilion harbor at least once per year	6,034

Source: (81) (28) (17)

2.120 A third prime summer activity in the Vermilion area is swimming which is prevalent off the marina docks, in the river and lagoons, at Sherod Park and Showse Park bathing beaches, in Lake Erie at the foot of Main Street and at private beaches. A description of bathing beaches in the City of Vermilion is found in Table 2.29. Little or no swimming occurs off the piers and breakwaters and, in fact, may be dangerous due to under currents and vessel traffic in adjacent waters. Additional water-related summer activities include: waterskiing outside the breakwater area; scuba diving from boats or off shore; canoeing, especially in the river and lagoons; and camping upstream along the banks of the Vermilion River. In a letter of comment on the Draft Statement (letter dated 6 November 1975, copy in Appendix F), the Linwood Park Company provided the following information on Linwood Beach, which is located along the lakeshore east of the harbor:

"The Linwood Park Company beach is approximately one-half mile long running eastward from the Lagoons beach. The sand quality has been excellent. Linwood Park is open to the public on payment of a modest gate fee from June to September. Accommodations include playground, shuffle board courts, picnic grove with tables and grills. The fee charged is in line with entrance fees of State and national park systems. Those who own cottages in the Park also pay the fee.

"Linwood Park Company was founded in 1883, has been in continuous operation since and has been responsible for the operation and maintenance of the Park. It is incorporated under the laws of the State of Ohio, owns the land, pays city, county, State and Federal taxes."

2.121 Local residents enjoy a variety of winter recreational activities on or near the harbor and river including ice skating and hockey (primarily in the lagoons' area), snowmobiling (upstream along frozen stretches of the Vermilion River and the lagoons), and sledding (on a sloped area in the city park adjacent to the water treatment facilities). Ice fishing is not conducted in the channel or adjacent lake area due to the lack of solid ice. Hunting for raccoon, pheasant, rabbit, deer and quail occurs throughout the Vermilion area during fall and winter months. In 1974, license sales by the Vermilion Fish and Game Club (which has 300 members) amounted to 750 hunting and trapping licenses and 70 deer permits.

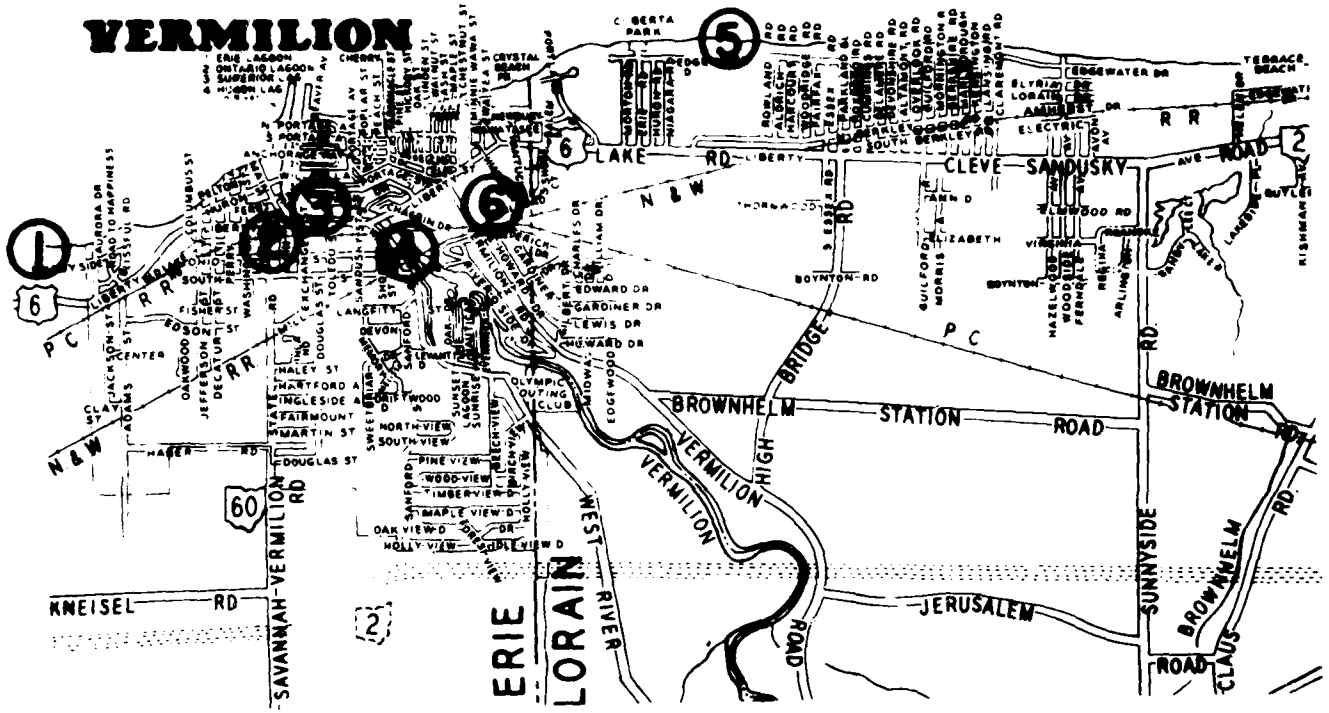
2.122 There are five parks in the city of Vermilion as shown in Plate 2.20. Of these, Sherod Park (on Lake Erie in the west section of Vermilion) and Showse Park (on Lake Erie in the east section of Vermilion) are the largest; their facilities include baseball diamonds, picnic tables, grills, playgrounds, nature trails and unmanaged beaches. Victory Park, with limited recreational facilities, is

TABLE 2.29

BATHING BEACHES
VERMILION, OH

Beach	Location	Size		Access	Responsible for Maintenance	Season
		Width	Length			
City Beach	Foot of Main Street	100'	200'	Public	City of Vermilion	June-October
Lagoons Beach	East of east pier	100'	800'	Residents of lagoons vicinity	Vermilion Lagoon's Association	June-October
Linwood Park Beach	Linwood Park lakeshore	100'	1000'	Residents of Linwood Park and public (fee charged)	Linwood Park Co.	June-September

Source: (79)



1. SHEROD PARK
2. VICTORY PARK
3. EXCHANGE PARK
4. PUBLIC BOAT LAUNCH AND PARK
5. SHOWSE PARK
6. Y.M.C.A.

VERMILION HARBOR, OHIO

PARKS & RECREATION

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Source: (79)

PLATE 2.20

located next to City Hall. Exchange Park, at the corner of Liberty Avenue and Main Street, has park benches and a memorial to those soldiers from Vermilion who died in wars. A park along the Vermilion River's west bank contains the city's public boat launch facilities. In addition, the Lorain County Metropolitan Park District maintains the Vermilion River Reservation along the river south of the city which consists of 217 acres and includes hiking, picnicking and camping facilities.

2.123 Two public golf courses are located within the Vermilion vicinity; one on the Erie-Lorain County border approximately 4 miles south of the city; and the other located approximately 5 miles west of the city off Route 6. Additional recreational facilities within Vermilion include a bowling alley and miniature golf course on West Liberty Avenue and enclosed pools at the YMCA and Valley View Pool.

Demography

2.124 The demography of Vermilion may be defined as a statistical description of the city's population. It serves as a description of many of the people who benefit from the presence of the harbor. Population trends and general growth of the city may be related to expansion and maintenance of harbor activities.

2.125 The 1970 population of Vermilion was 9,872. This represents a 62.9 percent increase in population since 1960, indicating the recent rapid growth of the community (90). The section of the City of Vermilion in Erie County was more heavily populated than that in Lorain County, having 5,500 versus 4,372 people, or 56 percent of the city's total population versus 44 percent (103). In 1970, 40.2 percent of the population was under 18 years of age and 94.4 percent was under 65 years of age (90). Ninety-two percent of Vermilion residents are natives of the United States (87). There were 2,804 households in Vermilion in 1970, with an average family size of 3.5 people per household. Approximately 64.6 percent of the community's houses were owner-occupied, while 35.4 percent were occupied by renters (90).

2.126 During the summer months, Vermilion experiences an approximate resident population increase of 5,000 (78). About 80 percent of the summer residents rent cottages for less than $150 per month (90). West of Vermilion the Beaulah Beach area is strictly seasonal, as are many of the cottages in this general area (83). The Linwood Park area within the city is composed of 149 cottages, 131 of which are strictly seasonal, opening on 15 April and closing by 16 October. Approximately one-half of Linwood Park's permanent occupants are retired (89). While the residential areas located adjacent to the lagoons are comprised of permanent residences, many

of these inhabitants spend part or all of the winter in a warmer climate (89). In 1970, only 2.8 percent of the housing was vacant. Many of the cottage residences are now occupied on a year-round basis, and the influx of a temporary summer population is limited by the availability of seasonal housing. Many people reside in their boats which are moored in marina slips during the boating season (89).

Cultural Resources

2.127 The nature of a city's cultural resources serves to indicate those features which its citizens feel are worthy of preservation. The extent to which cultural activities are influenced by the presence of the harbor indicates the importance of the harbor to overall community prosperity. Knowledge of existing cultural resources provides an indication of potential project impacts.

2.128 Cultural activities in Vermilion are closely associated with its position as the largest small-boat harbor on Lake Erie. During the third weekend in June, the Vermilion Chamber of Commerce sponsors the annual Festival of Fish; activities include model boat shows, boat rides, sail races, fish fries, a review of the fleet and an antique boat parade. During August, the South Shore Regatta is highlighted by the annual Inter-Lake Regatta race from Put-in-Bay to Vermilion. The Grand Opera is featured in February (87). Additional festivals held in near-by cities and towns which are attended by many Vermilion residents include the International Festival in Lorain, a water festival in Huron, and a melon festival in Milan (83).

2.129 Vermilion's historical heritage is also closely tied to its harbor activity. The Great Lakes Historical Society Museum at 480 Main Street contains a large collection of ship models, marine relics and paintings and photographs whose theme is the history of the Great Lakes (104). A group of residents and businessmen initiated a development plan called "Harbour Town 1837" with the purpose of restoring Vermilion's older section to its original nautical style. The "Harbour Town" area is located west of the river and is bordered by the lake on the north, by Jefferson Street on the west, by South Street on the south, and by the river and West River Road on the east. The Friends of Harbour Town have identified 47 historical buildings in the area, four of which are adjacent to the river (the Kishman Fish Company at 573 Main Street, built in the 1880's; the Sail Loft, 555 Main Street, built in 1840; the Captain Thompson house, 485 Main Street, built in 1830; and the Farmer's Exchange, Main Street and Liberty Avenue) (105). Work on the "Harbour Town" project is currently underway with several buildings already completed. The only structure in Vermilion listed in the National Register of Historic Places is the Town Hall at 736 Main Street which was built in 1883 (105)(106). There are two known archaeological sites in Lorain County; Bradley Fort and the Morris-Franks site, both in Brownhelm Township. The latter is a late prehistoric village site and is listed on the National Register of Historic Places (107).

Table 2.30 presents a list of shipwrecks which have occurred in Lake Erie in the vicinity of Vermilion Harbor. No significant shipwrecks have occurred since 1912, although small recreational vessels have occasionally capsized in the vicinity of the harbor (137, 138). None of the identified shipwrecks are either listed on, or are being nominated to, the National Register of Historic Places, and none are within the bounds of the project channels or open-lake disposal area.

Quality of the Human Environment

2.130 The quality of the human environment in the area can be assessed by evaluating a number of parameters such as the degree and manner in which the harbor area has been residentially and commercially developed and maintained, the availability and diversity of recreational facilities outside the harbor area, and the aesthetic appeal of the harbor. Superimposed over parameters of the physical environment, human factors such as the area's unemployment rate and poverty level, the amount of community cohesion and social club involvement, and the region's historical and cultural resources, also contribute to the quality of the human environment.

2.131 Activities and facilities in the immediate project area center around water-related recreation and commerce. There are several public beaches, parks and municipal docks as well as a number of marinas and boat clubs operating in the harbor's immediate vicinity. The Kishman Fish Company, a commercial fishing concern, operates out of Vermilion Harbor. Residents of both Vermilion and nearby cities (i.e., Elyria, Mansfield and Cleveland) use and enjoy the many recreational and commercial facilities afforded by the harbor. The two restaurants in the project area, L'auberge du Port and McGarvey's Boat Drive-In, are known to be quality establishments that attract both local and regional patrons. The six residential structures in the project area, the commercial establishments and the municipal docks and facilities are generally in a good state of repair. The availability of homes or homesites within the project area is limited by commercial and municipal land use as well as by the financial stability of private property owners in this area. In 1970, 4.8 percent of the city's 2,479 families reported incomes below the poverty level (102). In 1974, unemployment rates for Erie and Lorain Counties were 4.9 and 5.0 percent, respectively, which is slightly higher than the average of 4.8 percent for the State of Ohio. By 1975, unemployment rates rose on local, state, and national levels, and were 7.1 percent in Erie County, 8.5 percent in Lorain County, and 9.1 percent in Ohio. Data on unemployment rates in the City of Vermilion were unavailable (108).

2.132 There is an estimated seasonal population increase in Vermilion of approximately 5,000 persons; many of these people rent summer homes in the Linwood Park area. The year-round population

TABLE 2.30

LAKE ERIE SHIPWRECKS NEAR VERMILION HARBOR, OH

Name of Vessel	Type of Vessel	Year of Accident	Circumstances of Accident	Location of Wreck
General Anthony Wayne	steamer	1850	exploded and sunk	off Vermilion Harbor
E. G. Merrick	schooner	1851	wrecked	near Vermilion
C. F. Burton	schooner	1859	wrecked	Vermilion Point
Illinois	schooner	1865	sunk	near Vermilion
Patrick Henry	tug	1887	foundered	off Vermilion piers
Mary Ann Norman	tug	1894	burned	off Vermilion
Edna Goodill	tug	1900	foundered	off Vermilion piers
Charles A. Trinter	tug	1912	burned	off Vermilion piers

Source: (11, 139)

of this city has been increasing steadily through the 1960's and projections indicate that this trend will continue for several years in the immediate future (103). Of the 2,800(+) housing units in Vermilion, approximately 65 percent are owner-occupied. The average number of persons per household is listed as 3.5 (90). Residents of Vermilion enjoy membership in more than 40 local civic, fraternal, cultural and social clubs and organizations, including the Kiwanis, Rotary and Lions clubs.

2.133 There are no structures in the project area that are listed on the National Register of Historic Places. However, the Great Lakes Historical Museum and the Harbour Town 1837 section of west Vermilion both help to preserve the colorful nautical history of this region. The annual Festival of the Fish in June, the South Shore Regatta in August and the Grand Opera performances by the visiting Bowling Green University Music Department each February are events which highlight the social and cultural activities of the area.

2.134 The Vermilion Harbor area with its harbor scenery and rows of sailboats which are moored here presents an aesthetically pleasing appearance. The weekly regatta leaving the harbor each Sunday morning always attracts a number of onlookers (28). Breezes from the lake help to cool Vermilion during summer and warm the city during winter. Although background noise from power boats entering and leaving the harbor does exist, a steady noise level is not perceptible until one approaches the U.S. Highway 6 bridge (28). Net tarring operations in the summer and fish processing at the Kishman Fish Company, exhaust fumes from traffic along U.S. Highway 6, and scents from the L'auberge du Port restaurant, are noticeable odors in the project area.

Future Environments

2.135 Projections concerning both the future physical and social environments have been made by local, regional, state and Federal agencies. Analysis of these projections is helpful in determining future conditions in the project area and in evaluating potential impacts of the operation and maintenance activities.

2.136 Vermilion has experienced a steady growth in population increasing from less than 2,000 in 1940 and 4,785 in 1960 to greater than 11,000 in 1975. As shown in Table 2.31, projections made by the Lorain County Regional Planning Commission indicate that Vermilion's population is expected to continue to grow to greater than 17,000 in the next 15 years. Population projections made by the same planning commission in 1965 underestimated the 1970 population by more than 2,000 (78), indicating the city's strong potential for quick population growth. Population increases have been due to both natural

increase and net migration (natural increase being the number of births over the number of deaths during a specified period of time, and net migration being the difference between the number of people moving into an area and the number moving out of an area) (103).

TABLE 2.31

PROJECTED POPULATION ESTIMATES
VERMILION, 1970-1990

Year	1970	1975	1980	1985	1990
Population	9,872	11,261	12,928	14,942	17,273

Source: (103)

2.137 The largest area of employment in Vermilion and surrounding communities is manufacturing. The trend in recent years has shown a slight percentage decrease of the total work force engaged in this category of employment (103), although the number of people employed in manufacturing has increased and a healthy number of new factories within commuting distance have been opened in recent years (109). The percentage decline in manufacturing has been accompanied by increases in the service and government categories of employment, with 13.6 percent and 10.4 percent of Vermilion workers being employed in these categories, respectively. The increase in these two areas of employment should continue locally as people continue to demand more leisure time and increased and better services from both the private and public sectors (103).

2.138 An increase in leisure time should also be beneficial to Vermilion businessmen engaged in recreation-related services. In 1950, five marinas and boat clubs provided harbor space for approximately 180 craft. Today, harbor dockage has increased more than five times, with 12 marinas and boat clubs in operation, and the demand for dock facilities far outweighs the available space along the river channel (28). Fishing license sales within Vermilion have increased every year since 1971 (82); the number of fishermen frequenting the Vermilion area may be expected to expand as fish populations increase with improving water quality of Lake Erie. The City of Vermilion plans further development of the park along the west bank of the Vermilion River to provide improved facilities for boaters, swimmers, fishermen and picnickers.

2.139 Vermilion lies within a nine-county area for which the Ohio Department of Natural Resources projected the extent of recreational activities for 1975, 1980 and 1990. As shown in Table 2.32,

TABLE 2.32

PROJECTED RECREATIONAL OCCASIONS FOR
NORTH CENTRAL OHIO*, 1975-1990

Activity	No. of Occasions, 1975	No. of Occasions, 1980	No. of Occasions, 1990
Swimming	5,311,024	5,777,349	6,635,990
Boating	3,202,442	3,488,933	3,971,877
Sailing	207,943	225,372	271,974
Fishing	5,091,801	5,528,899	6,323,944

*Includes Lucus, Wood, Ottawa, Sandusky, Erie, Lorain, Cuyahoga, Lake and Geauga Counties.

Source: (110)

the number of occasions that people enjoy swimming, fishing, boating and sailing is expected to increase steadily to 1990, with the largest percentage increases expected in sailing (110). The completion of Interstate 90 will afford Vermilion residents faster access to Cleveland, and thus will probably cause an increase in the number of people who will commute to work in that city. This highway will also probably stimulate commercial and recreational business in Vermilion through easier access by out-of-town residents. Harbour Town 1837 is a concept being used by downtown businessmen to stimulate commercial activity in future years.

2.140 Improved municipal sewage treatment facilities and stricter enforcement of industrial wastewater effluent limitations in areas bordering Lake Erie have succeeded in improving water quality in the lake in the past few years, and this trend may be expected to continue (71). Currently, there are no plans to renovate the wastewater treatment plant to include tertiary treatment (65). Air quality in the area is expected to continue to be acceptable due to monitoring and enforcement activities by the Ohio EPA (63).

2.141 Due to the increasing residential and commercial nature of the harbor area and city, there may be a continued degradation of floral habitat in the future, which will reduce the wildlife potential for the harbor area. The Vermilion River Reservation (an extensive wilderness area, south of the city on the Vermilion River), which was recently developed by the Lorain County Metropolitan Park District, will afford prime habitat for flora and fauna in the future. County-wide plans for the further acquisition and development of parks along both the Vermilion and Black rivers also exist (111)(112)(113) as well as plans for the development of existing public or semi-public open areas (112)(113)(114). It should be noted that an increase in or development of this type of acreage in the harbor vicinity does not necessarily mean an increase in wildlife habitat since many of these current plans include non-wildlife-related facilities, i.e., amusement centers, parking areas, racetracks, drive-in theatres (112), institutional grounds, some public utilities (113)(114) and airports (89). Improved water quality in Lake Erie (71) should allow a richer aquatic floral community to become established which, in turn, should allow for the upgrading of the potential faunal community, both aquatic and terrestrial. The future of fish stocking programs is undetermined at this time both on the Federal and state level.

3. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 The Buffalo District, Corps of Engineers requested six public planning agencies, which have particular interest in the Vermilion area, to evaluate the relationship of maintenance operations in Vermilion Harbor to their respective land use plans for the project area. The planning agencies were requested to analyze potential areas of compatibility or conflict between the harbor maintenance activities and the objectives and specific terms of existing or proposed land use plans, policies and controls, if any, that have been formulated for the harbor area. Types of plans considered included master plans, zoning regulations, plans developed in response to the Clean Air Act and Federal Water Pollution Act Amendments of 1972, and other related land use proposals.

3.02 In response to the Corps request for land use plan evaluations, the Ohio DNR stated, "To our knowledge there are no conflicts with objectives of existing or proposed land use plans, policies and regulations." A copy of the Ohio DNR reply letter is included in Appendix A., Letters of Coordination.

3.03 The following land use planning agencies were contacted but did not reply to the Corps request:

Erie Regional Planning Commission
Lorain County, Regional Planning Commission
Northeast Ohio Areawide Coordinating Agency
Vermilion City Planning Commission
U. S. Department of Housing and Urban Development

4. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

Introduction

4.01 The environmental setting of the Vermilion area is described in detail in Chapter 2 in terms of historic, existing and future conditions as defined by various natural and human environmental components. Any effect upon such components is defined as an environmental impact. Environmental impacts resulting from the proposed operation and maintenance project can be classified by duration, magnitude, geographic level of impact and degree of permanency. Impact duration can be: temporary, experienced only during the time when maintenance operations are actually being performed; short-term, experienced for a period of days following cessation of maintenance activities; or long-term, impacts which represent changes in an environmental component experienced over a period of years. The magnitude of an impact can be expressed as high, medium or low depending upon its relative environmental significance. For example, the elimination of 2.0 acres of a particular type of spawning habitat may be of high magnitude if it is known that only 3.0 acres of such habitat exist. Similarly, the elimination of 2.0 acres of spawning habitat may be of medium or low magnitude if it is known that hundreds of acres of such habitat exist. Geographic impact levels can be termed: immediate area, which includes only the spatial area within a few hundred feet of a particular activity site; project area, which includes the harbor, the open lake disposal site, and adjoining areas; local, which includes the city of Vermilion; regional, which includes the northern portion of the State of Ohio; and national, which includes the entire country. The degree of permanency of an impact can be described as either reversible or irreversible and irretrievable. Reversible impacts are those which will be nullified within a period of a few years at most; while irreversible and irretrievable impacts are those which will not be nullified in less than 50 to 100 years.

4.02 Environmental impacts may result from harbor survey and inspection, dredging, sweep operations, transport of dredged material, disposal of dredged material, and structural repair. This chapter presents a discussion of environmental impacts associated with each of the six operation and maintenance activities comprising the proposed project.

General Impacts

4.03 This section presents a discussion of environmental impacts that are common to each of the six maintenance activities or that result from the cumulative effects of the overall project.

4.04 The climate, physiography and topography, geology, and soils are not affected by the project, but rather have an impact on the project. For instance, climatic conditions dictate what time of year that it is feasible to dredge Vermilion Harbor. Topographic, geologic and soil conditions in the upriver watershed and along the Lake Erie shoreline influence the degree and type of sediments that cause harbor shoaling.

4.05 No long-term, adverse effects on any rare or endangered species will result from the proposed project. The plants that are growing on the harbor piers are not threatened or endangered. The Indiana bat, bald eagle, American peregrine falcon and sharp-shinned hawk will not be adversely affected by the project although they may be infrequent transients in the area. The common tern and upland sandpiper are more likely to occur in the harbor area during operation and maintenance activities, but should not be directly affected because of their mobility. No habitat for these species will be affected except for the common tern's which uses open water for feeding and resting. This habitat in the project area will undergo temporary disturbance due to noise and on-the-water activity. Endangered fish that may occur in the harbor area or open-lake dump zone at the time of project implementation include the silver lamprey, lake sturgeon, spotted gar, mooneye, cisco, muskellunge lake chubsucker, silver chub, pugnose minnow and burbot. These species are all transients and have not been collected in Vermilion Harbor or the open-lake zone. If they are in the project area during the proposed activity, they will be able to readily depart the area of immediate disturbance and will not be adversely affected.

4.06 Terrestrial vegetation adjacent to the maintained channels will not normally be disturbed during maintenance operations. However, some emergency ropes, cables or guy wires may be attached to trees along the channel which should have a short-term, low-magnitude adverse impact on those particular trees. Where such special emergency use is permitted, the tree trunk will be adequately wrapped with a sufficient thickness of burlap or rags over which softwood cleats will be tied before any line is attached. Any trees, shrubs, or other landscape features that may be unavoidably scarred or damaged will be restored as nearly as possible to their original conditions. If a shoreline area is unavoidably, extensively disturbed, the affected area will be graded, seeded and planted to prevent erosion and restore habitat in an effort to reestablish the original condition to the maximum feasible extent.

4.07 Since survey launches and tugs are powered by inboard, outboard or inboard-outboard motors, a minor amount of oil and lead will be released into harbor waters, as well as a minor amount of gaseous pollutants (especially hydrocarbons and carbon monoxide), into the project area's atmosphere, thereby producing temporary,

low-magnitude, adverse impacts on the water and air quality of the natural environment in the immediate area (115, 116). Similar temporary impacts will result from the operation of pumps, motors, and other equipment onboard the dredge. These impacts are partially mitigated by the fact that all Corps and contract vessels are in compliance with USEPA standards for the control of smoke and fume emissions.

4.08 Temporary, adverse aesthetic impacts of low-to-medium magnitude will result during the presence and operation of maintenance vessels in the project area. Maintenance plant will be visible by persons wishing to observe the harbor setting from piers, docks, bridge approaches and other structures adjacent to the harbor. Operation of project vessels is not expected to significantly increase noise levels except in the immediate work area; this effect will be temporary and will affect only those people present in the immediate area, such as marina users and residents of dwelling units peripheral to the project area. These people may also detect temporary, low intensity odors from vessel emissions and exposed dredged material. The levels and types of odors that are detectable from dredged materials are believed to be related to the chemical and biological constituents contained within the dredgings. Limited observations by Buffalo District personnel have indicated that odors from dredged materials may range from non-detectable in sandy materials to pungent odors, similar to those from hydrogen sulfide or petroleum, in highly-polluted materials. If, during the course of maintenance activities, it is determined that objectionable, maintenance-related odors or noises are adversely affecting the adjacent community, appropriate measures will be implemented to modify or eliminate such effects.

4.09 The presence of maintenance vessels in the harbor navigation channels will cause a temporary inconvenience of low magnitude to recreational and commercial craft that must avoid work areas when entering or leaving the harbor. Since operations will be conducted during the fall months of the year, there will be no interference with the peak summer recreational boating period. U. S. Coast Guard navigation aids will be supplied when warranted.

4.10 Increased activity and noise levels resulting from operation and maintenance activities will cause a temporary, low-magnitude disruption of the gulls, terns, mallards, songbirds and shore birds that utilize the piers, breakwater, beaches and harbor waters for resting and feeding. This will be the only impact on terrestrial wildlife resulting from the proposed project. Affected animals will return to the area when project activities are completed.

4.11 A temporary, low-magnitude increase in the demand on local utilities, such as water and electricity, will occur due to the need for such resources by maintenance equipment and personnel. Maintenance

vessels and activities will create a temporary, low magnitude potential safety hazard to local boaters and other harbor users. Community services, such as police, rescue, and medical services, may therefore be utilized if their particular assistances are required.

4.12 The area immediately adjacent to Vermilion Harbor is dependent on recreation, tourism and commercial fishing generated by the harbor. Continued recreational and economic activity in the area can be partially attributed to maintenance of the harbor channel and its associated structures. The recreational and aesthetic value of Vermilion, which is enhanced by the presence of a channel providing access to Lake Erie, may attract new residential and recreational development. While such development would cause changes in land and water uses, transportation modes and volumes, population, and demographic characteristics, tax base and revenue generated, future development in the immediate harbor area will be limited by the existing, highly developed nature of the harbor shoreline.

4.13 The presence of maintenance personnel will result in short-term, low magnitude benefits to local retail and service establishments due to expenditures for food, lodging, entertainment, and other items. Expenditures for these items will amount to about $200 per week for each member of the maintenance crew. Operation and maintenance of Vermilion Harbor will allow for the continued use of the port facilities by pleasure craft owners of the northern and eastern regions of Ohio. This, in turn, will have an indirect, long-term, beneficial effect upon revenue, employment and earnings of the service industries of Vermilion, particularly those businesses offering services associated with water-related recreation.

4.14 No manufacturing firms in Vermilion use the harbor for receipt of raw materials or the shipment of finished goods. Therefore, the project will have no effect upon revenue, employment or earnings within local manufacturing concerns. The project will have a direct, long-term, beneficial effect of high magnitude on the Kishman Fish Company which deals in wholesale and retail fish and fish products. Operation and maintenance of the harbor will allow for continued use of the harbor by Kishman's vessels, as well as by pleasure craft in general. The estimated average annual wholesale value of fish expected to be landed at Vermilion Harbor over the next three years (1976-1978) is $650,000 (145). The project will have an indirect, long-term, beneficial effect upon those Vermilion wholesalers who supply edible goods to the city's and harbor's recreational users.

4.15 Operation and maintenance of the harbor will help maintain Vermilion's place as one of Lake Erie's largest, small-boat harbors, as well as preserve the area's desirability for vacationers using

Vermilion's recreational facilities. This is a long-term, beneficial impact of high magnitude that affects Vermilion's economic activities, including property rental in Linwood Park; boat sales, storage and service; and the local restaurants and amusement facilities.

4.16 Continued operation and maintenance of Vermilion Harbor will have a direct, long-term effect upon the total energy supply available in the Vermilion Harbor area, due to the amounts of fuel consumed by maintenance vessels (during operation and maintenance activities) and by power boats. Boating activity in the maintained harbor will be accompanied by the consumption of fuel products that are necessary to operate recreational vessels. The exact impact of present and future boating activities at Vermilion Harbor upon energy resources cannot be determined. However, it is expected that, due to the continued maintenance of authorized harbor channels, many of the power craft presently utilizing Vermilion Harbor will continue to require considerable quantities of fuel for craft operation. In a broader context, a recent report prepared by the Boating Industry Association, Chicago and the National Association of Engine and Boat Manufacturers, Greenwich, CT noted that the recreational boating industry employs yearly half a million people and contributes $4 billion to the annual gross national product, while recreational boating consumes less than one half of one percent of the nation's petroleum. It is expected that the economic value of the industry will weigh heavily in any future decisions concerning the construction and maintenance of projects related to recreational boating.

4.17 Fuel consumption will also be affected by the number of recreators using motor vehicles to arrive at Vermilion Harbor. Continued maintenance of the harbor will provide continued local recreational facilities for the community, thus reducing motor vehicle traveling distances and fuel consumption for the local recreating population.

4.18 The project will have an indirect, long-term, low-magnitude, beneficial effect upon both the rate of local seasonal population growth and total population as the result of the continued desirability for the recreational and residential areas. The project will have a local, long-term, beneficial effect of medium magnitude upon local housing parameters (i.e., repair and maintenance of existing structures, changes in home ownership or percent of owner-occupied homes) by preserving the desirability of the harbor and lagoon areas as recreational and residential locations, thereby promoting home maintenance upkeep and owner stability. The project will allow continued community participation in yacht clubs, boat clubs and in harbor-related organizations such as "Friends of Harbour Town."

4.19 The maintenance project will neither create nor destroy land areas at Vermilion, nor is it likely that it will stimulate a change from current occupancies. Hence, the project will not directly

affect short-term land use within the project area. Operation and maintenance of Vermilion Harbor will have a direct, long-term, beneficial effect of high magnitude upon the quality and utility of community-owned harbor properties open to the public for recreational purposes. An indirect, long-term effect will be the creation of a land area at the Site 1 confined disposal facility at Huron, OH due to the deposition of polluted dredgings from Vermilion at the facility.

4.20 There will be a direct, long-term, beneficial effect of high magnitude on recreational boating in that the maintained project will allow for continued use of the harbor by pleasure craft of all types, including deep draft sailboats. The effect will extend to over 4,000 boaters from the Great Lakes region who use Vermilion Harbor during the recreational navigation season.

4.21 There are no known archaeological or historical sites, such as campsites and shipwrecks, in or adjacent to the harbor or the open-lake disposal site. Since the project will involve no new work dredging or construction, but will entail the removal of recently accreted shoals in authorized navigation channels and the repair of existing structures, the project is not expected to disturb any previously unidentified archaeological or historical sites. If, during the source of the maintenance operations, items of apparent cultural interest are discovered, they will be left undisturbed and the proper authorities will be notified.

4.22 The Vermilion Town Hall (located approximately 1,000 feet south of the project area) is listed in the National Register of Historic Places. Consultation with the Ohio Historic Preservation Officer indicates that no adverse affect on the Town Hall or any other historical site will result from the project. Similar inquiries to the U. S. Department of the Interior indicate that maintenance activities will not affect any existing or proposed unit of the National Park System or any National Landmark. Letters to and comments from these agencies are included in Appendix A, Letters of Coordination.

4.23 Local interests at Vermilion have expressed concern about the long-term effects of the in-place Vermilion Harbor navigation project, which includes the existing navigation channels, piers, and breakwater. These effects, which are listed in paragraph 1.47, are not direct impacts of the harbor maintenance project (dredging, structural repair, and related operations) that is the subject of this document. However, since maintenance activities insure the continued integrity of the existing navigation project, the identified issues can be considered to be indirectly related to maintenance operations. As discussed in Chapter 1, the Buffalo District has completed a Section 111 Study of shoreline erosion that may be attributable to the navigation project. The Section 111 Study report is included as Appendix G to this Final Statement and should be consulted for further details on

this issue. The District will also initiate an Adverse Impact Study to investigate other identified concerns of the local interests that may be resulting from the in-place navigation project. These concerns include adverse effects on the public water supply, increased beach water pollution, ice formation in the harbor, increased ice jam flooding potential, increased flood potential, increased shoaling in the Federal and private lagoon navigation channels, land use changes and resultant changes in occupancy, and increased navigation hazards.

4.24 The Vermilion Port Authority provided some initial insight into the problems identified by local interests in its November 1975 report to the Vermilion City Council. In general, the report indicates that the problems of water quality degradation at the municipal water intake and at the beaches, ice jam flooding potential, and shoreline erosion were evident before the new work construction of the harbor breakwater in 1973. While the breakwater tends to affect water quality conditions by diverting the river outflow toward the public water intake and the beaches, the report states that "The local water intakes have been obsolete for several years, and it is well known new intakes are needed in deep water." In addition, periodic beach water problems (silting and beach contamination) "may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm." The Port Authority listed ice jam flooding under severe conditions as a questionable problem, but since the breakwater keeps windrowed ice "away from the ends of the piers, water can reach the lake under all conditions." High lake levels are identified as the primary cause of the loss of beach areas at the Nakomis and Linwood Beaches, and the build-up of beach materials at Lagoons Beach and in the entrance channel. The report states that "When the lake level returns to normal, most of these beaches will return." Positive results of the breakwater cited by the Port Authority include a reduction of river surge, helping to control harbor water levels during north to northeast winds, providing a safer harbor entrance during storms, preventing windrowed ice from jamming at the pier heads, allowing ice to flow from the harbor during northeast winds, obligating the Corps to maintain the harbor up to the Liberty Avenue Bridge, and providing a protected sportfishing area behind the structure. Identified negative results are the deflection of river flows closer to the shoreline and possible problems for small-craft entering the harbor. The problems of entrance channel shoaling during northeast to east storms and harbor ice action during severe ice conditions were listed as questionable and in need of further evaluation (140). The aforementioned Corps study will further address these and other problems in order to resolve the community's concerns through any corrective actions that may be warranted.

Survey and Inspection Operations

4.25 The impacts of survey and inspection activities are expected to be temporary, to be of low magnitude and to occur only in the immediate area due to the relatively small scale of these operations. There are no anticipated impacts on aquatic life due to survey and inspection operations since the normal harbor operation creates background disturbances equal to or greater than survey and inspection operations. Temporary aesthetic impacts, such as noise, odor and visual disruption, and temporary navigation inconvenience will result as previously described.

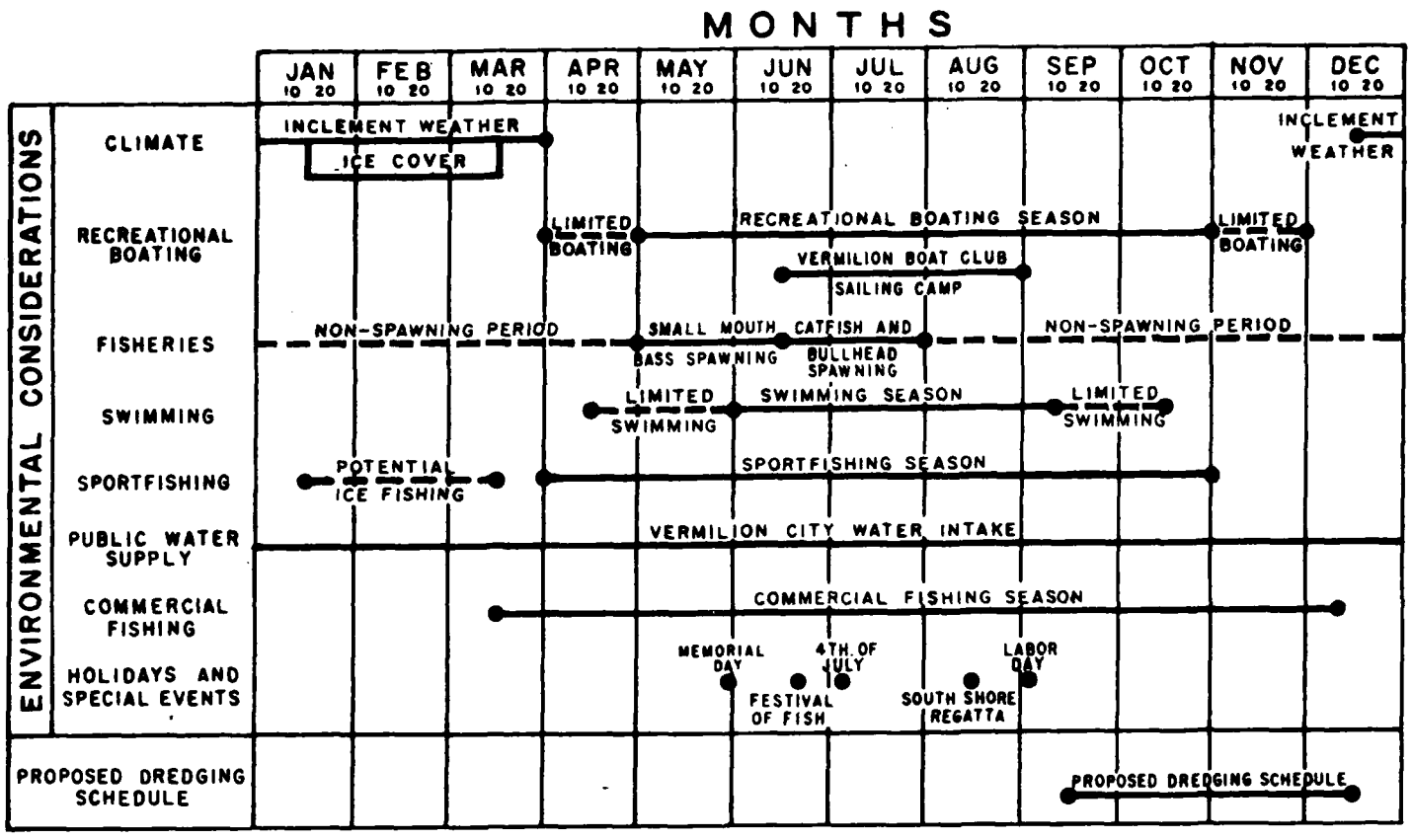
Dredging Operations

4.26 Impacts resulting from dredging operations are affected to some degree by the type of dredge utilized, although the duration, magnitude and geographic levels of impacts are generally common among the dredge plant that could be used at Vermilion. The four types of dredges which will probably be used for this project are the dipper dredge, the clamshell dredge, the cutterhead dredge, and the hopper dredge. The dipper and clamshell are mechanical dredges, while the cutterhead and hopper dredges are hydraulic dredges. Each dredge has different operating characteristics and is further described in Appendix D. The temporal relationships between various harbor related activities and the proposed period for routine maintenance dredging operations are shown on Plate 4.1.

4.27 Temporary, low-magnitude, aesthetic impacts will result from increased turbidity, noise, odor and visual interruptions caused by the presence of the dredge and its associated support vessels. A temporary inconvenience to recreational and commercial craft will arise as they circumnavigate the immediate area of the dredging equipment.

4.28 Dredging operations are not expected to affect erosion along the shoreline of Lake Erie, within the harbor area, or throughout the Vermilion River watershed. Approximately 24,800 cubic yards of sediment will be removed from the entrance channel, river channel, and lake approach areas, at a frequency of approximately once every three years, increasing present depths in these areas, which have been reduced due to shoaling. This dredging of sediment and subsequent increase in depths is expected to produce a relatively long-term, high-magnitude, beneficial impact to navigation for the more than 10,000 recreational and commercial boaters from the regional area who use the harbor extensively. The increase in channel depths is especially beneficial to the operators of sailboats through the channel since these craft require a deeper draft than motor-driven boats to allow keel clearance.

4.29 Each dredging operation will have a relatively long-term, medium-magnitude, beneficial effect upon sediment quality through the



LEGEND:

——— PERIOD OF PEAK ACTIVITY OCCURRENCE

– – – – PERIOD OF LIMITED ACTIVITY OCCURRENCE

VERMILION HARBOR, OHIO

RELATIONSHIP OF HARBOR RELATED ACTIVITIES TO DREDGING SCHEDULE

U. S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 4.1

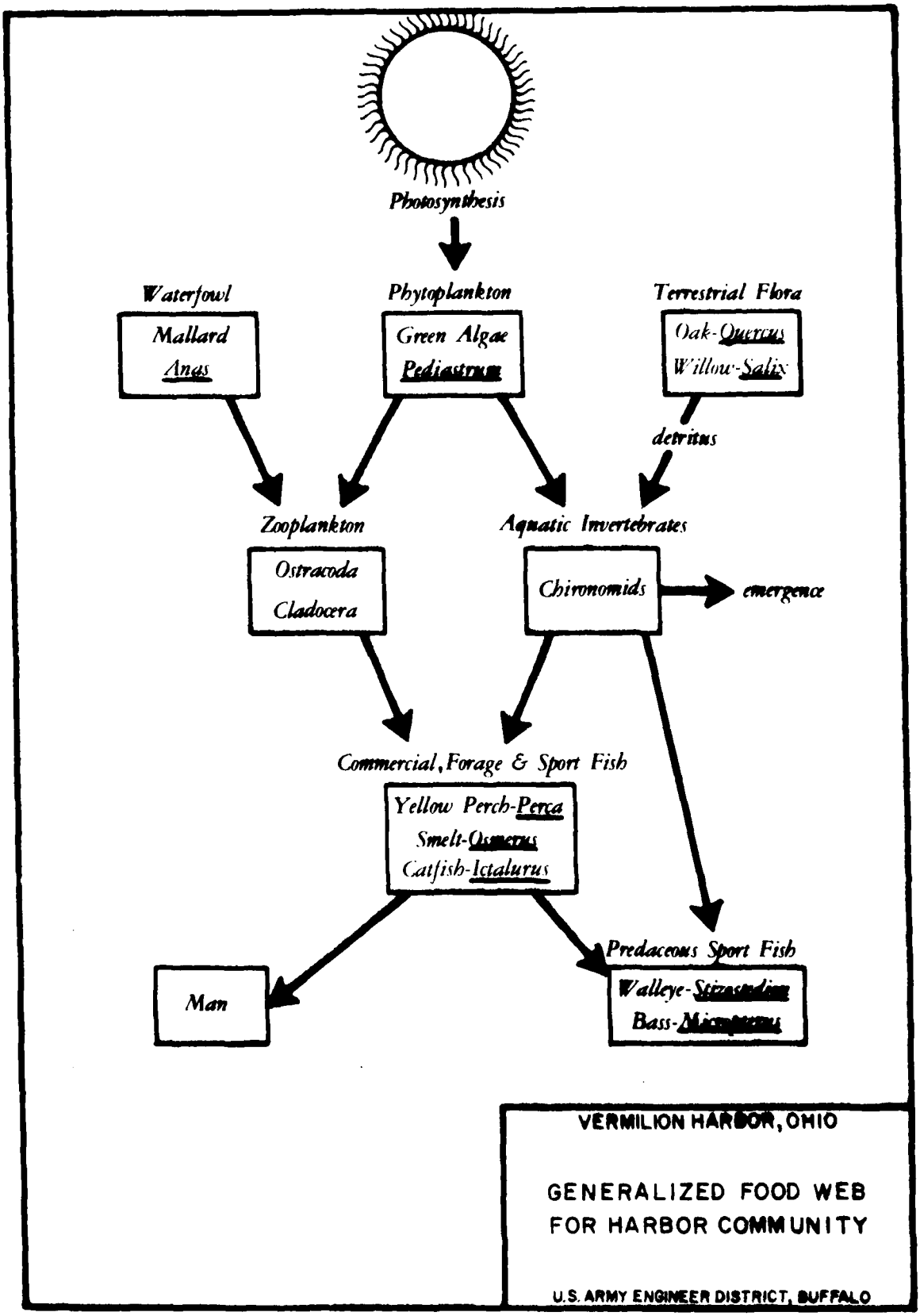
removal of 4,800 cubic yards of polluted sediments, producing an improvement in the quality of the natural environment for benthic inhabitants of the area. With water quality standards being enforced, new sedimentation in Vermilion Harbor should be relatively unpolluted. Therefore, the removal of sediments which are presently polluted will result in improved quality of sediments in Vermilion Harbor.

4.30 A short-term, medium to high-magnitude, adverse impact on the water quality of the immediate area of the dredge and for a short distance down current, will result from the dredging operations. The mechanical mixing and agitation created by the dredge will increase turbidity and suspended solids. The presence of various soluble chemical constituents in the sediment will cause increases in their concentration in the surrounding water. Those constituents involved include: Kjeldahl nitrogen, phosphorous, COD, oil and grease, and heavy metals such as zinc, mercury, lead, copper, chromium and cadmium. The amount of oxygen-demanding material contained in the sediment and sunken debris to be removed will determine the extent of dissolved oxygen depletion resulting from the operation. Studies have shown that these adverse increases in turbidity, solids, nutrients, COD, and heavy metals and decreases in dissolved oxygen are almost totally reduced to levels prior to dredging within 24 hours (118). As indicated in the 1975 U.S.E.P.A. sediment quality analyses, concentrations of mercury and lead are well below U.S.E.P.A. criteria limits in all sections of the Federal harbor. While zinc concentrations did exceed the U.S.E.P.A. criterion, a representative from U.S.E.P.A., Region V has indicated that, with the possible exception of station VER-75-6 in the lower river channel, zinc levels at each of the sampled stations are typical of natural background levels (about 125 mg/kg to about 175 mg/kg) that can be expected to be found in Vermilion Harbor (132). Therefore, the suspension of heavy metals during maintenance dredging is not expected to result in any long-term adverse affects on aquatic or human life. In a recent study of the environmental effects of various dredge types operating at San Francisco Harbor, it was concluded that "when working in the same type of material and with the same hydrographic and oceanographic conditions, the cutterhead pipeline caused the least disturbance in the water column. The trailing suction hopper dredge during periods when overflowing was not occurring was the second least degrading. The grapple (clamshell) dredge and the hopper dredge during overflow significantly increased the turbidity and the suspended solids level throughout the water column. The physical impacts of dredging operations on the water column are minor when compared to turbidity and suspended solids increases caused by Mother Nature" (146). Every effort will be made to minimize the unavoidable effects of dredging on water quality. In order to reduce the resuspension of polluted materials, dredging will be confined to essential portions of the navigation channels, and non-essential project areas will not be dredged.

4.31 Dredging will have no direct impact on aquatic vegetation except that nutrients released from the disturbed sediments may encourage a temporary increase in aquatic vegetation growth. Turbidity, a by-product of maintenance dredging, reduces the photosynthetic capability of aquatic vegetation; therefore, dredging activities may be considered to have a local, low-level, long-term impact in that turbidity produced by dredging activities may interfere with the full establishment of the aquatic macroflora.

4.32 Data regarding the effects of dredged materials from Great Lakes harbors on plankton is relatively scarce (119); therefore, the possible effects of turbidity are speculative and uncertain. A local, low-level, short-term impact may be experienced by planktonic organisms during dredging operations through an increase in turbidity and the release of nutrients from disturbed sediments. Turbidity generated in the harbor waters during dredging operations reduces light penetration and temporarily limits the photosynthetic process of phytoplankton, thus affecting the food chain (120). The interrelationships involved in an aquatic food chain are illustrated in Plate 4.2. Conversely, turbidity may be beneficial since suspended particles protect aquatic life forms from algae blooms by decreasing light penetration, and, turbidity promotes adsorption of heavy metals, toxic materials, and pollutants onto clay particles in suspension (120). Although specific documentation is not available, it is possible that certain heavy metals and other undesirable substances released during dredging may enter the food chain through planktonic organisms. One study (121) indicates that a lesser importance should be attached to potential toxic effects on phytoplankton communities because of their high reproductive capacity which allows for rapid population re-growth following even a massive reduction in number. Increased nutrient levels encourages both phytoplankton and zooplankton growth. Algae blooms usually involve only a limited number of species. When blooms occur, an adverse impact may be experienced, resulting from an imbalance in the food chain (i.e., inadequate number of consumers to control the algal input) (120). In addition, increased algal growth can ultimately lead to low dissolved oxygen levels which is detrimental to fish and other lake biota.

4.33 Dredging will have direct and indirect impacts on aquatic invertebrates. The greatest concern is over the destruction of the benthos which is a major food for many fish species. The removal of bottom sediments will destroy existing populations of benthic organisms, thus resulting in a short-term alteration of the aquatic food chain in the immediate area. Those benthic macroinvertebrates most affected are filter feeders, such as aquatic worms (Tubificidae) and midge larvae (Chironomidae) and other organisms of limited mobility including leeches (Helobdella sp.). The direct effect of dredging activity on existing benthos is usually confined to the project area (122). Periodic dredging at Vermilion Harbor will prohibit complete reestablishment of a completely developed (mature) benthic community between dredging operations.



Source: (79)

PLATE 4.2

Inconclusive data on indirect, long-term impacts related to dredging operations makes it impossible to state whether such impacts would be adverse or beneficial. There is, however, definitely a change in the physical environment as a result of dredging activities. One study (122) indicates that the potential for indirect effects on biological communities is usually attributed to physical alterations of the environment due to dredging, stating:

> These physical alterations include changes in bottom geometry and the creation of deep water regions, new open water, changes in bottom substrates and habitats, alterations in water velocity and current patterns, changes in future sediment patterns, alterations of sediment-water interface with subsequent release in bio-stimulating or toxic chemicals, and the creation of turbidity clouds (122).

4.34 It is probable that there will be short-term, low-level impact on the local fish populations in the area based on the available habitat in the lower Vermilion River. The principal areas which are populated by resident species, such as sunfish, and utilized as spawning and nursery grounds are those above the area to be dredged and the sand beach areas east and west of the harbor entrance (49) which will not be affected by the proposed action. The temporary increase in turbidity expected to occur locally during dredging operations can lead to reduced feeding visibility, disruption of identified spawning areas due to siltation, reduced vegetation cover, a decrease in availability of food, and a degradation of water quality (122). In addition, increased suspended solids can affect fish species by clogging or damaging gill filaments. The disturbance of the harbor may also result in a temporary relocation of resident species including crappie (Pomoxis annalris) and largemouth bass (Micropterus salmoides). Although it has not been documented, certain fish species more tolerant to turbidity, such as the carp (Cyprinus carpio), may be attracted to the area to feed on those benthic organisms released from the disturbed sediments.

4.35 In letters dated 6 June 1975 to the U. S. Department of the Interior, Fish and Wildlife Service and the Ohio DNR, the Buffalo District requested that these agencies identify any significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. In response to this request, in a letter dated 18 June 1975, the Fish and Wildlife Service indicated that, "Since the river does serve as a spawning area for smallmouth bass, we recommend that no dredging be conducted during the period May 1 through June 15." A reply from the Ohio DNR, dated 24 June 1975, recommended, "that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be

done during October and November when salmon are moving "through the harbor area." Based on this information, the Buffalo District proposed conducting maintenance dredging operations between 15 June and 1 October in the Draft Environmental Impact Statement on the operation and maintenance of Vermilion Harbor (Statement dated September 1975). However, in February 1976, District personnel were informed of an error in the critical fishery periods identified in the Ohio DNR's 24 June 1975 letter. In a telephone conversation between District personnel and the Ohio DNR, Division of Wildlife on 27 January 1976, a representative of the Division indicated that no dredging should be conducted between 1 May and 15 June, due to a smallmouth bass spawning migration from Lake Erie into the Vermilion River, or in late June or July, when channel catfish, bullheads, and shovelhead (flathead) catfish may enter the river to spawn. In a 29 January 1976 letter to the Director, Ohio DNR, the District Engineer stated that, in view of the revised harbor fishery information, and in order to avoid potential interference with the harbor's critical fishery activities, the Corps will "conduct future routine maintenance dredging operations in the authorized Federal channels at Vermilion Harbor between 15 September and 15 December. In a letter of reply dated 5 February 1976, the Director, Ohio DNR indicated that, "We have no objection to your proposed fall dredging of the Vermilion Harbor from 15 September through 15 December." Copies of the above discussed correspondence relating to fish and wildlife scheduling considerations are included in Appendix A, Letters of Coordination.

4.36 Therefore, by initiating maintenance dredging operations after 15 September, and completing operations before 15 December, potential interference with the late spring and early summer fish migrations identified by the Fish and Wildlife Service and the Ohio DNR will be avoided. It is important to note that future maintenance dredging operations may be required during a time period other than the fall season described above. This situation was true for the June 1974 and February 1975 emergency dredging operations. If it is anticipated that an alternative work period will be necessary, the appropriate agencies will be consulted to formulate plans to mitigate identifiable adverse effects that may result from dredging operations. Should an indication occur during the actual harbor dredging process that fish spawning areas or migrating fish species are being endangered, operations will be suspended and appropriate consultation will be initiated regarding the development of environmental mitigation measures. These problems could include the dredging of spawning beds, covering of spawning beds by disturbed sediments, or the interference with actual spawning or spawning migrations.

4.37 Any direct impact on fisheries will result in a short-term, indirect effect on local sportfishing. The degree of impact will be dependent upon the sport species present during dredging and their individual reactions to dredging-related aquatic conditions.

As indicated above, some species may temporarily relocate to adjacent areas due to disturbed conditions, while others may be attracted to suspended benthic organisms. The magnitude of the effect of dredging on sportfishing is expected to be low due to the general lack of intensive sportfishing activity from the harbor structures and in the harbor channels.

4.38 Conditions that agitate lake and harbor waters, such as heavy rains and winds during storms, and dredging, tend to suspend coliform bacteria in bottom materials and therefore have the potential for producing temporary periods during which coliform counts may exceed State criteria for water-contact recreation and public water supplies (130, 131). While there are no known research studies concerning the relationships between dredging operations and possible changes in coliform counts, the potential for short-term, medium-magnitude adverse impacts on swimming activities at the City, Lagoons, Linwood, and Nakomis Beaches, and on water supplies from the Vermilion City water intake, does exist if coliform counts increase during dredging. Effects will also be influenced by existing local coliform levels, which have generally remained well within levels recommended by the State. By conducting maintenance dredging operations after the close of the recreational swimming season (early September), any high coliform counts that may result from dredging would not be expected to affect any extensive swimming activities. However, if it is necessary to maintenance dredge during the local swimming season, or if significant adverse effects on beach water quality occur during limited, late season swimming activities, the Corps will consult with the appropriate public health agencies to determine if any mitigation measures may be required.

4.39 Since the City of Vermilion's water intake pipe is located in Lake Erie about 1,000 feet west of the west approach to the harbor, short-term, medium magnitude adverse impacts are possible due to increases in turbidity and other parameters resulting from dredging the harbor entrance. In previous years, dredging at Vermilion Harbor has occasionally been linked to increased turbidity, conductivity, coliform bacteria counts, and concentrations of heavy metals depending on wave, wind, and current action (123). Some of these parameters can be reduced to normal levels through additional treatment at the water filtration plant, but some (such as concentrations of heavy metals) might remain high despite treatment (123). The operator of the water filtration plant will be notified of proposed dredging operations in order that proper treatment can be provided for by adjusting chemical addition and filtration rates if such actions are required. Dredging at Vermilion and the subsequent disposal of dredged materials have reportedly had no effect on water quality at Huron, OH (west of Vermilion) and would not be expected to have any effects in the future (124). Similarly, representatives of the Ohio Edison plants at West Lorain and Lorain stated that no problems were associated with past dredging at Vermilion and could not foresee any effects of dredging extending that far to the east of Vermilion (125).

4.40 Routine maintenance dredging will be conducted after the season in which several annual, harbor-related community events occur, including the Festival of Fish (third weekend in June), the South Shore Regatta (second weekend in August), and the Vermilion Boat Club Sailing Camp (15 June through 1 September). Maintenance activities may be scheduled to avoid potential conflict with other major harbor events that may periodically be scheduled during the proposed fall dredging period if the Corps receives a sufficiently early notice of the time of the event and no significant operational or other environmental conflicts will result.

Transport of Dredged Materials

4.41 About 20,000 cubic yards of materials dredged from the project area that are classified by USEPA, Region V as suitable for open-lake disposal will be transported to the open-lake disposal site located 2 miles north of Vermilion Harbor. About 4,800 cubic yards of dredgings classified by the USEPA, Region V as polluted will be transported to the diked disposal facility located 10 miles west of Vermilion at Huron Harbor, OH. The material will be transported by scow and tug. Estimated travel time to the open-lake disposal site is less than 30 minutes and to the diked disposal facility is 60 to 90 minutes. Approximately 20 to 35 trips will be required for transporting dredged materials to the open-lake site, and approximately 5 to 8 trips to the diked site will be required (number of trips based on range of scow volume from 600 to 1,000 cubic yards). A hopper dredge will require between 20 and 25 trips during each routine operation to transport dredgings from the harbor to the open-lake dump zone. During these trips, tug or dredge engines will emit a small amount of noise and gaseous pollutants into the local atmosphere above the open lake, producing very short-term, low-magnitude, adverse impacts on air quality in the immediate area. The scow or dredge in motion may cause a short-term, adverse inconvenience of low-magnitude to a small number of recreational or commercial navigators who must avoid its path in the open lake. Both the tug and dredge will meet U. S. Coast Guard regulations for non-polluting discharge systems for the treatment of onboard wastes, and measures will be taken to prevent any waste, oil or sediment from leaking from the vessels.

4.42 Since the transport scows will be closed containers, and should not discharge any materials in transit, there are no anticipated environmental impacts on plankton, fish or benthic communities or on aquatic or terrestrial vegetation or terrestrial wildlife as a result of the transport activity. Hopper release doors will also be sealed to prevent leakage.

Disposal of Dredged Material

4.43 An estimated 20,000 cubic yards of sediment suitable for open-lake disposal will be deposited in the open-lake disposal area two miles north of the outer end of the east pier. At the disposal area, the deposition of sediments will cause a low-magnitude, short-term decrease in lake depths which in itself would be considered neither beneficial nor adverse to recreational or commercial boaters (126). Maximum depth decreases can be expected to be in the range of a few centimeters (127). Studies have shown that transport of sediment deposits by lake currents or other means to areas outside the defined disposal area will be extremely minimal (127). During sediment disposal, short-term, high-magnitude, adverse increases in turbidity will be precipitated in the water column immediately above the disposal site and in the down-current direction for approximately 400 to 1,200 feet (121). The extent of this turbidity plume depends on wind, wave and current action at the disposal site, and particle size distribution and settling rates of the sediment which is being disposed. Sediment disposal will also cause a short-term, medium-to-high magnitude, adverse increase in COD and concentrations of solids, nutrients, heavy metals and similar decreases in dissolved oxygen in the water column above the disposal site and in the down-current direction for approximately 100 feet from the immediate dump area (121). Water quality in areas outside the immediate disposal area may be expected to remain unaffected, and there is expected to be no impact on quality at Vermilion's water intake. Within the disposal area, settling rates are such that water quality parameters should be reduced to levels prior to disposal within 24 hours or less depending upon the disposal site water depth (118).

4.44 Adverse environmental impacts will be mitigated by operational procedures wherever possible. For example, dumping will take place only while the disposal scow or hopper dredge is stationary. Studies have shown that this procedure eliminates much of the turbidity plume created during disposal (121). Every precaution will be made to confine the dumping and resultant sedimentation zone strictly to the open-lake disposal area which encompasses 160 acres. There will be no direct impact on aquatic vegetation as a result of dredged material disposal activities.

4.45 The direct impact of the open-lake disposal of dredged materials on plankton has not been completely defined. Research on the effects of dredged materials (121) shows that parameters such as potentially harmful heavy metals and pesticide residues, turbidity and the release of nutrients from these materials can potentially lead to serious consequences in the aquatic ecosystem. Mitigative measures have been instituted to insure that polluted materials dredged from Vermilion Harbor will not be dumped in the open waters of Lake Erie.

However, the release of chemical constituents may promote the growth of algae and the subsequent uptake of potentially harmful chemical constituents such as pesticide residues and heavy metals, which can be absorbed through the food chain. Turbidity levels will increase but are expected to be of short duration constituting a low-level impact on the photosynthetic processes of local planktonic forms.

4.46 A local, short-term, adverse impact will be experienced by aquatic invertebrates inhabiting the open-lake disposal area. These benthic macroinvertebrates will be covered by dredged materials during the actual open-lake disposal process (122). Some of these organisms will be able to migrate up through the material while others not capable of extensive movements will be lost. Should potentially harmful chemical substances be released, it is possible that they could enter these organisms through the food chain. Fish species in the vicinity of the Vermilion River open-lake disposal area will be relatively unaffected by the disposal operation due to their ability to move away from the immediate area. Turbidity generated by the release of dredged materials is expected to be of short duration. Polluted dredged materials will not be deposited in the open-water area; consequently, there is little chance that potentially harmful materials such as heavy metals could enter the food chain and ultimately affect fish populations.

4.47 There will be a short-term, low-magnitude, adverse impact upon any sport and commercial fishing which may occur in the disposal site. Depending on the nature of the material deposited, it is possible that improved habitat for benthic organisms could improve both commercial and sportfishing in the area by attracting fish species (122). Open-lake disposal will not affect commercial sand and gravel dredging operations, which may occur as close as four miles to the north of the harbor's disposal zone.

4.48 Several short-term, low-to-medium magnitude environmental impacts will result during the disposal of polluted harbor dredgings in the Huron Harbor Site 1 diked disposal facility. The presence of maintenance plant will result in localized effects on air quality and aesthetics. The transfer of dredgings will be conducted in a manner to prevent spillage between the transporting scow or hopper dredge and the enclosed site. Depending on the stage of site filling at the time of deposition, aquatic and terrestrial organisms will be disturbed when dredgings are deposited in the facility. A long-term effect of this operation will be a contribution to the creation of a land area at Huron Site 1. A complete discussion of potential effects associated with disposal in the Huron facility are presented in the final environmental impact statement for Huron Site 1, which is available upon request to the Buffalo District Office.

Sweep Survey Operations

4.49 The impacts of sweep survey operations are expected to be temporary and of low magnitude, and to occur only in the immediate area due to the relatively small scale of the activity. There are no anticipated impacts on aquatic life due to the survey and inspection operations since background harbor disturbance equals or exceeds project activities. The sweep survey equipment consists of a shallow draft vessel and a sweep float equipped with iron bars suspended to a depth equal to the authorized channel depth. Since the sweep is performed after dredging, the iron bars should not contact the harbor bottom, thus no impact on water quality will result. Aesthetic impacts, such as noise, odor and visual disruption, and navigation inconvenience will be expected as previously described.

4.50 During the sweep survey, large submerged objects in the harbor channels will be located and removed immediately if equipment is available, providing a long-term, beneficial aid of low magnitude to the thousands of regional boaters who use the harbor. Large obstructions that are occasionally located during the sweep operations are generally limited to structural stones, which when found are replaced on the harbor structure. Other objects, such as abandoned automobiles or containment drums, are removed and turned over to the appropriate local authorities, such as the Police Department, for disposition in accordance with local procedures.

Structural Maintenance

4.51 Continued maintenance of the piers and breakwater at Vermilion Harbor will provide a long-term, high-magnitude, beneficial impact on navigation in the region. Prior to the construction of the breakwater, lake currents made navigation through the harbor entrance difficult during lake storms. Thus, boaters using the harbor area will be afforded continued protection. Structural maintenance will allow the lagoons and the entrance and river channels to freeze smoothly, eliminating high waves (surges), thereby providing an annual short-term, medium-magnitude, beneficial impact upon such activities as hockey and ice skating on the lagoons, and local ice breaking operations in the river channel.

4.52 Depending upon the nature and extent of repairs performed on existing structures, the project may have a direct, short-term, beneficial effect of low-to-medium magnitude on revenue, employment and earnings of some local, retail trade establishments. Specifically affected will be those dealing with the supply and transport of building materials such as stone and concrete products.

4.53 Structural maintenance activities can be expected to cause a short-term, low-magnitude, adverse inconvenience to a few commercial

and recreational boaters who will have to avoid project vessels in the harbor area. Maintenance vessels will be operated to avoid major interference to the commercial and recreational vessels, and the U. S. Coast Guard will provide navigation aids if necessary. Structural repairs will result in the emission of a minor amount of noise, dust, odors and gaseous pollutants into the atmosphere in the immediate vicinity of the structures under repair, resulting in a temporary, low-magnitude deterioration of the natural environment's quality. Repair operations and equipment may result in a low-magnitude, temporary inconvenience to some sport fishing, swimming and pleasure boating activities that normally take place in the project area. The Corps of Engineers will mitigate these effects as much as possible through precautionary measures. All maintenance vessels will be in compliance with USEPA standards for the control of smoke and fumes; dust control will be accomplished where necessary. Maintenance activities may cause low-to-medium magnitude, short-term, adverse increases in turbidity levels in small portions of the harbor area waters.

4.54 Structural maintenance activities are expected to be concentrated at pier areas. Since structures such as breakwaters and piers tend to attract certain species of aquatic invertebrates, such as scuds and fish, it is anticipated that normal maintenance will result in a temporary, low-level impact on these organisms by temporarily displacing some of them from the immediate area. Pioneer vegetation species have established themselves on the piers. This vegetation may be destroyed or partially removed due to maintenance activity of the piers. Since these plants are ubiquitous weedy species, and in their present limited density and distribution on the piers provide very poor habitat for terrestrial animal species, their removal is considered a low-magnitude, adverse impact.

5. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.01 Those adverse effects which cannot be avoided in the execution of operation and maintenance activities include:

a. Survey and Inspection Operations

1. Short-term, low-magnitude inconvenience to a few recreational navigators who must avoid the work areas in the harbor or channel.

2. Short-term, low-magnitude, adverse impacts on local natural environmental quality caused by the release of a small amount of oil and lead from the project vessels into the harbor waters and gaseous pollutants and noise into the harbor atmosphere.

b. Dredging Operations

1. Minor short-term inconveniences of low magnitude to a small number of recreational and commercial navigators who must avoid the local work area.

2. Short-term, low-magnitude increase in pollutant levels caused by motors used to power tugs and dredges releasing small amounts of noise and gaseous pollutants into the atmosphere.

3. Short-term, high-magnitude impacts caused by unavoidable spillage of dredged materials from dredge buckets, or hopper overflow, thereby increasing turbidity and suspended solids levels and decreasing dissolved oxygen levels in the water column directly above the surface being dredged as well as in the immediate down-current direction.

4. Short-term disruption of benthic and planktonic communities (up to 14.4 acres) as well as the displacement of nektonic organisms.

5. Short-term impacts caused by the resuspension of sediments resulting in the release of heavy metals and nutrients into the aquatic environment.

6. Temporary emigration of fish from Vermilion Harbor until such time as water quality improves and turbidity decreases, resulting in temporary reduction in recreational fishing potential.

7. The prevention of the reestablishment of a mature benthic community regardless of improvements in the quality of the sediment, caused by continued maintenance dredging on a periodic basis.

c. Transport of Dredged Materials

1. Short-term, low-magnitude, adverse impacts on local air quality caused by the engines of the hopper dredge or the tug used to transport the scow emitting minor amounts of noise and gaseous pollutants into the atmosphere above the open lake.

2. Minor, short-term inconveniences caused by the scow or hopper dredge in motion to a small number of recreational and commercial navigators who must avoid its path in the open lake.

d. Disposal Operations

1. *Short-term, medium-to-high-magnitude, adverse impacts* by increases in turbidity, COD, solids, heavy metals, and nutrient levels, and decreases in dissolved oxygen levels in the water column above the immediate disposal site and in the down-current direction, depending upon prevailing wind and lake current conditions.

2. Disruption of up to 160 acres of benthic habitat (the area inside the specified disposal site for dredgings). Some benthic organisms may be able to burrow up through the freshly deposited dredged materials, but the remainder will be lost beneath the deposited materials.

3. Localized, short-term, low-to-medium magnitude effects on air quality, aesthetics, and aquatic and terrestrial organisms at the Huron diked disposal facility during disposal operations.

e. Sweep Survey

1. Short-term, low-magnitude inconvenience to a few recreational and commercial navigators who must avoid the work areas in the harbor or channel.

2. Short-term, low-magnitude, adverse impacts on local natural environmental quality caused by the releases of a small amount of oil and lead from the project vessels into the harbor waters and gaseous pollutants and noise into the harbor atmosphere.

f. Structural Maintenance

1. Short-term, low-magnitude inconveniences to a few local recreational and commercial boaters who will be forced to avoid project vessels in the harbor area, and sportfishermen unable to use work areas on the structures.

2. Short-term, low-magnitude deterioration of the natural environment caused by the emissions of a minor amount of noise, dust, odors, and gaseous pollutants to the air as well as increased turbidity in the water during structural repairs.

3. Temporary, low-level, adverse impacts on aquatic invertebrates and fish by displacing some of them temporarily from the immediate area during structural repair.

6. ALTERNATIVES TO THE PROPOSED PROJECT

Introduction

6.01 The following sections describe various alternatives to the proposed maintenance project at Vermilion Harbor, which is described in detail in Chapter 1. Each alternative is described and evaluated with respect to its relationship to harbor maintenance activities.

Discontinue Operation and Maintenance Activities (No Action)

6.02 It would be possible to discontinue all channel maintenance and structural repair operations in Vermilion Harbor. This course of action would require Congressional approval before maintenance activities could be terminated. Because this alternative would not require maintenance equipment or activities to implement, it is considered technically feasible. Average annual costs saved by following this course of action would be equivalent to the average annual costs previously listed for the harbor's operation and maintenance activities.

6.03 Historical mid-channel depth data for the existing Federal channels at Vermilion Harbor is presented in Table 6.1. If Corps maintenance dredging were discontinued, depths in the harbor channels would be expected to fluctuate as they did prior to the completion of new work dredging in these channels in 1973 (reference Table 6.1). While depths in the entrance channel have remained relatively constant over the available period of record, they would also be expected to fluctuate between about 5.0 and 15.0 feet if Corps maintenance were discontinued. Channel reductions could occur within a matter of weeks, if severe lake storm or basin flooding conditions were encountered, or in several years if sediment loads in the river and littoral systems were reduced. In view of the recreational and economic beneifts to be derived from mainteining project depths, it is highly probable that non-Federal interests would continue maintenance dredging and channel conditions would not significantly change.

6.04 A discontinuation of dredging in the river channel and lake approaches would produce a long-term effect of progressively higher magnitude and adverse consequences as water depths in the harbor area would decrease through the accumulation of an increased volume of sediment and debris. As the piers and breakwater suffered a large amount of deterioration, lake waves would re-enter the harbor with full force altering channel currents. Increased flow velocities in the channel would result from the decrease in volume due to sedimentation. The aforementioned effects of discontinued dredging would combine to

Table 6.1 - Mid-Channel Depths
Vermilion Harbor, OH, 1847-1973
(depths in feet)

Year	Lake Approach Channel*			Entrance Channel			River Channel		
	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
1847	data not available			17.6	11.0	12.8	data not available		
1854	data not available			13.3	4.6	10.1	data not available		
1874	data not available			13.9	10.3	12.1	11.7	4.8	9.8
1903	13.4	12.1	12.5	14.6	10.7	12.5	12.8	7.7	10.6
1907	14.0	12.0	13.3	14.9	12.3	12.9	14.1	9.9	11.3
1935 (March)	data not available			16.7	10.9	13.3	11.9	6.7	8.3
1935 (May)**	12.9	9.7	11.9	15.3	9.4	12.7	data not available		
1935 (June)**	12.8	11.7	12.3	15.7	11.3	13.1	data not available		
1940	data not available			14.5	11.3	13.0	11.6	5.1	7.5
1946	13.0	12.2	12.7	14.6	11.5	12.5	11.0	4.6	7.1
1959	13.8	12.3	13.2	17.6	11.2	14.5	13.3	6.1	9.0
1964	13.5	12.2	13.0	14.7	10.9	13.0	data not available		
1966	data not available			14.1	10.0	12.4	data not available		
1969	data not available			14.3	10.8	12.7	12.1	5.1	7.9
1973	12.4	10.0	11.4	data not available			12.0	3.5	7.5

Notes: * Lake approach channel depths taken along an extension of the entrance channel center line extended 300 feet lakeward from the outer end of the east pier.

** May 1935 soundings taken before contract maintenance dredging of the entrance channel; June 1935 soundings taken after contract maintenance dredging in the entrance channel.

Federal new work dredging of the entrance channel occurred in the 1830's and 1870's; the channel was maintenance dredged in 1915 and 1935. Other channels were incorporated into the maintained Federal project after their new work dredging was completed in 1973.

Source: Examination soundings for years listed in table, U. S. Army Engineer District, Buffalo.

produce a long-term, high-magnitude, adverse impact in navigability of the river channel and lake approaches, and might culminate in the loss of access to Lake Erie through the Vermilion Harbor for all but the shallowest draft recreational craft.

6.05 Continued unrelieved deposition of polluted sediments from various upstream sources would result in a long-term, adverse deterioration of sediment quality of progressively higher magnitude. Implementation of the no-action alternative would result in an equilibrium of sedimentation and transportation, allowing polluted sediments to enter the lake. The discontinuance of dredging would allow for the full establishment of a mature benthic community as well as for the potential establishment of spawning habitat.

6.06 Short-term effects of discontinued operation and maintenance of the Vermilion Harbor would include the high-magnitude, adverse inconvenience to approximately sixty recreational sailboat owners who would be unable to negotiate the river channel due to insufficient draft near their place of dockage. Discontinued maintenance of the river channel would result in short-term, medium-magnitude inconveniences to recreational boat operators.

6.07 Decreased navigability of the harbor would eventually result in a decline in the harbor's desirability as a boating-related recreational facility, resulting in loss of business and income by those firms and invididuals providing goods and services to the harbor's recreational users. This loss of business would have a greater effect on local maranas and boat sales and service industries; those who supply seasonal rental property, and operators of motels, resorts, and restaurants would also be affected, but to a lesser extent. During 1974, the marinas and the commercial fishing company had a combined sales of some $3.5 million. Federal and local resources invested in the existing harbor facilities would be lost by discontinuing maintenance of those facilities.

6.08 Should the harbor deteriorate, there could eventually be a decline in the assessed property values and property tax revenues received from land in the harbor, lagoon and Linwood Park areas. Other impacts would be a possible loss of tax revenue from boat and fishing license sales, as well as lower sales and income tax receipts. Approximate harbor-generated income and sales tax revenue in 1974 were $120,000 and $114,000, respectively. Extensive channel shoaling would increase the river's flood potential, and resultant threats to property and life, as the channel capacity decreased.

6.09 The commercial fishery operating out of Vermilion Harbor could be forced to suspend or relocate its operations should the harbor deteriorate, thus causing a loss of tax revenue to the city as well as increasing local unemployment. Twenty-seven persons are employed on a full-time basis and an additional 23 persons are employed on a part-time basis by the Kishman Fish Company in Vermilion.

6.10 Vermilion's cultural activities and attractions such as the Festival of the Fish, the South Shore Regatta, and interest in further development of the "Harbour Town 1837" section of the city could also be adversely affected by harbor deterioration.

6.11 Due to the potential large-scale deterioration of both the natural and the human environments which would result from the no-action alternative, it was not given further consideration.

Maintaining Alternative Channel Dimensions

6.12 The scope of maintenance dredging at Vermilion Harbor could be reduced by dredging the authorized channels to lesser depths or widths. Such operations would be technically feasible to accomplish using the same maintenance equipment and procedures that are described in Chapter 1 for the proposed project. Alternative costs would be dependent upon the depth and width of dredging. However, because channel dredging dimensions would be reduced, maintenance costs would probably be less than the cost of the proposed project.

6.13 If channel dredging dimensions were reduced, the volume of maintenance dredgings and operational working time would be expected to decrease. Dredging volume and time reductions would diminish the level of dredging impact on the natural environment, particularly temporary impacts on the aquatic ecology of Vermilion Harbor and the harbor's Lake Erie disposal area. For example, by reducing the volume of maintenance dredgings, less shoal material would be suspended, thereby reducing turbidity and potential adverse effects on water quality. A reduction in working time would decrease the duration of dredging disturbances, thereby reducing the duration of adverse impacts on plankton, macroinvertebrates, fisheries, and water quality.

6.14 Reducing the scope of maintenance dredging would produce similar results on temporary dredging impacts on the human environment, such as decreasing the duration of inconvenience to recreational navigation due to the presence of maintenance plant in the harbor. However, any reduction in the authorized project channel depths or widths would seriously affect the operational viability of Vermilion Harbor for recreational navigation.

6.15 Local marina owners have indicated that, during the 1975 recreation season, the average vessel draft of a majority of the small craft docked at Vermilion Harbor facilities ranged between 2.0 and 4.0 feet (128). In order to safely navigate, small craft require a 4.0 foot channel depth (1.0 foot for squat draft, 1.0 foot for low water design, and 2.0 feet nominal clearance) in addition to the vessel draft (129). Therefore, the range of minimum channel drafts necessary to insure safe navigation in the Vermilion Harbor river channel is between 6.0 and 8.0 feet. Dredging to a depth less than 6.0 feet would effectively preclude small craft navigation in the harbor, while dredging to a depth between 6.0 and 8.0 feet would progressively eliminate navigation by the existing fleet as depths decreased. Reducing channel depths to less than 8.0 feet would not only have a direct effect on navigation, but also adverse effects on employment, businesses, service and retail sales, public revenues, and other factors indirectly related to recreational boating. Any reduction in channel depths, or widths, would decrease the channel capacity to carry flood flows, thereby increasing potential property damages and threats to life due to the flooding.

6.16 A depth of 12.0 feet in the harbor's east lake approach and entrance channels is necessary to provide a safe navigation entrance to the harbor during storm periods, when high wave troughs in these lakeward channels could significantly reduce the available vessel draft. The 12.0 depth is particularly necessary for safe navigation by sail craft, which have typical vessel drafts of between 4.0 and 8.0 feet. In addition, the 12.0 foot depth in these channels is required for the entrance and maneuverability of Coast Guard vessels during ice breaking operations. Such operations are conducted to avoid damaging flooding.

6.17 Channel widths of 100 feet in the entrance channel and 100 and 80 feet in the river channel are necessary to avoid major interference and vessel collisions between an operating maintenance dredge (typically between 30 and 50 feet in width, depending on the vessel used) and two-way small boat traffic. Channel widths of 150 and 250 feet in the west and east lake approach channels, respectively, are necessary to permit an adequate area for safe navigation during storm periods and during the presence of maintenance vessels. Any decrease in the authorized channel widths would also impede vessel traffic between the navigation channels and marina dock channels, which could result in vessel groundings.

6.18 In view of the long-term direct effects on recreational navigation and safety, and indirect effects on the harbor's economic functions that would result from maintaining alternative channel dimensions, this course of action was not given further consideration.

Alternative Dredging Schedules

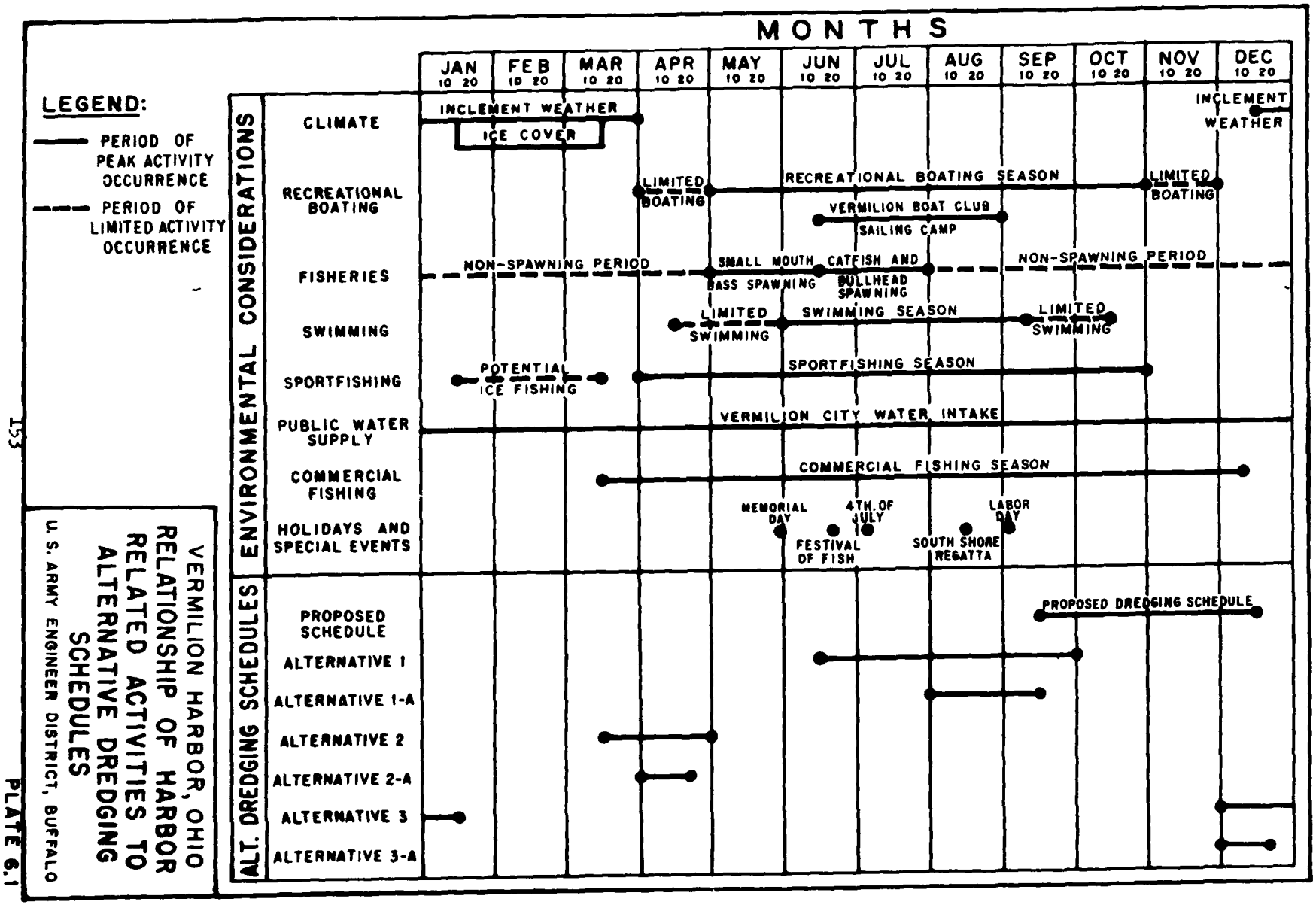
6.19 The following six alternative schedules for routine maintenance dredging were considered as options to the proposed dredging

schedule (six week duration between 15 September and 15 December, frequency of once every three years):

Alternative Schedule Designation	Dredging Duration and Period	Dredging Frequency
1	any 6 week period between 15 June and 1 October	once every 3 years
1-A	any 3 week period between 1 August and 15 September	annually
2	6 week period between 15 March and 1 May	once every 3 years
2-A	3 week period between 1 April and 20 April	annually
3	6 week period between 1 December and 15 January	once every 3 years
3-A	3 week period between 1 December and 20 December	annually

Alternative 1-A is a subalternative of the alternative 1 dredging schedule in that it's dredging period date limits (1 August - 15 September) occur within the date limits of the alternative 1 schedule (15 June - 1 October). Similarly, alternatives 2-A and 3-A are subalternatives of alternatives 2 and 3, respectively. Consideration of alternative 2-A was specifically requested in a letter of comment on the Draft Statement, dated 6 October 1975 (copy in Appendix F), from Mr. George W. Grossman. No alternative schedules were considered for the 15 January through 15 March period due to the high probability of lake ice preventing access to the open-lake disposal zone and generally hazardous navigation conditions that typically occur during the winter season. The temporal relationships between the considered dredging schedules and significant water-related activities of the Vermilion Harbor area are displayed on Plate 6.1.

6.20 As shown on Plate 6.1, the winter dredging schedules (alternatives 3 and 3-A) would have the least potential for interference with local water uses. Public water supplies obtained through the Vermilion city water intake could be temporarily affected by dredging-related turbidity, but this effect would occur during any dredging schedule and can be mitigated by operational procedures at the water plant.



VERMILION HARBOR, OHIO
RELATIONSHIP OF HARBOR RELATED ACTIVITIES TO ALTERNATIVE DREDGING SCHEDULES
U. S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 6.1

Other affects would be short-term disruption of aquatic biota, which would also occur during any dredging period, and potential interference with the last 10 days of the commercial fishing season. In comparing the two winter schedules, alternative 3, which would require dredging for about six weeks once every three years, would be less environmentally disruptive than the alternative 3-A, which would result in annual effects for a total of nine weeks over a three-year period. Furthermore, dredging during either period is not operationally practical even during mild winters. The restricted time period would mean that the maintenance contractor would probably have to work 24 hours per day to complete the work in the required time period, and costs would be at least about 50 percent higher than normal work season costs. Therefore, alternatives 3 and 3-A were not considered further.

6.21 Spring dredging schedules (alternatives 2 and 2-A) would result in short-term disruptions of the public water supply, the commercial fishing and sportfishing seasons, aquatic biota, and limited early swimming and recreational boating activities. As in the case of the winter schedules discussed above, dredging for about six weeks once every three years under alternative 2 would result in fewer cumulative, long-term effects than annual dredging for three weeks under alternative 2-A. Both of the spring schedules constitute highly restrictive operational periods that would make contracting for the work at reasonable costs almost impossible. Early spring contract starts would involve substantial contingency costs, for lake tows of scows by tugs, that would increase maintenance dredging costs by between 35 percent to 50 percent over normal work season costs. In addition, the alternative 2-A schedule would incur three times the value of mobilization and demobilization costs of the alternative 2 schedule due to more frequent operations. Therefore, alternatives 2 and 2-A were not given further consideration.

6.22 Both summer dredging schedules (alternatives 1 and 1-A) fall within the season of optimal operating conditions for dredging plant. However, dredging according to the alternative 1-A schedule would be more costly than alternative 1 since it would involve annual charges for mobilization and demobilization. Summer dredging would temporarily affect, to varying degrees, recreational boating, swimming, sportfishing, fish spawning, commercial fishing operations, the public water supply, and some special harbor events and holiday activities. Either summer schedule would be more environmentally disruptive than winter or spring schedules. Alternative 1 would be environmentally more favorable than alternative 1-A because its long-term impacts resulting from dredging for six weeks once every three years would be less than dredging for three weeks annually under the alternative 1-A schedule. Dredging during the alternative 1 schedule was originally proposed as the project

dredging schedule in the Draft Statement on the operation and maintenance of Vermilion Harbor. However, in view of revised harbor fishery information from Ohio DNR and the objections of local interests to the impact of temporary, dredging-related adverse effects on beach water quality, the alternative 1 summer schedule was replaced by the proposed fall schedule. Annual dredging during the alternative 1-A schedule would eliminate potential interference with identified, significant fish spawning periods but would not eliminate potentially adverse effects on beach water quality during the peak swimming season. Therefore, due to the unavoidable, adverse environmental effects of summer maintenance dredging, alternative schedule 1 and 1-A were not considered further.

Land Disposal

6.23 Materials removed from Vermilion Harbor during maintenance dredging could be deposited in abandoned strip mines, quarries, or sand and gravel pits. In addition, this material may be used for agricultural purposes due to its high nutrient content.

6.24 Land disposal could be accomplished either by truck transport or by pumping dredgings via a pipeline, from the transporting scow to the disposal site. However, the cost of using maintenance dredgings for fill purposes is, in most cases, a prohibitive factor. In addition to normal dredging expenses, the scow must transport the dredged material to a site in close proximity to the fill area. A pipeline system, with auxiliary pumps, must be installed between the scows docking site and the fill area. Costs for construction of this system increase markedly with any increase in the pumping distance. Trucking costs are similarly prohibitive.

6.25 Approximately 23,000 cubic yards of sediments excavated during the 1973 construction dredging were disposed of in an abandoned quarry, located about 3.5 miles south of Vermilion, which was made available by the Vermilion Fish and Game Association. This site was subsequently filled, graded, seeded, and planted with trees and is not available for further disposal operations (135). The Vermilion Port Authority has assisted the Corps in locating two additional potential upland disposal sites. These sites, which are located east of Vermilion off U.S. Route 6, were adjacent to a streambed, and have been rejected due to potential leaching problems that could result from their use. No other land disposal areas were either recently suggested or made available by local interests. Therefore, at this time, there are no known viable land disposal sites in the Vermilion area.

6.26 The impacts associated with dredging and structural maintenance are not changed by this alternative. Reduced air and water quality, the removal of harbor sediments, and the disruption of aquatic habitat will occur during dredging.

6.27 In addition, land disposal of both polluted and unpolluted sediments could be expected to have an effect upon groundwater quality, vegetation forms, soils, habitats of fauna and flora, and land forms at the disposal site. Transportation of sediment from the river and lake to the disposal area could be expected to produce impacts on the natural environment's air quality along and in the immediate vicinity of the route due to emission of gaseous polutants, dust, odors, and noise. Land disposal of dredged material will have no effect on the aquatic environment of the project area since no land disposal activities involve work in or on the water of the project area.

6.28 Land disposal of sediments could be expected to affect land use and property values in the immediate vicinity of the disposal site. Disposal operations would create an aesthetic disruption in the area adjacent to the selected disposal sites. The unavailability of potential sites precludes further consideration of this alternative at this time.

Use of Unpolluted Dredged Material for Beach Nourishment

6.29 The Corps of Engineers has authority to place unpolluted dredged materials on beach areas if the cost of this action does not exceed the cost associated with such material's least costly means of disposal, which is open-lake disposal at Vermilion Harbor. When the cost of beach nourishment exceeds the cost of open-lake disposal beach nourishment could still be accomplished, without further Congressional authorization, if local interests would bear the additional costs associated with this action. If local interests are unable to fund the additional costs, then a complete beach nourishment project with Congressional authorization and funding would be necessary.

6.30 Beach nourishment disposal may be technically and economically feasible to accomplish using the harbor's unpolluted dredgings from the entrance channel. Shallow lake depths in the littoral zone would generally preclude the approach of a scow to within an economical pumping distance from the shoreline. However, a dredge operating in the outer section of the entrance channel or in the lake approach channel could transfer dredgings directly from the channel to the adjacent shoreline. This procedure could be accomplished by pumping dredgings through the discharge pipeline if a cutterhead dredge is operating, or by swinging the excavation bucket over either pier and releasing dredgings if a clamshell or dipper dredge is used. The latter procedure was employed to nourish the downdrift (west) beach area during the June 1974 and February 1975

emergency dredging operations in the entrance channel. Cubic yard costs during these operations were about $4.00 and $3.50, respectively. During the November 1975 emergency dredging operation, 2,350 yards of unpolluted entrance channel materials were dredged by the U. S. Derrickboat TONAWANDA (which was equipped with a clamshell bucket for the operation), transported upriver in a scow, transferred into dump trucks, and trucked to the edge of a bluff at the east end of Nakomis Beach (located along the lakeshore about 3,500 feet east of the east pier). Dredgings were dumped over the bluff onto Nakomis Beach. The economic feasibility of updrift disposal was not determined due to the small quantity of material involved. Based on the 1975 USEPA, Region V sediment quality analysis, and the Buffalo District's estimate of the volume of sediment in the harbor, approximately 20,000 cubic yards of unpolluted littoral sediment in the lake approach channel and outer section of the entrance channel would be suitable for use as beach nourishment material during each three-year routine maintenance dredging operation.

6.31 Deposition of unpolluted materials at the Lagoons Beach, Linwood Park Beach, Nakomis Beach or other beaches east of the harbor was suggested in several letters of comment on the Draft Statement from local interests (copies of letters are in Appendix F). Updrift beach disposal was accomplished in November 1975 partially in response to the expressed desire for such an action by local interests. However, the primary objective of the updrift disposal operation was to provide a basis for determining sand movements east of the harbor. Beach profiles were plotted during the operation and will be replotted sometime in mid-1976. Comparisons between the two profile series are expected to indicate the general location and direction of movement of the 2,350 yards that were added to the updrift littoral system. Long-term updrift disposal would not be practical under existing conditions due to the westward flowing littoral current, which would tend to redeposit nourishment materials back into the lake approach and entrance channels. A groin or series of groins perpendicular to the eastern beach shoreline may be an effective means of retaining nourishment materials along the shoreline. A single, long groin near the Linwood Beach - Lagoons Beach property line or a series of vinyl tube groins along the eastern shoreline were suggested in a comment on the Draft Statement from Mr. George W. Grossman (letter dated 6 October 1975, copy in Appendix F). In addition, the Vermilion Port Authority suggested constructing two breakwalls on the Linwood-Nakomis Beach properties (140). The construction of such shoreline structures is beyond the scope of authority under which the Corps maintains Vermilion Harbor.

6.32 Downdrift disposal over the west pier to nourish the Vermilion City Beach or other beach areas west of and in close proximity to the harbor would be more practical than updrift disposal due to the net westerly littoral movement at Vermilion. Downdrift disposal was

accomplished during the June 1974 and February 1975 emergency dredging operations and could be conducted in the future in a similar manner. Although Mr. Theodore D. Wakefield, owner of the corner property adjacent to the west pier and the lakeshore, has expressed a favorable opinion toward downdrift disposal of unpolluted materials, no other local interests have requested further consideration of this alternative or have offered to fund a beach nourishment program. Beach nourishment was not recommended in the Port Authority's November 1975 report.

6.33 During the deposition of suitable beach fill materials at any location, turbidity would be increased in the littoral zone peripheral to the fill area and for some distance downdrift. Fishery habitat along the lakeshore in the fill area would be lost. Some benthic and planktonic organisms would be destroyed. Mobile aquatic life, including any fish present at the time of operations, would be expected to migrate from the disturbed area. Shoreline erosion would be reduced in the fill area, thereby protecting the existing beach and shoreline natural and human environments. Turbidity could affect the city water intake west of the harbor.

6.34 In summary, the adverse environmental effects of beach disposal would generally be short-term and of low magnitude. A long-term beneficial impact would be beach enhancement. Both updrift and downdrift disposal would be technically feasible to accomplish, although recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal is not practical under existing conditions since the nourishment material would tend to be littorally transported back into the navigation channels. Downdrift disposal is more feasible in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, each downdrift disposal operation would probably require an individual environmental evaluation due to the late season swimming activities at westward beaches, the location of the city water intake and other environmental considerations. Should appropriate local interests express an interest in beach nourishment using suitable maintenance dredgings from a specific operation, the Corps will further analyze the engineering and economic feasibility of the specific proposal, and a separate environmental assessment of the action will be prepared.

Modification of the Harbor Structures

6.35 Structural modifications of the Vermilion Harbor breakwater and east pier have recently been suggested by local interests. The objectives of the various modifications include mitigating shoreline erosion, reducing beach water pollution, and reducing the scope of maintenance dredging. The suggested alternatives, which include raising

the east pier, removing the breakwater, and removing a section of the breakwater, are considered with respect to their potential effects on harbor maintenance operations in the following paragraphs.

6.36 In a November 1975 report prepared by the Vermilion Port Authority for the Vermilion City Council, the Port Authority suggested that the "east pier should be raised; existing blocks should be extended 100 feet south and another row added (staggered beside existing blocks)" (140). The objective of this alternative would be to trap some of the sand that is presently transported over the pier by wind and wave action (particularly during northeast and east storms) on the east side of the pier at the Lagoons Beach. This alternative would probably be effective in temporarily reducing entrance channel shoaling adjacent to the east pier. However, it would not affect channel shoaling from materials transported by the Vermilion River. Sedimentation in the east lake approach channel could increase due to runoff carrying sand, which would build up on the east side of the pier, from Lagoons Beach back into the lake during storm periods. Sedimentation in the upper section of the entrance channel could also increase as the sand build-up shifted south along the grounds of the Lagoons cottages and eventually spilled over into the entrance channel. Furthermore, sand would eventually overtop the raised portion of the pier as the build-up increased. Therefore, the net result of modifying the east pier would probably be to initially displace sand shoaling from the outer section entrance channel to the inner section of the entrance channel and the east lake approach channel, and eventually lead to greater shoaling along the entire length of the entrance channel. Long-term maintenance costs would increase if this situation were to occur. The magnitude and type of short-term environmental effects that would result from modifying the pier would be comparable to those associated with structural repair. However, the duration of dredging-related environmental impacts would be expected to increase with the modified pier due to the need to remove additional shoal material. Sand build-up along the Lagoons cottages could have a long-term adverse effect on the community's aesthetics, residential desirability, and property values.

6.37 The alternative of removing the breakwater in order to reduce the scope of maintenance dredging was suggested in letters of comment on the Draft Statement from the Ohio Environmental Protection Agency, the Sierra Club - Northeast Ohio Group, and several private citizens in the Vermilion community (copies of letters are in Appendix F). In general, it is their contention that the breakwater causes harbor shoaling, and that the maintenance dredging necessary to remove the shoal material is both costly and environmentally degradating. As previously indicated, materials in the lake approach channel include sand that is scoured from the entrance channel and settles out behind

the breakwater, sand carried by runoff from the Lagoons Beach, and silty, gravelly materials that are transported by the river and settle out behind the breakwater. Removal of the breakwater would probably reduce the volume of sand and silty, gravelly materials that build up in the protected waters behind the breakwater. Any reduction in the volume of materials requiring dredging would reduce maintenance costs and the duration of the environmental effects of dredging. However, elimination of the breakwater would diminish or eliminate the ability of the total navigation project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge). Furthermore, the short-term maintenance benefits would accrue at the expense of the following long-term benefits that the Vermilion Port Authority has attributed to the breakwater's presence (140):

"1. Has reduced the surge in the river.

"2. Limits the build-up of water in the river during north to northeast winds; consequently helps control water levels.

"3. Provides a safer harbor entrance during storms.

"4. Prevents windrowing of ice at entrance to east and west pier heads.

"5. Apparently creates a venturi action and ice did flow out of the harbor in 1974 and 1975 during northeast winds.

"6. Obligates the Corps of Engineers to maintain the harbor to the 6 and 2 road bridge.

"7. Provides a protected area for sport fishing behind the breakwall."

6.38 The alternative of "cutting a hole in the new breakwater below water level to permit free flow of river water into the lake" was suggested by the Vermilion Port Authority as a means of reducing the deflection of river water, by the breakwater, toward the east and west lakeshores (140). The technical feasibility of this breakwater modification is questionable. The degree of shoaling reduction would be a function of the size and location of the portion removed from the structure. If shoaling were diminished, maintenance costs and the duration of short-term dredging impacts would be reduced. However, as the size of the removed section would increase, the degree of protection from wind, wave, and ice action that the total structure presently provides for the harbor would be reduced. This would reduce, to varying degrees, the levels of the breakwater's long-term benefits listed in the previous paragraph.

6.39 Any action that would result in a permanent modification of the existing harbor structures is beyond the scope of authority under which Corps maintenance is conducted. Congressional approval would be required before permanent modifications could be implemented. Although no specific cost estimates have been developed, the least costly alternative would probably be modifying the east pier as suggested by the Port Authority. Removing the breakwater would probably be the most expensive alternative. Removing a section of the breakwater would not be as costly as completely removing the structure, but its cost would probably greatly exceed the cost of modifying the east pier. None of the considered alternatives would be expected to result in a significant decrease in the overall degree of harbor shoaling. While structural modifications could result in some small reductions in shoaling (and consequently in maintenance costs and dredging-related, temporary environmental effects), the long-term adverse effects that would result from structural modifications would outweigh short-term benefits. Therefore, it has been determined that modifications of the harbor structures for the singular purpose of potentially reducing the scope of maintenance dredging are not justifiable at this time.

Control of Erosion

6.40 The amount of sediment that settles in the authorized harbor navigation channels could be reduced by controlling the rate of erosion, and subsequent supply of sediment, from lakeshore and watershed sources. Means for implementing erosion control include both structural solutions, such as lakeshore revetments and groins located to control littoral drift sources, and management systems, such as improved agricultural practices, building and zoning regulations, and land use planning. As previously discussed, Mr. George W. Grossman has suggested constructing a long groin at the Linwood Beach - Lagoons Beach property line or a series of vinyl tube groins along the eastern shoreline (letter dated 6 October 1975, copy in Appendix F). In addition, the Vermilion Port Authority suggested constructing two breakwalls on the Linwood-Nakomis Beach properties (140). While technically feasible, the implementation of such erosion control measures for the singular purpose of reducing channel shoaling is not economically viable. Furthermore, this alternative is beyond the scope of authority under which the Corps maintains Vermilion Harbor, and implementation and funding of erosion control programs would be the responsiblity of local municipalities and private interests in the watershed and along the lakeshore. Although erosion control measures could have a long-term effect on maintenance activities by reducing sediment volume and dredging costs, they would not completely eliminate the need for future maintenance dredging in Vermilion Harbor.

6.41 Construction of lakeshore revetments and groins could be expected to have an effect upon lake and channel currents, littoral drift, shoreline erosion, winter ice conditions, and navigability of project area and surrounding waters. Changes in these systems could affect commercial and recreational boaters and fishermen who frequent project waters as well as property owners and business operators in the vicinity of the project. It is expected that these impacts would include a short-term, low-magnitude deterioration of air quality of the natural environment in the immediate vicinity of construction due to emission of various gaseous pollutants, odors, dust and noise. Similarly, a short-term, low-magnitude deterioration of various water quality parameters, such as turbidity and levels of suspended solids and dissolved oxygen, could be expected, having an adverse impact upon benthic inhabitants of construction areas. Project vessels and construction activities might be expected to produce short-term, low-magnitude inconveniences to a small number of recreational and commercial vessels forced to avoid the construction areas. Both the construction of revetments and other structures and the implementation of erosion control measures could be expected to produce long-term, beneficial impacts on sedimentation rates (i.e., reduction) and on the chemical quality of the sediment deposited in the river channel and the lake approach areas. However, the magnitude of these benefits is small compared to the total amount of sediment which would still be deposited in project area waters. The construction of revetments and groins would have low-to-medium-magnitude, beneficial effects on the local employment and income both in the construction industry and in retail trade industries that supply building materials.

6.42 The implementation of upstream land use planning zoning requirements and modifications of existing agricultural practices would significantly affect farmers as well as municipal, industrial and residential developers. However, coordination and funding of such projects are matters of local and state concern and are beyond the scope of the Corps authority.

6.43 Due to the relatively large economic costs and the relatively small magnitude of benefits derived from this alternative, it was not considered further at this time.

Control of Sediment Pollutants

6.44 Treatment of sediments by chemical means to allow for the open-lake dumping of dredged material, while technically feasible for small amounts of polluted material, is economically unrealistic at this time for the quantities that are dredged from Vermilion Harbor. The Corps of Engineers Waterways Experiment Station is currently investigating the environmental effects of specific disposal practices,

including the effect of dispersion, settling, and resedimentation on the migration of chemical constituents during open water disposal. Knowledge that is generated by this investigation is fundamental to further consideration of chemical treatment of dredging as a viable maintenance technique.

6.45 A long-range goal to control harbor pollutants would be the implementation of pollution abatement measures throughout the Vermilion region to reduce the addition of potentially harmful and nutritive constituents to harbor sediments. Such measures, which could include upgrading of sewage treatment plants and use of settling basins for stormwater discharges, are required by both Federal and state laws. Implementation of this alternative would be the responsibility of municipalities and industries that use the Lake Erie and Vermilion River water resources, and is beyond the Corps maintenance authority. The exact implementation and operational costs of abatement programs are not known; however, they are expected to be costly.

6.46 Chemical treatment of polluted sediment would cause a long-term, high-magnitude decrease in the potential harmful effects of sediment disposal in the open lake. At the disposal area, the deposition of increased amounts of sediments suitable for open-lake disposal would cause a low-magnitude, long-term decrease in lake depths. These changes themselves would be considered neither beneficial nor adverse by human users of these waters. In comparison to the project as it is now planned, deposition of additional treated sediment of the open-lake disposal area would produce a short-term, medium-magnitude additional increase in the extent and intensity of turbidity and concentrations of suspended solids, and a similar decrease in dissolved oxygen concentrations.

6.47 Under requirements of both Federal and state laws, upgrading the wastewater treatment facilities to possibly include tertiary treatment, and installation of stormwater settling basins could be expected to produce a long-term, high-magnitude, beneficial improvement in sediment and water quality experienced in the Vermilion Harbor and surrounding waters. Stormwater and wastewater are two of the major causes of polluted sediment. Improvements in these systems could be expected to reduce: concentrations of BOD, COD, total solids, nitrogen, phosphorous, heavy metals, and pesticides; and microorganisms found in Lake Erie near the Vermilion water intake and in sediments in the Vermilion River.

6.48 The resident aquatic fauna of Vermilion Harbor and dumping area is currently thought to be composed predominantly of organisms that can tolerate or adjust to various forms of pollution. The treatment of

sediments by chemical means and the control of harbor pollutants would allow less pollution-tolerant life forms to inhabit the disposal area. The end result would be the improvement of species diversity and stabilization of the aquatic environment in both the harbor and open-lake dumping zone.

6.49 Treatment of polluted sediments would eliminate the need for transportation to and disposal of the sediments at the Huron Harbor confined disposal facility. Conservation of fuel associated with the transport of polluted sediments is considerable and would produce a medium-magnitude, long-term, beneficial impact upon fuel supplies. Improved wastewater and stormwater treatment will also have a beneficial effect upon both the aesthetic and economic value of the harbor area. An improvement in water quality parameters such as water clarity, BOD, COD, nitrogen, phosphorus, and bacterial content, would increase the harbor's overall appeal as a recreational facility, thereby augmenting the income of those who supply harbor-related recreational services and facilities. Although chemical treatment of polluted sediments and improved wastewater and stormwater treatment would have a beneficial effect upon quality of sediment, these alternatives would not appreciably reduce sedimentation rates experienced in the river channel and adjacent lake waters and would not in any way alleviate the need for dredging at the present time.

6.50 Since technology for mass treatment of polluted sediments is not yet available, and stormwater and wastewater treatment facilities are beyond the Corps maintenance authority, this alternative was not considered further.

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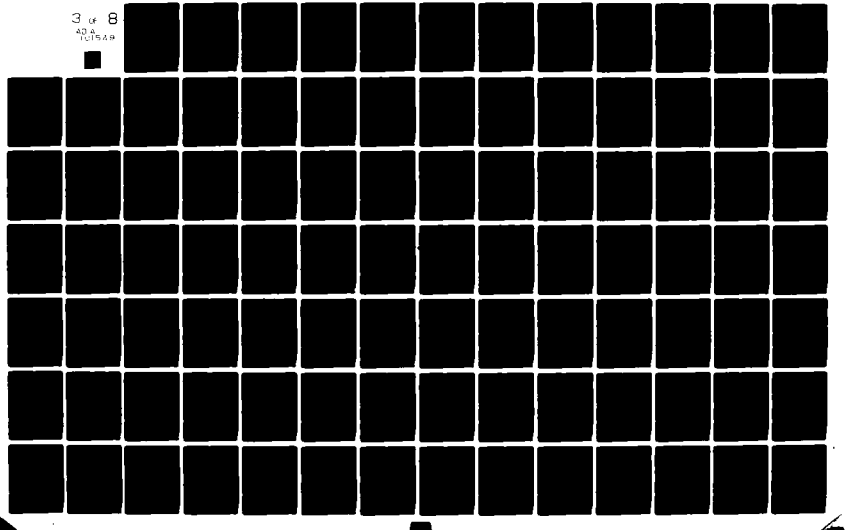

7. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 In order to evaluate the environmental relationships that can be expected to occur as a result of implementing operation and maintenance activities at Vermilion Harbor, the following definitions have been applied:

a. "Local short-term uses" are defined as operation and maintenance activities within the harbor environment and the impacts of these activities.

b. "Man's environment" includes the physical, biological, economic, and social components influencing the human community.

c. "Maintenance and enhancement of long-term productivity" is defined as the promotion of future activities or conditions beneficial to the natural and human environments expected to occur within the effective lifetime of the existing Vermilion Harbor project, which is estimated to be 50 to 100 years.

7.02 The removal of polluted sediments containing potentially harmful heavy metals and pesticides from the harbor area will have a beneficial effect upon long-term natural productivity by improving sediment quality in the harbor area. The removal of polluted sediments makes the area more attractive to fish as a potential habitat and spawning ground. At the same time, the benthic habitat that will be removed by dredging (up to 14.4 acres) cannot be immediately replaced, and periodic dredging will prevent the reestablishment of a completely diversified community of benthic invertebrates.

7.03 Operation and maintenance activities in Vermilion Harbor will not disrupt the natural productivity of Lake Erie. Dredging will result in the temporary degradation of water quality in the vicinity of Vermilion Harbor and the open-lake since nutrients, potentially harmful chemical constituents, heavy metals and suspended solids will be reintroduced into solution. As materials settle following maintenance activities, a low-magnitude siltation of aquatic habitat will occur in the harbor. The aquatic ecosystem within the harbor will be disrupted on a long-term basis due to the periodic disturbance or destruction of the benthic habitat.

7.04 Human productivity within the harbor area and in other locations where users of the harbor reside or do business, will benefit from continued maintenance and subsequent use of the harbor. The harbor will continue to provide recreational opportunities for boaters,

sailors, fishermen and swimmers; economic opportunities to operators of marinas, yacht clubs, motels, restaurants, and fishermen; public revenues generated on local, county, state and Federal governmental levels through various taxes and licenses related to the harbor; and community cohesion through a continuation of cultural events and social organizations directly or indirectly related to the harbor.

8. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE MADE IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

8.01 Implementation of the proposed project would result in the expenditure or elimination of various natural and human resources. In order to evaluate resource commitments that can be expected to occur as a result of proposed project activities at Vermilion Harbor, the following definitions are made:

a. "Irreversible or irretrievable commitments" are defined as those commitments of resources for periods of no less than 50 to 100 years.

b. "Natural resources" are defined as the physical and biological components identified in Chapter 2, including climate, physiography and topography, geology, soils, terrestrial vegetation, terrestrial wildlife, hydrology, sediment, aquatic vegetation, plankton, aquatic invertebrates and fisheries.

c. "Human resources" are defined as those environmental components directly associated with man's activities, including land and water uses, transportation, structures and utilities, public services and facilities, industry and business, employment and income, recreation, demography and cultural resources.

8.02 Continued maintenance dredging of the harbor, even on a periodic basis, will prevent the establishment of a diversified community of benthic macroinvertebrates in the Vermilion Harbor vicinity. Lake and harbor currents may disperse turbidity arising from dredging, thereby creating siltation which would affect aquatic habitat not specifically within the actual harbor maintenance area. The aquatic habitat in the 160 acres of open lake disposal areas will be periodically disrupted by the deposition of dredged material and rock. The deposition of these materials will decrease lake depths on the order of a few centimeters in the dump zone.

8.03 The time, capital, labor, material, and fuel committed to the maintenance of Vermilion Harbor will not be retrievable. About six weeks or more of time will be committed for each maintenance operation. Each operation is expected to occur approximately once every three years. This represents approximately 482 mandays of labor committed to the project for each operation (01). Approximately $188,000 in average costs per operation will be committed to the maintenance dredging operations. Part of these costs are reflected in the some 9,000 gallons of fuel that are committed to each dredging operation (01).

9. COORDINATION WITH OTHERS

Cultural Resources

9.01 In order to fully evaluate the environmental impacts of Vermilion Harbor maintenance operations upon potentially valuable National, State, and local cultural resources, as required by the National Historic Preservation Act of 1966 (80 Stat. 915), and Executive Order 11593, Protection and Enhancement of the Cultural Environment (13 May 1971), the Buffalo District consulted the National Register of Historic Places, as published in the Federal Register dated 4 February 1975, and subsequent National Register updates, in accordance with procedures outlined in the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties" (39 F.R. 3365). Upon review of the National Register, it was determined that the Vermilion Town Hall, 736 Main Street is a National Register property that is within the maintenance activities' area of potential environmental impact. The criteria of effect (39 F.R. 3365, paragraph 800.8) were applied with respect to the above property and it was determined that the District's maintenance activities at Vermilion Harbor will not cause a change in the quality of the above cited property. This determination is based on the fact that the Town Hall is located approximately 1,000 feet southwest of the nearest maintained channel area and is separated from the site of potential maintenance operations by a developed urban environment that will generally preclude the introduction of any visual, audible, or atmospheric elements that may alter the property's setting. Maintenance dredging in the Vermilion River channel is not expected to destroy, alter, isolate, or in any other way affect the property or its setting.

9.02 In a letter to the Ohio State Historic Preservation Officer (SHPO), dated 15 May 1975, the District described the proposed maintenance activities and above determinations to the Ohio SHPO for review. The District's letter further indicated that, in view of the fact that the subject maintenance activities will involve only the removal of recently accreted shoal material in existing channels and the repair of existing structures, an in depth cultural resources field survey of the project area is not warranted because harbor maintenance activities are confined to existing, authorized project areas and do not entail any new work that could disturb unidentified sites or artifacts. The Ohio SHPO was requested to provide recommendations concerning the identified properties and the possible need for further action on this matter.

9.03 In a letter of reply dated 21 May 1975, the Ohio SHPO provided the following statement:

> "Thank you for your letter of May 15 describing the above project and its expected effects upon cultural resources."

"We concur with your finding that the maintenance activities at Vermilion Harbor will not affect any National Register properties. Further, it is our opinion that there are no further cultural resources in the project area which might be affected by the project."

"We feel that further action regarding cultural resources is not necessary. Thank you for the opportunity to make this review."

9.04 Based on the above described correspondence and coordination, the District Engineer has determined that no further action, regarding the evaluation of identified or unidentified cultural resources, is necessary for the Vermilion Harbor maintenance project, and that all requirements for the protection and preservation of National Register properties have been fulfilled.

9.05 In a letter dated 15 May 1975, the Buffalo District requested the Regional Director of the U. S. Department of the Interior, National Park Service, Midwest Region (NPS, MWR) to identify any elements located in the Vermilion Harbor area that are presently included, or are eligible for inclusion, in the National Landmarks Program. In an initial response dated 23 May 1975, NPS, MWR requested further information concerning the subject maintenance project, which was provided by the District in a letter dated 4 June 1975. In a final response dated 27 June 1975, the Regional Director, NPS, MWR stated that, "None of the proposed activities would adversely affect any existing or proposed unit of the National Park System or any National Landmark."

9.06 Copies of all of the above discussed correspondence concerning the Buffalo District's cultural resources coordination are included in Appendix A, Letters of Coordination. Copies of the Draft Statement were provided to the Ohio SHPO, the U. S. Department of the Interior and the Advisory Council on Historic Preservation for further review and comment. Comments from responding agencies are presented in subsequent paragraphs in this chapter; copies of their commenting letters are included in Appendix F, Letters of Comment.

Land Use Plans

9.07 Federal, State, and local land use planning agencies were contacted to determine the relationship of Vermilion Harbor maintenance activities to land use proposals. Comments from coordinating agencies are discussed in Chapter 3 of this Statement and copies of responding letters are included in Appendix A, Letters of Coordination. The six contacted land use planning agencies were provided with copies of the Draft Statement for further review and comment. Comments from these

agencies are presented in subsequent paragraphs in this chapter; copies of their commenting letters are included in Appendix F, Letters of Comment.

Fish and Wildlife Resources

9.08 As previously discussed in Chapter 1 of this Statement, the Buffalo District requested the U. S. Department of the Interior, Fish and Wildlife Service, and Ohio DNR to identify significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. Information received from these agencies has been used in preparing a maintenance schedule that will eliminate interference with major fish spawning and migrating activities. Copies of correspondence relating to fish and wildlife resources are included in Appendix A, Letters of Coordination. The U. S. Department of the Interior and Ohio DNR were provided with copies of the Draft Statement for further review and comment. Their comments on the Draft are presented in paragraphs 9.23 and 9.17, respectively.

Other Coordination

9.09 During the review period for the Draft Statement, a letter was received from Mr. Theodore Wakefield concerning the Corps position on public access to the U. S. West Pier (letter dated 27 September 1975, copy in Appendix A). In a letter dated 10 October 1975 (copy in Appendix A), the District Engineer provided the following in response to Mr. Wakefield's inquiry:

> "Since this is a Federal project, public access should be provided if at all possible. The Corps encourages multi-purpose uses of harbor structures, such as the Vermilion piers and breakwater, wherever it is consistent with views and policies of local interests.
>
> "As indicated in your letter there is an apparent conflict between the City Council's plan to provide public access to the U. S. West Pier and your views, as a shoreline homeowner, regarding increased public use of the adjacent area. It is not appropriate for the Corps to intercede or attempt to resolve issues that involve disagreements between local interest. These disagreements should be resolved at the local level."

9.10 Future coordination of routine Corps maintenance operations at Vermilion Harbor will be accomplished by the issuance of a public notice to all interested parties that may desire to comment on specific, proposed maintenance activities. The system of on-going coordination

is discussed in detail in the Chapter 1 section entitled "Public Participation."

Coordination of the Draft Environmental Impact Statement

9.11 The Draft Environmental Impact Statement on the operation and maintenance of Vermilion Harbor was sent to the following agencies and organizations for review and comment:

Agency	Date Comments Requested	Date Comments Received
Academic Council on Environmental Problems 3141 Huntington Road Shaker Heights, OH 44120	11 Sep 75	No comments received
Advisory Council on Historic Preservation 1522 K Street, NW Suite 430 Washington, DC 20005	11 Sep 75	28 Oct 75
Al's Boat House 655 West River Road Vermilion, OH 44089	11 Sep 75	No comments received
Center for Urban Affairs Northwestern University 2040 Sheridan Road Evanston, IL 60201	11 Sep 75	No comments received
Citizens for Clean Air and Water, Inc. 312 Park Building 140 Public Square Cleveland, OH 44114	11 Sep 75	No comments received
Citizens for Land & Water Use 2083 Elbur Avenue Cleveland, OH 44107	11 Sep 75	No comments received
City of Sandusky Department of Sanitation Sandusky, OH	11 Sep 75	No comments received

Agency	Date Comments Requested	Date Comments Received
City of Vermilion, City Hall 736 Main Street Vermilion, OH 44089	11 Sep 75	No comments received
City of Vermilion, Engrs Ofc. 5335 Devon Drive Vermilion, OH 44089	11 Sep 75	No comments received
City of Vermilion, Mayor 736 Main Street Vermilion, OH 44089	11 Sep 75	No comments received
City of Vermilion, Office of City Finance Director 799 West River Road Vermilion, OH 44089	11 Sep 75	No comments received
City of Vermilion, Water Dept. 537 Main Street Vermilion, OH 44089	11 Sep 75	No comments received
Cleveland Audubon Society 2063 East 4th Street Cleveland, OH 44115	11 Sep 75	No comments received
Cleveland Isaac Walton League of America, Inc. 3577 Cummings Street Cleveland, OH 44115	11 Sep 75	No comments received
Cleveland Museum of Natural History Wade Oval, University Circle Cleveland, OH 44106	11 Sep 75	No comments received
Erie County, Auditor's Office Sandusky, OH	11 Sep 75	No comments received
Erie County Board of Health 5335 Devon Drive Vermilion, OH 44089	11 Sep 75	No comments received
Erie Regional Planning Comm. 2121 Cleveland Road Sandusky, OH 44870	11 Sep 75	No comments received

Agency	Date Comments Received	Date Comments Received
Federal Energy Administration New Post Ofc. Bldg., Rm. 7102 12th & Pennsylvania Ave., NW Washington, DC 20461	11 Sep 75	No comments received
Great Lakes Basin Commission P. O. Box 999 Ann Arbor, MI 48107	11 Sep 75	No comments received
Great Lakes Historical Society 1480 Main Street Vermilion, OH 44089	11 Sep 75	No comments received
Great Lakes Sailboats 5024 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
Isaac Walton League of America, Ohio Division 42 Grand Avenue Tiffin, OH 44883	11 Sep 75	No comments received
Kishman Fish Company 573 River Street Vermilion, OH 44089	11 Sep 75	No comments received
Lake Erie Watershed Conser- vation Foundation 621 Superior Building Cleveland, OH 44114	11 Sep 75	No comments received
League of Ohio Sportsmen 2404 Cleveland Avenue Columbus, OH 43211	11 Sep 75	No comments received
Linwood Park Company 1070 Wilbert Road Lakewood, OH 44107	11 Sep 75	6 Nov 75
Linwood Park Cottage Owners Ass. 3678 Traver Road Shaker Heights, OH 44122	11 Sep 75	9 Nov 75

Agency	Date Comments Received	Date Comments Received
Lorain County Regional Planning Commission 21 Turner Block, Court Street Elyria, OH 44035	11 Sep 75	No comments received
Lorain County, Treasurer's Ofc. Lorain, OH	11 Sep 75	No comments received
McGarvey's Boat Drife-In 5150 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
Moes Marine Service 5336 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
National Audubon Society Central Midwest Regional Ofc. Route 1, Box 19 Mauckport, IN 47172	11 Sep 75	No comments received
National Wildlife Federation 666 Euclid Ave., Suite 725 Cleveland, OH 44114	11 Sep 75	No comments received
Northeast Ohio Areawide Coordinating Agency 439 The Arcade Cleveland, OH 44114	11 Sep 75	No comments received
Northwest Ohio Great Lakes Research Center 214A Graduate Bldg. Bowling Green, OH 43403	11 Sep 75	9 Oct 75
Ohio Edison Company Akron, OH		
Ohio Environmental Council 248 Old West Wilson Bridge Road Worthington, OH 43058	11 Sep 75	No comments received
Ohio Historical Society Ohio Historical Center Columbus, OH 43211	11 Sep 75	No comments received

Agency	Date Comments Received	Date Comments Received
Ohio League of Conservation 9560 Whitegate Lane Cincinnati, OH 45243	11 Sep 75	No comments received
Ohio League of Women Voters 1445 Meadow Lane Yellow Springs, OH 45387	11 Sep 75	No comments received
Ohio State University Museum of Zoology 1813 North High Street Columbus, OH 43210	11 Sep 75	No comments received
Parson's Marine Industrial Service 5260 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
Romp's Water Port 5055 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
Ryer's Boat Livery 636 Sandusky Street Vermilion, OH 44089	11 Sep 75	No comments received
Sierra Club - Northeast OH 2489 Stratford Road Cleveland Heights, OH 44118	11 Sep 75	25 Nov 75
Sierra Club, Office of the Midwest Representative 444 West Main St., Room 10 Madison, WI 53703	11 Sep 75	No comments received
Sport Fishing Institute 608 13th Street, NW Washington, DC 20005	11 Sep 75	No comments received
State Historic Preservation Ofcr. Ohio Historical Center Columbus, OH 43211	11 Sep 75	No comments received
State of Ohio, Dept. of Health 450 East Town Street Columbus, OH 43216	11 Sep 75	No comments received

Agency	Date Comments Requested	Date Comments Received
State of Ohio, Dept. of Highways Columbus, OH 43211	11 Sep 75	No comments received
State of Ohio, Department of Natural Resources Fountain Square Columbus, OH 43224	11 Sep 75	16 Sep 75
State of Ohio, Environmental Protection Agency 395 East Broad Street Columbus, OH 43215	11 Sep 75	13 Nov 75
U. S. Department of Agriculture Forest Service Northeastern Area, State and Private Forestry 6816 Market Street Upper Darby, PA 19082	11 Sep 75	7 Nov 75
U. S. Department of Agriculture Soil Conservation Service 311 Old Federal Building Columbus, OH 43215	11 Sep 75	29 Sep 75
U. S. Department of Commerce Washington, DC 20240	11 Sep 75	5 Nov 75
U. S. Dept. of Health, Education & Welfare, Region V 300 South Wacker Drive Chicago, IL 60606	11 Sep 75	No comments received
U. S. Dept. of Housing & Urban Development, Region V 300 South Wacker Drive Chicago, IL 60605	11 Sep 75	No comments received
U. S. Dept. of the Interior Washington, DC 20240	11 Sep 75	29 Oct 75
U. S. Dept. of Transportation Federal Highway Administration 333 Bryson Building Columbus, OH 43215	11 Sep 75	16 Oct 75

Agency	Date Comments Requested	Date Comments Received
U. S. Dept. of Transportation Ninth Coast Guard District 1240 East Ninth Street Cleveland, OH 44199	11 Sep 75	No comments received
U. S. Environmental Protection Agency, Region V 230 South Dearborn Street Chicago, IL 60604	11 Sep 75	14 Nov 75
U. S. Post Office 5463 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
Valley Harbor Marina 1295 West River Road Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Boat Club 5416 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Chamber of Commerce P. O. Box 145 Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion City Planning Comm. 500 Southview Drive Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Fish & Game Assn. Thompson Road Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Fish & Game Club, Inc. Thompson Road Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Port Authority City Hall 736 Main Street Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Power Boats 5054 Liberty Avenue Vermilion, OH 44089	11 Sep 75	No comments received

Agency	Date Comments Requested	Date Comments Received
Vermilion Service Director 5335 Devon Drive Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Sewage Treatment Plant 799 W. River Road Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Township Board of Trustees Town Hall Vermilion, OH 44089	11 Sep 75	No comments received
Vermilion Yacht Club 5440 Anchorage Way Vermilion, OH 44089	11 Sep 75	22 Sep 75
Mr. David T. and Ms. Roberta Burns 153 Pickwick Drive Northfield, OH 44067	No date specified	7 Nov 75
Mr. Raymond A. Boas 133 Brookhaven Road North Kingston, RI 02852	No date specified	7 Nov 75
Mr. Murray Cook 212 Mohawk Drive Pittsburgh, PA 15228	No date specified	12 Nov 75
Ms. Hazel Cramer 504 Stewart Avenue Ithaca, NY 14850	No date specified	8 Nov 75
Mr. Stuart P. Cramer 5613 Huron Street Vermilion, OH 44089	No date specified	5 Nov 75
Mr. William E. Dearth 6151 Wilson Mills Road, #109 Highland Heights, OH 44143	No date specified	11 Nov 75
Mr. Benjamin F. Forbes 2000 West Fourteenth Cleveland, OH 44113	No date specified	6 Nov 75

Agency	Date Comments Requested	Date Comments Received
Mr. Fred W. Fussner 3301 West 165th Street Cleveland, OH 44111	No date specified	No date
Mr. Fred S. Galovich 3358 Babcock Boulevard Pittsburgh, PA 15237	No date specified	12 Nov 75
Mr. George W. Grossman 17125 Amber Drive Cleveland, OH 44111	11 Sep 75	6 Oct 75
Mr. Dean A. Herrold 415 Walnut Street Vermilion, OH 44089	No date specified	6 Nov 75
Mr. Frank J. Holub 16 East Marshall Avenue Pittsburgh, PA 15214	No date specified	12 Nov 75
Mr. J. H. Jeavons 710 Vermilion Road Vermilion, OH 44089	11 Sep 75	No comments received
Dr. Franklin P. Johnson 1600 James Street Monroeville, PA 15146	No date specified	8 Nov 75
Mrs. Lois W. Johnson 2309 Haymaker Road Monroeville, PA 15146	No date specified	8 Nov 75
Mr. Dean M. Koppin 25302 Stonycroft Southfield, MI 48075	No date specified	14 Nov 75
Mr. D. H. Kreps 841 Spring Road Charleston, WV 25314	No date specified	8 Nov 75
Mr. L. L. Ludwig 1760 Karg Road Akron, OH 44313	No date specified	7 Nov 75

Agency	Date Comments Requested	Date Comments Received
Ms. Esther S. Meckel 849 Coast Boulevard La Jolla, CA 92037	No date specified	7 Nov 75
Ms. Lois R. Moelter 505 Chatham Center Office Building Pittsburgh, PA 15219	No date specified	6 Nov 75
Mr. Gary F. Morgan 1101 Lindsay Road Carnegie, PA 15106	No date specified	8 Nov 75
Dr. John A. New II 4837 Doverdell Drive Pittsburgh, PA 15236	No date specified	8 Nov 75
Mr. George F. Persons 643 Washington Avenue Elyria, OH 44035	No date specified	7 Nov 75
Ms. Ruth E. Peterka 3678 Traver Road Shaker Heights, OH 44122	No date specified	6 Nov 75
Mr. Edward A. and Ms. Virginia R. Peters 3387 Hollister Road Cleveland Heights, OH 44118	No date specified	7 Nov 75
Mrs. Carl Prestel 25905 Kilreigh Drive Farmington Hills, MI 48024	No date specified	No date
Mr. Robert Prochaska 14411 South Woodland Road Shaker Heights, OH 44120	No date specified	6 Nov 75
Mr. Hugh J. Pugsley 1437 North Highland Avenue Pittsburg, PA 15206	No date specified	7 Nov 75
Mr. J. W. Rutledge 334 Boulevard of the Allies Pittsburgh, PA 15222	No date specified	7 Nov 75

Agency	Date Comments Requested	Date Comments Received
Mrs. George M. Thomas 33 Conestoga Drive Bethel Park, PA 15102	No date specified	13 Nov 75
Mr. Walter C. Waite 2341 McNary Boulevard Pittsburgh, PA 15235	No date specified	10 Nov 75
Mr. Theodore Wakefield 555 Main Street Vermilion, OH 44089	11 Sep 75	27 Sep 75
Dr. Andrew White Biology Department John Carroll University University Heights Cleveland, OH 44118	11 Sep 75	No comments received
Mr. Redge A. Wilde Concord Square G4 Route 2 New Concord, OH 43762	No date specified	23 Nov 75
Mr. W. Craig Wilde 1605 North Fillmore Street Arlington, VA 22201	No date specified	23 Nov 75
Anonymous 5131 Fifth Street Vermilion, OH 44089	No date specified	10 Nov 75

9.12 Agency and organization comments that were received have been addressed with an appropriate response and are presented on the following pages.

9.13 ADVISORY COUNCIL ON HISTORIC PRESERVATION
(commenting letter dated 28 October 1975, copy on page F-2)

a. COMMENT:

This is in response to your request of September 11, 1975 for comments on the environmental statement for Operation and Maintenance, Vermilion Harbor, Erie County, OH. Pursuant to its responsibilities under Section 102(2) (C) of the National Environmental Policy Act of 1969 and the "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800), the Advisory Council on Historic Preservation has determined that your Draft Environmental Statement appears adequate regarding our area of expertise and we have no further comment to make.

The Council appreciates being afforded the opportunity to review your undertaking.

a. RESPONSE:

No response required.

Your comments on the Draft Statement are appreciated.

9.14 LINWOOD PARK COMPANY
(commenting letter dated 6 November 1975, copy on page F-3)

a. COMMENT:

Thank you for the copy of the Draft Environmental Impact Statement, Operation and Maintenance Vermilion Harbor Erie County, OH. We appreciate the opportunity to comment on it.

We believe that further serious consideration should be given to the effect and timing of dredging on the quality of beach sand and of the water in swimming areas east and west of the harbor entrance. This is especially important since the proposed dredging schedule is during a high use period of beaches and adjacent waters. At best, it is a short, short summer in Northern Ohio; twelve to fourteen weeks.

Perhaps a re-assessment by the Fish and Wildlife Service and the Ohio Department of Natural Resources is in order. Could they perhaps weigh the health and enjoyment of a large number of people against a questionable quantity of fish spawn? Is it also possible fish may still move up-river to the shallows where most spawning occurs in spite of dredging turbulence?

a. RESPONSE

In view of revised harbor fishery information from the Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

b. COMMENT:

We are not commenting on the breakwater, advantages or disadvantages, at this time. We do not believe them pertinent to this study.

b. RESPONSE:

No response required.

c. COMMENT:

For your information and for the record the Linwood Park Co. beach is approximately one-half mile long running eastward from the Lagoons Beach. The sand quality has been excellent. Linwood Park

is open to the public on payment of a modest gate fee from June to September. Accommodations include playground, shuffle board courts, picnic grove with tables and grills. The fee charged is in line with entrance fees of state and national park systems. Those who own cottages in the Park also pay the fee.

Linwood Park Company was founded in 1883, has been in continuous operation since and has been responsible for the operation and maintenance of the Park. It is incorporated under the laws of the State of Ohio, owns the land, pays city, county, state and Federal taxes.

Thank you for your usual fine cooperation. Please keep us informed of any plans or studies relative to the area.

c. RESPONSE:

Paragraph 2.120 has been expanded to include the information provided in the comment.

The Linwood Park Company, as well as other concerned interests, will be informed of any plans or studies relative to the Vermilion area.

Your comments on the Draft Statement are appreciated.

9.15 LINWOOD PARK COTTAGE OWNERS ASSOCIATION
(commenting letter dated 9 November 1975, copy on page F-5)

a. COMMENT:

I am writing this letter on behalf of the Linwood Park Cottage Owners Association, Vermilion, OH. Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, 26 September 1975, p: 44349.

The Linwood Park Cottage Owners Association (LCOA) represents the lessees who maintain property in the park. Our membership includes people from across the United States. Linwood Park is a tradition. It has been built by 92 years of dedicated work and direction by the directors of Linwood Park Company, LCOA, and the Religious Council of Linwood. It represents a unique place in our lives and those of thousands of others who came to Linwood to enjoy its sandy beaches and clear waters for a variety of recreational purposes.

a. RESPONSE:

Paragraph 2.97 has been expanded to include pertinent information from the comment.

b. COMMENT:

Today, however, Linwood is different, and for most of us that difference is for the worst. In 1973 the U.S. Army Corps of Engineers built a breakwater at the mouth of the Vermilion River. We feel that this wall is the cause of "that difference." The reasons for erecting the wall were probably sound at the time, but events of the last few years suggest that any proposed benefits from the wall have been overshadowed by actual results.

b. RESPONSE:

The navigation improvements to Vermilion Harbor were authorized by Congress to benefit an existing navigation project. The purpose of the breakwater is to alleviate undesirable wave action at the harbor entrance and in the channel approaching the lagoons, particularly for commercial fishing vessels and recreational craft based at Vermilion.

The benefits of the Vermilion Harbor navigation project, as listed in the project's General Design Memorandum (August 1971) include those to commercial fishing, recreation, navigation, an a harbor-of-refuge. In addition, in its recent report, the Vermilion Port Authority identified the following positive results of the navigation project (140):

"1. Has reduced the surge in the river.

"2. Limits the build-up of water in the river during north to northwest winds; consequently helps control water levels.

"3. Provides a safer harbor entrance during storms.

"4. Prevents windrowning of ice at entrance to east and west pier heads.

"5. Apparently creates a venturi action and ice did flow out of the harbor in 1974 and 1975 during northeast winds.

"6. Obligates the Corps of Engineers to maintain the harbor to the 6 and 2 road bridge.

"7. Provides a protected area for sport fishing behind the breakwall."

c. COMMENT:

As a concerned lessee and President of the LCOA, I feel that you should understand what has happened to our environment since the construction of the breakwall.....

I. Acres of our sandy beach have eroded drastically in many areas;

II. Our clear waters have become polluted and unsafe for swimming;

III. The natural flow of the Vermilion River has been diverted away from the center of the lake to our shoreline;

IV. The river channel is narrow and shallower, which hampers our boaters' access to the lake proper; and

V. Our drinking water has become unpalatable.

c. RESPONSE:

One of the conclusions of the Buffalo District Report on Section 111 Study of Vermilion, Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of the eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effect that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas, shoaling in the navigation channels, increased navigation hazards, periodic contamination of the municipal water supply, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study (Appendix G).

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

(1) Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

(2) Effect of the breakwater on the build-up of sand east of the pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand build-up at the west end of the Lagoons Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Build-up of sand in the river from northeast to east storms."

(3) Effect of the breakwater on navigation:

"The wall was designed and built to improve the harbor for a small craft refuge and to make a more safe entry to the harbor in severe weather. It has done this well after the work of local citizens for over fifteen years."

4. Effect of the breakwater on the municipal water supply:

"There is some increased turbidity in the area of the water intake. The drinking water has been affected once or twice since the breakwall was constructed. This had happened before the wall was built, especially in the spring. Periodic contamination has been a concern and seems to be more frequent in the last several years.

"The local water intakes have been obsolete for several years, and it is well known new intakes are needed in deep water."

d. COMMENT:

The net result to our environment since 1973 has been detrimental to our area and caused many adverse feelings among our residents. All of us come to Linwood for a great many reasons; the Corps of Engineers came for a specific one. Yet, if we examine the stated goals of the Corps we find their goals not unlike our own, for each of us are concerned about the environment and its enjoyment by all people.

The stated missions of the Corps are dedicated to accomplishing basic environmental goals which include the following:

I. Be responsible to the full range of social, economic, and other needs in use of water and related resources;

II. Balance environmental quality and development by providing the widest possible range of beneficial uses of the environment without environmental abuse, risk to health or safety, or other unintended, unanticipated, and undesirable consequences;

III. Arrest and abate the degradation and deterioriation of our physical, biological, and cultural environment;

IV. Give environmental values full consideration in decision-making along with technical and economic considerations;

V. Consider a full range of alternatives to solving man's problems and meeting his needs;

VI. Apply non-structural solutions where practical; apply technology creatively and imaginatively with concern for their impacts on environmental quality.

I'm sure you'll agree that the situation warrants a solution...a solution which will be amenable to all parties concerned. I am confident that through mutual cooperation with your department, the Corps of Engineers and the LCOA, we can once again enjoy the benefits Linwood Park has to offer its lessees and guests.

d. RESPONSE:

A section entitled, "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken or will take in

order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. These actions will be taken with the objective of meeting the Corps basic environmental goals in a timely and efficient manner. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

e. COMMENT:

I would like to suggest that this letter be included in the Final Environmental Impact Report due in December of this year (1975). Please feel free to contact me for any reasons concerning the issues stated above. Thank you for your time and cooperation.

e. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested. Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.16 NORTHWEST OHIO GREAT LAKES RESEARCH CENTER
(commenting letter dated 9 October 1975, copy on page F-7)

a. COMMENT:

In reply to your Draft Environmental Impact Statements for Rocky River and Vermilion dated September 8 and September 11, respectively, please be advised of my following comments. Given the nature of our agency, I am immediately attracted and concerned about the historical impact ramifications. The Rocky River study regarding this area was particularly weak. Judging by the bibliography, the information was obtained from readily available, though often historically inaccurate, county histories and would appear to have little correlation to the study.

Inasmuch as both statements are concerned with operation and maintenance, it would imply bottomlands. I would suggest that any historical inquiry be aimed more at this area. For example, there is no mention made of the great loss of equipment by the Bradstreet expedition in 1764 at the mouth of Rocky River. There is no suggestion made in either statement regarding vessel losses that may have occurred in the area. The existence of such a wreck may contain artifacts of historical and/or archaeological value.

a. RESPONSE:

Paragraph 2.129 has been expanded, and Table 2.30 has been added, to discuss vessel losses in the vicinity of Vermilion Harbor. Paragraph 4.21 has been expanded to discuss potential impacts of harbor maintenance activities on these features.

b. COMMENT:

I would suggest a study of vessel losses on Lake Erie similar to that which we recently completed for the Michigan Department of Natural Resources. For more information on this study, feel free to contact us or Mr. James Bryant, Stevens T. Mason Building, Lansing, Michigan, 48926 (Michigan Department of Natural Resources).

We appreciate receiving these statements as we feel sure, given our function, they will prove valuable as a research tool in years to come, and we are hopeful that our suggestions have been and will continue to be of some assistance.

b. RESPONSE:

The Buffalo District is aware of the referenced shipwreck study sponsored by the Michigan Department of Natural Resources, and agrees that a similar study of submerged cultural resources in Lake Erie would be a valuable planning tool. However, inasmuch as the proposed routine maintenance project was coordinated with the Ohio State Historic

Preservation Officer in accordance with procedures outlined in the Advisory Council on Historic Preservation's "Procedures for the Protection of Historic and Cultural Properties" (39 F.R. 3366), and in view of the lack of adverse comments on the Draft Statement from the Advisory Council on Historic Preservation, the U. S. Department of the Interior, National Park Service, the Ohio State Historic Preservation Officer, and the Ohio Historical Society, further cultural resources studies for the operation and maintenance of Vermilion Harbor are not considered necessary. See the Chapter 9 section entitled "Cultural Resources" for a further discussion.

Your comments on the Draft Statement are appreciated.

9.17 OHIO DEPARTMENT OF NATURAL RESOURCES
(commenting letter dated 16 September 1975, copy on page F-8)

a. COMMENT:

This is to acknowledge receipt of the three copies each of the Draft Environmental Impact Statement for Vermilion and Rocky River harbors.

These documents are in review by our staff and their comments will be submitted to Ohio EPA for inclusion in their coordinated response.

a. RESPONSE:

Comments from the Ohio Environmental Protection Agency, including comments from the Ohio Department of Natural Resources, are addressed in paragraph 9.18 of this document.

9.18 OHIO ENVIRONMENTAL PROTECTION AGENCY
(commenting letter dated 13 November 1975, copy on page F-9)

a. COMMENT:

The Ohio Environmental Protection Agency has been charged, by the Governor, with lead agency and review coordination responsibilities for the State of Ohio on Federal Environmental Impact Statements. The above-mentioned Draft Environmental Impact Statement has been reviewed by sections of this Agency, the Ohio Department of Natural Resources, and the Ohio Department of Economic and Community Development. The following comments constitute those received from the above agencies and have been coordinated under the auspices of the State Clearinghouse.

General:

Overall the Draft EIS was well done concer ing the environmental impacts of the proposed action. The "Description of the Environment" Section was exceptionally well done, providing reviewers with a comprehensive description of specifics for a project area.

There have, however, been questions raised by local residents as to whether or not continued maintenance dredging at the scale envisioned by the Corps is the most cost beneficial and environmentally sound method of keeping the harbor navigable. Recent studies done by these residents have indicated that the detached breakwater, while providing a beneficial impact of a small boat refuge, has upset the normal flow of the river into the lake, thus creating the adverse impacts of increased shoaling and beach redistribution.

a. RESPONSE:

The concerns of local residents regarding harbor maintenance and the detached breakwater have been documented in letters of comment on the Draft Statement, copies of which are included in Appendix F. Specific responses to these concerns are presented in subsequent paragraphs in this chapter.

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken or will undertake in an effort to investigate identified local concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. As indicated in that discussion, the Section 111 Study of shore damages attributable to the Vermilion navigation project has been completed. The Study's main conclusion is that at this time it cannot be determined whether the recent shoreline changes are due to abnormally high lake levels or the detached breakwater. The study recommendations include conducting a five-year

shoreline monitoring program and preparing a supplemental Section 111 Study based on the results of the monitoring program. Further actions to prevent or mitigate shore damages at Vermilion will be taken in accordance with the final recommendations of the supplemental Study. The report is attached as Appendix G and should be consulted for more detailed information. The Buffalo District will also conduct an Adverse Impact Study to address other local concerns about impairment of local water quality (for both water-contact recreation and the public water supply), alteration of hydrologic conditions, navigation hazards, and other issues that have been attributed to the presence of the detached breakwater. Appropriate recommendations for further action will be made based on this Study's conclusions.

b. COMMENT:

While, to this Agency's knowledge, no State agencies have conducted studies into this matter, the Ohio EPA is aware that public water supply service for Vermilion has been upset in the past due to debris collection around the lake intake, this debris collection being possibly attributable to the detached breakwater.

b. RESPONSE:

The relationship between the location of the detached breakwater and the Vermilion public water supply, including the possibility of increased debris buildup as an adverse effect on water quality, will be addressed in the aforementioned Adverse Impact Study. In a November 1975 report to the Vermilion City Council, the Vermilion Port Authority noted the following about the municipal water intake (140):

> "There is some increased turbidity in the area of the water intake. The drinking water has been affected once or twice since the breakwall was constructed. This had happened before the wall was built, especially in the spring. Periodic contamination has been a concern and seems to be more frequent in the last several years.
>
> "The local water intakes have been obsolete for several years, and it is well known new intakes are needed in deep water.
>
> "With or without the new breakwall, the present water intake is too close to shore. Intake installed when Vermilion's population was limited and not designed to handle volume of water required by the present population."

The relationship between harbor maintenance operations and the public water supply is discussed in paragraph 4.39.

c. COMMENT:

While the impact of the detached breakwater makes little difference as to the necessity for dredging Vermilion Harbor at this time, it is felt that the Corps should consider the alternative of removal or modification of the breakwater as one method of reducing the frequency of dredging in the future. This proposal would seem to be best dealt with in the alternatives section of this Draft EIS. Since the Corps mentions two instances of emergency dredging in the past 17 months, and since there are indications that the detached breakwater may be the cause of these instances, it is felt that this EIS may be the most appropriate vehicle for a discussion of the impacts associated with the breakwater vis a vis future operation and maintenance requirements for Vermilion Harbor.

c. RESPONSE:

The section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39) has been revised in this Final Statement to discuss three specific structural modifications which were suggested for consideration after the Draft Statement had been released for public review (September 1975). Removal of the breakwater, as suggested in this and other comments received on the Draft Statement, and removing a portion of the breakwater, as suggested in a November 1975 Vermilion Port Authority report, are included in the subject section. It has been determined that while either of these courses of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, any alteration or removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. These benefits, as listed in the Port Authority's report, include a reduction of river surge, helping to control harbor water levels during north to northeast winds, providing a safer harbor entrance during storms, preventing windrowed ice from jamming at the pier heads, allowing ice to flow from the harbor during northeast winds, obligating the Corps to maintain the harbor up to the Liberty Avenue Bridge, and providing a protected sport-fishing area behind the structure (140). In view of the long-term, benefits that would be lost if the structure were altered or removed, the alternative of structurally modifying the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further at this time.

d. COMMENT:

Specific Comments:

The Geology Section could use more recent figures as to geological periods. The following comments are made in the interests of accuracy:

In the first sentence of paragraph 2.03 (page 18) it would be more up-to-date to use the figures 600 to 230 million years instead of the stated 600 to 220 million years.

d. RESPONSE:

Paragraph 2.03 has been revised in response to the comment.

e. COMMENT:

A more recent age for the Mesozoic Era (page 20, first sentence of paragraph 2.04) is from 230 to 70 million years old.

e. RESPONSE:

Paragraph 2.04 has been revised in response to the comment.

f. COMMENT:

The Nebraskan began, not ended, approximately 1 million years ago (page 20, second sentence of paragraph 2.04).

f. RESPONSE:

Paragraph 2.04 has been revised in response to the comment.

g. COMMENT

The Devonian began about 400 million years ago and ended approximately 350 million years ago (page 29, paragraph 2.25), therefore the rocks in the Vermilion are more precisely between 600 and 350 million years old.

g. RESPONSE:

Paragraph 2.25 has been revised in response to the comment.

h. COMMENT:

The Generalized Geologic Section of Rocks in Ohio (Stout, 1944) (paragraph 2.27, page 29) is superseded in part by "Generalized Column of Rocks in Ohio, " which is available at no charge from the Division of Geological Survey.

h. RESPONSE:

A copy of the "Generalized Column of Rocks in Ohio" was provided to the Buffalo District by the Ohio DNR, Division of Geological Survey. The information presented in the Ohio DNR publication is in agreement with that which is presented in paragraph 2.27. The publication is a useful reference source and will be valuable in preparing future environmental statements.

i. COMMENT:

A bulk sediment analysis is presented for VER-75-8 on page 72, but the location of the sampling site is not shown on Plate 1.3 as referenced.

i. RESPONSE:

A representative of USEPA, Region V has indicated that the sediment sampled at Station VER 75-8 was a replicate of station VER 75-2; therefore both stations have the same location. This information was not included in the USEPA sediment quality report on Vermilion Harbor (see map on page A-25). Plate 1.3 has been revised in response to the comment.

j. COMMENT:

The statement in paragraph 1.34 (page 17) that the estimated commercial fishing, recreational, navigation, and harbor-of-refuge benefits from the harbor project are about $634,200 (approximately $1,902,600 every three years), appears to be quite high in light of the statement in paragraph 2.107 (page 89) that the total real-estate tax revenues in Vermilion are about $1,396,450 (Erie County) to $1,538,634 (Lorain County) per year. Thus, the benefits alleged for the dredging project equal some 45 percent of total real-estate tax revenues.

j. RESPONSE:

The $634,200 in annual benefits attributable to the Vermilion Harbor navigation project were derived by updating the estimate of project benefits shown in the project design memorandum ($475,900, April 1972 price levels) by a factor of 1.3326 (factor derived from the construction cost index appearing in the 21 August 1975 "Engineering News Record") to arrive at an estimate commensurate with price levels prevailing at the time that the Draft Statement was released. A complete justification of the original estimate of benefits is presented in the General Design Memorandum for the Vermilion Harbor navigation project.

We concur with your estimate of the city's annual total real estate tax revenue as derived from data in this document. However, there

is no known economic relationship between annual benefits attributable to the navigation project and the city's estimated annual total real estate tax revenue.

The statement in question has been deleted from the Final Statement since it may be misleading in that it does not include the value of other benefits, such as sportfishing and windrowed ice protection, that may also be attributed to the project. Therefore, in order to avoid further confusion, the statement was deleted.

k. COMMENT:

A statement in paragraph 4.19 (page 121) indicates that the project will neither create nor destroy land areas. While this may be true for the Vermilion area, the sediment which is taken to the Huron Diked Disposal Site will be utilized in "creating" a land area.

k. RESPONSE:

Paragraph 4.19 has been revised and paragraph 4.48 has been added in response to the comment.

1. COMMENT:

Paragraph 4.27 (page 123) indicates that dredging operations will have a long-term, medium-magnitude, beneficial effect on sediment quality, and thus infers that benthic organisms will increase in numbers and species diversity. This inference should be tempered by the realization that the sediment, polluted or otherwise, will require dredging approximately every three years under the present proposal, and therefore a stable benthic community will not occur in the long-term.

We appreciate the opportunity to review this Draft EIS and look forward to receiving the Final EIS when it becomes available.

1. RESPONSE:

Paragraph 4.29 indicates that the removal of polluted and polluted-restricted disposal sediments will improve "the quality of the natural environment for benthic inhabitants of the area." Paragraph 4.33 states that "periodic dredging at Vermilion Harbor will prohibit complete reestablishment of a completely developed (mature) benthic community between dredging operations." Paragraphs 7.02 and 8.02 also note the long-term effects on the harbor's benthic community.

Your comments on the Draft Statement are appreciated.

9.19 SIERRA CLUB, NORTHEAST OHIO GROUP
(commenting letter dated 25 November 1975, copy on page F-12)

a. COMMENT:

Subject: Draft EIS entitled, "Operation and Maintenance, Vermilion Harbor, Erie County, Ohio."

Thank you for sending us a copy of the above draft EIS. Several of our members have reviewed the Statement and one member in particular has boating experience at Vermilion Harbor. In addition we have received copy of a letter dated October 6, 1975 from Mr. George W. Grossman to the Buffalo District, giving detailed comments on the Vermilion Harbor situation.

We agree with Mr. Grossman's analysis to the effect that the only remedy to the high dredging requirements at Vermilion Harbor is to completely remove the detached breakwater. Remedial dredging will almost certainly be required after removal of the breakwater. However, the long-term expense and adverse environmental impacts will be reduced to the point where removal of the breakwater will probably have a favorable benefit/cost ratio.

Please keep us posted on future developments on Vermilion Harbor.

a. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modifications of the Harbor Structures" (paragraph 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

The Buffalo District is aware of the alleged adverse effects that have been attributed to the presence of the detached breakwater by

Mr. Grossman and other local interests. A section entitled, "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken or will take in order to investigate the community's concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project. The Buffalo District will inform the Sierra Club, Northeast Ohio Group, of future developments at Vermilion Harbor and encourages the Group's participation in the Corps environmental program. The Group will receive copies of all reports, including this Final Statement, as they become available for public distribution.

Your comments on the Draft Statement are appreciated.

9.20 U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
(commenting letter dated 7 November 1975, copy on page F-13)

a. COMMENT:

Refer to: NCBED-PE, Draft Environmental Statement, Operations and Maintenance Vermilion Harbor, OH.

We have reviewed the above statement on continued dredging, timber-crib, riprap and breakwater construction.

Since dredging and spoil disposal will be in the lake, there should be no direct effect on terrestrial vegetation.

a. RESPONSE:

We concur.

b. COMMENT:

The final statement should describe any shore erosion and loss of trees that may be caused, through changes in currents, by the breakwater parallel to the shore.

Thank you for the opportunity to review this Draft Statement.

b. RESPONSE:

The Buffalo District has recently completed a Section 111 Study report on shore damages that may be attributable to the Vermilion Harbor navigation project. One of the conclusions of the report is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

Several trees at the beaches east of the harbor have been lost in the last several years due to shoreline changes in that area. The losses began to occur prior to the installation of the detached breakwater in 1973 and therefore cannot be attributed to the presence of the structure. Local concerns about the effect of the breakwater on land areas east of the harbor will be addressed in an Adverse Impact Study of this and other conditions at Vermilion (see paragraph 1.49).

Your comments on the Draft Statement are appreciated.

9.21 U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
(commenting letter dated 29 September 1975, copy on page F-14)

a. COMMENT:

The Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor in Erie County was addressed to the State conservationist, U.S. Soil Conservation Service, Columbus, OH, for review and comment.

We have reviewed this draft statement and have no specific comments. The statement, as it relates to the items on which we normally comment, does an excellent job of assessing the impact the proposed work will have on the environment.

We appreciate the opportunity to review and comment on this proposed project.

a. RESPONSE:

Your comments concerning the quality of the Draft Statement are appreciated.

9.22 U.S. DEPARTMENT OF COMMERCE
(commenting letter dated 5 November 1975, copy on page F-15)

a. COMMENT:

Reference your draft environmental impact statement entitled "Operation and Maintenance, Vermilion Harbor, Erie County, Ohio." In order to expedite transmittal of the enclosed comments from the National Oceanic and Atmospheric Administration, we are sending them to you in the form in which they were received in this office.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight (8) copies of the final statement.

a. RESPONSE:

Comments from the National Oceanic and Atmospheric Administration are addressed in response b. below. Eight copies of the Final Statement will be forwarded to the U.S. Department of Commerce when the statement is filed with the Council on Environmental Quality.

b. COMMENT:

The subject DEIS prepared by the Corps of Engineers, Buffalo District, on environmental effects of maintenance dredging in Vermilion Harbor, Lake Erie, has been reviewed and comments herewith submitted.

Maintenance of project navigation depths in Vermilion Harbor is essential for small craft navigation and should be accomplished when needed.

Open-lake disposal of clean sand from the lake approach and the entrance channels is a waste of precious natural resource. Priority should be given to nearshore or onshore disposal to protect beaches from erosion. The Statement indicates that in the past disposal over the west pier was recommended by the Ohio Department of Natural Resources (paragraph 1.12). However, no reasons are given for the recommendation and no explanation is provided for not using the recommended area for disposal of spoil during regular maintenance dredging.

b. RESPONSE:

In a 4 June 1974 telephone conversation with Buffalo District personnel, a representative of the Ohio Deparment of Natural Resources recommended that unpolluted dredgings be deposited west of the west pier in order to reintroduce the material back into the predominant natural east-to-west littoral system at Vermilion.

The alternative of updrift disposal of unpolluted maintenance dredgings for beach nourishment purposes is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal is not practical under existing conditions since the nourishment materials would tend to be transported littorally back into the navigation channels. Therefore, this alternative was not considered further at this time.

The alternative of using unpolluted dredged material for beach nourishment with downdrift disposal is also discussed in detail in the aforementioned "Beach Nourishment" section. Downdrift disposal is more feasible than updrift disposal in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the lake shoreline near Vermilion Harbor, the use of unpolluted materials for beach nourishment poses several environmental questions that must evaluated for each proposed maintenance operation. The presence of valuable fishery habitat, public and private beaches, and the public water intake (all of which are located along the lakeshore within about 1,000 feet of the river mouth) must be considered in view of the duration, time of year, quantity and quality of dredgings, and other characteristics of each dredging action. The Corps will investigate the environmental and economic feasibility of downdrift disposal on a case-by-case basis in order to determine the best course of action for each proposed operation. Should appropriate local interests express an interest in beach nourishment for a specific operation, the Corps will further analyze the engineering and economic feasibility of the specific proposal, and a separate environmental assessment of the action will be prepared. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

Your comments on the Draft Statement are appreciated.

9.23 U.S DEPARTMENT OF THE INTERIOR
(commenting letter dated 29 October 1975, copy on page F-17)

a. COMMENT:

The Department of the Interior has reviewed the Draft Environmental Statement for the Operation and Maintenance of Vermilion Harbor, Erie County, OH, as requested in your transmittal letter of 11 September 1975, to our Assistant Secretary, Program Development and Budget. Our comments relate to areas of our jurisdiction and expertise and have been prepared in accordance with the National Environmental Policy Act of 1969.

We believe that the Buffalo District's plan to dispose of 9,000 cubic yards of "polluted-restricted sediments" in Lake Erie is environmentally unsound. These sediments are high in organic materials and contain other potentially harmful constituents such as heavy metals which will be reintroduced to the water column.

a. RESPONSE:

As was indicated in the Draft Statement, the Buffalo District's plan to dispose of restricted disposal sediments dredged from the Vermilion Harbor entrance channel was formulated in accordance with the recommendations of U.S.E.P.A., Region V, as presented in its report entitled "Vermilion, Ohio, Report on the Degree of Pollution of Bottom Sediments, 1975 Harbor Sediment Sampling Program, April 9, 1975" (complete report and U.S.E.P.A. transmittal letter are included in Appendix A). In the report, U.S.E.P.A. acknowledges that sediments in the restricted disposal zone contain "moderately high concentrations of organics (volatile solids, COD, TKN) and zinc," and that "concentrations of oil and grease, mercury, and lead are low." A representative of U.S.E.P.A., Region V, has indicated that that agency's primary concern with disposal operations is the potential long-term effect of materials after they have settled in the disposal zone. Covering restricted disposal materials with a layer of materials suitable for open-lake disposal would be, according to U.S.E.P.A., Region V, an effective measure to prevent long-term resuspension of moderately polluted materials (134).

However, since the real effectiveness and practicality of the subject disposal method has not yet been demonstrated, the U.S. Department of the Interior's environmental reservations are well founded. Open-lake disposal of restricted disposal sediments would probably result in the reintroduction of some highly concentrated organic materials, heavy metals, and other potentially harmful constituents into the water

column. In addition, the materials that would be deposited over the restricted disposal materials would probably gradually shift away from the disposal area in the long-term due to the action of lake bottom currents, particularly during severe storm periods. This could result in the exposure of some or all of the restricted disposal sediments over a period of years, which could negate the objective of the layered-disposal plan.

The Corps Waterways Experiment Station (WES) is presently investigating the process and environmental effects of open-lake disposal of maintenance dredgings from Ashtabula Harbor, OH (located about 100 miles east of Vermilion). The WES study at Ashtabula, which is part of a broad national study of the environmental effects of specific disposal practices, will provide some initial background data on open-lake disposal practices and fate of harbor dredgings once they have been deposited on the lake bottom. Since the study is still in progress, no conclusions are available at this time. However, information from this study should provide a better basis for evaluating the layered-disposal method's effectiveness.

In view of the environmental uncertainties concerning the long-term effectiveness of open-lake disposal by covering restricted disposal sediments with unpolluted sediments, this course of action has been eliminated from the proposed project. Paragraph 1.30 has been added to discuss the revised plan for the disposal of any restricted disposal sediments that may be dredged from Vermilion Harbor, which is to dispose of such materials in the Huron Harbor Site 1 confined disposal facility. Please note that October 1975 soundings of the restricted disposal zone, which were unavailable when the Draft Statement was released in September 1975, indicate that river scouring has maintained depths at or below the 12-foot project depth in this zone. Therefore, no maintenance is expected to be required in the restricted disposal zone, and no sediments are expected to require removal and disposal. However, if shoaling does occur and it is necessary to dredge restricted disposal sediments, these materials will also be deposited in the Huron facility.

b. COMMENT:

Such "polluted-restricted sediments" will amount to less than 30,000 cubic yards over the next 10 years since it has been stated that dredging in the harbor will be done every three years. Either the Huron confined disposal area 10 miles to the west and/or the abandoned quarry which was once made available by the Vermilion Fish and Game Association for spoil disposal should be able to handle this amount of materials.

b. RESPONSE:

Response a.above discusses the Buffalo District's plan to dispose of restricted disposal materials in the Huron Site 1 confined disposal facility.

A representative of the Vermilion Fish and Game Association has indicated that the upland disposal site used for the deposition of new work dredgings in 1973 has been filled, graded, seeded, and planted with trees, and is therefore not available as a disposal area (135). Since there are currently no viable upland disposal sites in the Vermilion area, this course of action was not considered further.

c. COMMENT:

Unpolluted materials which are composed mainly of sand are a valuable resource that should be utilized for beach nourishment and placed directly on the beach where environmental damage would be minimal rather than being dumped in open water. Previous similar Corps impact statements have indicated that pumping of materials can be economically accomplished without having to utilize additional booster pumps for distances of at least one-half mile. This alternative should be considered even in the absence of any expressed local requests for beach nourishment.

c. RESPONSE:

A section in Chapter 6 entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34) addresses the relationship between maintenance operations and beach nourishment. As is indicated in that section, disposal of unpolluted sediments at either updrift or downdrift beaches would be technically feasible to accomplish, although recent experience has shown that updrift disposal by trucking sediments to eastward beach areas would be much more costly than downdrift disposal by placing materials over the west pier. Pumping suitable sediments to updrift areas could be accomplished if a hydraulic (cutterhead or hopper) dredge were operating. However, while a cutterhead may operate economically, use of a hopper dredge would require the construction of a dock facility for tie-up and pump-out, which would not be economically feasible. Furthermore, long-term updrift disposal by any equipment is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Downdrift disposal is more feasible in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. Downdrift disposal could be economically accomplished by releasing materials directly over the

west pier if a mechanical dredge (clamshell, dipper, backhoe) is used, or by pumping from a hydraulic dredge to the downdrift beach areas which are located within about 1,000 feet of the west pier. However, due to the nature of the lake shoreline near Vermilion Harbor, the use of unpolluted materials for each nourishment poses several environmental questions that must be evaluated for each proposed maintenance operation. The presence of valuable fishery habitat, public and private beaches, and the public water intake (all of which are located along the lakeshore within about 1,000 feet of the river mouth) must be considered in view of the duration, time of year, quantity and quality of dredgings, and other characteristics of each dredging action. The Corps will investigate the feasibility of shoreline disposal, and the views of appropriate Federal, State, and local interests, on a case-by-case basis in order to determine the best course of action for each proposed operation. Should appropriate local interests express an interest in downdrift beach nourishment for a specific operation, the Corps will further analyze the engineering and economic feasibility of the specific proposal, and a separate environmental assessment of the action will be prepared. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

Your comments on the Draft Statement are appreciated.

9.24 U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION
(commenting letter dated 16 October 1975, copy on page F-18)

a. COMMENT:

As requested, we have reviewed the draft environmental statement for the Operation and Maintenance, Vermilion Harbor, Erie County, OH, and have no comments to offer regarding the statement.

The draft statement was sent directly to our Division Office in Columbus, OH, for review and comment. We would like to bring to your attention that the appropriate point of contact to obtain FHWA review and comment on draft environmental statements is the Regional office. Please have future requests for review of draft statements forwarded to this office.

The opportunity to review and comment on the draft environmental statement is appreciated.

a. RESPONSE:

Future requests for review of Draft Environmental Statements will be forwarded to the regional office as requested.

9.25 U.S. ENVIRONMENTAL PROTECTION AGENCY
(commenting letter dated 14 November 1975, copy on page F-19)

a. COMMENT:

We have completed our review of the Draft Environmental Impact Statement (EIS) for the Operation and Maintenance of Vermilion Harbor, Erie County, OH, which was sent to us on 11 September 1975. Based on the information provided in the EIS, we have no major objections to the proposed dredging but request additional information to more fully assess the total project impact. The following comments are for your use in preparing the Final EIS.

Approximately 9,000 cubic yards of material have been classified as suitable for restricted open-lake disposal. This type of classification requires unpolluted material to be used as a cover. There are 6,000 cubic yards of material available to act as this cover material. The Final EIS should indicate how accurately the unpolluted material can be placed on top of the previously deposited restricted material at the disposal site. The degree of accuracy should relate to actual coverage of the restricted material rather than placement within the 1/2-square mile disposal site. Also, an evaluation should be provided in the EIS on the covering ability of the 6,000 cubic yards of unpolluted material over the 9,000 cubic yards of restricted material. If the restricted material cannot be effectively covered, then alternate disposal methods will have to be employed.

a. RESPONSE:

Since the U.S.E.P.A., Region V's proposal to cover restricted disposal sediments with unpolluted sediments is a relatively recent development, there are no known existing research studies of the operation that would presently permit a detailed evaluation of the accuracy of coverage and placement, or the covering ability of a given amount of sediments. However, the Corps Waterways Experiment Station (WES) is presently investigating the process and environmental effects of open-lake disposal of maintenance dredgings from Ashtabula Harbor, OH, (located about 100 miles east of Vermilion). The WES study at Ashtabula, which is part of a broad national study of the environmental effects of specific disposal practices, will provide some initial background data on open-lake disposal practices and fate of harbor dredgings once they have been deposited on the lake bottom. Since the study is still in progress, no conclusions are available at this time. However, information from this study should provide a better basis for evaluating the layered-disposal method's effectiveness.

As was indicated in the U. S. Department of the Interior's letter of comment on the Draft Statement (dated 29 October 1975, copy in Appendix F), open-lake disposal of restricted disposal sediments would probably result in the reintroduction of some highly concentrated organic materials, heavy metals, and other potentially harmful constituents into the water column. In addition, the unpolluted materials that would be deposited over the restricted disposal materials would probably gradually shift away from the disposal area in the long-term due to the action of lake-bottom currents, particularly during severe storm periods. The aforementioned WES study will provide more detailed information on this possibility. In view of the environmental uncertainties concerning the long-term effectiveness of open-lake disposal by covering restricted disposal sediments with unpolluted sediments, this course of action has been eliminated from the proposed project. Paragraph 1.30 has been added to discuss the revised plan for the disposal of any restricted disposal sediments that may be dredged from Vermilion Harbor, which is to dispose of such materials in the Huron Harbor Site 1 confined disposal facility.

Please note that October 1975 soundings of the restricted disposal zone, which were unavailable when the Draft Statement was released in September 1975, indicate that river scouring has maintained depths at or below the 12-foot project depth in this zone. Therefore, no maintenance is expected to be required in the restricted disposal zone, and no sediments are expected to require removal and disposal. However, if shoaling does occur and it is necessary to dredge restricted disposal sediments, these materials will also be deposited in the Huron facility.

b. COMMENT:

Since the Vermilion area is subject to severe storms, the EIS should discuss how these storms affect materials deposited at the open-lake disposal site.

b. RESPONSE:

Since the Vermilion Harbor open-lake disposal site is located in over 32 feet of water, normal climatic conditions would not affect deposited materials. Although there is no known documentation of the effect of lake storms on disposal zones, such storms undoubtedly result in some degree of shifting in bottom materials. The aforementioned WES study will provide a more accurate basis for evaluating the subject effect.

c. COMMENT:

In addition, the Final EIS should indicate whether or not the open-lake disposal site has been used by sand and gravel operators as a site to obtain material.

c. RESPONSE:

Paragraphs 2.112 and 4.47 have been expanded in response to the comment.

d. COMMENT:

The maintenance of Vermilion Harbor will be accomplished by contract. If the contractor uses either a clamshell or dipper type of dredge, consideration should be given to requiring the use of vertical curtains to restrict the area affected by turbidity.

d. RESPONSE:

Vertical curtains are most generally used in shallow streams where work is being conducted by land equipment, such as a bulldozer. While curtains are effective to varying degrees in minimizing turbidity, they have not been widely used during construction or maintenance operations at Great Lakes harbors. The Vermilion Harbor maintenance dredging contractor will be required to employ all economically feasible state-of-the-art means for minimizing turbidity that are available at the time the maintenance dredging contract is awarded. The use of vertical curtains and other more technically advanced means will be considered at that time.

e. COMMENT:

The Final EIS should provide information on previous dredging operations at Vermilion.

e. RESPONSE:

Paragraphs 1.03 through 1.11, which discuss the history of the Federal project at Vermilion, have been added in response to the comment.

f. COMMENT:

Furthermore, the EIS should discuss whether or not the breakwater completed in 1974 has increased the amount of sediment deposited in the harbor channel resulting in the need to conduct additional dredging.

f. RESPONSE:

The Buffalo District has completed the Report on Section 111 Study of Vermilion Harbor, OH (January 1976) that addresses the issue

of local shore damages that may be attributable to the Federal navigation project. One of the conclusions of the report is as follows:

"Since the completion of the detached breakwater in October 1973, approximately 11,000 cubic yards of shoaling material has been removed from between the harbor piers to provide necessary project depth. During the same period, approximately 8,550 cubic yards of material was removed from the outer harbor portion of the project. Visual examinations of the dredged material indicates that the material removed from between the piers is primarily poorly sorted, silty, gravelly sand. On the other hand, the material dredged from the outer harbor is generally much finer and consists of clayey-silts with some pockets of silty-sands with traces of gravel. The high clay and organic detritus content indicates that the major portion of the material removed from the outer harbor is most likely material brought down by the Vermilion River" (141).

It is difficult to determine whether or not the 8,550 cubic yards of material removed from the lake approach channel represents an increase in shoaling since that channel was not a part of the navigation project prior to 1973. The approximately 11,000 cubic yards of material removed from the entrance channel does represent an increase in shoaling in that channel over past records. However, as is also noted in the Section 111 report:

"Whether the detached breakwater is in any way responsible for the increased overtopping of the east pier that has required frequent maintenance dredging between the piers is open to question. That little or no maintenance at this location was required prior to construction of the breakwater strongly implies its responsibility for the change. However, the record high lake levels that have increased the beach berm height relative to the height of the east pier and the higher elevation of wave runup from northeasterly storms may be the cause of the increased overtopping. More time and study is needed to evaluate the effect of the detached breakwater, particularly during a period of more normal lake levels" (141).

The issue of shoaling at the channel mouth will be evaluated in the Adverse Impact Study of conditions attributed to the presence of the breakwater. Please see paragraph 1.49 for a detailed discussion of this study. The Section 111 report is attached as Appendix G and should also be consulted for more detailed information.

g. COMMENT:

It was indicated in the EIS that there have been two emergency dredging operations conducted at Vermilion Harbor since May 1974, and we

have been informed of the necessity of a third such operation. Based on past dredging, the Final EIS should indicate the frequency that these emergency operations will be necessary, whether or not the breakwater is responsible for this situation, if the deposition of material at the Vermilion entrance channel is causing erosion at some other location and the mitigation measures which can be made to alleviate this situation.

g. RESPONSE:

It is not possible to predict the frequency of future emergency operations since the need for such activities is a function of natural conditions and circumstances, particularly severe lake storms during a period of high lake levels. Emergency dredging is accomplished only when the failure to do so would result in extensive damage to properties and possibly loss of life. Recent emergency operations at Vermilion have been conducted to remove shoals that were potential causes of ice jams and subsequent flooding in the harbor. Although not anticipated, future emergency operations will be conducted if the District Engineer determines that critical conditions exist and such operations are warranted. It is expected that as the recent high lake levels gradually decrease, storm-related shoaling and the need for emergency dredging will also decrease.

Please see response f. above for a discussion of the relationship between the existing breakwater and shoaling in the navigation channel.

One of the conclusions of the Section 111 report is:

"Construction of the detached breakwater portion of the harbor was initiated in June 1973 at a time of record high lake levels. Since that time, significant shoreline changes have occurred, particularly to the east of the east pier. However, the accretion and erosion that has occurred to the east between the start of breakwater construction in June 1973 to November 1975 is very similar to the accretion and erosion that occurred between 1968 and May 1973. Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by the high lake levels and those that may be attributed to the detached breakwater" (141).

The report recommends that a five-year monitoring program be undertaken in order to more fully evaluate the shoreline environment. Upon completion of this program, which is expected in 1981, a supplemental Section 111 study will be prepared based on the monitoring results. Appropriate mitigation measures, if any, will be recommended in the supplemental study.

h. COMMENT:

When work takes place near the Vermilion water intake, extreme care should be taken to assure that sediments and contaminants do not enter the water supply system. To prevent adverse impacts upon the water supply, consideration should be given to stopping pumpage for a short time.

h. RESPONSE:

The mouth of the Vermilion city water intake pipeline is located about 1,000 feet west of the western limit of the lake approach channel and is, therefore, beyond the immediate project area. However, all maintenance activities will be conducted in a manner that will insure the maximum mitigation of short-term adverse water quality conditions related to maintenance.

Paragraph 4.39 discusses measures that can be taken at the city water filtration plant to mitigate potential, temporary water quality degradation if such measures are required. The plant operator would be responsible for any decision to temporarily suspend plant pumping operations. Dredging operations can be suspended if the District Engineer determines that it is in the best overall interest of the public to do so.

i. COMMENT:

Based on the above discussion, we have classified the project as LO (Lack of Objections) and rated the EIS as Category 2 (additional information necessary). We appreciate the opportunity to review this Draft EIS. When the Final EIS is filed with the Council on Environmental Quality, please forward two copies to us. If you have any questions regarding our comments, please contact Mr. Gary A. Williams at 312-353-5756.

i. RESPONSE:

Two copies of the Final Statement will be forwarded to the U.S. Environmental Protection Agency when it is filed with the Council on Environmental Quality.

Your comments on the Draft Statement are appreciated.

9.26 VERMILION YACHT CLUB
(commenting letter dated 22 September 1975, copy on page F-21)

a. COMMENT:

The writer is in receipt of a copy of Operation and Maintenance, Vermilion Harbor, Erie County, Ohio mailed recently to our club steward, Mr. F. Hanschildt.

After reading the report and writing only for myself as a member and currently as the chief officer of our Club, I would like to commend those individuals who are responsible for its preparation for a piece of work excellently done. I learned a great deal from the report as to what many of the natural and man-made causes of the problems that occur in the Vermilion River watershed and the lake areas immediately at the mouth.

a. RESPONSE:

Your comments concerning the quality of the Draft Environmental Impact Statement are appreciated.

b. COMMENT:

Could you not present through releases to the newspapers in the area some of the information relating to the Hydrology, for I am certain much misinformation exists in the minds of many who are in a position in the Lagoons community and in the surrounding Beach Communities to prejudice the efforts of your department in this area. I believe they are fair-minded individuals who are lacking the engineering facts of the problems.

b. RESPONSE:

Your recommendation is most appropriate. We will make every effort to inform the public of Corps investigations and activities in the Vermilion community and region through press releases and public notices. Copies of past Corps studies have been distributed to all interested parties, and over 70 Federal, State and local public and private entities received copies of the Draft Environmental Impact Statement on the operation and maintenance of Vermilion Harbor. Further information concerning hydrology or any other topic related to Corps activities will be made available to the public, as appropriate.

c. COMMENT:

May I suggest that in the future your communications be addressed either to the attention of the Commodore of Vermilion Yacht Club or to the Board of Trustees.

c. RESPONSE:

Future communications will be addressed to either the Commodore of Vermilion Yacht Club or the Board of Trustees as requested.

9.27 MR. DAVID T. AND MS. ROBERTA A. BERNS
(commenting letter dated 7 November 1975, copy on page F-23)

a. COMMENT:

We are owners of a summer cottage located in Linwood Park at Vermilion, OH. As we understand that a Section 111 study of the Vermilion Harbor is to be completed in December of this year, it is appropriate that we write you at this time.

We would appreciate receiving a copy of the draft environmental impact statement regarding Vermilion Harbor that was circulated in September. We also wish to receive copies of the final environmental statement and the Section 111 study.

a. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 3 December 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 study will be forwarded when available. Please note that the Section 111 study report is included as Appendix G in this Final Statement.

b. COMMENT:

The Corps of Engineers installations at Vermilion Harbor affect the quality of the beach area that we use during the summer months. In particular, the breakwater installation is causing a continuing degradation of the beach area.

The sand beach that was once abundant at the east end of Linwood Beach is disappearing. It is obvious that this sand is piling up in front of the Vermilion Lagoons area and spilling around the East pier to fill up the river channel. The beach was relatively stable in all the many years Linwood Park has existed prior to installation of the breakwater and it is a logical correlation that degradation of the beach is caused by the breakwater.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Eire, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is

attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

c. COMMENT:

The breakwater installation has changed the flow of water out of the river channel such that this water is so diverted across the beaches on both sides of the river. It is apparent that the water in front of the beaches is contaminated by river debris where previously the water was relatively clear.

c. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channel, diversion of river water into, and pollution of, adjacent recreational swimming areas, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the

navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the build-up of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been lost of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

d. COMMENT:

If dredging of the river channel is conducted during the summer months, the water in front of the beach areas will be polluted, turbid, and unusable for swimming. Our property would lose much of its usefulness, value, and recreational attractiveness. Dredging should definitely not be conducted during the summer months.

d. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

e. COMMENT:

The Corps of Engineers is responsible for taking positive action to prevent any further degradation of the beach areas at Vermilion and to restore the beach areas to the configuration that was prevalent prior to installation of the breakwater.

e. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. As indicated above, a copy of the Section 111 study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

f. COMMENT:

We ask that these comments be taken into account in the final environmental impact report and the Section 111 study.

f. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 study report as requested.

Your comments on Corps maintenance activities and the navigation project at Vermilion Harbor are appreciated.

9.28 MR. RAYMOND A. BOAS
(commenting letter dated 7 November 1975, copy on page F-24)

a. COMMENT:

Reference Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, 26 September 1975, p. 44349.

My wife and I own a summer cottage at Linwood Park in Vermilion, OH, and we are concerned over the apparent effect the Vermilion Harbor Breakwater is having on the Linwood Beach. Would you please send us: (a) a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975, (b) a copy of the final environmental impact statement, and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

a. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 study will be forwarded when available. Please note that the Section 111 study report is included as Appendix G in this Final Statement.

b. COMMENT:

My wife's family has derived pleasure from the park and beach since its inception in the late 1880's, and we are continuing the family tradition in enjoying the park immensely ourselves. Upon my retirement from the United States Navy in some years to come, we plan to use our cottage in Linwood Park at 5225 7th Street full time in the summers. Currently, and prior to that time we are renting the cottage for the majority of the summer season using the revenue to maintain and improve the cottage. The majority of our tenants have also loved Linwood Park and its beach for many, many years. Thus, we have a long term interest in the condition of the Linwood Beach.

b. RESPONSE:

No response required.

c. COMMENT:

In commenting on the Draft Environmental Impact Statement on the Operation and Maintenance of Vermilion Harbor per the Notice

in the Federal Register, 26 September 1975, p. 44349, I request that my letter be included in the Section 111 study and the final environmental impact report.

c. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 study report as requested.

d. COMMENT:

In our collection of early Linwood Park mementos we have several postcards of Linwood Beach and the Vermilion Lagoons, showing the beach contour over a period of decades prior to the erection of the breakwater. The dominant feature in these pictures is the small beach at the Vermilion Lagoons with no sand pileup at the pier. My wife remembers as a child burning her feet on the hot sand before reaching the water's edge. Our children now don't have the same sensation because there is considerably less beach.

d. RESPONSE:

No response required.

e. COMMENT:

The sand from our beach in Linwood Park now surrounds the pier due to the erection of the breakwater and fills the river until it is dredged by the Corps and dumped out in Lake Erie.

e. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141), The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms."

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on the build-up of sand east of the east pier (Lagoons Beach) and navigation channel shoaling (140):

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward."

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

f. COMMENT:

The summertime dredging of our sand in the river pollutes our beach making swimming unpleasant.

f. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

g. COMMENT:

The loss of our sand and the pollution of our beach must stop. The solution is simple - remove the breakwater and all the problems it causes.

g. RESPONSE:

Please see response e. above for a discusssion of the Corps investigation of shoreline damages at Vermilion.

The revised dredging schedule discussed in response f. above will eliminate beach water pollution related to maintenance dredging during the local swimming season.

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the

total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

h. COMMENTS:

Currently, there are others deeply involved in making your office aware of the problems caused in Vermilion, OH, by the Vermilion Harbor breakwater. As a future resident of Vermilion, OH, I trust your office will listen to the facts presented by those deeply involved in investigating this matter and will arrive at a satisfactory solution for the removal of the breakwater and restoration of the Linwood Park Beach. Copies of this letter will be sent to the Mayor and City Council of Vermilion, OH, and the Congressional representatives for that district.

h. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.29 MR. MURRAY COOK
(commenting letter dated 12 November 1975, copy on page F-26)

a. COMMENT:

I am a cottage owner in Linwood Park and am seriously concerned with the breakwater problem that presently exists. For this reason I would like to request a copy of the following:

1. A Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September, 1975.

2. A copy of the Final Environmental Impact Statement.

3. A copy of the Section III study of Vermilion Harbor due in December, 1975.

I strongly urge the Corps of Engineers to correct the deterioating condition of our beaches.

a. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section lll Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An adverse Impact Study will be initiated in order to address additional community concerns about the project.

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 24 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section lll Study will be forwarded when available. Please note that the Section lll Study report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.30 MS. HAZEL CRAMER
(commenting dated 8 November 1975, copy on page F-27)

a. COMMENT:

Every year since I was born I have spent the summer at Linwood Park in Vermilion, OH. I would very much appreciate your sending me a copy of the Draft Environmental Impact Statement for Operation and Maintenance of the Vermilion Harbor, (Sept. 1975).

a. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter also indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

b. COMMENT:

I understand that Corps disclaims responsibility for the heart-breaking erosion that has occurred only since the harbor was blocked by the breakwall.

b. RESPONSE:

Under Section 111 of the River and Harbor Act of 1968 (Public Law 90-483, approved 13 August 1968), "The Secretary of the Army, acting through the Chief of Engineers is authorized to investigate, study and construct projects for the prevention or mitigation of shore damages attributable to Federal navigation works". In accordance with this authority, and at the request of the State of Ohio, the Buffalo District has completed the Report on Section 111 Study of Vermilion Harbor, OH. One of the report's conclusions is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

> "1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

c. COMMENT:

There did not used to be a sand bar in the river, the beach used to be three times wider, there was no black gum on the sand and the shoreline was completely different.

c. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps Draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on pollution of adjacent recreational swimming areas, shoaling in the navigation channels, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the folfowing insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beached have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the build-up of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Build-up of sand in the river from northeast to east storms."

d. COMMENT:

I protest violently that such damage has been done to our beach, and I would very much like to know what I can do as a very frustrated, helpless-feeling, angry citizen.

d. RESPONSE:

Your comments expressing concerns about the effect of the breakwater on the Vermilion Harbor environment have been instrumental in the Corps initiation of the aforementioned Adverse Impact Study.

9.31 MR. STUART P. CRAMER
(commenting letter dated 5 November 1975, copy on page F-29)

a. COMMENT:

Will you kindly include the following comments in the Section 111 study and final environmental impact report on Operation and Maintenance of Vermilion Harbor per notice Federal Register, 26 September 1975. p. 44349; and in Section 111 of the study due in December.

a. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 study report as requested.

b. COMMENT:

As a long time cottage owner at Linwood Park, and a lifelong user of this beach, I wish to state that before the present breakwall was constructed there was never any sand build-up at the east side pier.

Nor was there beach erosion despite NE storms.

Nor was there sandbar in the river.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, The Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on the build-up of sand east of the east pier (Lagoons Beach) and navigation channel shoaling (140):

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

c. COMMENT:

I therefore believe that this sand should be returned to Linwood Beach and not dredged up and dumped into the lake.

c. RESPONSE:

Use of unpolluted dredged material for beach nourishment (updrift disposal) is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beaches east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

d. COMMENT:

I demand a removal of the breakwall to prevent further pollution and the inevitable flooding that will result from ice backing up in the river.

d. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

Your concerns about the effect of the breakwater on the increased probability of ice jam flooding will be addressed in the aforementioned Adverse Impact Study. Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on ice jams and flooding:

"This is the most difficult part of the problem. The Authority believes that wind-row ice is more dangerous than river ice. By keeping the wind-row away from the ends of the piers, water can reach the lake under all conditions.

"We believe that some flooding will occur and will always be a danger. This can be complicated by river ice. There was held in late 1969 or 1970 a series of meetings in Vermilion to consider the problem. This is also their opinion. These meetings were attended by ice experts of the Coast Guard, Lake Carriers Association, and Corps of Engineers.

"The ice breaker, Kaw, tested the ability to operate in the Vermilion River last year. The results were as predicted by the ice committee in 1970.

"Questionable - Must still be evaluated - Under severe ice conditions, I am not certain of action of ice behind breakwall; feel it will be better than without wall but do not know that anyone knows for certain."

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.32 MR. WILLIAM E. DEARTH
(commenting letter dated 11 November 1975, copy on page F-30)

a. COMMENT:

Please forward to the sender the following at your earliest convenience:

1. copy of Draft Environmental Statement of Operation and Maintenance of Vermilion, OH, Harbor dated September 1975,

2. copy of final environmental impact statement,

3. copy of Section 111 Study of Vermilion Harbor due in December.

a. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

b. COMMENT:

As a cottage owner at Linwood Park, Vermilion, OH, I am most interested in the pending action regarding the breakwall installed at the mouth of the Vermilion River.

In the past year I have seen the beach sand gradually washed away and deposited in the river, then dredged and redeposited on the west shore. Linwood Park at one time was envied by many other lake front cottage owners; however, if this erosion continues, we will be faced with the loss of beach and needless to say, a considerable financial loss as far as the valuation of our cottage is concerned.

Prior to the erection of the breakwall we had no pollution problem or loss of beach. High or low water or the northeast storm did not effect the overall picture of the beach line.

I would appreciate your personal attention in this matter, to help return Linwood Park to the summer pleasure spot it once was.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on pollution of adjacent recreational swimming areas, shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

Your concerns about the effect of the breakwater on local property values will be addressed in the aforementioned Adverse Impact Study. Please note that local realtors and the Chairman of the Vermilion Port Authority have indicated that property values in the Lagoons and Linwood residential areas are not decreasing but rather are increasing, in some cases at a substantial rate (142, 143, 144).

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.33 MR. BENJAMIN F. FORBES
(commenting letter dated 6 November 1975, copy on page F-31)

a. COMMENT:

Having owned a cottage at Linwood Park, Vermilion, OH, for the past 10 years and having spent a part of each summer there for more than 25 years, our family is very much concerned about the effects which the breakwater, recently constructed at the mouth of the Vermilion River, has had on the beaches to the east.

We are aware of the changing conditions of the Lagoons Beach, the Linwood Park Beach and the Nakomis Beach, all of which are to the east of the Vermilion River. We have observed the tremendous buildup of sand in front of the Lagoons, the lessening of the Linwood Beach and the elimination of the beach at the easterly end of the Linwood Beach as well as the elimination of the Nakomis Beach.

There is now an actual sand bar in the Vermilion River channel between the two piers, something we have never seen before. We can positively vouch for the changes, all bad in our opinion, since the erection of breakwater across the mouth of the Vermilion River. There never used to be such sand buildup and/or erosion, beach pollution, etc. in all the years we've been there nor in the past 100 years or so according to conversations with some of the older folks during the time we've been going to Vermilion.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else."

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels, diversion of river water into, and pollution of, adjacent recreation swimming areas, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line [illegible]mes along the beach, and the base of the east pier, as well [illegible]ll boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) nad navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

b. COMMENT:

The dredging of the river has been and will be a tremendous continuing taxpayer expense.

b. RESPONSE:

Periodic maintenance dredging is necessary in order to maintain adequate channel depths for harbor navigation, which insures the continued viability of the harbor for economic and recreational purposes. The cost of maintenance is a function of harbor shoaling conditions (location, volume, depth, etc.), environmental considerations (sediment quality, season with least degree of environmental activity, etc.), operational factors (characteristics of dredge plant, location of disposal areas, etc.), and local, regional, and national economic conditions (recent rising labor costs, Congressional appropriations of maintenance funds, etc.). The proposed plan for maintaining Vermilion Harbor is the most economical plan in view of all of the factors that have been considered in its formulation.

c. COMMENT:

Summertime dredging will make out beach a terrible place to swim and I believe the many bad environmental changes caused by the new structure proves that it should be removed.

c. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

Your concerns about environmental changes that may be attributable to the existing breakwater will be addressed in the aforementioned Section 111 and Adverse Impact Studies.

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

d. COMMENT:

We feel that this was a dreadful mistake and I am requesting a copy of the draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor dated September 1975. I would also appreciate receiving a copy of the final environmental impact statement.

It is also my understanding that there is a study of the Vermilion Harbor due to be released in December of this year and I would request that our family's comments be included in that study and that a copy of the study be sent to us as well, when released.

d. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

Your comments have been included in this Final Statement and the preliminary Section 111 Study report as requested.

e. COMMENT:

There are a large number of people who have suffered loss of property value because of the building of this breakwater and likewise there are a large number of innocent people who may suffer further from the installation of this breakwater structure. Again, I sincerely believe this structure should be removed.

Thank you in advance for sending me information requested.

e. RESPONSE:

Your concerns about the effect of the breakwater on local property values will be addressed in the aforementioned Adverse Impact Study. Please note that local realtors and the Chairman of the Vermilion Port Authority have indicated that property values in the Lagoons and Linwood residential areas are not decreasing but rather are increasing, in some cases at a substantial rate (142, 143, 144).

Your comments on Corps maintenance activities and the navigation project at Vermilion Harbor are appreciated.

9.34 MR. FRED W. FUSSNER
(no date on commenting letter, copy on page F-23)

a. COMMENT:

Reference Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, 26 September 1975, p. 44349.

Before the breakwater we had no sand pile up at the pier. No sand in the river. No beach erosion or beach pollution in 100 years of high and low water and NE storm. I have been coming to Linwood for over 75 years. Our beach was always the finest on Lake Erie until recently.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

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"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct

an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effect, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on pollution of adjacent recreational swimming areas, shoaling in the navigation channels, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been lost of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

b. COMMENT:

We oppose the continued open-lake disposal of our sand dredged from the river.

b. RESPONSE:

Use of unpolluted dredged material for beach nourishment (updrift disposal) is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beaches east of the harbor is not practical under existing conditions since the nourishment materials would tend to be litorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

Use of unpolluted dredged material for beach nourishment (downdrift disposal) is also discussed in detail in the aforementioned "Beach Nourishment" section. Downdrift disposal is more feasible than updrift disposal in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the downdrift shoreline, the environmental and economic feasibility of downdrift disposal must be evaluated on a case-by-case basis in order to determine the best course of action for each proposed operation. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

Since each of the above alternatives to open-lake disposal is not presently feasible for various stated reasons, the open-lake disposal of unpolluted sediments dredged from Vermilion Harbor is recommended as the appropriate disposal method for harbor maintenance.

c. COMMENT:

We demand the return of our beach sand.

c. RESPONSE:

See response b. above for a discussion of updrift disposal of unpolluted sediments dredged during maintenance operations.

d. COMMENT:

We oppose summertime dredging when we are swimming. It's not fair nor healthy.

d. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities wihtin the limitations of operational and project cost considerations.

e. COMMENT:

We sincerely demand the removal of the breakwater as a solution to all the problems it causes including beach pollution. Our property values have been reduced since the beach has been degraded. The Vermilion River will be diverted across our beach as long as the breakwater stands.

e. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that

the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

Your concerns about the effect of recent shoreline changes on local property values will be addressed in the aforementioned Adverse Impact Study. Please note that local realtors and the Chairman of the Vermilion Port Authority have indicated that property values in the Lagoons and Linwood residential areas are not decreasing but rather are increasing, in some cases at a substantial rate (142, 143, 144).

f. COMMENT:

I request to have my comments included in the Section 111 Study and the final environmental impact report.

f. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

g. COMMENT:

Kindly help us to keep our beach at Linwood. We love Linwood and regard it as a Second Heaven. My father, Fred Fussner Sr., was one of its founders. In his name we appeal for any help you can give.

g. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. As indicated above, a copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.35 MR. FRED S. GALOVICH
(commenting letter dated 12 November 1975, copy on page F-34)

a. COMMENT:

As a concerned cottage owner in Linwood Park, I would like to request a copy of the following:

1. A Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September, 1975.

2. A copy of the Final Environmental Impact Statement.

3. A copy of the Section III study of Vermilion Harbor due in December, 1975.

a. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 24 November 1975. The transmitta indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

b. COMMENT:

It is my hope that the Army Corps of Engineers will work extremely close with the Linwood Park Association in correcting the breakwater problem that now exists.

One of the reasons I was so impressed with Linwood Park was the privacy and cleanliness of the beach, and if the Corps of Engineers does not correct the situation that will deteriorate our beach, it is my firm belief as well as the belief of many other cottage owners, that our property will, in fact, decrease.

b. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages

that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address additional community concerns about the project. The District will actively seek the assistance of the Linwood Park Cottage Owners Association, as well as that of other local agencies and individuals, in investigating the community's concerns to arrive at an acceptable solution to identifiable problems.

Your concerns about the effect of the breakwater on local property values will be addressed in the aforementioned Adverse Impact Study. Please note that local realtors and the Chairman of the Vermilion Port Authority have indicated that property values in the Lagoons and Linwood residential areas are not decreasing but rather are increasing, in some cases at a substantial rate (142, 143, 144).

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.36 MR. GEORGE W. GROSSMAN
(commenting letter dated 6 October 1975, copy on page F-35)

a. COMMENT:

Ref: Draft Environmental Impact Statement
Vermilion Harbor, OH
September 1975

Thank you for forwarding the Draft Environmental Impact Statement for the proposed Vermilion Harbor operation and maintenance project dated September, 1975, for review. There certainly is no question as to the professional competence of the firm of Ryckman/Edgerley/Tomlinson and Associates of St. Louis which prepared this study. Nevertheless, the study reflects the viewpoint of engineers based in St. Louis who possibly never saw Vermilion Harbor prior to 1975.

a. RESPONSE:

Some of the basic input data presented in the Draft Statement was prepared for the Buffalo District by the referenced consulting firm under Contract Number DACW49-75-C-0084 during the period between June and September 1975. The firm's "document manager," who has coordinated the firm's input data preparation, was knowledgeable about Vermilion Harbor prior to 1975. The Buffalo District was fully responsible for the preparation and content of both the Draft and Final Environmental Impact Statements concerning routine Corps operation and maintenance activities at Vermilion Harbor.

b. COMMENT:

The study is not fully responsive to the needs of the Corps "customers" in Vermilion. There are many serious deficiencies within the report which prohibit accurate evaluation of the problem by the various organizations who will review it.

b. RESPONSE:

This Final Environmental Impact Statement has incorporated comments that were received on the Draft Statement from interested Federal, State and local public and private interests. Revisions based on these comments have been made in an effort to be fully responsive to the needs of the Corps customers in the Vermilion community and region.

c. COMMENT:

I wish to propose an alternative action for the consideration of the Corps and the Corps "customers". This alternative is the removal of the Vermilion Harbor breakwater, a subsequent dredging operation to remove the sediment accumulation caused by the breakwater, and further dredging as required. Prior history of Vermilion Harbor indicates such dredging would be required every ten or fifteen years.

c. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable and the alternative was not considered further.

The existing Federal navigation project at Vermilion Harbor prior to 1973 consisted of only the piers and the entrance channel. Since that time, the detached breakwater and the lake approach and river channels were added to the project. Therefore, the history of maintenance operations at Vermilion Harbor prior to 1973 does not provide a valid basis for predicting maintenance requirements of the existing, expanded navigation project. The scope of maintenance activities can be expected to be greater than that of the prior project due to the added project features, interactions among those features, and other conditions that presently exist.

d. COMMENT:

For convenience, I have taken segments of the information in the Draft Environmental report, reprinted them, and then commented on each

point. I request that you include this review and comment, in full, in the Appendix to the Final Environmental Statement. This request also applies to the attached report, "Shore and Harbor Physical Processes at Vermilion, OH," dated September 1975. I also request that these two reports be placed in the current Section 111 study of Vermilion Harbor being conducted by the Corps and scheduled for completion in December, 1975.

d. RESPONSE:

Your letter of comment and its referenced attached report are included in Appendix F, pages F-35 through F-48, in this Final Statement. Responses to the comments contained in the subject letter are included in this paragraph (9.36) of this document. Your letter and report have also been included in the Report on Section 111 Study of Vermilion Harbor, OH, which is included as Appendix G of this Final Statement.

e. COMMENT:

1. Corps Statement: Authorization

1.02 The work under consideration in this Environmental Impact Statement is the recurring future maintenance of the completed channels and structures that comprise the shallow-draft navigation project for Vermilion Harbor, OH. The project was authorized by the River and Harbor Acts of 1836, 1875, 1905, and 1958 Act (described in House Document 231, 85th Congress, 1st session), including the breakwater construction and new work dredging of the river and lake approach channels, were initiated in June 1973 and completed in May 1974. The existing project is complete. (pg. 1)

f. Detached breakwater: Cellular steel sheet pile construction; 864 feet in length; 10 feet above LWD in height; perpendicular to, and 300 feet north of the east pier (pg. 3, 1.03).

1. Comment: Public Law 85-500, 85th Congress, approved 3 July 1958, authorized improvement of Vermilion Harbor in accordance with plans and conditions set forth in House Document 231, 85th Congress, First Session. These plans called for two detached breakwaters, 725' long and 225' long, with a 150' opening between them, creating a new harbor entrance 500' north of the entrance between the east and west piers. The authorized design would have funneled river water northward into the lake, minimizing water pollution problems in the area.

As shown above and in Plate 1.1, the Corps constructed a single detached breakwater 864' long which diverted river flow east and west. No Congressional authorization for this change is shown in public records and, to my knowledge, the change in design was not made known to or approved by local authorities.

e. RESPONSE:

In the authorizing document and the original project document plan it was contemplated that a new harbor entrance, 150 feet wide and about 500 feet lakeward of the outer end of the east pier, would be formed by overlapping arrowhead breakwaters. Initial model testing of this concept, conducted at the Corps Waterways Experiment Station (WES) between September 1968 and July 1969, demonstrated that arrowhead breakwaters would reduce wave action, but indications were that a disproportionate increase in breakwater length would be required to reduce wave heights to satisfactory levels in the critical harbor areas. As a result of further testing, the model study recommended that a detached "T" type breakwater, approximetely 700 feet long, installed perpendicular to the entrance channel centerline and 200 feet from the outer end of the existing east pier, would provide adequate protection from wave action in the critical harbor areas.

Subsequent discussions with the Vermilion Port Authority and the U. S. Coast Guard indicated that other factors besides wave action should be considered in the breakwater selection process. The Port Authority stressed the need for additional navigation clearance between the proposed breakwater and the existing pier heads during:

(1) Periods of peak usage by recreational craft;

(2) Severe weather conditions when an added measure of safety is required for the mariner seeking the safety of a harbor of refuge, and

(3) During the winter months when jamming of river ice at the mouth of the river frequently causes flooding of adjacent upland areas with extensive damage to both public and private property. The additional clearance would provide a larger channel for the ice to escape safely into the lake and would permit the Coast Guard to come into the harbor to break up the ice jams.

The U.S. Coast Guard also emphasized the need for additional navigation clearance in order to permit easier and safer maneuverability for their vessels during ice breaking operations. Although flood protection is not a feature of this harbor modification, it was considered imperative that the proposed plan of improvement should not adversely affect the problems of flooding and ice jamming. Therefore, the project

plan was modified to provide for the construction of a detached "T" type breakwater, approximately 864 feet long and located about 100 feet further lakeward than the alignment recommended by the model study. The increase in breakwater length was required to provide about the same protection against wave action at the revised breakwater location.

The decision to change the harbor configuration was based on the discretionary language in the 1958 authorizing document which provides for "....such modifications thereof as in the discretion of the Chief of Engineers may be advisable." The change in harbor configuration from an "arrowhead" alignment to a "T" alignment is within the scope of the discretionary language of the authorizing document and does not require additional Congressional approval.

Local authorities were notified of, and involved in, the design of the navigation project. The city of Vermilion designated the Vermilion Port Authority as the competent public body empowered to regulate the development of harbor facilities, as required in item d. of the project's local assurances. As discussed above, the Port Authority was consulted during the course of the WES model study and during the ensuing investigations that determined the optimal location for the breakwater. Final approval of the Vermilion Harbor plan, including the "T" type breakwater 864 feet long and 300 feet north of the outer end of the existing east pier, was received from the Chairman of the Vermilion Port Authority in a letter to the District Engineer dated 6 April 1971. The mayor of the city of Vermilion was the official responsible for fulfillment of local cooperation for the project.

Coordination of the design phase of the Vermilion Harbor navigation project with Federal, State and local interests is documented in the project's General Design Memorandum (August 1971). This document contains appropriate documentation of coordination with the U. S. Coast Guard, the U. S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the U. S. Fish and Wildlife Service, the Bureau of Outdoor Recreation, the Ohio Department of Natural Resources, and the Vermilion Port Authority. Copies of the Draft Environmental Statement (October 1971) for the subject project were forwarded for review and comment to each of the aforementioned agencies as well as ninety-eight individuals representing various local and regional public and private interests. Comments on the Draft were received from the seven listed agencies and the Lake Erie Watershed Conservation Foundation, the Northeast Ohio Areawide Coordinating Agency, the Lorain County Regional Planning Commission, and the Ohio Historical Society. During the Waterways Experiment Station (WES) model study of the Vermilion Harbor navigation project (September 1968 through July 1969), the following local citizens visited WES in connection with the Vermilion model study: Mayor, city of Vermilion; Chairman, Vermilion

Port Authority; President, Vermilion City Council; Vermilion City Service Director; Chairman, Vermilion Municipal Planning Commission; Vice President, Erie County (Ohio) Bank; representatives of the Lorain (Ohio) Journal, Parsons Marine and Industrial Service, Romp's Water Port, and ITT Wakefield Corporation; a representative of Ohio Congressman Charles Mosher; and twelve residents of Vermilion. According to the Vermilion Port Authority, "This project was given more publicity than any project in the city's history. Anyone not aware simply was not interested" (140).

f. COMMENT:

The changed design has caused long-term, high magnitude adverse environmental effects that would not occur with the original design. These adverse environmental effects include beach water pollution, drinking water pollution, obstruction of ice flow, and increased sedimentation.

f. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas, periodic contamination of the public water supply, problems related to ice formation and ice jam flooding, shoaling in the navigation channels, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140).

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the municipal water supply:

"There is some increased turbidity in the area of the water intake. The drinking water has been affected once or twice since the breakwall was constructed. This had happened before the wall was built, especially in the spring. Periodic contamination has been a concern and seems to be more frequent in the last several years.

"The local water intakes have been obsolete for several years, and it is well known new intakes are needed in deep water."

3. Effect of the breakwater on ice jams and flooding:

"This is the most difficult part of the problem. The Authority believes that wind-row ice is more dangerous than river ice. By keeping the wind-row away from the ends of the piers, water can reach the lake under all conditions.

"We believe that some flooding will occur and will always be a danger. This can be complicated by river ice. There was held in late 1969 or 1970 a series of meetings in Vermilion to consider the problem. This is also their opinion. These meetings were attended by ice experts of the Coast Guard, Lake Carriers Association, and Corps of Engineers.

"The ice breaker, Kaw, tested the ability to operate in the Vermilion River last year. There results were as predicted by the ice committee in 1970.

"Questionable - Must still be evaluated - Under severe ice conditions, I am not certain of action of ice behind breakwall; feel it will be better than without wall but do not know that anyone knows for certain."

4. Effect of the breakwater on the build-up of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand build-up at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Build-up of sand in the river from northeast to east storms."

g. COMMENT:

A full explanation of the reasons for and authorization for changing plans written into law should be presented. If the breakwater as constructed is not fully authorized by law, the alternative action of removal seems indicated.

g. RESPONSE:

Please see responses e. and c. above for discussions of navigation project authorization and the alternative of removing the breakwater, respectively.

h. COMMENT:

2. Corps Statement: Benefits

Estimated annual commercial fishing, recreational navigation, and harbor of refuge benefits from the harbor project are about

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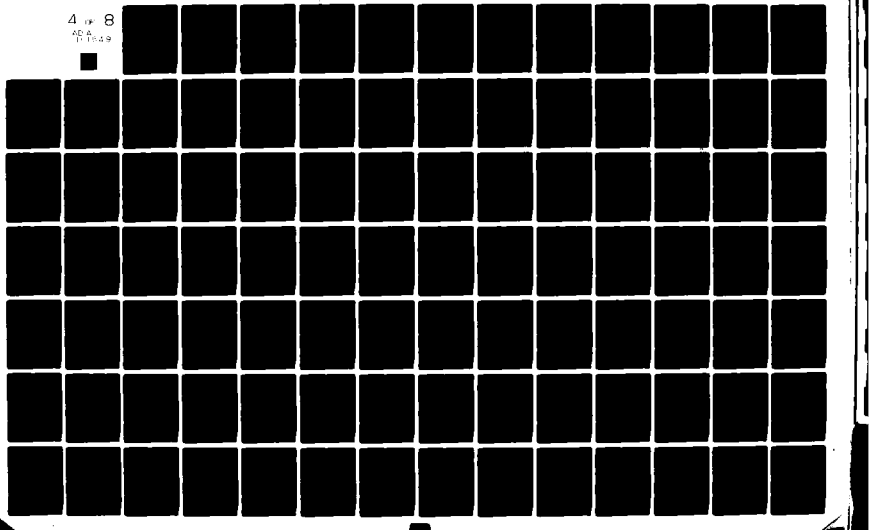

$634,200, or approximately $1,902,600 every three years (August 1975 price levels). (pg. 17, 1.34)

2. Comment: There is no supporting data in the report to justify a claim of $634,200 in annual benefits. Using an average real estate tax rate of $55 per $1,000 of assessed valuation, the total real estate tax revenues in Vermilion are about $1,400,000 per year. The claimed benefits from dredging equal 45% of total real estate tax revenue.

h. RESPONSE:

The $634,000 in annual benefits attributable to the Vermilion Harbor navigation project were derived by updating the estimate of project benefits shown in the project design memorandum ($475,900, April 1972 price levels) by a factor of 1.3326 (factor derived from the construction cost index appearing in the 21 August 1975 "Engineering News Record)" to arrive at an estimate commensurate with price levels prevailing at the time that the Draft Statement was released. A complete justification of the original estimate of benefits is presented in the General Design Memorandum for the Vermilion Harbor navigation project.

We concur with your estimate of the city's annual total real estate tax revenue as derived from data in this document. However, there is no known economic relationship between annual benefits attributable to the navigation project and the city's estimated annual total real estate tax revenue.

The statement in question has been deleted from the Final Statement since it may be misleading in that it does not include the value of other benefits, such as sportfishing and windrowed ice protection, that may also be attributed to the project. Therefore, in order to avoid further confusion, the statement was deleted.

i. COMMENT:

3. Corps Statement: Past Dredging Records and Soundings

1.12 Prior to completion of the harbor modifications authorized by the 1958 River and Harbor Act (including the lake approach and river by channels and the detached breakwater discussed above in paragraph 1.03 a., c., and f.), the Vermilion entrance channel was dredged about once every ten years using a government derrickboat, equipped with a clamshell bucket, and a dump scow. (pg. 6).

Harbor maps showing the results of past sounding operations at Vermilion Harbor are available for review at the Buffalo District Office. Sounding operations at Vermilion Harbor are performed by the Buffalo District using Corps equipment (pg. 5, 1.07).

3. Comment: The information in the report on past dredging operations and soundings is inadequate. House Document 231 states that the total maintenance cost of Vermilion Harbor from 1839 to 30 June 1956 was $60,000. This would include repairs to the piers in the 1870's and early 1900's. It is evident that there was very little dredging of Vermilion Harbor during the 117-year period from 1839 to 1956. A full statement of dredging dates and amounts removed is essential for evaluation of this report.

Soundings were taken at the conclusion of the May 1974 dredging and again in 1975. They reveal that 8,000 cu. yds. of sediment is accumulating each year in the harbor since construction of the breakwater. Seventeen pages of bird sightings are certainly essential to define the impact of dredging on bird life, but historical records on dredging and soundings should also be included.

The presentation of this historical data will reveal that sedimentation rates have been increased tremendously by the breakwater. If the harbor cost $500 a year to maintain for 117 years and it now will cost $93,000 per year to maintain, there obviously are great economic benefits in the alternative proposal to remove the breakwater.

1. RESPONSE:

Paragraph 1.03 through 1.11, which briefly describe the history of the Federal harbor project at Vermilion, have been added in response to the comment. The discussion presents the requested dredging information.

The discussion of bird populations at Vermilion in Appendix E of this document is presented for the information of those professionals, students, and others with a particular interest in the subject.

Please see response f. above for a discussion of the effect of the breakwater on shoaling in the navigation channels.

The $500 annual maintenance cost for Vermilion Harbor is misleading. Price levels have increased markedly since the late-nineteenth and early-twentieth centuries, and it is not practical to compare costs from historic price levels with an August 1975 cost estimate. As indicated in the navigation project's authorizing House Document, "The latest (1949) approved estimate for annual cost of maintenance is $8,000" for Vermilion

Harbor. When updated to 1975 price levels, this annual estimate is over $38,000 to maintain only the piers and entrance channel (price level as of 2 October 1975 appearing in the 9 October 1975 "Engineering News Record)." Please note that the anticipated average annual cost of maintaining Vermilion Harbor has been revised to $62,700 based on October 1975 soundings. These soundings were unavailable when the Draft Statement was released in September 1975.

Please see response c. above for a discussion of the alternative of removing the existing breakwater.

j. COMMENT:

4. Corps Statement: Amount of Solids Transmitted by Vermilion River

Since the harbor waters in the project area are at the same elevation as Lake Erie, backwater effects slow the river velocity in the project area and induce settling of the larger soil particles. The Vermilion River is a primary source of sediment in the harbor area (pg. 46, 2.53).

The accumulations are small in comparison with the eroded soil transported by the river (133,000) tons per year) (03). (pg. 46, 2.52)

No permit maintenance dredging has been performed in Vermilion Harbor in the last ten years.

1.13 It is expected that future maintenance dredging at Vermilion Harbor will be required approximately every three years, and will entail the removal of about 24,000 cubic yards of material during each dredging operation, or about 8,000 cubic yards annually. Shoaling rates and funding considerations may affect dredging volumes and frequency in the future. The duration of dredging operations will be dependent upon the nature and location of material to be removed, the type of dredge available, location of the disposal site, and other factors (pg. 7).

4. Comment: It is evident that the Huron St. to Liberty St. reach of the Vermilion River has transmitted at least 133,000 tons, approximately 66,000 cubic yards, of sediment each year without any dredging from 1915 to 1973.

j. RESPONSE:

Prior to the 1973 completion of the Federal river channel (between Huron Street and Liberty Street), the Corps was not authorized to maintain the river above the limit of the authorized entrance channel

(Huron Street). Therefore, no Corps dredging was accomplished in this area between 1915 and 1973. However, as indicated in paragraph 1.06, the river between Huron and Liberty Streets was dredged by a private Contractor in the 1930's in connection with the construction of the Lagoons development.

k. COMMENT:

The backwater effects introduced by the breakwater, which have been reported by the Corps, obviously are causing a long-term, high magnitude adverse impact. The estimated annual 8,000 cu. yds. of sediment, if evenly distributed over the entrance channel and river channel (an area of 7.9 acres), would cause a deposit of 7.5 inches per year.

This rate of sedimentation in a river channel not dredged from 1915 to 1973 and an entrance channel dredged only "about every ten years" indicates that the need for dredging 8,000 cu. yds. a year is solely due to the breakwater.

Adoption of the proposed alternative action of removing the breakwater could reduce annual dredging costs from the estimated $93,000 per year to perhaps $9,300 per year.

k. RESPONSE:

The estimated annual 8,300 cubic yards of sediment was derived for the entire harbor and not just for the entrance and river channels. As indicated in paragraph 1.12, subparagraphs a., b., and c., the total area of the three existing channels is about 14.4 acres. If evenly distributed over the entire harbor area, 8,300 cubic yards would cover the 14.4 acres of channels to a depth of 4.29 inches annually. However, as noted in paragraph 1.15, sediment tends to build up in the entrance channel and in the upstream section of the river channel at the river mouth adjacent to the east pier, on the south side of the east lake approach channel and in the upstream section of the river channel, and it is not evenly distributed as suggested in the comment.

Please see responses f. and c. above for discussions of the effect of the breakwater on shoaling in the navigation channels and the alternative of removing the breakwater, respectively.

The cost of maintenance is a function of harbor shoaling conditions (location, volume, depth, etc.), environmental considerations (sediment quality, season with least degree of environmental activity,

etc), operational factors (characteristics of dredge plant, location of disposal areas, etc.), and local, regional, and national economic conditions (recent rising labor costs, Congressional appropriations of maintenance funds, etc.). The proposed plan for maintaining Vermilion Harbor is the most economical plan in view of all of the factors that have been considered in its formulation.

1. COMMENT:

5. Corps Statement: Adverse Effects from Dredging

1.14 Future maintenance dredging at Vermilion Harbor will be conducted during the summer season of the year, starting after about 15 June and finishing before 1 October. The 3.5 month period should allow sufficient time for an expected average six weeks dredging operation to be performed. The following operational constraints and environmental characteristics of Vermilion Harbor were considered in making this scheduling determination:

a. While the earliest opening date of the available work season for construction and maintenance was, in recent years, 2 March, contract dredging is usually initiated about 1 April due to lake conditions that tend to inhibit safe operations until that time. Similarly, while the latest work season closing date was 30 December, lake storms generally hinder safe operations in November and December and the work season effectively closes about 1 November. Therefore, routine maintenance dredging would ordinarily be accomplished between about 1 April and 1 November.

b. In letters dated 6 June 1975 to the U. S. Department of the Interior, Fish and Wildlife Service and the Ohio DNR, the Buffalo District requested that these agencies identify any significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. In response to this request, the Fish and Wildlife Service, in a letter dated 18 June 1975, indicated that, "since the river does serve as a spawning area for smallmouth bass, we recommend that no dredging be conducted during the period May 1 through June 15." A reply from the Ohio DNR, dated 24 June 1975, recommended, "that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be done during October and November when salmon are moving "through the harbor area." Therefore, by initiating maintenance dredging operations after 15 June, and completing operations before 1 October, potential

interference with the spring and fall fish migrations identified by the Fish and Wildlife Service and the Ohio DNR will be avoided.

4.28 A short-term, high-magnitude, adverse impact on the water quality of the immediate area of the dredge and for a short distance down current, will result from the dredging operations. The mechanical mixing and agitation created by the dredge will increase turbidity and suspended solids. The presence of various soluble chemical constituents in the sediment will cause increases in their concentration in the surrounding water. Those constituents involved include: Kjeldahl nitrogen, phosphorous, COD, oil and grease, and heavy metals such as zinc, mercury, lead, copper, chromium and cadmium. The amount of oxygen-demanding material contained in the sediment and sunken debris to be removed will determine the extent of dissolved oxygen depletion resulting from the operation. Studies have shown that these adverse increases in turbidity, solids, nutrients, COD, and heavy metals and decreases in dissolved oxygen are almost totally reduced to levels prior to dredging within 24 hours (118). (pg. 123)

In previous years, dredging at Vermilion Harbor has occasionally been linked to increased turbidity, conductivity, coliform bacteria counts, and concentrations of heavy metals depending on wave, wind and current action (123). Some of these parameters can be reduced to normal levels through additional treatment, but some (such as concentrations of heavy metals), might remain high despite treatment (123) (pg. 127, 4.36).

Maintenance activities may be scheduled to avoid potential conflict with a major harbor event, such as a regatta, if the Corps receives a sufficiently early notice of the time of the event and no significant operational or other environmental conflicts will result (pg. 15, 1.28).

5. Comment: These portions of the Draft Environmental Statement may be summarized as follows: Dredging has a short-term, high magnitude impact on water quality. To avoid adverse effects on aquatic life, dredging will not be done during the periods from April 20 to June 15 and Oct. 1 to Nov. The June 15 to Oct. 1 period has been designated for dredging.

As a sport fisherman, I can agree that adverse impacts on aquatic life should be avoided. However, the release of sediments containing coliform bacteria and toxic heavy metals, such as mercury, lead, and cadmium, cannot possibly be tolerated during the months of June, July, August, and September when the beaches adjacent to the channel are used by swimmers. The breakwater deflects the warm, stratified river water into the beaches during the summer and a high magnitude, long-term, and possibly irreversible threat to human life would result. Dredging should only be done during the first three weeks in April.

If the breakwater remains, annual April dredgings should replace the proposed "6 weeks every three years" cycle. This may have a substantial impact on dredging costs.

Adoption of the alternative action of removing the breakwater would remove the need for annual dredging. This alternative is recommended to avoid a serious public health hazard. After removal, a one-time emergency dredging could be scheduled in September if the surrounding beaches were posted by public health authorities.

1. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

A section entitled "Alternative Dredging Schedules" (paragraph 6.19 through 6.22) has been added to the Final Statement in response to your comment about dredging annually in April. An evaluation of the environmental, economic and operational factors related to this and other alternative dredging schedules indicate that the proposed fall schedule, as described above, is presently the best schedule for routine maintenance dredging in Vermilion Harbor. Therefore, the alternative dredging schedule suggested in the comment was not considered further.

Please see response c. above for a discussion of the alternative of removing the breakwater.

m. COMMENT:

6. Corps Statement: Beach Erosion

Several large structural stones have been stored on top of the east pier since July 1974 (pg. 3, 1.03d).

As evidenced by the EPA analysis of sediments collected in the river channel near the end of the piers and in the lake approach areas, and by the large buildup of sandy sediments just east of the east pier, much of the sediment in this portion of the harbor is composed of sand. Materials carried in littoral drift (generally east to west in the Vermilion area), are the source of these sandy sediments which are generated from updrift areas in Lake Erie located to the east of Vermilion (44) (pg. 49, 2.54).

6.35 The Corps of Engineers has authority to place unpolluted dredge materials on beach areas if the cost of this action does not exceed the cost associated with open-lake disposal. When the cost of beach nourishment exceeds the cost of open-lake disposal, beach nourishment can still be accomplished without further Congressional authorization, if local interests will bear the additional costs associated with this action. If local interests are unable to fund the additional costs, then a complete beach nourishment project with Congressional authorization and funding would be necessary.

6.36 Beach nourishment disposal may be technically and economically feasible to accomplish using the harbor's unpolluted dredgings from the entrance channel. Shallow lake depths in the littoral zone would generally preclude the approach of a scow to within an economical pumping distance from the shoreline. However, a dredge operating in the outer section of the entrance channel could transfer dredgings directly from the channel to the downdrift shoreline. This procedure could be accomplished by pumping dredgings through the discharge pipeline if a cutterhead dredge is operating, or by swinging the excavation bucket over the west pier and releasing dredgings in the downdrift area if a clamshell or dipper dredge is used. The latter procedure was employed during the June 1974 and February 1975 emergency dredging operations. Cubic yard dredging costs during these operations were about $4.00 and $3.50, respectively.

6.37 Based on the 1975 USEPA, Region V sediment quality analysis and the Buffalo District's estimate of the volume of sediment in the harbor, approximately 6,000 cubic yards of unpolluted littoral sediment in the lake approach channel and outer section of the entrance channel (2,000 cubic yards anually) may be suitable for use as beach nourishment material. Deposition of unpolluted materials at the lagoons beach, Linwood Park Beach, or other beaches east of the harbor would not be practical due to the westward flowing littoral current, which would tend to redeposit nourishment materials back into the lake approach and entrance channels. Deposition at the Vermilion City Beach or other beach areas west of, and in close proximity to the harbor, would be more practical and could be accomplished as described above (pg. 41).

6. Comment: The large structural stones "stored" on the east pier were placed there in 1974 by the Corps in an effort to halt beach sand flow into the Vermilion River. They have been only partially successful. The 12' deep river channel filled with sand again, 24 September 1975, in a NE storm. A sand bar is now present, above water, in the channel. "Emergency" dredging operations will be required again for the third time since January 1974.

m. RESPONSE:

A discussion of the third emergency dredging operation at Vermilion Harbor is presented in paragraph 1.10.

n. COMMENT:

The Corps states that the Lagoon-Linwood-Nakomis Beach east of the channel is the source of the sand in the river. The estimate of 2,000 cu. yds. per year of unpolluted sand is grossly underestimated because the east pier is not high enough to be a barrier now although it was an effective barrier for 134 years. The physical processes by which the breakwater causes this effect are shown in the attached report.

n. RESPONSE:

The Corps estimate of the volume of unpolluted sediments to be dredged during each routine maintenance operation (once every three years) has been revised to about 20,000, or about 6,700 cubic yards annually. The revision is based on October 1975 harbor soundings that were unavailable when the Draft Statement was released in September 1975.

The referenced attached report is entitled "Shore and Harbor Physical Processes at Vermilion, OH," and is included in its entirety in Appendix F, pages F-45 through F-48. Please note that this report presents Mr. Grossman's views of shoreline and hydrologic processes. The Corps Report on Section 111 Study of Vermilion Harbor, OH is attached as Appendix G and should be consulted for a more detailed discussion of such processes and shoreline conditions at Vermilion.

o. COMMENT:

The Corps has not and does not intend to return the sand to the beaches from which it originated because they are not authorized to do so and because it is not "practical." However, replacement of the sand already dredged and to be dredged will be required under Section 111 of the 1968 Rivers and Harbors Act. These replacement costs could double the projected $93,000 per year in maintenance costs.

o. RESPONSE:

The alternative of updrift disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would

be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be litorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

p. COMMENT:

The maintenance and dredging procedures proposed within the Draft Environmental Statement will result in the destruction of Linwood and Nakomis Beaches, causing long-term, high-magnitude, irreversible effects on the Vermilion shoreline. Emergency measures to halt this erosion should be taken at once. The alternative action of removal of the breakwater will halt sand shoaling almost immediately, bring about a gradual restoration of previous beach contours, and reduce dredging costs drastically. No other remedial action can produce these three effects.

p. RESPONSE:

Since none of the proposed routine maintenance activities described in Chapter 1 will occur at either Linwood or Nakomis Beaches, such activities, in and by themselves, will not affect these areas. The existing breakwater may or may not have an effect on the beaches.

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

> "1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.
>
> "2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

Please see response c. above for a discussion of the alternative of removing the breakwater.

q. COMMENT:

7. Corps Statement: Destruction of Land Area

4.19 The project will neither create nor destroy land areas, nor is it likely that it will stimulate a change from current occupancies (pg. 121).

7. Comment: This statement is materially in error. The project has already destroyed much land area and created other land area. This can be documented by aerial photographs.

q. RESPONSE:

Please see the Section 111 Study report (Appendix G) for a detailed discussion of shoreline changes at Vermilion, particularly paragraphs 51. through 60. on aerial photographs of the lakeshore.

r. COMMENT:

The project will also stimulate a change from current occupancies. Linwood Park, founded in 1883 as a religious meeting place, is a summer vacation community within Vermilion. The loss of Linwood Beach will cause an undesirable change to permanent residency. The project, if maintained, is likely to destroy a beautiful 92 year old park that is unequalled on the Great Lakes.

r. RESPONSE:

Your concerns about the effect of the breakwater on the destruction of land resulting in an undesirable change of residential occupancy will be addressed in the aforementioned Adverse Impact Study. Since the Lagoons housing has always been year-round housing, no changes are expected in that area. Please note that the Chairman of the Vermilion Port Authority has indicated that the Linwood area has exhibited the least degree of change from summer to year-round housing of any of the local housing areas (144).

Paragraph 4.19 has been revised to indicate that the statement identified in the comment (see comment q.) pertains to the maintenance project and not to the navigation project as interpreted in the comment.

s. COMMENT:

The project may also stimulate a change from current occupancies in the Vermilion Lagoons. In the 3 May 1972 Environmental Statement, the Corps said, "The effects of the proposed detached breakwater on the combined flood and ice jamming problem are as yet undetermined." And, "Unfortunately, the effects probably will not be known until the project is constructed." The effects will make themselves known after a few severe winters.

s. RESPONSE:

Your concerns about the effect of the breakwater on increased flood potential in the floodplain and increased probability of ice jam flooding will be addressed in the aforementioned Adverse Impact Study. Please see response f. above for a discussion of this issue. Please see response r. above for a discussion of residential occupancy changes.

t. COMMENT:

8. Corps Statement: Ice Formation

2.20 Historical records show that the Vermilion Harbor area is subject to freezing from approximately 15 December to 15 March, and at least some freezing of the harbor occurs during 90 percent of the time in winter. During an average winter, the harbor area is frozen from three to five weeks, not necessarily continuously. Ice depths average .4 to 6 inches, with a maximum depth of 18 inches (17). During a normal winter, ice formation on Lake Erie will begin between 15 January and 25 January. The areas of the lake which first produce an extensive ice cover are the shallow western basin and the inner bay at Long Point to the east. During the mid-season (1 to 10 February), extensive sections of the central basin, especially adjacent to the north and south shores, experience partial ice coverage. At this time, 70 percent to 90 percent of the open lake north of Vermilion becomes covered with ice, although the area close to shore does not freeze as quickly. During the time of maximum ice cover in a normal winter (20 to 28 February), greater than 95 percent of the lake surface may be frozen to depths ranging from 10 to 18 inches. The area of Vermilion is subject to wind row ice, which can accumulate to depths of 20 feet or more. During the early decay period (25 February to 5 March), open water may appear in the lake north of Vermilion, but the shoreline in the vicinity of Vermilion may stay frozen until 15 March (18) (pg. 24).

Structural maintenance will allow the lagoons and the entrance and river channels to freeze smoothly, eliminating high waves (surges), thereby providing a long-term, medium-magnitude, beneficial impact upon

recreational users of these areas for such activities as hockey and ice skating on the lagoons (pg. 130, 4.46).

8. Comment: Hockey and ice skating on the Lagoons could be considered as short-term, very low-magnitude, beneficial impacts. The increased ice formation in the smooth waters behind the breakwater, which is typical of protected waters, increases the probability of ice jam floods. Since the 150' opening for ice flow provided for in the authorized design was not constructed, long-term, high-magnitude, possibly irreversible, adverse impacts may result. Any discussion of project maintenance costs should include a statement as to whether the Corps is responsible, under the provisions of the 1968 Rivers and Harbors Act, for mitigation of flood damages when the breakwater causes flooding.

Adoption of the alternative action of removal of the breakwater would reduce the probability of ice jam floods.

t. RESPONSE:

Paragraph 4.51 has been revised to indicate that the indirect impact on winter recreational activities is an annual short-term, medium-magnitude, beneficial impact. The magnitude of the impact has been assessed as being medium, as opposed to very low as suggested in the comment, because it is assessed from the recreators' point of view.

Please see response f. above for a discussion of the effect of the breakwater on potential ice jam flooding.

Please see response c. above for a discussion of the alternative of removing the existing breakwater.

u. COMMENT:

9. Private Dredging - Comment: The many private lagoons in the project area and upstream of the project area can be expected to experience increased sedimentation due to backwater effects from the breakwater. Mitigation of these costs will be required under the 1968 Rivers and Harbors Act.

Some formula for an equitable sharing of private dredging costs incurred as a result of the breakwater should be devised and included as a part of the project cost.

u. RESPONSE:

Your concerns about the effect of the breakwater on increased sedimentation in adjacent private lagoons will be addressed in the aforementioned Adverse Impact Study. The Chairman of the Vermilion Port

Authority has indicated that while lagoons area residents have reported some shoaling in the east end of the Huron Lagoon (southernmost), the influx of more deep-craft sail boats into the lagoons, in combination with gradually decreasing lake levels, compound navigation problems in the Lagoons (144). No requests for permit maintenance dredging in the Vermilion lagoons have been received by the Buffalo District since the existing navigation project was completed in 1973.

Federal payments for private dredging costs are not required under Section 111 of the 1968 Rivers and Harbors Act. Private dredging costs must be borne by the private interest conducting the dredging and are not a part of the cost of maintaining the Federal project.

v. COMMENT:

10. Beach Water Pollution - Comment: The breakwater diverts river flow across adjacent beaches. Fishermen are now rarely found fishing from the east pier because the water to the east is too polluted to support fish life. This point can be supported by affidavits from local fishermen, if necessary.

Southwest winds, which are present about 20% of the time, draw the polluted river water away from the beaches. Winds in the W to NE quadrant drive the polluted water into the beaches causing many days when the beaches are too dirty for swimming. The only adequate solution to this problem is the alternative action of removal of the breakwater.

v. RESPONSE:

Please see response f. above for a discussion of the effect of the breakwater on beach pollution.

Please see response c. above for a discussion of the alternative of removing the existing breakwater.

w. COMMENT:

Conclusion

The Vermilion Harbor project, in two years, has become an environmental disaster unequalled on Lake Erie and perhaps on the entire Great Lakes. There are many adverse Environmental Impacts which are long-term, high-magnitude, and irreversible.

Many of the adverse impacts, such as increased probability of ice jam floods, beach water pollution, drinking water pollution, and increased sedimentation, result from an unauthorized change in design.

The Corps was authorized by Congress to convey the river 500' farther north to a new entrance 150' wide. The project was constructed to block and divert the river east and west.

1. The Vermilion Harbor breakwater was unauthorized and should be removed because of adverse environmental effects.

2. The claims of benefits are unsupported.

3. Historical dredging and sounding records which would demonstrate that the Vermilion River was essentailly self-cleaning prior to the project installation were omitted from the report. Prior to the project, the Vermilion River transmitted 66,000 cu. yds. of sediment annually without any dredging.

4. Dredging costs which were $500 a year are now $93,000 a year.

5. Dredging has adverse environmental effects on aquatic and human life. Summer dredging will ruin swimming at adjacent beaches.

6. Serious beach erosion has resulted from the breakwater portion of the project. Emergency remedial action is mandated to halt this erosion.

7. Destruction of land area is occurring which will result in undesirable change of occupancy.

8. The probability of ice jam flooding is increased by the project.

9. Federal participation in private channel dredging has not been considered in the report.

10. Beach water pollution caused by the project is a hazard to health.

w. RESPONSE:

The above comments are summaries of more detailed comments which are presented and addressed in previous comment-response paragraphs.

The navigation improvements to Vermilion Harbor were authorized by Congress to benefit on existing navigation project. The purpose of the breakwater is not to block and divert the river but rather to alleviate undesirable wave action at the harbor entrance and in the channel approaching the lagoons, particularly for commercial fishing vessels and recreational craft based at Vermilion.

x. COMMENT:

The only solution for these serious environmental problems would be the removal of the Vermilion Harbor breakwater under emergency authorization during 1976. A subsequent clean-up dredging during September, 1976 will restore the harbor to its prior condition. Maintenance dredging will be required every ten or fifteen years on the basis of the harbor history.

x. RESPONSE:

Please see response c. above for a discussion of the alternative of removing the existing breakwater.

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

y. COMMENT:

A solution to the single problem of beach erosion at Linwood Beach can be achieved by construction of a long groin near the Linwood-Lagoons property line. This would not permit the sand piled up at the east pier to return to its original contour. The cost of such a groin and beach restoration is likely to exceed $1,000,000 which will require Congressional authorization.

Such a long groin will not solve the beach water pollution, sedimentation, and ice jam flooding problems. It would be environmentally unacceptable to the Lagoons residents because river pollution and sediment would be trapped between the east pier and the proposed groin. This would render the Lagoons beach useless for recreational swimming.

y. RESPONSE:

The alternative discussion entitled "Control of Erosion" has been expanded to include your proposals for the construction of either a single, long groin or a series of vinyl tube groins along the eastern shoreline. Such structures would be costly to construct and

probably would not result in a significant decrease in navigation channel shoaling (and consequently maintenance activities and costs). Furthermore, the implementation of shoreline structures to control erosion is beyond the scope of authority under which the Corps maintains the Vermilion Harbor, navigation project. Therefore, this alternative was not considered further at this time.

z. COMMENT:

Since the breakwater portion of the project was unauthorized as constructed and it has caused many long-term, high-magnitude, potentially irreversible and adverse Environmental Impacts, I strongly recommend removal of the structure at the earliest possible time.

z. RESPONSE:

In a meeting with the Buffalo District Engineer on 7 October 1975, Mr. Grossman presented his recommendation for the removal of the existing detached breakwater at Vermilion Harbor. The District Engineer indicated that the Corps is presently not authorized to accomplish that action. However, the District Engineer described the Section 111 Study that was in progress at that time and indicated that the Corps would continue to investigate local conditions in order to arrive at an acceptable and appropriate course of action.

a.a. COMMENT:

Thank you for the opportunity to review and comment upon the Draft Environmental Statement. This report has been forwarded to those organizations on the mailing list, where an address is available, for their comment.

a.a. RESPONSE:

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.37 MR. DEAN A. HERROLD
(commenting letter dated 6 November 1975, copy on page F-49)

a. COMMENT:

I have been coming to Linwood Park for well over 60 years and bought a cottage here about 10 years ago. The Linwood Beach was always the prime attraction and also the main attraction as the Park has no amusements or concessions.

a. RESPONSE:

No response required.

b. COMMENT:

Now our beach is being destroyed by the building of a breakwater which benefits nobody.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

The benefits of the Vermilion Harbor navigation project, as listed in the project's General Design Memorandum (August 1971)

include those to commercial fishing, recreation, navigation, or a harbor-of-refuge. In addition, the Vermilion Port Authority has identified the following positive results of the navigation project (140):

"1. Has reduced the surge in the river.

"2. Limits the build-up of water in the river during north to northeast winds; consequently helps control water levels.

"3. Provides a safer harbor entrance during storms.

"4. Prevents windrowing of ice at entrance to east and west pier heads.

"5. Apparently creates a venturi action and ice did flow out of the harbor in 1974 and 1975 during northeast winds.

"6. Obligates the Corps of Engineers to maintain the harbor to the 6 and 2 road bridge.

"7. Provides a protected area for sport fishing behind the breakwall."

c. COMMENT:

In fact we as property owners were not even notified of this project and to this day I do not know who is responsible for this monstosity and the expenditure of thousands of dollars of our tax money.

c. RESPONSE:

Coordination of the design phase of the Vermilion Harbor navigation project with Federal, State and local interests is documented in the project's General Design Memorandum (August 1971). This document contains appropriate documentation of coordination with the U.S. Coast Guard, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, the Bureau of Outdoor Recreation, the Ohio Department of Natural Resources, and the Vermilion Port Authority. Copies of the Draft Environmental Statement (October 1971) for the subject project were forwarded for review and comment to each of the aforementioned agencies as well as 98 individuals representing various local and regional public and private interests. Comments on the Draft were received from the seven listed agencies and the Lake Erie Watershed Conservation Foundation, the Northeast Ohio Areawide Coordinating Agency, the Lorain County Regional Planning Commission, and the

Ohio Historical Society. During the Waterways Experiment Station (WES) model study of the Vermilion Harbor navigation project (September 1968 through July 1969), the following local citizens visited WES in connection with the Vermilion model study: Mayor, City of Vermilion; Chairman, Vermilion Port Authority; President, Vermilion City Council; Vermilion City Service Director; Chairman, Vermilion Municipal Planning Commission; Vice President, Erie County (Ohio) Bank; representatives of the Lorain (Ohio) Journal, Parsons Marine and Industrial Service, Romp's Water Port, and ITT Wakefield Corporation; a representative of Ohio Congressman Charles Mosher; and 12 residents of Vermilion. According to the Vermilion Port Authority, "This project was given more publicity than any project in the city's history. Anyone not aware simply was not interested" (140).

The U.S. Army Corps of Engineers was responsible for the planning, design, and construction of the existing navigation project at Vermilion Harbor in accordance with authorizing legislation. The views of appropriate Federal, State and local interests were actively sought and incorporated into the project's final design. The Vermilion Port Authority has indicated that "This project came into being at the request of the city of Vermilion and not sold to the city by the Corps of Engineers" (140).

d. COMMENT:

I am interested in restoring our beach and I understand it can only be done by removing this breakwater.

d. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

Please see response b. for a discussion of recent shoreline changes at Vermilion.

e. COMMENT:

Therefore, I request that a copy of the draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor dated September 1975 as well as a copy of the Final Environmental Impact Statement and a copy of Section 111 Study of Vermilion Harbor due in December.

e. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

f. COMMENT:

Why was this done to our beach? For years Linwood and Cedar Point had the best beaches on Lake Erie. Unless this breakwater is removed promptly, the only beach left will be Cedar Point.

f. RESPONSE:

Please see responses b. and d. above for discussions of recent shoreline changes at Vermilion and the alternative of removing the breakwater.

g. COMMENT:

Can you let me know who was responsible for this crime against nature and who was it supposed to benefit?

g. RESPONSE:

Please see responses c. and b. above for discussions of Corps responsibility for the authorized navigation project and community benefits derived from the project.

h. COMMENT:

I am against the disposal of our beach sand by dredging it from the river.

h. RESPONSE:

Please refer to Chapter 6 for a discussion of maintenance dredging disposal alternatives for this project.

i. COMMENT:

To compound this action, it is being done in the summer when we are swimming.

i. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

j. COMMENT:

Let's remove the breakwater and solve all these problems and I would appreciate your including these facts and demands in the Section 111 Study and the Final Environmental Impact Report.

j. RESPONSE:

Please see response d. above for a discussion of the alternative of removing the existing breakwater.

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on Corps maintenance activities and the navigation project at Vermilion Harbor are appreciated.

9.38 MR. FRANK J. HOLUB
(commenting letter dated 12 November 1975, copy on page F-50)

a. COMMENT:

I have owned a cottage at Linwood Park, Vermilion, OH, for the past 26 years and have been visiting the park with my family since 1931. We have enjoyed our summer vacations at this park all those years.

Linwood Park has been known all over the State of Ohio and western Pennsylvania for having the best and finest beach on Lake Erie.

a. RESPONSE:

No response required.

b. COMMENT:

However, since the construction of the breakwater at the mouth of the Vermilion River, it will be known, no doubt, as the worst and most contaminated beach on the lake. Surely the persons who designed the construction and had to do with the location of the breakwater should have visualized what the conditions would be in the event of northwestern and northeastern winds and storms on the lake; and too in the spring time when the ice runs out from the river to the lake that there would be a jam at the mouth of the river as the debris from the river together with the ice would spread itself either towards the west to the city of Vermilion's Beach or to the east to the beach of Linwood Park.

b. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas, increased probability of ice jam flooding, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which

will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small-boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on ice jams and flooding:

"*This is the most difficult part of the problem.* The Authority believes that windrow ice is more dangerous than river ice. By keeping the windrow away from the ends of the piers, water can reach the lake under all conditions.

"We believe that some flooding will occur and will always be a danger. This can be complicated by river ice. There was held in late 1969 or 1970 a series of meetings in Vermilion to consider the problem. This is also their opinion. These meetings were attended by ice experts of the Coast Guard, Lake Carriers Association, and Corps of Engineers.

"The ice breaker, Kaw, tested the ability to operate in the Vermilion River last year. The results were as predicted by the ice committee in 1970.

"Questionable - Must still be evaluated. Under severe ice conditions, I am not certain of action of ice behind breakwall; feel it will be better than without wall but do not know that anyone knows for certain."

c. COMMENT:

I still remember the flood in Vermilion which flooded all the streets and cottages, except a few, in the Lagoons and the damage caused

by the swift current of the water when it flowed from the high points to the lake. This flood occurred just a few years ago - I believe it was around the 4th of July.

c. RESPONSE:

The flood described in the comment occurred on 4 July 1969. Please note that the date of this flood was four years before the existing breakwater was constructed. No major flooding has occurred in Vermilion since 1969.

d. COMMENT:

I do not recall during the past forty years or more that the mouth of the Vermilion River ever had an island in the middle of the stream - the reason for the island no doubt being due to the construction of the breakwater which in my opinion should have been constructed perhaps four or five hundred feet out in the lake instead of its present location, which to me looks like about 75 feet or less.

d. RESPONSE:

The effect of the breakwater on shoaling in the navigation channels will be addressed in the aforementioned Adverse Impact Study. Please note that the Vermilion Port Authority provided the following insights into the effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling (140):

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated. Buildup of sand in the river from northeast to east storms."

As is indicated in paragraph 1.12, f., the detached breakwater is located 330 feet north of the outer end of the east pier.

e. COMMENT:

According to some of the residents of Vermilion, all of whom live there winter and summer, the plan which they had seen for the construction of the breakwater showed it to be located many hundred feet out in the lake. The present breakwater, as mentioned above, and as your engineers are aware, moves the water either in the western or eastern direction and during heavy rains and high winds the water from the lake is blown back into the river causing some of the homes and streets in the lagoons to be flooded.

e. RESPONSE:

The navigation project General Design Memorandum (August 1971) indicates that the distance between the outer end of the east pier and the center line of the then proposed breakwater would be 330 feet.

Please see response b. above for a discussion of the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas.

Please see response b. above for a discussion of the effect of the breakwater on increased flooding potential. No flooding has occurred in the Lagoons development since the existing navigation project was completed in 1973.

f. COMMENT:

Many thousands of persons together with their children, grandchildren and great grandchildren, have had the pleasure of bathing at Linwood Park but due to the conditions now existing at the park and due to the breakwater there is less sand and more rocky beach which creates a hazard for those persons who wish to swim and especially for the younger children. I feel certain that your Corps of Engineers would not like a situation of that kind to exist.

f. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is

attached at Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

g. COMMENT:

I wish you would send me a copy of (a) draft Environmental Impact Statement for the operation and maintenance of the Vermilion Harbor dated September 1975; (b) copy of the Final Environmental Impact Statement and (c) a copy of Section III study of Vermilion Harbor due in December.

g. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study Report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.39 DR. FRANKLIN P. JOHNSON
(commenting letter dated 8 November 1975, copy on page F-51)

a. COMMENT:

I, as many others, am greatly disturbed about the condition of the beach at Linwood Park, Vermilion, OH. I own a cottage at Linwood Park and as well as seeing the "most beautiful beach on Lake Erie" being destroyed I am, also, greatly concerned about the decrease that might occur to our property values.

For as long as some of my family can recall (seventy-five years) there had never been a problem with the beach until the breakwater at the entrance of the Vermilion River was built. I'm sure that nature wrecked havoc with storms then as it does now, but the beach was never destroyed.

At a time when environmentalists are working to preserve, I believe that the removal of the breakwater would stop the erosion to the beach and would stop the problem of pollution that comes from the Vermilion River and is no longer going out into the lake but is sent along the shoreline.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on beach pollution (140):

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small-boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

Your concerns about the effect of the breakwater on local property values will be addressed in the aforementioned Adverse Impact Study. Please note that local realtors and the Chairman of the Vermilion Port Authority have indicated that property values in the Lagoons and Linwood residential areas are not decreasing but rather are increasing, in some cases at a substantial rate (142, 143, 144).

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

b. COMMENT:

Would you please send me a copy of the draft Environmental Impact Statement for operation and maintenance of Vermilion Harbor dated September 1975, a copy of the Final Environmental Impact Statement, and a copy of the Section III study of Vermilion Harbor due in December.

b. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.40 MRS. LOIS W. JOHNSON
(commenting letter dated 8 November 1975, copy on page F-52)

a. COMMENT:

Would you please give serious consideration to the removal of the breakwater built at Vermilion, OH?

a. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

b. COMMENT:

As a property owner at Linwood Park, I want my daughter to have memories of happy summers enjoying what was once a wide, wide beach and swimming in an unpolluted lake. Literally hundreds of Pittsburghers sought out Linwood Park as a perfect family vacation spot. You can't imagine the shock on their faces when they saw the beach since the breakwater was built.

b. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project.

A copy of the Section 111 Study Report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address the community's additional concerns about the project.

c. COMMENT:

I would appreciate it if you would send me a copy of the draft Environmental Impact Statement for operation and maintenance of Vermilion Harbor dated September 1975, a copy of the Final Environmental Impact Statement, and a copy of the Section 111 Study of Vermilion Harbor due in December.

c. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study Report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.41 MR. DEAN M. KOPPIN
(commenting letter dated 14 November 1975, copy on page F-53)

a. COMMDNT:

I am one of several partners with real estate holdings in Linwood Park, Vermilion, OH and are most concerned regarding the deterioration, erosion and increased water pollution problems that have been reported since the construction of the Vermilion River breakwater.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in

October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on water pollution problems and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small-boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the municipal water supply:

"There is some increased turbidity in the area of the water intake. The drinking water has been affected once or twice since the breakwall was constructed. This had happened before the wall was built, especially in the spring. Periodic contamination has been a concern and seems to be more frequent in the last several years.

"The local water intakes have been obsolete for several years, and it is well known new intakes are needed in deep water."

b. COMMENT:

As a concerned property owner and citizen please forward copy of the following reports for our evaluation and subsequent action.

1. Draft Environmental Impact Statement for operation and maintenance of Vermilion Harbor dated September 1975.

2. Final Environmental Impact Statement.

3. The Section 111 study of Vermilion Harbor due in December.

b. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 24 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study Report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.42 MR. D. H. KREPS
(commenting letter dated 8 November 1975, copy on page F-54)

a. COMMENT:

Ref: Draft Environmental Impact Statement on Operation & Maintenance of Vermilion Harbor per notice Federal Register, 26 Sept 1975 p. 44349.

Please consider this letter a response to the above referenced subject.

a. RESPONSE:

Your comments have been included in this Final Statement.

b. COMMENT:

As a property owner at Linwood Park, Vermilion, OH I believe the recently constructed breakwater off the mouth of the Vermilion River in Lake Erie is extremely detrimental to the Linwood Park beach and request the removal at once.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

c. COMMENT:

My family has been associated with Linwood Park for five generations. During this time we have thoroughly enjoyed the social, religious and environmental atmosphere that the park has created.

c. RESPONSE:

No response required.

d. COMMENT:

To see this natural park being torn apart in just the past two years by a breakwater that offers absolutely nothing is truly incomprehensible.

d. RESPONSE:

Please see response b. above for a discussion of recent shoreline changes at Vermilion.

The benefits of the Vermilion Harbor Navigation Project, as listed in the project's General Design Memorandum (August 1971) include those to commercial fishing, recreation, navigation, on a harbor-of-refuge. In addition, the Vermilion Port Authority has identified the following positive results of the navigation project (140):

"1. Has reduced the surge in the river.

"2. Limits the buildup of water in the river during north to northeast winds; consequently helps control water levels.

"3. Provides a safer harbor entrance during storms.

"4. Prevents windrowing of ice at entrance to east and west pier heads.

"5. Apparently creates a venturi action and ice did flow out of the harbor in 1974 and 1975 during northeast winds.

"6. Obligates the Corps of Engineers to maintain the harbor to the 6 and 2 road bridge.

"7. Provides a protected area for sport fishing behind the breakwall."

e. COMMENT:

Linwood Park beach has withstood the ravages of Lake Erie storms down through the ages. Over the past 100 years we had no sand piled up at the pier, no sand in the river and no beach erosion or pollution.

e. RESPONSE:

Please see response b. above for a discussion of recent shoreline changes at Vermilion.

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor Navigation Project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on pollution of adjacent recreational swimming areas, shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects

of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small-boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principle cause has been high water. When the lake level returns to normal most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated. Buildup of sand in the river from northeast to east storms."

f. COMMENT:

I am opposed to the continued open-lake disposal of our sand dredged from the river and demand the return of our beach sand.

f. RESPONSE:

Use of unpolluted dredged material for beach nourishment (updrift disposal) is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beaches east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

Use of unpolluted dredged material for beach nourishment (downdrift disposal) is also discussed in detail in the aforementioned "Beach Nourishment" section. Downdrift disposal is more feasible than updrift disposal in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the downdrift shoreline, the environmental and economic feasibility of downdrift disposal must be evaluated on a case-by-case basis in order to determine the best course of action for each proposed operation. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

g. COMMENT:

I am in opposition to summer time dredging when we are swimming.

g. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

h. COMMENT:

The removal of the breakwater is the only solution to all of the problems it has caused.

h. RESPONSE:

Please see response b. above for a discussion of the alternative of removing the existing breakwater.

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study Report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

1. COMMENT:

I request my comments be included in the Section 111 Study and the Final Environmental Impact Report.

1. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study Report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.43 MR. L. L. LUDWIG
(commenting letter dated 7 November 1975, copy on page F-56)

a. COMMENT:

I am writing in reference to the draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, page 44349.

a. RESPONSE:

Your comments have been included in this Final Statement.

b. COMMENT:

My comments are directed at the relatively new breakwater in Lake Erie at the mouth of the Vermilion River, and the effect it has had on the adjacent Linwood Park Beach.

My family has been vacationing at Linwood Park since 1954. The attraction has been the excellent beach there. However, since erection of the breakwater, a continual decline in the Linwood Park beach has occurred. The breakwater obviously has created several detrimental effects to the Linwood Park Beach, including the following:

Beach sand apparently no longer shifts east and west naturally. It now moves only west, from the Linwood Park Beach into the Vermilion River.

b. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigaxion of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further

action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling (140):

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated. Buildup of sand in the river from northeast to east storms."

c. COMMENT:

As needed to maintain the river, the original Linwood Park Beach sand is then dredged out of the Vermilion River, and dumped into the open-lake.

c. RESPONSE:

Open-lake disposal of unpolluted harbor sediments is presently the best available disposal alternative for such materials, although downdrift (westward) shoreline disposal will be considered on a case-by-case basis for each specific disposal operation.

d. COMMENT:

Very serious erosion has occurred at the east end of the Linwood Park Beach, all since erection of the breakwater.

d. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic chauge in water front property due to high water."

e. COMMENT:

Linwood Park Beach pollution has increased, at least as measured by eye, since erection of the breakwater.

e. RESPONSE:

Your concern atout the effect of the breakwater on pollution of adjacent recreational swimming areas will be addressed in the aforementioned Adverse Impact Study. Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on beach pollution (140):

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the west pier, as well as a small-boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

f. COMMENT:

I can't help but ask the following questions:

Why, at the very least, can't the sand dredged from the Vermilion River be returned from whence it came, back to Linwood Park Beach?

f. RESPONSE:

The alternative of updrift disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the beaches east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

g. COMMENT:

On a larger scale, why must an apparently environmentally damaging structure like the Vermilion breakwater have to be retained when it is obvious, at least to the local citizens, that it accomplishes very little, if any good, and causes very obvious and widespread damage to a natural asset; the Linwood Park Beach?

g. RESPONSE:

The benefits of the Vermilion Harbor Navigation Project, as listed in the project's General Design Memorandum (August 1971) include those to commercial fishing, recreation, navigation, on a harbor-of-refuge. In addition, the Vermilion Port Authority has identified the following positive results of the navigation project (140):

"1. Has reduced the surge in the river.

"2. Limits the buildup of water in the river during north to northeast winds; consequently helps control water levels.

"3. Provides a safer harbor entrance during storms.

"4. Prevents windrowing of ice at entrance to east and west pier heads.

"5. Apparently creates a venturi action and ice did flow out of the harbor in 1974 and 1975 during northeast winds.

"6. Obligates the Corps of Engineers to maintain the harbor to the 6 and 2 road bridge.

"7. Provides a protected area for sport fishing behind the breakwall."

Please see response d. above for a discussion of recent shoreline changes at Vermilion.

h. COMMENT:

I request that my comments and questions be included in the Section 111 study, and the final environmental impact report.

h. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study Report as requested.

i. COMMENT:

I have never heard of the Corps of Engineers engaging in environmental protection projects. I only hear of their involvement in projects that are environmentally damaging. Of course, neither is the actual case. However, the evidence apparent to the public is very negative. This issue at Vermilion, OH is a prime example. I hope that good judgment can prevail, and that a reasonable solution to the problems posed by this breakwater can be reached, and soon.

i. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study Report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.44 MS. ESTHER S. MECKEL
(commenting letter dated 7 November 1975, copy on page F-58)

a. COMMENT:

As an owner and summer resident of a cottage at Linwood Park, Vermilion, OH, I am deeply concerned about the erosion of our once lovely beach that has been caused by that unsightly breakwater erected at the entrance to the river from Lake Erie. Before I was old enough to know where I was, I was taken to Linwood and it and the town of Vermilion and its friendly folk have been home to me all those years - I'm 80!! Our beach has shrunk terribly in two years' time.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141$. The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

b. COMMENT:

When a N.E. storm hits, it carries our sand to the river and if this isn't remedied, we're just going to lose our beach, one of the nicest along Lake Erie until that monstrosity was put up.

b. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor

navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nacomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated. Buildup of sand in the river from northeast to east storms."

c. COMMENT:

Certainly you wouldn't want that to happen to property you own! Nor do we! I don't like noise, but I'm sure the sounds of the Corps

dynamiting that thing would be music to my ears. I'll never understand its being put there in the first place! A hideous eyesore!

c. RESPONSE:

The navigation improvements to Vermilion Harbor were authorized by Congress to benefit an existing navigation project. The purpose of the breakwater is to alleviate undesirable wave action at the harbor entrance and in the channel approaching the lagoons, particularly for commercial fishing vessels and recreational craft based at Vermilion.

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

d. COMMENT:

Please put me on record as being one who wants our rights against pollution and destruction of our property protected and restored to its former and natural condition.

d. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study Report.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.45 MS. LOIS R. MOELTER
(commenting letter dated 6 November 1975, copy on page F-59)

a. COMMENT:

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 28, 1975, p. 44349.

I have spent more than fifty summers at Linwood Park, Vermilion, OH and I am appalled at what the Corps of Engineers has done to our beach in the name of progress and a haven for small craft! I have operated small boats in and out of the Vermilion Harbor for more than twenty-five years and never found it impossible to get in or out. What you have really accomplished is the absolute destruction of a once magnificent beach, the pollution of our waters and the thoughtless creation of a "safe" harbor for all the incompetent small craft operators on southern Lake Erie.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on pollution of adjacent recreational swimming areas, increased navigation hazards, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on navigation:

"The wall was designed and built to improve the harbor for a small craft refuge and to make a more safe entry to the harbor in severe weather. It has done this well after the work of local citizens for over fifteen years."

b. COMMENT:

I am irrevocably opposed to dredging our sand out of the river and placing it on the west side of the pier, in fact, to any dredging during the summer!

b. RESPONSE:

The alternative of downdrift (westward) disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Downdrift disposal is feasible in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the downdrift shoreline, the environmental and economic feasibility of downdrift disposal must be evaluated on a case-by-case basis in order to determine the best course of action for each proposed operation. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

c. COMMENT:

I ask for the removal of the breakwall with all due haste, since its continuance spells nothing but doom for our beach, pollution of our waters and a great threat of flooding in the spring.

c. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing,

recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

Your concerns about the effect of the existing breakwater on pollution of adjacent recreational swimming areas and increased flood potential in the floodplain will be addressed in the aforementioned Adverse Impact Study. Please note that the Vermilion Port Authority has provided the following insights into your concerns about the effect of the breakwater on ice jams and flooding (140):

"This is the most difficult part of the problem. The Authority believes that windrow ice is more dangerous than river ice. By keeping the windrow away from the ends of the piers, water can reach the lake under all conditions.

"We believe that some flooding will occur and will always be a danger. This can be complicated by river ice. There was held in late 1969 or 1970 a series of meetings in Vermilion to consider the problem. This is also their opinion. These meetings were attended by ice experts of the Coast Guard, Lake Carriers Association, and Corps of Engineers.

"The ice breaker, Kaw, tested the ability to operate in the Vermilion River last year. The results were as predicted by the ice committee in 1970.

"Questionable - Must still be evaluated - Under severe ice conditions, I am not certain of action of ice behind breakwall; feel it will be better than without wall but do not know that anyone knows for certain."

d. COMMENT:

I request that my comments be made a part of the Section 111 study and the final Environmental Impact Report. In addition, I am hereby requesting a copy of the draft Environmental Impact Statement for operation and maintenance of Vermilion Harbor dated Sept. 1975 and a copy of the final Environmental Impact Statement as well as a copy of the Section 111 study of Vermilion Harbor due in December.

d. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study Report is included as Appendix G in this Final Statement.

e. COMMENT:

On behalf of all of us who have lived at and enjoyed the beautiful beach at Linwood Park and the quiet harbor at Vermilion for all these many, many years, I appeal for a fair hearing of our problem and a prompt disposal of that monstrous breakwall.

e. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.46 MR. GARY F. MORGAN
(commenting letter dated 8 November 1975, copy on page F-60)

a. COMMENT:

I have been going to Linwood Beach in Vermilion, OH for the past fifteen (15) years, my wife has been going to Linwood Park for the past thirty-nine (39) years.

There have been many severe storms batter the beach during these years, which I thought would destroy it completely but my wife and some old timers assured me that the beach would come back. The laws of nature always prevailed.

a. RESPONSE:

No response required.

b. COMMENT:

On the other hand when man interferes with nature man usually loses. Since the breakwater has been constructed, man has managed to destroy a beautiful beach in two (2) years. There has been erosion along the shoreline of Lake Erie because of high water and wind but thanks to the kindness of nature Linwood has always survived.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

c. COMMENT:

My wife has spent her summers swimming at the Linwood Beach since she has been two (2) years of age. We both want our children to be able to do the same. However with the mud slick and debris from the river being diverted along the beach it makes it very undesirable to swim in the waters of Lake Erie.

c. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investiated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

d. COMMENT:

Engineers have done some wonderful things to improve this beautiful land in which we all live. No matter how great a man may be, it still takes a big one to admit his faults and errors. If this error is not corrected in the near future Linwood Park will be no more, instead it will be the site of some multiple family housing or some commercial or industrial usage. Undoubtedly, causing more pollution to a struggling body of water.

Sir, all my family and I ask of you is to CARE just a little.

d. RESPONSE:

Your concerns about the effect of the breakwater on local land use characteristics will be addressed in the aforementioned Adverse Impact Study. Since the Lagoons housing has always been year-round housing, no changes are expected in that area. Please note that the Chairman of the Vermilion Port Authority has indicated that the Linwood area has exhibited the least degree of change from summer to year-round housing of any of the local housing areas (144). No multi-family residences or commercial-industrial tracts have been developed at either the Lagoons or Linwood to date.

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study Report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns, including the effect of the breakwater on property occupancy characteristics.

e. COMMENT:

Please send to me the following information: (a) the draft Environmental Impact Statement of Operation and Maintenance of Vermilion Harbor dated Sept. 1975, (b) a copy of the final Environmental Impact Statement, and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

e. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.47 DR. JOHN A. NEW III
(commenting letter dated 8 November 1975, copy on page F-62)

a. COMMENT:

I am a cottage owner at Linwood Park, Vermilion, OH. I have been going there for the past 69 years. We rented a cottage until we bought ours in 1946.

My family has been going to Linwood Park, for about 75 years.

I remember the large beach we had and at one time there used to be a pierout from the old hotel.

a. RESPONSE:

No response required.

b. COMMENT:

I grant you there has been erosion over the years, but since the breakwall has been built, the erosion in the past two years has done the job of 65 years.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

c. COMMENT:

Pollution has also been a factor. Everytime there is a heavy rain, the muddy water pours out in the river and hits the breakwall and is deflected to our beach, and the water is muddy for three or four days. Then become a silt problem and last summer the water was so dirty, I wouldn't permit my two grandchildren to go swimming. If this keeps up the whole beach will be contaminated and will make bathing dangerous.

c. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on beach pollution (140):

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

d. COMMENT:

I wish to have my comments included in the Section III study and the final environmental impact report.

d. RESPONSE:

Your comments have been included in this Final Statement and Section 111 Study as requested.

e. COMMENT:

I do hope the breakwall will be removed, if not, Linwood Park will become a housing area and a wonderful park will be destroyed.

e. RESPONSE:

Your concerns about the effect of the breakwater on residential occupancy characteristics will be addressed in the aforementioned Adverse Impact Study. Since the Lagoons housing has always been year-round housing, no changes are expected in that area. Please note that the Chairman of Vermilion Port Authority has indicated that the Linwood area has exhibited the least degree of change from summer to year-round housing of any of the local housing areas (144).

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39.) It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.48 MR. GEORGE F. PERSONS
(commenting letter dated 7 November 1975, copy on page F-63)

a. COMMENT:

RE: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349.

About 1908 my father, C. A. Persons, Sr. resided in Oberlin, OH some eighteen (18) miles from Linwood Park in Vermilion by way of a horse drawn carriage. It was a normal frequent exciting trip for the family to go to Linwood for swimming and a picnic. They would pass the "Grove" beside Linwood Avenue, proceed north on Poplar Street to Front Street (now vacated) and then go east along the beach front to the picnic area. It was the cottage, #40 at the time, that took my father's eye. He bought his dream cottage in 1945. Since his seasonal business did not allow a summer vacation, our family of five and many house guests fully utilized the facility, now 5261 Front St., during the summer.

Now my two brothers and I own the cottage and our families number seventeen who share this with our friends in the spring, summer, fall, and sometimes during the winter for beach activities on a tri-wheeler or snowmobile, and a picnic. We've used a day sailer and an outboard motor boat docked in the Vermilion River area as family activities changed.

Our family has been involved at Linwood! We have seen the waters rise and fall and the winds blow from all directions.

a. RESPONSE:

No response required.

b. COMMENT:

Not since the breakwater was installed has the Linwood Beach been the same. We had no sand, only rocks and some dead fish and debris at the pier, we had no sand in the river, we had no roots of the trees exposed, nor did we have beach erosion.

At times of low water we have had a drop off in the beach edge but the water was cleaner and presumably the sand was cleaner. Environmental pollution from sewage, farmlands fertilizer and silt continued to build up. Now we trust the E.P.A. is reducing the surge resulting from greater habitation and faster run off. But the point is that the "dam" in front of the mouth of the river is definitely changing the shoreline of the Linwood Beach. We are losing our sand, we are starting

to lose our trees, we will feel the impact of swimming in polluted water which is slanted to the east against our beach.

Our environment has changed to the detriment of the proud, peaceful, law abiding citizens of Linwood Park.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. *For years, a breakwall was maintained just west of the* Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas, shoaling in the navigation channels, and other conditions that have been attributed to

the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

Several trees at the beaches east of the harbor have been lost in the last several years due to shoreline changes in that area. The

losses began to occur prior to the installation of the detached breakwater in 1973 and therefore cannot be solely attributed to the presence of the structure. Your concerns about the effect of the breakwater on land areas east of the harbor will be addressed in the aforementioned Adverse Impact Study.

c. COMMENT:

It is a crime to cast Linwood beach sand, which has drifted westward against the pier, out into the lake west of the pier or anywhere except from where it originated.

c. RESPONSE:

Use of unpolluted dredged material for beach nourishment (updrift disposal) is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beaches east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

Use of unpolluted dredged material for beach nourishment (downdrift disposal) is also discussed in detail in the aforementioned "Beach Nourishment" section. Downdrift disposal is more feasible than updrift disposal in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the downdrift shoreline, the environmental and economic feasibility of downdrift disposal must be evaluated on a case-by-case basis in order to determine the best course of action for each proposed operation. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

d. COMMENT:

The prevailing N.W. winds cannot perform their stabilizing effect after a northeastern. The damming effects of the recently installed breakwater is positive and continuing.

d. RESPONSE:

Please see response b. above for a discussion of the Corps studies concerning the existing breakwater.

e. COMMENT:

The Corps is morally bound to return this valued asset from where it came, the Linwood Beach.

e. RESPONSE:

Please see response c. above for a discussion of updrift (eastward) shoreline disposal of unpolluted sediments.

f. COMMENT:

I demand that this be done at a time when swimming will not be adversely effected by stirred up pollution. Summer time dredging is probably most convenient, but scheduling for this seriously effected area should be in the spring or fall.

f. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

g. COMMENT:

Please send the sand back to "New Castle".

g. RESPONSE:

Please see response c. above for a discussion of updrift (eastward) shoreline disposal of unpolluted sediments.

h. COMMENT:

Eliminate the breakwater, acknowledge an error and let nature rebuild its cyclical happenings.

h. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures"

(paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

i. COMMENT:

Only once in thirty (30) years of sailing have I found it difficult to enter the mouth of the river. A line squall had hit, our boat was knocked down, but lives were not endangered. Within fifteen minutes we were assisted by power boats who took us in tow back to the harbor. Exposed to the weather yes, but not polluted on each swim.

Since the July 4th 1969 flood we have missed the range lights. We certainly don't need them now with the dam in front of the mouth. They did do a fine job. The "protection" of the breakwater creates confusion with river traffic.

One item that has not happened recently is the severe ice jams and resulting flood waters from the Lagoons up the river to the other lowland homes, more and more of which we are year round housing. How often will an ice jam be caused mechanically by the breakwater, and choked by the sand buildup in the river channel?

Enough silt flows to the Vermilion River mouth to create a problem with ice jams without compounding the problem with damming configuration of a breakwater.

i. RESPONSE:

Your concerns about the effect of the breakwater on increased navigation hazards, beach pollution, increased probability of ice jam flooding, and shoaling in the navigation channels will be addressed in the aforementioned Adverse Impact Study (please see response b. above). Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on ice jams and flooding:

"This is the most difficult part of the problem. The Authority believes that windrow ice is more dangerous than river ice. By keeping the windrow away from the ends of the piers, water can reach the lake under all conditions.

"We believe that some flooding will occur and will always be a danger. This can be complicated by river ice. There was held in late 1969 or 1970 a series of meetings in Vermilion to consider the problem. This is also their opinion. These meetings were attended by ice experts of the Coast Guard, Lake Carriers Association, and Corps of Engineers.

"The ice breaker, Kaw, tested the ability to operate in the Vermilion River last year. The results were as predicted by the ice committee in 1970.

"Questionable - Must still be evaluated - Under severe ice conditions, I am not certain of action of ice behind breakwall; feel it will be better than without wall but do not know that anyone knows for certain."

2. Effect of the breakwater on navigation:

"The wall was designed and built to improve the harbor for a small craft refuge and to make a more safe entry to the harbor in severe weather. It has done this well after the work of local citizens for over fifteen years."

Your concerns about the effect of the breakwater on residential occupancy characteristics will be addressed in the aforementioned Adverse Impact Study. Since the Lagoons housing has always been year-round housing, no changes are expected in that area. Please note that the Chairman of the Vermilion Port Authority has indicated that the Linwood area has exhibited the least degree of change from summer to year-round housing of any of the local housing areas (144).

j. COMMENT:

I deplore you to rid the community of Vermilion and particularly the Linwood Park residents of this nemisis.

Remove the breakwater to eliminate all the varied problems it causes.

j. RESPONSE:

Please see response h. above for a discussion of the alternative of removing the breakwater. Your concerns about problems that may be attributable to the navigation project will be addressed in the aforementioned Section 111 and Adverse Impact Studies.

k. COMMENT:

Eliminate the summer time dredging for the health of all concerned.

k. RESPONSE:

Please see response f. above for a discussion of the proposed Corps maintenance dredging schedule for Vermilion Harbor.

1. COMMENT:

Return the beach sand from where it came. Please do not waste it into the lake. Save our environment, save our beach.

1. RESPONSE:

Please see response c. above for a discussion of alternatives to open-lake disposal of unpolluted sediments, including the alternative of updrift (eastward) shoreline disposal.

m. COMMENT:

I respectfully request that my thoughts, ideas and statements be included in the Section 111 study as well as in the final Environmental Impact Report forthcoming.

m. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study Report as requested.

n. COMMENT:

I am doing my best to eliminate water, air, eye, and ear pollution.

What can you do to better our environment in Vermilion to bring it at least back to normal?

n. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. A copy of the Section 111 Study Report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.49 MS. RUTH E. PETERKA
(commenting letter dated 6 November 1975, copy on page F-66)

a. COMMENT:

Ref. Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor.

The breakwall at the mouth of the Vermilion River is a cause of distress and hardship to us at Linwood Park, Vermilion, OH, where my husband and I maintain a secondary home at 5079 Elm St.

The path of the river is diverted at the mouth. This has caused two problems of which I am aware. First, the water intake is affected. The city assures me that the water is safe for human consumption, but water should also be palatable. I question the additives with regard to our physical well-being which are necessary for safe consumption. Secondly, the river carries the waste from the Vermilion disposal plant, and now flows along the shoreline. The pollution from this flow cannot be diluted and washed away at an adequate rate for safe swimming.

The sand buildup at the mouth of the river is dangerous to the purpose for which it is said the breakwall was constructed, namely, a safe refuge for small craft. The sand bars do not allow free use of the river channel. At times, the boats are fortunate to have a channel at all.

a. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas, periodic contamination of the municipal water supply, increased navigation hazards, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion

Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are be addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the municipal water supply:

"There is some increased turbidity in the area of the water intake. The drinking water has been affected once or twice since the breakwall was constructed. This had happened before the wall was built, especially in the spring. Periodic contamination has been a concern and seems to be more frequent in the last several years.

"The local water intakes have been obsolete for several years, and it is well known new intakes are needed in deep water."

3. Effect of the breakwater on navigation:

"The wall was designed and built to improve the harbor for a small craft refuge and to make a more safe entry to the harbor in severe weather. It has done this well after the work of local citizens for over fifteen years."

b. COMMENT:

The dredging necessary to maintain this channel is a harassment to those of us who live near the channel. It is also an added expense for us, the taxpayers, to assume.

b. RESPONSE:

The potential noise, odors, navigation inconvenience and other temporary adverse effects of maintenance dredging are acknowledged as unavoidable results of such operations (see Chapter 4 for a detailed discussion of dredging-related impacts). Such results may be viewed as costs for maintaining a viable harbor that has long-term benefits for commercial fishing operations, recreational navigators, and other local and regional uses of Vermilion Harbor. Please note that routine maintenance dredging is anticipated at a frequency of only once every three years. Furthermore, fall dredging (six week period between 15 September and 15 December) will occur after the majority of the community's summer population has left the area, thereby reducing the number of residents who may experience unavoidable effects related to maintenance operations.

The cost of maintenance is a function of harbor shoaling conditions (location, volume, depth, etc.), environmental considerations (sediment quality, season with least degree of environmental activity, etc.), operational factors (characteristics of dredge plant, location of disposal areas, etc.), and local, regional, and national economic conditions (recent rising labor costs, Congressional appropriations of maintenance funds, etc.). The proposed plan for maintaining Vermilion Harbor is the most economical plan in view of all of the factors that have been considered in its formulation.

c. COMMENT:

I have been a resident at Linwood for 26 years. Prior to that time, I had spent some part of the summer at Linwood for over 60 years. In spite of severe storms, hurricane, flood, high water or low water, the beach east of the pier to the bluff at Crystal has remained fairly stable. I cannot remember ever seeing any part of the Linwood beach devoid of sand as it now appears. The one new factor which has entered the picture is the breakwall, which would seem to be responsible for the above described situations.

c. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in water front property due to high water."

d. COMMENT:

Will you please consider the above critique in your final draft which you are planning for December 1975. Thank you for this consideration.

d. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study Report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.50 MR. EDWARD A. AND MS. VIRGINIA R. PETERS
(commenting letter dated 7 November 1975, copy on page F-67)

a. COMMENT:

Reference Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per notice Federal Register, 26 September 1975, p. 44349.

We have been a cottage owner and a summer resident of Linwood Park, Vermilion, OH, for 62 years. Our two sons and four grandchildren have also enjoyed their summers there.

The beach at Linwood Park, through these many years, has enjoyed the reputation of being one of the finest beaches along Lake Erie.

a. RESPONSE:

No response required.

b. COMMENT:

Before the breakwater was built we had no sand pileup at the pier, no sand in the river, no beach erosion or beach pollution, nor any rocky beach.

In two short years, since the breakwater, we have seen our lovely sand beach deteriorate until there is very little beach sand left. We would like to protest the wrong that has been done.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

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"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

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Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on the build-up of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shore line. The principle cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this and outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

2. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

c. COMMENT:

As tax payers we appeal for help from you and Public Law 91-110, the National Environmental Protection Act, which Law was enacted for the protection of the Public.

c. RESPONSE:

The Draft and Final Environmental Statements for the Vermilion Harbor navigation project (dated October 1971 and May 1972, respectively) and the Draft and Final Statements for harbor maintenance operations (dated September 1975 and March 1976, respectively) have been prepared in accordance with the guidelines presented in Public Law 91-190, "National Environmental Policy Act of 1969," as well as appropriate Department of the Army regulations. Your comments on the Draft Statement for harbor maintenance operations have been a valuable resource in reviewing the Corps activities at Vermilion Harbor. Your views, as well as those of other local interests, have been instrumental in modifying the maintenance dredging schedule, to avoid potential interference with summer swimming activities, and in initiating the aforementioned Section 111 and Adverse Impact Studies of conditions at Vermilion. Future Corps actions to further enhance the quality of life at Vermilion or to mitigate any adverse conditions that may be attributable to the existing navigation project, will be taken as a result of those studies' recommendations.

d. COMMENT:

Would you please have our comments included in the Section 111 Study and the final environmental impact report?

d. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

e. COMMENT:

Would you please send us a copy of the draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor dated September 1975 and a copy of the Final Environmental Impact Statement, also a copy of the Section 111 Study of Vermilion Harbor due in December 1975?

Thank you very much, Lt. Col. Walker. We will appreciate your consideration.

e. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.51 MRS. CARL PRESTEL
(no date on commenting letter, copy on page F-68)

a. COMMENT:

I am a cottage owner at Linwood Park, Vermilion, OH. I have been going to Linwood Park for over 50 years. In all those years, I have not missed spending some time of each summer at the Park.

Bringing up our family we went to Linwood Park every year and now our sons are spending their summers with their families at Linwood. Most of the time we were there was always spent on the beautiful sandy beach. With so much pride we would have our relatives and friends come and we spent much of the time with them on our beautiful beach.

a. RESPONSE:

No response required.

b. COMMENT:

But now in just a few years it has all been changed. The beach isn't beautiful now. It is unbelievable what has happened in this short time. Last year half of our beach was gone and now this year it is still worse. All on account of the breakwater put in at the Vermilion River.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

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"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

c. COMMENT:

For years now we used to go down to the pier and watch the cruisers going in and out of the river into the lake and there was no difficulty. Why after all these years without any accidents or any lives lost or any emergencies did this breakwater have to be put in?

c. RESPONSE:

The navigation improvements to Vermilion Harbor were authorized by Congress to benefit an existing navigation project. The purpose of the breakwater is to alleviate undesirable wave action at the harbor entrance and in the channel approaching the lagoons, particularly for commercial fishing vessels and recreational craft based at Vermilion.

d. COMMENT:

Now the sand of our beach is being dumped into the Vermilion River and our beach is being polluted.

d. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels, pollution of adjacent recreational swimming areas, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

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"Questionable - Must still be evaluated - Build-up of sand in the river from northeast to east storms."

2. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

e. COMMENT:

Before our beach is completely gone that breakwater should be removed and our sand, trapped in the Vermilion River, should be returned to our beach.

e. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

The alternative of updrift disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

f. COMMENT:

I would like to have my comments included in the Section 111 Study and also the final environmental impact report.

f. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.52 MR. ROBERT PROCHASKA
(commenting letter dated 6 November 1975, copy on page F-70)

a. COMMENT:

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, 26 September 1975, p. 44349.

It has come to my attention that the Corps of Engineers feels no responsibility for the erosion of the beach at Linwood Park in Vermilion, Ohio and places the cause to weather.

My experience at Linwood goes back to 1944, and with time out for the Navy and college, I have visited or rented in the park until 1970, when I purchased a cottage there and made it my summer residence. All those years I kept going back and finally purchased, mainly, because of the beach. Never a change - until the breakwater went in. It is so evident that a change has occurred, the whole basin the beach is in has tilted with a buildup of beach on the west end and no beach on the east. It is so bad now that I have to wear my tennis shoes when I go swimming because of the rocks. Up to the time the breakwater was built I would play ball (keep away) with the children and my daughters in the shallow water on smooth sand. And the beach is getting narrower. Where there was beach wide enough for baseball and football games by the youngsters, it now is looking more like a bowling alley.

As a registered engineer I am quite often asked if I believe the breakwater has effected our beach. I tell them you don't have to be an engineer to realize this.

Please, do something to save our beach.

a. RESPONSE:

One of the conclusions of the Report on Section 111, Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in waterfront property due to high water."

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation proj- etc. As indicated above, a copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address the community's additional concerns about the project.

b. COMMENT:

Would you include my comments in the Section 111 study and the final environmental impact report.

b. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.53 MR. HUGH J. PUGSLEY
(commenting letter dated 7 November 1975, copy on page F-71)

a. COMMENT:

Reference Breakwater at Vermilion, OH.

Our family has a history of over 65 years at Linwood Park in Vermilion, and we have seen the conditions of the beach over all these years. There have been minor changes because of storms - but nothing like the horrible things which have happened since the installation of the breakwater. Beside erosion, the most of the beach is building up with silt and debris coming down the Vermilion River, and being directed our way. Pollution in the river can be corrected, but the other material cannot be.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

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"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lake front in Ohio to determine the dramatic change in water front property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have atrributed to the presence of the detached breakwater in order to verify the validity of

such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on beach pollution (140):

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned clean (*whole in south winds*).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

""The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

b. COMMENT:

We feel so very helpless that a misfortune like the breakwater has been forced upon us.

We have had a power boat for many years, and at no time in the past have I had any trouble getting into the entrance to Vermilion Harbor - regardless of the weather.

b. RESPONSE:

The U.S. Army Corps of Engineers was responsible for the planning, design, and construction of the existing navigation project

at Vermilion Harbor in accordance with authorizing legislation. The project was authorized by Congress to benefit an existing navigation project. The views of appropriate Federal, State, and local interests were actively sought and incorporated into the project's final design. The Vermilion Port Authority has indicated that "This project came into being at the request of the city of Vermilion and not sold to the city by the Corps of Engineers" (140).

c. COMMENT:

Will you please send me a copy of the draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September 1975 - also any other related statements.

c. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

Your comments on the navigation project at Vermilion Harbor are appreciated.

9.54 MR. J. W. RUTLEDGE
(commenting letter dated 7 November 1975, copy on page F-73)

a. COMMENT:

Subject: Draft Environmental Impact Statement operation and maintenance of Vermilion Harbor per notice Federal Register 9/26/75 page 44349.

As a lease holder in Linwood Park, Ohio for a period of eleven years and a vacationer at that spot for a period of thirty years the writer feels called up to comment relative to the upcoming Draft Environmental Impact Statement that is expected in December 1975.

Over the past several weeks I have heard and been advised of various comments relative to the above and the general contents of it. If some of the information is correct somebody is going to draw some very invalid conclusions.

a. RESPONSE:

No response required.

b. COMMENT:

As an individual who is cognizant of the lake action on the Linwood Park beach at Vermilion I can say there have been many changes over the years but nothing as drastic, since the installation by the Corps of Engineers of the monstrosity at the mouth of the Vermilion River, a North West lake action has been null and void as far as the Linwood Park beach is concerned, for this reason the north eastern storm done nothing but wash the beach away. The authorities have been plagued with a pile up of Linwood Park sand against the East pier of the Vermilion River which extends out to the entire length of the pier. Prior to the installation of the monstrosity the immediate beach area to the East of the East pier was practically nothing except rock and stony area. Because of the monstrosity, sand movement from Linwood Beach has not only built up against the pier but has gone over the pier and clogging the river on several occasions.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH, is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report

is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in waterfront property due to high water."

In July 1976 the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling (140):

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoon

Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildrup of sand in the river from northeast to east storms."

c. COMMENT:

Quite frankly, there is no permanent remedy for this problem and the damage that is being brought on the property owners of Linwood Park, other than the complete elimination of the monstrosity. As a resident of the area I personally can guarantee the elimination of the monstrosity someday in the near future, whether it be from our action or from the pressure of others.

c. RESPONSE:

The alternative of removing the breakwater is discussed and and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

d. COMMENT:

The installation of this monstrosity has caused fear among the residents of the Vermilion Lagoon and one of these days there will be a drastic flood heaping ruin of many, many thousands of dollars on the property. If and when this happens, the Corps undoubtedly will be forced to take action and remove it. Prior to that we are hoping the Corps will see the light and realize the damage and threat this monstrosity poses for the people of the area and take immediate action for its removal.

We certainly hope flood damage and even possible loss of life as a result of such a flood is not necessary to bring about correction of this. The Corps of Engineers has certainly had enough pressure brought to them over the past two years relative to this installation that somebody along the line should realize the truth and the mistake that took place. Why do we need to go long enough to have a disaster before we can get action on our request.

d. RESPONSE:

Your concerns about increased flooding potential due to the existing breakwater will be addressed in the aforementioned Adverse Impact Study. Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on ice jams and flooding (140):

> "This is the most difficult part of the problem. The Authority believes that wind-row ice is more dangerous than river ice. By keeping the wind-row away from the ends of the piers, water can reach the lake under all conditions.
>
> "We believe that some flooding will occur and will always be a danger. This can be complicated by river ice. There was held in late 1969 or 1970 a series of meetings in Vermilion to consider the problem. This is also their opinion. These meetings were attended by ice experts of the Coast Guard, Lake Carriers Association, and Corps of Engineers.
>
> "The ice breaker, Kaw, tested the ability to operate in the Vermilion River last year. The results were as predicted by the ice committee in 1970.
>
> "Questionable - Must still be evaluated - Under severe ice conditions, I am not certain of action of ice behind breakwall; feel it will be better than without wall but do not know that anyone knows for certain."

e. COMMENT:

In the latter part of 1974 and thus far in 1975 there has been upwards of approximately 18 to 20,000 cubic yards of sand passed over the East Pier of the Vermilion River from Linwood Park beach in the river bed that has had to be dredged from the river by the Corps. We ask that you check your records and determine how many times and at what period the Corps ever had to dredge the Vermilion River prior to 1974 and the installation of this monstrosity.

e. RESPONSE:

Visual examination of harbor sediments prior to the November-December 1975 emergency dredging operation indicated that the shoal between the piers was comprised of poorly-sorted, silty, gravelly sands. Offshore material between the jetties and the breakwater was generally much finer, consisting of clayey-silts with some pockets of silty-sands with traces of gravel. The clay and organic detritus content indicated that the bulk of the outer harbor sediment was probably material brought down by the Vermilion River. The finer portion of littoral material that is normally carried in suspension probably settled out in the relatively quiet water behind the breakwater and also contributed to this deposit. Further, some of the beach material which has washed over the east pier and deposited in the entrance channel is probably carried by the Vermilion River during periods of high discharge into the lake approach channel, where the gravels and sands quickly settle out in isolated pockets. The deposits between the piers and behind the breakwater represent a combination of littorally and fluvially transported material. The relative influence of each source varies with location, river discharge, and wave conditions.

A brief history of the Corps harbor improvements at Vermilion is presented in paragraphs 1.03 through 1.11. As is indicated in the history discussion, Corps records show that the Federal harbor was maintenance dredged in 1873, 1915 and 1935. It is important to note that prior to the completion of the existing navigation project in 1973 the Federal project at Vermilion consisted only of the entrance channels and the piers. The lake approach and river channels, as well as the detached breakwater, were not in existence, and therefore not maintained, before that time.

f. COMMENT:

The writer would like to request the Corps realize the disaster they have heaped upon the people of this area and that they take immediate steps of restitution and of restoring the Linwood Park beach by the return of the beach sand which has washed away and by the elimination of the monstrosity.

In addition the mouth of the river has had its flow diverted by the monstrosity to the point that all of the waste and pollution from the river is now being directed and pushed directly across the face of the Linwood Park swimming area.

f. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. As is indicated above, a copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns, including diversion of river water into, and pollution of, adjacent recreational swimming areas. Please note that the Vermilion Port Authority provided the following insights into your concerns about the effect of the breakwater on beach pollution (140):

> "The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).
>
> "However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.
>
> "The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

The alternative of updrift disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.39). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

Please see response c. above for a discussion of the alternative of removing the existing breakwater.

g. COMMENT:

I would like to request that the comments made in this letter be included in section three study of the Environmental report when it is released.

I wish to thank you for your consideration and cooperation in this matter.

g. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.55 MRS. GEORGE M. THOMAS
(commenting letter dated 13 November 1975, copy on page F-75)

a. COMMENT:

I am writing to you in reference to the Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, 26 September 1975, p. 44349.

There are several things I feel impelled to tell you. Before we had the breakwater we had no problems as we now have. We had intermittent changes in the beach with the cycle of water levels in Lake Erie, but these were minor and over a period of years the beach remained constant. I can speak to this because we have owned property in Linwood Park for over 50 years. Previous to the building of the breakwater we had not had a problem with pollution as we have constantly had since the breakwater was built. You can stand at the top of the land on the lakefront and see very distinctly by the color of the water coming out of Vermilion River that the breakwater is re-directing it toward our beach. During those 50 years, never have I seen water washing over the pier as it now does, never has the sand piled at the pier and never, never has sand been washed over the pier into the river. As a matter of fact the things that have happened in the last 2 years are so foreign to what has been the standard pattern that I can hardly believe that what I am seeing today is fact!

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion

of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in waterfront property due to high water."

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of the Adverse Impact Study will be to review all previous reports on Corps programs of Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on pollution of adjacent recreation swimming areas, shoaling in the navigation channels, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

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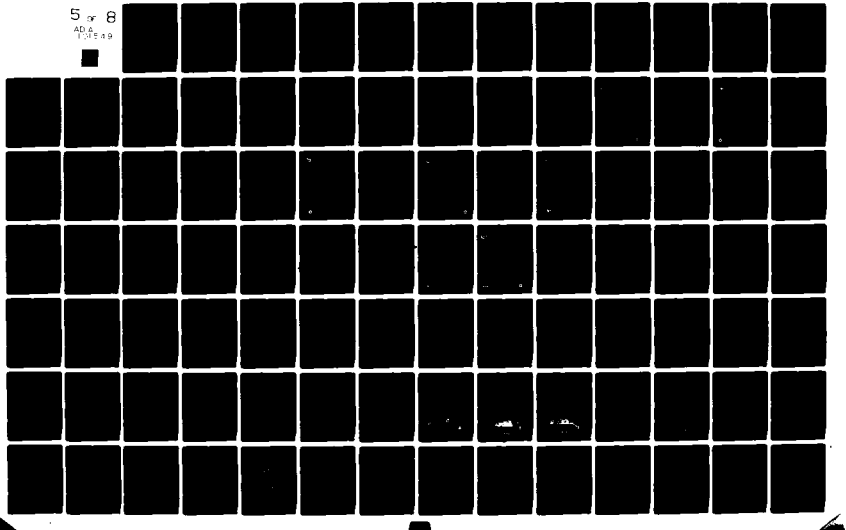


"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoons Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

b. COMMENT:

I am certainly in opposition to the disposal of our sand (as you dredge it from the river) anywere except back on our beach where it came from, and think it is your responsibility to return it.

b. RESPONSE:

Use of unpolluted dredged material for beach nourishment (updrift disposal) is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

Use of unpolluted dredged material for beach nourishment (downdrift disposal) is also discussed in detail in the aforementioned "Beach Nourishment" section. Downdrift disposal is more feasible than updrift disposal in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the downdrift shoreline, the environmental and economic feasibility of downdrift disposal must be evaluated on a case-by-case basis in order to determine the best course of action for each proposed operation. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

c. COMMENT:

Further, I see no reason why you should be dredging this all during the summer when this is the only time the beach facility can be used.

c. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

d. COMMENT:

This whole problem has come about since the building of the breakwater by the Corps of Engineers. The way to eliminate all the problems of water pollution, beach erosion, river dredging, is to eliminate the breakwater and to do it immediately.

d. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

e. COMMENT:

We have traveled some and have seen some famous beaches of the world: Miami, Bradenton, Clearwater, Sanibel Island, Waikiki and Kamakura, Japan. The beach at Linwood Park compares favorably with them. On Lake

Erie there are few beaches that compare with our beach at Linwood Park (possibly Presque Isle and Headlands Beach State Park) and here is a fine beach like this one being systematically destroyed because of a manmade disturbance.

e. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. As previously indicated, a copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

f. COMMENT:

I request that my comments be included in the Section 111 study of the final environmental impact report.

f. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

g. COMMENT:

I would also request a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975 - a copy of the final environmental impact statement and a copy of the Section 111 study of Vermilion Harbor due in December.

g. RESPONSE:

A copy of the Draft Statement was forwarded to you with a letter of transmittal dated 24 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.56 MR. WALTER C. WAITE
(commenting letter dated 10 November 1975, copy on page F-76)

a. COMMENT:

As a cottage owner in Linwood Park, Vermilion, Ohio, I am writing in regard to the condition of our beach in the past several years.

I have not missed a year since 1924 in spending our summers at Linwood and previous to the building of the breakwall I would say we had the finest beach on Lake Erie. We enjoyed a beach with beautiful sand which measured about 75 yards in width.

a. RESPONSE:

No response required.

b. COMMENT:

In the past two years this picture changed to where our beach was reduced to about 10 yards in width, with no sand but plenty of stones and debris.

The removal of the breakwall will solve all our problems, but until this is done our beach will be helped immensely by returning to our beach the sand dredged from the Vermilion River.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine dramatic change in waterfront property due to high water."

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

The alternative of updrift disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

c. COMMENT:

I also wish to object to the summertime dredging of sand as this makes swimming off our beach impossible.

c. RESPONSE:

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance drredging on swimming activities at beach areas adjacent to the harbor,

the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

d. COMMENT:

I will appreciate your kindness in having my comments included in the Section 111 Study and the final environmental impact report.

Ref: Draft Environmental Impact Statement on operation and maintenance of Vermilion Harbor per notice Federal Register, 26 September 1975, p. 44349.

d. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.37 MR. THEODORE D. WAKEFIELD
(comments received on a "Quality Control Report Form"; no copy has been included in the Final Statement)

a. COMMENT:

Exhaustive detail - maybe too much. I recommend dumping unpolluted material over west pier for nourishment westward and lowest cost. Harbour Town perimeter is as shown on attached map.

a. RESPONSE:

Paragraph 6.32 has been expanded to indicate the commentor's favorable opinion toward deposition of unpolluted materials west of the west pier. Plate 2.17 has been corrected and paragraph 2.129 has been expanded to indicate the current perimeter of "Harbour Town 1837."

9.58 MR. REDGE A. WILDE
(commenting letter dated 23 November 1975, copy on page F-77)

a. COMMENT:

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per notice Federal Register, 26 September 1975, p. 44349.

I would like to inform those with responsibility for the Vermilion Harbor breakwall (completed by the Corps of Engineers in 1973) of my intimate knowledge of the environmental situation, both past and present, and of my immediate personal concern. Also, I wish that my observations be included in the Section 111 Study and the final environment impact report.

a. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

b. COMMENT:

Members of my family have been visiting Vermilion, Ohio, and Linwood Park (directly east of the Vermilion Harbor piers) for the past seventy years, and for more than my 30 years have owned a "cottage" *on the lakefront. No one in the family nor I can remember a greater disaster befalling Linwood Park or the small community of Vermilion than the end results of the above-mentioned breakwall.

There has always been a Nakomis Beach to the east of Linwood Park, sometimes reduced and sometimes enlarged due to the prevailing weather conditions and water levels, but always present. Now it is gone along with half, if not more, of Linwood Park's half mile of beach (one of the few safe swimming beaches of its size on Lake Erie).

*Of the approximately 150 Linwood Park "cottages" few, if any, are valued at less than $30,000 apiece.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions, with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in waterfront property due to high water."

c. COMMENT:

The east Vermilion Harbor pier, always a fine fishing spot, is now so buried in Nakomis and Linwood Park sands that there is virtually no water in which to fish. The need for extensive dredging of the harbor and the river almost defies recollection, but now seems destined to become a major biannual event. In the past, beach closings due to Vermilion River water pollution have never been seriously considered (even at the height of many other Lake Erie beach closings) and now they appear to be an imminent possibility every year due to the diversion of river water flow and dredging.

Concerning one of the breakwater's supposed benefits, "boating safety," I have not seen nor heard of one accident in the Vermilion Harbor which the present breakwater could have averted. I have personally passed through the Vermilion Harbor, and many others, in just about every type of boat and weather condition imaginable, and frankly believe that the harbor is less safe now than it was before the breakwall was constructed. The wall sets up cross-wave patterns and is a visual barrier making it particularly hazardous to small watercraft.

c. RESPONSE:

In July 1976, the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring

additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreation swimming areas, shoaling in the navigation channels, increased navigation hazards, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, and the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

2. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

"The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoons Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the

east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experience greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

3. Effect of the breakwater on navigation:

"The wall was designed and built to improve the harbor for a small craft refuge and to make a more safe entry to the harbor in severe weather. It has been done this well after the work of local citizens for over fifteen years."

d. COMMENT:

With these liabilities so closely at hand it seems imperative that immediate action be taken to replace the sand to the natural beaches, eliminate all dredging during the summer swimming season, and remove the ultimate problem, the breakwall itself.

d. RESPONSE:

The alternative of updrift disposal of unpolluted maintenance dredgings is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enchancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

e. COMMENT:

As there has been a great deal of controversy over the relative merits of the Corps of Engineers projects, it is very hard for any one person to completely assess the Corps peacetime mission. However, due to a person's particular knowledge of any one project, a fairly objective assessment can be made. Regarding the Vermilion Harbor breakwall and my first hand knowledge of its consequences, I would have to say that my faith and respect for the Corps (as a 1LT reserve officer, graduate of Ft. Belvoir, 1974) would be greatly shaken if a mistake is not admitted and a humble reversal of damages actively sought.

Thank you for your help.

e. RESPONSE:

A section entitled "Other Corps Studies of Vermilion Harbor" (paragraphs 1.48 through 1.49) has been added to this Final Statement to explain the actions that the Buffalo District has taken in order to investigate your concerns and provide an acceptable solution to any adverse effects that may be attributable to the harbor navigation project. As indicated above, a copy of the Section 111 Study report is attached as Appendix G and should be consulted for more detailed information on shore damages that may be related to the navigation project. An Adverse Impact Study will be initiated in order to address your additional concerns about the project.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.59 MR. W. CRAIG WILDE
(commenting letter dated 23 November 1975, copy on page F-79)

a. COMMENT:

I am writing in reference to the draft environment impact statement on the operation and maintenance of Vermilion Harbor per notice Federal Register, 26 September 1975, page 44349.

I have spent every summer for thirty-two years at our family place in Vermilion, Ohio. Recently there has been substantial and deplorable damage done to the beach, harbor, and lake area by the breakwater constructed at Vermilion. The harmful effects listed below have never been observed by me in thirty years before the breakwater went up, and I am sure the breakwater is their cause.

The beach has eroded drastically. The breakwater has obviously interfered with the natural processes that have maintained the beach essentially unchanged for many more years than I have been going there. I have never seen such loss of beach at Vermilion, even when other areas of the South Shore were experiencing serious erosion. This erosion, thus, cannot be attributed to unusual natural circumstances.

a. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in waterfront property due to high water."

b. COMMENT:

It is quite evident where the sand is going. It is piling up at the piers and is clogging the mouth of the river, whence it is being hauled to the shore west of the piers or out in the lake. It is thus being permanently lost to the beach east of the piers.

Pollution has also become a problem. The breakwater has caused the river to silt much more than in the past, and the necessary dredging in the summer is a serious source of pollution for the whole area. Furthermore, the breakwater directs the flow of river water directly at the beach, making the beach and shoreline substantially less clean.

b. RESPONSE:

In July 1976 the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically, the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on shoaling in the navigation channels, diversion of river water into, and pollution of, adjacent recreational swimming areas, and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

> "The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoons Beach was deposited before construction began. This problem has been occurring the full length

of the Lake Erie shoreline. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.

"There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

2. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

In view of revised harbor fishery information from Ohio DNR and your concerns about the potential indirect effect of maintenance dredging on swimming activities at beach areas adjacent to the harbor, the Buffalo District has changed its proposed maintenance dredging schedule to a six-week period between 15 September and 15 December with a frequency of about once every three years. This schedule will result in the least possible disruption of the local environment and its activities within the limitations of operational and project cost considerations.

c. COMMENT:

In thirty years of boating, swimming, and using the beach at Vermilion, I never missed having a breakwater there. This was a stable,

naturally self-sustaining recreational area. The breakwater is ruining it. I believe the breakwater must be removed.

c. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

d. COMMENT:

I request that my comments be included in Section 111 study and in the final environmental impact report being made on this subject.

d. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

9.60 ANONYMOUS
(commenting letter dated 10 November 1975, copy on page F-80)

a. COMMENT:

Ref: Draft Environmental Statement on Operation and Maintenance of Vermilion Harbor per notice Federal Register 26 September 1975, p. 44349.

For above reference we would like to request (a) a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975, (b) a copy of the final environmental impact statement and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

a. RESPONSE:

A copy of the Draft Statement was forwarded to the resident at the address shown on the commenting letter with a letter of transmittal dated 18 November 1975. The transmittal letter indicated that a copy of this Final Statement will be forwarded after it has been filed with the Council on Environmental Quality, and a copy of the Section 111 Study will be forwarded when available. Please note that the Section 111 Study report is included as Appendix G in this Final Statement.

b. COMMENT:

As residents of Linwood Park, Vermilion, Ohio for the past six years, we are concerned about the drastic erosion and loss of sand off our beach since the breakwall was built off the mouth of the Vermilion River.

b. RESPONSE:

One of the conclusions of the Report on Section 111 Study of Vermilion Harbor, OH is that "Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by high lake levels and those that may be attributed to the detached breakwater" (141). The subject report is attached as Appendix G and should be consulted for additional detailed information.

The Vermilion Port Authority presented the following conclusions with respect to Linwood Beach in its November 1975 report to the Vermilion City Council (140):

"1. Linwood does not, and never did, have a stable beach. Beach always changed with lake water levels and severity of storms.

"2. For years, a breakwall was maintained just west of the Linwood Hotel and also crib at Crystal Beach. Failure to maintain these structures contributed more to erosion of eastern end of Linwood Beach, Nakomis, and Crystal Beach than anything else.

"3. One only has to observe the lakefront in Ohio to determine the dramatic change in waterfront property due to high water."

c. COMMENT:

We are opposed to the continued open-lake disposal of our sand dredged from the river and feel that this beach sand should be returned to Linwood Park Beach.

c. RESPONSE:

Use of unpolluted dredged material for beach nourishment (updrift disposal) is discussed and evaluated in the section entitled "Use of Unpolluted Dredged Material for Beach Nourishment" (paragraphs 6.29 through 6.34). Recent experience has shown that updrift disposal would be much more costly than downdrift disposal. Long-term updrift disposal at Linwood Beach or any of the other beach areas east of the harbor is not practical under existing conditions since the nourishment materials would tend to be littorally transported back into the navigation channels. Therefore, this alternative was not considered further at this time.

Use of unpolluted dredged material for beach nourishment (downdrift disposal) is also discussed in detail in the aforementioned "Beach Nourishment" section. Downdrift disposal is more feasible than updrift disposal in terms of disposal costs and the tendency for shoreline materials to move westward away from the navigation channels. However, due to the nature of the downdrift shoreline, the environmental and economic feasibility of downdrift disposal must be evaluated on a case-by-case basis in order to determine the best course of action for each proposed operation. At this time, downdrift beach interests (Vermilion City Beach) have not expressed an interest in downdrift beach nourishment.

d. COMMENT:

The buildup of sand to the west of Linwood started when the breakwall was built and each year increases the beach of the Vermilion lagoons until eventually it will reach the breakwall itself.

The diversion of the Vermilion River caused the breakwall results in polluted water to flow across our beaches and prevents sanitary swimming conditions during the summer months.

d. RESPONSE:

In July 1976 the Buffalo District will initiate a study to investigate possible adverse effects of the Vermilion Harbor navigation project. The objectives of this Adverse Impact Study will be to review all previous reports on Corps programs at Vermilion, conduct an in-depth investigation of adverse effects that local interests have attributed to the presence of the detached breakwater in order to verify the validity of such effects, and identify alternative solutions or problems requiring additional study. The study report will be in compliance with the Corps draft Environmental Guidelines distributed in October 1975, specifically the policy to "Review periodically the operation and maintenance of completed projects to assure that environmental quality exists consistent with project purposes." Your concerns about the effect of the breakwater on diversion of river water into, and pollution of, adjacent recreational swimming areas and other conditions that have been attributed to the structure will be addressed in the Adverse Impact Study. Appropriate recommendations for further action to resolve your concerns will be based on the study's conclusions, which will be available in 1977. Your insights into the environment of Vermilion Harbor are welcomed as a valuable resource for this investigation. Possible effects of the navigation project on shoreline changes and erosion will not be investigated in this study but are addressed in the separate Section 111 Study.

Please note that the Vermilion Port Authority provided the following insights into the concerns identified in your comment (140):

1. Effect of the breakwater on the buildup of sand east of the east pier (Lagoons Beach) and navigation channel shoaling:

> "The beach at Nakomis was lost before construction of the pier. One-third of the sand buildup at the west end of the Lagoons Beach was deposited before construction began. This problem has been occurring the full length of the Lake Erie shoreline. The principal cause has been high water. When the lake level returns to normal, most of these beaches will return.
>
> "There has been loss of sand from Linwood's east end and deposits in the river. The small sand bar at the east wall is not a problem at this time. River flow is moving much of this sand outward.

"The overwash on the east pier is caused partly by high water. With or without the structure we will still have the problem. Mentor, the Grand River, Rocky River, and several small river harbors have experienced greater sanding than Vermilion.

"Questionable - Must still be evaluated - Buildup of sand in the river from northeast to east storms."

2. Effect of the breakwater on beach pollution:

"The discharge of river water is diverted closer to the beaches. However, in certain winds, the beaches have always been churned, clean (while in south winds).

"However, this may be a small price to pay for the greater protection given the Main Street pumping station, the line of homes along the beach, and the base of the east pier, as well as a small boat entering the river in a storm.

"The water discoloration has been occurring since the beginning of time, except now it cannot mushroom out as before."

e. COMMENT:

We feel it is the responsibility of the Army Corps of Engineers to remedy this problem by removing the breakwall or by other engineering methods stop the erosion and polluting of the Linwood Park Beach.

e. RESPONSE:

The alternative of removing the breakwater is discussed and evaluated with respect to its relationship to harbor maintenance activities in the section entitled "Modification of the Harbor Structures" (paragraphs 6.35 through 6.39). It has been determined that while this course of action would probably reduce the level of shoaling (and therefore maintenance costs and short-term dredging-related environmental effects) in the lake approach channel, removal of the existing breakwater would diminish or eliminate the ability of the total project to achieve its ongoing objectives (enhancement of commercial fishing, recreation, and navigation activities; provide a harbor of refuge) as well as reducing or negating the benefits that the Vermilion Port Authority has attributed to the presence of the structure. In view of the long-term qualitative benefits that would be lost if the structure were removed, the alternative of removing the existing breakwater for the singular purpose of reducing the scope of maintenance activities is not presently justifiable, and the alternative was not considered further.

f. COMMENT:

We are requesting to have our comments included in the Section 111 Study and final environmental impact report.

f. RESPONSE:

Your comments have been included in this Final Statement and the Section 111 Study report as requested.

Your comments on the Draft Statement for the maintenance of Vermilion Harbor are appreciated.

APPENDIX A

LETTERS OF COORDINATION

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

6 June 1975

Clyde R. Odin, Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
Room 301, Manley Miles Bldg.
1405 South Harrison Road
East Lansing, MI 48823

Dear Mr. Odin:

The Buffalo is currently preparing a Draft Environmental Impact Statement for maintenance activities conducted at Vermilion Harbor, Erie and Lorain Counties, OH. The on-going maintenance includes repair of the existing east and west piers and detached breakwater and dredging the existing lake approach, entrance, and river channels. Recent maintenance operations have included minor structural repairs on the east pier during the summer of 1974 and maintenance dredging of the entrance channel in the spring of 1975. As in the past, future maintenance activities will not entail any new work construction or dredging, and will be conducted on an as-needed basis. A map of the maintained structures and channels is inclosed for your reference.

In order to conduct a thorough environmental analysis of the proposed maintenance, and to integrate environmental considerations into maintenance scheduling, I would be most pleased if you would identify any significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. Your evaluation of the time and nature of major fish migration and spawning activities, the presence of any rare or endangered species, or other pertinent ecological factors that may be related to harbor maintenance would be most helpful in this respect.

NCBED-PE
Clyde R. Odin, Supervisor

I would appreciate receiving a written reply, outlining your reccomendations relative to fish and wildlife resources at Vermilion by 20 June 1975.

Sincerely yours,

Byron G. Walker

BYRON G. WALKER
Major, Corps of Engineers
Deputy District Engineer

Incl
as stated

United States Department of the Interior

IN REPLY REFER TO

FISH AND WILDLIFE SERVICE
DIVISION OF ECOLOGICAL SERVICES
Great Lakes Area Office
Room 301, Manly Miles Building
1405 South Harrison Road
East Lansing, Michigan 48823
June 18, 1975

Colonel Bernard C. Hughes
U.S. Army Engineer District,
Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

This is in response to Major Walker's letter of June 6, 1975, requesting information on fish and wildlife resources associated with planning maintenance activities at Vermilion Harbor, Erie and Lorain Counties, Ohio.

In the past, rainbow trout have been planted in the Vermilion River, however, due to the poor return rate, stocking will probably be discontinued.

Accordingly, we will have no objection to fall dredging, however, since the river does serve as a spawning area for smallmouth bass, we recommend that no dredging be conducted during the period May 1 through June 15.

Sincerely,

Clyde R. Odin
Supervisor

cc: Darrell Allison, Ohio DNR District 2
RO, Twin Cities, MN (ES)

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

6 June 1975

Robert W. Teater, Director
Ohio Department of Natural Resources
ATTN: Robert Lucas, Department of
Interagency Coordination
Fountain Square
Columbus, OH 43224

Dear Mr. Teater:

The Buffalo District is currently preparing a Draft Environmental Impact Statement for maintenance activities conducted at Vermilion Harbor, Erie and Lorain Counties, OH. The on-going maintenance includes repair of the existing east and west piers and detached breakwater, and dredging the existing lake approach, entrance, and river channels. Recent maintenance operations have included minor structural repairs on the east pier during the summer of 1974 and maintenance dredging of the entrance channel in the spring of 1975. As in the past, future maintenance activities will not entail any new work construction or dredging, and will be conducted on an as-needed basis. A map of the maintained structures and channels is inclosed for your reference.

In order to conduct a thorough environmental analysis of the proposed maintenance, and to integrate environmental considerations scheduling, I would be most pleased if you would identify any significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. Your evaluation of the time and nature of major fish migration and spawning activities, the presence of any rare or endangered species, or other pertinent ecological factors that may be related to harbor maintenance would be most helpful in this respect.

I would appreciate receiving a written reply, outlining your recommendations relative to fish and wildlife resources at Vermilion by 20 June 1975.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
Major, Corps of Engineers
Deputy District Engineer

A-5

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

ODNR
Ohio Department of Natural Resources
Fountain Square · Columbus Ohio 43224 · (614) 466 3770

June 24, 1975

Major Byron G. Walker
Deputy District Engineer
Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

RE: Rocky River Harbor, Ohio

Dear Major Walker:

This is in reply to your separate inquiries regarding fish and wildlife resources that should be considered in the planning of maintenance activities at Rocky River and Vermilion harbors.

Our Division of Wildlife recommends that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be done during October and November when salmon are moving through these harbor areas.

Sincerely,

Robert W Teater

ROBERT W. TEATER
Director

RWT:eas

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

15 May 1975

Dr. Thomas H. Smith
State Historic Preservation Officer
Ohio Historical Center
Interstate 71 and 17th Avenue
Columbus, OH 43211

Dear Mr. Smith:

The Buffalo District is currently preparing a Draft Environmental Impact Statement for maintenance activities conducted at Vermilion Harbor, Erie, and Lorain Counties, OH. The ongoing maintenance includes repair of the existing east and west piers and detached breakwater and dredging the existing lake approach, entrance, and river channels. Recent maintenance operations have included minor structural repairs on the east pier during the summer of 1974, and maintenance dredging of the entrance channel in the spring of 1974 and the spring of 1975. As in the past, future maintenance activities will not entail any new work construction or dredging and will be conducted on an as-needed basis. A map of the maintained structures and channels is inclosed for your reference.

In order to evaluate the environmental impacts of the subject maintenance activities upon cultural resources. I have reviewed the National Register supplements, dated 11 March 1975 and 6 May 1975 and have determined that the Vermilion Town Hall, 736 Main Street is a National Register property that is within the maintenance activities' area of potential environmental impact. In accordance with the Advisory Council on Historic Preservation's procedures for the protection of historic and cultural properties as outlined in 39 F. R. 3366, I have applied the criteria of effect (paragraph 800.8) and have determined that the District's maintenance activities at Vermilion Harbor will not cause a change in the quality of the above cited property. This determination is based on the fact that the Town Hall is located approximately 1,000 feet southwest of the nearest maintained channel area and is separated from the site of potential maintenance operations by a developed urban environment that will generally preclude the introduction of any visual, audible, or atmospheric elements that may alter the property's setting. Maintenance dredging in the Vermilion River channel is not expected to destroy, alter, isolate, or in any other way affect the property or its setting.

NCBED-PE
Dr. Thomas H. Smith

Furthermore, because the subject activities involve only the removal of recently accreted shoal material in existing channels and the repair of existing structures, it is my opinion that an indepth cultural resources field survey of the project area is not warranted. Harbor maintenance activities are confined to existing, authorized project areas and do not entail any new work that could disturb unidentified sites or artifacts.

I would be most pleased if you would review the above determinations, and any appropriate archaeological, historical, architectural, or other cultural resource studies that your office may have knowledge of; and, based on your review, recommend whether or not further action, concerning cultural resources, is necessary. I would appreciate receiving a written reply by 26 May 1975.

Sincerely yours,

Byron G. Walker

BYRON G. WALKER
Major, Corps of Engineers
Deputy District Engineer

Incl
as stated

May 21, 1975

Byron G. Walker
Major, Corps of Engineers
Deputy District Engineer
Buffalo District
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Re: Vermilion Harbor, Ohio
Draft EIS

Dear Major Walker:

Thank you for your letter of May 15 describing the above project and its expected effects upon cultural resources.

We concur with your finding that the maintenance activities at Vermilion Harbor will not affect any National Register properties. Further, it is our opinion that there are no further cultural resources in the project area which might be affected by the project.

We feel that further action regarding cultural resources is not necessary. Thank you for the opportunity to make this review.

Sincerely,

Thomas H. Smith
State Historic Preservation Officer
Director, Ohio Historical Society

Ohio Historic Preservation Office
Ohio Historical Center I-71 & 17th Avenue Columbus, Ohio 43211 (614) 466-8727

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

15 May 1975

Merril D. Beal, Regional Director
Midwest Region
National Park Service
U. S. Department of the Interior
1709 Jackson Street
Omaha, NB 68102

Dear Mr. Beal:

The Buffalo District is currently preparing a Draft Environmental Impact Statement for maintenance activities conducted at Vermilion Harbor, Erie, and Lorain Counties, OH. The ongoing maintenance includes repair of the existing east and west piers and detached breakwater, and dredging the existing lake approach, entrance, and river channels. Recent maintenance operations have included minor structural repairs on the east pier during the summer of 1974 and maintenance dredging of the entrance channel in the spring of 1974 and the spring of 1975. As in the past, future maintenance activities will not entail any new work construction or dredging and will be conducted on an as-needed basis. A map of the maintained structures and channels is inclosed for your reference.

In order to fully evaluate the environmental effects of the maintenance activities upon cultural resources, I would be most pleased if you would identify any elements located within the activities' area of potential environmental impact that are presently included or are eligible for inclusion in the National Landmarks Program.

The Buffalo District is currently in consultation with the Ohio State Historic Preservation Officer as part of an evaluation of cultural resources in the Vermilion Harbor area.

I would appreciate receiving a written reply by 26 May 1975.

Sincerely yours,

Byron G. Walker

BYRON G. WALKER
Major, Corps of Engineers
Deputy District Engineer

Incl
as stated

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7619 MWR CE

MAY 23 1975

Major Byron G. Walker
Corps of Engineers
Deputy District Engineer
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

This will respond to your letters of May 15 concerning maintenance proposals at Rocky River Harbor and Vermilion Harbor, Ohio.

In projects such as these, our principal concern is for potential adverse effects upon cultural resources at dredge spoil disposition sites; and since these sites are not identified in the graphics, we cannot assist you. Please review our letters to your office of April 2, and September 5 (two letters), 1974, for more detailed information in these regards.

We are a little puzzled with your references to the National Landmark program in relation to cultural resources. There are three categories of landmarks: historic, natural and environmental education. Only the historic are classed as cultural resources. We wonder if your reference is actually to the National Register of Historic Places. If so, your attention is respectfully invited to the Advisory Council on Historic Preservation, Procedures for Compliance, Part 800.4(a), published in the Federal Register February 4, 1975, Volume 40, Number 24.

In summary, if your reference is, in fact, to the National Landmark program, we shall require the specific data noted above and in previous responses to similar proposals. If

your reference is to National Register properties, it is incumbent upon your office to search the record. The record is published in the Federal Register issue noted above and in supplements thereto.

If we can be of any further assistance in our area of jurisdiction, please do not hesitate to call upon us.

Sincerely yours,

Robert L. Giles

Robert L. Giles
Acting Regional Director

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

4 June 1975

Robert L. Giles, Acting Regional Director
Midwest Region, National Park Service
U. S. Department of the Interior
1709 Jackson Street
Omaha, NB 68102

Dear Mr. Giles:

Thank you for your letter of 23 May 1975 concerning the Buffalo District's inquiries of 15 May 1975 on maintenance activities at Rocky River and Vermilion Harbors, OH.

As requested in your letter, we have inclosed maps showing the locations of the disposal sites that will be used for the deposition of harbor dredgings removed during maintenance activities at the Rocky River and Vermilion project areas. The District is currently in consultation with the U. S. Environmental Protection Agency (EPA), Region V concerning the suitability of dredgings from these harbors for open-lake disposal. Pending EPA's recommendations, which are expected to be available in July 1975, maintenance dredgings from Rocky River that are determined to be unpolluted will be deposited in one of the harbor's two open-lake disposal areas (shown on Inclosure 1), and dredgings that are determined to be polluted will be deposited in a confined disposal site at Cleveland Harbor (shown on Inclosure 2). Similarly, unpolluted material from Vermilion will be deposited in the harbor's open-lake disposal site (shown on Inclosure 3), and polluted material will be deposited in a confined disposal site at Huron Harbor (shown on Inclosure 4).

Please notify this office if additional information is needed for your evaluation of the relationship between the above described disposal areas and elements that are presently included, or are eligible for inclusion, in the National Landmarks Program.

As noted in our 15 May 1975 letter, the Buffalo District is in consultation with the Ohio State Historic Preservation Officer as a part of an evaluation of the two harbors' archaeological, historical, architectural, and other cultural resources, particularly those that are listed, or are eligible

NCBED-PE
Robert L. Giles, Acting Regional Director

for listing, in the National Register of Historic Places. However, in preparing Environmental Impact Statements for Federal civil works projects, the Buffalo District has adopted a broad working definition of cultural resources, which includes not only archaeological, historical, and architectural elements, but also unique community events or areas. Specific elements that could be included in this definition are annual boat regattas, harbor festivals, and museums, as well as significant natural and environmental education landmarks of the type included in the National Landmark Program. Therefore, my letter of 15 May 1975 addressed natural and environmental education sites as elements that constitute resources in a community's total cultural setting.

I trust that this clarifies our use of the term cultural resources in relation to such sites. If I can be of additional assistance in your evaluation of natural and environmental education sites that may be affected by the maintenance of Rocky River and Vermilion Harbors, please let me know.

Sincerely yours,

Incl
as stated

Byron G. Walker
BYRON G. WALKER
Major, Corps of Engineers
Deputy District Engineer

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7619 MWR CE

JUN 27 1975

Major Byron G. Walker
Deputy District Engineer
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

We are pleased to respond to your letter of June 4, 1975 (File NCBED-PE), which enclosed maps of disposal sites for operation and maintenance activities at Rocky River and Vermilion Harbors, Ohio.

None of the proposed activities would adversely affect any existing or proposed unit of the National Park System or any National Landmark.

Sincerely yours.

Merrill D. Beal

Merrill D. Beal
Regional Director

JOHNNY HORIZON 76

ODNR
Ohio Department of Natural Resources
Fountain Square · Columbus Ohio 43224 · (614) 466-3770

May 28, 1975

Byron G. Walker, Major
U.S. Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

This is in reply to your letter of 15 May 1975 concerning the Corps ongoing maintenance activities at Vermilion Harbor, Ohio.

To our knowledge there are no conflicts with objectives of existing or proposed land used plans, policies and regulations.

Sincerely,

Robert W. Teater

ROBERT W. TEATER
Director

RWT:eas

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

JUL 15 1975

Colonel Bernard C. Hughes
District Engineer
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

Enclosed for your information is our report on the bottom sediment survey conducted at Vermilion, Ohio on April 9, 1975.

Sediments lakeward of the beach are suitable for unrestricted disposal. Sediments in the channel between the small boat harbor and the beach are suitable for open lake disposal subject to the conditions recommended in the report. Sediments upstream from the small boat harbor are not suitable for open lake disposal and require diked disposal or disposal on land.

Further details on this classification and a map showing the location of each zone are included in the report.

As we obtain additional data on Lake Erie harbors, we will send you the necessary information to keep your reports up-to-date.

Sincerely yours,

Christopher M. Timm, Director
Surveillance and Analysis Division

Enclosure

VERMILION, OHIO

REPORT ON THE DEGREE OF POLLUTION OF BOTTOM SEDIMENTS

1975 HARBOR SEDIMENT SAMPLING PROGRAM

APRIL 9, 1975

U.S. Environmental Protection Agency
Region V
Great Lakes Surveillance Branch

DISCUSSION OF RESULTS

Sediments from stations VER 75-3, 4 and 5 are primarily sand with more than 50% being retained on a #200 sieve (Table III). These samples are characterized by low concentrations of organics and oil and grease with low to moderate concentrations of metals (Table II). Sediments from the area lakeward of the beach are suitable for unrestricted lake disposal. This confirms the results of a special survey done by the Corps of Engineers on May 21, 1974 where a shoal of clean sands was found in the vicinity of station VER 75-3.

Sediments from station VER 75-2 are primarily silt. Sediment from station VER 75-1 is a mixture of very coarse gravel 49% and silt 36%. Both are clearly affected by polluted material from further upstream. They have moderately high concentrations of organics (volatile solids, COD, TKN) and zinc. Concentrations of oil and grease, mercury, and lead are low. Concentrations of the supplementary parameters are moderate or low. Sediment from this area between the beach line and the first lagoon (see map) is suitable for restricted open lake disposal. If it is not contained in a diked disposal area it should be dredged first and covered over by the clean material further out in the channel.

Sediments from station VER 75-6 and 7 are primarily silts and are characterized by high concentrations of volatile solids, TKN, and COD. The zinc concentrations are also elevated. Concentrations of mercury, lead, and oil and grease are lower, however. Concentrations of ammonia, phosphorus, and iron are substantially higher than in the other samples. This confirms the results of a survey done by the Ohio District Office of EPA on March 29, 1973 which found heavily polluted sediments in the Vermilion River. All material upstream from the first lagoon is heavily polluted and is not suitable for open lake disposal.

Elutriate tests were run on samples VER 75-1 and VER 75-5. The elutriate-lake water ratios were 16.7 for ammonia and 158 for manganese at VER 75-1. The ratio was 22.6 for ammonia and 258 for manganese at VER 75-5. The elutriate results were somewhat higher at VER 75-5 than at VER 75-1 in spite of the fact that the bulk sediment shows VER 75-1 to be more polluted. This may be explained by the high percentage of very coarse material at VER 75-1.

The benthic biota is dominated by pollution tolerant oligochaetes at all stations. The low populations found at stations VER 75-3 and 5 probably reflect the low concentrations of organics and a harsh sandy substrate rather than toxic conditions. Higher oligochaete populations are found at VER 75-1 and 2 where the concentrations of organics are higher.

The lower populations at VER 75-6 and 7 where the sediment is silty and provides a better substrate could reflect toxicity.

TABLE I
FIELD OBSERVATIONS

HARBOR: Vermilion

STATE: Ohio

SAMPLED: April 9, 1975

STATION NO.	DEPTH (ft.)	OBERSERVATIONS				GENERAL REMARKS
		COLOR	SAMPLE DESCRIPTION	ODOR	OIL	
VER-1	19'	Brown	Mostly small weathered stones with thin layer of sandy silt	Slight Fishy	None	Some organic detritus
VER-2	18'	Brown	Silty sand (sample mostly water)	None	None	Some organic detritus
VER-3	15'	Brown	Sand and stones with some silt	None	None	
VER-4	16'	Brown	Sand with streaks of clay	None	None	
VER-5	16'	Brown	Sand	None	None	
VER-6	10'	Gray with thin brown surface layer	Silt with some sand	Slight Septic	None	
VER-7	14'	Greenish-gray w/brown surface layer	Silt with some fine sand	Fishy	None	
VER-8	18'	Brown	Silty sand	None	None	Some organic detritus

TABLE II
BULK SEDIMENT RESULTS

HARBOR: Vermilion, Ohio

SAMPLED: April 9, 1975

Parameter	VER 75-1	VER 75-2	VER 75-3	VER 75-4	VER 75-5	VER 75-6	VER 75-7	VER 75-8
Total Solids	46.0	45.0	44.6	60.0	61.8	37.6	43.5	56.9
Volatile Solids	6.5	5.7	4.0	4.7	3.3	7.5	7.4	4.9
Chem.Oxy.Demand	72000	71000	48000	43000	36000	80000	76000	55000
T. Kjel. Nitrogen	1700	1800	1000	1100	740	2200	2400	1400
Oil-Grease	<500	700	<500	<200	400	700	900	<500
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	29	27	29	22	16	28	34	22
Zinc	125	150	135	110	120	165	240	140
T. Phosphorus	520	640	440	380	370	860	900	490
Ammonia Nitrogen	87	170	46	90	60	200	350	120
Cyanide	<1.0	—	—	—	<1.0	--	—	--
Phenols	< 2	--	—	--	2	--	--	--
Manganese	340	440	540	430	390	390	450	400
Nickel	39	41	46	37	32	45	68	41
Arsenic	15	17	16	12	11	19	16	12
Barium	90	110	130	100	71	110	150	120
Cadmium	< 1	< 1	2.2	< 1	< 1	< 1	2.3	< 1
Chromium	28	41	25	27	27	62	52	34
Magnesium	4600	6800	7900	6700	7900	5300	5500	4700
Copper	21	30	31	23	21	29	38	21
Iron	23,900	27,700	26,200	20,400	19,600	31,100	38,800	24,200

All values mg/kg dry weight unless otherwise noted

TABLE III
SIEVE ANALYSIS RESULTS

HARBOR: Vermilion, Ohio

SAMPLED: April 9, 1975

Sediment Size Analysis by Percent at Each Station

Sieve No. and Description	VER 75-1	VER 75-2	VER 75-3	VER 75-4	VER 75-5	VER 75-6	VER 75-7	VER 75-8
Retained on #10 Medium Gravel and larger	49	7	19	7	4	6	7	5
Retained on #20 Fine Gravel	6 (55)	3 (10)	9 (28)	2 (9)	3 (7)	4 (10)	3 (10)	4 (9
Retained on #60 Medium and Coarse Sand	4 (59)	8 (18)	16 (44)	32 (41)	21 (28)	15 (25)	8 (18)	9 (18)
Retained on #200 Fine Sand	5 (64)	8 (26)	13 (57)	13 (54)	27 (55)	14 (39)	6 (24)	12 (30)
Passing #200 silts and clays	36 (100)	74 (100)	43 (100)	46 (100)	45 (100)	61 (100)	76 (100)	70 (100)

TABLE IV
ELUTRIATE TEST RESULTS

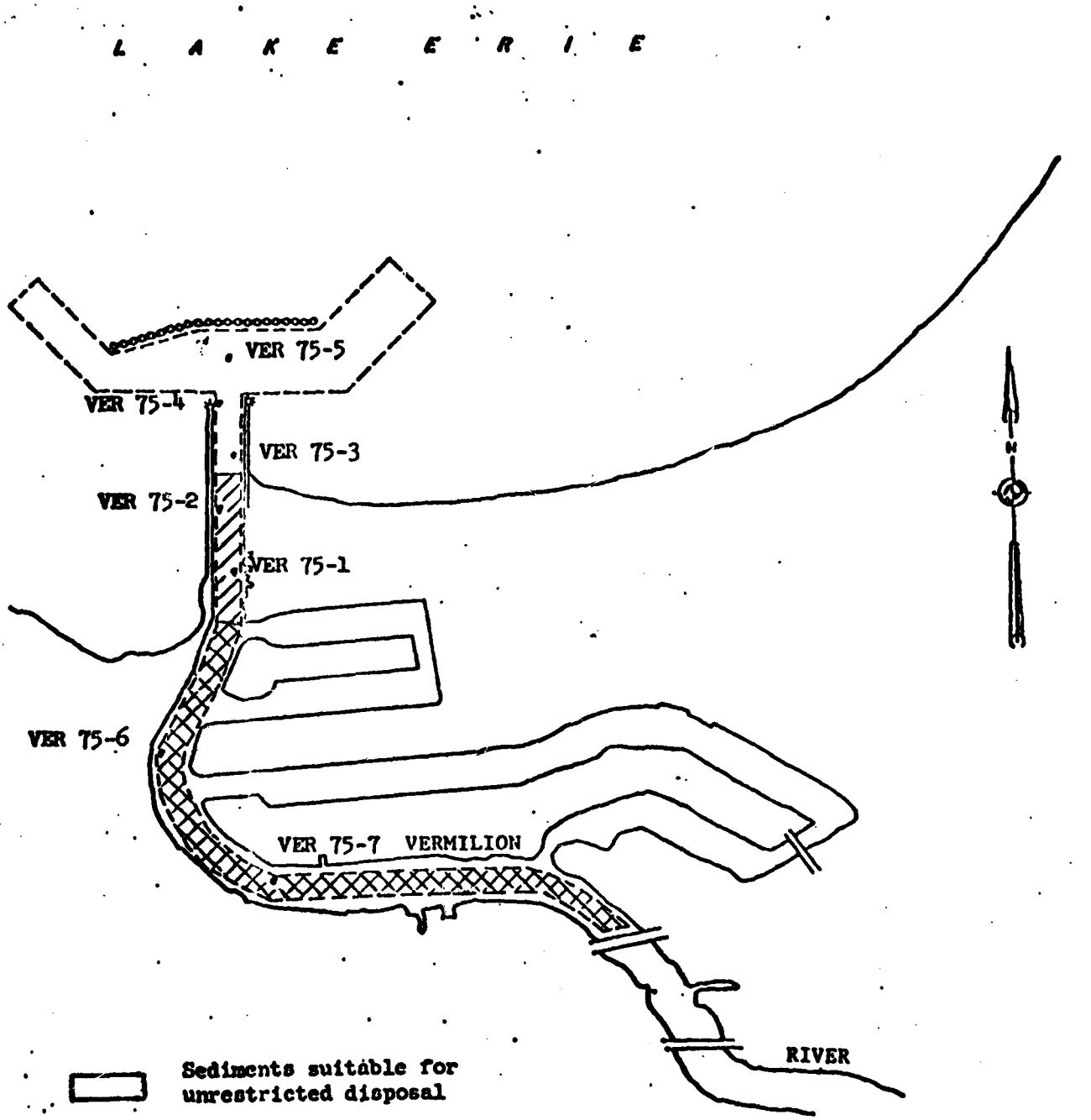
HARBOR: Vermilion, Ohio

SAMPLED: April 9, 1975

EVALUATED PARAMETER		WATER FROM DISPOSAL SITE	Elutriate Water Using Sediments at Each Station			
			VER 75-1	Elut/Lake	VER 75-5	Elut/Lake
Chem. Oxy. Demand	(mg/l)	10	74	7.4	94	9.4
T. Kjel. Nitrogen	"	0.53	5.50	10.4	7.08	13.3
Ammonia Nitrogen	"	0.20	3.33	16.7	4.52	22.6
T. Phosphorus	"	0.019	0.043	2.3	0.039	2.0
Cyanide	"	3	5	1.6	6	2
Phenols	(µg/l)	5	23	4.6	31	6.2
Arsenic	"	< 2	3	>1.5	5	>2.5
Barium	"	<50	<50	--	<50	—
Cadmium	"	<0.2	<0.2	--	<0.2	—
Chromium	"	1	1	—	1	—
Copper	"	3	3	—	3	—
Iron	"	<20	70	>3.5	80	> 4
Lead	"	2	2	—	2	—
Manganese	"	< 5	790	>158	1290	>258
Mercury	"	<0.1	0.1	--	0.1	—
Zinc	"	< 5	10	> 2	5	--
Aluminum	"	<200	<200	—	<200	—

TABLE V
BIOLOGICAL RESULTS

	VER 75-1	VER 75-2	VER 75-3	VER 75-4	VER 75-5	VER 75-6	VER 75-7
Diptera							
Procladius sp	2	7				1	
Chironomus sp	2	3			2	1	1
Crypto chironomus sp	1	1					
Ephemeroptera							
Hexagenia limbata		11					
Oligochaeta							
Limnodrilus sp	407	240	38	220	53	130	188
Tubifex sp		5		1		3	
Branchiura sowerbyi		2				1	1
Gastropoda							
Ferrissia sp			1				
Bithynia tetaculata				28			
Isopoda							
Asellus sp				1			
Amphipoda							
Gammarus					1 (poor cond)		
Total Organisms	412	264	39	250	56	137	190
Total Taxa	4	7	2	4	3	6	3



Sediments suitable for unrestricted disposal

Sediments suitable for restricted lake disposal

Sediments not suitable for open lake disposal

1975 SEDIMENT SAMPLING STATIONS

U.S. ENVIRONMENTAL PROTECTION AGENCY

GREAT LAKES SURVEILLANCE BRANCH

April 9, 1975

VERMILION HARBOR

OHIO

SCALE OF FEET

The Firelands Community Bank

MAIN OFFICE
357 MAIN STREET
HURON, OHIO 44839
PHONE (419) 433 5170

BERLIN HEIGHTS OFFICE
24 MAIN STREET
BERLIN HEIGHTS, OHIO 44814
PHONE (419) 588-2095

REPLY TO:
Huron, Ohio

September 27, 1975

Major Byron G. Walker
Deputy District Engineer
Buffalo District, Corps of Engineers
Department of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

Under separate cover I have mailed my comments and a slight correction to the Draft Environmental Impact Statement on Vermilion Harbor.

What prompts me to write you is that our home is adjacent to the West pier. For years there has been clamoring for access to the West pier, and this situation has now gotten to the point where the City Council has authorized a plan to provide public access to the West pier.

My question to you is this, what's the attitude of the Corps of Engineers toward the public being on the West pier? As you know, this will present many problems. From the City's point of view, it will mean additional parking congestion at the foot of Main Street in front of the Great Lakes Museum. For us adjacent to the pier, it will be the problem of the public, their litter, their urination, their defecation. For the Corps of Engineers, it will mean driftwood fires on sandstone, with its shattering of the stones.

As for a walkway on the pier, the section of the pier that was repaired after the 1969 flood is a jumble of rock, and the rest of it has hazardous cracks and openings.

It is obvious how I feel toward opening access to the West pier. I am anxious to know what would be the reaction of the Corps of Engineers if we should accede or be compelled to sell land which would cause public access.

Cordially,

Theodore D. Wakefield
Chairman of the Board

"We Like Working for Your Interest"

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

10 October 1975

Mr. Theodore D. Wakefield
Chairman of the Board
The Firelands Community Bank
Main Office
357 Main Street
Huron, OH 44839

Dear Mr. Wakefield:

Thank you for your letter of 27 September 1975 concerning the U.S. West Pier at Vermilion Harbor.

Since this is a Federal project, public access should be provided if at all possible. The Corps encourages multipurpose uses of harbor structures, such as the Vermilion piers and breakwater, wherever it is consistent with views and policies of local interests.

As indicated in your letter there is an apparent conflict between the City Council's plan to provide public access to the U.S. West Pier and your views, as a shoreline homeowner, regarding increased public use of the adjacent area. It is not appropriate for the Corps to intercede or attempt to resolve issues that involve disagreements between local interests. These disagreements should be resolved at the local level.

I trust that this letter clarifies the position of the Corps of Engineers in this matter.

Sincerely yours,

BERNARD C. HUCHES
Colonel, Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

29 January 1976

Dr. Robert W. Teater, Director
Ohio Department of Natural Resources
Fountain Square
Columbus, OH 43224

Dear Dr. Teater:

This letter concerns determination of the most suitable time of the year to accomplish maintenance dredging at Vermilion Harbor, OH.

Mr. Kenneth Orth, of my environmental staff, has informed me of an apparent error in your letter of 24 June 1975 concerning critical fishery periods at Vermilion Harbor, OH, and their relationship to scheduling harbor dredging. Your letter indicated that your Division of Wildlife "recommends that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be done during October and November when salmon are moving through these harbor areas."

In a 27 January 1976 telephone conversation between Mr. Orth and Mr. Carl Mosley of your staff, Mr. Mosley indicated that the above statements concerning spring bass movements and fall salmon movements are not applicable to Vermilion Harbor. Mr. Mosley stated that an in-house ODNR memo of 19 June 1975 contained the correct information for Vermilion. The memo recommended that no dredging be conducted between 1 May and 15 June, due to a smallmouth bass spawning migration from Lake Erie into the Vermilion River, or in late June or July, because channel catfish, bullheads, and shovelhead catfish may enter the river to spawn.

In view of the above revised information on the harbor's fisheries, and the objections of local interests to summer dredging in the vicinity of public and private beaches, I propose to conduct future routine maintenance dredging operations in the authorized Federal channels at Vermilion Harbor between 15 September and 15 December. Dredging during this period will avoid major potential interference with the harbor's critical fishery activities identified in the 19 June 1975 ODNR memo. Fall dredging will also minimize potential conflicts with swimming and recreational boating in the harbor and adjacent areas. Please note that the fall dredging

period constitutes a change from the proposed summer dredging period that was discussed in my Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, dated September 1975. The revised dredging period will not affect either the expected duration (six weeks) or frequency (about once every three years) of future, routine maintenance operations as described in the Draft Statement.

Inasmuch as I am currently completing the Final Environmental Impact Statement for Vermilion Harbor maintenance, I would appreciate receiving your final recommendations on my proposed 15 September through 15 December maintenance dredging schedule for Vermilion. In order to incorporate your views into the Final Statement, I would appreciate receiving a written reply no later than 13 February 1976.

Thank you for your continuing cooperation with the Buffalo District.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

ODNR
Ohio Department of Natural Resources
Fountain Square · Columbus, Ohio 43224 · (614) 466-3770

February 5, 1976

Colonel Bernard C. Hughes, District Engineer
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

This is in reply to your letter of January 29, 1976 regarding the dredging schedule for Vermilion Harbor.

It appears there is some confusion on fish migration not only for Vermilion Harbor but Rocky River and Huron Harbor as well. I believe the following statements prepared by our Division of Wildlife will clear the air on all three harbors.

> Huron Harbor - we recommend no dredging be done from April 23 through June 7 to protect migrating smallmouth bass and white bass. We also recommend no dredging be done from October 1 through November 30 to protect migrating salmon.
>
> Rocky River - we recommend no dredging be done from September 15 through April 15 to protect migrating rainbow trout. However, because of the anticipated adverse impact on general recreation, due to dredging activities extending through the month of May, we will concur that maintenance dredging be initiated on 7 April 1976.
>
> Vermilion Harbor - we recommend no dredging from May 1 through June 15 to protect smallmouth bass spawning migrations and from June 24 through July 24 to protect spawning migrations of channel catfish, bullheads and shovelhead catfish.
>
> Our general recommendation in all cases of dredging is to utilize methods which minimize turbidities.

We have no objection to your proposed Fall dredging of the Vermilion Harbor from 15 September through 15 December.

We regret the mix-up in our own internal paper handling. Please accept our apologies.

Sincerely,

ROBERT W. TEATER
Director

RWT:bl

cc: Bob Lucas
Carl Mosley

APPENDIX B

GLOSSARY OF TERMS

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GLOSSARY OF TERMS

AEROBIC	Refers to life or processes occurring only in the presence of free oxygen; refers to a condition characterized by an excess of free oxygen in the aquatic environment.
ALGAE	General name for chlorophyll-bearing organisms in the plant subkingdom Thallobionta.
ALLUVIUM	Soil material, such as sand, silt, or clay, that has been deposited on land by streams.
ANAEROBIC	Refers to life or processes occurring in the absence of free oxygen; refers to conditions characterized by the absence of free oxygen.
AQUIFER	A formation, group of formations, or a part of a formation that is water bearing.
BACKWATER	A creek or arm of the sea near to and parallel to the coast, and communicating with the sea by barred entrances. A water reserve obtained at high tide and to be discharged at low tide for clearing off deposits in channel beds and tideways.
BEDROCK	A layer of solid rock overlain by soil and rock fragments.
BENTHIC	Relating to or occurring at the bottom of a body of water.
BENTHOS	Organisms that live on or in the bottom of bodies of water.
BIOTA	All life of a region.
BOD	Biochemical oxygen demand; a water quality parameter which specifies the amount of oxygen needed by organisms while consuming organic material in the water.
BRACHIOPODA	A phylum of solitary, marine, bivalved coelomate animals.

BREAKWATER	Any barrier placed at the mouth of a river, estuary, etc. to form a harbor or to break the force of waves and protect shipping, docks, etc.
CAMBRIAN	The lowest geologic system that contains abundant fossils of animals, and the first (earliest) geologic period of the Paleozoic era from 570 to 500 million years ago.
CENOZOIC	The youngest of the era, extending from the end of the Mesozoic Era (65 million years ago) to present.
CFS	Cubic feet per second - rate of fluid flow at which 1 cubic foot of fluid passes a measuring point in 1 second.
CHLORINATION	The process of adding chlorine to drinking water for disinfection purposes. Wastewater may also be disinfected by chlorination before release to a surface water.
CLADOCERAN	Member of an order of small freshwater branchiopod crustaceans, commonly known as water fleas, characterized by a transparent bivalve shell.
CLIMAX VEGETATION	Final or stable vegetation communities in a successful series which are more or less in equilibrium with existing environmental conditions and composed of a definite group of plant species. Loosely, climax community.
COAMING	A raised border around an opening in a deck.
COD	Chemical oxygen demand; a parameter of water quality which specifies the quantity of oxidizable material in a water sample.
COLIFORM	Group of bacteria, primarily inhabitants of the human digestive tract, indicators of pollution.
COMMUNITY	All forms of life inhabiting a common environment.
COPEPOD	A macroinvertebrate in the order of Crustacea.
DEMOGRAPHIC	Pertaining to the nature and description of populations.
DEVONIAN	The fourth period of the Paleozoic Era.

DIATOMS	A number of related microscopic algae, one-celled or in colonies - these species can be used as biological indicators of water quality.
DIP (Geology)	The angle that a stratum or fault plane makes with the horizontal. Also known as angle of dip; true dip.
DIVERSITY	Pertaining to the variety of species within a given association of organisms. Areas of high diversity are characterized by a great variety of species; usually relatively few individuals represent any one species. Areas with low diversity are characterized by a few species; often relatively large numbers of individuals represent each species.
D.O.	Dissolved oxygen; the amount of oxygen dissolved in water. Approximately 4 to 14 parts per million dissolved oxygen are required to support game fish.
DREDGE	A floating barge or vessel equipped with equipment for removing earthen material from the bottom of a body of water.
DRIFT	In geology, material carried from one place to another, normally by a glacier or flowing stream.
ECOLOGY	The study of the relationship of organisms to their environment.
ECONOMIC	BASE The sum of all activities that result in the receipt of income in any form by the inhabitants of a specified area. These activities might range from agriculture or manufacturing to government services, retailing or distribution.
ECOSYSTEM	A community including all the component organisms, together with the environment forming an interrelated system.
EFFLUENT	An outfall of water from a particular source.
EMERGENT	Rooted under the water, but having the stem, leaves and flowers exposed above the water.
ENVIRONMENT	All the conditions, circumstances, and influences surrounding and affecting the development of an organism or group of organisms.

ESTUARY	A semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with freshwater.
EUTROPHICATION	Of bodies of water, the process of becoming better nourished either naturally by processes of maturation or artifically by fertilization.
FAUNA	The animal life inhabiting a specific area.
FETCH	The distance traversed by waves without obstruction. An area of the sea surface over which seas are generated by a wind having a constant speed and direction.
FISCAL YEAR	A twelve month period used for fiscal purposes; does not always coincide with a calendar year.
FLORA	The plant life inhabiting a specific area.
FOOD WEB	The passage of energy and materials from producers through progressive sequences of plant-eating and meat-eating consumers.
FRY	Young fish; small adult fish, especially when in large groups.
HABITAT	The sum total of environmental conditions of a specific place that is occupied by an organism, a population or a community.
HERPTILE	General classification for group belonging to either the reptile or amphibian species.
HISTORICAL	References to features generally consisting of structures or site locations which are relevant to an event, person, or period specifically commemorative to previous generations.
HOPPER	An enclosed chamber in a hopper dredge, in which dredged material is temporarily stored during dredging operations.
HYDROLOGY	A science dealing with the properties, distribution and circulation of water on the surface of land, in the soil, and underlying rocks, and in the atmosphere.
IGLD	International Great Lakes Datum.

ISOPLETH	A line drawn through points on a graph which a given quantity has the same numerical value (or occurs with the same frequency) as a function of the two coordinate variables. Also known as isorithm.
JACK	A male salmon, any of several fishes.
LACUSTRINE	Deposits that range from fine clays to sand. They were derived from glaciers and deposited in glacial lakes by water originating mainly from the melting of glacial ice. Many are interbedded or laminated.
LAGOON	A shallow lake or pond, especially one connected with a larger body of water.
LITTORAL	Of or relating to the shore of a lake or ocean.
LITTORAL CURRENT	A current which approximately parallels the shore of a lake.
LITTORAL DRIFT	Suspended material such as sands or silts which are transported and deposited by a littoral current.
LWD	Low water datum or chart datum is a fixed reference plane selected by the United States and Canada, so that the majority of the time during the navigation season on the Great Lakes actual levels will be above that plane. The LWD for Lake Erie is 568.6 feet above mean water level at Father Point, Quebec, International Great Lakes Datum.
MACRO	Large.
MACROINVERTEBRATE	An animal lacking a backbone and internal skeleton.
MESOZOIC	A geological era from the end of the Paleozoic to the beginning of the Cenozoic; commonly referred to as the Age of Reptiles.
METAVOLCANIC	Partly metamorphosed volcanic rocks.
MGD	Million gallons per day, units used to express the rate of flow of a liquid.
MICRO	Small.
MICROINVERTEBRATE	An animal lacking a backbone and internal skeleton.

MIGRATION CORRIDOR	A well defined broad aerial pathway used by migrating birds, especially waterfowl, to and from their breeding grounds. Also called a migratory flyway.
MIGRATORY FLYWAY	See migration corridor.
MORAINE	An accumulation of earth, stones, and other debris deposited by a glacier. Types are these: terminal, lateral, medial, ground.
MSL	Mean sea level.
NUTRIENTS	Chemical elements essential to life, particularly referring to nitrogen, phosphorus and carbon.
OMNIVORE	An organism that eats both animal and vegetable matter.
OMNIVOROUS	Eating any sort of food, especially both animal and vegetable.
ORDOVICIAN	The second system and period of the Paleozoic era; younger than Cambrian and older than Silurian, approximately 425 to 500 million years old.
PALEOZOIC	The era of geologic time between the late Pre-Cambrian and Mesozoic eras, comprised of the Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian and Permian systems; approximately 230 to 600 million years ago.
pH	A measure of the number of hydrogen ions in a solution, if the pH exceeds 7 the solution is considered to be basic, if less than 7 it is acidic.
PHOTOSYNTHESIS	The metabolic process by which simple sugars are manufactured from carbon dioxide and water by plant cells using light as an energy source.
PHYTOPLANKTON	Planktonic life belonging to the plant kingdom.
PIONEER SPECIES	An organism that is able to establish itself in a barren area and begin an ecological cycle.
PLANKTONIC	Free floating.
PLEISTOCENE	The earlier of the two epochs of the Quaternary period, also called Glacial epoch and formerly called Ice Age. Generally synonymous with Quaternary.

PREEN	To clean and trim (the feathers) with the beak to make (oneself) trim, to dress up or adorn.
PRIMARY CONSUMER	In the food web, animals which feed on vegetation.
RUBBLE MOUND	A type of structural design and construction consisting of a structural core of small stones with an exterior wall of larger, roughly dressed stones.
SCOUR	To abrade and wear away. Used to describe the wearing away of terrace or diversion channels or stream beds.
SECONDARY TREATMENT	Wastewater treatment in which bacteria consume the organic parts of the wastes. This biochemical action is accomplished by use of trickling filters or the activated sludge process. Customarily, disinfection by chlorination is the final stage of the secondary treatment process.
SEDIMENT	Material that settles on the bottom of a body of water.
SEICHE	A periodic oscillation of a body of water whose period is determined by the resonant characteristics of the containing basins as controlled by the physical dimensions. These periods generally range from a few minutes to an hour or more.
SEISMIC	Pertaining to or produced by an earthquake.
SHALES	A general term for lithified muds, clays, and silts, that are fissile and break along planes parallel to the original bedding.
SHOAL	An area on the bottom of a body of water where sand, rock or other material has accumulated, decreasing water depths in the area.
SILURIAN	The fifth system and period of the Paleozoic Era; younger than Ordovician and older than Devonian, approximately 405 to 425 million years ago.
SLUDGE	A soft or muddy bottom deposit as on tideland or in a stream bed. Any semi-solid waste from a chemical process.
SMSA	Standard Metropolitan Statistical Area.

SOIL ASSOCIATION	A group of soils geographically associated in a characteristic repeating pattern.
SOIL SERIES	A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.
SPECIES	An organism or organisms forming a natural population, or groups of populations that transmit specific characteristics from parent to offspring. Each species is reproductively isolated from other populations with which they might breed. Hybrids, the results of interbreeding, usually exhibit a loss of fertility.
STEEL SHEET PILING	Steel wall sections which are interlocked and driven into the harbor bottom, forming an impermeable wall around a harbor structure.
SUBSTRATUM	Any layer underlying the true soil.
SUCCESSION	The evolutionary process of species development through time by modifying and being modified by the physical environment in which the species grows. Example: pond, grassland, woods.
TILL	Stiff, stony, unstratified glacial drift forming poor subsoil relatively impervious to water.
TOE STONES	Large, bearing stones placed along the base of a rubble mound structure.
TURBIDITY	The condition of a body of water that contains suspended material such as clay or silt particles, dead organisms, or their parts, or small living plants and animals.
UBIQUITOUS	Present, or seeming to be present, everywhere at time; existing everywhere, omnipresent.
UNDERSTORY	The plants of a forest undergrowth; broadly; any underlying layer of low vegetation.
USCGS	United States Coast and Geodetic Survey (later known as National Oceanic and Atmospheric Administration).
ZOOPLANKTON	Planktonic organisms belonging to the animal kingdom.

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APPENDIX D

MAINTENANCE EQUIPMENT AND METHODS
VERMILION HARBOR, OH

Introduction

D.01 Maintenance activities at Vermilion Harbor consists of operations to maintain authorized depths in navigation channels and the repair of the harbor structure. Each of these general types of activities is accomplished through a specific series of tasks using suitable maintenance equipment. The following sections describe the various maintenance activities and equipment that are employed in the maintenance of Vermilion Harbor. Quantitative measurements of vessel dimensions, vessel capacities, dredging costs, and other characteristics of maintenance equipment and methods, as presented in this appendix, are typical conditions presented for general comparative purposes. Specific characteristics are dependent upon the specific vessels used by, or available to, contractors bidding on government contracts for the work, available Government plant, and the exact nature of harbor conditions at the time of maintenance operations.

Channel Maintenance

General

D.02 The maintenance of authorized harbor navigation channels generally consists of a sounding survey, a sweep survey, channel clearing, and dredging and disposal operations. Discussions of the nature of each of these activities, and the equipment used during each activity, are presented in the following sections.

Sounding Survey

D.03 Prior to the removal of channel shoals by dredging operations, authorized navigation channels are inspected by the Corps to determine the location and amount of sediment deposition. An initial inspection is conducted with the use of sounding equipment installed on a small survey launch. Survey launches are small inboard, outboard, or inboard-outboard craft, similar to a recreational pleasure boat, with average dimensions of 20 feet in length, 7 feet in width, and 2 feet in draft. As the launch cruises the project channels, the channel depths are recorded, by the sounding equipment, at established channel reference points. The sounding survey generally takes about one week to complete but may require more time if adverse weather is encountered. Upon completion of the survey, recorded sounding information is used to prepare harbor maps that display the predredging channel depths in the project area. Maps from past sounding surveys at Vermilion Harbor are available for review at the Buffalo District Office.

Dredging

D.04 After the navigation channels have been surveyed, shoal areas, in which sediment accretions have accumulated and decreased

channel depths to less than authorized depths, are dredged to attain project depths. Dredging operations at Vermilion Harbor may be accomplished by either a mechanical or a hydraulic dredge. The following section briefly describes these types of dredge plants.

D.05 Mechanical dredges excavate channel bottom sediments by an arrangement of machinery on board a vessel that pushes, pulls or other-wise forces a container (normally termed a bucket) into the sediments in a manner to fill the container with the sediments. Once filled, the container (bucket) is lifted by the dredge machinery above the surface of the water where the sediments are placed or dumped into a vessel apart from the dredge (normally a scow alongside) and transported to the site selected for disposal. Many variations exist in the arrangements of dredge machinery. Specific types of mechanical dredges that may be used for maintenance dredging at Vermilion Harbor are the clamshell and dipper dredges. General information about the operating and performance characteristics, dimensions and operating costs of clamshell and dipper dredges are presented in Tables D.1 and D.2. Corps derrickboats can be converted to clamshell dredges by replacing stone-handling apparatus with a clamshell bucket. General characteristics of a derrickboat are similar to those presented in Table D.1.

D.06 Hydraulic dredges excavate channel bottom sediments by either hydraulically or mechanically dislodging the sediments, and by accumulating and transporting the sediments within a moving stream of water contained within a steel pipeline. Motor or engine driven pumps (one or more) are used to maintain the flow of the water in the pipeline. The pipeline may be several thousands of feet in length in order to convey the dredged material to an upland or other suitable disposal site; or a short pipeline may deposit the dredged material in a container either on board the dredge or on another vessel, usually a scow, for transport of the dredged materials by means of the container to a disposal site. Hydraulic dredges are categoriezed under descriptive names, such as cutterhead (cutter suction), dust pan, hopper, sidecasting and sand suction, which describe some prominent feature of that dredge type. The specific type of contract hydraulic dredge that may be used at Vermilion is the cutterhead or cutter suction type. The use of other hydraulic dredge types for work in Vermilion is not feasible because the dredge type is either not available on the Great Lakes or the dimensions of existing contract dredges prevent the dredges from entering and working within Vermilion Harbor. The operating and performance characteristics, dimensions and operating costs of a typical cutterhead dredge are presented in Table D.3.

D.07 Materials removed by a mechanical or cutterhead dredge are often transported to a disposal site in scows. A scow is a low-lying, flat-bottomed vessel with typical dimensions of 130 feet in length, 30 feet in width, and 10 feet in draft when loaded. Its carrying capacity

Table D.1

General Characteristics: Clamshell Dredge

Type of Dredge: mechanical

Description: A low-lying, flat-bottomed vessel; equipped with a clamshell bucket suspended by cables from a forward-extending, rotating boom assembly.

Typical Dimensions: 120 foot length, 50 foot width, 6 foot draft

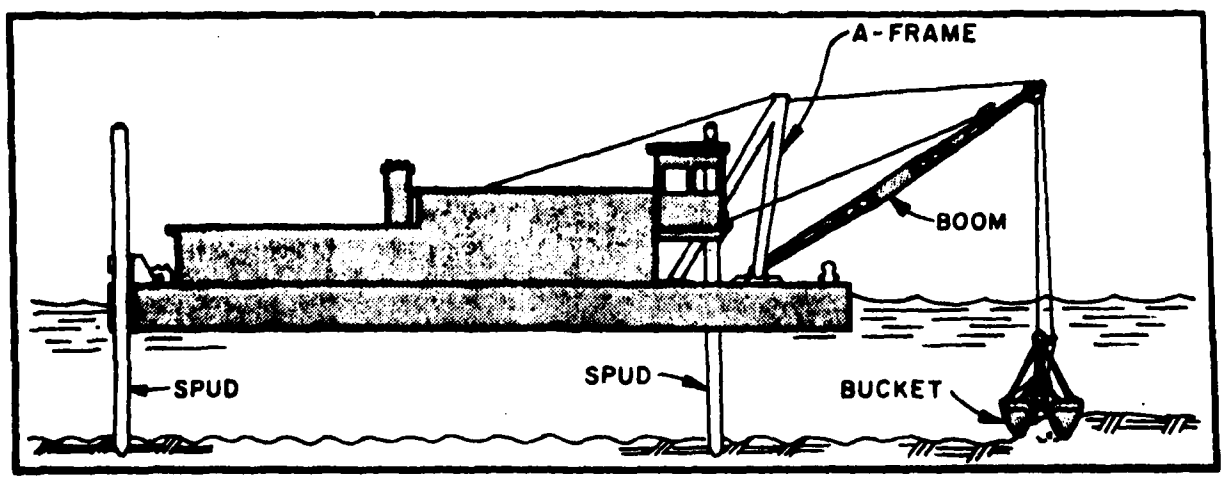
Mobility: Moved and maneuvered by a tug; moved by operation of spuds or winches while dredging.

Dredging Suitability: Best suited for excavating soft or cohesive materials; useful for deep digging and for dredging in confined areas alongside structures.

Means of Dredging: The open clamshell bucket is lowered onto the shoal material. As the bucket jaws are closed, material is scooped into the bucket. The filled bucket is then raised above water level; moved, on the rotating boom, into position over a dump scow; and opened to release dredgings into the scow.

Dredging Capacity: Dependent upon bucket size, depth of cut, and material dredged; may range up to 400 cubic yards an hour when excavating soft, light-weight material with a special 12 cubic yard, light-weight bucket.

Dredging Costs: Generally in the range of $2.00 to $4.00 per cubic yard of material excavated. Costs are dependent on many factors such as size of bucket, dredge horsepower, type of material being dredged, location of disposal site, availability of scows and many similiar items.



Clamshell Dredge

Table D.2

General Characteristics: Dipper Dredge

Type of Dredge: mechanical

Description: A low-lying, flat-bottomed vessel; equipped with a dipper bucket mounted on a forward-extending, rotating boom assembly.

Typical Dimensions: 120 foot length, 50 foot width, 6 foot draft

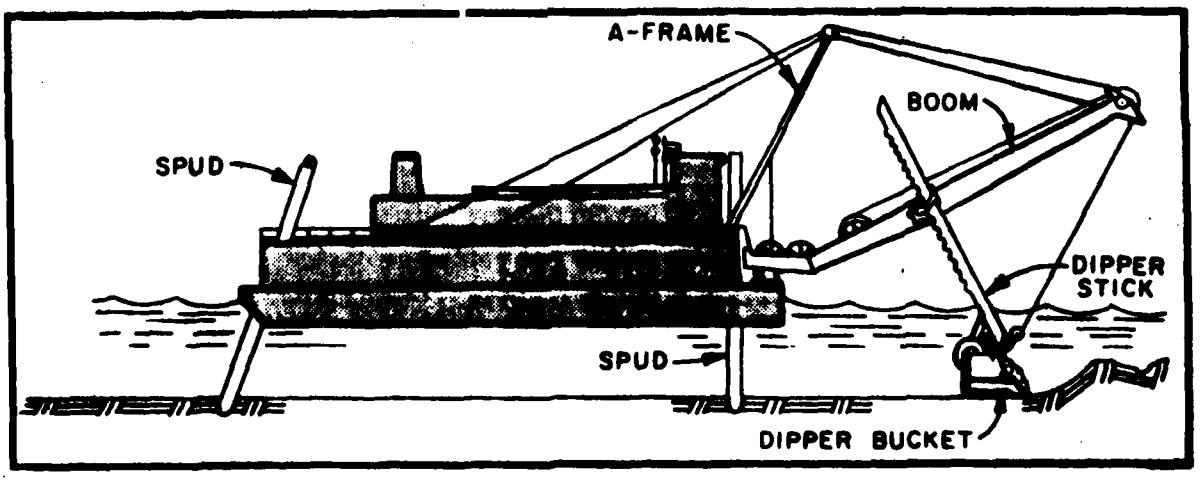
Mobility: Moved and maneuvered by a tug; moved by operation of spuds or winches while dredging.

Dredging Suitability: Useful for dredging hard compacted material, including some types of ledge rock.

Means of Dredging: The dipper bucket is lowered onto the shoal, and, as its raised, its open edge cuts through the shoal and scoops material into the bucket. The filled bucket is raised above water level, moved on the rotating boom into position over a dump scow, and tipped forward to dump material into the scow. A variation of the dipper dredge, often called a backhoe, digs or scoops in the reverse direction i.e. toward the dredge.

Dredging Capacity: Dependent upon bucket size, depth of cut, and material dredged; may range up to 400 cubic yards an hour.

Dredging Costs: Generally in the range of $3.00 to $5.00 per cubic yard; dependent upon dredging capacity of an individual dredge.



Dipper Dredge

Table D.3

General Characteristics: Cutterhead Dredge

Type of Dredge: hydraulic, pipeline

Description: A low-lying, flat-bottomed vessel; equipped with a revolving cutterhead surrounding the intake end of a submerged, forward-extending suction line.

Typical Dimensions: 100 foot length, 30 foot width, 6 foot draft

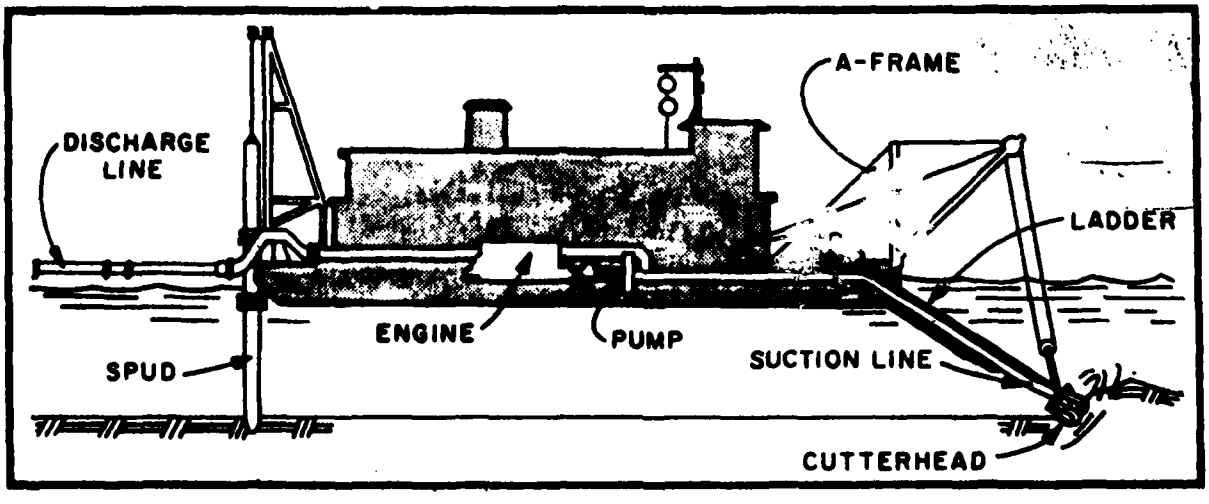
Mobility: Moved and maneuvered by a tug; moved by operation of spuds or winches while dredging.

Dredging Suitability: Used most frequently for dredging soft or loose materials where final disposal can be accomplished within the range of the discharge pipeline. Many variations exist involving such things as changes in the type of cutterhead and providing additional pumps in the pipeline system.

Means of Dredging: The revolving cutterhead breaks through and loosens shoal material, which is drawn up through the suction line. The cutterhead is swept across the shoal as the dredge moves ahead into the cut. Material drawn through the suction line is pumped, through a discharge line, into a dump scow.

Dredging Capacity: Dependent upon horsepower of pumping and cutterhead machinery, sizes and length of pipeline, nature of dredgings, and other factors; may range up to 600 cubic yards an hour.

Dredging Costs: About $1.00 per cubic yard of material; dependent upon dredging capacity of an individual dredge.



Cutterhead Dredge

is about 1,100 tons. Scows configured for carrying dredged materials are usually provided with internal hoppers, which contain the material for transport. Like many other maintenance vessels, a scow requires a tug to provide mobility to and around the work area.

D.08 Because the scow is not equipped with a means for self-propulsion, its operation requires the use of an auxiliary vessel to provide mobility. In most cases, a tug is used to tow the scow. The tug is small, yet powerful, and is capable of both moving and directing the course of other vessels in harbor and open-lake waters. It is equipped with a marine engine that uses between 300 and 500 gallons of diesel-marine fuel in a routine work week. Average tug dimensions vary from 45 to 110 feet in length and 13 to 26 feet in width; the keel draft, when loaded, varies between 5 and 12 feet. A tug is generally used to transport the scow and other non-self-propelled vessels, across open-lake waters between harbors. Depending upon the draft of the particular xug in use, it may also be used to tow or push other vessels, such as a scow, barge, dredge, or derrickboat, when operating in the harbor.

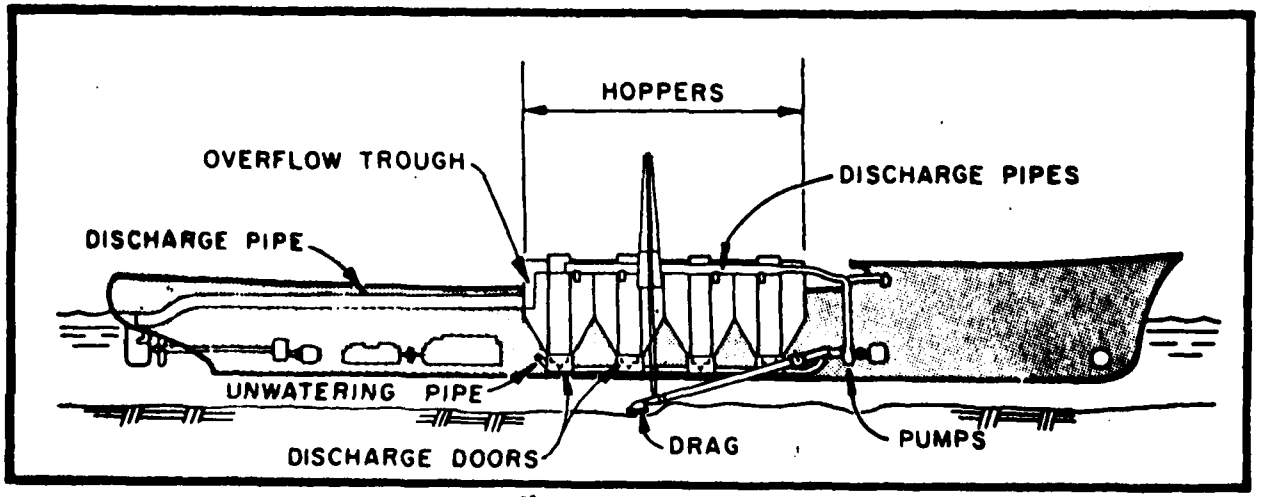
D.09 Dredging in the 12-foot navigation channels at Vermilion Harbor will be accomplished by one of the Buffalo District's smaller hopper dredges whenever feasible. A hopper dredge is essentially a self-propelled ship. Hopper dredge sizes range from 1,000 ton river and lake dredges to larger 5,000 ton seagoing ships that are capable of operating in a variety of waterways. Great Lakes hopper dredges usually operate 24 hours a day, six day a week from mid-March until mid-December, when lake ice prevents dredging. A hopper dredge is powered by diesel-electric engines that supply electric power for the propulsion motors, the dredge pumps, and the ship's support systems. The specific type of fuel used to generate power differs among dredges, but DF No. 2 and diesel-marine fuels are the most common types in use.

D.10 Dredging machinery onboard a hopper dredge, as shown on Table D.4, consists of one or mord pumps located in the vessel's hold. The pumps, together with connecting suction and discharge pipelines, enable the dredge to remove sediments from the harbor bottom and to deposit these sediments in the hoppers onboard the dredge. Each pump is provided with one or two suction pipes which lead out through the side of the hull to a flexible connection that permits raising and lowering the external portion of the suction pipe. The trailing suction pipes terminate at dragheads that remain near the harbor bottom while the vessel is underway and dredging. There is no mechanical agitation of bottom materials during the dredging process except for occasional draghead pressure; rather, the process depends on the rush of water around the edges of the draghead to scour the material being removed from the harbor bottom and to transport the material into the suction pipe. Generally, the draghead creates a trough in the bottom sediment as the vessel moves through the channel. The trough arda is refilled as adjacent sediment sinks into

Table D.4

General Characteristics: Buffalo District Hopper Dredges

Vessel	U. S. Dredge HOFFMAN	U. S. Dredge LYMAN
Overall Length	215'-10-1/2"	215'-10'1/2"
Width	40'-4"	40'-4"
Light Draft	9'-8"	9'-11"
Loaded Draft	12'-9"	13'-0"
Loaded Displacement (long tons)	2,134	2,180
Number of Hoppers	4	4
Total Capacity of Hoppers (cubic yards)	920	920
Maximum Dredging Depth	36'	36'
Total Pumping Power (HP)	410	410
Diameter of Suction Pipe	18"	18"
Length of Suction Pipe	60'	40'
Light Speed (MPH)	14.1	13.6
Loaded Speed (MPH)	13.1	12.6
Average Daily Performance (cubic yards)	10,000	10,000



Hopper Dredge

the cleared area in the wake of the dredge. Pumping continues while the ship is underway at slow speed in navigation channels and while the dragheads slide over the sediments to be dredged. The dredgings are discharged into onboard hoppers where they settle, while fines and excess water overflow at the top of the hoppers. Usually the first 15 minutes of a dredge cycle can be accomplished without overflow. Dredging continues until an economical load has been accumulated in the hoppers, which generally takes about 30 minutes. The pumps are then shut down, and the dredge travels to the disposal site.

P.11 During open-lake disposal, the dredge is brought to a complete stop at the disposal area, and the hoppers' contents are released through hopper doors (located about 13 feet below the lake surface) situated in the vessel's hull, on either side of the keel. After the dredged material has been discharged, and while the vessel is still stationary, a minimal amount of hopper washout may be performed to keep equipment operational. This stationary disposal process is generally accomplished in between five and eight minutes. In recent years, the District's hopper dredges have been equipped with piping through which the hoppers can be pumped out into an enclosed disposal site. In this pump-out operation, the dredge is tied up to a mooring and its discharge pipe is connected to a pipeline, through which the sediments flow into a disposal area that would otherwise be inaccessible to the dredge.

D.12 Hopper dredges are not equipped with cutter heads and are more efficient in removing a thin layer of sediment covering extensive areas than other types of dredges. The size of a hopper dredge is usually expressed as its hopper capacity in cubic yards. Its actual rate or performance is based upon the length of time required to fill the hoppers, and travel time to and from the disposal site. The rates of performance change with the character of the disposal site. The rates of performance change with the character of the material dredged, the pumping rate, and vessel speed. Information about the Buffalo District's small hopper dredges (U. S. Dredge HOFFMAN and U. S. Dredge LYMAN) that could operate in the 12-foot channels at Vermilion Harbor is presented in Table D.4.

Disposal of Dredged Material

D.13 Once the scow or hopper dredge has been filled with an economical load of dredgings, the materials are transported to the selected disposal site. The method used to remove the dredged material from a scow is dependent upon the disposal site and the type of scow being used. Some scows are equipped with doors in the bottom of their hull that can be opened over an open-lake disposal site to release contained material. Others are built in two sections that may be swung apart to release material at an open-lake site. Disposal into a confined

site is accomplished by pumping dredgings, through a connecting pipeline, from the scow into the site, or removing with a clamshell dredge. These latter methods for disposal into a confined site will be used for Vermilion Harbor materials deposited in the Huron diked disposal facilities. Deposition of dredgings from a hopper dredge is accomplished as previously described.

D.14 Dredging operations, involving the tasks of removing, transporting, and disposing of shoal material, continue until authorized channel depths have been reached. The duration of such activities is dependent upon the volume and physical composition of dredgings, the type of equipment used, weather and wave conditions, and other factors that may influence operational efficiency. Upon completion of dredging operations, a post-dredging survey, using a survey launch, is conducted to determine depths in maintenance-completed channels.

Sweep Survey

D.15 After dredging and disposal operations, the Corps undertakes a sweep survey to locate large objects, such as displaced stones or discarded vehicles that may have been deposited in harbor channels. The survey is conducted by a sweep float, which is basically a pontoon-supported craft with approximate overall dimensions of 60 feet in length, 20 feet in width, and 1 foot in draft. A series of iron bars, which are suspended from the float's deck by cables, are placed in the channel at a depth equal to the authorized channel depth. The vessel is then towed across the project area, and, by contact between the suspended bars and submerged objects, determines the location of any large, heavy objects that cannot be removed by dredging equipment. The locations of any identified obstructions are either marked on a harbor map for future removal, or immediately marked by a buoy if removal equipment is readily available. The float is pushed by either a shallow-draft tug or a survey launch.

Channel Clearing

D.16 Large obstructions that may be identified during the sweep survey are removed from the navigation channel and disposal is accomplished according to the character of the object removed. Vehicles are placed on docks on landings where local authorities can make appropriate accounting and disposition. Stones are placed on harbor structures or removed to a location outside of the maintained channels where they are not a navigation hazard.

D.17 The channel clearing operation is accomplished by a derrickboat, which is a low-lying, flat-decked vessel equipped with a boom-type crane. Derrickboats are typically 120 feet long, 50 feet wide, and have

about a 6 foot draft, when loaded. The lifting capacity of derrickboat cranes ranges from 25 to 70 tons, depending on the particular type of crane installed on the vessel. A derrickboat is usually towed to the work site by a tug, and may be maneuvered while working by the tug. The derrickboat utilizes two or three spuds as a means of anchorage or stabilization during operations. A spud is basically a cylindrical or rectangular post that extends vertically from above deck through the hull; the spud is lowered into the channel bottom to anchor the vessel. The derrickboat is moved by lifting the spuds and pushing the vessel with a tug, or by pulling the vessel by means of winches and cables anchored onshore.

D.18 Large materials that are lifted from the channel by a derrickboat are placed on a deck barge for transport from the project area. A typical deck barge is 120 feet long, 30 feet wide, has a draft, when loaded, of about 6 feet, and a total carrying capacity of approximately 675 tons. It is a low-lying, flat-bottomed vessel that is pushed to its destination, and moved across the project area, by a tug.

Structural Repair

D.19 Structural repair materials, such as stone and concrete supplies, may be transported to the harbor's east pier on a deck barge. Once materials have arrived at the work site, they are lifted and set in place on the damaged structure by a derrickboat. The derrickboat may also be used to salvage displaced structural materials, particularly large stones, and replace them on the structure. As previously noted, both the derrickboat and the barge require a tug to move and direct their courses. Descriptions of these vessels are presented in preceding sections of this appendix.

D.20 Because the east pier is accessible from the shore, it may be possible to accomplish repairs on the near-shore end using a land-based crane similar to the type of crane installed on a derrickboat. Repair materials may also be transported to the site in large heavy-duty trucks, such as a dump truck or a flat-bed truck, or in smaller vehicles such as a survey truck or pickup truck, depending on the type of materials to be removed.

Maintenance Personnel

D.21 The number of personnel onboard maintenance vessels is generally dependent upon each individual vessel's manpower requirements for safe and efficient operations. Typical vessel crew sizes are four on a survey launch and tug, six on a sweep float, and eight on a dredge and derrickboat. Corps hopper dredges have a crew of between 40 and 55, depending on the particular dredge in use. Each crew is comprised

of one or two officers (captain, mates, engineers) and several crewmen (deckhands, oilers, etc.). A normal work day often exceeds eight hours, and the work week usually consists of six days. Except in the case of Corps hopper dredges, most of the maintenance vessels that can be expected to be operating in Vermilion Harbor do not have regular onboard eating and sleeping facilities. Therefore, maintenance personnel obtain food, lodging, and other services and products from local businesses.

APPENDIX E

FIELD SURVEY OF VERMILION HARBOR
CLEVELAND ENVIRONMENTAL RESEARCH GROUP (CERG)
JULY, 1975

Vermilion Harbor Study Area

The lack of recent biological data concerning the Vermilion Harbor created the need for at least a single recent sample in the area. Therefore, on July 3, 1975 a set of Plankton, Benthos and Fisheries samples were collected by the personnel of CERG. It should be noted that these samples represent only a cursery investigation of the area and that there is no seasonal data on which to base any conclusions concerning the fluctuation of biological populations, especially the migratory fishes and phytoplankton populations. Benthic samples were collected only by grab samplers and therefore, those species which are located in the breakwall rock or on hard substrates within the study area will not be represented.

The following are the results of the samples collected in July, 1975.

Phytoplankton and Zooplankton:

Plankters were collected at two stations, See Map. Station I is located immediately outside the river channel and 100 meters East of the river mouth. Zooplankton was collected using a #10 net, 10 inches in diameter. Zooplankters were preserved on site, and counted in preservative. Results are expressed in number of individuals per liter. Vertical tows were made of approximately 4.5 M.

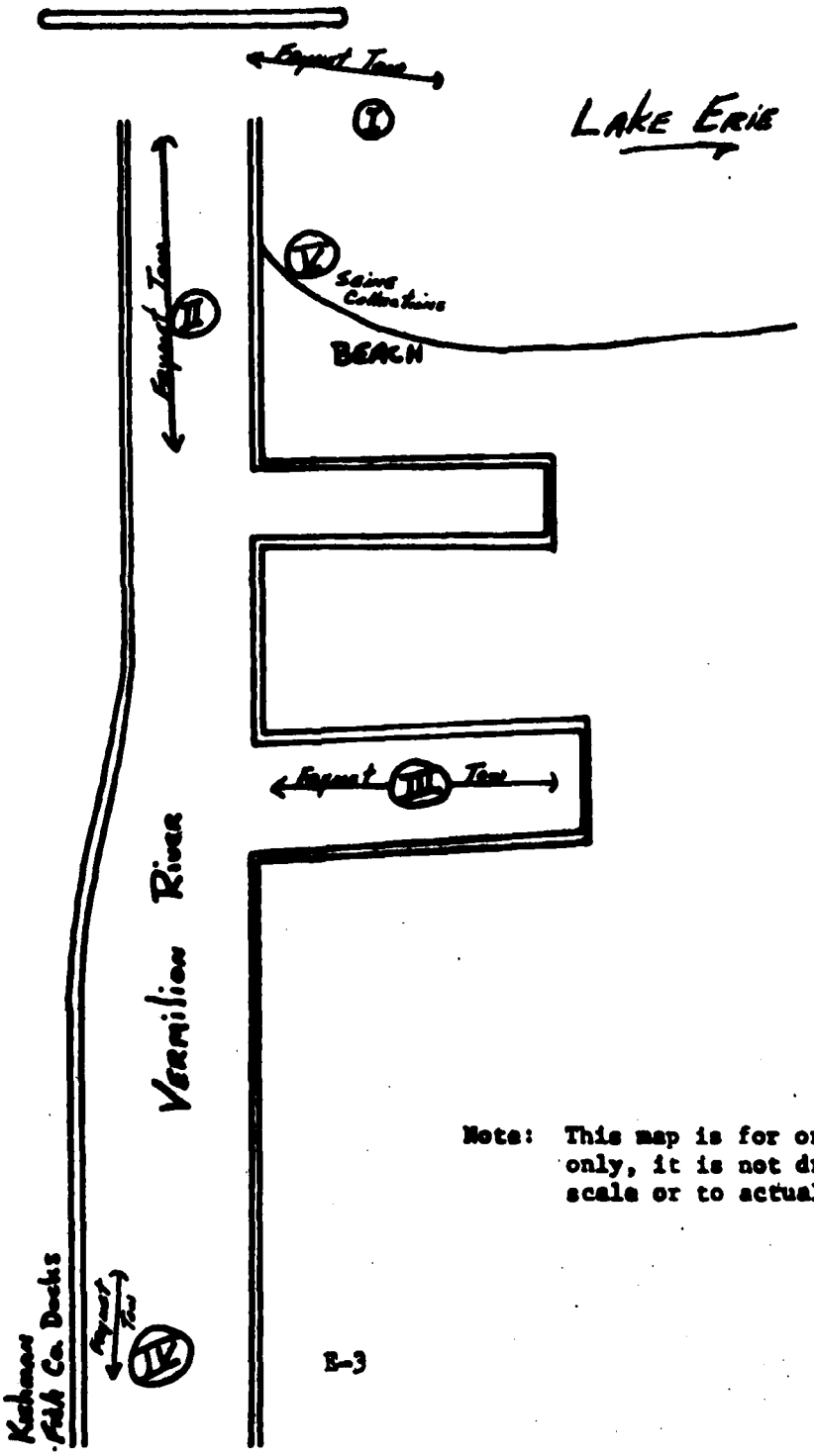
Phytoplankton was collected by subsample of water collections. 125 ml. was preserved in Lugols Iodine. Samples were counted with an inverted microscope and the results expressed in cells per liter. Samples for phytoplankton counts were collected near the surface of the water column, only at Station II.

In addition to the phytoplankton counts, larger colonial forms were also collected and identified. These are as follows and were present at both stations:

Anabaena flos-aquae

Aphanozomenon flos-aquae

Collection Stations; July 3, 1975 Vermilion, Ohio



Note: This map is for orientation only, it is not drawn to scale or to actual shape.

STATION II

Phytoplankton Vermil ion, Ohio Harbor Entrance July 3, 1975

The following counts were made using the Untermöhl inverted microscope technique. The samples were taken from surface waters near the entrance of the harbor (inside). The samples were fixed with Lugol's Iodine.

Organism	# cells/ liter
Green Algae	
Pediastrum simplex	1200
Pediastrum duplex	3600
Pediastrum boryanum	1000
Pediastrum tetras	1100
Coelastrum sp.	2700
Scenedesmus sp. (few each of several species)	700
Quadrigula sp.	200
Other Colonial Green Algae (Colonies in Matrix or other Coat)	4900
Desmids	
Staurastrum sp.	1300
Cosmarium sp.	500
Closterium sp.	100
Closteriopsis longissima	100
Diatoms	
Centric Diatoms (Mostly Stephanodiscus Niagarae)	3200
Tabellaria fenestrata (cells)	700
Fragilaria sp. (mm of colony)	250
Other Algae	
Ceratium hirundinella	100
Cryptomonas ovata and other small flagellates present in large numbers.	

STATION I

Zooplankton Vermil ion, Ohio Harbor Entrance (outside)

July 3, 1975

Organism	#./liter
Copepods	
Nauplius	4
Cladocerans	
Bosmina coregoni	60
Bosmina longirostris	3
Ceriodaphnia sp.	1
Rotifers	
Polyarthra vulgaris	8
Polyarthra euryptera	2
Trichocerca sp.	9
Keratella cochlearis	3
Kellicottia longispina	0.5
Asplanchna sp.	2
Monostyla sp.	1
Trochosphaera aequatorialis	0.5

Present in smaller numbers but identified

Few adult copepods

Aeolosoma niveum

STATION II

Zooplankton Vermil ion, Ohio Harbor Entrance (inside)

July 3, 1975

	Organism	# ./liter
Copepods	Diaphanasoma leuchtenburgianum	5
	Cyclopoid	8
	Calanoid	1
	nauplius	6
Cladocerans		
	Bosmina coregoni	35
	Bosmina longirostris	1
	Daphnia galeata	0.5
	Ceriodaphnia sp.	0.5
Rotifers		
	Polyarthra vulgaris	10
	Trichocerca sp.	8
	Keratella cochlearis	2
	Kellicottia longispina	0.5
	Brachionus sp.	0.5
	Asplanchna sp.	1.

Present in smaller numbers but identified

Leptodora kindtii

Daphnia pulex

Benthos of the Vermilion River area:

Two benthic samples were collected from the sediment on July 3, 1975 utilizing a Ponar grab with dimensions of 23 X 23 cm. Following collection, samples were screened and washed os site with a o.6 mm screen and preserved in buffered formalin. Upon return to the laboratory, specimens were sorted and classified tO genus utilizing standard taxonomic keys.

It should be noted that the benthic assemblages reported are reflective of the type of substrates sampled. While the Ponar is quite versitile, it fails to sample benthic organisms present in rock or breakwall areas. Mobile benthic organisms such as crayfish or amphipods may not be collected, even though they exist in large numbers and may form an important part of the available food for the fishery. Since a fair amount of breakwater rock and vertical bulkhead substrates exist in the study area, it is possible that a substantial portion of the benthic community has been neglected.

Estimates of Chironomidae given here are probably representative of yearly low values since emergences in the Lake Erie area occurred in late May to June. These hatches result in considerable reductions of the larval populations.

<u>STation I</u>

The substrate at this station consisted of largly clay and sandy materials Results of benthcs present indicated a low biomass dominated largely by Chironomidae of the genus <u>Procladius</u>. Although dry weights were not taken, it is estimated that over 75% of the biomass was of this organism. Based on the ratio of Tubificidae and Chironomidae, the area would be classified as one of light to moderately polluted substrates.

<u>Station II</u>

The substrate at this station consisted principally of plant detritus.

As with the previous station, this area would seem to be only lightly polluted. Results of benthic collections at these two stations are as follows:

Station I

Taxon	Density # / m^2	Relative Abundance %
Tubificidae		
immature without capilliform chaetae	151	17 %
Limnodrillus sp.	113	13 %
Peloscolex sp.	19	2 %
Chironomidae		
Procladius sp.	548	63 %
Chironomis sp.	38	4 %

Station II

Taxon	Density # / m^2	Relative Abundance %
Tubificidae		
Limnodrillus sp.	76	44 %
Hirudinea		
Helobdella sp/	19	12%
Chironomidae		
Procladius sp.	38	22 %
Gasteropoda		
Physa integera	38	22 %

Fishes of Vermilion Harbor area

Fishes were collected in conjunction with the benthic and plankton samples on July 3, 1975. Collections were made by seining at station V, and by frynet tows at stations I - IV. Additionally, specimens were observed both in the breakwall area and in the creels of sportsmen fishing at the mouth of the river. From these samples and observations, the following species of fishes have been documented as present in the area.

Alewife	Alosa psuedoharengus
Eastern Gizzardshad	Dorosoma cepedianum
Carp	Cyprinus carpio
Goldfish	Carassius auratus
Emerald Shiner	Notropis atherinoides
Spottail Shiner	Notropis hudsonius
Channel Catfish	Ictalurus punctatus
White Bass	Morone chrysops
White Crappie	Pomoxis annularis
Rock Bass	Ambloplites rupestris
Smallmouth Blackbass	Micropterus dolomeiui
Bluegill Sunfish	Lepomis macrochirus
Pumpkinseed Sunfish	Lepomis gibbosus
Yellow Perch	Perca flavescens
Freshwater Drum	Aplodinotus grunniens

Local sportsmen also report that Walleye, Coho Salmon and Largemouth Blackbass are also taken during certain periods of the year. In spite of the presence of these game species, there is only a small fishery in the river in the study area, principally because of two factors; (1) the main sport fishery is in the open lake from small boats and, (2) there is limited space which the public has access to in the area.

Collections of adults and fry, and discussions with local residents, and a cursory evaluation of the habitat present indicates that there is a limited amount of habitat diversity in the study area. The main river is channeled and bounded by vertical bulkheads of wood or steel. This type of habitat supports very little spawning of most game species. The most valuable habitat present

is that of the rock-lined channel breakwater and the sand beach to the east of the harbor entrance. The protected waters of the lagoons offers habitat for other species and is utilized as a nursery area. The river channel itself appears to be the least utilized area insofar as the fishery is concerned.

Collections of fry were taken with a one-meter fry net towed by an outboard motor boat. Collections have been adjusted to indicate the number of fry of each species per one minute of tow. The direction of tow is indicated on the enclosed map of the harbor area.

Station #	Species	Fry per minute	
I	Fish Eggs	12.0	
	Emerald Shiner	2.0	= 14.8
	Eastern Gizzardshad	0.4	
	Unidentified	0.4	
II	Emerald Shiner	0.8	
	Eastern Gizzardshad	107.6	= 110.0
	Unidentified	1.6	
III	Alewife	40.0	
	Eastern Gizzardshad	702.0	= 742.8
	Unidentified	0.8	
IV	Alewife	5.3	
	Eastern Gizzardshad	445.4	= 458.7
	Unidentified	8.0	
V(fry seine used)	Emerald Shiner	Several thousand	
	Spottail Shiner	Few hundred	

Chemical Data

Vermilion River July 3, 1975

Station I

Depth	Temperature	Oxygen	Conductivity
Surface	26 C	9 ppm	260 u mhos
1 meter	25.5	8.8	300
2 meter	25.0	8.7	300
3 meter	25.0	8.6	---
4 meter	24.5	8.3	---

Station II

Depth	Temperature	Oxygen	Conductivity
Surface	25.0 C	8.4 ppm	293 u mhos
1 meter	25.0	8.6	340
2 meter	25.0	8.6	340
3 meter	25.0	8.4	---
4 meter	24.5	7.4	---

A SURVEY OF AVAILABLE RECORDS OF BIRDS FROM THE MOUTHS OF THE ROCKY RIVER AND VERMILION RIVER, OHIO

Prepared for

Cleveland Environmental Research Group

by

Dr. E. Bruce McLean

11 July 1975

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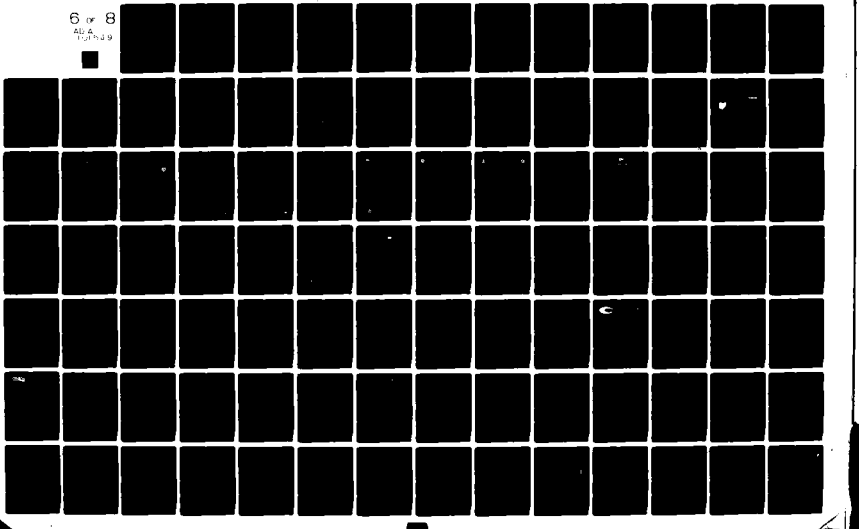


A. Introduction

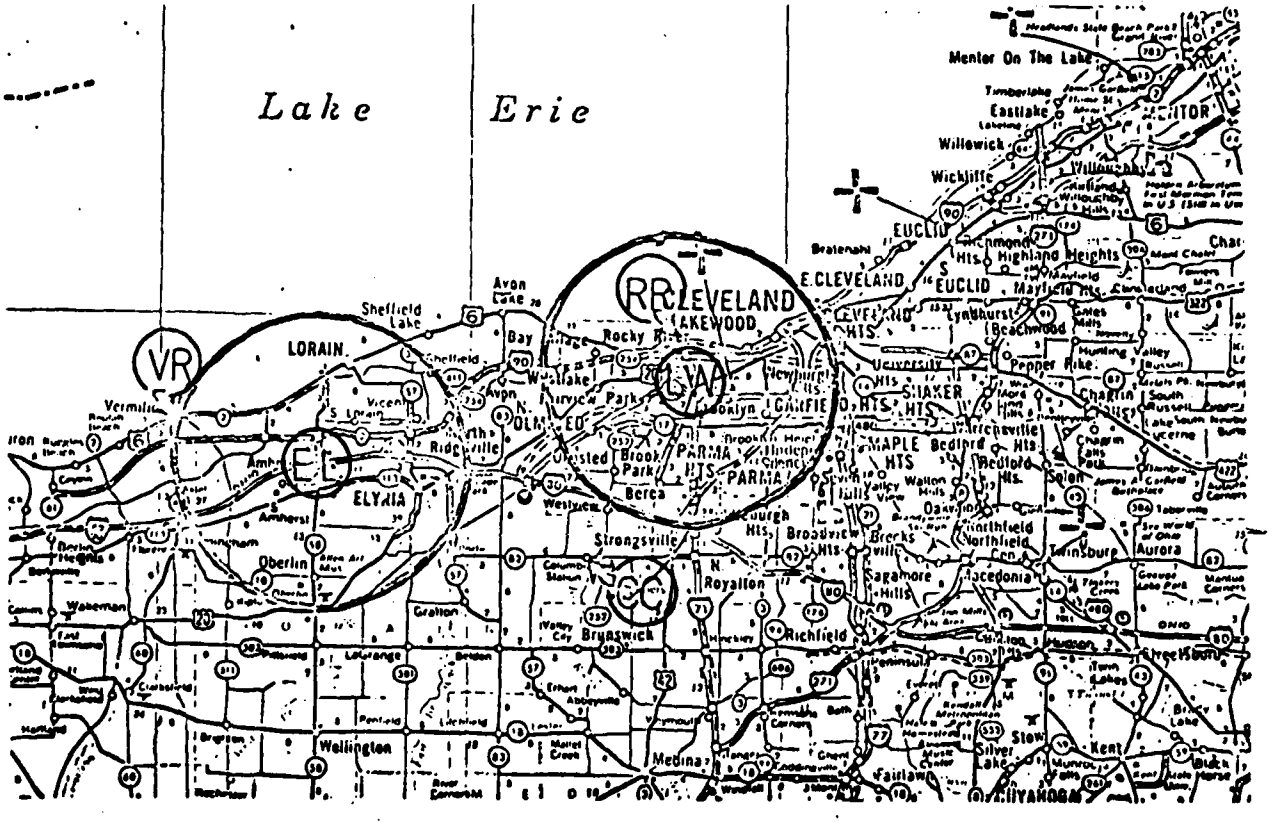
A search was made in the available literature and by personal communication with local observers to obtain information on the birds of the Rocky and Vermilion Rivers from United States Route 6 to their respective mouths and immediately adjacent waters of Lake Erie. The purpose of the study was to provide baseline data on avian populations prior to a proposed dredging project in the mouths of these rivers. No on-site work was performed at this time.

B. Literature

Some general references exist pertinent to the mouth of the Rocky River, and a few records were obtained from Williams (1959) and Newman (1969). Both authors surveyed the bird life within a thirty mile radius from Cleveland Public Square. Williams' work covers the period from 1796 through 1949, and Newman's from 1955 through 1966. The Cleveland Bird Calendar, a quarterly journal currently published jointly by the Kirtland Bird Club and the Cleveland Museum of Natural History, began publication in 1905, and contains detailed noteworthy occurrence records, observations on nesting and other behavior, and a review of each season, particularly migratory movements and population fluctuations. It covers the same area as the above publications. Nine years' issues of this journal, from Volume 62 (1965) through Volume 70 (1974) were examined. The Christmas Bird Count, published in American Birds, formerly Audubon Field Notes, includes three counts of interest. The Lakewood Count includes the mouth of the Rocky River, and the Elyria-Lorain Count terminates just east of the mouth of the Vermilion River (Figure 1). Data from the past ten years of these counts were summarized (Tables 1 and 2).

Figure 1

MAP OF THE AREA SHOWING THE RELATIONSHIP OF THE PROJECT SITES TO THE AREAS OF SOME PUBLISHED DATA PRESENTED IN THE TABLES



EL = 15-mile diameter circle of Elyria-Lorain Christmas Bird Count.

LW = 15-mile diameter circle of Lakewood Christmas Bird Count.

RR = Arrow indicating the mouth of the Rocky River.

VR = Arrow indicating the mouth of the Vermilion River.

CC = Arrow indicating the Columbia Center site on the West Branch, Rocky River, where Breeding Bird Censuses and Winter Bird Population Studies have been performed.

The Firelands Christmas Count area extends eastward to Chappel Creek, about five miles west of the mouth of the Vermilion River. Data from the Firelands count were not summarized, but may be found in recent issues of American Birds.

No breeding bird census information was found for the two areas, although Barber (1966,1967) censused a shrubby floodplain of the West Branch of the Rocky River near Columbia Center, 12.5 air miles south of the mouth. His area included swampy habitat, a lagoon, and areas subject to periodic flooding, and contained shrubby riparian vegetation. It is of dubious value in assessing river-mouth populations, but may be of some value in the most general sense. Barber (1970) also conducted a winter bird population study on this same area. His data are summarized in Tables 3 and 4.

The birds of the Lake Erie shoreline at a site to the east in Cleveland and at the mouth of the Chagrin River in Eastlake, have been recently studied (McLean, 1973, 1974).

The Trautmans' (1968) list of birds of Ohio and Hicks' (1935) study of Ohio breeding birds contain pertinent information. Journal articles pertinent to the region's bird life exist in addition to those mentioned above. Most are summarized in one or more of the above-mentioned books and are catalogued in Gerrick (1968).

C. Birds of the Vermilion River Mouth

The area near the mouth of the Vermilion River is occupied by a yacht club and housing built on old filled marshland. Little habitat other than lawns down to the bulkheaded shore exists outside the water itself, although Mallards nest on the lawns (Johnson, 1975; White, 1975). The primary

importance of the area is as a feeding and resting ground for water birds. The area is important in winter to waterfowl until it freezes. Virtually the only pertinent data available are the Christmas Census results from Elyria-Lorain, immediately to the east, summarized in Table 1. Note that the species marked with an asterisk as those most likely to occur near the river mouth comprise 45% of the species recorded during Christmas Counts for ten years, and 98% of the average number of individuals recorded each year. Since the lake-front species are confined to a relatively small fraction of the over 176 square mile census area, it may be seen that they make up a relatively important part of the winter bird fauna of the area. The high water-bird counts in this census, however, are probably largely due to populations in the warm water area at Lorain Harbor, and in years when the mouth of the Vermilion is frozen, few waterbirds are found there. No breeding or migratory bird data were obtained from the literature, or from talks with members of the Black River Audubon Society or naturalists of the Lorain County and Cuyahoga County Metropolitan Park Districts. Wing-Tips, the local newsletter of the Black River Audubon Society, contains few records from the Vermilion, according to Johnson.

D. Birds of the Rocky River Mouth

Information from the mouth of the Rocky River is scanty, but far more available than that from the Vermilion. The occurrence of several species of birds is documented in various issues of the Cleveland Bird Calendar, and in Newman (1969). Several rarities are documented in recent years, as follow:

Cattle Egret
European Wigeon
Harlequin Duck
White-winged Scoter
Surf Scoter
Black Scoter
Bald Eagle
Osprey
Purple Sandpiper
Red Phalarope
Franklin's Gull
Little Gull
Hawk Owl

Table 1

SUMMARY OF DATA FROM THE SIXTY-FIFTH THROUGH THE SEVENTY-FOURTH CHRISTMAS BIRD COUNTS AT ELYRIA-LORAIN, OHIO. SOME QUESTIONABLE RECORDS DELETED.

Species	No. years recorded out of 10 years	Average no./year in years recorded
Ring-billed Gull*	10	48752
Starling*	10	30732
Herring Gull*	10	12306
Bonaparte's Gull*	10	8273
House Sparrow*	10	2738
Common Grackle*	10	2473
Brown-headed Cowbird	10	1800
Red-winged Blackbird*	10	1208
Tree Sparrow	10	836
Common Crow*	10	564
Dark-eyed Junco	10	521
Mallard*	10	311
Mourning Dove*	10	237
Rock Dove*	10	223
Cardinal	10	223
Common Goldeneye*	10	204
Blue Jay*	10	196
American Goldfinch	10	164
Song Sparrow*	10	131
Black-capped Chickadee	10	82
Tufted Titmouse	10	82
Horned Lark	10	80
Downy Woodpecker	10	79
Black Duck*	10	64
White-breasted Nuthatch	10	53
American Kestrel	10	31
Red-tailed Hawk	10	23
Hairy Woodpecker	10	15
Common Flicker	10	14
Red-bellied Woodpecker	10	9
Ring-necked Pheasant	10	6
Common Merganser*	9	173
Canvasback*	9	155
Lesser Scaup*	9	114
Red-breasted Merganser*	9	105
Greater Scaup*	9	98
Bobwhite	9	30
Bufflehead*	9	27

* = Species of birds most likely to frequent the project areas.

Table 1 (continued)

Species	No. years recorded out of ten years	Average no./year in years recorded
White-crowned Sparrow	9	17
Field Sparrow	9	16
Brown Creeper	9	7
Carolina Wren	9	5
Cedar Waxwing	8	48
White-throated Sparrow	8	12
American Robin	8	6
Great Black-backed Gull*	8	4
Rough-legged Hawk	8	3
Redhead*	7	18
Ruddy Duck*	7	12
Eastern Meadowlark	7	11
Golden-crowned Kinglet	7	10
Yellow-rumped Warbler	7	10
Red-breasted Nuthatch	7	4
Marsh Hawk	7	3
Swamp Sparrow	7	3
Red-shouldered Hawk	7	2
Rufous-sided Towhee	7	2
Red-headed Woodpecker	6	12
Pied-billed Grebe*	6	2
Belted Kingfisher*	6	2
American Coot*	6	1
Great Horned Owl	6	1
Winter Wren	6	1
Rusty Blackbird*	5	22
Eastern Bluebird	5	3
Cooper's Hawk	5	2
Common Redpoll	4	50
Snow Bunting	4	50
Canada Goose*	4	9
Horned Grebe*	4	2
Screech Owl	4	2
Barred Owl	4	1
Evening Grosbeak	3	11
Hooded Merganser*	3	3
Yellow-bellied Sapsucker	3	3
American Wigeon*	3	2
Great Blue Heron*	3	1
Sharp-shinned Hawk	3	1
Glaucous Gull*	3	1
Loggerhead Shrike	3	1

* = Species of birds most likely to frequent the project areas.

Table 1 (continued)

Species	No. years recorded out of ten years	Average no./year in years recorded
Killdeer*	2	6
Pintail*	2	3
Common Loon*	2	2
Green-winged Teal*	2	2
Oldsquaw*	2	2
Short-eared Owl	2	2
Vesper Sparrow	2	2
Double-crested Cormorant*	2	1
Savannah Sparrow	2	1
Lapland Longspur	2	1
Scaup sp.*	1	100
Pine Siskin	1	20
Whistling Swan*	1	17
Purple Finch	1	9
White-fronted Goose*	1	3
Blue-winged Teal*	1	3
King Eider*	1	3
Ruby-crowned Kinglet	1	3
Wood Duck*	1	2
Mute Swan*	1	1
Gadwall*	1	1
White-winged Scoter*	1	1
Surf Scoter*	1	1
Bald Eagle*	1	1
Common Snipe	1	1
Snowy Owl*	1	1
Pileated Woodpecker	1	1
Gray Catbird	1	1
Brown Thrasher	1	1
Common Yellowthroat	1	1
White-winged Crossbill	1	1
Henslow's Sparrow	1	1
Chipping Sparrow	1	1

* = Species of birds most likely to frequent the project areas.

Average number of species recorded per census = 66

Average number of individuals recorded per census = 112,063

It is important to note that the Bald Eagle is a nationally threatened and endangered species and the Osprey is a status-undetermined species (Office of Endangered Species and International Activities, 1973; Federal Register, 1974).

As the mouth of the Rocky River contains conditions similar to that of the Vermilion, including piers, a yacht club and lagoon, and adjacent residences, water birds again assume importance in the fauna. The Lakewood Christmas Count, ten years of which are summarized in Table 2, shows high percentages of water birds, although not to the degree shown in the Elyria-Lorain Count. Waterfowl and gulls, particularly Bonaparte's, often congregate in the mouth of the river when it is open (Altemus, 1975).

Large migratory flights of hawks and some small land birds, such as Blue Jays, are frequently observed just south of the Lake Erie shoreline in the Rocky River Valley.

A projected list of birds occurring in the vicinity of the mouth of the Rocky River follows. Unusual species have been documented.

Common Loon
Horned Grebe
Pied-billed Grebe
Double-crested Cormorant
Great Blue Heron
Black-crowned Night Heron
Cattle Egret
Whistling Swan
Canada Goose
Snow Goose
Mallard
Black Duck
Gadwall
Pintail
Green-winged Teal
Blue-winged Teal
European Wigeon
American Wigeon
Northern Shoveler
Redhead
Ring-necked Duck
Canvasback
Lesser Scaup
Greater Scaup
Common Goldeneye
Bufflehead
Oldsquaw
King Eider
Common Eider
Black Scoter
Surf Scoter
White-winged Scoter
Ruddy Duck
Hooded Merganser
Common Merganser
Red-breasted Merganser
Harlequin Duck
Bald Eagle
Osprey
American Coot
Killdeer
Ruddy Turnstone
Purple Sandpiper
Red Phalarope
Herring Gull
Great Black-backed Gull
Ring-billed Gull
Glaucous Gull
Bonaparte's Gull
Franklin's Gull
Little Gull
Common Tern
Caspian Tern
Rock Dove
Mourning Dove
Snowy Owl
Hawk Owl
Belted Kingfisher
Blue Jay
Common Crow
Starling
House Sparrow
Red-winged Blackbird
Common Grackle
Song Sparrow

Table 2

SUMMARY OF DATA FROM THE SIXTY-FOURTH THROUGH THE SEVENTY-THIRD CHRISTMAS BIRD COUNTS AT LAKEWOOD, OHIO; SOME QUESTIONABLE RECORDS ARE DELETED.

Species	No. years recorded out of 10 years	Average no./year in years recorded
Starling*	10	11378
Ring-billed Gull*	10	2763
House Sparrow *	10	2043
Dark-eyed Junco	10	631
Tree Sparrow	10	594
Greater Scaup *	10	568
Mallard*	10	529
Blue Jay*	10	515
Lesser Scaup*	10	510
Herring Gull*	10	492
Cardinal	10	486
Brown-headed Cowbird	10	431
Black-capped Chickadee	10	398
Bonaparte's Gull*	10	339
Mourning Dove*	10	274
Common Goldeneye*	10	222
American Goldfinch	10	209
Tufted Titmouse	10	203
Downy Woodpecker	10	185
White-breasted Nuthatch	10	161
Red-winged Blackbird*	10	145
Black Duck*	10	141
Common Crow*	10	136
Common Grackle*	10	134
Song Sparrow*	10	119
Bufflehead*	10	60
Hairy Woodpecker	10	35
White-throated Sparrow	10	29
Ring-necked Pheasant	10	22
Red-breasted Nuthatch	10	14
Red-breasted Merganser*	10	13
Brown Creeper	10	11
American Kestrel	10	9
Belted Kingfisher*	10	9
White-crowned Sparrow	10	9
Red-tailed Hawk	10	8
Common Flicker	10	7
Rufous-sided Towhee	10	7
Carolina Wren	10	5
Red-shouldered Hawk	10	3
Great Horned Owl	10	3

* = Species of birds most likely to frequent the project areas.

Table 2 (continued)

Species	No. years recorded out of ten years	Average no./year in years recorded
Cedar Waxwing	9	44
Bobwhite	9	19
Re d-headed Woodpecker	9	18
American Robin	9	17
Purple Finch	9	10
Field Sparrow	9	6
Red-bellied Woodpecker	9	5
Redhead*	9	4
Winter Wren	9	4
Common Merganser*	8	78
Ruddy Duck*	8	37
Killdeer*	8	6
Great Black-backed Gull*	8	6
Fox Sparrow	8	6
Yellow-bellied Sapsucker	8	3
Great Blue Heron*	8	2
Evening Grosbeak	7	27
Golden-crowned Kinglet	7	10
American Wigeon*	7	6
Ruby-crowned Kinglet	7	5
Horned Grebe*	7	4
Swamp Sparrow	7	4
Wood Duck*	7	3
Common Redpoll	6	56
Brown Thrasher	6	5
Canvasback*	6	4
Green-winged Teal*	6	3
Hooded Merganser*	6	2
Barred Owl	6	1
Rusty Blackbird*	5	38
Canada Goose*	5	14
Pine Siskin	5	7
Eastern Meadowlark	5	4
Pintail*	5	3
Cooper's Hawk	5	2
Gray Catbird	5	2
American Coot*	5	1
Snow Bunting	4	17
Rough-legged Hawk	4	7
Northern Shoveler*	4	5
Pied-billed Grebe	4	3
Marsh Hawk	4	2
Pileated Woodpecker	4	2
Yellow-rumped Warbler	4	2

* = Species of birds most likely to frequent the project areas.

Table 2 (continued)

Species	No. years recorded out of ten years	Average no./year in years recorded
Chipping Sparrow	3	5
Gadwall*	2	5
Pine Grosbeak	2	4
Common Snipe	2	3
Brewer's Blackbird	2	3
Harris' Sparrow	2	3
White-winged Scoter*	2	2
American Woodcock	2	2
Common Tern*	2	2
Easterm Phoebe	2	2
Snow Goose*	2	1
King Eider*	2	1
Snowy Owl*	2	1
Hermit Thrush	2	1
Loggerhead Shrike	2	1
Savannah Sparrow	2	1
Horned Lark	1	13
Whistling Swan*	1	5
Common Scoter*	1	3
Common Loon*	1	1
Black-crowned Night Heron*	1	1
Common Eider*	1	1
Harlequin Duck*	1	1
Oldsquaw*	1	1
Surf Scoter*	1	1
Virginia Rail	1	1
Purple Sandpiper*	1	1
Little Gull*	1	1
Mockingbird	1	1
Eastern Bluebird	1	1
Vesper Sparrow	1	1

* = Species of birds most likely to frequent the project areas.

Average number of species recorded per census = 77

Average number of individuals recorded per census = 24,130

TABLE 3 - BREEDING BIRD CENSUSES FOR A THIRTY-ACRE SHRUBBY RIVER FLOOD PLAIN ON THE WEST BRANCH OF THE ROCKY RIVER NEAR COLUMBIA CENTER, LORAIN COUNTY, OHIO, 12.5 AIR MILES SSW OF THE MOUTH OF THE ROCKY RIVER.

Species	Terr. Males 1966	T.M./100 a. 1966	Terr. Males 1967	T.M./100 a. 1967
Song Sparrow	17	57	19	63
Yellow Warbler	13	43	20	67
Gray Catbird	17	57	11	37
Willow Flycatcher	10	33	12	40
Red-winged Blackbird	14	47	8	27
American Goldfinch	10	33	11	37
American Robin	5	17	6	20
Cardinal	8	27	3	10
Starling	3	10	6	20
Mourning Dove	2.5	-	4	13
Common Yellowthroat	1.5	-	4	13
Downy Woodpecker	1.5	-	3	10
House Wren	1	-	3	10
Common Grackle	-	-	4	13
Indigo Bunting	2.5	-	1.5	-
Field Sparrow	-	-	3	10
Common Flicker	1.5	-	1	-
Northern Oriole	1.5	-	1	-
Mallard	1	-	1	-
Black-capped Chickadee	1	-	1	-
Tufted Titmouse	1	-	1	-
Warbling Vireo	1	-	1	-
Yellow-breasted Chat	1	-	1	-
Blue Jay	1.5	-	+	-
Brown Thrasher	1.5	-	-	-
Wood Thrush	0.5	-	1	-
Red-eyed Vireo	0.5	-	1	-
Ring-necked Pheasant	-	-	1	-
Spotted Sandpiper	-	-	1	-
Belted Kingfisher	1	-	-	-
Blue-winged Warbler	-	-	1	-
American Woodcock	+	-	+	-
Eastern Phoebe	+	-	+	-
White-breasted Nuthatch	+	-	+	-
Rufous-sided Towhee	+	-	-	-
Rose-breasted Grosbeak	-	-	+	-
Non-territorial Breeders (females)				
Brown-headed Cowbird	10	-	5	-

Terr. Males = Number of male territories on study area.
T.M./100 a. = Density per 100 acres where 3 or more territories on study area.
+ = Less than one-fourth of a territory on the study area.

TABLE 4 - WINTER BIRD POPULATION STUDY, 1969-1970, FOR A THIRTY-ACRE SHRUBBY RIVER FLOOD PLAIN ON THE WEST BRANCH OF THE ROCKY RIVER NEAR COLUMBIA CENTER, LORAIN COUNTY, OHIO, 12.5 AIR MILES SSW OF THE MOUTH OF THE ROCKY RIVER.

Species	Individuals	Density (Birds/100 acres)
American Goldfinch	9	30
Starling	4	13
Tree Sparrow	4	13
Blue Jay	3	10
Song Sparrow	3	10
Chickadee sp.	2	7
Cardinal	2	7
Red-tailed Hawk	1	3
Downy Woodpecker	1	3
Common Crow	1	3
Tufted Titmouse	1	3
White-breasted Nuthatch	1	3
Evening Grosbeak	1	3
Redpoll sp.	1	3
Mallard	+	-
American Kestrel	+	-
Ring-necked Pheasant	+	-
Hairy Woodpecker	+	-
Carolina Wren	+	-
Golden-crowned Kinglet	+	-
Red-winged Blackbird	+	-
Dark-eyed Junco	+	-
Average Total	34	113

Breeding bird data for the mouth of the Rocky River are not available. Breeding and winter bird population data for a section of the West Branch of the Rocky River, 12.5 air miles south of the mouth, are summarized in Tables 3 and 4 (Barber, 1966, 1967, 1970).

E. Projected effects of dredging

If dredging activities are confined to the terminal channel areas of the two rivers, the banks are not disturbed, and the spoils disposed of elsewhere, impact on the bird populations as here seen would be minimal. It should be re-emphasized that little to no valid current data exists on these sites, and on-site investigation, preferably during four seasons, would be necessary to generate meaningful data from which conclusions could be drawn.

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Williams, A.B. 1950. Birds of the Cleveland Region. Cleveland Museum of Natural History, Cleveland, Ohio 213 pp.

APPENDIX F

LETTERS OF COMMENT

Advisory Council
On Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

October 28, 1975

Major Byron G. Walker
Deputy District Engineer
Buffalo District
Corps of Engineers
U.S. Department of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

This is in response to your request of September 11, 1975 for comments on the environmental statement for Operation and Maintenance, Vermilion Harbor, Erie County, Ohio. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969 and the "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800), the Advisory Council on Historic Preservation has determined that your draft environmental statement appears adequate regarding our area of expertise and we have no further comment to make.

The Council appreciates being afforded the opportunity to review your undertaking.

Sincerely yours,

John D. McDermott
Director, Office of Review
and Compliance

THE LINWOOD PARK CO.

ESTABLISHED 1883

ON LAKE ERIE

VERMILION, OHIO 44089

1070 Wilbert Rd.
Lakewood, Ohio 44107
November 6, 1975

Department of the Army
Buffalo Dist. Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attention of: Major Byron G. Walker
Deputy District Engineer

Dear Major Walker:

Thank you for the copy of the Draft, Environmental Impact Statement, Operation and Maintenance Vermilion Harbor Erie County, OH. We appreciate the opportunity to comment on it.

We believe that further serious consideration should be given to the effect and timing of dredging on the quality of beach sand and of the water in swimming areas east and west of the harbor entrance. This is especially important since the proposed dredging schedule is during a high use period of beaches and adjacent waters. At best, it is a short, short summer in Northern Ohio; twelve to fourteen weeks.

Perhaps a re-assessment by the Fish and Wildlife Service and the Ohio Department of Natural Resources is in order. Could they perhaps weigh the health and enjoyment of a large number of people against a questionable quantity of fish spawn? Is it also possible fish may still move up-river to the shallows where most spawning occurs in spite of dredging turbulence?

We are not commenting on the breakwater, advantages or disadvantages, at this time. We do not believe them pertinent to this study.

For your information and for the record the Linwood Park Co. beach is approximately one-half mile long running eastward from the Lagoons beach. The sand quality has been excellent. Linwood Park

is open to the public on payment of a modest gate fee from June to September. Accomodations include playground, shuffle board courts, picnic grove with tables and grills. The fee charged is in line with entrance fees of state and national park systems. Those who own cottages in the Park also pay the fee.

Linwood Park Company was founded in 1883, has been in continuous operation since and has been responsible for the operation and maintenance.of the Park. It is incorporated under the laws of the State of Ohio, owns the land, pays city, county, state and Federal taxes.

Thank you for your usual fine cooperation. Please keep us informed of any plans or studies relative to the area.

Very truly yours,

THE LINWOOD PARK COMPANY

R.S. Cheheyl

R.S. Cheheyl
President

Linwood Park Cottage Owners Association

Officers:
President: Dr. Frank Peterka
1st V. P.: Mr. Norman White
2nd V.P. : Dr. George Keidel
Secretary: Mrs. Hazel Cramer
Treasurer: Mrs. Adelle Baker

The purpose of LPCOA shall be the maintenance and preserving of Linwood Park as the estate family summer vacation area complete with glen, and sun and shore and sea.

November 9, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Lt. Colonel Byron G. Walker;

I am writing this letter on behalf of the Linwood Park Cottage Owners Association, Vermilion, Ohio. Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, September 26, 1975, p. 44349.

The Linwood Park Cottage Owners Association (LCOA) represents the leasees who maintain property in the park. Our membership includes people from across the United States. Linwood Park is a tradition. It has been built by 92 years of dedicated work and direction by the directors of Linwood Park Company, LCOA, and the religious council of Linwood. It represents a unique place in our lives and those of thousands of others who came to Linwood to enjoy its sandy beaches and clear waters for a variety of recreational purposes.

Today, however, Linwood is different, and for most of us that difference is for the worst. In 1973 the U.S. Army Corps of Engineers built a breakwater at the mouth of the Vermilion River. We feel that this wall is the cause of "that difference." The reasons for erecting the wall were probably sound at the time, but events of the last few years suggest that any proposed benefits from the wall have been overshadowed by actual results.

As a concerned leasee and President of the LCOA, I feel that you should understand what has happened to our environment since the construction of the breakwall...

I. Acres of our sandy beach have eroded drastically in many areas;

II. Our clear waters have become polluted and unsafe for swimming;

III. The natural flow of the Vermilion River has been diverted away from the center of the lake to our shoreline;

IV. The river channel is narrow and shallower, which hampers our boaters' access to the lake proper; and

V. Our drinking water has become unpalatable.

The net result to our environment since 1973 has been detrimental to our area and caused many adverse feelings among our residents. All of us come to Linwood for a great many reasons; the Corps of Engineers came for a specific one. Yet, if we examine the stated goals of the Corps we find their goals not unlike our own, for each of us are concerned about the environment and its enjoyment by all people.

The stated missions of the Corps are dedicated to accomplishing basic environmental goals which include the following:

I. Be responsible to the full range of social, economic, and other needs in use of water and related resources;

II. Balance environmental quality and development by providing the widest possible range of beneficial uses of the environment without environmental abuse, risk to health or safety, or other unintended, unanticipated, and undesirable consequences;

III. Arrest and abate the degradation and deterioriation of our physical, biological, and cultural environment;

IV. Give environmental values full consideration in decision-making along with technical and economic considerations;

V. Consider a full range of alternatives to solving mans problems and meeting his needs;

VI. Apply non-structural solutions where practical; apply technology creatively and imaginatively with concern for their impacts on environmental quality.

I'm sure you'll agree that the situation warrants a solution...a solution which will be amenable to all parties concerned. I am confident that through mutual cooperation with your department, the Corps of Engineers, and the LCOA, we can once again enjoy the benefits Linwood Park has to offer its lessees and guests.

I would like to suggest that this letter be included in the final environmental impact report due in December of this year (1975). Please feel free to contact me for any reasons concerning the issues stated above. Thank you for your time and cooperation.

Sincerely yours,

Dr F Peterka

Dr. F.F. Peterka

cc: Mr. Norman White, First Vice-President
Dr. George Keidel, Second Vice-President
Mrs. Hazel Cramer, Secretary
Mrs. Adelle Baker, Treasurer

Bowling Green State University

Northwest Ohio — Great Lake
Research Cente
214-A Graduate Buildin
Bowling Green, Ohio 4340
(419) 372-247

October 9, 1975

Major Byron G. Walker
Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

In reply to your Draft Environmental Impact Statements for Rocky River and Vermilion dated September 8 and September 11, respectively, please be advised of my following comments. Given the nature of our agency, I am immediately attracted and concerned about the historial impact ramifications. The Rocky River study regarding this area was particularly weak. Judging by the bibliography, the information was obtained from readily available, though often historically inaccurate, county histories and would appear to have little correlation to the study.

In as much as both statements are concerned with operation and maintainance, it would imply bottomlands. I would suggest that any historical inquiry be aimed more at this area. For example, there is no mention made of the great loss of equipment by the Bradstreet expedition in 1764 at the mouth of Rocky River. There is no suggestion made in either statement regarding vessel losses that may have occurred in the area. The existance of such a wreck may contain artifacts of historical and/or archeological value.

I would suggest a study of vessel losses on Lake Erie similar to that which we recently completed for the Michigan Department of Natural Resources. For more information on this study, feel free to contact us or Mr. James Bryant, Stevens T. Mason Building, Lansing, Michigan, 48926 (Michigan Department of Natural Resources).

We appreciate receiving these statements as we feel sure, given our function, they will prove valuable as a research tool in years to come, and we are hopeful that our suggestions have been and will continue to be of some assistance.

Most respectfully,

Richard J. Wright

Dr. Richard J. Wright
Director

RJW/jb

ODNR
Ohio Department of Natural Resources
Fountain Square · Columbus, Ohio 43224 · (614) 466-3770

September 16, 1975

Colonel Bernard C. Hughes
District Engineer, Detroit District
U.S. Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

This is to acknowledge receipt of the three copies each of the Draft Environmental Impact Statement for Vermilion and Rocky River harbors.

These documents are in review by our staff and their comments will be submitted to Ohio EPA for inclusion in their coordinated response.

Sincerely,

Robert W Teater

ROBERT W. TEATER
Director

RWT/r

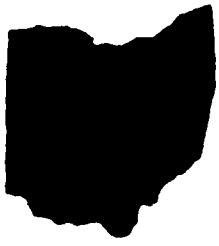
State of Ohio Environmental Protection Agency, Box 1049, 361 East Broad Street, Columbus, Ohio 43216 (614) 466-8565

November 13, 1975

Re: Draft Environmental Impact Statement, Vermilion Harbor Operation and Maintenance, U.S. Army Corps of Engineers

James A. Rhodes
Governor
Ned E. Williams, P.E.
Director

Colonel Bernard C. Hughes
District Engineer
Buffalo District
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207



Dear Colonel Hughes:

The Ohio Environmental Protection Agency has been charged, by the Governor, with lead agency and review coordination responsibilities for the State of Ohio on Federal Environmental Impact Statements. The above mentioned Draft Environmental Impact Statement has been reviewed by sections of this Agency, the Ohio Department of Natural Resources, and the Ohio Department of Economic and Community Development. The following comments constitute those received from the above agencies and have been coordinated under the auspices of the State Clearinghouse.

General:

Overall the Draft EIS was well done concerning the Environmental impacts of the proposed action. The "Description of the Environment" Section was exceptionally well done, providing reviewers with a comprehensive description of specifics for a project area.

There have, however, been questions raised by local residents as to whether or not continued maintenance dredging at the scale envisioned by the Corps is the most cost beneficial and environmentally sound method of keeping the harbor navigable. Recent studies done by these residents have indicated that the detached breakwater, while providing a beneficial impact of a small boat refuge, has upset the normal flow of the river into the lake, thus creating the adverse impacts of increased shoaling and beach redistribution. While, to this Agency's knowledge, no State Agencies have conducted studies into this matter, the Ohio EPA is aware that public water supply service for Vermilion has been upset in the past due to debris collection around the lake intake, this debris collection being possibly attributable to the detached breakwater.

While the impact of the detached breakwater makes little difference as to the necessity for dredging Vermilion Harbor at this time, it is felt that the Corps should consider the alternative of removal or modification of the breakwater as one method of reducing the frequency of dredging in the future. This proposal would seem to be best dealt with in the alternatives section of this Draft EIS. Since the Corps mentions two instances of emergency dredging in the past 17 months, and since there are indications that the detached breakwater may be the cause of these instances, it is felt that this EIS may be the most appropriate vehicle for a discussion of the impacts associated with the breakwater vis a vis future operation and maintenance requirements for Vermilion Harbor.

Specific Comments:

1) The Geology section could use more recent figures as to geological periods. The following comments are made in the interests of accuracy.

   (a) In the first sentence of paragraph 2.03 (page 18), it would be more up-to-date to use the figures 600 to 230 million years instead of the stated 600 to 220 million years.

   (b) A more recent age for the Mesozoic Era (page 20, first sentence of paragraph 2.04) is from 230 to 70 million years old.

   (c) The Nebraskan began, not ended, approximately 1 million years ago (page 20, second sentence of paragraph 2.04).

   (d) The Devonian began about 400 million years ago and ended approximately 350 million years ago (page 29, paragraph 2.25); therefore, the rocks in the Vermilion are more precisely between 600 and 350 million years ols.

   (e) The Generalized Geologic Section of Rocks in Ohio (Stout, 1944)(paragraph 2.27, page 29) is superseded in part by "Generalized Column of Rocks in Ohio." which is available at no charge from the Division of Geological Survey.

2) A bulk sediment analysis is presented for Ver-75-8 on page 72, but the location of the sampling site is not shown on Plate 1.3 as referenced.

3) The statement in paragraph 1.34 (page 17) that the estimated commercial fishing, recreational, navigation, and harbor-of-refuge benefits from the harbor project are about $634,200 (approximately $1,902,600 every three years), appears to be quite high in light of the statement in paragraph 2.107 (page 89) that the total real-estate tax revenues in Vermilion are about $1,396,450 (Erie County) to $1,538,634 (Lorain County) per year. Thus, the benefits alleged for the dredging project equal some 45 percent of total real-estate tax revenues.

4) A statement in paragraph 4.19 (page 121) indicates that the project will neither create nor destroy land areas. While this may be true for the Vermilion area, the sediment which is taken to the Huron Diked Disposal Site will be utilized in "creating" a land area.

5) Paragraph 4.27 (page 123) indicates that dredging operations will have a long-term, medium-magnitude, beneficial effect on sediment quality, and thus infers that benthic organisms will increase in numbers and species diversity. This inference should be tempered by the realization that the sediment, polluted or otherwise, will require dredging approximately every three years under the present proposal, and therefore a stable benthic community will not occur in the long-term.

We appreciate the opportunity to review this Draft EIS and look forward to receiving the Final EIS when it becomes available.

Very truly yours,

Ned E. Williams, P.E.
Director

SIERRA CLUB

NORTHEAST OHIO GROUP • CLEVELAND, OHIO

2070 Coventry Road
Cleveland, Ohio 44118
November 25, 1975

Major Byron G. Walker
CORPS OF ENGINEERS
1776 Niagara Street
Buffalo, New York 14207

Subject: Draft EIS entitled "Operation and Maintenance, Vermilion Harbor, Erie County, Ohio"

Dear Major Walker:

Thankyou for sending us a copy of the above draft EIS. Several of our members have reviewed the Statement and one member in particular has boating experience at Vermilion Harbor. In addition we have received copy of a letter dated October 6, 1975 from Mr. George W. Grossman to the Buffalo District, giving detailed comments on the Vermilion Harbor situation.

We agree with Mr. Grossman's analysis to the effect that the only remedy to the high dredging requirements at Vermilion Harbor is to completely remove the detached breakwater. Remedial dredging will almost certainly be required after removal of the breakwater. However the long-term expense and adverse environmental impacts will be reduced to the point where removal of the breakwater will probably have a favorable benefit/cost ratio.

Please keep us posted on future developments at Vermilion Harbor.

Sincerely yours,

Edward J. Fritz
Vice Chairman

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
(215) 596-1671

8400
November 7, 1975

Bryon G. Walker, Major
Corps of Engineers
Deputy District Engineer
Department of the Army
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Refer to: NCBED-PE, Draft
Environmental Statement,
Operations and Maintenance
Vermillion Harbor, OH

Dear Major Walker:

We have reviewed the above statement on continued dredging, timber-crib, riprap and breakwater construction.

Since dredging and spoil disposal will be in the lake, there should be no direct effect on terrestrial vegetation.

The final statement should describe any shore erosion and loss of trees that may be caused, through changes in currents, by the breakwater parallel to the shore.

Thank you for the opportunity to review this Draft Statement.

Sincerely,

DALE O. VANDENBURG
Staff Director
Environmental Quality Evaluation

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
311 Old Federal Building, Columbus, Ohio 43215

September 29, 1975

Major Byron G. Walker
Corps of Engineers
Deputy District Engineer
Department of the Army
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

The Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor in Erie County was addressed to the state conservationist, U.S. Soil Conservation Service, Columbus, Ohio, for review and comment.

We have reviewed this draft statement and have no specific comments. The statement, as it relates to the items on which we normally comment, does an excellent job of assessing the impact the proposed work will have on the environment.

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

Robert E. Quilliam
State Conservationist

Attachment

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

November 5, 1975

Colonel Bernard C. Hughes
District Engineer - Buffalo District
Corps of Engineers
U. S. Department of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

Reference your draft environmental impact statement entitled "Operation and Maintenance, Vermilion Harbor, Erie County, Ohio". In order to expedite transmittal of the enclosed comments from the National Oceanic and Atmospheric Administration, we are sending them to you in the form in which they were received in this office.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight (8) copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Attachment

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Great Lakes Environmental Research Laboratory
2300 Washtenaw Avenue
Ann Arbor, Michigan 48104

October 10, 1975

OCT 14 1975

TO : Director
Office of Ecology and Environmental Conservation, EE

FROM : Eugene J. Aubert
Director, GLERL

SUBJECT: DEIS 7509.35 - Vermilion Harbor, Ohio

The subject DEIS prepared by the Corps of Engineers, Buffalo District, on environmental effects of maintenance dredging in Vermilion Harbor, Lake Erie, has been reviewed and comments herewith submitted.

Maintenance of project navigation depths in Vermilion Harbor is essential for small craft navigation and should be accomplished when needed.

Open lake disposal of clean sand from the lake approach and the entrance channels is a waste of precious natural resource. Priority should be given to nearshore or onshore disposal to protect beaches from erosion. The Statement indicates that in the past disposal over the west pier was recommended by the Ohio Department of Natural Resources (Paragraph 1.12). However, no reasons are given for the recommendation and no explanation is provided for not using the recommended area for disposal of spoil during regular maintenance dredging.

United States Department of the Interior

OFFICE OF THE SECRETARY
NORTH CENTRAL REGION
230 S. DEARBORN STREET, 32nd FLOOR
CHICAGO, ILLINOIS 60604

(ER-75/901)

October 29, 1975

Colonel Bernard C. Hughes
District Engineer
U. S. Army Engineer District
Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

The Department of the Interior has reviewed the Draft Environmental Statement for the Operation and Maintenance of Vermilion Harbor, Erie County, Ohio, as requested in your transmittal letter of September 11, 1975, to our Assistant Secretary, Program Development and Budget. Our comments relate to areas of our jurisdiction and expertise and have been prepared in accordance with the National Environmental Policy Act of 1969.

We believe that the Buffalo District's plan to dispose of 9,000 cubic yards of "polluted-restricted sediments" in Lake Erie is environmentally unsound. These sediments are high in organic materials and contain other potentially harmful constituents such as heavy metals which will be reintroduced to the water column. Such "polluted-restricted sediments" will amount to less than 30,000 cubic yards over the next 10 years since it has been stated that dredging in the harbor will be done every 3 years. Either the Huron confined disposal area 10 miles to the west and/or the abandoned quarry which was once made available by the Vermilion Fish and Game Association for spoil disposal should be able to handle this amount of material.

Unpolluted materials which are composed mainly of sand are a valuable resource that should be utilized for beach nourishment and placed directly on the beach where environmental damage would be minimal rather than being dumped in open water. Previous similar Corps impact statements have indicated that pumping of materials can be economically accomplished without having to utilize additional booster pumps for distances of at least one-half mile. This alternative should be considered even in the absence of any expressed local requests for beach nourishment.

Sincerely yours,

for Madonna F. McGrath
Acting Special Assistant
to the Secretary

P-17

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5
18209 DIXIE HIGHWAY
HOMEWOOD, ILLINOIS 60430

October 16, 1975

IN REPLY REFER TO 05-00.5

Major Byron G. Walker
Deputy District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Major Walker:

As requested, we have reviewed the draft environmental statement for the Operation and Maintenance, Vermilion Harbor, Erie County, Ohio and have no comments to offer regarding the statement.

The draft statement was sent directly to our Division office in Columbus, Ohio for review and comment. We would like to bring to your attention that the appropriate point of contact to obtain FHWA review and comment on draft environmental statements is the Regional office. Please have future requests for review of draft statements forwarded to this office.

The opportunity to review and comment on the draft environmental statement is appreciated.

Sincerely yours,

Donald E. Trull
Regional Administrator

BY: W. G. Emrich

W. G. Emrich, Director
Office of Environment and Design

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

NOV 14 1975

RE: 74-090-115
D-COE-F32030-OH

Colonel Bernard C. Hughes
District Engineer
U. S. Army Corps of Engineers, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

We have completed our review of the Draft Environmental Impact Statement (EIS) for the Operation and Maintenance of Vermilion Harbor, Erie County, Ohio which was sent to us on September 11, 1975. Based on the information provided in the EIS, we have no major objections to the proposed dredging but request additional information to more fully assess the total project impact. The following comments are for your use in praparing the Final EIS.

Approximately 9,000 cubic yards of material have been classified as suitable for restricted open lake disposal. This type of classification requires unpolluted material to be used as a cover. There are 6,000 cubic yards of material available to act as this cover material. The Final EIS should indicate how accurately the unpolluted material can be placed on top of the previously deposited restricted material at the disposal site. The degree of accuracy should relate to actual coverage of the restricted material rather than placement within the 1/2 square mile disposal site. Also, an evaluation should be provided in the EIS on the covering ability of the 6,000 cubic yards of unpolluted material over the 9,000 cubic yards of restricted material. If the restricted material can not be effectively covered, then alternate disposal methods will have to be employed.

Since the Vermilion area is subject to severe storms, the EIS should discuss how these storms affect materials deposited at the open-lake disposal site. In addition, the Final EIS should indicate whether or not the open-lake disposal site has been used by sand and gravel operators as a site to obtain material.

The maintenance of Vermilion Harbor will be accomplished by contract. If the contractor uses either a clamshell or dipper type of dredge, consideration should be given to requiring the use of vertical curtains to restrict the area affected by turbidity.

The Final EIS should provide information on previous dredging operations at Vermilion. Furthermore, the EIS should discuss whether or not the breakwater completed in 1974 has increased the amount of sediment deposited in the harbor channel resulting in the need to conduct additional dredging. It was indicated in the EIS that there have been two emergency dredging operations conducted at Vermilion Harbor since May, 1974 and we have been informed of the necessity of a third such operation. Based on past dredging, the Final EIS should indicate the frequency that these emergency operations will be necessary, whether or not the breakwater is responsible for this situation, if the deposition of material at the Vermilion entrance channel is causing erosion at some other location and the mitigation measures which can be made to alleviate this situation.

When work takes place near the Vermilion water intake, extreme care should be taken to assure that sediments and contaminants do not enter the water supply system. To prevent adverse impacts upon the water supply, consideration should be given to stopping pumpage for a short time.

Based on the above discussion, we have classified the project as LO (Lack of Objections) and rated the EIS as Category 2 (additional information necessary). We appreciate the opportunity to review this Draft EIS. When the Final EIS is filed with the Council on Environmental Quality, please forward two copies to us. If you have any questions regarding our comments, please contact Mr. Gary A. Williams at 312-353-5756.

Sincerely yours,

Donald A. Wallgren
Chief,
Federal Activities Branch

VERMILION YACHT CLUB

VERMILION, OHIO 44089

September 22, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagra Strut
Buffalo, New York, 14207

Attention: Mayor, Byron G Walker

Gentlemen:

The writer is in receipt of a copy of Operation and Maintenance, Vermilion Harbor, Erie County, Ohio mailed recently to our Club steward, Mr F. Hauschildt.

After reading the report and writing only for myself as a member and recently, as the chief officer of our Club I would like to commend those individuals who were responsible for it's preparation for a piece of work excellently done I learned a great deal from the report as to what many of the natural and man made causes of the problems that occur in the Vermilion River watershed and the lake areas immediately at it's mouth. Could you not present through releases to the newspapers in the area some of the information relating to the Hydrology, for I am certain much misinformation exists in the minds of many who are in a position in the Lagoons Community and in the surrounding Beach Communities to prejudice the efforts

of your department in this area. I believe they are fair minded individuals who are lacking the engineering facts of the problems.

May I suggest that in the future your communications be addressed either to the attention of the Commodore of Vermilion Yacht Club or to its Board of Trustees?

Yours very truly,
Albert F. Sprock,
Commodore for 1975, V.Y.C.

Home address:
ALBERT F. SPROCK
1126 ARGONNE ROAD
SOUTH EUCLID, OHIO 44121

153 Pickwick Drive
Northfield, Ohio 44067
November 21, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14027

Dear Col. Walker,

We are owners of a summer cottage located in Linwood Park at Vermilion, Ohio. As we understand that a Section III study of the Vermilion Harbor is to be completed in December of this year, it is appropriate that we write you at this time.

We would appreciate receiving a copy of the draft environmental impact statement regarding Vermilion Harbor that was circulated in September. We also wish to receive copies of the final environmental statement and the Section III study.

The Corps of Engineers' installations at Vermilion Harbor affect the quality of the beach area that we use during the summer months. In particular, the breakwater installation is causing a continuing degradation of the beach area.

a. The sand beach that was once abundant at the East end of Linwood Beach is disappearing. It is obvious that this sand is piling up in front of the Vermilion Lagoons area and spilling around the East pier to fill up the river channel. The beach was relatively stable in all the many years Linwood Park has existed prior to installation of the breakwater and it is a logical correlation that degradation of the beach is caused by the breakwater.
b. The breakwater installation has changed the flow of water out of the river channel such that this water is now diverted across the beaches on both sides of the river. It is apparent that the water in front of the beaches is contaminated by river debris where previously the water was relatively clear.
c. If dredging of the river channel is conducted during the summer months, the water in front of the beach areas will be polluted, turgid, and unusable for swimming. Our property would lose much of its usefulness, value, and recreational attractiveness. Dredging should definitely <u>not</u> be conducted during the summer months.
d. The Corps of Engineers is responsible for taking positive action to prevent any further degradation of the beach areas at Vermilion and to restore the beach areas to the configuration that was prevelant prior to installation of the breakwater.

We ask that these comments be taken into account in the final environmental impact report and the Section III study.

Cordially yours,
David T. Berns
David T. Berns
Roberta A. Berns
Roberta A. Berns

133 Brookhaven Road
North Kingstown, R. I. 02852
7 November 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N. Y. 14207

Attn: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349

Dear Sir:

My wife and I own a summer cottage at Linwood Park in Vermilion, Ohio, and we are concerned over the apparent effect the Vermilion Harbor Breakwater is having on the Linwood Beach. Would you please send us: (a) a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept, 1975, (b) a copy of the final environmental impact statement, and (c) a copy of the Section III study of Vermilion Harbor due in December.

My wife's family has derived pleasure from the park and beach since its inception in the late 1880s, and we are continuing the family tradition in enjoying the park immensely ourselves. Upon my retirement from the United States Navy in some years to come, we plan to use our cottage in Linwood Park at 5225 7th St. full time in the summers. Currently, and prior to that time we are renting the cottage for the majority of the summer season using the revenue to maintain and improve the cottage. The majority of our tenants have also loved Linwood Park and its beach for many, many years. Thus, we have a long term interest in the condition of the Linwood Beach.

In commenting on the Draft Environmental Impact Statement on the Operation and Maintenance of Vermilion Harbor per the Notice in the Federal Register, Sept. 26, 1975, p. 44349, I request that my letter be included in the Section III study and the final environmental impact report. In our collection of early Linwood Park mementos we have several postcards of Linwood Beach and the Vermilion Lagoons, showing the beach contour over a period of decades prior to the erection of the breakwater. The dominant feature in these pictures is the small beach at the Vermilion Lagoons with no sand pileup at the pier. My wife remembers as a child burning her feet on the hot sand before reaching the waters edge. Our children now don't have the same sensation because there is considerably less beach. The sand from our beach in Linwood Park now surrounds the pier due to the erection of the breakwater and fills the river until it is dredged by the Corps and dumped out in Lake Erie. The summertime dredging of our sand in the river pollutes our beach making swimming unpleasant. The loss of our sand and the pollution of our beach must stop. The solution is simple - remove the breakwater and all the problems it causes.

Currently, there are others deeply involved in making your office aware of the problems caused in Vermilion, Ohio by the Vermilion Harbor breakwater. As a future resident of Vermilion, Ohio, I trust your office will listen to the facts presented by those deeply involved in investigating this matter and will arrive at a satisfactory solution for the removal of the breakwater and restoration of the Linwood Park Beach. Copies of this letter will be sent to the Mayor and City Council of Vermilion, Ohio, and the congressional representatives for that district.

Yours,

Raymond A. BOAS

212 Mohawk Drive
Pittsburgh, Pa. 15228
November 12, 1975

Department of Army
Corps of Engineers
1776 Niagra Street
Buffalo, N. Y. 14207

Atten: Lt. Col. Byron G. Walker

Dear Col. Walker:

I am a cottage owner in Linwood Park and am seriously concerned with the breakwater problem that presently exists. For this reason I would like to request a copy of the following:

1. A Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September, 1975.

2. A copy of the final Environmental Impact Statement.

3. A copy of the Section III study of Vermilion Harbor due in December, 1975.

I strongly urge the Corps of Engineers to correct the deteriorating condition of our beaches.

Sincerely,

Murray Cook

304 Stewart Ave. #5
Ithaca, N.Y. 14850
November 8, 1975

Lt. Col Byron C. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Dear Colonel Walker,

Every year since I was born I have spent the summer at Linwood Park in Vermilion Ohio. I would very much appreciate your sending me a copy of the draft environmental impact statement for operation and maintenance of the Vermilion Harbor, (Sept. 1975). I understand

that the Corps disclaims responsibility for the heart breaking erosion that has occurred only since the harbor was blocked by the breakwall. There did not used to be a sand bar in the river, the beach used to be 3 times wider, there was no black gum on the sand and the shoreline was completely different. I protest violently that such damage has been done to our beach, and I would very much like to know what I can do as a very frustrated, helpless-feeling, angry citizen.

Sincerely yours,
Hazel Cramer

STUART P. CRAMER
ATTORNEY AT LAW
5613 HURON STREET
VERMILION, OHIO 44089

November 5, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
Buffalo, New York 14207

Dear Colonel Walker:

Will you kindly include the following comments in the Section III study and final environmental impact report on Operation and Maintenance of Vermilion Harbor per notice Federal Register, Sept. 26 1975, p. 44349; and in Section III of the study due in December:

As a long time cottage owner at Linwood Park, and a lifelong user of this beach, I wish to state that before the present breakwall was contructed there was never any sand build-up at the east side pier.

Nor was there beach erosion dispite NE storms.

Nor was there sandbar in the river.

I therefore believe that this sand should be returned to Linwood beach and not dredged up and dumped into the lake.

I demand a removal of the breakwall to prevent further polution and the inevitable flooding that will result from ice backing up in the river.

Sincerely yours,

Stuart P. Cramer

Stuart P. Cramer

THE DEARTH AGENCY
Insurance

WILLIAM E. DEARTH

6151 WILSON MILLS ROAD, #109
HIGHLAND HEIGHTS, OHIO 44143
461-1787

November 11, 1975

Department of Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York, 14207

Attention Lt. Col. Byron G. Walker

Sir:

Please forward to the sender the following at your earliest convenience

a. Copy of Draft Environmental statement of operation and maintenance of Vermilion, Ohio Harbor dated Spetember, 1975.

b. Copy of final environmental impact statement

c. Copy of section three study of Vermilion Harbor due in December

As a cottage owner at Linwood Park, Vermilion, Ohio, I am most interested in the pending action regarding the Breakwall installed at the mouth of the Vermilion River.

In the past year I have seen the Beach sand gradually washed away and deposited in the river, then dredged and redeposited on the West Shore. Linwood Park at one time was envied by many other Lake front cottage owners, however, if this erosion continues, we will be faced with the loss of beach and needless to say, a considerable financial loss as far as the valuation of our cottage is concerned.

Prior to the erection of the Breakwall we had no pollution problem or loss of beach. High or Low water or the Northeast storm did not effect the over all picture of the beach line.

I would appreciate your personal attention in this matter, to help return Linwood Park to the summer pleasure spot it once was.

Very truly yours,

William E. Dearth

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PHONE 771-6779

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THE BENJAMIN P. FORBES COMPANY

2000 WEST FOURTEENTH STREET CLEVELAND, OHIO 44113

November 6, 1975

Department of the Army
Buffalo District, Corp of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attention: Lt. Col. Byron G. Walker

Dear Lt. Col. Walker,

Having owned a cottage at Linwood Park, Vermilion, Ohio, for the past 10 years and having spent a part of each summer there for more than 25 years, our family is very much concerned about the effects which the breakwater recently constructed at the mouth of the Vermilion River has had on the beaches to the East.

We are aware of the changing conditions of the Lagoons beach, the Linwood Park beach and the Wakomis beach, all of which are to the east of the Vermilion River. We have observed the tremendous build up of sand in front of the Lagoons, the lessening of the Linwood beach and the elimination of the beach at the easterly end of the Linwood Beach as well as the elimination of the Wakomis beach.

There is now an actual sand bar in the Vermilion River channel between the two piers, something we have never seen before. We can positively vouch for the changes, all bad in our opinion, since the erection of breakwater across the mouth of the Vermilion River. There never used to be such sand build up and/or erosion, beach pollution, etc. in all the years we've been there nor in the past 100 years or so according to conversations with some of the older folks during the time we've been going to Vermilion.

The dredging of the river has been and will be a tremendous continuing taxpayer expense. Summertime dredging will make our beach a terrible place to swim and I believe the many bad environmental changes caused by the new structure proves that it should be removed.

We feel that this was a dreadful mistake and I am requesting a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September, 1975. I would also appreciate receiving a copy of the final environmental impact statement.

It is also my understanding that there is a study of the Vermilion Harbor due to be released in December of this year and I would request that our family's comments be included in that study and that a copy of the study be sent to us as well, when released.

There are a large number of people who have sufferred loss of property value because of the building of this breakwater and likewise there are a large number of innocent people who may suffer further from the installation of this breakwater structure. Again, I sincerely believe this structure should be removed.

Thank you in advance for sending me information requested.

Very truly yours,

Benj F. Forbes

BFF/jas

1

Fred W. Fussner
3301 West 165th St.
Cleveland, Ohio 44111
[illegible] 424 [illegible] St. Linwood Pk.
Vermilion Ohio - 44089

Dept. of the Army -
Buffalo Dist. Corps of Engineers
[illegible] Niagara St.
Buffalo, N.Y. 14207
Attn: Lt. Col. Byron G. Walker
Re: Draft Environmental Impact
statement on Operation and
Maintainance of Vermilion Harbor
[illegible] Notice Federal Register.
Sept. 26, 1975, p. 44349-

Before the breakwater we had
the sand pile up at the pier.
No sand in the river -
No beach erosion or beach pollution
in [illegible] years of high + low water + [illegible] storm.

2.

Fred W. Fussner
3301 West 165th St.
Cleveland, Ohio 44111

I have been coming to Linwood
for over 75 years Our Beach was
always the finest on Lake Erie
until recently.
We oppose the continued open lake
disposal of our sand dredged from
the river.
We demand for the return of our
beach sand
We oppose summertime dredging when
we are swimming - Its not
fair nor healthy.
We sincerely demand the removal
of the breakwater as a solution
to all the problems it causes
including beach pollution.

Our property values have 3.
been reduced [illegible] the beach
has been [illegible] degraded
The Vermilion River will be
diverted across our beach as long
as the Breakwater stands.
I request to have my comment
included in the [illegible] study
and the final environmental
impact report.

Kindly help us to keep
our beach at Linwood.
We love Linwood and [illegible]
[illegible] it as a Sand [illegible]
My father, Fred Fussner, Sr.
was one of its founders [illegible]
his name we [illegible] for
any help you can give. F.W. Fussner

FRED S GALOVICH
FINANCIAL ADVISORY SERVICES

3358 babcock blvd pittsburgh pa 15237 (412) 367-1650

November 12, 1975

Department of Army
Buffalo District
Corps of Engineers
1776 Niagra Street
Buffalo, N.Y. 14207

Atten: Lt. Col. Byron G. Walker

Dear Col. Walker:

As a concerned cottage owner in Linwood Park, I would like to request a copy of the following:

1. A Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September, 1975.

2. A copy of the final Environmental Impact Statement.

3. A copy of the Section III study of Vermilion Harbor due in December, 1975.

It is my hope that the Army Corps of Engineers will work extremely close with the Linwood Park Association in correcting the breakwater problem that now exists.

One of the reasons I was so impressed with Linwood Park was the privacy and cleanliness of the beach, and if the Corps of Engineers does not correct the situation that will deteriorate our beach, it is my firm belief as well as the belief of many other cottage owners, that our property will, in fact, decrease.

Sincerely,

Fred S. Galovich

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

October 6, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attn: Major Byron G. Walker

Ref: Draft Environmental Impact Statement
Vermilion Harbor, Ohio
September, 1975

Dear Major Walker:

Thank you for forwarding the Draft Environmental Impact Statement for the proposed Vermilion Harbor operation and maintenance project, dated September, 1975, for review. There certainly is no question as to the professional competence of the firm of Ryckman/Edgerley/Tomlinson and Associates of St. Louis which prepared this study. Nevertheless, the study reflects the viewpoint of engineers based in St. Louis who possibly never saw Vermilion Harbor prior to 1975. The study is not fully responsive to the needs of the Corps' "customers" in Vermilion. There are many serious deficiencies within the report which prohibit accurate evaluation of the problem by the various organizations who will review it.

I wish to propose an alternative action for the consideration of the Corps and the Corps' "customers". This alternative is the removal of the Vermilion Harbor breakwater, a subsequent dredging operation to remove the sediment accumulation caused by the breakwater, and further dredging as required. Prior history of Vermilion Harbor indicates such dredging would be required every ten or fifteen years.

For convenience, I have taken segments of the information in the draft environmental report, reprinted them, and then commented on each point. I request that you include this review and comment, in full, in the appendix to the final environmental statement. This request also applies to the attached report, "Shore and Harbor Physical Processes at Vermilion, Ohio" dated September, 1975. I also request that these two reports be placed in the current Section 111 study of Vermilion Harbor being conducted by the Corps and scheduled for completion in December, 1975.

1. Corps' Statement: Authorization

> 1.02 The work under consideration in this Environmental Impact Statement is the recurring future maintenance of the completed channels and structures that comprise the shallow-draft navigation project for Vermilion Harbor, OH. The project was authorized by the River and Harbor Acts of 1836, 1875, 1905, and 1958 and was constructed in stages. Harbor improvements authorized by the 1958 Act (described in House Document 231, 85th Congress, 1st session), including the breakwater construction and new work dredging of the river and lake approach channels, were initiated in June 1973 and completed in May 1974. The existing project is complete. (pg. 1)
>
> f. Detached breakwater: Cellular steel sheet pile construction; 864 feet in length; 10 feet above LWD in height; perpendicular to, and 300 feet north of the east pier. (pg. 3, 1.03)

1. Comment: Public Law 85-500, 85th Congress, approved 3 July, 1958, authorized improvement of Vermilion Harbor in accordance with plans and conditions set forth in House Document 231, 85th Congress, First Session. These plans called for two detached breakwaters, 725' long and 225' long, with a 150' opening between them, creating a new harbor entrance 500' north of the entrance between the east and west piers. The authorized design would have funneled river water northward into the lake, minimizing water pollution problems in the area.

As shown above and in Plate 1.1, the Corps constructed a single detached breakwater 864' long which diverted river flow east and west. No Congressional authorization for this change is shown in public records and, to my knowledge, the change in design was not made known to or approved by local authorities. The changed design has caused long-term, high magnitude adverse environmental effects that would not occur with the original design. These adverse environmental effects include beach water pollution, drinking water pollution, obstruction of ice flow, and increased sedimentation.

A full explanation of the reasons for and authorization for changing plans written into law should be presented. If the breakwater as constructed is not fully authorized by law, the alternative action of removal seems indicated.

2. Corps' Statement: Benefits

> Estimated annual commercial fishing, recreational navigation, and harbor of refuge benefits from the harbor project are about $634,200, or approximately $1,902,600 every three years (August 1975 price levels). (pg. 17, 1.34)
>
> 2.107 As of January 1, 1970, the total tax valuation for the City of Vermilion was $25,390,000. The real estate tax rate in the city is $51.60 for Erie County and $60.60 for Lorain County per $1,000 of assessed evaluation. (pg. 89)

2. Comment: There is no supporting data in the report to justify a claim of $634,200 in annual benefits. Using an average real estate tax rate of $55 per $1000 of assessed valuation, the total real estate tax revenues in Vermilion are about $1,400,000 per year. The claimed benefits from dredging equal 45% of total real estate tax revenue.

3. Corps' Statement: Past Dredging Records and Soundings

> 1.12 Prior to completion of the harbor modifications authorized by the 1958 River and Harbor Act (including the lake approach and river channels and the detached breakwater discussed above in paragraph 1.03 a., c., and f.), the Vermilion entrance channel was dredged about once every ten years using a government derrickboat, equipped with a clamshell bucket, and a dump scow. (pg. 6)
>
> Harbor maps showing the results of past sounding operations at Vermilion Harbor are available for review at the Buffalo District Office. Sounding operations at Vermilion Harbor are performed by the Buffalo District using Corps equipment. (pg. 5, 1.07)

3. Comment: The information in the report on past dredging operations and soundings is inadequate. House Document 231 states that the total maintenance cost of Vermilion Harbor from 1839 to June 30, 1956 was $60,000. This would include repairs to the piers in the 1870's and early 1900's. It is evident that there was very little dredging of Vermilion Harbor during the 117-year period from 1839 to 1956. A full statement of dredging dates and amounts removed is essential for evaluation of this report.

Soundings were taken at the conclusion of the May 1974 dredging and again in 1975. They reveal that 8,000 cu. yds. of sediment is accumulating each year in the harbor since construction of the breakwater. Seventeen pages of bird sightings are certainly essential to define the impact of dredging on bird life, but historical records on dredging and soundings should also be included.

The presentation of this historical data will reveal that sedimentation rates have been increased tremendously by the breakwater. If the harbor cost $500 a year to maintain for 117 years and it now will cost $93,000 per year to maintain, there obviously are great economic benefits in the alternative proposal to remove the breakwater.

4. Corps' Statement: Amount of Solids Transmitted by Vermilion River

> Since the harbor waters in the project area are at the same elevation as Lake Erie, backwater effects slow the river velocity in the project area and induce settling of the larger soil particles. The Vermilion River is a primary source of sediment in the harbor area (pg. 46, 2.53)
>
> the accumulations are small in comparison with the eroded soil transported by the river (133,000 tons per year) (03). (pg. 46, 2.52)
>
> No permit maintenance dredging has been performed in Vermilion Harbor in the last ten years.
>
> 1.13 It is expected that future maintenance dredging at Vermilion Harbor will be required approximately every three years, and will entail the removal of about 24,000 cubic yards of material during each dredging operation, or about 8,000 cubic yards annually. Shoaling rates and funding considerations may affect dredging volumes and frequency in the future. The duration of dredging operations will be dependent upon the nature and location of material to be removed, the type of dredge available, location of the disposal site, and other factors. (pg. 7)

4. Comment: It is evident that the Huron St. to Liberty St. reach of the Vermilion River has transmitted at least 133,000 tons, approximately 66,000 cubic yards, of sediment each year without any dredging from 1915 to 1973.

The backwater effects introduced by the breakwater, which have been reported by the Corps, obviously are causing a long-term, high magnitude adverse impact. The estimated annual 8,000 cu. yds. of sediment, if evenly distributed over the entrance channel and river channel (an area of 7.9 acres), would cause a deposit of 7.5 inches per year.

This rate of sedimentation in a river channel not dredged from 1915 to 1973 and an entrance channel dredged only "about every ten years" indicates that the need for dredging 8,000 cu yds. a year is solely due to the breakwater.

Adoption of the proposed alternative action of removing the breakwater could reduce annual dredging costs from the estimated $93,000 per year to perhaps $9,300 per year.

5. Corps' Statement: Adverse Effects from Dredging

1.14 Future maintenance dredging at Vermilion Harbor will be conducted during the summer season of the year, starting after about 15 June and finishing before 1 October. The 3.5 month period should allow sufficient time for an expected average six weeks dredging operation to be performed. The following operational constraints and environmental characteristics of Vermilion Harbor were considered in making this scheduling determination:

a. While the earliest opening date of the available work season for construction and maintenance was, in recent years, 2 March, contract dredging is usually initiated about 1 April due to lake ice conditions that tend to inhibit safe operations until that time. Similarly, while the latest work season closing date was 30 December, lake storms generally hinder safe operations in November and December and the work season effectively closes about 1 November. Therefore, routine maintenance dredging could ordinarily be accomplished between about 1 April and 1 November.

b. In letters dated 6 June 1975 to the U. S. Department of the Interior, Fish and Wildlife Service and the Ohio DNR, the Buffalo District requested that these agencies identify any significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. In response to this request, the Fish and Wildlife Service, in a letter dated 18 June 1975, indicated that, "since the river does serve as a spawning area for smallmouth bass, we recommend that no dredging be conducted during the period May 1 through June 15." A reply from the Ohio DNR, dated 24 June 1975, recommended, "that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be done during October and November when salmon are moving "through the harbor area." Therefore, by initiating maintenance dredging operations after 15 June, and completing operations before 1 October, potential interference with the spring and fall fish migrations identified by the Fish and Wildlife Service and the Ohio DNR will be avoided.

4.28 A short-term, high-magnitude, adverse impact on the water quality of the immediate area of the dredge and for a short distance down current, will result from the dredging operations. The mechanical mixing and agitation created by the dredge will increase turbidity and suspended solids. The presence of various soluble chemical constituents in the sediment will cause increases in their concentration in the surrounding water. Those constituents involved include: Kjeldahl nitrogen, phosphorous, COD, oil and grease, and heavy metals such as zinc, mercury, lead, copper, chromium and cadmium. The amount of oxygen-demanding material contained in the sediment and sunken debris to be removed will determine the extent of dissolved oxygen depletion resulting from the operation. Studies have shown that these adverse increases in turbidity, solids, nutrients, COD, and heavy metals and decreases in dissolved oxygen are almost totally reduced to levels prior to dredging within 24 hours (118). (pg. 123)

In previous years, dredging at Vermilion Harbor has occasionally been linked to increased turbidity, conductivity, coliform bacteria counts, and concentrations of heavy metals depending on wave, wind and current action (123). Some of these parameters can be reduced to normal levels through additional treatment, but some (such as concentrations of heavy metals), might remain high despite treatment (123). (pg. 127, 4.36)

Maintenance activities may be scheduled to avoid potential conflict with a major harbor event, such as a regatta, if the Corps receives a sufficiently early notice of the time of the event and no significant operational or other environmental conflicts will result. (pg. 15, 1.28)

5. Comment: These portions of the draft environmental statement may be summarized as follows: Dredging has a short-term, high magnitude impact on water quality. To avoid adverse effects on aquatic life, dredging will not be done during the periods from April 20 to June 15 and Oct. 1 to Nov. The June 15 to Oct. 1 period has been designated for dredging.

As a sport fisherman, I can agree that adverse impacts on aquatic life should be avoided. However, the release of sediments containing coliform bacteria and toxic heavy metals, such as mercury, lead, and cadmium, cannot possibly be tolerated during the months of June, July, August, and September when the beaches adjacent to the channel are used by swimmers. The breakwater deflects the warm, stratified river water into the beaches during the summer and a high magnitude, long-term, and possibly irreversible threat to human life would result. Dredging should only be done during the first three weeks in April.

If the breakwater remains, annual April dredgings should replace the proposed "6 weeks every 3 years" cycle. This may have a substantial impact on dredging costs.

Adoption of the alternative action of removing the breakwater would remove the need for annual dredging. This alternative is recommended to avoid a serious public health hazard. After removal, a one-time emergency dredging could be scheduled in September if the surrounding beaches were posted by public health authorities.

6. Corps' Statement: Beach Erosion

Several large structural stones have been stored on top of the east pier since July 1974. (pg. 3, 1.03d)

As evidenced by the EPA analysis of sediments collected in the river channel near the end of the piers and in the lake approach areas, and by the large buildup of sandy sediments just east of the east pier, much of the sediment in this portion of the harbor is composed of sand. Materials carried in littoral drift (generally east to west in the Vermilion area), are the source of these sandy sediments which are generated from updrift areas in Lake Erie located to the east of Vermilion (44). (pg. 49, 2.54)

6.35 The Corps of Engineers has authority to place unpolluted dredge materials on beach areas if the cost of this action does not exceed the cost associated with open-lake disposal. When the cost of beach nourishment exceeds the cost of open-lake disposal, beach nourishment can still be accomplished, without further Congressional authorization, if local interests will bear the additional costs associated with this action. If local interests are unable to fund the additional costs, then a complete beach nourishment project with Congressional authorization and funding would be necessary.

6.36 Beach nourishment disposal may be technically and economically feasible to accomplish using the harbor's unpolluted dredgings from the entrance channel. Shallow lake depths in the littoral zone would generally preclude the approach of a scow to within an economical pumping distance from the shoreline. However, a dredge operating in the outer section of the entrance channel could transfer dredgings directly from the channel to the downdrift shoreline. This procedure could be accomplished by pumping dredgings through the discharge pipeline if a cutterhead dredge is operating, or by swinging the excavation bucket over the west pier and releasing dredgings in the downdrift area if a clamshell or dipper dredge is used. The latter procedure was employed during the June 1974 and February 1975 emergency dredging operations. Cubic yard dredging costs during these operations were about $4.00 and $3.50, respectively.

6.37 Based on the 1975 USEPA, Region V sediment quality analysis, and the Buffalo District's estimate of the volume of sediment in the harbor, approximately 6,000 cubic yards of unpolluted littoral sediment in the lake approach channel and outer section of the entrance channel (2,000 cubic yards annually) may be suitable for use as beach nourishment material. Deposition of unpolluted materials at the lagoons beach, Linwood Park Beach, or other beaches east of the harbor would not be practical due to the westward flowing littoral current, which would tend to redeposit nourishment materials back into the lake approach and entrance channels. Deposition at the Vermilion City Beach or other beach areas west of, and in close proximity to the harbor, would be more practical and could be accomplished as described above. (pg. 41)

6. Comment: The large structural stones "stored" on the east pier were placed there in 1974 by the Corps in an effort to halt beach sand flow into the Vermilion River. They have been only partially successful. The 12' deep river channel filled with sand again, Sept. 24, 1975, in a NE storm. A sand bar is now present, above water, in the channel. "Emergency" dredging operations will be required again for the third time since January, 1974.

The Corps states that the Lagoons-Linwood-Nakomis beach east of the channel is the source of the sand in the river. The estimate of 2,000 cu. yds. per year of unpolluted sand is grossly underestimated because 8,900 cu. yds. was removed within a period of nine months. "Emergency" dredging will be required after every strong NE storm because the east pier is not high enough to be a barrier now although it was an effective barrier for 134 years. The physical processes by which the breakwater causes this effect are shown in the attached report.

The Corps has not and does not intend to return the sand to the beaches from which it originated because they are not authorized to do so and because it is not "practical". However, replacement of the sand already dredged and to be dredged will be required under Section 111 of the 1968 Rivers and Harbors Act. These replacement costs could double the projected $93,000 per year in maintenance costs.

The maintenance and dredging procedures proposed within the draft environmental statement will result in the destruction of Linwood and Nakomis beaches, causing long-term, high-magnitude, irreversible effects on the Vermilion shoreline. Emergency measures to halt this erosion should be taken at once. The alternative action of removal of the breakwater will halt sand shoaling almost immediately, bring about a gradual restoration of previous beach contours, and reduce dredging costs drastically. No other remedial action can produce these three effects.

7. Corps' Statement: Destruction of Land Area

> 4.19 The project will neither create nor destroy land areas, nor is it likely that it will stimulate a change from current occupancies. (pg. 121)

7. Comment: This statement is materially in error. The project has already destroyed much land area and created other land area. This can be documented by aerial photographs.

The project will also stimulate a change from current occupancies. Linwood Park, founded in 1883 as a religious meeting place, is a summer vacation community within Vermilion. The loss of Linwood Beach will cause an undesirable change to permanent residency. The project, if maintained, is likely to destroy a beautiful 92 year old park that is unequalled on the Great Lakes.

The project may also stimulate a change from current occupancies in the Vermilion Lagoons. In the 3 May, 1972 environmental statement, the Corps said, "The effects of the proposed detached breakwater on the combined flood and ice jamming problem are as yet undetermined." And, "Unfortunately, the effects probably will not be known until the project is constructed." The effects will make themselves known after a few severe winters.

8. Corps' Statement: Ice Formation

> 2.20 Historical records show that the Vermilion Harbor area is subject to freezing from approximately 15 December to 15 March, and at least some freezing of the harbor occurs during 90 percent of the time in winter. During an average winter, the harbor area is frozen from three to five weeks, not necessarily continuously. Ice depths average .4 to 6 inches, with a maximum depth of 18 inches (17). During a normal winter, ice formation on Lake Erie will begin between 15 January and 25 January. The areas of the lake which first produce an extensive ice cover are the shallow western basin and the inner bay at Long Point to the east. During the mid-season (1 to 10 February), extensive sections of the central basin, especially adjacent to the north and south shores, experience partial ice coverage. At this time, 70 percent to 90 percent of the open lake north of Vermilion becomes covered with ice, although the area close to shore does not freeze as quickly. During the time of maximum ice cover in a normal winter (20 to 28 February), greater than 95 percent of the lake surface may be frozen to depths ranging from 10 to 18 inches. The area of Vermilion is subject to wind row ice, which can accumulate to depths of 20 feet or more. During the early decay period (25 February to 5 March), open water may appear in the lake north of Vermilion, but the shoreline in the vicinity of Vermilion may stay frozen until 15 March (18). (pg. 24)
>
> Structural maintenance will allow the lagoons and the entrance and river channels to freeze smoothly, eliminating high waves (surges), thereby providing a long-term, medium-magnitude, beneficial impact upon recreational users of these areas for such activities as hockey and ice skating on the lagoons. (pg. 130, 4.46)

8. Comment: Hockey and ice skating on the Lagoons could be considered as short-term, very low-magnitude, beneficial impacts. The increased ice formation in the smooth waters behind the breakwater, which is typical of protected waters, increases the probability of ice jam floods. Since the 150' opening for ice flow provided for in the authorized design was not constructed, long-term, high-magnitude, possibly irreversible, adverse impacts may result. Any discussion of project maintenance costs should include a statement as to whether the Corps is responsible, under the provisions of the 1968 Rivers and Harbors Act, for mitigation of flood damages when the breakwater causes flooding.

Adoption of the alternative action of removal of the breakwater would reduce the probability of ice jam floods.

9. Private Dredging - Comment: The many private lagoons in the project area and upstream of the project area can be expected to experience increased sedimentation due to backwater effects from the breakwater. Mitigation of these costs will be required under the 1968 Rivers and Harbors Act.

Some formula for an equitable sharing of private dredging costs incurred as a result of the breakwater should be devised and included as a part of the project cost.

10. Beach Water Pollution - Comment: The breakwater diverts river flow across adjacent beaches. Fishermen are now rarely found fishing from the east pier because the water to the east is too polluted to support fish life. This point can be supported by affidavits from local fishermen, if necessary.

Southwest winds, which are present about 20% of the time, draw the polluted river water away from the beaches. Winds in the W to NE quadrant drive the polluted water into the beaches causing many days when the beaches are too dirty for swimming. The only adequate solution to this problem is the alternative action of removal of the breakwater.

Conclusion

The Vermilion Harbor project, in two years, has become an environmental disaster unequalled on Lake Erie and perhaps on the entire Great Lakes. There are many adverse environmental impacts which are long-term, high-magnitude, and irreversible.

Many of the adverse impacts, such as increased probability of ice jam floods, beach water pollution, drinking water pollution, and increased sedimentation, result from an unauthorized change in design. The Corps was authorized by Congress to convey the river 500' farther north to a new entrance 150' wide. The project was constructed to block and divert the river east and west.

1. The Vermilion Harbor breakwater was unauthorized and should be removed because of adverse environmental effects.

2. The claims of benefits are unsupported.

3. Historical dredging and sounding records which would demonstrate that the Vermilion River was essentially self-cleaning prior to the project installation were omitted from the report. Prior to the project, the Vermilion River transmitted 66,000 cu. yds. of sediment annually without any dredging.

4. Dredging costs which were $500 a year are now $93,000 a year.

5. Dredging has adverse environmental effects on aquatic and human life. Summer dredging will ruin swimming at adjacent beaches.

6. Serious beach erosion has resulted from the breakwater portion of the project. Emergency remedial action is mandated to halt this erosion.

7. Destruction of land area is occurring which will result in undesirable change of occupancy.

8. The probability of ice jam flooding is increased by the project.

9. Federal participation in private channel dredging has not been considered in the report.

10. Beach water pollution caused by the project is a hazard to health.

The only satisfactory solution for these serious environmental problems would be the removal of the Vermilion Harbor breakwater under emergency authorization during 1976. A subsequent clean-up dredging during September, 1976 will restore the harbor to its prior condition. Maintenance dredging will be required every ten or fifteen years on the basis of the harbor history.

A solution to the single problem of beach erosion at Linwood Beach can be achieved by construction of a long groin near the Linwood-Lagoons property line. This would not permit the sand piled up at the east pier to return to its original contour. The cost of such a groin and beach restoration is likely to exceed $1,000,000 which will require Congressional authorization.

Such a long groin will not solve the beach water pollution, sedimentation, and ice jam flooding problems. It would be environmentally unacceptable to the Lagoons residents because river pollution and sediment would be trapped between the east pier and the proposed groin. This would render the Lagoons beach useless for recreational swimming.

However, the emergency funds which have been used for emergency dredgings should be employed to construct temporary groins, possibly of the vinyl tube type, to hold the beaches east of the channel. Land based excavating equipment could also be used to push sand away from the pier. These measures would be less expensive than continued "emergency" dredging.

Since the breakwater portion of the project was unauthorized as constructed and it has caused many long-term, high-magnitude, potentially irreversible and adverse environmental impacts, I strongly recommend removal of the structure at the earliest possible time.

Thank you for the opportunity to review and comment upon the draft environmental statement. This report has been forwarded to those organizations on the mailing list, where an address is available, for their comment.

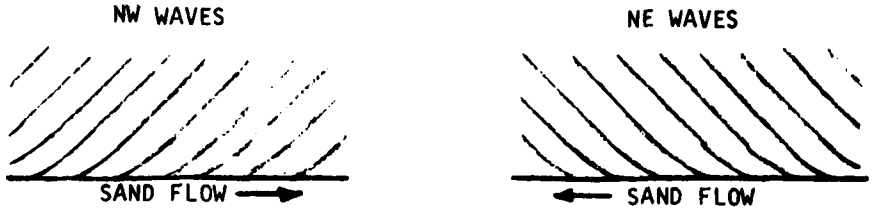
Sincerely yours,

George W. Grossman

SHORE AND HARBOR PHYSICAL PROCESSES
AT VERMILION, OHIO
by
George W. Grossman September, 1975

SHORE PROCESSES

1. A sand beach protects a shoreline from erosion and it is also a desirable recreational facility. Sand moves back and forth along a shoreline in a direction determined by the waves.

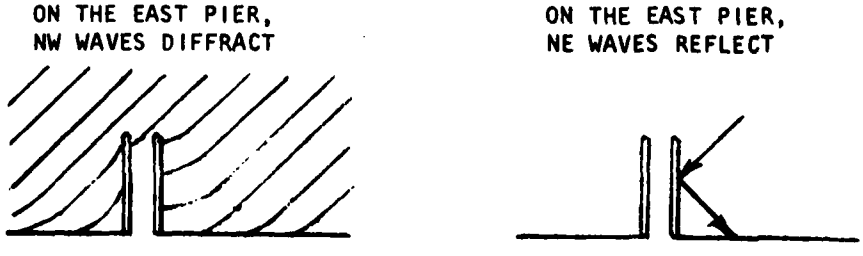


Refraction, bending of the waves as they reach shallow water, holds the sand into the shoreline. Westerly waves at Vermilion refract to become light NW waves. Easterly waves become light NE waves at the shore.

2. The greatest sand flow results when water levels are the highest as more beach is under water. The highest short-term water levels at Vermilion occur in NE storms. Therefore, sand has a net westerly flow here. High rates of sand flow also occur when lake levels are high on a long-term basis because of excessive rainfall in the Great Lakes Basin.

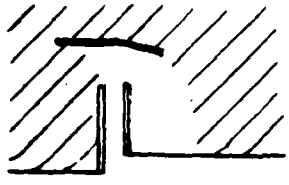
3. Prior to 1839, sand flowed across the mouth of the Vermilion River, blocking the 6' to 7' deep river channel. In 1839, the Corps of Engineers dredged the mouth of the river and constructed parallel piers 100' apart. This prevented westward sand movement across the harbor entrance.

4. One might expect the net westerly sand flow to cause sand to pile up at the east pier and eventually cover the pier and block the river. However, diffraction of NW waves and reflection of NE waves balances the westerly flow, creating a stable beach in a dynamic equilibrium.



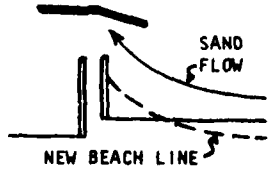
A 3700' long stable beach was thus held on the east side of the Vermilion Channel. Surveys over 118 years from 1854 to 1972 indicate no substantial gain or loss in this beach.

5. The net westerly sand flow continued west of the Vermilion Channel. With no replacement sand moving across the mouth of the river, "a wide sand beach extending west from the river to the township line" in the early 1800's moved west to Huron. Erosion of the shoreline for 1-1/2 miles west of the river occurred.



6. The construction of an 860' breakwater across the mouth of the Vermilion River in 1973 altered shore processes. NW waves were reflected by the breakwater and could no longer scour the beach adjacent to the east pier. The old dynamic equilibrium was destroyed, and new sand movement processes were started.

7. Without the counter effect of NW waves, NE waves pushed sand in behind the breakwater. As sand piled up on the pier, 200' in one year, NE wave reflection from the pier was eliminated. In two years, the corner of the east pier and the beach has been completely filled with sand. Sand is present underwater along the entire length of the east pier to its outer end.



Sand is now being pushed around the end of the east pier, causing shoaling. Dredging to maintain channel depth and disposition of the dredged sand west of the channel completes the destructive process.

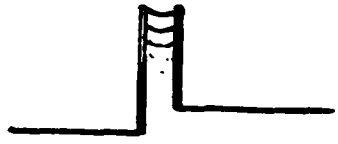
The beach erosion will continue in the next few years until about 700' to 1000' of the 3700' Lagoons-Linwood-Nakomis beach remains. Without the protection of a sand beach, very slow erosion will occur at Nakomis Beach as it has a durable shale bluff. Rapid shore erosion will occur at Linwood Park in low clay bluffs. No erosion will occur in the Lagoons area because it will be protected by a beach. Similar offshore breakwaters constructed in Lorain and Cleveland, Ohio years ago caused similar erosion of beaches and shore.

Prompt removal of the Vermilion Harbor breakwater will halt this destructive process and bring about a natural restoration of the Lagoons-Linwood-Nakomis beach to about 60-70% of its 1971 level. No other remedial action will cause natural restoration. The cost of artificially restoring Linwood and Nakomis beaches after complete erosion should exceed $1,000,000.

HARBOR PROCESSES

1. For boats, a straight-in approach is the most desirable method of making the transition from rough lake water to smoother harbor water. Sailboats with a keel or centerboard can make the transition under almost any conditions. Power boats with less draft should have the power to come in faster than the waves to avoid broaching.

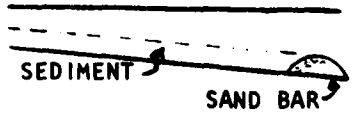
A relatively narrow entrance channel with a length to width ratio of more than 4-1 or 5-1 is the most efficient for reducing wave action. Diffraction of waves within the confines of the channel walls will reduce wave action in a distance of 2 - 3 times the width. This provides a gradual, rather than abrupt, change from rough water to smooth water.



A 60' wide channel width is adequate for recreational craft at many harbors on the Great Lakes. A 100' channel width, such as at Vermilion, is suitable for entry under almost any wave condition that a craft can withstand in open water.

2. Although waves are reduced at the mouth of a channel, their effect continues as swells for a considerable distance. This phenomenon, sometimes called surging, causes bottom turbulence and keeps bottom silt in suspension. River flow then carries it out into the lake. Fresh water streams, lacking tidal currents to sweep out sediment, can be kept clean by surging. From about 1913 to 1973, a period of sixty years, the Vermilion River channel from Huron Street to Liberty Street did not require dredging.

3. The breakwater brought wave action or surging to a halt. Rapid silting or sedimentation has occurred, reducing channel depth. Sand bar shoaling between the piers contributed to sedimentation. The river bottom has a natural slope of about 8' per mile and is estimated to slope 3' - 4' between Liberty Street and the channel entrance. A sand bar near the mouth causes sediment to back up behind it.



Sedimentation reduces the capacity of the river to discharge water and ice.

4. Harbor ice jamming behind the breakwater will be more extensive. Although ice pushed by wave action can pile up 15' high as it meets the solid obstruction of a beach, ice at the harbor entrance is rarely pack ice. It commonly is surface ice floe which can be displaced by the force of the river.

Ice pushed into the breakwater by river flow will be pushed back with equal and opposite reaction. Relatively slow river flow, which was incapable of removing ice from a narrow unobstructed channel, will not shove ice into the lake. Unless Newton's Third Law is found invalid, ice jams and subsequent flooding are inevitable. The only requirement for an ice jam flood is an adequate supply of ice.

5. Pollution of drinking water and beaches by the breakwater is an extremely serious public health problem. It is so serious it cannot be adequately covered in a report on physical beach and shore processes.

CONCLUSION

If we accept the 1839 decision to create a harbor by building piers and agree that the advantage of a port outweighed the disadvantage of shore erosion for 1-1/2 miles west, then:

1. The Vermilion channel, from 1839 to 1972, had a desirable straight-in approach. A natural self-cleaning mechanism maintained the river channel without dredging. The channel was wide enough for the size of boat that could be accommodated by the channel depth.

2. A stable recreational sand beach, 3700' long, was maintained east of the channel for 133 years.

3. The only problem with the Vermilion Harbor is that the river channel is reduced from an average width of 120' - 130' in the Huron Street to Liberty Street reach to 100' between the piers. This restriction has caused floods.

The Vermilion Harbor, from 1839 to 1972, was a very desirable ecological balance of the river, the lake, and the adjacent beaches. This balance made the port of Vermilion one of the best, if not the best, recreational boating facility on the Great Lakes.

This balance of natural forces has been eliminated by the breakwater. The beaches will be destroyed. The businesses and homes in the flood plain may be destroyed by flooding.

The Vermilion Harbor breakwater should be removed at the earliest possible time.

REFERENCES: The basic processes of wave refraction, diffraction, and reflection are discussed in PSSC Physics, a high school text. Practical illustration of actual effects is discussed by R. P. Hartley, "Effects of Large Structures on the Ohio Shore of Lake Erie", Division of Geological Survey, State of Ohio.

CANTON FREIGHT TRAFFIC SERVICE

Post Office Box 1277 Station XCX Box 281

Canton, Ohio 44718 Vermilion, Ohio..

November 6, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY. 14207

Attention: Lt. Col. Byron G. Walker

Gentlemen:

I have been comming to Linwood Park for well over60 years and bought a cottage here about 10 years ago. The Linwood Beach was always the prime attraction and also the main attraction as the Park has no amusements or concessions.

Now our beach is being destroyed by the building of a breakwater which benefits nobody. In fact we as property owners were not even notified of this project and to this day I do not know who is responsible for this monstosity and the expenditure of thousands of dollars of our tax money.

I am interested in restoring our beach and I understand it can only be done by removing this breakwater.

Therefore I request that a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept. , 1975 as well as a copy of the final environmental impact statement and a copy of Section 111 study of Vermilion Harbor due in December.

Why was this done to our beach? For years Linwood and Cedar Point had the best beaches on Lake Erie. Unless this breakwater is removed promptly, the only beach left will be Cedar Point.

Can you let me know who was resonsible for thiscoime against nature and who was it supposed to benefit?

I am against to the dispsal of our beach sand by dredging it from the river. To compound this action, it is being done in the summer when we are swimming.

Lets remove the breakwater and solve all these problems and I would appreciate your including t ese facts and demands in the Section 111 study and the final environmental impact report.

Very truly yours,

Dean A Herrold

F-49

Dean A Herrold
415 Walnut Street, Linwood Park

Pittsburgh, Pa. 15214
16 N. Marshall Avenue
November 12, 1975

In Re: Breakwater - Vermilion OHIO

Department of the Army
Buffalo District - Corps of Engineers,
1776 Niagara Street, Buffalo, New York 14207

Attention of Lt. Col. Byron G. Walker

Sir:

I have owned a cottage at Linwood Park, Vermilion, OHIO, for the Past 26 years and have been visiting the Park with my family since 1931. We have enjoyed our summer vacations at this Park all those years.

Linwood Park has been known all over the State of OHIO and Western Pennsylvania for having the best and finest beach on Lake Erie. However, since the construction of the breakwater at the mouth of the Vermilion River, it will be known, no doubt, as the worst and most contaminated beach on the Lake. Surely the persons who designed the construction and had to do with the location of the breakwater should have visualized what the conditions would be in the event of northwestern and northeastern winds and storms on the lake; and too in the Spring time when the ice runs out from the river to the lake that there would be a jam at the mouth of the river as the debris from the river together with the ice would spread itself either towards the west to the City of Vermilion's Beach or to the east to the beach of Linwood Park.

I still remember the floor in Vermilion which flooded all the streets and cottages, except a few, in the lagoons and the damage caused by the swift current of the water when it flowed fromthe high points to the lake. This flood occurred just a few years ago - I believe it was around the 4th of July.

I do not recall during the past forty years or more that the mouth of the Vermilion River ever had an island in the middle of the stream - the reason for the island no doubt being due to the construction of the breakwater which in my opinion should have been constructed perhaps four or five hundred feet out in the lake instead of its present location, which to me looks like about 75 feet or less. According to some of the residents of Vermilion, all of whom live there winter and summer, the plans which they had seen for the construction of the breakwater showed it to be located many hundred feet out in the lake. The present breakwater, as mentioned above, and as your engineers are aware, moves the water either in the western or eastern direction and during heavy rains and high winds the water from the lake is blown back into the river causing some of the homes and streets in the lagoons to be flooded.

Many thousands of persons together with their children, grandchildren and great grandchildren, have had the pleasure of bathing at Linwood Park but due to the conditions now existing at the Park and due to the breakwater there is less sand and more rocky beach which creates a hazard for those persons who wish to swim and especially for the younger children. I feel certain that your corps of engineers would not like a situation of that kind to exist.

I wish you would send me a copy of (a) draft environmental impact statement for the operation and maintenance of the Vermilion Harbor dated Sept. 1975; (b) copy of the final enfironmental impact statement and (c) a copy of Section III study of Vermilion Harbor due in December.

Yours truly,

F-50

Frank J. Kolub

FRANKLIN P. JOHNSON, M. D.
1600 JAMES STREET
MONROEVILLE, PA. 15146

VA 3-3777

November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Lt. Col. Byron G. Walker

Gentlemen:

I, as many others, am greatly disturbed about the condition of the beach at Linwood Park, Vermilion, Ohio. I own a cottage at Linwood Park and as well as seeing the "most beautiful beach on Lake Erie" being destroyed I am, also, greatly concerned about the decrease that might occur to our property values.

For as long as some of my family can recall (seventy-five years) there had never been a problem with the beach until the breakwater at the entrance of the Vermilion River was built. I'm sure that nature wrecked havoc with storms then as it does now, but the beach was never destroyed.

At a time when environmentalists are working to preserve, I believe that the removal of the breakwater would stop the erosion to the beach and would stop the problem of pollution that comes from the Vermilion River and is no longer going out into the Lake but is sent along the shore line.

Would you please send me a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975, a copy of the final environmental impact statement, and a copy of the Section III study of Vermilion Harbor due in December.

Thank you.

Yours very truly,

F. P. Johnson M.D.

Franklin P. Johnson, M. D.

law

2309 Haymaker Road
Monroeville, Pennsylvania
November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Lt. Col. Byron G. Walker

Gentlemen:

Would you please give serious consideration to the removal of the breakwater built at Vermilion, Ohio?

As a property owner at Linwood Park, I want my daughter to have memories of happy summers enjoying what was once a wide, wide beach and swimming in an unpolluted lake. Literally hundreds of Pittsburghers sought out Linwood Park as a perfect family vacation spot. You can't imagine the shock on their faces when they saw the beach since the breakwater was built!

I would appreciate it if you would send me a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975, a copy of the final environmental impact statement, and a copy of the Section III study of Vermilion Harbor due in December.

Sincerely,

Lois W Johnson

(Mrs.) Lois W. Johnson

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November 14, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N.Y. 14207

Attn: Lt. Col. Byron G. Walker

Re: Vermilion Harbor
Vermilion, Ohio

Gentlemen:

I am one of several partners with real estate holdings in Linwood Park, Vermilion, Ohio and are most concerned regarding the deterioration, erosion and increased water pollution problems that have been reported since the construction of the Vermilion River breakwater.

As a concerned property Owner and citizen please forward copy of the following reports for our evaluation and subsequent action.

1. Draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept., 1975.
2. Final environmental impact statement
3. The Section III study of Vermilion Harbor due in December.

Very truly yours,

Dean M. Koppin

Dean M. Koppin
25302 Stonycroft
Southfield, MI 48075

DMK:ko

841 Spring Rd
Charleston, W Va 25314
Nov 8, 1975

Dept of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, N.Y. 14207
Attn: Lt. Col. Byron W Walker

Ref: Draft Environmental Impact
Statement on Operation & Maintenance
of Vermilion Harbor per notice
Federal Register, Sept 26, 1975 p 44349

Dear Sir:

Please consider this letter a response to the above reference subject.

As a property owner at Kinwood Park, Vermilion, O.
I believe the recently constructed breakwater
off the mouth of the Vermilion River in
Lake Erie is extremely detrimental to the
Kinwood Park beach and request the
removal at once.

My family has been associated with
Kinwood Park for five generations dating

...this time we have thoroughly enjoyed the social, religious and environmental atmosphere that the park has created. To see this natural park being torn apart in just the past two years by a breakwater that offers absolutely nothing is truly unconscionable.

Linwood Park beach has withstood the ravages of Lake Erie storms down thru the ages. Over the past 100 yrs. we had no sand piled up at the pier, no sand in the river and no beach erosion or pollution.

I am opposed to the continued open lake disposal of our sand dredged from the river and demand the return of our beach sand. I am in opposition to summertime dredging when we are swimming.

The removal of the breakwater is the only solution to all of the problems it has caused.

I request my comments be included in the Section 111 Study and the final environmental impact report.

Sincerely,

D. H. Kreps

L. L. Ludwig
1760 Karg Drive
Akron, Ohio 44313
November 7, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

I am writing in reference to the Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, page 44349. My comments are directed at the relatively new breakwater in Lake Erie at the mouth of the Vermilion River, and the effect it has had on the adjacent Linwood Park Beach.

My family has been vacationing at Linwood Park since 1954. The attraction has been the excellent beach there. However, since erection of the breakwater, a continual decline in the Linwood Park beach has occurred. The breakwater obviously has created several detrimental effects to the Linwood Park Beach, including the following:

1. Beach sand apparently no longer shifts East and West naturally. It now moves only West, from the Linwood Park Beach into the Vermilion River. As needed to maintain the river, the original Linwood Park Beach sand is then dredged out of the Vermilion River, and dumped into the open lake.

2. Very serious erosion has occurred at the East end of the Linwood Park Beach, all since erection of the breakwater.

3. Linwood Park Beach polution has increased, at least as measured by eye, since erection of the breakwater.

I can't help but ask the following questions:

1. Why, at the very least, can't the sand dredged from the Vermilion River be returned from whence it came, back to Linwood Park Beach?

2. On a larger scale, why must an apparently environmentally damaging structure like the Vermilion breakwater have to be retained when it is obvious, at least to the local citizens, that it accomplishes very little if any good, and causes very obvious and widespread damage to a natural asset; the Linwood Park Beach?

I request that my comments and questions be included in the Section III study, and the final environmental impact report.

I have never heard of the Corps of Engineers engaging in environmental protection projects. I only hear of their involvement in projects that are environmentally damaging. Of course, neither is the actual case. However, the evidence apparent to the public is very negative. This issue at Vermilion, Ohio is a prime example. I hope that good judgement can prevail, and that a reasonable solution to the problems posed by this breakwater can be reached, and soon.

Sincerely,

L. L. Ludwig

vh
cc: Senator John Glenn
Senator Robert Taft
Representative John Seiberling
George W. Grossman

Lt. C. I B. G. Walker
Buffalo, N.Y. - 14207

Dear Sir,

As an owner and summer resident of a cottage at Linwood Park, Vermilion, Ohio, I am deeply concerned about the erosion of our once lovely Beach that has been caused by that unsightly breakwater erected at the entrance to the River from Lake Erie. Before I was old enough to know who I was, I was taken to Linwood and it and the town of Vermilion and its friendly folk have been home to me all those years - Since 80!! (!!), Our Beach has shrunk terribly in 2 years' time - when a N.E. storm hits, it carries our sand to the River and if this isn't remedied, we're just going to lose our Beach, one of the finest along L. Erie, until that unsightly structure was put up. Certainly you wouldn't want that to happen to property you own! Nor do we! I don't like noise, but I'm sure the sound of the Corps' dynamiting that thing would be music to my ears - I'll never understand its being put there in the first place! A hideous eyesore!

Please put me on record as being one who wants our rights against pollution and destruction of our property protected and restored to its former and natural condition.

Very truly yours,

549 Coast Blvd.
La Jolla, Calif. 92037
(Miss) Esther E. Meckel

7 November, 1975.

F-58

DOEGE-MOELTER AGENCY
505 CHATHAM CENTER OFFICE BUILDING
PITTSBURGH, PENNSYLVANIA 15219 · TELEPHONE: 281-9700

representing
The TRAVELERS Insurance Companies

November 6, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
ATT: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 28, 1975 p. 44349

Gentlemen:

I have spent more than fifty summers at Linwood Park, Vermilion, Ohio and I am appalled at what the Corps of Engineers has done to our beach in the name of progress and a haven for small craft! I have operated small boats in and out of the Vermilion Harbor for more than twenty-five years and never found it impossible to get in or out. What you have really accomplished is the absolute destruction of a once magnificent beach, the pollution of our waters and the thoughtless creation of a "safe" harbor for all the incompetent small craft operators on Southern Lake Erie.

I am irrevocably opposed to dredging our sand out of the river and placing it on the West side of the pier, in fact, to <u>any</u> dredging during the summer!

I ask for the removal of the breakwall with all due haste, since its continuance spells nothing but doom for our beach, pollution of our waters and a great threat of flooding in the Spring.

I request that my comments be made a part of the Section III study and the final environmental impact report. In addition, I am hereby requesting a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept., 1975 and a copy of the final environmental impact statement as well as a copy of the Section III study of Vermilion Harbor due in December.

On behalf of all of us who have lived at and enjoyed the beautiful beach at Linwood Park and the quiet harbor at Vermilion for all these many, many years, I appeal for a fair hearing of our problem and a prompt disposal of that monstrous breakwall.

Very truly yours,

Lois R. Moelter

1101 Lindsay Road
Carnegie, Pa. 15106
November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
Attn: Lt. Col. Byron G. Walker
Dear Sir,

I have been going to Linwood Beach in Vermilion, Ohio for the past fifteen (15) years, my wife has been going to Linwood Park for the past thirty-nine (39) years.

There have been many severe storms batter the beach during these years, which I thought would destroy it completely but my wife and some old timers assured me that the beach would come back. The laws of nature always prevailed.

On the other hand when man interferes with nature man usually loses. Since the breakwater has been constructed, man has managed to destroy a beautiful beach in two (2) years. There has been erosion along the shoreline of Lake Erie because of high water and wind but thanks to the kindness of nature Linwood has always survived.

My wife has spent her summers swimming at the Linwood Beach since she has been two (2) years of age. We both want our children to be able to do the same. However with the mud slick and debris from the river being diverted along the beach it makes it very uncesirable to swim in the waters of Lake Erie.

Engineers have done some wonderful things to improve this beautiful land in which we ALL live. No matter how great a man may be, it still takes a big one to admit his faults and errors. If this error is not corrected in the near future Linwood Park will be no more, instead it will be the site of some multiple family housing or some commercial or industrial usage. Undoubtingly, causing more pollution to a struggling body of water.

Sir, all my family and I ask of you is to CARE just a little.

Please sent to me the following information: (a) the draft of environmental impact statement of operation and maintenance of Vermilion Harbor dated Sept., 1975, (b) a copy of the final environmental impact statement, and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

Sincerely,

Gary F. Morgan

Dr. John A. New II
4837 Doverdell Drive
Pittsburgh, Pa. 15236

November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir,

I am a cottage owner at Linwood Park, Vermilion, Ohio. I have been going there for the past 69 years. We rented a cottage until we bought ours in 1946.

My family has been going to Linwood Park, for about 75 years.

I remember the large beach we had and at one time there used to be a pierout from the old hotel.

I grant you there has been erosion over the years, but since the breakwall has been built, the erosion in the past two years has done the job of 65 years.

Pollution has also been a factor. Everytime there is a heavy rain, the muddy water pours out in the river and hits the breakwall and is deflected to our beach, and the water is muddy for three or four days. Then become a silt problem and last summer the water was so dirty, I wouldn't permit my two grandchildren to go swimming. If this keeps up the whole beach will be contaminated and will make bathing dangerous.

I wish to have my comments included in the Section II study and the final environmental impact report.

I do hope the breakwall will be removed, if not, Linwood Park will become a housing area and a wonderful park will be destroyed.

Sincerely

John A. New M.D

F-62

November 7, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attn: Lt. Col. Byron G. Walker

RE: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349

About 1908 my father, C. A. Persons, Sr. resided in Oberlin, Ohio some eighteen (18) miles from Linwood Park in Vermilion by way of a horse drawn carriage. It was a normal requent exciting trip for the family to go to Linwood for swimming and a picnic. They would pass the "Grove" beside Linwood Avenue, proceed north on Poplar Street to Front Street (now vacated) and then go east along the beach front to the picnic area. It was the cottage, #40 at the time, that took my father's eye. He bought his dream cottage in 1945. Since his seasonal business did not allow a summer vacation, our family of five and many house guests fully utilized the facility, now 5261 Front St., during the summer.

Now my two brothers and I own the cottage and our families number seventeen who share this with our friends in the Spring, Summer, Fall, and sometimes during the winter for beach activities on a tri-wheeler or snowmobile, and a picnic. We've used a day sailer and an out board motor boat docked in the Vermilion River area as family activities changed.

Our family has been involved at Linwood! We have seen the waters rise and fall and the winds blow from all directions.

Not since the breakwater was installed has the Linwood Beach been the same. We had no sand, only rocks and some dead fish and debris at the pier, we had no sand in the river, we had no roots of the trees exposed, nor did we have beach erosion.

At times of low water we have had a drop off in the beach edge but the water was cleaner and presumably the sand was cleaner. Environmental pollution from sewage, farmlands fertilizer and silt continued to build up. Now we trust the E.P.A. is reducing the surge resulting from greater habitation and faster run off. But the point is that the "dam" in front of the mouth of the river is definitely changing the shoreline of

Department of the Army
Buffalo District, Corps of ENgineers

Attn: Lt. Col Byron G. Walker

the Linwood Beach. We are losing our sand, we are starting to lose our trees, we will feel the impact of swimming in polluted water which is slanted to the east against our beach.

Our environment has changed to the detriment of the proud, peaceful, law abiding citizens of Linwood Park.

It is a crime to cast Linwood beach sand, which has drifted westward against the pier, out into the lake west of the pier or anywhere except from where it originated.

The prevailing N.W. winds cannot perfrom their stabilizing effect after a northeaster. The daming effects of the recently installed breakwater is positive and continuing.

The Corps is morally bound to return this valued asset from where it came, the Linwood Beach. I demand that this be done at a time when swimming will not be adversely effected by stirred up pollution. Summer time dredging is probably most convenient, but scheduling for this seriously effected area should be in the Spring or Fall. Please send the sand back to "New Castle". Eliminate the breakwater, acknowledge an error and let nature rebuild its cyclical happenings.

Only once in thirty (30) years of sailing have I found it difficult to enter the mouth of the river. A line squall had hit, our boat was knocked down, but lives were not endangered. Within fifteen minutes we were assisted by power boats who took us in tow back to the harbor. Exposed to the weather yes, but not polluted on each swim.

Since the July 4th 1969 flood we have missed the range lights. We certainly don't need them now with the dam in front of the mouth. They did do a fine job. The "protection" of the breakwater creates confusion with river traffic.

One item that has not happened recently is the severe ice jams and resulting flood waters from the Lagoons up the river to the other lowland homes, more and more of which we are year round housing. How often wil, an ice jam be caused mechanically by the breakwater, and choked by the sand build up in the river channel?

Department of the Army
Buffalo District, Corps of Engineers

Attn: Lt. Col Byron G. Walker

Enough silt flows to the Vermilion River mouth to create a problem with ice jams without compounding the problem with daming configuration of a breakwater.

I deplore you to rid the community of Vermilion and particularly the Linwood Park residents of this nemisis.

(1) Remove the breakwater to eliminate all the varied problems it causes.

(2) Eliminate the summer time dredging for the health of all concerned.

(3) Return the beach sand from where it came. Please do not waste it into the Lake, Save our environment, save our beach.

I respectfully request that my thoughts, ideas and statements be included in the Section III study as well as in the final environmental impact report forth coming.

I am doing my best to eliminate water, air, eye, and ear pollution.

What can you do to better our environment in Vermilion to bring it at least back to normal?

Very truly yours,

George F. Persons

George F. Persons
643 Washington Avenue
Elyria, Ohio 44035

3678 Traver Rd.
Shaker Hts., Ohio 44122
Nov., 6, 1975

Dept. of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attn. Lt. Col. Byron G. Walker
Ref. Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor.

Dear Sir,

The breakwall at the mouth of the Vermilion River is a cause of distress and hardship to us at Linwood Park, Vermilion, Ohio, where my husband and I maintain a secondary home at 5079 Elm St.

The path of the river is diverted at the mouth . This has caused two problems of which I am aware. First, the water intake is affected. The city assures me that the water is safe for human consumption, but water should also be palatable. I question the additives with regard to our physical well being which are necessary for safe consumption. Secondly, the river carries the waste from the Vermilion disposal plant, and now flows along the shoreline. The pollution from this flow can not be diluted and washed away at an adequate rate for safe swimming.

The sand build up at the mouth of the river is dangerous to the purpose for which it is said the breakwall was constructed, namely, a safe refuge for small craft. The sand bars do not allow free use of the river channel. At times, the boats are fortunate to have a channel at all. The dredging necessary to maintain this channel is a harassment to those of us who live near the channel. It is also an added expense for us, the taxpayers, to assume.

I have been a resident at Linwood for 26 years. Prior to that time, I had spent some part of the summer at Linwood for over 60 years. In spite of severe storms, hurricane, flood, high water or low water, the beach east of the pier to the bluff at Crystal has remained fairly stable. I cannot remember ever seeing any part of the Linwood beach devoid of sand as it now appears. The one new factor which has entered the picture is the breakwall, which would seem to be responsible for the above discribed situations.

Will you please consider the above critique in your final draft which you are planning for December 1975. Thank you for this consideration.

Sincerely,
Ruth E. Peterka

Ruth E Peterka

Edward A. and Virginia R. Peters
3387 Hollister Road,
Cleveland Heights, Ohio 44118

November 7, 1975

Department of the Army
Buffalo District, Corps of Engineers,
1776 Niagara Street,
Buffalo, New York 14207

Attn: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per notice Federal Register, September 26, 1975, p 44349

Dear Lt. Col. Walker:

We have been a cottage owner and a summer resident of Linwood Park, Vermilion, Ohio for sixty two years. Our two sons and four grandchildren have also enjoyed their summers there.

The beach at Linwood Park, through these many years, has enjoyed the reputation of being one of the finest beaches along Lake Erie. Before the breakwater was built we had no sand pileup at the pier, no sand in the river, no beach erosion or beach pollution, nor any rocky beach.

In two short years, since the breakwater, we have seen our lovely sand beach deteriorate until there is very little beach sand left. We would like to protest the wrong that has been done. As tax payers we appeal for help from you and Public Law 91-110, the National Environmental Protection Act, which Law was enacted for the protection of the Public.

Would you please have our comments included in the Section III study and the final environmental impact report? Would you please send us a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September, 1975 and a copy of the final environmental impact statement, also a copy of the Section III study of Vermil Harbor due in December, 1975?

Thank you very much, Lt. Col. Walker. We will appreciate your consideration.

Sincerely yours,

Edward A. + Virginia R. Peters

Edward A. and Virginia R. Peters
F-67

Mrs. Carl Prestel
25905 Kilbreigh Drive
Farmington Hills, Mich.
48024

Lt. Col. Bryon L. Walker
Department of the Army.
Buffalo District Corps of Engineers.

Dear Lt. Col. Walker,

I am a cottage owner at Linwood Park, Vermilion, Ohio. I have been going to Linwood Park for over fifty years. In all those years I have not missed spending some time of each summer at the Park.

Bringing up our family we went to Linwood Park every year and now our sons are spending their summers with their families at Linwood. Most of the time we were there was always spent on the beautiful sandy beach. With as much pride we would have our relatives and friends come and we spent much of the time with them on our beautiful beach. But now in just a few years it has all been changed. The beach isn't beautiful now. It is unbelievable what has happened in this short time.

(2)

Last year half of our beach was gone and now this year it is still worse. All on account of the breakwater put in at the Vermilion River.

For years now we used to go down to the pier and watch the cruisers going in and out of the river into the lake and there was no difficulty. Why after all these years without any accidents or any lives lost or any emergencies did this breakwater have to be put in?

Now the sand of our beach is being dumped into the Vermilion River and our beach is being polluted. Before our beach is completely gone that breakwater should be removed and our sand, trapped in the Vermilion River, should be returned to our beach.

I would like to have my comments included in the Section 111 study and also the final environmental impact report.

Sincerely

F-69 Florence M. Prestel

November 6,1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York

Attention: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement
on Operation and Maintenance of Vermilion
Harbor per Notice Federal Register, Sept.
26, 1975, p. 44349

Gentlemen:

It has come to my attention that the Corps of Engineers feels no responsibility for the erosion of the beach at Linwood park in Vermilion Ohio and places the cause to weather.

My experience at Linwood goes back to 1944, and with time out for the Navy and college, I have visited or rented in the park until 1970, when I purchased a cottage there and make it my summer residence. All those years I kept going back and finally purchased, mainly, because of the beach. Never a change - until the breakwater went in. It is so evident that a change has occurred, the whole basin the beach is in has tilted with a build up of beach on the west end and no beach on the east. It is so bad now that I have to wear my tennis shoes when I go swimming because of the rocks. Up to the time the breakwater was built I would play ball (keep away) with the children and my daughters in the shallow water on smooth sand. And the beach is getting narrower. Where there was beach wide enough for baseball and football games by the youngsters, it now is looking more like a bowling alley.

As a registered engineer I am quite often asked if I believe the breakwater has effected our beach. I tell them you don't have to be an engineer to realize this.

Please, do something to save our beach.

Very truly yours,

Robert Prochaska

Robert Prochaska
14411 S. Woodland Rd.
Shaker Heights, Ohio 44120

P.S. Would you include my comments in the Section III study and the final environmental impact report.

c.c. Senator John Glenn, Senator Robert Taft, Rep. Charles Vanik

Hugh J. Pugsley
1437 North Highland Avenue
Pittsburgh, Pennsylvania 15206

Nov. 7 - 1975

Corps of Engineers,
Buffalo, N.Y.
Attn: Lt. Col. Byron G Walker.

Gentlemen -

Reference - Breakwater at Vermilion, Ohio

Our family has a history of over 65 years at Lindwood Park - in Vermilion, and we have seen the condition of the beach over all these years. There have been minor changes because of storms - but nothing like the horrible things which have happened since the installation of the breakwaters. Besides erosion, the west of the beach is building up with silt and debris coming down the Vermilion river, and being directed our way. Pollution in the river can be corrected, but the other material cannot be.

We feel so very helpless that a misfortune like the breakwater

has been forced upon us.

We have had a powerboat for many years, and at no time in the past have I had any trouble getting into the entrance to Vermilion harbor - regardless of the weather.

Will you please send me a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor, dated Sept - 1975? - also any other related statements.

Yours very truly

Hugh J Ringley

RUTLEDGE EQUIPMENT COMPANY

FLOOD LIGHTING EQUIPMENT • GASOLINE AND OIL EQUIPMENT

TELEPHONE: 261 - 1415
AREA CODE 412

334 BOULEVARD OF THE ALLIES
PITTSBURGH, PA. 15222

November 7, 1975

Dept. of the Army,
Buffalo District Corps of Engr.,
1776 Niagara Street
Buffalo, N. Y. 14207

Attention: Lt. Col. Biram G. Walker

Subject: Draft Environmental Impact Statement operation and maintenance of Vermillion Harbor per notice federal register 9/26/75 page 44349

Gentlemen:

As a lease holder in Linwood Park, Ohio for a period of eleven years and a vacationer at that spot for a period of thirty years the writer feels callsd upon to comment relative to the upcoming Draft Environmental Impact Statement that is expected in December, 1975.

Over the past several weeks I have heard and been advised of various comments relative to the above and the general contents of it. If some of the information is correct somebody is going to draw some very invalid conclusions. As an individual who is cognizant of the lake action on the Linwood Park beach at Vermillion I can say there have been many changes over the years but nothing as drastic, since the installation by the Corps of Engineers of the monstrosity at the mouth of the Vermillion River, a North West lake action has been null and void as far as the Linwood Park beach is concerned, for this reason the north eastern storm done nothing but wash the beach away. The authorities have been plagued with a pile up of Linwood Park sand against the East pier of the Vermillion river which extends out to the entire length of the pier. Prior to the installation of the monstrosity the immediate beach area to the East of the East pier was practically nothing except rock and stony area. Because of the monstrosity, sand movement from Linwood beach has not only built up against the pier but has gone over the pier and clogging the river on several occations.

Quite frankly, there is no permanent remedy for this problem and the damage that is being brought on the property owners of Linwood Park, other than the complete elimination of the monstrosity. As a resident of the area I personally can guarantee the elimination of the monstrosity someday in the near future, whether it be from our action or from the pressure of others.

The installation of this monstrosity has caused fear among the residents of the Vermillion Lagoon and one of these days there will be a drastic flood heaping ruin of many, many thousands of dollars on the property. If and when this happens, the Corps undoubtly will be forced to take action and remove it. Prior to that we are hoping the Corps will see the light and realize the damage and threat this monstrosity poses for the people of the area and take immediate action for its removal.

We certainly hope flood damage and even possible loss of life as a result of such a flood is not necessary to bring about correction of this. The Corps of Engineers has certainly had enough pressure brought to them over the past two years relative to this installation that somebody along the line should realize the truth and the mistake that took place. Why do we need to go long enough to have a disaster before we can get action on our request.

In the latter part of 1974 and thus far in 1975 there has been upwards of approximately 18 to 20,000 cubic yards of sand passed over the East pier of the Vermillion River from Linwood Park beach in the river bed that has had to be dredged from the river by the Corps. We ask that you check your records and determine how many times and at what period the Corps ever had to dredge the Vermillion River prior to 1974 and the installation of this monstrosity.

The writer would like to request the Corps realize the disaster they have heaped upon the people of this area and that they take immediate steps of restitution and of restoring the Linwood Park beach by the return of the beach sand which has washed away and by the elimination of the monstrosity.

In addition the mouth of the river has had its flow diverted by the monstrosity to the point that all of the waste and pollution from the river is now being directed and pushed directly across the face of the Linwood Park swimming area.

I would like to request that the comments made in this letter be included in the section three study of the Environmental report when it is released.

I wish to thank you for your consideration and cooperation in this matter.

Yours very truly,

J. W. Rutledge

JWR:eob

Nov. 13, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207
Attn: Lt. Col. Byron G. Walker

33 Conestoga Drive
Bethel Park, Pa.
15102

Dear Sir,

I am writing to you in reference to the Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349.

There are several things I feel impelled to tell you. Before we had the breakwater we had no problems as we now have. We had intermitant changes in the beach with the cycle of water levels in Lake Erie, but these were major and over a period of years the beach remained constant. I can speak to this because we have owned property in Linwood Park for over 50 years. Previous to the building of the breakwater we had not had a problem with pollution as we have constantly had since the breakwater was built. You can stand at the top of the land on the lakefront and see very distinctly by the color of the water coming out of Vermilion River that the breakwater is re-directing it toward our beach. During those 50 years, never have I seen water washing over the pier as it now does, never has the sand piled at the pier and never, never has sand been washed over the pier into the river. As a matter of fact the things that have happened in the last 2 years are so foreign to what has been the standard pattern that I can hardly believe that what I am seeing today is fact! I am certainly in opposition to the disposal of our sand (as you dredge it from the river) anywhere except back on our beach where it came from, and think it is your responsibility to return it. Further, I see no reason why you should be dredging this all during the summer when this is the only time the beach facility can be used.

This whole problem has come about since the building of the breakwater by the Corps of Engineers. The way to eliminate all the problems of water pollution, beach erosion, river dredging, is to eliminate the breakwater and to do it immediately.

We have traveled some and have seen some famous beaches of the world: Miami, Bradenton, Clearwater, Sanibel Island, Waikiki and Kamakura, Japan. The beach at Linwood Park compares favorably with them. On Lake Erie there are few beaches that compare with our beach at Linwood Park (possibly Presque Isle and Headlands Beach State Park) and here is a fine beach like this one being systematically destroyed because of a man made disturbance.

I request that my comments be included in the Sectim III study of the final environmental impact report. I would also request a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept., 1975 - - a copy of the final environmental impact statement, and a copy of the Section III study of Vermilion Harbor due in December.

Very truly yours,

Mrs. George Thomas

Mrs. George M. Thomas

2341 McNary Blvd.
Pittsburgh, Pa. 15235
Nov. 10, 1975.

Lt. Col. Byron G. Walker
Dept. of the Army
1776 Niagara St.
Buffalo, N. Y.

Dear Sir:

As a cottage owner in Linwood Park, Vermilion, Ohio, I am writing in regard to the condition of our beach in the past several years.

I have not missed a year since 1924 in spending our summers at Linwood and previous to the building of the breakwall I would say we had the finest beach on Lake Erie. We enjoyed a beach with beautiful sand which measured about 75 yards in width. In the past two years this picture changed to where our beach was reduced to about 10 yards in width, with no sand but plenty of stones and debris.

The removal of the breakwall will solve all our problems, but until this is done our beach will be helped immensely by returning to our beach the sand dredged from the Vermilion River. I also wish to object to the summertime dredging of sand as this makes swimming off our beach impossible.

I will appreciate your kindness in having my comments included in the Section 111 study and the final environmental impact report.

Sincerely,

Walter C Waite

Ref: Draft Environmental Impact Statement on Operation and maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, P. 44349.

Concord Square G4
Route 2
New Concord, Ohio 43762
23 Nov., 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
Attn: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349.

Dear Sir:

I would like to inform those with responsibility for the Vermilion Harbor breakwall (completed by the Corps of Engineers in 1973) of my intimate knowledge of the environmental situation, both past and present, and of my immediate personal concern. Also, I wish that my observations be included in the Section III study and the final environment impact report.

Members of my family have been visiting Vermilion, Ohio, and Linwood Park (directly east of the Vermilion Harbor piers) for the past seventy years, and for more than my 30 years have owned a "cottage"* on the lakefront. No one in the family nor I can remember a greater disaster befalling Linwood Park or the small community of Vermilion than the end results of the above mentioned breakwall.

There has always been a Nakomis Beach to the east of Linwood Park, sometimes reduced and sometimes enlarged due to the prevailing weather conditions and water levels, but always present. Now it is gone along with half, if not more, of Linwood Park's half mile of beach (one of the few safe swimming beaches of its size on Lake Erie).

The east Vermilion Harbor pier, always a fine fishing spot, is now so buried in Nakomis and Linwood Park sands that there is virtually no water in which to fish. The need for extensive dredging of the harbor and the river almost defies recollection, but now seems destined to become a major biannual event. In the past, beach closings due to Vermilion River water pollution have never been seriously considered (even at the height of many other Lake Erie beach closings) and now they appear to be an imminent possibility every year due to the diversion of river water flow and dredging.

Concerning one of the breakwater's supposed benefits, "boating safety," I have not seen nor heard of one accident in the Vermilion Harbor which the present breakwater could have averted. I have personally passed through the Vermilion Harbor, and many others, in just about every type of boat and weather condition imaginable, and frankly believe that the harbor is less safe now than it was before the breakwall was constructed. The wall sets up cross wave patterns and is a visual barrier

making it particularly hazardous to small watercraft.

With these liabilities so closely at hand it seems imperative that immediate action be taken to replace the sand to the natural beaches, eliminate all dredging during the summer swimming season, and remove the ultimate problem, the breakwall itself.

As there has been a great deal of controversy over the relative merits of the Corps of Engineers' projects, it is very hard for anyone person to completely assess the Corp's peacetime mission. However, due to a person's particular knowledge of any one project, a fairly objective assessment can be made. Regarding the Vermilion Harbor breakwall and my first hand knowledge of its consequences, I would have to say that my faith and respect for the Corps (as a 1LT reserve officer, graduate of Ft. Belvoir, 1974) would be greatly shaken if a mistake is not admitted and a humble reversal of damages actively sought.

Thank you for your help.

Sincerely,

Ridge A. Wilde

Ridge A. Wilde

*Of the approcimately 150 Linwood Park "cottages" few, if any, are valued at less than $30,000. apiece.

3009 N. Fillmore Street
Arlington, Virginia 22201
November 23, 1975

Department of the Army
Buffalo District Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
attn. Lt. Col. Byron G. Walker

Dear Sirs:

I am writing in reference to the draft environment impact statement on the operation and maintenance of Vermilion Harbor per Notice Federal Register, September 26, 1975, page 44349.

I have spent every summer for thirty-two years at our family place in Vermilion, Ohio. Recently there has been substantial and deplorable damage done to the beach, harbor, and lake area by the breakwater constructed at Vermilion. The harmful effects listed below have never been observed by me in thirty years before the breakwater went up, and I am sure the breakwater is their cause.

The beach has eroded drastically. The breakwater has obviously interfered with the natural processes that have maintained the beach essentially unchanged for many more years than I have been going there. I have never seen such loss of beach at Vermilion, even when other areas of the South Shore were experiencing serious erosion. This erosion, thus, cannot be attributed to unusual natural circumstances.

It is quite evident where the sand is going. It is piling up at the piers and is clogging the mouth of the river, whence it is being hauled to the shore west of the piers or out in the lake. It is thus being permanently lost to the beach east of the piers.

Pollution has also become a problem. The breakwater has caused the river to silt much more than in the past, and the necessary dredging in the summer is a serious source of pollution for the whole area. Furthermore, the breakwater directs the flow of river water directly at the beach, making the beach and shore line substantially less clean.

In thirty years of boating, swimming, and using the beach at Vermilion, I never missed having a breakwater there. This was a stable, naturally self-sustaining recreational area. The breakwater is ruining it. I believe the breakwater must be removed.

I request that my comments be included in the Section III study and in the final environmental impact report being made on this subject.

Sincerely yours,

W. Craig Wilde

November 10, 1975

Department of the Army
Buffalo District Corp. of Engineers
1776 Niagara St.
Buffalo, New York, 14207

Attn: Lt. Col. Byron G Walker

Ref: Draft Enviremental Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register Sept. 26, 1975 P 44349

Dear Sir:

Per above reference we would like to request a) a copy of the draft enviremental impact statement for operation and maintenance of Vermilion Harbor dated Sept. 1975. (b) a copy of the final enviremental impact statement and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

As residents of Linwood Park, Vermilion, Ohio for the past six years, we are concerned about the drastic erosion and loss of sand off our beach since the breakwall was built off the mouth of the Vermilion river. We are opposed to the continued open lake disposal of our sand dredged from the river and feel that this beach sand should be returned to Linwood Park Beach.

The buildup of sand to the west of Linwood started when the breakwall was built and each year increases the beach of the Vermilion lagoons until eventually it will reach the breakwall itself.

The divertion of the Vermilion river caused the breakwall results in polluted water to flow across our beaches and prevents sanitary swimming conditions during the summer months.

We feel it is the responsibility of the Army Corp. of Engineers to remedy this problem by removing the breakwall or by other engineering methods stop the erosion and polluting of the Linwood Park beach We are requesting to have our comments included in the Section 111 study and final enviremental impact report.

Yours truly,

5131 Fifth St.
Linwood Park
Vermilion, Ohio 44089

F-80

AD-A101 549 CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT F/G 13/2
OPERATION AND MAINTENCE, VERMILION HARBOR, ERIE COUNTY, OHIO.(U)
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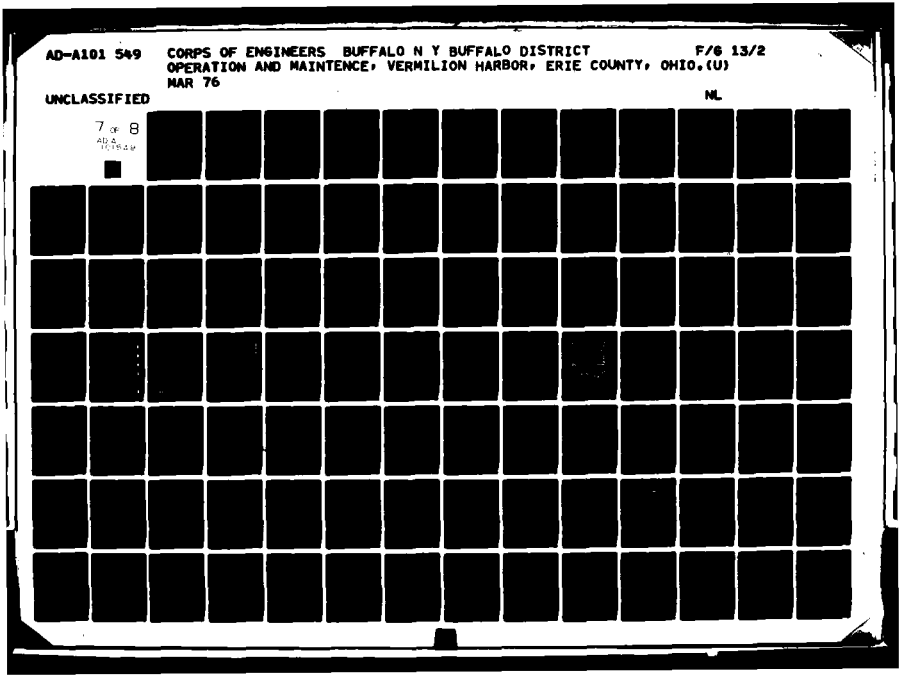

APPENDIX G

PRELIMINARY REPORT ON SECTION 111 STUDY OF VERMILION HARBOR, OH 21 JANUARY 1976

NCBED-PS 21 January 1976

SUBJECT: Preliminary Report on Section 111 Study of Vermilion Harbor, OH

Division Engineer, North Central
ATTN: NCDPD-PF

AUTHORITY

1. This is a report on a preliminary investigation of shore damages attributable to navigation works at Vermilion Harbor, OH and is submitted in accordance with ER 1105-2-50. The investigation was requested by the State of Ohio, Department of Natural Resources, William B. Nye, former Director. Mr. Nye's letter of 13 December 1974 and previous correspondence are attached as Supplement No. 1 of this report. The basic authority for the investigation is Section 111 of the River and Harbor Act of 1968 (PL 90-483, approved 13 August 1968) which states:

> "The Secretary of the Army, acting through the Chief of Engineers is authorized to investigate, study and construct projects for the prevention or mitigation of shore damages attributable to Federal navigation works. The cost of installing, operation and maintenance shall be borne entirely by the United States. No such projects shall be constructed without specific authorization by Congress if the estimated first cost exceeds $1,000,000."

PURPOSE

2. The purpose of this investigation is to determine whether the Federal navigation improvements at Vermilion Harbor have caused or increased the erosion of the shore in the vicinity and, if so, to determine what measures are justified to mitigate the damages.

PRIOR REPORTS

3. A cooperative beach erosion control study of the entire Lake Erie shoreline of the State of Ohio, was made between 1947 and 1952 by the Corps of Engineers acting initially in cooperation with the State of

Ohio Department of Public Works and subsequently, because of the reorganization of State agencies, with the Department of Natural Resources. Two of the published reports on this comprehensive study are particularly pertinent to the Vermilion Harbor area. Appendix VI of this study, published as House Document No. 32, 83rd Congress, 1st Session, covers 20 miles of shoreline west of Vermilion Harbor to Sandusky Harbor, OH. Appendix VIII, published as House Document No. 229, 83rd Congress, 1st Session, covers about 14 miles of shoreline east of Vermilion Harbor to Sheffield Lake Village.

4. These reports contain detailed descriptions of the nearshore and coastal characteristics, shoreline and offshore changes, existing structures, the factors affecting shore processes, and general plans of improvement for alleviation of damages from shore erosion.

5. In 1964, the State of Ohio Department of Natural Resources, Division of Geological Survey, published a report by Robert P. Hartley entitled, "Effects of Large Structures on the Ohio Shore of Lake Erie." The report contains general descriptions of the major harbors and the visible areas of accretion and erosion adjacent to the harbor structures. It contains no quantitative data on rates of accretion and erosion or detailed investigations of any particular harbor. However, it concludes that - "Most of the large structures along the Ohio shore have caused build-up of beaches on their updrift sides and accelerated erosion downdrift."

6. Several reports concerning the improvement of Vermilion Harbor in the interests of shallow-draft navigation accommodating commercial fishing vessels and recreational craft in recent years and the relatively small lake freighters during the early years have been prepared and published as House Documents. They are of particular interest in showing the progressive authorized changes in the harbor structures and contain limited information on the effects of the structures on shoreline changes. These reports are:

Document Number	Year
H.D. No. 252 58th Congress, 2nd Session	1903
H.D. No. 283 62nd Congress 2nd Session	1911
H.D. No. 231 85th Congress 1st Session	1957

The most recent study of Vermilion Harbor is contained in the General Design Memorandum prepared in 1971 prior to construction of the offshore breakwater. It also contains a report on the model study made by the Waterways Experiment Station.

NCBED-PS
SUBJECT: Preliminary Report on Section 111 Study of Vermilion Harbor, OH

LOCATION AND DESCRIPTION

7. Vermilion Harbor is located toward the westerly end of the south shore of Lake Erie. It is about midway between Lorain Harbor and Huron Harbor and about 11 miles distant from each of these deep-draft harbors. In its natural condition only the lower reach of the river, about one mile in length, had sufficient depth to accommodate even small craft. For about 3,000 feet above its mouth the river channel was about 75 feet wide and from 6 to 10 feet deep below low water datum.

HISTORY AND DESCRIPTION OF FEDERAL PROJECT

8. Construction of the piers at the mouth of the Vermilion River was undertaken by the Federal Government in 1836. At that time there was less than two feet of water over the bar at the mouth of the river. The original project consisted of parallel piers 125 feet apart running out into the lake from each side of the river mouth to reach a depth of 10 feet. In the spring of 1874, both piers were extended to the 12-foot depth contour. At that time the east pier was 1,075 feet long and the west pier was 1,175 feet in length. No further lakeward extensions of the piers have been made. The present lakeward ends, except for minor changes during pierhead reconstruction, are in their 1874 positions. The piers were originally constructed as stone filled timber cribs each one about 16 feet wide and 30 feet long. The top height of the cribs was about five feet above low water datum. Frequent and extensive repairs to both piers have been made. Some parts have been completely rebuilt and between 1907-14 the entire timber superstructure was replaced with heavy stone, raising the top height of the piers 6 to 6-1/2 feet above low water datum.

9. The original project depth in the entrance channel was 8 feet. This was increased to 12 feet by the River and Harbor Act of 3 March 1875. The project then provided for a 12-foot channel extending from the 12-foot contour in the lake upstream for a distance of about 1,335 feet from the outer end of the entrance piers. The channel deepening was completed in 1878 except for a small rock area near the inner limits of the entrance channel. Little maintenance of these project channels was required. Spring freshets and other high flows appear to have scoured the channel between the piers.

10. To provide safer entrance conditions and to improve the access channel to expanding facilities for recreational craft farther upstream, the 1958 River and Harbor Act authorized the construction of a new harbor entrance about 500 feet lakeward of the outer end of the east pier, formed by overlapping arrowhead breakwaters. It also authorized the

extension of an 8-foot channel upstream to the Liberty Street Bridge. The channel extension was generally 100 feet wide narrowing to 80 feet in the upper 430 feet. This authorization extended the project channel to about 3,600 feet upstream from the outer end of the rivermouth piers.

11. A model study of the proposed breakwater system was made in 1968-69. The study was limited to an investigation of the effects of various structures on wave action. The study showed that the arrowhead breakwater plan did not provide sufficient protection for full use of the harbor. A single breakwater, generally parallel to shore and about 300 feet lakeward of the outer end of the east pier was selected as a more effective and economical alternative.

12. The project features including new lake approach channels around the new breakwater are shown on the Project Map of Vermilion Harbor inclosed as Plate 1. The breakwater was physically constructed between June and October 1973 and channel dredging was performed between September and December 1973.

SHORE CHARACTERISTICS

13. General. Since the shore and beach characteristics and the streams entering the lake are the principal factors affecting the amount of available beach material, whose movement may be affected by the navigation structures at Vermilion Harbor, they are discussed briefly in the following paragraphs. More detailed descriptions are contained in the beach erosion control reports referred to in paragraph 3.

14. Shore and Beach characteristics east of Vermilion Harbor. Immediately east of the U. S. East Pier at the mouth of the Vermilion River at the present time there is an exposed sand beach about 250 feet wide tapering to zero width in a distance of about 2,500 feet to the east. Adjacent to the east pier at least another 300 foot width of beach fill that has accumulated since the east pier was completed in 1837 is now occupied by substantial homes and access roads.

15. The tapering beach area ends at the base of a steep shale bluff near the easterly limit of a summer resort area known as Linwood Park. The black Huron shale is exposed at the water's edge and its top surface is generally 6 to 15 feet above lake level. It is covered with glacial material from about 5 to 12 feet thick. The shale outcrop extends for about 2-1/2 miles to the east when it dips to just below lake level and remains at that level until it again rises above water level about one mile east of Lorain Harbor. From there to Cleveland the shale surface elevation increases until the entire 50-60 foot high bluffs are composed entirely of shale. In the 8 miles of shoreline between Vermilion

and Lorain Harbor where the shale surface is below lake level the bluffs are about 30 feet high and composed of glacial till at and above water level. This is generally covered by several feet of fine lacustrine clay deposited on the beds of post glacial lakes that have existed at higher levels than the present Lake Erie. Grain-size analyses of the bluff material have found only about 12 percent coarser than a 60-mesh sieve (0.25 mm) which is about the finest material found on existing beaches in significant amounts.

16. Shore and beach characteristics west of Vermilion Harbor. Westerly of Vermilion Harbor the Huron shale surface remains close to lake level. Immediately west of the west pier an exposed beach about 50 feet wide tapers to a width of 10 to 15 feet in a distance of about 600 feet. The bluff behind the beach is about 10 feet high and consists of boulder clay overlain with lacustrine clay. The height of the bluffs gradually increases toward the west reaching a maximum height of about 30 feet in a distance of four miles. The bluffs are nearly vertical and are partially protected by seawalls or short segments of narrow beaches impounded by short groins. The bluff generally consists of about equal thicknesses of the lower stratum of boulder clay that contains some coarse granular material, even up to boulder sizes in this instance, and an upper stratum of fine silt and clay.

17. The 11 miles of shore between Vermilion and Huron Harbors is almost completely developed with either permanent or summer residences. Most of these have been protected at some time during the past 65 years. Many of the earlier structures were stone filled timber cribs that have in many cases been restored with concrete superstructures. In 1951 when a complete inventory of shore structures was made there were 205 individual structures between Vermilion and Huron Harbors. This is an average of one structure in every 283 feet of shore at that time. The majority of the structures were short groins less than 150 feet long but a few were up to 470 feet long. At least 10 seawalls or bulkheads over 300 feet long had been built. Undoubtedly more structures have been added since 1951.

18. Streams. The Vermilion River that enters Lake Erie through Vermilion Harbor rises in the northern part of Ashland County, OH and follows a general northerly course for about 45 miles. Its drainage area is about 272 square miles. For about two miles above its mouth it is from 100 to 200 feet wide with natural depths up to 10 feet in the lower mile but generally less than three feet above that. The present Federal project channel that was deepened in 1973 to 8 feet extends about 3,600 upstream from the ends of the piers. High flows in the river during flood stages provide scouring velocities in the lower

reaches of the river and prior to the deepening in 1973 very little dredging was performed to maintain a usable channel. Except where beach sand is washed over the east pier into the channel, the sediment in the lower channel is mostly silt and mud. The river is not a significant source of beach building material.

19. Beaver Creek is the only sizable stream entering the lake between Vermilion and Lorain Harbors. It rises only 11 miles inland and has a drainage area of about 60 square miles. Although there is a sand beach at the river mouth it is due to the impounding of beach sand by a 400-foot jetty rather than material being supplied by the stream.

20. The Black River that enters the lake at Lorain Harbor is not a significant source of beach material since the lower three miles is dredged annually during maintenance operations. Whatever granular material is brought down by the river would be removed during the maintenance operations and removed from the littoral zone.

21. Several small streams enter the lake between Vermilion and Huron Harbors. There is no indication from previous studies that any of these streams contribute a significant amount of beach building materials.

FACTORS AFFECTING SHORE PROCESSES

22. Lake levels. The stillwater level of Lake Erie varies irregularly from year to year. Cycles of high and low stages, extending over periods of several years, follow each other with no consistent pattern. These cycles are produced primarily by rainfall and runoff in the Lake Erie and Upper Lakes basins. They are unpredictable with any degree of reliability except for perhaps 4 to 6 months in advance when the influence of precipitation and runoff during the preceding months and estimates of the same factors in future months can be combined with a fair degree of accuracy. Each year the lake surface is subject to consistent seasonal changes, the lowest stages occurring during the winter months and the highest during the summer.

23. In addition to the annual fluctuations, there are also oscillations of irregular amounts and durations produced by storms. Some local changes may have a duration of only a few minutes or up to several hours during which fluctuations are produced by local squalls and abrupt changes in barometric pressure. At other times the level of the entire lake is affected for longer periods by strong winds of sustained velocity and direction that drive the surface water forward to raise the level on the leeward shore and lower the level on the windward shore. This type of fluctuation is very pronounced on Lake

Erie because of its shallow depth that affords less opportunity for the wind-impelled surface water to return through reverse currents beneath the storm-disturbed surface. Oscillations of the lake surface may continue for many hours after abatement of the storm conditions by which they were produced.

24. The U. S. Lake Survey Center maintains automatic water level gages at Toledo, OH, about 60 miles northwest of Vermilion and at Cleveland Harbor, about 35 miles to the east. At Toledo, a wind setup of 3.3 feet recurs about once a year. A setup of 4.3 feet recurs about once every five years. Likewise at Cleveland, a wind setup of 1.5 feet recurs about once a year and a setup of about 1.9 feet recurs once in five years. By interpolation, a setup of about 1.8 feet annually and 2.3 feet every five years can be expected at Vermilion.

25. Pertinent data on Lake Erie levels, compiled from gage records at Cleveland Harbor, OH, are shown in the following table. Elevations, in feet are referred to mean water level at Father Point, St. Lawrence River, Quebec (International Great Lakes Datum) and to low water datum (LWD) for Lake Erie, elevation 568.6 feet.

Lake Erie Levels 1860-1974

Item	Elevation IGLD	Elevation LWD	Date
Highest monthly mean stage	573.51	+4.71	June 1973
Lowest monthly mean stage	567.49	-1.11	Feb. 1936
Long term mean surface (1860-1967)	570.36	+1.76	
Yearly Mean 1968	570.92	+2.32	
Yearly Mean 1969	571.54	+2.94	
Yearly Mean 1970	571.10	+2.50	
Yearly Mean 1971	571.27	+2.67	
Yearly Mean 1972	571.89	+3.29	
Yearly Mean 1973	572.71	+4.11	
Yearly mean 1974	572.52	+3.92	
Yearly mean 1975 (provisional)	572.27	+3.67	

26. Winds and wave action. No direct observation of wind or wave data have been made at Vermilion Harbor. For design purposes wave data was hindcast from wind data recorded at Lorain Harbor, OH, using methods described in the Coastal Engineering Research Center's Shore Protection Manual. The following table summarizes the basic data and the wave characteristics as developed for the design of the offshore breakwater.

Wind and Deep-Water Wave Characteristics

Fetch		Wind		Waves	
Direction	Length (Miles)	Velocity mph.	Duration ft.	Height ft.	Period Sec.
W	20	50	20	9.0	6.5
NW	50	42	12	9.0	7.5
N	50	33	12	8.5	7.0
NE	100+	35	24	11.0	8.0

27. A wave refraction study developed for design of the offshore breakwater disclosed no unusual patterns of convergence or divergence of wave energy due to irregularities of the bottom contours.

28. Littoral drift. Generally, the predominant direction of littoral currents and drift along the shoreline between Lorain and Huron, OH is east to west as indicated by the accumulation of sand to the east of the harbor structures at Beaver Creek, Vermilion Harbor, Huron Harbor and the smaller individual structures along the shore.

29. The longer fetch distances to the north and northeast across Lake Erie allow larger waves to develop than those that can develop over the shorter fetches from the west and northwest. Accordingly, greater total wave energy is directed westerly. Reversals of current and drift from the predominant east-west to a west-east direction do occur, as indicated by the accumulation of a small sand beach along the shoreline immediately to the west of Vermilion Harbor.

30. The likelihood of frequent reversals in the direction of littoral drift is confirmed by the wind pattern on Lake Erie. Because of the direction of the shoreline in the vicinity of Vermilion Harbor winds from the west-southwest, through west to northwest directions generate waves and currents tending to move beach material in a west to east

direction. According to a recent study of 10 years of wind records of the National Oceanographic and Atmospheric Administration (formerly U. S. Weather Bureau) at Hopkins Airport and Burke Lakefront Airport at Cleveland, OH, the average annual percentage frequency of occurrence of winds from WSW through W to NW totals 24.1 percent. Winds from the NNW through N to ENE that tend to create an east-west littoral drift occur 22.7 percent of the time. Winds from the remaining octants east through south to southwest are generally offshore and have little effect on littoral movement. From the standpoint of frequency alone this wind pattern should produce a net west-east movement but the physical evidence of predominant accretion of sand and gravel on the easterly side of existing structures demonstrates conclusively that easterly winds, although less frequent, are more effective in moving beach material. Further evidence that reversals of drift have occurred throughout the life of the project is found in the following statement from HD/252/58/2 written in 1903: "The piers terminate at the position occupied by the 12-foot contour in 1874. Sand travels around the west pier from the western foreshore and is deposited in an outer bar." Sand movement around the west pier is facilitated by the relatively shallow depth of water and hard bottom, probably shale, found in a wide area west of the west pier. The offshore slope is much flatter than that to the east of the piers. The 4-foot depth contour (LWD) intersects the west pier only about 100 feet from its outer end and is from 400 to 600 feet offshore for at least 1,000 feet west of the pier. By comparison, the 4-foot contour east of the piers is generally less than 50-feet offshore. These conditions have persisted over at least the last 30 years as shown by detailed soundings in the two areas.

31. Water seepage and frost action. The rate of erosion resulting from the sloughing of material from the face of the silt and clay bluffs is increased by the action of ground water, surface runoff and frost action. Although some of the bluff material is relatively impervious, it generally contains thin lenses of sand that allow percolation of ground water to the face of the bluff. During dry periods, shrinkage cracks occur near the surface, both on top and along the face of the bluffs, allowing surface water from subsequent rains to penetrate and further soften the bluff material. Freezing of water in these cracks and seepage lenses during the winter months hastens the disintegration process. This is also true of the shale bluffs found easterly of Vermilion Harbor but to a lesser degree.

32. Further weakened by wave undercutting large sections of the bluff frequently fall to the beach where wave action quickly breaks up and washes away the fine material. Unprotected bluffs cannot attain a stable slope and the process of sloughing, removal and undercutting by

wave action goes on in a continuous cycle. The rate depends to a large extent upon lake levels and the related intensity of wave attack.

33. The intensive development of the shore frontage with summer cottages and permanent homes adds to the seepage problem. Frequently the water supply is from public water mains supplied from sources outside the immediate area while sewage disposal is generally by means of individual septic tanks. Thus the ground water supply is increased which adds to the amount of seepage and, in turn, to the erosion problem.

ANALYSIS AND STUDY OF THE SPECIFIC PROBLEM

34. General. The specific purpose of this preliminary investigation is to determine whether the navigation structures built at Vermilion Harbor are contributing to the erosion of the adjacent shore. This requires consideration of potential effects that the structures might have. The obvious potential sources of damage, generally applicable to all major structures built along the shore are: (1) the interception of littoral drift that may contribute to the starvation and erosion of downdrift beaches and; (2) the concentration of wave energy in or near the harbor by wave reflection or diffraction from the harbor structures that may increase the erosion or cause other damage at specific locations.

35. These potential causes of damage in the vicinity of Vermilion Harbor have been determined in this preliminary investigation to the extent possible using available information on file without further field surveys or extensive studies made specifically for this investigation. Considerable information is available from previous studies, surveys, and reports. From this information rough calculations of the amount of material that has been impounded by the harbor structures and removed by maintenance dredging have been made. Rates of erosion reported in previous studies have been reviewed and updated by comparison of large scale aerial photos of the shoreline on both sides of Vermilion Harbor taken in 1948, 1968, 1973 and 1974.

36. The authorized Federal navigation improvements at Vermilion Harbor between 1836 and 1973 consisted only of two parallel piers at the river mouth and the maintenance of a 12-foot channel for a distance of about 1,335 feet upstream from the outer ends of the piers. Therefore, it is considered advisable to consider the effect of this first improvement on the adjacent shoreline up to the time of construction of the offshore breakwater in 1973 and to consider separately the combined effects of the breakwater, piers and improved channels from 1973 to the present time.

37. Shoreline changes 1836-1973. The earliest available information concerning the effects of the river mouth piers is a drawing, dated 5 January 1847, that shows soundings between the piers and out to about 800 feet off their lakeward ends. Soundings between the piers, uncorrected for lake stage, taken on 4 January 1847 show channel depths generally from 11 to 14.5 feet. Off the end of the piers is a horseshoe shaped shoal with a least depth of 6 feet. The drawing also shows earlier soundings taken between the piers, in August 1845, when the channel depth was only 6 to 8 feet. It appears that the survey made on 4 January 1847 was an investigation following a flood flow in the river that scoured the channel between the piers and deposited the shoal lakeward of their outer ends.

38. Two notes on this drawing are of particular interest to the present study. At the inner end of the east pier is a note reading; "500 foot deposit of sand and flood wood since 1837." Flood wood is now called debris. Such a deposit area near its inner end is shown tapering off to the east of the east pier. To the west of the inner end of the west pier is another note reading; "100 feet gone off the west side since 1837." A shaded area 100 feet wide and about 600 feet long perpendicular to the west pier indicates the eroded area.

39. This drawing indicates rapid and substantial changes in the shore immediately adjacent to the piers in the 10 years following their construction. Lakeward movement of the shoreline averaged 50 feet annually on the east side and erosion of 10 feet annually occurred on the west side. Apparently the shoreline continued to build lakeward and bars continued to form lakeward of the piers because the 1872 annual report of the Chief of Engineers states that $5,000 was to be expended in deepening the channel across the outer bar and inside near the west pier. The following year (1873) a contract was awarded for a 132-foot lakeward extension of the east pier and a 66-foot lakeward extension of the west pier. The contract also provided for the base of the east pier to be connected to shore.

40. During the period 1867 to 1880 the position of the shoreline fluctuated widely. A drawing, inclosed as Attachment No. 1, that was part of the Chief of Engineers annual report for 1880, shows the location of the shoreline adjacent to both sides of the piers in 1867, 1872, 1874 and 1880. The cause for concern over the shore connection of the east pier in 1873 is clearly indicated by the 1872 position at the shoreline which was about 375 feet shoreward of its 1867 position and close to the inner end of the pier. No record of a breakthrough at this point has been found.

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41. In 1884, ten years after the lakeward extension of both piers, the annual report of the Chief of Engineers contains the following statement: "The sand is also steadily encroaching around the ends of the piers into the channel and to arrest the progress it will be necessary to extend the piers, say 500 feet farther into the lake." The annual reports for the next four years contained the same statement but in 1888 it was reported that examination of the channel on 6 July 1888: "showed a least depth of 10.7 feet from the lake to the town landing." The report for 1890 stated that an examination in June 1890 also showed a least depth of 10.7 feet. Five years later, in 1895, the annual report states: "The channel depths between the piers at Vermilion vary less than at most other places on the lake. No bars have formed since completion of the piers." (1874) It seems evident that sometime between 1884 and 1895 the shore processes reached a state of equilibrium in the immediate vicinity of the piers. It was not a condition of static equilibrium as the position of the shoreline immediately adjacent to the piers still fluctuated widely but very little maintenance dredging was required to maintain a usable channel through 1973. Erosion west of the west pier stopped in part due to protection that has been provided but the shoreline has consistently remained lakeward of its 1893 position. The following table taken from the 1958 report on Vermilion Harbor, published in House Document No. 231/85/1, updated by more recent observations from surveys and aerial photos, shows the changes in the shoreline between 1854 and April 1973 at the east and west piers and 100 feet east and west of the piers.

42. Shoreline changes east of Vermilion Harbor (1836-1973). The accretion area easterly of the east pier extends roughly 1/2 mile in that direction. Shoreline changes at greater distances from the harbor piers are also pertinent to this investigation. Two complete surveys of the shoreline are available from which reliable long range comparisons may be made. Both surveys were made by the U. S. Lake Survey - the first in 1876 and the other in 1948 during the State of Ohio beach erosion control study. The report on that study found that between 1/2 mile and three miles east of the east pier, the shore moved landward an average of about 40 feet in the 72 year period between 1876 and 1948, an average of about 1/2 foot per year. As previously described this 2-1/2 mile reach of shore consists of shale bluffs which are relatively resistant to erosion. The next three miles of shore between the shale area and Beaver Creek eroded an average of about 135 feet during the 72 year period or about 1.9 feet annually. A maximum of 280 feet was lost in the area just west of Beaver Creek or an average of about 3.9 feet annually in spite of partial protection provided to the railroad right-of-way in this reach by timber piling and stone riprap. The beach erosion control study (HD 229/83/1) found that an annual net loss of 37,750 cubic yards of

material occurred between Vermilion and Beaver Creek in the 1876-1948 period. Of this amount, only about 12 percent or 4,500 cubic yards, was found to be granular material coarse enough to provide beach material.

Shoreline Changes 1854-1973

Year	Distance in feet from outer ends of piers to shoreline: 100' west of W pier	At W pier	At E pier	100' east of E pier	Source
1854	1,050	1,110	430	458	House Doc. 231/85/1
1874	1,098	960	380	405	"
1893	1,120	1,090	430	462	
1907	1,081	755	382	420	
1921	1,110	788	335	423	
1932	570	310	320	362	
1935	620	565	331	378	
1942	586	538	335	391	
1946	910	780	280	325	"
1948	1,032	760	347	380	Aerial photos
1967	570	485	320	380	Surveys
1968	990	730	423	442	Aerial photos
1973	1,012	953	340	380	Aerial photos

Note: Prior to 1948 it is not known whether distances taken from House Document 231/85/1 have been corrected for changes in lake levels.

43. A comparison of 1968 and 1973 aerial photos of this same reach shows an annual rate of erosion of 3 to 4 feet or at least double that for the 1876-1948 period. Assuming the same percentage of granular content as earlier studies indicate, about 9,000 cubic yards of beach material must have been supplied to the shore annually during the 1968-1973 period.

44. Shoreline changes west of Vermilion Harbor (1836-1973). The beach erosion control study of the area west of Vermilion (HD 32/83/1) reports an average shoreline erosion of 57 feet for the reach between Vermilion and Darby Creek for the period 1877 to 1939. This is an average loss of about 0.9 foot per year. Darby Creek is about two miles west of Vermilion Harbor.

45. A study of shoreline changes in the vicinity of Vermilion made in 1935 indicates that the Vermilion piers afford protection to the shoreline immediately to the west from the more severe northeasterly storms. At the west pier, the 1935 shoreline was about 395 feet lakeward of the 1874 shoreline and tapered landward to coincide with the 1874 shoreline at a point about 300 feet west of the pier. From there the two shorelines nearly coincided to a groin located about 800 feet west of the west pier. This groin was constructed in 1933 and is about 430 feet long. At the west side of the groin the 1935 shoreline was 300 feet lakeward of the 1874 shoreline and again tapered to meet the latter about 450 feet west of the groin. A buildup on the west side of shore structures to this extent is not consistent or even typical of conditions near Vermilion but it does demonstrate that strong reversals of drift do occur. The distances from the west pier to the shoreline at the inner end of the pier and 100 feet to the west shown in the table in paragraph 41 show wide fluctuations but also show that overall erosion has not increased since 1854.

46. A comparison of 1968 and 1973 aerial photos shows that the bluff erosion west of Vermilion to Darby Creek generally averaged between 1 and 2 feet annually, a little higher than the 0.9 foot per year during the 1877 to 1939 period. The 1968 aerials taken at a time when the lake stage was about 2.1 feet lower than that when the 1973 photos were taken show exposed beaches to the east of most groins. Many of these beaches do not appear in the 1973 photos because of the higher lake stage and more bluff erosion is evident.

47. Comparison of the rates of erosion east and west of Vermilion is not a good measure of the effect of the harbor piers on the shoreline. The natural shale bluffs beginning about 1/2 mile east of the east pier are more erosion resistant than other sections of the frontage. Erosion

of the shore to the west has been reduced by the extensive protection provided by groins and seawalls.

48. Dredging operations (1867-1973). A remarkably small amount of maintenance dredging was required to maintain usable channels in Vermilion Harbor between 1867 and 1973. The amount of dredging to maintain the Federal project is shown in the following table. Records prior to 1367 are not readily available. Local interests have done a small amount of dredging during this period principally in the river channel above the Federal project. No records of these dredgings are available.

Maintenance Dredging Vermilion Harbor 1867-1973

Year	Amount c.y.	Type of material	Location
1873	2,216	Solid and loose rock	Between piers
1879	2,026	Sand and gravel	
	659	Loose rock	
1915	10,530	Mostly shale rock	Between piers and in lake
1935	Unknown	Type unknown Cost $4,840	Entrance Channel

49. Summary of effect of piers (1837-1973). From the foregoing analysis it seems evident that the Vermilion Harbor piers had a significant effect on the immediately adjacent shoreline during about a 50-year period following their completion in 1837. The beach area that had been influenced by the harbor structures extended about 3,900 feet east of the east pier. Accretion on the easterly side advanced the shoreline lakeward about 500 feet within 10 years following construction of the piers and erosion on the west side of about 100 feet occurred during the same period. In 1874 both piers were extended to prevent sand from moving around the ends of the piers to block the channel or to create offshore bars. The same troubles were reported for the next 14 years. Available shoreline changes before and after the extension in 1874 are shown on Attachment No. 1. By 1888, with no further changes in the piers, conditions had apparently stabilized and the channels remained remarkably clear with very little maintenance. Due to reversals in the direction of littoral drift, variation in lake levels, and other natural causes, there have been periodic and temporary landward and

lakeward movements of the shoreline on both sides of the piers since that time but, in general, the shore near Vermilion Harbor was relatively stable from 1838-1973.

50. During the early years of the project, the benefits from protection and improvement of a long reach of shore to the east were considered to outweigh the erosion damage to the west. Since there are no continuing damages attributed to the pier structures, no action towards preventing erosion for that portion of the harbor is warranted under Section 111.

51. Effect of existing project including offshore breakwater (1973-1975). As discussed in paragraphs 10-12, the Vermilion Harbor project was modified in 1973-74 by the construction of an offshore breakwater about 864 feet long generally parallel to shore and about 300 feet lakeward of the outer end of the east pier. To evaluate the effect of the new structure on the adjacent shoreline all available survey data covering the period from about six years before construction started in June 1973 up to the present time has been utilized. Data available include the following:

a. 1967 hydrographic survey with soundings and beach profiles on 100-foot centers from 700 feet east of the east pier to 800 feet west of the west pier, extending lakeward to about 20-foot depth;

b. April 1968 aerial photos covering at least five miles each side of Vermilion;

c. April 1973 aerial photos taken about two months prior to start of construction;

d. September 1974 aerial photos taken about 11 months after completion of the breakwater;

e. November 1975 hydrographic survey with soundings and beach cross-sections approximately on 500-foot centers from the east pier eastward for about 3,500 feet and extending lakeward to about 10-foot depth;

f. Before and after contract dredging soundings between the piers and in the entrance channels outside the piers, taken in August 1973 and November 1973-January 1974; and

g. Examination soundings in the same areas taken in October 1975 and December 1975.

52. The first five items have been utilized in studying shoreline changes and items f and g were used in determining the amount of shoaling in the project channels since they were deepened to project depths. There is insufficient survey information available to permit quantitative measurement of erosion and accretion rates along the shoreline during this period. However, changes in the shoreline are indicative of relative rates and amounts of erosion. Typical beach and bottom profiles were plotted to determine the beach and bottom slopes and to find whether changes in the slope have occurred between 1967 and 1975. These are shown on Attachment No. 2. No significant changes were found and a consistent 1 on 13 slope from the beach berm to several feet below lake level was found at two widely separated 1975 profiles. Using those beach and bottom slopes and the known lake levels at the time the aerial photos were taken and the hydrographic survey was made, the shorelines of 1968, 1973 and 1975 have been adjusted to a common lake level.

53. A line perpendicular to the east pier at its outer end was used as a common base line from which distances to the shoreline were carefully scaled on the aerial photos and sounding maps. Distances were interpolated at points between the stations where cross sections were taken during the November 1975 hydrographic survey. This approximation is fairly reliable in beach areas where shoreline changes are uniform. However, interpolation is not reliable and was not used in the bluff area starting near the eastern end of the Linwood Park Beach. The following table summarizes the scaled distances.

Distance to Water's Edge From Baseline Normal to Outer End E. Pier

Distance East from pier(ft.)	Distance from end of East Pier to water's edge (ft.)								
	April 1968	April 1973	Change 1968-73			Nov. 1975	Change 1973-75		
LAGOONS BEACH									
0	454	340	A	114		182	A	158	
100	484	380	A	104		222	A	158	
200	504	420	A	84		262	A	158	
300	523	440	A	83		302	A	138	
400	527	455	A	72		347	A	108	
500	515	455	A	60		387	A	68	
600	501	455	A	46		412	A	43	
700	492	460	A	32		439	A	21	
800	496	470	A	26		462	A	8	

NCBED-PS
SUBJECT: Preliminary Report on Section 111 Study of Vermilion Harbor, OH

Distance to Water's Edge From Baseline Normal to Outer End E. Pier (Cont'd)

Distance East from pier(ft.)	Distance from end of East Pier to water's edge (ft.) April 1968	April 1973	Change 1968-73	Nov. 1975	Change 1973-75	
LINWOOD PARK BEACH						
900	492	465	A 27	462	A 3	
1000	469	435	A 34	442	E 7	
1100	454	420	A 34	437	E 17	
1200	415	390	A 25	437	E 47	
1300	392	370	A 22	432	E 62	
1400	346	350	E 4	429	E 79	
1500	339	350	E 11	417	E 67	
1600	339	365	E 26	412	E 47	
1700	339	370	E 31	415	E 45	
1800	339	360	E 21	402	E 42	
1900	319	340	E 11	402	E 62	
2000	312	335	E 23	397	E 62	
2100	308	335	E 27	398	E 63	
2200	308	335	E 27	397	E 62	
2300	294	350	E 56	391	E 41	
2400	281	365	E 84	391	E 26	
2500	269	360	E 91	398	E 38	
2600	269	350	E 81	392	E 42	
2700	266	360	E 94	382	E 22	
2800	266	370	E 104	377	E 7	
2900	262	370	E 108	370	0	
3000	258	340	E 72	340	0	(Shale)
NAKOMIS BEACH						
3100	250	310	E 60	315	E 5	(Shale)
3200	223	290	E 67	NA	Unknown	
3300	215	290	E 65	NA	Unknown	
3400	190	280	E 90	287	E 7	(Shale)
CRYSTAL SHORES						
3500	175	270	E 95	NA	Unknown	(Shale)
3600	150	235	E 85	NA	Unknown	(Shale)
3700	135	170	E 35	NA	Unknown	(Shale)
3800	110	140	E 30	NA	Unknown	(Shale)

A - Accretion
E - Erosion
NA - Not Available

54. The 1968, 1973 and 1975 shorelines and the baseline are shown and 1973 aerial photo, inclosed as Attachment No. 3. The 5-year interval between the April 1968 and April 1973 aerial photos was a period almost immediately prior to construction of the detached breakwater which was undertaken and physically completed between June 1973 and October 1973. The interval between the April 1973 photos and the November 1975 survey covers a 2-1/2 year period from the start of construction of the breakwater to about two years after its completion. The changes in the shoreline for the 1968-73 and the 1973-75 periods shown in columns 4 and 6 of the table occurred during periods closely representative of conditions immediately before start of construction of the breakwater and immediately after its completion.

55. The shoreline changes between April 1968 and April 1973 could not, of course, have been influenced by the detached breakwater but were strongly affected by the above-average lake levels that were already rising in 1968 and reached a record peak level in June 1973 that was about 4.9 feet above low water datum and about 2.5 feet above the long term mean level for the month of June. The highest monthly mean levels ever recorded occurred during the months of January through October 1973. Record levels for November and December occurred in 1972. Near record levels continued through 1974 and were only about 0.6 to 0.8 feet lower during the summer of 1975. Thus throughout the entire periods being considered, both before and after construction of the detached breakwater, lake levels were exceptionally high (see chart on page 7). The effect of the high lake levels on shoreline changes must therefore be considered concurrently with the effect of the new detached breakwater.

56. The shoreline changes between 1968 and 1975 are shown graphically on the aerial photo inclosed as attachment No. 3, and numerically in the table on page 15. It is clearly evident that substantial changes occurred between 1968 and 1973 in the 4,000 feet of shoreline east of the east pier. The beach was entirely lost in the Crystal Shores and Nakomis Beach frontage. An average beach width of about 60 feet was lost in the Crystal Shores frontage and about 70 feet in the Nakomis Beach area. Erosion also occurred in the easterly three-fourths of the Linwood Park Beach varying from about 100 feet at the easterly end to zero about 600 feet from the westerly end of its frontage. The average loss was about 51 feet. In the westerly 600 feet of Linwood Park Beach and the approximately 800-foot frontage of Lagoons Beach, accretion between 1968 and 1973 widened the beach an average of about 55 feet and a maximum of 114 feet at the east pier.

57. Between April 1973 and November 1975, the period following start of construction of the detached breakwater, little, if any, change occurred

in the shoreline of Crystal Shores and Nakomis Beach. The beach had already been lost prior to April 1973 and the erosion resistant shale bluff suffered little change within the accuracy of the available survey data. Practically the entire length of Linwood Park Beach suffered erosion between 1973 and 1975. The only exceptions were about 100 feet at the extreme east end that is in the shale bluff area which resisted erosion and about 100 feet at the extreme west end where minor accretion occurred. The average loss in the eroding portion of Linwood Beach was about 44 feet. Accretion from near the west limit of Linwood Park Beach to the east pier varied from 3 feet to 158 feet. In November 1975 the shoreline was only about 182 feet from the outer end of the east pier, the most lakeward position of the beach found in any records during this preliminary investigation. The Lagoons Beach area and the extreme westerly end of Linwood Park Beach, a total distance of about 900 feet east of the east pier, is the only frontage where accretion has consistently occurred since 1968.

58. It is unlikely that changes during the 1968-1973 period occurred at a uniform rate but probably accelerated with time as the lake levels increased throughout the period. For this reason, it is not possible to arrive at a reliable average annual rate of change prior to start of construction of the breakwater for comparison with an annual rate since its construction. It is significant to note, however, in analyzing the effect of the breakwater that substantial shoreline changes occurred before the breakwater was built and that the same pattern has continued since its construction.

59. Less survey information is available for the shore west of the west pier. Aerial photos, taken in April 1973 just prior to start of construction of the breakwater and another set taken in September 1974 a year after its completion, were compared. Locations of the shoreline at the west pier and at 100-foot intervals out to 800 feet are shown in the following table.

60. Further comparison of the April 1973 and September 1974 aerials for a distance of about 3/4 mile west of the west pier indicates no other significant changes in the shoreline. Most of the shore is protected by seawalls or by short sections of sand beach impounded by groins. Both sets of photos show sand beaches generally on the east side of the groins. The lake stage on both sets of photos is the same and there are no readily discernable changes in the size or width of the beach areas. Scale inaccuracies do not permit a precise comparison but it is quite evident that no significant changes have occurred within the 17 month period following the start of construction of the detached breakwater.

Location of Shoreline West of West Pier

Distance west of west pier(ft.)	Distance from outer end w. pier: Apr. 1973	Sept. 1974	Movement 1973-1974: Lakeward	Shoreward
0	970	883	87	
100	1020	940	80	
200	1100	1004	96	
300	1120	1070	50	
400	1170	1107	63	
500	1185	1153	32	
600	1185	1172	13	
700	1220	1200	20	
800	1265	1232	33	

As is readily apparent, accretion or lakeward movement of the shore is found at all points.

61. Outer Harbor Fill and Dredging Quantities. Deepening of the outer harbor between the ends of the piers and the new detached breakwater was accomplished between September 1973 and December 1973. The area was sounded after dredging during the period November 1973 to January 1974. Examination soundings of the same areas were taken in October 1975. For convenience in computing dredging areas and quantities the overall area was divided into the four areas shown on Plate 1. Area D was not dredged but a comparison of before dredging soundings with the later examination soundings was made to determine, what, if any, changes in depth had occurred. Before dredging soundings were taken on 7-8 August 1973 in all areas.

Outer Harbor Fill and Dredging Quantities

	Date	Area A	Area B	Area D
Avg. depth before 1973 dredging	7-8 Aug 73	10.1	10.2	9.0
Avg. depth after 1973 dredging	Dec 1973	13.3	12.8	-
Estimated amount dredged (cy.)	May 73 - Dec 73	11,850	14,300	-
Avg. depth prior to Dec 1975 maintenance dredging	Oct 1975	13.1	10.7	8.1
Avg. depth after Dec 1975 maintenance dredging		-	11.7	-
Estimated amount dredged Dec 75		0	8,550	0
Estimated fill since Nov 73 dredging (cy.)	Dec 73 - Dec 75	740	8,550	1,650

Examination of the data in the above table shows that in Area A which is essentially the approach channel around the easterly end of the detached breakwater average shoaling of only 0.2 foot occurred. However, in Area B, which is the improved area between the breakwater and the piers, the average shoaling amounted to 2.1 feet and the average depth returned to within 0.5 foot of its original condition. Average shoaling of about 0.9 foot occurred in Area D where no dredging has been done since construction of the breakwater.

62. Maintenance dredging to remove shoals between the piers has been done on three occasions since December 1973. Material washed over the east pier during northeasterly storms has partially blocked the entrance and required removal. Dredging operations have been undertaken as follows:

Dredging Quantities Between the Piers

Date	Quantity c.y.	Disposal Area
25 June - 2 July 1974	5855	Over west pier
24 Feb - 10 Mar 1975	3000±	Over west pier
12 Nov - 20 Nov 1975	2350	Beach near sta. 3000

63. Grain size analyses of the sediment deposits or dredged material have not been made. However, visual examination shows the deposit between the piers to be poorly-sorted, silty, gravelly sands. Offshore material between the jetties and the breakwater is generally much finer consisting of clayey-silts with some pockets of silty-sands with traces of gravel. The high clay and organic detritus content indicates that the bulk of the outer harbor sediment is probably material brought down by the Vermilion River. The finer portion of littoral material that is normally carried in suspension has probably settled out in the relatively quiet water behind the breakwater and also contributed to this deposit. Further, some of the beach material which has washed over the east jetty and deposited between the jetties is probably carried by the Vermilion River during periods of high discharge into the outer harbor where the gravels and sands quickly settle out in isolated pockets. The deposits between the jetties and behind the breakwater represent a combination of littorally and fluvially transported material. The relative influence of each source varies with location, river discharge, and wave conditions.

64. Discussions. From such information as is available for this preliminary study, the shoreline changes and the factors affecting the changes have been presented during a period from five years prior to start of construction of the detached breakwater in 1973 to December 1975, a little over two years following its completion. It has been found that during this entire period there has been consistent movement of beach material toward the east pier. The buildup at the pier has progressed farther lakeward toward its outer end than has been previously recorded. Since April 1968, the length of the accretion area easterly of the east pier has shortened and the erosion area to the east has lengthened. At about 2,900 feet east of the east pier the direction of the shoreline changes where the vertical shale bluff comes close to the shore. The beach now extends only to the latter point and about 1,000 feet of beach that existed farther to the east in 1968 has eroded.

65. Erosion of this beach began during the period of high lake levels that has persisted since 1968 and the trend has continued to the present time. It is not possible at this time to separate the effects of the high lake levels on shoreline changes from effects of the harbor structures, particularly the effect of the detached breakwater. It is characteristic of such structures to cause deposition of littoral material on their shoreward side. This may account for the rapid sedimentation in the area between the breakwater and the end of the piers. However, most of this material is too fine for beach building material as indicated by visual examination. The detached breakwater will also shield part of the shore to the east of the piers from direct wave action from westerly and northwesterly storms. It may, therefore,

reduce to some extent the reversals of drift that tend to stabilize the shore. However, a quantitative estimate cannot be determined at this time.

66. Whether the detached breakwater is in any way responsible for the increased overtopping of the east pier that has required frequent maintenance dredging between the piers is open to question. That little or no maintenance at this location was required prior to construction of the breakwater strongly implies its responsibility for the change. However, the record high lake levels that have increased the beach berm height relative to the height of the east pier and the higher elevation of wave runup from northeasterly storms may be the cause of the increased overtopping. More time and study is needed to evaluate the effect of the detached breakwater, particularly during a period of more normal lake levels.

CONCLUSIONS

67. Based on this preliminary study, the following conclusions can be made:

a. The original piers and later extensions had significant effect on the adjacent shoreline during the first ten years following their completion in 1937. Rapid accretion easterly of the east pier and a lesser amount of erosion west of the west pier occurred. Within 50 years, or by 1888, the volume of material on both sides reached a state of apparent equilibrium.

b. From the period 1888 until 1973, the shoreline remained relatively stable with only minor periodic and temporary landward and lakeward movements of the shoreline on both sides of the pier due to reversals in the direction of litteral drift, variation in lake levels and other natural causes. Since there are, therefore, no continuing damages attributed to the pier structures, no action towards preventing erosion for that portion of the harbor is warranted under Section 111.

c. Since the completion of the detached breakwater in October 1973, approximately 11,000 cubic yards of shoaling material has been removed from between the harbor piers to provide necessary project depth. During the same period, approximately 3,550 cubic yards of material was removed from the outer harbor portion of the project. Visual examinations of the dredged material indicates that the material removed from between the piers is primarily poorly sorted, silty, gravelly sand. On the other hand, the material dredged from the outer harbor is generally much finer and consists of clayey-silts with some pockets of silty-sands

with traces of gravel. The high clay and organic detritus content indicates that the major portion of the material removed from the outer harbor is most likely material brought down by the Vermilion River.

d. Construction of the detached breakwater portion of the harbor was initiated in June 1973 at a time of record high lake levels. Since that time, significant shoreline changes have occurred, particularly to the east of the east pier. However, the accretion and erosion that has occurred to the east between the start of breakwater construction in June 1973 to November 1975 is very similar to the accretion and erosion that occurred between 1968 and May 1973. Since the period 1968-1975 has been a period of abnormally high levels on Lake Erie, it is not possible at this time to differentiate between the shoreline changes to the east that may have been caused by the high lake levels and those that may be attributed to the detached breakwater.

e. More study is required to evaluate the effect of the detached breakwater, particularly during a period of more normal lake levels.

RECOMMENDATIONS

68. It is recommended that:

a. No action be taken at this time under Section 111 to prevent or mitigate shore damages in the vicinity of the Vermilion Harbor since it cannot be determined whether the recent shoreline changes are due to abnormally high lake levels or the detached breakwater.

b. A monitoring program be accomplished over the next five year period using operations and maintenance funding. The monitoring program would include:

(1) Beach and bottom cross-sections at 200-foot spacing extending for a distance of 4,000 feet east of the east pier and 2,500 feet west of the west pier and lakeward to the 20-foot depth contour utilizing the baseline used in the November 1975 survey.

(2) Sampling and grainsize determination of beach and bottom materials along cross-sections 400 feet apart.

(3) Sampling of bottom material in the outer entrance and between the piers.

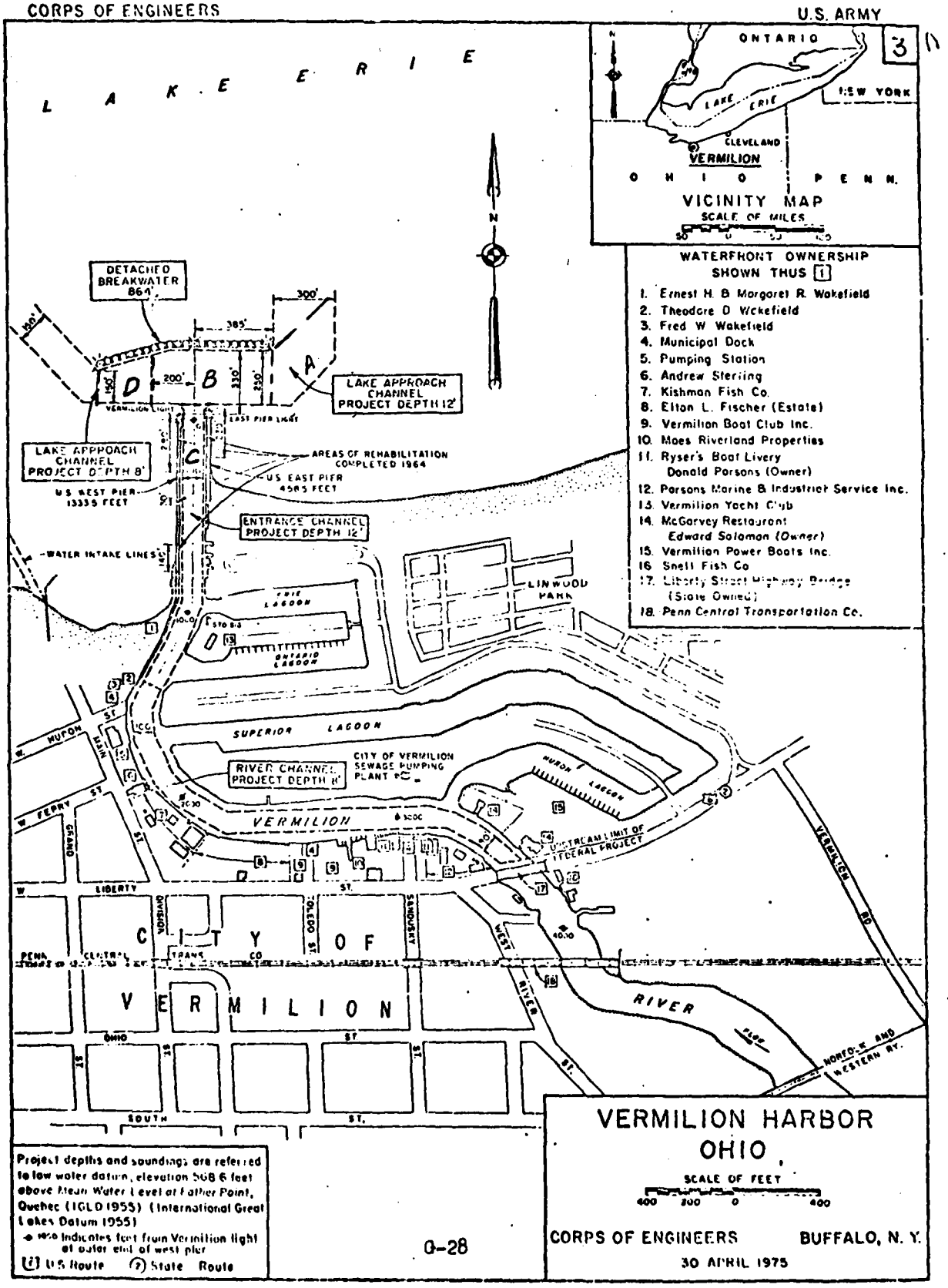
(4) Monitoring of the project for unusual developments that might warrant more or less frequent surveys.

c. A supplemental Section 111 study be prepared in 1981 based on the results of the five-year monitoring program.

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CORPS OF ENGINEERS

U.S. ARMY



Project depths and soundings are referred to low water datum, elevation 568.6 feet above Mean Water Level at Father Point, Quebec (IGLD 1955) (International Great Lakes Datum 1955)

-10.0 Indicates feet from Vermilion light at outer end of west pier

[17] U.S. Route (17) State Route

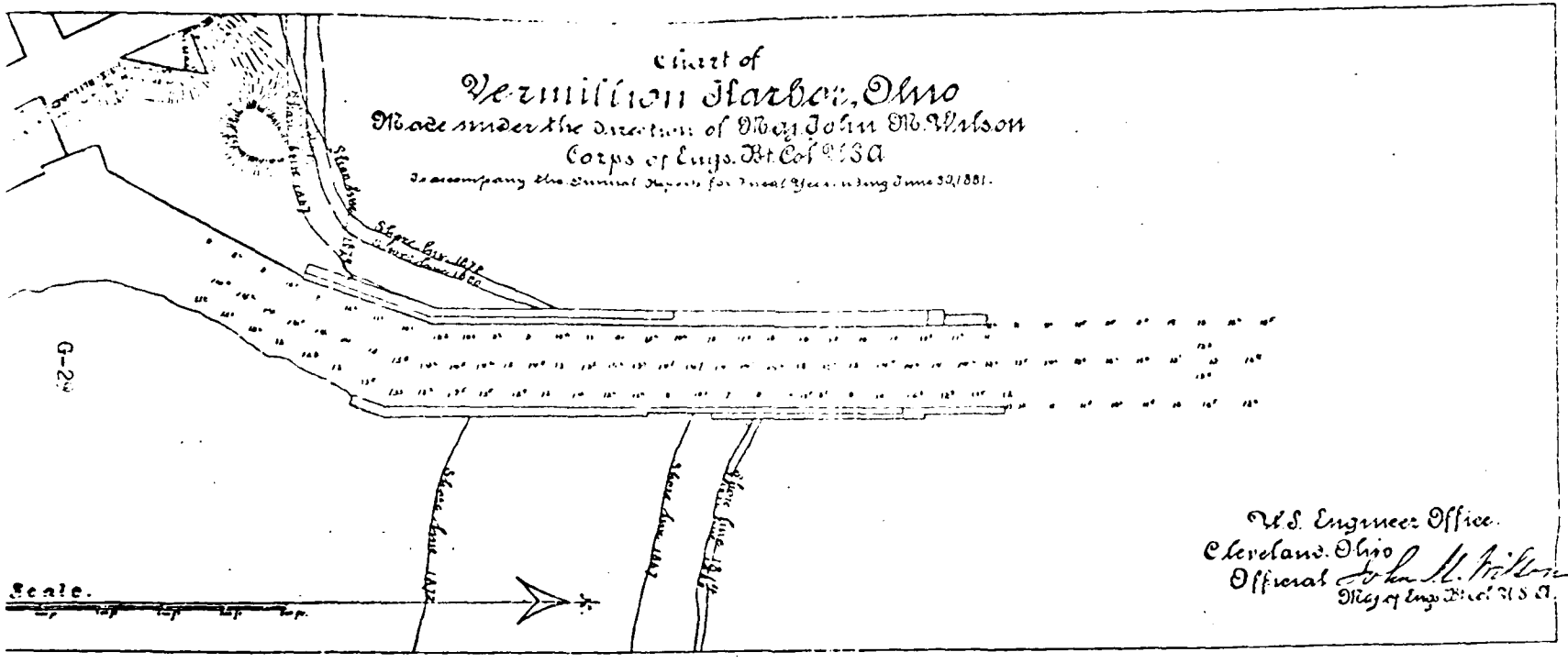
VERMILION HARBOR
OHIO

SCALE OF FEET

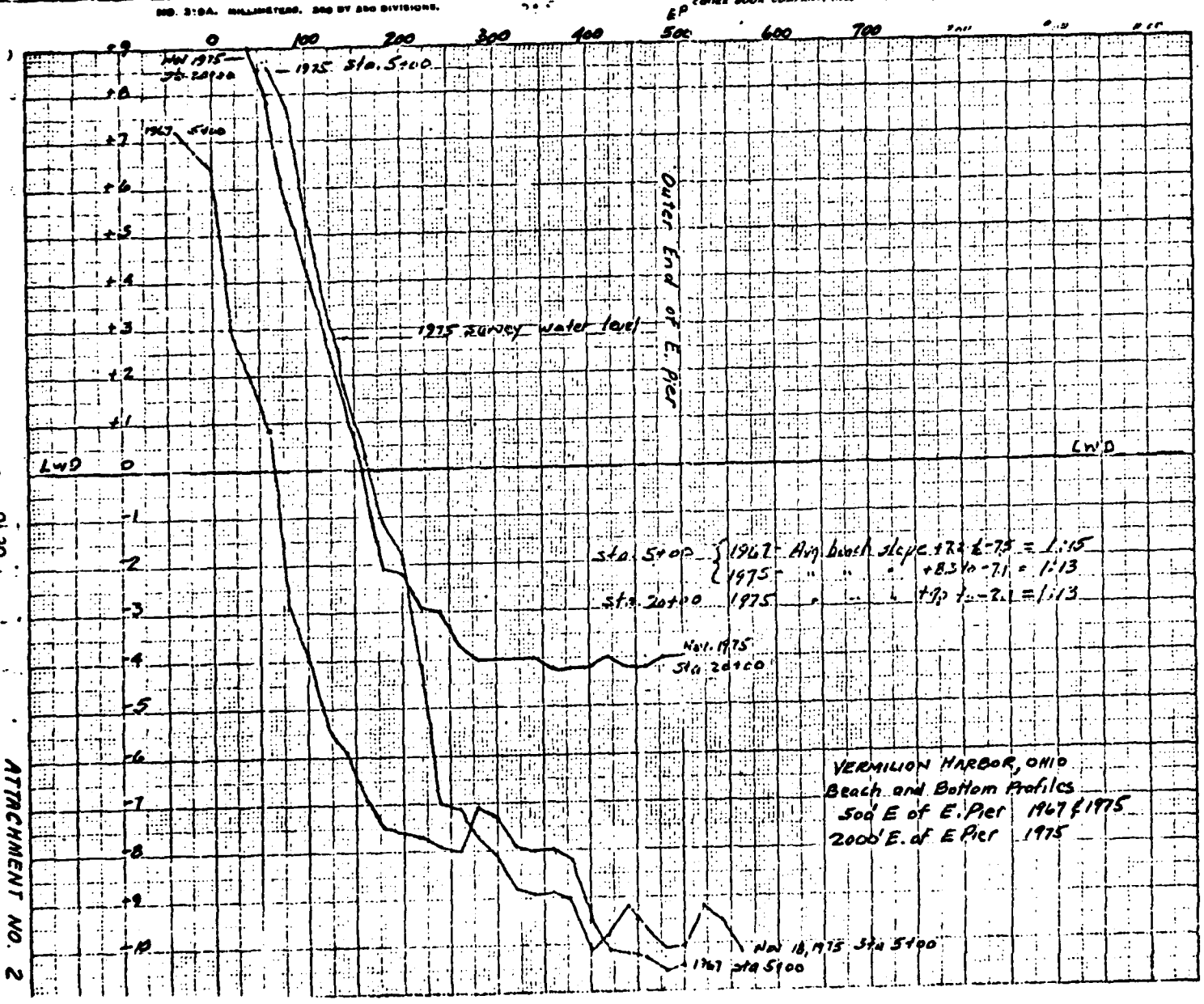
400 200 0 400

CORPS OF ENGINEERS BUFFALO, N. Y.

30 APRIL 1975



ATTACHMENT NO. 1



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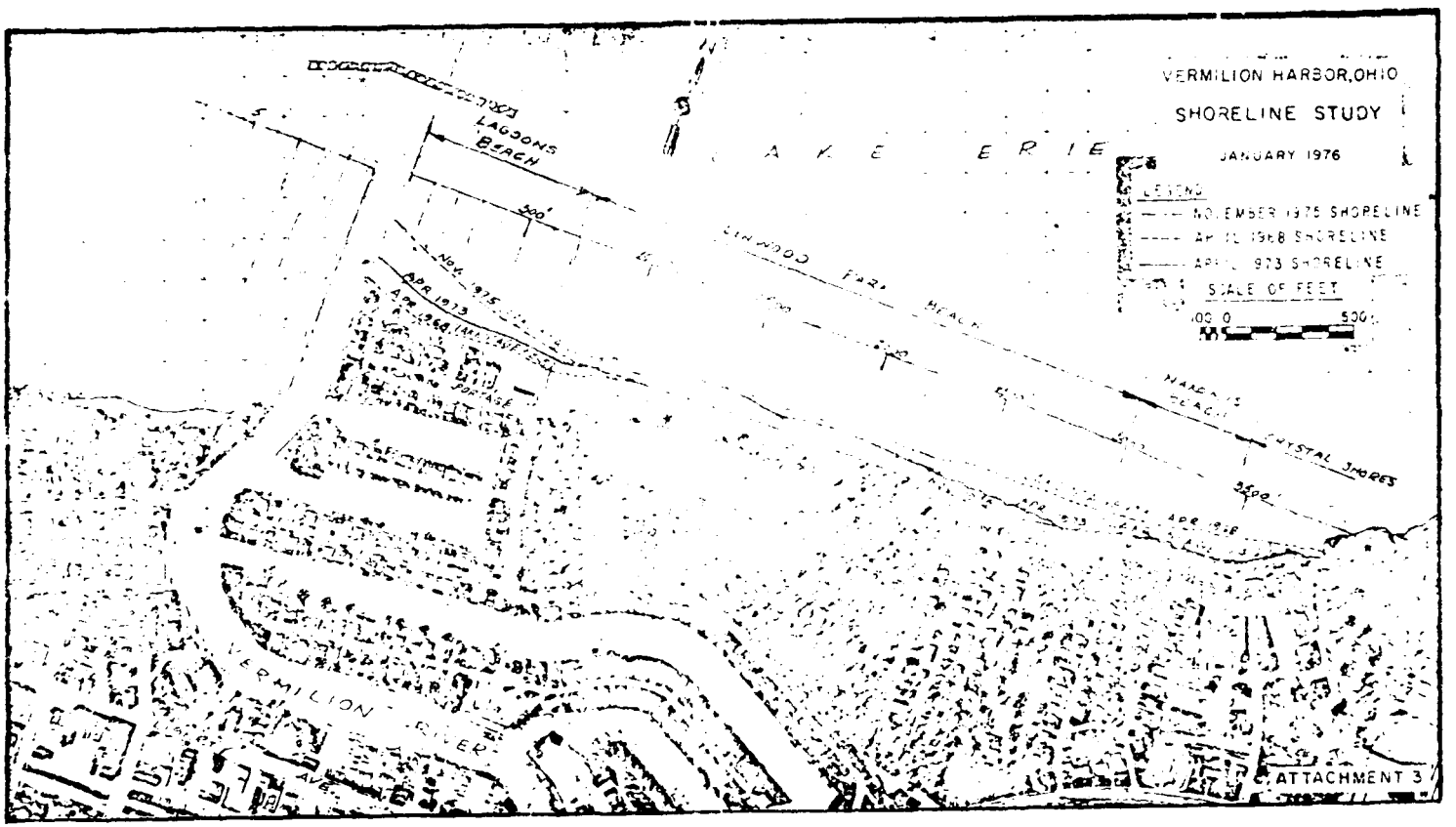

VERMILION HARBOR, OHIO
SHORELINE STUDY
JANUARY 1976
LEGEND
NOVEMBER 1975 SHORELINE
APRIL 1968 SHORELINE
APRIL 1973 SHORELINE
SCALE OF FEET
0
500
LAGOONS BEACH
300'
LAKE ERIE
APR. 1973
APR. 1968
MARINE BEACH
CRYSTAL SHORES
350'
VERMILION RIVER
ATTACHMENT 3

DEPARTMENT OF
NATURAL RESOURCES
JOHN J GILLIGAN
Governor
WILLIAM B NYE
Director

Director's Office
FOUNTAIN SQUARE · COLUMBUS, OHIO 43224 · (614) 466-3770

December 13, 1974

Colonel Bernard C. Hughes
District Engineer
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Proposed Initiation of Section 111 Studies (P.L. 90-483) at Lake Erie Harbors

Dear Colonel Hughes:

This is to acknowledge receipt of your letter of 14 November 1974 relative to the above listed subject.

In response to your correspondence, members of my staff have once again reviewed the list of priority harbors that was furnished to your planning office in September of this year. Since all five harbors considered possess serious erosion problems, it was extremely difficult to determine a listing of priorities. However, in light of the Buffalo District's limited study capabilities for the current fiscal year, as expressed in your 14 November letter, we have concluded that study efforts for Ashtabula as well as Fairport should commence as soon as possible. These recommendations are made with the understanding that a Section 111 study for Conneaut Harbor has been underway for some time and is expected to be completed at any early date.

We appreciate the opportunity to provide our recommendations and trust that meaningful results will be obtained from these studies.

Sincerely,

William B. Nye

WILLIAM B. NYE
Director

WBN/fm

Supplement No 1

bb/236

NCBED-PB

14 November 1974

William B. Nye, Director
Department of Natural Resources
Fountain Square
Columbus, OH 43224

Dear Mr. Nye:

This letter is in response to your letter dated 4 October 1974 in regard to initiation of studies pursuant to Section 111 of Public Law 90-483.

At the present time I have commitments to prepare 27 reconnaissance reports under several continuing authorities for various areas within the Buffalo District boundaries which extend from Sandusky, OH to Massena, NY. These studies will take several years to complete. I do not have the staff to prepare five Section 111 reports during the current fiscal year. However, I plan to initiate two of the Section 111 studies during this fiscal year.

The District's first priority for Section 111's is Ashtabula where a Section 103 reconnaissance study is nearing completion. This study indicates that a Section 111 study should be made to completely investigate the problem.

I will keep you informed of our progress in these studies. I will notify your office approximately one month prior to our start of the reconnaissance report. The purpose of that action will be to provide you with further information on the preliminary local assurances required and to confirm that you feel conditions still warrant an investigation.

Sincerely yours,

CF:
NCBED-PB

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

Supplement No. 1
pg 2 of 3

DEPARTMENT OF
NATURAL RESOURCES
JOHN J GILLIGAN
Governor
WILLIAM B NYE
Director

Director's Office
FOUNTAIN SQUARE • COLUMBUS, OHIO 43224 • (614) 469-3770

July 31, 1974

Colonel Bernard C. Hughes
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Hughes:

I was recently informed that the Corps has undertaken several Section 111 studies (PL 483, 90th Congress) on Lake Michigan. Because of our interest in our own Lake Erie shoreline and because of the probable detrimental influence of several of the Federal navigation works along our shore within the Buffalo District we would like the Corps to initiate five Section 111 studies for the State of Ohio.

According to the Division of Geological Survey the Federal navigation works that should be investigated are located at Conneaut, Ashtabula, Fairport, Vermilion, and Huron.

We would greatly appreciate your consideration of this matter, moreover the Department of Natural Resources will be pleased to assist your organization in any way we can, I am,

Sincerely,

WILLIAM B. NYE
Director

WBN:eh

Supplement No. 1
of 2

APPENDIX A

CORRESPONDENCE

This appendix contains letters from private citizens expressing concern and/or opposition to the detached breakwater at Vermilion Harbor, OH. Responses to these letters from the Corps of Engineers are also included in the Appendix. The letters from private citizens contain many concerns not related to the Section 111 authority. These concerns will be investigated in a separate study scheduled to begin later this year. A letter dated 19 December 1975 to the North Central Division Engineer has requested approval to undertake this study. The request was forwarded to the Office of the Chief of Engineers by 1st indorsement, dated 30 December 1975.

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

August 13, 1975

Ryckman, Edgerly, Tomlinson & Associates, Inc.
12161 Lackland
St. Louis, Missouri 63141

Attn: Mr. Thomas M. Lachajczyk

Gentlemen:

I understand that your organization is studying the problems created by the installation of an offshore breakwater at Vermilion, Ohio, and that this work is being financed by the U. S. Army Corps of Engineers under Section 111, PL 90-483.

I wish to request that the enclosed 1974 report on beach erosion be made part of your report. This report covers only one aspect of the damages caused by the breakwater but it is documented and researched. Information of similar beach erosion problems at White City Beach in Cleveland, Ohio may be obtained from the Corps' Buffalo office.

You may be assured that your work will receive very close attention in Vermilion. The town may be described as a fused powder keg waiting for a match. Relatively slow and steady beach erosion will not touch off the powder, but the first flood will certainly set off an explosion.

Sincerely yours,

George W. Grossman

cc: Colonel Early J. Rush III
Colonel Bernard C. Hughes ✓

Linwood Park Cottage Owners Association

The purpose of LPCOA shall be the maintai and preserving of Linwood Park as the outstan family summer vacation area complete with glen, and sun and shore and sea.

SUMMARY REPORT OF BEACH EROSION AND ACCRETION
AT LAGOONS-LINWOOD-NAKOMIS BEACH, VERMILION, OHIO
AFTER CONSTRUCTION OF BREAKWATER IN 1973

AUGUST, 1974

The Lagoons-Linwood-Nakomis beach, east of the Vermilion River jetties, has been one of the most stable beaches on the Ohio shore during a 118-year period from 1854 to 1972. Stone jetties extended in 1854 have been impermeable to sand and effectively prevented any significant sand flow around the jetties.(1) Corps of Engineers' surveys in 1854, 1874, 1893, and 1935 showed the beach shoreline for 1000' east of the jetties varied less than 60' except for a period of extreme low water in 1935-36.(2)

Sand input to this beach from the east is scarce (1) and no sand is present in the near offshore area as the lake bottom is bedrock shale for 4 miles east and west of the Vermilion River.(3) Sand does by-pass the Beaver Creek jetty and some near offshore sand exists west of Beaver Creek. This area and shale bluff erosion east of Vermilion supply sand to the Lagoons-Linwood-Nakomis beach but the supply is so limited that no enlargement of this beach is shown in 118 years.

Sand in the Lagoons-Linwood-Nakomis beach shifts east and west. Wave action causes a net westerly movement and wind action a net easterly movement with dunes forming near the Linwood-Nakomis line in past years. The back and forth sand movement has been evident in beach gain and loss at Nakomis and Crystal Shores. A short groin formerly held sand at Crystal Shores but it has eroded away.

In the summer of 1973, a breakwater was constructed north of the Vermilion River jetties for a small boat refuge. Almost immediately, sand accretion was evident along the east pier. Measurements in August, 1974 indicate the beach at the pier has advanced 200' or more northward from its position in 1972.(4) The amount of sand accretion is estimated at 25,000 cubic yards. In view of the limited sand input to this beach system, all of this accretion may be assumed to result from erosion of Linwood and Nakomis beaches.

Substantial quantities of the sand gathered at the east pier were washed over the pier into the river channel by northeast storms in 1973 and 1974. River currents caused some of this sand to move out around the west pier to build up private and public beaches immediately west of the channel. The balance of the sand deposit in the channel was dredged by the Corps of Engineers in June, 1974 and dropped west of the channel, where it will probably result in further beach accretion in the area immediately west of the channel.

A number of sandstone blocks 3'-4' high have been placed on the east pier in August, 1974 by the Corps of Engineers to reduce sand flow into the channel. If these are successful, sand accretion at the east pier may be expected to form dunes on the Lagoons beach or move around the east pier to accumulate as a shoal between the jetties and the breakwater.

The probability of such shore effects as a result of breakwater and jetty construction was clearly pointed out by Hartley (1) in 1964 when he wrote, "The large structures have been built for the protection of facilities from wave action and sedimentation. They serve these purposes well. However, they have also resulted in changes of great magnitude in the adjacent shore."

Every large structure on the Ohio shore of Lake Erie has caused undesirable shore effects. The only structure on the Ohio shore Hartley terms "beneficial" is the Sandusky Harbor jetty, but Mosely (5) reports substantial downdrift erosion after the erection of these piers. The Lakeside to Marblehead area is an area of erosion but the rate is very slow due to the natural resistance of the rockbound shore.(3) (6)

The State of Ohio Department of Natural Resources, in comment on the environmental impact statement (7) submitted by the Corps of Engineers on the Vermilion breakwater, stated that sand accretion behind the breakwater was likely to occur and that diversion of river flow across bathing beaches would also occur. The Corps of Engineers' "Help Yourself" brochure shows breakwaters cause beach accretion behind them. The only installation even remotely comparable to the Vermilion breakwater on the Ohio shore is at White City in Cleveland. A breakwater here has caused updrift erosion and a sand pile-up behind it, as is occurring at Vermilion.(1)

High water levels are a contributing factor but not the cause of changes in our beach. No changes in beach profile have occurred at Huron in 1973 and 1974. Lake Erie was only a few inches lower in 1952 and 1969 than it is in 1974 and no changes occurred in our beach in those years. (See attached photo 5/7/56.)

The processes now occurring at Vermilion as a result of the breakwater installation can be expected to continue at high rates in times of high water, at low rates in times of low water. Each time sand moves westward under the influence of northeast storms (8), some of the sand will move behind the breakwater, where it cannot be removed by north or northwest wave action. The accumulations will form dunes, wash over into the channel, or wash around the east pier requiring frequent dredging. The east end of the Lagoons-Linwood-Nakomis beach will gradually recede westward, leaving a low clay bluff exposed to erosion. The shale bluffs east of Vermilion, which erode at a rate of less than 1' per year (6), end 100' west of the Linwood-Nakomis line.

On July 23, 1974, Congressman Charles A. Mosher wrote to the Linwood Park Cottage Owners Association expressing concern over the situation and advising us that he had conferred twice with Corps of Engineers officers from the Buffalo district about our beach problems. Congressman Mosher suggested that the City of Vermilion request application of Section III of the Rivers and Harbors Act of 1968 which requires the U. S. Government, acting through the Corps of Engineers, to study and act to prevent and mitigate damages caused by federal navigation structures.

On August 7, 1974, Colonel Early J. Rush, of the Corps of Engineers, wrote the LPCOA informing us that the State of Ohio has requested initiation of action under the Rivers and Harbors Act of 1968, PL90-483. Studies by the Buffalo district are now underway and, if shore damage attributable to the federal project has occurred, the actions necessary to mitigate such damage will take place.

At this time, then, action on restoration of the Lagoons-Linwood-Nakomis beach rests with the Corps of Engineers. If the breakwater is not removed, the westward flow of sand and loss of beach can only be halted by the installation of groins or jetties. Such structures have been proved on the Ohio shore and they would not interfere with recreational use of the beach.

Any substantial delay in installing groins or jetties may increase the cost of beach restoration. Groins require a supply of sand updrift to be effective. Nakomis beach now has no sand and the east end of Linwood beach has very little sand on the beach or under water. Sand nourishment may be required even if groins are installed now.

It is recommended, therefore, that we request the Corps of Engineers to consider temporary action to halt erosion. Short groins constructed with gabion baskets and rock fill can easily be installed, removed, or incorporated into permanent sheet piling groins if they prove successful. Vinyl tube type groins are also simple to install or remove. Temporary measures, such as sandstone blocks, have been employed to halt sand flow into the river. Temporary measures could also be applied to halt sand flow further east on the beach. Their cost could be recovered in reduced dredging costs.

Some hope for the Lagoons-Linwood-Nakomis beach is shown in the July, 1974 lake level forecast by the Lake Survey Center of the Department of Commerce. Lake Erie levels in the fall of 1974 are forecast to be about 3" below the record 1973 levels. Then, in December or January, Lake Erie is expected to drop 8" below the record highs. This apparently results from the current drought in the Midwest which extends into the Great Lakes watershed. Lake Erie was at 573 feet in July and is expected to drop to 571.6 feet in January. Damaging northeast storms have occurred with lake levels as low as 569.8 feet in 1881 and 1965.(8) However, most damaging storms occur with lake levels above 571 feet. Installation of some temporary protection this fall, coupled with an absence of severe northeast storms, may hold what beach we have.

REFERENCES

1. R. P. Hartley, "Effect of Large Structures on the Ohio Shore of Lake Erie" 1964

2. U. S. Corps of Engineers Dwg. 65-A-13, Jan. 10, 1936 by V. H. Donaldson

3. TR #7, Sheet D, "Eng. Geology of The Ohio Shore Line of Lake Erie"

4. Dwg. - Beach Accretion North of Vermilion Lagoons, LPCOA, August, 1974

5. E. L. Mosely, "Lake Erie Floods, Lake Levels, N.E. Storms", Ohio Historical Society Reprint, 1973

6. TR #8, Erosion or Accretion Along the Ohio Shore and Critical Erosion Areas, 1961

7. Environmental Impact Statement, Vermilion, Ohio, U.S. Corps of Engineers, 1972

8. C. H. Carter, IF #39, "The November 1972 Storm on Lake Erie"

Note: Ref. 1, 3, 6, and 8 available from Div. of Geological Survey, State of Ohio.

Reprinted from State of Ohio Technical Report No. 8, 1961

PRELIMINARY ESTIMATE OF EROSION OR ACCRETION ALONG THE OHIO SHORE OF LAKE ERIE AND CRITICAL EROSION AREAS

Department of Natural Resources
Division of Geological Survey

Cedar Point to New Entrance Road

This is an area of accretion, accreting more at northwest end. The average rate is probably about five feet per year at northwest, while it is nearly negligible at the southeast end.

New Entrance Road to Sawmill Creek

Erosion becomes serious in this stretch but it is sparsely populated. The maximum recession was about 100 feet, between 1949 and 1956, west of the Plum Brook water plant. East of the plant the recession was about 80 feet. Thus the shore is probably receding about 10 to 15 feet per year. (See Locality No. 5, Table.)

Sawmill Creek to Star Ditch

This reach is generally protected by various types of walls and groins and erosion is slight.

Star Ditch to Huron Entrance

The shore is eroding in this reach where it is not protected, the most serious at Oak Point and just west of the Huron water works plant. In these areas the retreat averages five to seven feet per year. From the water works to the Huron jetties erosion of the shore is negligible along a series of sea walls. (See Locality No. 6, Table.)

Huron Entrance to Old Woman Creek

This stretch is fairly stable, a great part of its length protected by the Huron Beach which is still accreting slowly. Walls have been built near the east end of the section which aid in stabilization of the bank. The rate of recession has not been measurable over the past few years.

Old Woman Creek through Oberlin Beach

Erosion is active and continuous in this reach even where protective structures have been built, averaging about five feet of recession per year.(See Locality No. 7, Table.)

Oberlin Beach to Cranberry Creek

The bank and beach are receding an average of about five feet per year in this reach except for the most eastern 1,000 feet where groins and walls have apparently stabilized the shore.

Cranberry Creek to Vermilion

Ruggles Beach and Mitiwauga Beach are apparently stable and groins are effective. Between Mitiwauga Beach and Reutenik Gardens the shore bank retreated an average of about 40 feet between 1949 and 1956. From here eastward to Chappel Creek the shore has been fairly stable over the past few years, groins being effective. Some bank retreat has occurred just west of Chappel Creek. A fairly stable beach fronts the Chappel Creek valley. From Cranberry Creek to Vermilion the rate of erosion varies. Although this stretch has been generally fairly well stabilized by groins and walls, unprotected areas may erode at a rate of more than five feet per year. Groins have been particularly effective in this stretch.

Vermilion to East End of Linwood Park

The Vermilion east jetty caused accretion of the Vermilion Lagoons beach and stabilized this entire reach.

Linwood Park through Vermilion-on-the-Lake

Erosion is only slight in this reach, it being rockbound. The average rate of recession is less than one foot per year.

Vermilion-on-the-Lake to Brownhelm Creek

Rock is above lake level throughout all but the eastern 2,000 feet of this reach, more or less stabilizing the shore. The eastern 2,000 feet has retreated at a rate of four to five feet per year. Recently built structures in this area will probably slow this rate.

Brownhelm Creek to Beaver Creek

The mouth of Brownhelm Creek contains a beach which is fairly stable. The remainder of this stretch has been stabilized by dumped materials of all types. A stable beach exists just west of Beaver Creek.

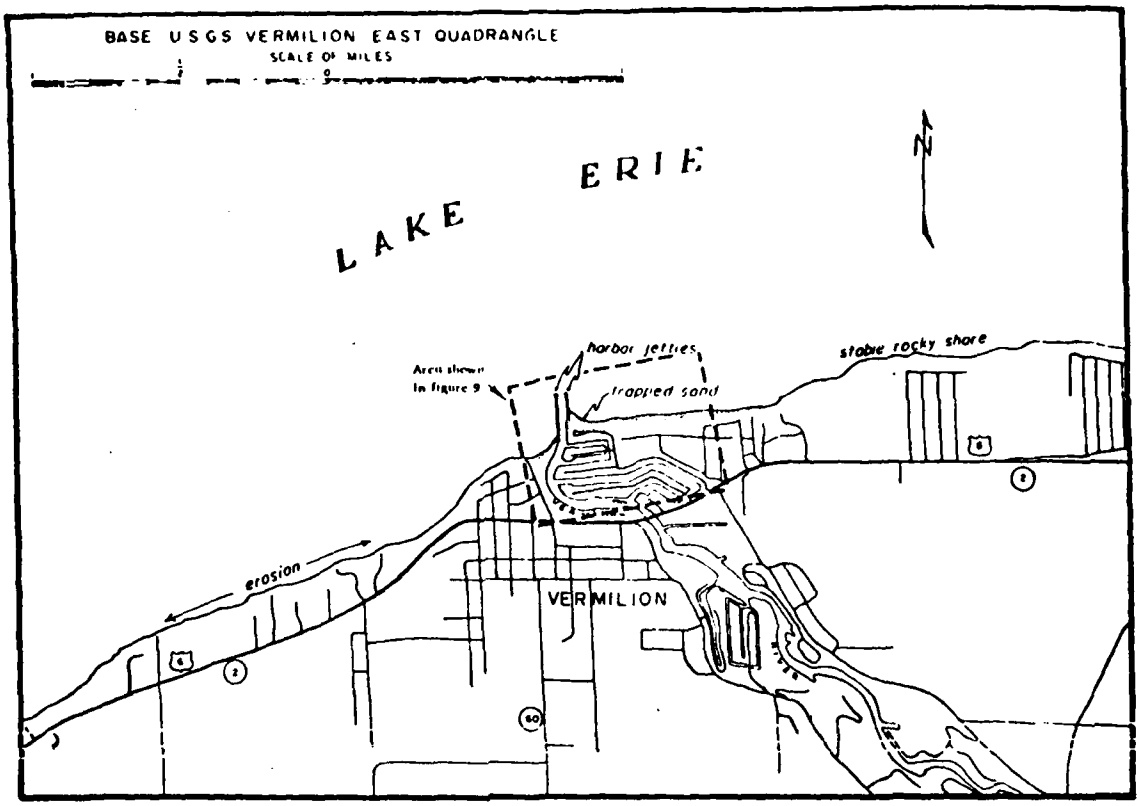
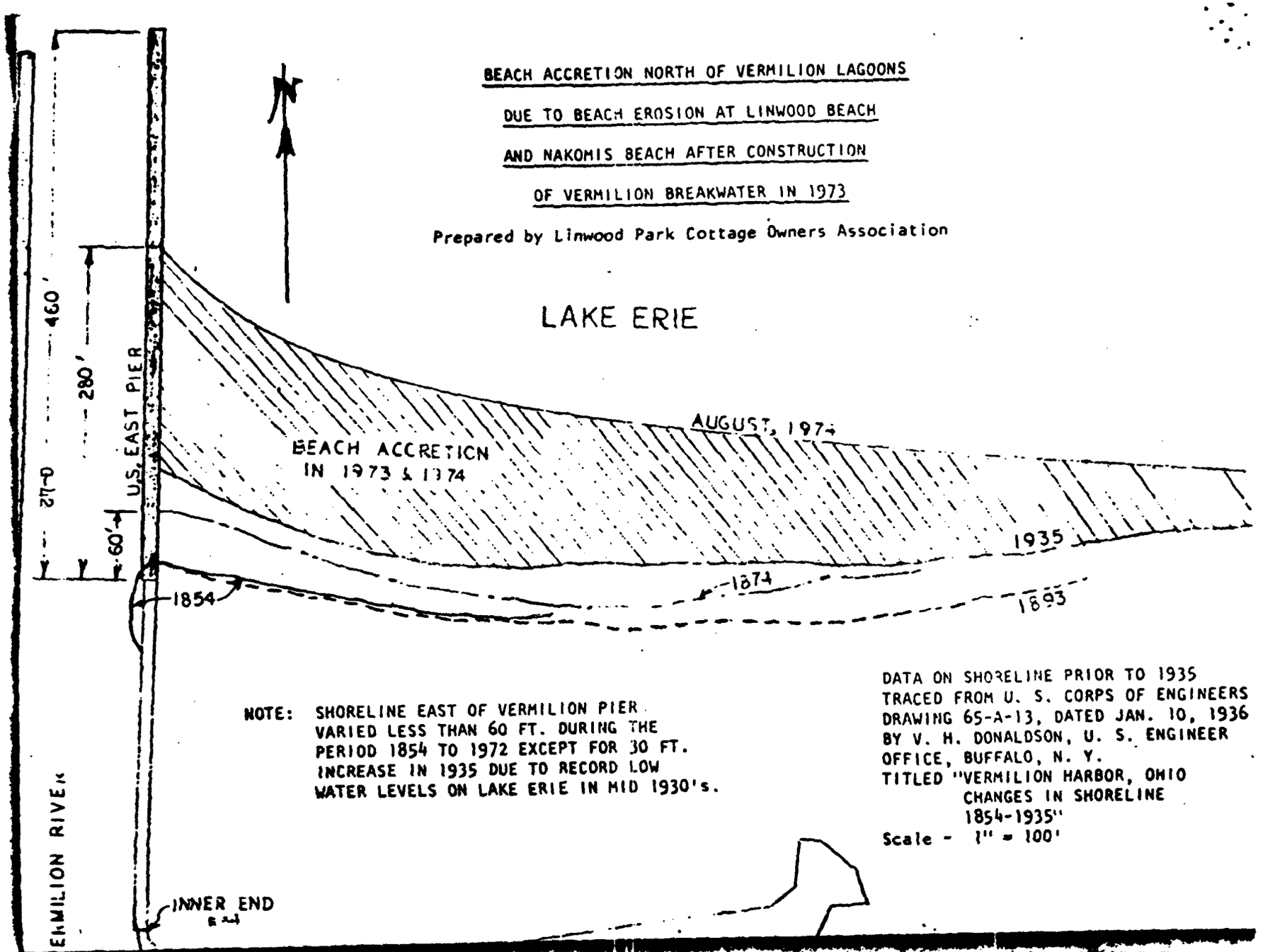


Figure 8.- Vermilion, Ohio, harbor jetties and shore conditions.

Figure 9.- Vermilion, Ohio. Vermilion harbor jetties at upper left. Beach east of jetties trapped by east jetty. Note position of shore west of jetties compared to that east of the jetties. Photo taken



NOTE: SHORELINE EAST OF VERMILION PIER VARIED LESS THAN 60 FT. DURING THE PERIOD 1854 TO 1972 EXCEPT FOR 30 FT. INCREASE IN 1935 DUE TO RECORD LOW WATER LEVELS ON LAKE ERIE IN MID 1930's.

DATA ON SHORELINE PRIOR TO 1935 TRACED FROM U. S. CORPS OF ENGINEERS DRAWING 65-A-13, DATED JAN. 10, 1936 BY V. H. DONALDSON, U. S. ENGINEER OFFICE, BUFFALO, N. Y. TITLED "VERMILION HARBOR, OHIO CHANGES IN SHORELINE 1854-1935"
Scale - 1" = 100'

Reprinted from Report of Investigations #53, Robert P. Hartley, State of Ohio, Dept. of Natural Resources, 1964

EFFECTS OF LARGE STRUCTURES ON THE OHIO SHORE OF LAKE ERIE

INTRODUCTION

Structures such as breakwaters and jetties, which extend into Lake Erie from the shore, usually affect shore processes. As a general rule, the larger the structure the greater the effect, although this is not always true. This report is restricted to those large structures which have had a measurable effect on half a mile or more of shore.

The large structures have been built for the protection of facilities from wave action and sedimentation. They serve these purposes well. However, they have also resulted in changes of great magnitude in the adjacent shore.

VERMILION

Parallel jetties were built at the mouth of the Vermilion River prior to 1850 (fig. 8). They have been repaired and renovated several times since. The jetties are built of stone blocks with their tops at about 6.5 feet above datum. The west jetty is about 1,000 feet long and the east jetty 460 feet. Both are impermeable to sand drift.

A beach more than 3,000 feet long has been trapped east of the jetties (fig. 9). The beach exceeds 150 feet in width and offers excellent protection to the landward residential and park areas. The beach is stable and has not changed materially in many years. Apparently the east jetty has trapped its limit of beach sand. Some sand is being added to form small dunes along the back of the beach. East of the beach the jetties have no effect on shore processes.

West of the jetties erosion is active all the way to Huron, ten miles to the west. The erosion throughout this stretch cannot be attributed to the Vermilion jetties, except that they are a contributing factor. However, for $1\frac{1}{2}$ miles west of the Vermilion River the jetties apparently starve the shore of sand. In this stretch groins are not too effective in trapping beaches. From this area west to Ruggles Beach, groins are more or less effective in beach-building, apparently because of a fair amount of sand in the nearshore zone and in eroding banks. Between Ruggles Beach and Huron, the beaches are narrow or nonexistent and bank erosion is generally serious.

Some sand appears to move to the west around the ends of the Vermilion jetties. It is not a significant amount, however, because the sand in littoral drift east of Vermilion is scarce.

The jetties at Vermilion do not greatly affect the shore to the west because of the slight supply of sand and relatively short lengths of the jetties. However, they have kept the sand on the beach to the east out of the littoral supply, with the result that shore conditions on the two sides are not in balance.

CONCLUSIONS

Most of the large structures along the Ohio shore have caused build-up of beaches on their updrift sides and accelerated erosion downdrift. The effects are not balancing, in that the length of eroding shore is ordinarily five or more times the length of shore which is protected by build-up. At some places the build-up is even too great, resulting in a waste of beach materials which are in short supply along most of the shore. One possible solution of the problem might be artificial redistribution of the trapped sands by dredging and other methods.

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

August 18, 1975

Lt. General William C. Gribble, Jr.
Office of Chief of Engineers
Dept. of the Army
Washington, D. C. 20314

Dear General Gribble:

I would like to recommend that serious consideration be given by the Corps of Engineers to the dismantling and removal of the breakwater constructed in 1973 across the mouth of Vermilion River in Vermilion, Ohio. On April 11, 1975, I was advised by Colonel Early J. Rush of your command that the Vermilion Harbor study was to be accomplished in the latter half of 1975. In its short two-year existence, the Vermilion Harbor breakwater has already provided much evidence that it is a flood-inducing, beach-eating, water-polluting, channel-clogging error.

The ostensible purpose in building this structure was to provide a small boat refuge between Huron Harbor and Lorain Harbor. Vermilion Harbor was a small boat refuge for 125 years before the breakwater was built. Anyone who has rocketed through the channel entrance under sail, planing on a wave, on a day when the waves were large enough to swamp a small boat, could concede that the channel is narrow but it is still adequate. Vermilion sailors have always had the skill to make harbor in good or bad weather.

The sole purpose of the Vermilion breakwater was to reduce the time for a boater to reach refuge in the event of bad weather. With the advent of continuous weather radio warnings, there is absolutely no need for the Vermilion breakwater. If the Coast Guard were to issue a regulation for a $7.95 weather radio in all boats, the improvement in boating safety would be equal in value to 100 breakwaters like the one at Vermilion. It is unreasonable and unconscionable to make Vermilion residents pay with flood damage to their homes and surrender their beaches to protect boaters when radio warnings can do the job. YOU CAN REMOVE THIS BREAKWATER and never harm one boater.

An observer, on the east pier during our July 4, 1969 flood, who noted that the water level in the channel was much higher than the lake, could also concede that the Vermilion channel is too narrow for suitable flood relief. This 1969 summer flood was a freak occurrence but it could happen again and the breakwater will increase damage by partially damming the river. Figure 1 shows a way the Vermilion channel could have been widened to make it safer and improve flood relief without causing beach erosion and pollution.

At Vermilion, there was a sand bar across the river mouth in the early 1800's. When the Corps extended the piers in 1857, the channel was kept clear and silt flowed out into the lake to be dispersed over a wide area. The Corps returned in 1973 to construct an impediment to this flow. Now, silt and sewage plant residues are dropped out directly over the city water intake. YOU CAN REMOVE THIS BREAKWATER and clean up our drinking water.

Every NE storm deposits a layer of black residue on the beaches that never was apparent before 1973. Corps chemists could undoubtedly trace these residues to the Vermilion sewage plant. They could also identify what brands of detergents are most popular in Vermilion as our near shore water frequently has a good head of suds on it. The Corps of Engineers has diverted the Vermilion River across public and private beaches. YOU CAN REMOVE THIS BREAKWATER and stop polluting our beaches.

A structure that impedes water flow is certain to impede ice flow. No one can predict when an ice pack along the south shore and sudden thaw will create conditions suitable for an ice jam flood, but it will occur. It happened before the river was bottled up by a breakwater. When this ice jam flood occurs, the damage claims will be in the millions of dollars. The U. S. will be obligated to pay them by the 1968 Rivers and Harbors Act.

In 1969, no one could sue for damages partially caused by a narrow channel installed 80 years before their homes were erected. Now, the U. S. accepts responsibility for damages due to navigation structures. Any judge, any jury would be easily convinced that you've throttled water and ice flow in the Vermilion River by an aerial photo like Figure 3. YOU CAN REMOVE THIS BREAKWATER and reduce the potential for flood damages in Vermilion.

The beach erosion claims for Linwood Beach could also be sizable. A 2000 ft. long beach, 300 ft. wide, has existed at Linwood Park for decades. The east end of this beach has been reduced by 200 ft. and most of the west beach by 100 ft. If we take a very modest estimate of 6 ft. of sand depth, and estimate the average erosion at 150 ft. or 50 yds. over a 700 yd. long beach, we've lost 2 x 50 x 700 or 70,000 cubic yards of sand. At $6.00 per cubic yard, our dollar loss of sand is now over $400,000. The $6.00 figure is based on Corps costs in dredging sand at Port Orford, Oregon.

If there is delay in applying remedial action, the cost to the Government for restoring this beach could be in excess of $800,000. Lower water levels are returning to the Great Lakes but our beach will not return. It's being trapped by the breakwater and being dredged and dumped by the Corps (Figure 2). YOU CAN REMOVE THIS BREAKWATER and halt beach erosion.

An aerial photograph of Vermilion Harbor taken in December, 1974 is shown in Figure 3. The lake was under the influence of a moderate NW storm at the time. By examining the photo, you will note that breaking waves are evident on the entire west shore and west pier. To the east, the effect of the breakwater is quite evident. NW waves are just ripples on the first 500 or 600 ft. of shore east of the channel. Wave reflection and turbulence caused by the breakwater structure reduced wave action to the east a distance approximately equal to the breakwater length. At the extreme left side of the photo, opposite an area in Linwood Park known as the Grove, whitecaps are again evident indicating no further eastward influence from the breakwater.

In a NE storm, conditions are exactly reversed. NE waves act upon the entire shore east of the channel and impinge on the east pier. NE waves act upon the entire Linwood-Lagoons Beach - NW waves affect about 2/3 of the beach. How could anyone miss the point that Linwood Beach will inevitably be pushed westward to pile up in front of the Lagoons, wash over and around the pier to plug the channel. Your own dredging records are substantiation of the fact that you have trapped our beach sand and are throwing it away. YOU CAN REMOVE THIS BREAKWATER and stop expensive dredging.

What is more aggravating is the knowledge that a similar breakwater causes similar problems just 40 miles up the shoreline in Cleveland at White City Beach. An offshore breakwall constructed many years ago caused an adjacent beach to be drawn in behind the breakwall (Figure 4). Your staff in Buffalo has been aware of this problem for years and prepared detailed proposals for reducing the beach pile-up by building a groin outside the shadow of the breakwall and redistributing the sand.

The Corps' plans for remedial measures at White City reveal an important principle: TO PREVENT SAND ACCUMULATION BEHIND AN OFFSHORE BREAKWATER, CONSTRUCT AN IMPERMEABLE GROIN UPDRIFT OF THE BREAKWATER. Failure to observe this principle at Vermilion, Ohio could cost the U. S. millions of dollars.

An impermeable groin can be installed at Vermilion to prevent further beach erosion (Figure 5). It will not replace the sand already lost. The center third of the breakwater can be removed to reduce pollution problems and the water intake can be extended. However, even two-thirds of the present breakwater will trap ice and maintain a flooding potential.

At Vermilion, the offshore breakwater causes -

1. contamination of the local water supply;
2. pollution of adjacent beaches;
3. an increased flood potential for a flood plain previously susceptible to flooding;
4. serious beach erosion;
5. drastically increased dredging costs.

General, twenty-five years ago, when the Vermilion breakwater was first proposed, there was no <u>real</u> need for it. There is less need for it today with continuous weather reports broadcast to any who care to listen. That breakwater will be removed after floods occur. Why not remove it now before homes and properties are damaged, lost to erosion, or destroyed?

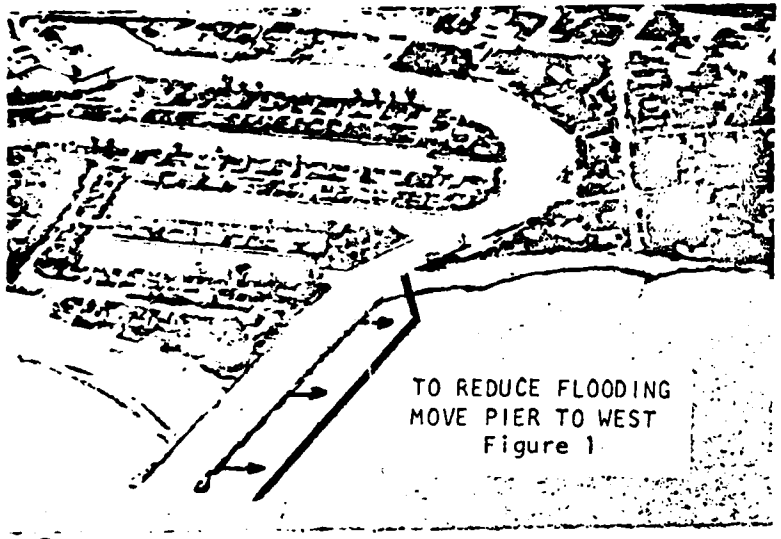
I request that this letter be made a part of the current Corps study of the Vermilion shore and that the issues herein be answered by that study.

Sincerely yours,

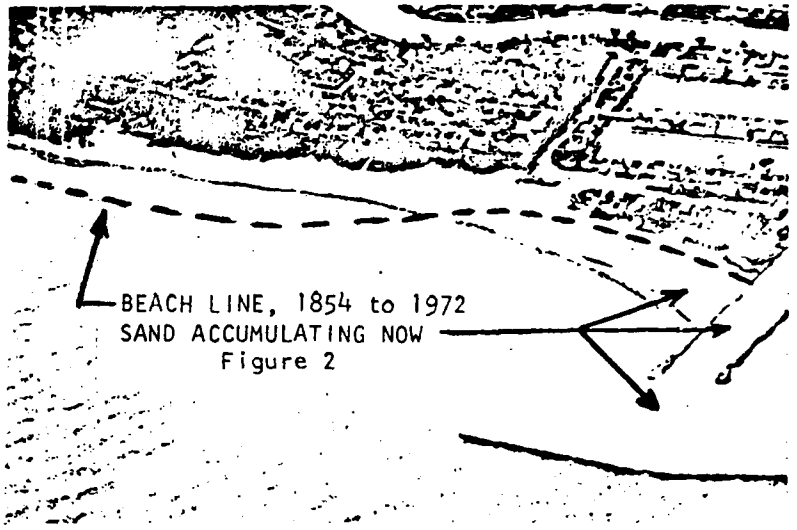
George W. Grossman

George W. Grossman

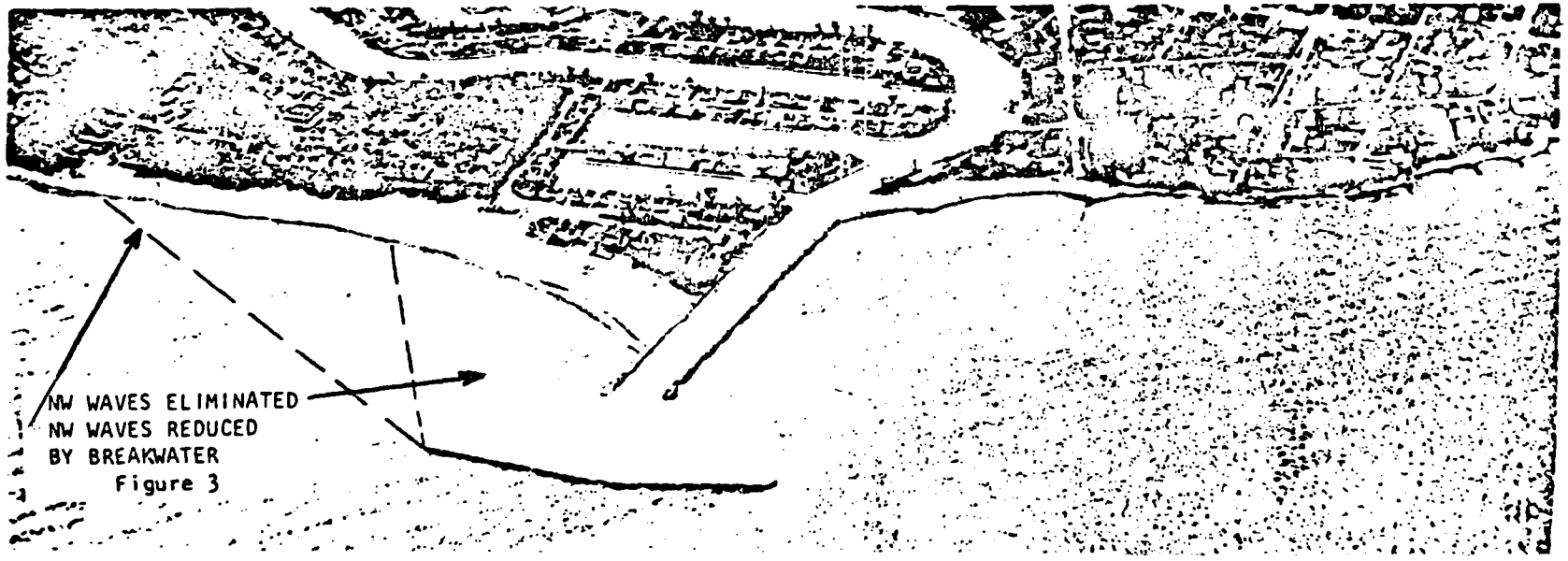
cc: Open Letter to all Interested



TO REDUCE FLOODING
MOVE PIER TO WEST
Figure 1



BEACH LINE, 1854 to 1972
SAND ACCUMULATING NOW
Figure 2



NW WAVES ELIMINATED
NW WAVES REDUCED
BY BREAKWATER
Figure 3

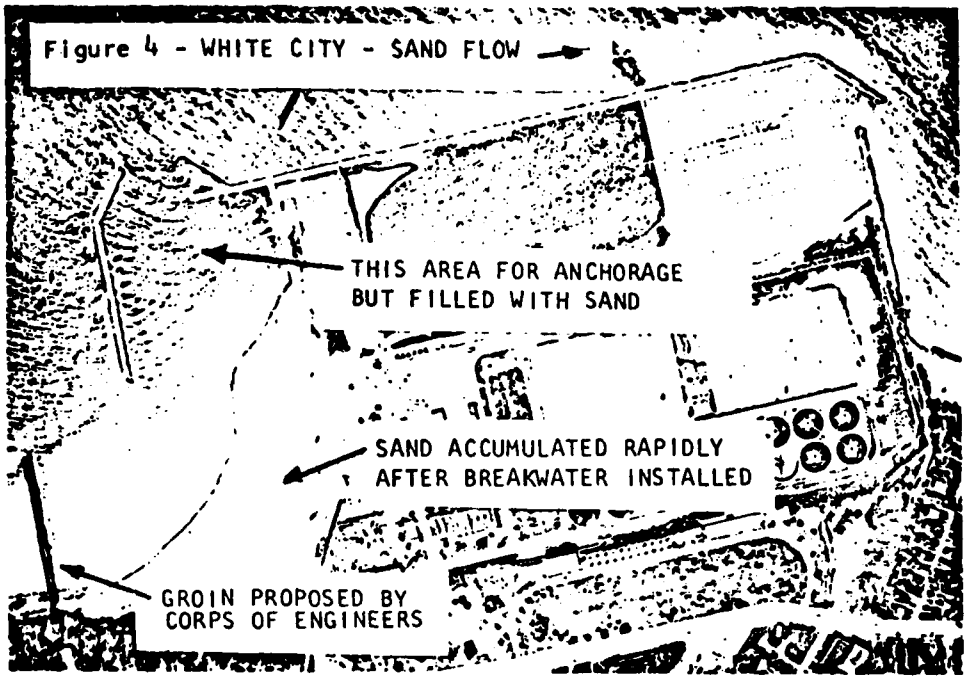
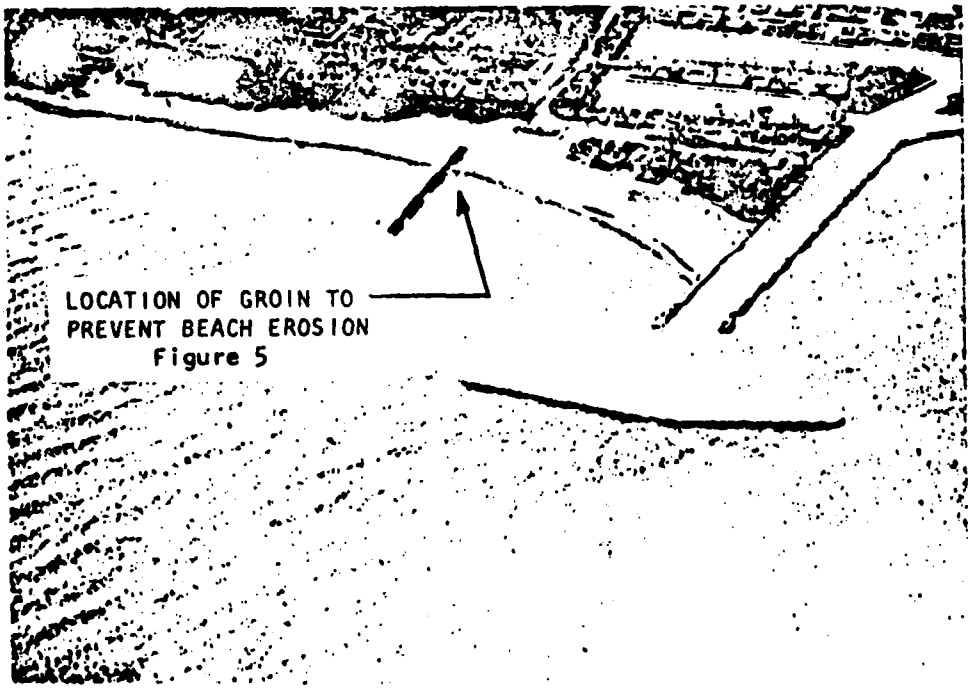


Figure 4 - WHITE CITY - SAND FLOW
THIS AREA FOR ANCHORAGE
BUT FILLED WITH SAND
SAND ACCUMULATED RAPIDLY
AFTER BREAKWATER INSTALLED
GROIN PROPOSED BY
CORPS OF ENGINEERS


LOCATION OF GROIN TO
PREVENT BEACH EROSION
Figure 5

DAEN-CWO-M 29 August 1975

Mr. George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

Dear Mr. Grossman:

This is in reply to your recent letter to Lieutenant General W. C. Gribble, Jr., Chief of Engineers, recommending the dismantling and removal of the breakwater at Vermilion Harbor, Ohio.

Your comments and suggestions are being forwarded to the Buffalo District Engineer for his consideration under the Vermilion Harbor Study currently underway. As you were previously advised, the District Engineer will furnish you the results of the study when completed.

Your interest in this matter is appreciated.

Sincerely yours,

TILFORD C. CREEL
LTC, Corps of Engineers
Assistant Director of Civil Works,
Upper Mississippi

CF: NORTH CENTRAL DIVISION
BUFFALO DISTRICT

8-25-75

My dear Mr. Gribble,

We request that serious consideration be given by you to Mr. George Grossman's letter of August 18, 1975, pleading for the removal of the new breakwater in the Vermilion Harbor; and that all comments such as this from us, from concerned individuals, be made part of the current Vermilion Harbor study by the Corps.

Respectfully,
Hazel Stuart Cramer

Encl

fs/236

NCBED-PS

25 September 1975

Mr. & Mrs. Stuart Cramer
P.O. Box 444
Vermilion, OH 44089

Dear Mr. & Mrs. Cramer:

Your postcard dated 25 August 1975 to LTG William C. Gribble, Jr., concerning the removal of the new breakwater at Vermilion, OH, and the consideration of Mr. Grossman's letter dated 18 August 1975 was sent to me for reply to you.

My staff is currently preparing a report that will address the erosion and shoaling problems in relation to Vermilion Harbor.

Your card will be made part of the correspondence appendix in the report.

I will inform you of the results of this most important report as soon as it is completed.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
HQDA (DAEN-CWA-A)
NCBED-PS

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AREA CODE 412

334 BOULEVARD OF THE ALLIES
PITTSBURGH, PA. 15222

August 27, 1975

Lt. General William C. Gribble, JR
Office of Chief of Engineers
Dept. of the Army
Washington, D.C. 20314

SUBJECT: Lake Breakwater, Vermillion, Ohio

Dear General Gribble:

This writer has become cognizant of Mr. George Grossmans letter of August 18, 1975 directed to you, relative to the Corps of Engineers construction of the Vermillion harbor breakwater which has actually become a threat to a large percentage of the Vermillion population.

In addition to being a boat harbor, the lagoon area itself includes the residences of approxamately 75-100 families. The value of these residences totals to several million dollars.

A blockage of flow caused by the breakwall at the mouth of the Vermillion River provides enough back-up during the winter season, as a result of ice jams and etc., that all of these residences are threatened by flood each and every year, if there is enough ice build-up on the river and at the mouth of the river. Fortunately for the last two years it has not provided such a build-up. It was very close this past winter (Jan.-Feb., 1975). The past two winters have been basically open seasons as far as cold weather and freezing were concerned. Prior years have been sufficiently cold for a sufficient length of time to provide ice build-up, even without the Breakwall to threaten these residences. With the Breakwall, the build-up would almost insure the total flooding and damage of a good portion, if not all of these above mentioned residences.

This writer is personally interested in the elimination of this breakwall, or the total revision of it, in as much as he is a resident of Linwood Park, whose swimming beach area is just to the east of the breakwall.

George Grossman has provided you with arial photographs of the breakwall, the river mouth, and the adjacent areas; which greatly illustrates the total movement of our Linwood Park beach area to the west wichis a direct result of the breakwall blockage of the normal wave action from the north west, on our length of beach. As Permitts, the northeast storms and any northeast turbulance tomove the sand from the beach in a westwardly direction, which has not only greatly reduced the depth of our Linwood park beach, but which has provided such a build-up as f front of sand in front of the lagoon area, it actually washes over the east pier and provided sand bars in the river mouth itself, which of course, creats a blockage of travel in and out of the river. It has been necessary, in the short period of

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time that the breakwall has existed, to actually dredge the river on two or three occasions in order to keep the channel open. The underwater sand at the lake edge has been totally washed away from the eastern end of the Linwood beach area. The beach depth has been reduced in the short time the breakwall has been in existance by approximately 50-60%. When you loose 50-60% of your beach area in a 2 year period, as a direct result of a Corps of Engineers "Goof-up", it should follow that the Corps of Engineers should be directly responsible for restroation of the origional situation, and elimination of the cause, of course, with intervening monetary damages which could be considerable; or by the Federal government, which created this situation in the first place.

I personally feel that the most irritating thing about this situation is the fact that various residents of Linwood Park, Vermillion, Ohio, met with representatives from the Corps of Engineers at the time construction was going on. We expressed the direct conviction that the construction of this wall would cause the exact effects that have taken place. We were assured by the Corps of Engineers representives that we were totally wrong in that none of this action would take place.

As a result of the Corps Construction, we have left beach and are in the process of heading toward "No Beach". We now have dirty, poluted water being trapped along the beach line due to the fact that the overflow of the river and the lake has been diverted to provide flow of the river sediment, garbage, and etc. onto and along our Linwood Beach.

The Writer wishes to request your opinion in view of the above information, and in view of Mr. George Grossman's letter, How long it will take the Corps to come to the same conclusion that we have and in turn, how long it will take the Corps to modify or remove the breakwall that has caused these problems.

In as much as the writer is personally a resident of Pittsburgh, Pa., and a summer vacationist in Linwood Park, Vermillion, Ohio; he is providing a sopy of this letter and a copy of Mr. Grossman's letter to Honerable Charles A. Mosher, Pennsylvania Senators Honerable Hugh Scott and the Honerable Richard Schweiker and to Congressman William S. Moorehead.

We wish to thank you for your consideration of the above stated requests. The wrtier feels that this is a serious problem and that the speediest of replies and considered action is of the utmost.

Yours very truly,

G-53

J. W. Rutledge

DALR-CWO-C 9 October 1975

Mr. J. W. Rutledge
334 Boulevard of the Allies
Pittsburgh, Pennsylvania 15222

Dear Mr. Rutledge:

This is in response to your letter addressed to Lieutenant General William C. Gribble, Jr. dated 27 August 1975 concerning your recommendation to remove the detached breakwater at Vermilion Harbor.

The Buffalo District is currently conducting a study under Section 111 of the River and Harbor Act of 1968 to determine shoreline damage as it may relate to the Vermilion harbor structures. This study is scheduled for completion in December 1975. If this study determines that the detached breakwater is, in fact, causing erosion problems, the Corps will analyze different alternatives to alleviate the problem. In addition, under the authority of Section 111, an environmental impact statement and detailed project report are required for any recommended alternatives. The current study is funded as a feasibility study and does not permit detailed design of possible alternatives. The study will recommend that a detailed project report be made if the findings are positive as to the impact of the Federal structures. Until these actions are taken, the Corps cannot take any action with respect to the detached breakwater at Vermilion Harbor.

With regards to the potential of flooding as a result of ice jams, the ice jamming was considered during the design of the breakwater. Our current reviews indicate that there should be a lesser potential for ice jamming now than there was before erection of the breakwater because of the greater width and depth in the lagoon area.

I have asked the District Engineer of the Buffalo District to inform you of the results of this most important report as soon as it is completed.

Sincerely yours,

CF:
NORTH CENTRAL DIVISION
BUFFALO DISTRICT

G-54

TILFORD C. GEYL
LTC, Corps of Engineers
Assistant Director of Civil Works,
Upper Mississippi

CFTS

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Post Office Box 1277 - Station "C" BOX 281

Canton, Ohio 44718 Vermilion, Ohio.

August 29, 1975

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Lt. General William C. Gribble, Jr.
Office of Chief of Engineers
Department of the Army
Washington, D. C.

Dear General Gribble:

We are in full support to the views and recommendations of Mr. George W. Grossman expressed in his letter of Aug. 18 to you.

Our home is located at the east end of the beach(whats left of it) and it is a crime against us and nature to destroy this once beautiful beach.

We have been comming to Linwood for over 50 years and the main attraction, in fact the only attraction was the Linwood Beach. It was noted as having the best beach on Lake Erie.

Now what remains is a narrow strip of sand mixed with a narrow strip of gravel and rocks. We used to enjoy bathing here, but now the gravel turns into rocks about 3 feet into the water and shelves sharply into a depth of 5 feet within another 3 feet.

We want the breakwater removed before we have cliffs instead of beach. The sooner, the better and we request that this letter be made a part of the current Vermilion Harbor Study by the Corps.

Very truly yours,

Dean R. Herrold
415 Walnut Street
Linwood Park,

fs/236

NCBED-PS

25 September 1975

Mr. Dean A. Herrold
415 Walnut Street
Linwood Park
Vermilion, OH 44089

Dear Mr. Herrold:

Your letter dated 29 August 1975 to LTG William C. Gribble, Jr., concerning the removal of the new breakwater at Vermilion, OH, and consideration of Mr. Grossman's comments was sent to me for reply.

My staff is currently preparing a report that will address the erosion and shoaling problems in relation to Vermilion Harbor.

Your letter will be given full consideration and be made a part of the correspondence appendix in the report.

I will inform you of the results of this most important report as soon as it is completed.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
HQDA (DAEN-CWA-A)
NCBED-PS

668 Avon Belden Rd.
Avon Lake. Ohio 44012
August 30. 1975

Lt. Gen. Wm. C. Gribble, Jr.

Dear Sir:

We endorse Mr. George H. Grossman's views in regard to his request that the Vermilion Breakwater be removed.

We own property in Vermilion. We are concerned about the damage this project has done to the city's water supply, pollution of beaches & beach erosion. We ask you to remove the Breakwater in the public interest.

Please make this letter a part of the current Vermilion Harbor study by the Corps.

Yours.

Mr. & Mrs. L. L. Leopold, Leonard L. Leopold

fs/236

NCBED-PS 25 September 1975

Mr. & Mrs. L. L. Leopold
668 Avon Belden Rd.
Avon Lake, OH 44012

Dear Mr. & Mrs. Leopold:

Your letter dated 30 August 1975 to LTG William C. Gribble, Jr., concerning the removal of the new breakwater at Vermilion, OH, and consideration of Mr. Grossman's comments was sent to me for reply to you.

My staff is currently preparing a report that will address the erosion and shoaling problems in relation to Vermilion Harbor.

Your letter will be given full consideration and be made a part of the correspondence appendix in the report.

I will inform you of the results of this most important report as soon as it is completed.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
HQDA (DAEN-CWA-A)
✓NCBED-PS

5

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

September 4, 1975

Colonel Bernard C. Hughes
Buffalo District
U. S. Army Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Dear Colonel Hughes:

The response to the publication of my August 18, 1975 letter to Lt. Gen. William C. Gribble, Jr. is overwhelmingly in favor of removal of the Vermilion breakwater. At this point, it is difficult to find anyone in Vermilion who will admit that they approved the installation.

The opposition to the breakwater is a coalition of three interests - the pure water group which could include anyone in the city, the flood plain residents and businessmen who know ice jam floods will occur, and Linwood Park residents who are losing their beach. Boaters detest the breakwater because it interposes two blind corners into a congested harbor entrance. The exodus of boats from the lake when a storm approached formerly was a simple matter of falling into line for a straight-in approach. Now, there is all sorts of confusion and near collisions.

I'm certain you've asked yourself "How did it happen?" I believe it happened because of a drive for shoreline protection by shoreline interests adjacent to the channel. The story of a "hazardous harbor entrance" is a myth. As the EPA correctly noted in the environmental statement, there is no record of boating accidents or loss of life at the harbor entrance. Thirty-five years ago, gill net boats, which handled like a cork with a rudder, occasionally had to make port in Huron but gill net boats disappeared years ago.

It seems evident that the Vermilion breakwater became a "navigation structure" simply because Federal funding would carry nearly all the cost. Shoreline protection, funded 2/3 by local government, will rarely be installed. The Edgewater Beach and White City projects, which were revived this spring by your office, have no chance of ever being adopted under current law.

A Corps' defense of the Vermilion breakwater is most difficult because it causes all the problems that might be expected from an offshore breakwater placed across a river mouth. You can mollify most of the "pure water" group by moving the water intake but this will not solve beach pollution, beach erosion, or ice jam floods. You can halt further erosion of Linwood Beach by erecting a long groin but this will not restore lost sand or have any effect on water pollution and ice jam floods.

The logical solution is the prompt removal of the breakwater. I have studied the offshore profiles at Vermilion and a substantial amount of the sand lost from Linwood Beach is still in the Lagoons area being held by the east pier. With removal of the breakwater and a little bulldozing of sand away from the pier, the Linwood-Lagoons beach, in three to five years, will recover much of what it had for over a century. Your cost for restoring the beach will be minimal.

The Corps has a most serious political problem with regard to the breakwater. Any congressman wants Federal funds expended in his district but Congressman Mosher relied on the Corps, as did city officials, to create benefits without problems. This has not happened and all the furor over beach erosion, water pollution, and ice jam floods will descend upon Congressman Mosher. The Corps cannot afford to create congressional enemies.

The best interests of the Corps and the best interests of Vermilion can be served by justifying the removal of the breakwater in the current Section 111 study and contracting removal for early next spring. Existing beach erosion and water pollution are adequate reasons. With luck, you might escape an ice jam flood or strong NE storms that wipe out our Linwood Beach.

There is no question in my mind that the Vermilion Harbor breakwall will be removed because Vermilion residents, Congressman Mosher, and the Corps cannot live with it. The timing is the only remaining question and there seems to be a mutually acceptable position that prompt removal will be advantageous to Vermilion and the Corps.

I would like to discuss this with you and your staff in Buffalo at the earliest possible time. For convenience in traveling, we could meet for lunch and then have a discussion in the afternoon. I can be reached at my office - 216/267-9200. Even if we should disagree, a face-to-face discussion of our positions would be helpful.

Sincerely yours,

George W. Grossman

cc: Lt. Gen. William C. Gribble, Jr.

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

September 12, 1975

Colonel Bernard C. Hughes
Buffalo District
U. S. Army Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Dear Colonel Hughes:

I spoke to Colonel Walker yesterday and I understand a meeting is being arranged. It would be appropriate to state what I hope to accomplish at such a meeting.

There is no question that the breakwater will be removed. The enclosed resolution was submitted to Vermilion Council last Monday and it will pass in October. If this fails to convince the Corps, an ice jam flood or drinking water pollution will do the job.

The timing of removal is highly important to the Corps. At this point, enough sand is being held by the pier so that the beach will restore itself after removal of the breakwater. A strong NE storm could change this picture at any time.

The cost of prompt remedial action will be the removal cost which I estimate at $500,000 to $600,000. This will not require Congressional action. Delay which results in $500,000 to $1,000,000 additional beach restoration cost and the project will have to go to Congress. This will bring national publicity to a $3,000,000 Corps blunder. The Corps will never live it down and other project removals will result. The choice that you and General Gribble have is simply a decision on prompt removal with a hope of minimal publicity or delayed removal with national publicity.

I will also request the following emergency measures in order to hold down total restoration costs -

1. Pushing sand away from the pier with excavating equipment. This will require concurrence of the Vermilion Lagoons Property Owners Association.

2. Disposition of sand dredgings east of the channel.

3. The installation of a vinyl tube type temporary groin on Linwood Beach to halt sand flow. This will require concurrence of the Linwood Park Company.

These measures will prevent cost escalation. They can be funded with dredging funds or whatever. Any organization that can obtain $97,000 for a study of the smell of dredgings can find $40,000 or $50,000. I will help to arrange prompt approval by the Linwood and Lagoons people if I receive copies of the request from you. I am working with these and other groups in Vermilion.

I have a technical presentation about 45 minutes long and we can discuss the problem after. The real question we have to answer is whether the Corps has the capacity to make a reasonably fast decision to cut its losses. I'm looking forward to the opportunity to meet with you.

Sincerely yours,

George W. Grossman

Enc.

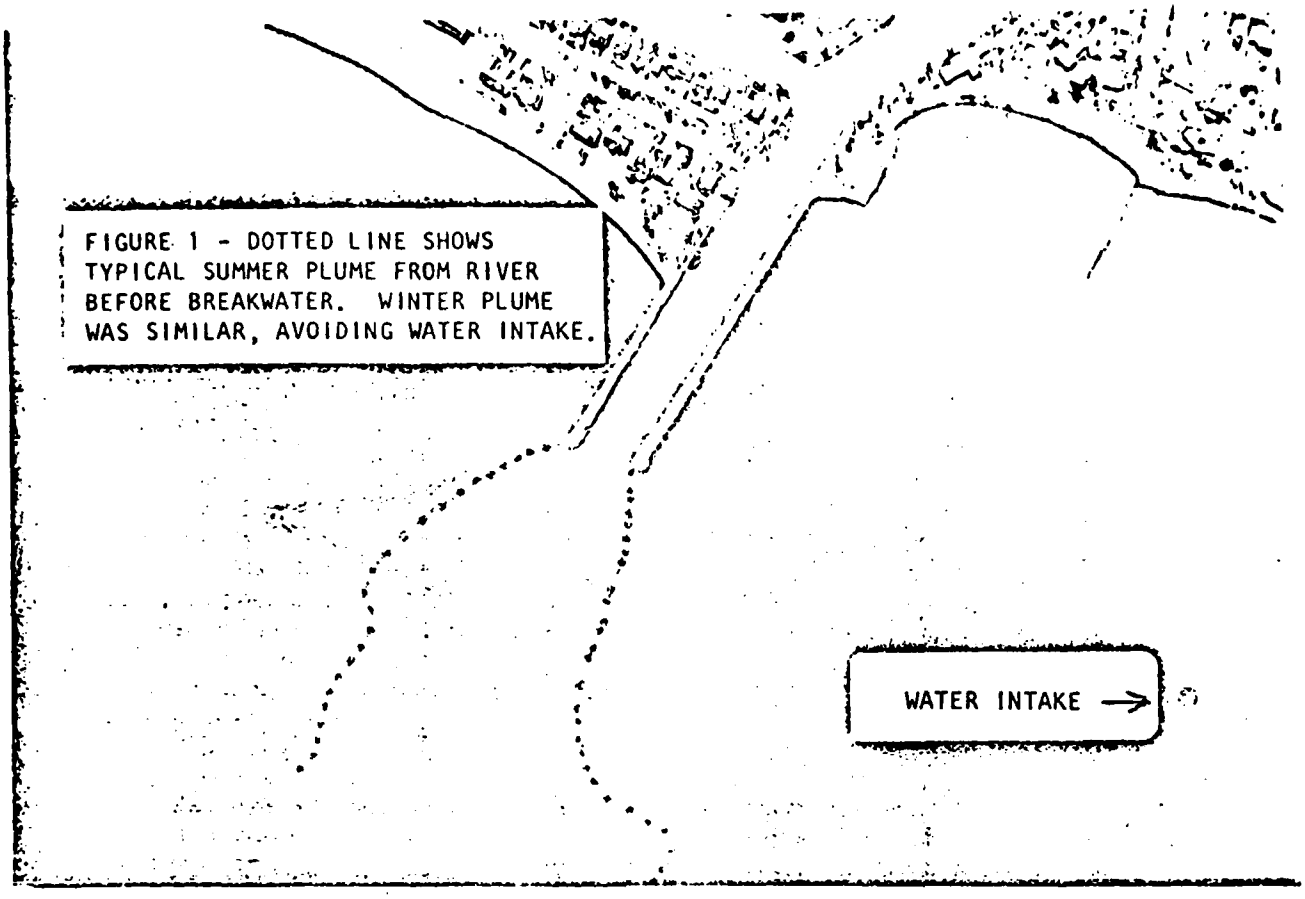


FIGURE 1 - DOTTED LINE SHOWS TYPICAL SUMMER PLUME FROM RIVER BEFORE BREAKWATER. WINTER PLUME WAS SIMILAR, AVOIDING WATER INTAKE.

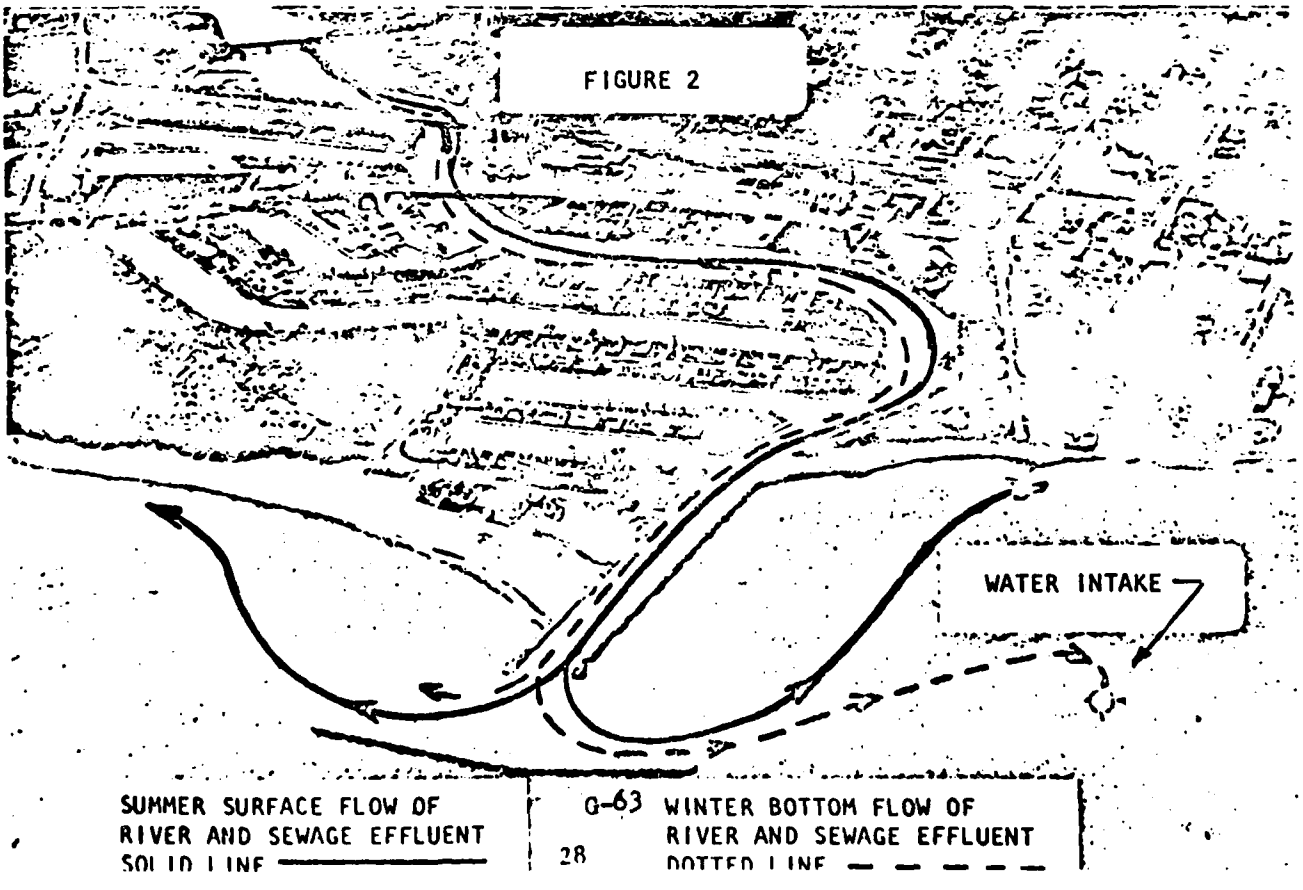


FIGURE 2

NCBED-PS

25 September 1975

Mr. George W. Grossman
17125 Amber Dr.
Cleveland, OH 44111

Dear Mr. Grossman:

This is in response to your letters dated 4 September 1975 and 12 September 1975 concerning your recommendation to remove the detached breakwater at Vermilion Harbor.

As you know, the Buffalo District is currently conducting a study under Section 111 of the River and Harbor Act of 1968 to determine shoreline damage as it might relate to the Vermilion harbor structures. This study is scheduled for completion in December 1975. If our study determines that the detached breakwater is, in fact, causing erosion problems, we will analyze different alternatives to alleviate the problem. In addition, under the authority of Section 111, an environmental impact statement and detailed project report are required for any recommended alternatives. Our current study is funded as a feasibility study and does not permit detailed design of possible alternatives. The study will recommend that a detailed project report be made if the findings are positive as to the impact of the Federal structures. Until these actions are taken, the Corps cannot take any action with respect to the detached breakwater at Vermilion Harbor.

The water intake problem that you mention in your letter is not within the scope of the Section 111 study. We have discussed this problem with responsible City officials and it is my understanding that several alternatives are under consideration to alleviate the water supply situation.

I have contacted Dr. Stack, Chairman of the Vermilion Port Authority concerning this matter. He has informed me of the meeting you attended with the Port Authority on 15 September. He stated that the Authority will be soliciting opinions on the breakwater in response to the resolution submitted in early September.

NCBED-PS bb/236
Mr. George W. Grossman

With regards to the potential of flooding as a result of ice jams, the ice jamming was considered during the design of the breakwater. Our current reviews indicate that there should be a lesser potential for ice jamming now than there was before erection of the breakwater because of the greater width and depth in the lagoon area.

Based on our telephone conversation today, I will be pleased to meet with you here in my office at 1300 hours on 7 October 1975 to discuss the status of our Section 111 study and related matters concerning the Vermilion Harbor structures.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
NCBRO
NCBED-PS

ROBERT TAFT, JR.
OHIO

United States Senate

WASHINGTON, D.C. 20510

October 14, 1975

Lt. Gen. William C. Gribble, Jr.
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Gribble:

Enclosed you will find my copy of a letter addressed to you from Mr. George W. Grossman. Also enclosed is correspondence to me from Mr. Grossman related to the Vermilion Harbor issue.

I would appreciate your comments in relation to the problems outlined by Mr. Grossman, and I would like to receive a copy of your response to his letter of September 30.

Thank you for your consideration.

Sincerely,

Robert Taft, Jr.

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

October 1, 1975

Senator Robert Taft
405 Russell Senate Office Bldg.
Washington, D. C. 20510

Dear Senator Taft:

I wish to advise you that the U. S. Army Corps of Engineers has violated the law in constructing the Vermilion Harbor breakwater. I am appealing to you to investigate this matter.

It will take a member of your staff about 15 minutes to verify my statements in the enclosed letter to Lt. Gen. William C. Gribble, Jr., Army Corps of Engineers. Congress, in 1958, authorized the Corps to construct breakwaters at Vermilion, Ohio. The Corps, in 1973, constructed a breakwater of different design which causes water pollution.

The Corps did not obtain authorization for the change from Congress or the City of Vermilion. They concealed the design change from the public by using the 1958 authorization, describing the new design in words, and omitting all drawings from the 3 May, 1972 final environmental statement.

I would be interested to know if you feel the public must accept the adverse environmental effects of such disregard of public law.

Sincerely yours,

George W. Grossman

PLEASE RETURN TO
SENATOR ROBERT TAFT, JR.

Enc.

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

September 30, 1975

Lt. General William C. Gribble, Jr.
Office of Chief of Engineers
Dept. of the Army
Washington, D. C. 20314

Dear General Gribble:

I have requested that the EPA take immediate action to remove the Vermilion Harbor breakwater because it is a hazard to public health. Please place a copy of the enclosed letter to Mr. Russell Train in the current Corps' Section III study of Vermilion Harbor as a public record of my protest.

The water pollution caused by the breakwater results from a Corps' change in design that was not authorized by Congress. The only authorization for this project was in PL85-500, 85th Congress, and House Document 231, 85th Congress, 1st Session. H.D. 231 specified two overlapping breakwaters, 725' long and 225' long, to create a new harbor entrance 150' wide, 500' north of the present entrance. This design would have funneled river water farther into the lake, reducing drinking water and beach pollution.

The Corps is probably authorized to make minor modifications in projects authorized by Congress. However, constructing a single breakwater, 864' long, which blocks the river and diverts it into the water intake and across beaches, is a major change. This change was not authorized by Congress or the City of Vermilion. The undesirable public health problems seem to dictate immediate action on your part.

Colonel Bernard Hughes recently advised me that the Corps is not authorized to take emergency corrective action to halt the erosion of Linwood Beach. We do know the Corps is authorized to make "emergency" dredgings of our beach sand from the Vermilion River and dispose of it.

I would appreciate a written explanation from the Office of the Chief of Engineers stating how the Corps is authorized to change plans written into law by Congress, stating how the Corps is authorized to take "emergency" action to remove and dispose of our beach sand, and stating why the Corps is not authorized to take simple, low-cost "emergency" measures to halt the flow of our beach into the river. Please send a copy of the letter to Senator Glenn, Senator Taft, and Congressman Mosher as I am certain they would be interested in how the Corps handles public funds.

Sincerely yours,

George W. Grossman

Enc.

cc: Senator John H. Glenn
Senator Robert Taft
Congressman Charles A. Mosher
Colonel Bernard C. Hughes

NCEDE 7 November 1975

Honorable Robert A. Taft, Jr.
United States Senate
Washington, DC 20510

Dear Senator Taft:

This letter is in response to your 14 October 1975 letter to General Gribble concerning correspondence you have received from Mr. Grossman with regard to the small-boat harbor constructed by the Corps of Engineers at Vermilion, OH. General Gribble requested that I respond to you directly concerning this matter since the Buffalo District was responsible for the design and construction of the harbor and is currently responsible for operations and maintenance of the harbor.

In his 1 October letter to you, Mr. Grossman alleges that the Corps of Engineers violated the law by constructing a small-boat harbor configuration at Vermilion that differed from the configuration in the 1953 Congressional authorization document. Mr. Grossman states that the Corps did not obtain authorization for the change from Congress or the city of Vermilion and that we concealed the design change from the public.

I would like to clarify Mr. Grossman's misunderstandings. First, with regard to changes in the harbor configuration, we based our actions on the discretionary language in the 1953 authorizing document which provides for "...such modifications thereof as in the discretion of the Chief of Engineers may be advisable." It is the position of the Corps of Engineers that the change in harbor configuration from an "arrowhead" alinement to a "tee" alinement is within the scope of the discretionary language of the authorizing document and does not require additional Congressional approval.

Secondly, Mr. Grossman's allegation that the configuration change was concealed from the public is totally incorrect. The design change was based on model studies and the Design Memorandum and Environmental Impact Statement were distributed for public review and comment. Further, on 26 May 1969, a delegation from Vermilion visited the Corps Waterways Experiment Station to observe the hydraulic model that was used as a basis for the harbor design. The Vermilion delegation included the Mayor of Vermilion, the Chairman of

NCEDE
Honorable Robert A. Taft, Jr. sk/200

the Port Authority, the President of the City Council, the City Service Director, the Chairman of the Planning Commission and several interested private citizens. None of those who observed the model voiced any objections to the design. In view of these facts, it is most difficult for me to understand the basis for Mr. Grossman's allegation that the Corps concealed the design change in any way.

Next, I would like to comment on the concern Mr. Grossman expressed in his 30 September letter to General Gribble with regard to my authority to accomplish emergency dredging at Vermilion Harbor and to take emergency corrective action to halt the erosion of Linwood Beach. For the past two years, in order to prevent ice jamming and subsequent flooding in the vicinity of the harbor over the winter months I have removed shoal material that has accumulated in the harbor channels. This dredging was accomplished as a part of my operations and maintenance program using funding appropriated by the Congress for this purpose. I have no authority at this time to take any action to halt erosion of Linwood Beach which is located to the immediate east of the harbor along the Lake Erie shoreline. I am currently preparing a study, under the authority of Section 111 of the 1968 River and Harbor Act, to determine whether the Vermilion Harbor structures have caused shoreline damage. This study is scheduled for completion in December 1975. If this study indicates that the Vermilion Harbor Structures have, in fact, caused erosion at Linwood Beach, then a follow-on detailed design analysis will be undertaken to determine what measures should be taken to mitigate this damage. Any mitigation measures I might recommend would be forwarded to the Office of the Chief of Engineers for approval and appropriate funding consideration.

I trust that this letter clarifies Mr. Grossman's misunderstandings concerning the Vermilion harbor project and will assist you in responding to him.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
HQDA (DAEN-CWA-D) w/incmg. corresp.
NCDED " "
Exec. Ofc. " "
PAO " "
NCHRO " "

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

September 19, 1975

Mr. Russell E. Train, Administrator
Environmental Protection Agency
401 M Street, S.W.
Washington, D. C. 20460

Dear Mr. Train:

I wish to request that the EPA take immediate action to obtain removal of the Vermilion Harbor breakwater because this structure is a menace to public health in Vermilion, Ohio. The U. S. Army Corps of Engineers constructed this water-polluting, beach-contaminating, river-silting, flood-generating, sand-trapping monster in 1973. Its sole positive environmental effect is that it has become a $1.5 million roost for gulls.

The EPA is to be commended for noting on December 21, 1971 that "a record of boating accidents or loss of life would add significant validity to the Corps' statement that Vermilion Harbor was too hazardous to enter during rough weather." The Corps replied that such information was "not available." The reason this information was "not available" is that there is no record of "boating accidents or loss of life" attributable to the harbor entrance. The Corps spent $1.5 million building a breakwater to solve a problem that never existed.

However, the Vermilion Harbor breakwater has caused a great many environmental problems. Of these, the public health problems are the most critical. Pollution of beach waters previously very acceptable for swimming and contamination of the drinking water supply in Vermilion should be stopped at once. The Corps of Engineers should not compel us to drink and swim in a murky mixture of river water and sewage plant effluent.

Recently, the Allegheny County Health Department reported 4,000 cases of illness in Sewickley, Pa. from polluted drinking water. Hundreds of persons there complained of cramps, fever, diarrhea, and vomiting in late August, 1975. Vermilion narrowly escaped such an epidemic last winter only because the Water Department acted quickly and efficiently. It has become a standing joke that "The water is OK to drink but not fit to wash clothes in" but that was the true condition. Many Vermilion residents now drink bottled water.

Figure 1, taken in 1968, shows how the Vermilion River flowed through a channel for 125 years to be diluted by Lake Erie. The city water intake was ideally located, 1300' offshore, out of the stream of dirty river water and far enough offshore to bring in pure water. Figure 2 shows how the breakwater diverts polluted river water directly across the Vermilion water intakes and private and public beaches.

Natural phenomena enhances seasonal water pollution effectiveness. In summer, the river water and sewage effluent is warmer and lighter than the water of Lake Erie. Fetid river water stratifies on top of the cooler lake water, is reflected from the breakwater, and then is pushed inshore by wave action. Incautious swimmers who take a mouthful of this turbid, detergent-laden water come up blowing bubbles. However, this warm, polluted water floated above the city water intake, located 10' below the lake surface, in the summer.

In wintertime, there is little temperature differential between the river and the lake. The cold river flow sinks under the lake water and is diverted by the breakwater to be taken up by the Vermilion water intake. The breakwater causes beach water pollution in summer - drinking water pollution in winter.

The Corps of Engineers, evidently aware that water pollution would occur, signed city officials to an agreement whereby the city agreed to bear the cost of relocating the water intake. The Corps was warned on January 10, 1972 by the Department of Natural Resources, State of Ohio, that river water would be diverted across bathing beaches by the breakwater. The Corps ignored this advice.

Our situation in Vermilion is similar to conditions in Duluth where Reserve Mining is polluting the water supply by dumping taconite tailings into Lake Superior, except that tax funds have financed our pollution in Vermilion. The EPA is forcing Reserve Mining to stop polluting Lake Superior - you should force the Corps of Engineers to stop polluting the Vermilion water supply and beaches, now.

The Corps of Engineers' Vermilion Harbor breakwater is a hazard to public health and private property because it -

1. diverts river water and sewage effluent into the city water supply;
2. causes beach pollution and serious beach erosion;
3. will increase the crest height and duration of summer flash floods and cause ice jam floods in winter.

The Environmental Protection Agency should force the removal of this environmental disaster before serious injury to public health and private property occurs. A copy of this letter is being sent to Lt. Gen. William C. Gribble, Jr., U. S. Army Corps of Engineers, for inclusion in the current Corps study of Vermilion Harbor.

Sincerely yours,

George W. Grossman

cc: Open letter to all concerned with pure water and the protection of our environment.

G-72

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

October 20, 1975

Lt. General William C. Gribble, Jr.
Office of Chief of Engineers
Dept. of the Army
Washington, D. C. 20314

Dear General Gribble:

Northeast storms on Lake Erie on September 24 and October 17 have washed much sand from the Lagoons-Linwood-Nakomis beach into the Vermilion River channel. This has happened on many occasions since the installation of the Vermilion Harbor breakwater. In June, 1974 and January, 1975, the Corps dredged a total of 9,000 cu. yds. of our beach sand from the Vermilion River and disposed of it so that it will never return.

Another emergency dredging will be required soon to prevent a disastrous ice jam flood in Vermilion. I ask you, as Chief of Engineers, to return our sand that must be dredged from the river. It's bad enough to see our beach trapped behind the breakwater - it's criminal for the Corps to complete the destruction with dredging.

Information and drawings given to me at the October 7, 1975 meeting with Colonel Hughes and four members of his staff indicate that I was in error in claiming the Lagoons-Linwood-Nakomis beach has remained the same since 1854. I learned that, in 1836, the shoreline at the east pier was located approximately where the first lagoon now lies. The construction of the original piers in 1837 caused sand to accumulate by the east pier in front of the marsh. Over the next 38 years to 1875, there were continuing problems with sand moving over and around the original piers. It was not until 1875, when the Corps extended the piers to their present length, that a stable beach condition evolved at Vermilion. This 98-year period, from 1875 to 1973, is considered the base period for the following comments.

1. Sand did not accumulate at the east pier or flow over the east pier in the period from 1875 to 1973.

There are hundreds of Vermilion residents who can testify that sand did not accumulate at or flow over the east pier in the past forty years. It was always necessary to climb up on the piers. Aerial photographs can document conditions in this period.

House Document 231, a letter from the Chief of Engineers dated July 3, 1957, states that the distance from the outer end of the east pier to the shoreline at the east pier was 430' in 1893, 382' in 1907, 395' in 1921, 320' in 1932, and 331' in 1935. The average distance from the end of the east pier to the shoreline over the period was 372'. The deviation from this average was plus 58', minus 52'. Over a 98-year period, the water's edge was about 85' from the inner end of the east pier.

2. NE storms did not push sand over the east pier during the period from 1875 to 1973.

Carter, in the Ohio publication, "The November 12, 1972 Storm on Lake Erie", lists many severe NE storms on Lake Erie. These occurred in Sept., 1878; July and August, 1879; Jan., 1881; April, 1882; May, 1903; July, 1943; May, 1946; March, 1952; April, 1965; April, 1966; July, 1969, and Nov. 12, 1972. None of these severe storms pushed sand over the east pier. The Nov., 1972 storm flooded yards on the shoreline near the east pier but did not push sand into the river channel. From 1875 to 1973, there was no need to dredge beach sand from the Vermilion channel.

3. High lake levels in the period from 1875 to 1973 did not cause changes in the Lagoons-Linwood-Nakomis beach or cause sand flow over the east pier.

Carter, in the previous reference, shows most damaging NE storms occur when Lake Erie is above its long-term average level of 570.5'. Lake Erie peaked at levels above 572' in the following years: 1973, 1972, 1969, 1955, 1953, 1952, 1951, 1947, 1943, 1930, 1929, 1913, 1890, 1887, 1885, 1884, 1883, 1882, 1876. There have been a great many times when Lake Erie was 1.5' or more higher than its long-term average of 570.5' in the period from 1875 to 1973.

4. Offshore breakwaters are beach accretion devices and cause sand to accumulate behind them.

The recent "Help Yourself" brochure published by the Corps' North Central Division describes offshore breakwaters as beach accretion devices. This brochure cautions that offshore breakwaters interfere with shore processes. It also states that their use demands extreme caution to preclude major down-drift erosion. This is because offshore breakwaters trap sand that moves in behind the structure and prevents further sand movement. The Corps recommends the use of offshore breakwaters only in areas of high littoral transport, whereas Vermilion is an area of low littoral transport.

5. Vermilion is an area of low littoral transport and the sand lost through Corps dredging will not be replaced for many years.

House Document 231, prepared by the Corps, states, "The amount of littoral drift at the locality is small, as evidenced by the limited accretions at the Vermilion entrance piers and at nearby groins." This Corps statement has been confirmed by Ohio authorities. The Corps completely halted sand flow over and around the east Vermilion pier in 1875. In 100 years, the Lagoons-Linwood-Nakomis beach has not gained in size except for the formation of small dunes on Linwood Beach. Obviously, there is little incoming sand from the east.

In summary, the sand accretion at the east Vermilion pier and the flow of sand from our beach into the Vermilion River, which has occurred since the installation of the breakwater in 1973, did not occur at any time in the previous 98 years. Despite periods of high water levels and numerous severe NE storms over 98 years, the profile of the Lagoons-Linwood-Nakomis beach remained unchanged over 98 years. The changes which are now evident are

caused by the installation of the breakwater. Wave runup on the sand accumulation by the east pier and the absence of any adequate backup for the sand causes sand to flow into the river with every NE storm of moderate intensity.

Every Corps staff member who can read the Corps' own publications should know that offshore breakwaters are beach accretion devices that cause sand to pile up behind them. Corps staffers should know that offshore breakwaters change the shore profile and cause erosion. They should know that offshore breakwaters at Lorain and Ashtabula caused exactly the same problems we are seeing at Vermilion. They should know that the installation of an offshore breakwater in an area with low littoral drift, like Vermilion, will cause adjacent beaches updrift to be eroded away.

With this knowledge available to them, Colonel Hughes and his staff, in a meeting with me on October 7, denied any Corps responsibility for the sand accretion at the pier and in the river. Since the restoration of our sand would be an admission that the breakwater is a beach accretion device, Colonel Hughes plans to continue to dredge our beach sand from the river and move it out of our beach system. The Buffalo district will destroy our Linwood Beach before admitting the Vermilion Harbor breakwater was a mistake.

General, if you feel that my points in this letter lack technical and scientific accuracy, I would appreciate it if you would fly in some of your staff to meet with me and inspect the situation. Standing on a sand bar that is blocking half the Vermilion River channel would be an educational experience.

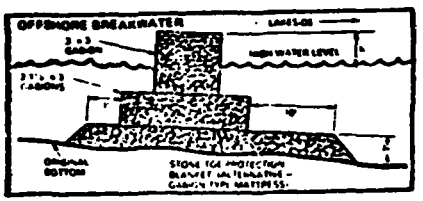
Somewhere within your command there has to be the honesty and decency and guts to concede that the Vermilion Harbor breakwater is doing exactly what the Corps' own publication said it would do. I ask you, as Chief of Engineers, to intercede in this matter and halt the destruction of our beach by dredging.

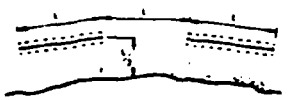
I request that you place this letter in the Section III report as I was in error in stating that our beach was stable from 1854 to 1973. It was only stable for the 98 years from 1875 to 1973. However, it is not necessary that you reply to this letter. We will receive your reply, as Chief of Engineers, when you send in that dredge to remove our beach sand from the Vermilion River. We'll see whether you will continue to destroy our beach or start to restore it.

Sincerely yours,

George W. Grossman

cc: Senator John H. Glenn
Senator Robert Taft
Congressman Charles A. Mosher
Mayor Jack Armstrong - Vermilion
Vermilion City Council
Vermilion Port Authority
Other concerned individuals and organizations



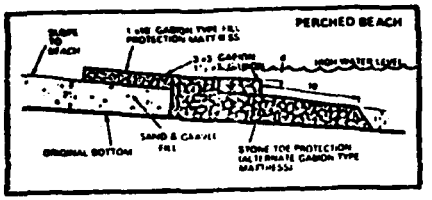


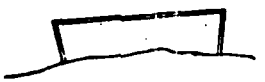
Offshore breakwaters are an acceptable method of shore protection for flat or moderate offshore slopes. Important design considerations include water depth, strength of lake bottom material, materials available for construction and the amount of littoral material. The design wave is based on water depth 50 feet lakeward of the structure.

Offshore breakwaters can be constructed of any material capable of withstanding the wave energies impinging on them, including stone, gabions, steel, wood and concrete shapes. A toe protection blanket is essential. Offshore breakwaters may be low structures to allow passage of wave energy or they can be high structures to completely block waves. They should be built in shallow water nearshore for reasons of economy. They can be constructed in place or they can be fabricated on shore and placed in position with a crane. They can be continuous for long distances or segmented with passages between them to allow exchange of water.

Caution. Offshore breakwaters interfere with shore processes; their use demands extreme caution to preclude major downdrift erosion. Consider them only in areas of high littoral transport. Make them low so they will be overtopped by waves during storms.

	Depth of Water 50' Offshore		
Dimensions	3–4	5–6	7–8
Height (ft.)	2.5	2.0	
Apron length (ft.)	10.0	10.0	Not Recommended
Unit of Materials			
Gabions - Stone filled (yd^3)	0.7	0.7	
Stone toe protection (yd^3)	0.6	0.6	
Cost $/Lin. Ft.	40.50	40.50	





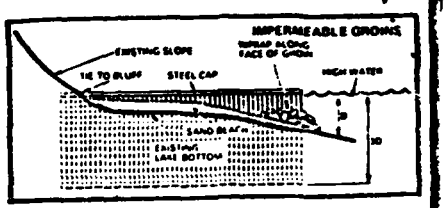
Perched beaches are a positive means of shore protection for shoreline areas with moderate or steep offshore slopes. Important design considerations include water depth, strength of lake bottom material, materials available for construction and the amount of littoral drift.

Perched beaches can be constructed of most materials. However, they must be sand tight and prevent the migration of sand and gravel fill through the retaining structure. Steel and wood piling or rock filled gabions are acceptable construction materials. Stone is not a suitable material for the retaining structure. The essential features of a perched beach are the toe protection blanket, the retaining structure, fill, and fill protection mattress.

Perched beaches are usually submerged. They must be continuous structures and must be tied back to shore at the ends. For this reason, short segments are not economical.

Caution. Perched beaches interfere with shore processes. Perched beaches act in a similar manner to groins submerged as offshore breakwaters. Make them low so they will be overtopped by waves during storms.

	Depth of Water 50' Offshore (ft.)		
Dimensions	3–4	5–6	7–8
Dimensions			
Depth (ft.)		1	1
Apron length (ft.)		10	10
Materials (per ft.)			
Gabions–Stone filled (yd^3)		.5	.5
Gabion type mattress (yd^3)		.4	.4
Sand & Gravel fill (yd^3)		100.0	100.0
Stone toe protection (yd^3)		.5	.5
Cost $/Lin. Ft.		225	225



Protection of shore erosion by groins assumes an adequate amount of littoral drift is available and is moving along the shoreline. Groins can have the undesirable effect of damaging downdrift shores. The layout of groins is very important. Groins should be kept low, only one foot above the expected high water, and short terminating at the -3 feet depth. Groins must be protected from flanking either by a rock revetment or a bulkhead placed perpendicular to the groins. The maximum length of groins should not exceed 100 feet. If possible groins should be artificially nourished by placing sand on the updrift side of each groin.

Caution. Groins are shore protection structures that interfere with shore processes and entrap littoral materials. Their use demands extreme caution to preclude major downdrift erosion. Consider them only in areas of high littoral transport. Make them low so they will be overtopped by waves during storms. Groins should be constructed in stages, starting at the extreme downdrift end of the area to be protected. Study the effects of the single groin carefully before completing the layout of the groin field.

	Depth of Water 50' Offshore		
Dimensions	3–4	5–6	7–8
Steel Piling (length-ft.)	115	85	
Steel Piling (wasted length-ft.)	100	80	Not Recommended
Depth (ft.)	15	15	
Groin Spacing (ft.)	200	100	
List of Materials (per groin)			
Sheet Piling (tons)	27	16	
Timber Waler (tons)	3	2	
Stone Filter Blanket (tons)	80	50	
Stone Rip-rap (tons)	140	140	
Cost $/Lin. Ft.	175	150	

THE BENJAMIN P. FORBES COMPANY

2000 WEST FOURTEENTH STREET CLEVELAND, OHIO 44113

September 23, 1975

Lt. General William C. Gribble, Jr.
Office of Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Gribble,

The Vermilion area has been an important part of the lives of our family for more than thirty years. As property owners here the area is still important to us and particularly so in the life of our daughter who now teaches in nearby Lorain and makes her residence here in Vermilion.

This past year very important changes have become evident, changes which I believe were caused directly by the construction of the breakwater across the mouth of the Vermilion River. I am specifically referring to the contamination of the drinking water supply which the city of Vermilion experienced this past year. My daughter became ill at this particular time and whether or not this was a direct result of the drinking water contamination, no one knows. I do know that inhabitants of Vermilion were publicly warned and we need help from your department.

I am also concerned about the increased flood damage potential since the construction of this breakwater. Our family personally experienced the serious flooding of the Vermilion River in July of 1969 and there is no way to imagine that an obstruction at the mouth of the river would do anything but aggravate and worsen conditions when such a catastrophe re-occurs some Spring or Summer in the future.

It is very evident also that the new breakwater is causing serious beach erosion in certain areas while building up sand accumulation in others. Sand deposit in front of the lagoons has been to such a degree that North-easterly storms now push sand right over and around the easterly Vermilion River pier and into the river channel causing a need for considerably more dredging annually or perhaps even more than once a year.

A letter to you from Mr. George Grossman of Cleveland was reprinted recently in a Vermilion news paper and I certainly concur with views expressed in that letter. Many of his statements I can personally attest to and believe it is your duty and the duty of your department to correct an apparent mistake made by that department in the construction of the breakwater across the mouth of the river in 1973.

I hope your study of the problem will bring out the need for the immediate removal of this breakwater to eliminate the water intake contamination and further erosion of beaches and shore line in the Vermilion area. This is particularly applicable to those areas being changed so rapidly and drastically since the construction of the breakwater two years ago.

Please include this letter as a part of the current Vermilion HarborStudy being made by the Corps.

Thank you.

Very truly yours,

Benj F. Forbes

BFF/jas

cc - Vermilion City Council
Charles A Hosher

mld/236

NCBED-PS

24 October 1975

Mr. Benj F. Forbes
Benjamin F. Forbes Company
2000 West Fourteenth Street
Cleveland, OH 44113

Dear Mr. Forbes:

Your letter dated 23 September 1975 to LTG William C. Gribbe, Jr. concerning the removal of the new breakwater at Vermilion was sent to me for reply to you.

My staff is currently preparing a report that will address the erosion and shoaling problems in relation to Vermilion Harbor and is scheduled to be completed in December 1975.

Your letter will be given consideration and be made a part of the correspondence appendix in the report.

I will inform you of the results of this most important report as soon as it is completed.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
HQDA (DAEN-CWA-A)
Division Engineer
NCBED-PS

George W. Grossman
17125 Amber Drive
Cleveland, Ohio 44111

October 6, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attn: Major Byron G. Walker

Ref: Draft Environmental Impact Statement
Vermilion Harbor, Ohio
September, 1975

Dear Major Walker:

Thank you for forwarding the Draft Environmental Impact Statement for the proposed Vermilion Harbor operation and maintenance project, dated September, 1975, for review. There certainly is no question as to the professional competence of the firm of Ryckman/Edgerley/Tomlinson and Associates of St. Louis which prepared this study. Nevertheless, the study reflects the viewpoint of engineers based in St. Louis who possibly never saw Vermilion Harbor prior to 1975. The study is not fully responsive to the needs of the Corps' "customers" in Vermilion. There are many serious deficiencies within the report which prohibit accurate evaluation of the problem by the various organizations who will review it.

I wish to propose an alternative action for the consideration of the Corps and the Corps' "customers". This alternative is the removal of the Vermilion Harbor breakwater, a subsequent dredging operation to remove the sediment accumulation caused by the breakwater, and further dredging as required. Prior history of Vermilion Harbor indicates such dredging would be required every ten or fifteen years.

For convenience, I have taken segments of the information in the draft environmental report, reprinted them, and then commented on each point. I request that you include this review and comment, in full, in the appendix to the final environmental statement. This request also applies to the attached report, "Shore and Harbor Physical Processes at Vermilion, Ohio" dated September, 1975. I also request that these two reports be placed in the current Section III study of Vermilion Harbor being conducted by the Corps and scheduled for completion in December, 1975.

1. Corps' Statement: Authorization

> 1.02 The work under consideration in this Environmental Impact Statement is the recurring future maintenance of the completed channels and structures that comprise the shallow-draft navigation project for Vermilion Harbor, OH. The project was authorized by the River and Harbor Acts of 1836, 1875, 1905, and 1958 and was constructed in stages. Harbor improvements authorized by the 1958 Act (described in House Document 231, 85th Congress, 1st session), including the breakwater construction and new work dredging of the river and lake approach channels, were initiated in June 1973 and completed in May 1974. The existing project is complete. (pg. 1)
>
> f. Detached breakwater: Cellular steel sheet pile construction; 864 feet in length; 10 feet above LWD in height; perpendicular to, and 300 feet north of the east pier. (pg. 3, 1.03)

1. Comment: Public Law 85-500, 85th Congress, approved 3 July, 1958, authorized improvement of Vermilion Harbor in accordance with plans and conditions set forth in House Document 231, 85th Congress, First Session. These plans called for two detached breakwaters, 725' long and 225' long, with a 150' opening between them, creating a new harbor entrance 500' north of the entrance between the east and west piers. The authorized design would have funneled river water northward into the lake, minimizing water pollution problems in the area.

As shown above and in Plate 1.1, the Corps constructed a single detached breakwater 864' long which diverted river flow east and west. No Congressional authorization for this change is shown in public records and, to my knowledge, the change in design was not made known to or approved by local authorities. The changed design has caused long-term, high magnitude adverse environmental effects that would not occur with the original design. These adverse environmental effects include beach water pollution, drinking water pollution, obstruction of ice flow, and increased sedimentation.

A full explanation of the reasons for and authorization for changing plans written into law should be presented. If the breakwater as constructed is not fully authorized by law, the alternative action of removal seems indicated.

2. Corps' Statement: Benefits

> Estimated annual commercial fishing, recreational navigation, and harbor of refuge benefits from the harbor project are about $634,200, or approximately $1,902,600 every three years (August 1975 price levels). (pg. 17, 1.34)
>
> 2.107 As of January 1, 1970, the total tax valuation for the City of Vermilion was $25,390,000. The real estate tax rate in the city is $51.60 for Erie County and $60.60 for Lorain County per $1,000 of assessed evaluation. (pg. 89)

2. Comment: There is no supporting data in the report to justify a claim of $634,000 in annual benefits. Using an average real estate tax rate of $55 per $1000 of assessed valuation, the total real estate tax revenues in Vermilion are about $1,400,000 per year. The claimed benefits from dredging equal 45% of total real estate tax revenue.

3. Corps' Statement: Past Dredging Records and Soundings

1.12 Prior to completion of the harbor modifications authorized by the 1958 River and Harbor Act (including the lake approach and river channels and the detached breakwater discussed above in paragraph 1.03 a., c., and f.), the Vermilion entrance channel was dredged about once every ten years using a government derrickboat, equipped with a clamshell bucket, and a dump scow. (pg. 6)

Harbor maps showing the results of past sounding operations at Vermilion Harbor are available for review at the Buffalo District Office. Sounding operations at Vermilion Harbor are performed by the Buffalo District using Corps equipment. (pg. 5, 1.07)

3. Comment: The information in the report on past dredging operations and soundings is inadequate. House Document 231 states that the total maintenance cost of Vermilion Harbor from 1839 to June 30, 1956 was $60,000. This would include repairs to the piers in the 1870's and early 1900's. It is evident that there was very little dredging of Vermilion Harbor during the 117-year period from 1839 to 1956. A full statement of dredging dates and amounts removed is essential for evaluation of this report.

Soundings were taken at the conclusion of the May 1974 dredging and again in 1975. They reveal that 8,000 cu. yds. of sediment is accumulating each year in the harbor since construction of the breakwater. Seventeen pages of bird sightings are certainly essential to define the impact of dredging on bird life, but historical records on dredging and soundings should also be included.

The presentation of this historical data will reveal that sedimentation rates have been increased tremendously by the breakwater. If the harbor cost $500 a year to maintain for 117 years and it now will cost $93,000 per year to maintain, there obviously are great economic benefits in the alternative proposal to remove the breakwater.

4. Corps' Statement: Amount of Solids Transmitted by Vermilion River

Since the harbor waters in the project area are at the same elevation as Lake Erie, backwater effects slow the river velocity in the project area and induce settling of the larger soil particles. The Vermilion River is a primary source of sediment in the harbor area (pg. 46, 2.53)

the accumulations are small in comparison with the eroded soil transported by the river (133,000 tons per year) (03). (pg. 46, 2.52)

No permit maintenance dredging has been performed in Vermilion Harbor in the last ten years.

1.13 It is expected that future maintenance dredging at Vermilion Harbor will be required approximately every three years, and will entail the removal of about 24,000 cubic yards of material during each dredging operation, or about 8,000 cubic yards annually. Shoaling rates and funding considerations may affect dredging volumes and frequency in the future. The duration of dredging operations will be dependent upon the nature and location of material to be removed, the type of dredge available, location of the disposal site, and other factors. (pg. 7)

4. Comment: It is evident that the Huron St. to Liberty St. reach of the Vermilion River has transmitted at least 133,000 tons, approximately 66,000 cubic yards, of sediment each year without any dredging from 1915 to 1973.

The backwater effects introduced by the breakwater, which have been reported by the Corps, obviously are causing a long-term, high magnitude adverse impact. The estimated annual 8,000 cu. yds. of sediment, if evenly distributed over the entrance channel and river channel (an area of 7.9 acres), would cause a deposit of 7.5 inches per year.

This rate of sedimentation in a river channel not dredged from 1915 to 1973 and an entrance channel dredged only "about every ten years" indicates that the need for dredging 8,000 cu yds. a year is solely due to the breakwater.

Adoption of the proposed alternative action of removing the breakwater could reduce annual dredging costs from the estimated $93,000 per year to perhaps $9,300 per year.

5. Corps' Statement: Adverse Effects from Dredging

1.14 Future maintenance dredging at Vermilion Harbor will be conducted during the summer season of the year, starting after about 15 June and finishing before 1 October.. The 3.5 month period should allow sufficient time for an expected average six weeks dredging operation to be performed. The following operational constraints and environmental characteristics of Vermilion Harbor were considered in making this scheduling determination:

a. While the earliest opening date of the available work season for construction and maintenance was, in recent years, 2 March, contract dredging is usually initiated about 1 April due to lake ice conditions that tend to inhibit safe operations until that time. Similarly, while the latest work season closing date was 30 December, lake storms generally hinder safe operations in November and December and the work season effectively closes about 1 November. Therefore, routine maintenance dredging could ordinarily be accomplished between about 1 April and 1 November.

b. In letters dated 6 June 1975 to the U. S. Department of the Interior, Fish and Wildlife Service and the Ohio DNR, the Buffalo District requested that these agencies identify any significant fish and wildlife resources that should be considered in the planning of maintenance activities at Vermilion Harbor. In response to this request, the Fish and Wildlife Service, in a letter dated 18 June 1975, indicated that, "since the river does serve as a spawning area for smallmouth bass, we recommend that no dredging be conducted during the period May 1 through June 15." A reply from the Ohio DNR, dated 24 June 1975, recommended, "that no dredging be done during the last week in April through the first week in June because of smallmouth bass and white bass movements during that period. It is further recommended that no dredging be done during October and November when salmon are moving "through the harbor area." Therefore, by initiating maintenance dredging operations after 15 June, and completing operations before 1 October, potential interference with the spring and fall fish migrations identified by the Fish and Wildlife Service and the Ohio DNR will be avoided.

4.28 A short-term, high-magnitude, adverse impact on the water quality of the immediate area of the dredge and for a short distance down current, will result from the dredging operations. The mechanical mixing and agitation created by the dredge will increase turbidity and suspended solids. The presence of various soluble chemical constituents in the sediment will cause increases in their concentration in the surrounding water. Those constituents involved include: Kjeldahl nitrogen, phosphorous, COD, oil and grease, and heavy metals such as zinc, mercury, lead, copper, chromium and cadmium. The amount of oxygen-demanding material contained in the sediment and sunken debris to be removed will determine the extent of dissolved oxygen depletion resulting from the operation. Studies have shown that these adverse increases in turbidity, solids, nutrients, COD, and heavy metals and decreases in dissolved oxygen are almost totally reduced to levels prior to dredging within 24 hours (118). (pg. 123)

In previous years, dredging at Vermilion Harbor has occasionally been linked to increased turbidity, conductivity, coliform bacteria counts, and concentrations of heavy metals depending on wave, wind and current action (123). Some of those parameters can be reduced to normal levels through additional treatment, but some (such as concentrations of heavy metals), might remain high despite treatment (123). (pg. 127, 4.36)

Maintenance activities may be scheduled to avoid potential conflict with a major harbor event, such as a regatta, if the Corps receives a sufficiently early notice of the time of the event and no significant operational or other environmental conflicts will result. (pg. 5, 1.28)

5. Comment: These portions of the draft environmental statement may be summarized as follows: Dredging has a short-term, high magnitude impact on water quality. To avoid adverse effects on aquatic life, dredging will not be done during the periods from April 20 to June 15 and Oct. 1 to Nov. The June 15 to Oct. 1 period has been designated for dredging.

As a sport fisherman, I can agree that adverse impacts on aquatic life should be avoided. However, the release of sediments containing coliform bacteria and toxic heavy metals, such as mercury, lead, and cadmium, cannot possibly be tolerated during the months of June July, August, and September when the beaches adjacent to the channel are used by swimmers. The breakwater deflects the warm, stratified river water into the beaches during the summer and a high magnitude, long-term, and possibly irreversible threat to human life would result. Dredging should only be done during the first three weeks in April.

If the breakwater remains, annual April dredgings should replace the proposed "6 weeks every 3 years" cycle. This may have a substantial impact on dredging costs.

Adoption of the alternative action of removing the breakwater would remove the need for annual dredging. This alternative is recommended to avoid a serious public health hazard. After removal, a one-time emergency dredging could be scheduled in September if the surrounding beaches were posted by public health authorities.

6. Corps' Statement: Beach Erosion

Several large structural stones have been stored on top of the east pier since July 1974. (pg. 3, 1.03d)

As evidenced by the EPA analysis of sediments collected in the river channel near the end of the piers and in the lake approach areas, and by the large buildup of sandy sediments just east of the east pier, much of the sediment in this portion of the harbor is composed of sand. Materials carried in littoral drift (generally east to west in the Vermilion area), are the source of these sandy sediments which are generated from updrift areas in Lake Erie located to the east of Vermilion (44). (pg. 49, 2.54)

6.35 The Corps of Engineers has authority to place unpolluted dredge materials on beach areas if the cost of this action does not exceed the cost associated with open-lake disposal. When the cost of beach nourishment exceeds the cost of open-lake disposal, beach nourishment can still be accomplished, without further Congressional authorization, if local interests will bear the additional costs associated with this action. If local interests are unable to fund the additional costs, then a complete beach nourishment project with Congressional authorization and funding would be necessary.

6.36 Beach nourishment disposal may be technically and economically feasible to accomplish using the harbor's unpolluted dredgings from the entrance channel. Shallow lake depths in the littoral zone would generally preclude the approach of a scow to within an economical pumping distance from the shoreline. However, a dredge operating in the outer section of the entrance channel could transfer dredgings directly from the channel to the downdrift shoreline. This procedure could be accomplished by pumping dredgings through the discharge pipeline if a cutterhead dredge is operating, or by swinging the excavation bucket over the west pier and releasing dredgings in the downdrift area if a clamshell or dipper dredge is used. The latter procedure was employed during the June 1974 and February 1975 emergency dredging operations. Cubic yard dredging costs during these operations were about $4.00 and $3.50, respectively.

6.37 Based on the 1975 USEPA, Region V sediment quality analysis, and the Buffalo District's estimate of the volume of sediment in the harbor, approximately 6,000 cubic yards of unpolluted littoral sediment in the lake approach channel and outer section of the entrance channel (2,000 cubic yards annually) may be suitable for use as beach nourishment material. Deposition of unpolluted materials at the lagoons beach, Linwood Park Beach, or other beaches east of the harbor would not be practical due to the westward flowing littoral current, which would tend to redeposit nourishment materials back into the lake approach and entrance channels. Deposition at the Vermilion City Beach or other beach areas west of, and in close proximity to the harbor, would be more practical and could be accomplished as described above. (pg. 41)

6. Comment: The large structural stones "stored" on the east pier were placed there in 1974 by the Corps in an effort to halt beach sand flow into the Vermilion River. They have been only partially successful. The 12' deep river channel filled with sand again, Sept. 24, 1975, in a NE storm. A sand bar is now present, above water, in the channel. "Emergency" dredging operations will be required again for the third time since January, 1974.

The Corps states that the Lagoons-Linwood-Nakomis beach east of the channel is the source of the sand in the river. The estimate of 2,000 cu. yds. per year of unpolluted sand is grossly underestimated because 8,900 cu. yds. was removed within a period of nine months. "Emergency" dredging will be required after every strong NE storm because the east pier is not high enough to be a barrier now although it was an effective barrier for 134 years. The physical processes by which the breakwater causes this effect are shown in the attached report.

The Corps has not and does not intend to return the sand to the beaches from which it originated because they are not authorized to do so and because it is not "practical". However, replacement of the sand already dredged and to be dredged will be required under Section 111 of the 1968 Rivers and Harbors Act. These replacement costs could double the projected $93,000 per year in maintenance costs.

The maintenance and dredging procedures proposed within the draft environmental statement will result in the destruction of Linwood and Nakomis beaches, causing long-term, high-magnitude, irreversible effects on the Vermilion shoreline. Emergency measures to halt this erosion should be taken at once. The alternative action of removal of the breakwater will halt sand shoaling almost immediately, bring about a gradual restoration of previous beach contours, and reduce dredging costs drastically. No other remedial action can produce these three effects.

7. Corps' Statement: Destruction of Land Area

> 4.19 The project will neither create nor destroy land areas, nor is it likely that it will stimulate a change from current occupancies. (pg. 121)

7. Comment: This statement is materially in error. The project has already destroyed much land area and created other land area. This can be documented by aerial photographs.

The project will also stimulate a change from current occupancies. Linwood Park, founded in 1883 as a religious meeting place, is a summer vacation community within Vermilion. The loss of Linwood Beach will cause an undesirable change to permanent residency. The project, if maintained, is likely to destroy a beautiful 92 year old park that is unequalled on the Great Lakes.

The project may also stimulate a change from current occupancies in the Vermilion Lagoons. In the 3 May, 1972 environmental statement, the Corps said, "The effects of the proposed detached breakwater on the combined flood and ice jamming problem are as yet undetermined." And, "Unfortunately, the effects probably will not be known until the project is constructed." The effects will make themselves known after a few severe winters.

8. Corps' Statement: Ice Formation

> 2.20 Historical records show that the Vermilion Harbor area is subject to freezing from approximately 15 December to 15 March, and at least some freezing of the harbor occurs during 90 percent of the time in winter. During an average winter, the harbor area is frozen from three to five weeks, not necessarily continuously. Ice depths average .4 to 6 inches, with a maximum depth of 18 inches (17). During a normal winter, ice formation on Lake Erie will begin between 15 January and 25 January. The areas of the lake which first produce an extensive ice cover are the shallow western basin and the inner bay at Long Point to the east. During the mid-season (1 to 10 February), extensive sections of the central basin, especially adjacent to the north and south shores, experience partial ice coverage. At this time, 70 percent to 90 percent of the open lake north of Vermilion becomes covered with ice, although the area close to shore does not freeze as quickly. During the time of maximum ice cover in a normal winter (20 to 28 February), greater than 95 percent of the lake surface may be frozen to depths ranging from 10 to 18 inches. The area of Vermilion is subject to wind row ice, which can accumulate to depths of 20 feet or more. During the early decay period (25 February to 5 March), open water may appear in the lake north of Vermilion, but the shoreline in the vicinity of Vermilion may stay frozen until 15 March (18). (pg. 74)
>
> Structural maintenance will allow the lagoons and the entrance and river channels to freeze smoothly, eliminating high waves (surges), thereby providing a long-term, medium magnitude, beneficial impact upon recreational users of these areas for such activities as hockey and ice skating on the lagoons. (pg. 130, 4.46)

8. Comment: Hockey and ice skating on the Lagoons could be considered as short-term, very low-magnitude, beneficial impacts. The increased ice formation in the smooth waters behind the breakwater, which is typical of protected waters, increases the probability of ice jam floods. Since the 150' opening for ice flow provided for in the authorized design was not constructed, long-term, high-magnitude, possibly irreversible, adverse impacts may result. Any discussion of project maintenance costs should include a statement as to whether the Corps is responsible, under the provisions of the 1968 Rivers and Harbors Act, for mitigation of flood damages when the breakwater causes flooding.

Adoption of the alternative action of removal of the breakwater would reduce the probability of ice jam floods.

9. Private Dredging - Comment. The many private lagoons in the project area and upstream of the project area can be expected to experience increased sedimentation due to backwater effects from the breakwater. Mitigation of these costs will be required under the 1968 Rivers and Harbors Act.

Some formula for an equitable sharing of private dredging costs incurred as a result of the breakwater should be devised and included as a part of the project cost.

10. Beach Water Pollution - Comment: The breakwater diverts river flow across adjacent beaches. Fishermen are now rarely found fishing from the east pier because the water to the east is too polluted to support fish life. This point can be supported by affidavits from local fishermen, if necessary.

Southwest winds, which are present about 20% of the time, draw the polluted river water away from the beaches. Winds in the W to NE quadrant drive the polluted water into the beaches causing many days when the beaches are too dirty for swimming. The only adequate solution to this problem is the alternative action of removal of the breakwater.

Conclusion

The Vermilion Harbor project, in two years, has become an environmental disaster unequalled on Lake Erie and perhaps on the entire Great Lakes. There are many adverse environmental impacts which are long-term, high-magnitude, and irreversible.

Many of the adverse impacts, such as increased probability of ice jam floods, beach water pollution, drinking water pollution, and increased sedimentation, result from an unauthorized change in design. The Corps was authorized by Congress to convey the river 500' farther north to a new entrance 150' wide. The project was constructed to block and divert the river east and west.

1. The Vermilion Harbor breakwater was unauthorized and should be removed because of adverse environmental effects.

2. The claims of benefits are unsupported.

3. Historical dredging and sounding records which would demonstrate that the Vermilion River was essentially self-cleaning prior to the project installation were omitted from the report. Prior to the project, the Vermilion River transmitted 66,000 cu. yds. of sediment annually without any dredging.

4. Dredging costs which were $500 a year are now $93,000 a year.

5. Dredging has adverse environmental effects on aquatic and human life. Summer dredging will ruin swimming at adjacent beaches.

6. Serious beach erosion has resulted from the breakwater portion of the project. Emergency remedial action is mandated to halt this erosion.

7. Destruction of land area is occurring which will result in undesirable change of occupancy.

8. The probability of ice jam flooding is increased by the project.

9. Federal participation in private channel dredging has not been considered in the report.

10. Beach water pollution caused by the project is a hazard to health.

The only satisfactory solution for these serious environmental problems would be the removal of the Vermilion Harbor breakwater under emergency authorization during 1976. A subsequent clean-up dredging during September, 1976 will restore the harbor to its prior condition. Maintenance dredging will be required every ten or fifteen years on the basis of the harbor history.

A solution to the single problem of beach erosion at Linwood Beach can be achieved by construction of a long groin near the Linwood-Lagoons property line. This would not permit the sand piled up at the east pier to return to its original contour. The cost of such a groin and beach restoration is likely to exceed $1,000,000 which will require Congressional authorization.

Such a long groin will not solve the beach water pollution, sedimentation, and ice jam flooding problems. It would be environmentally unacceptable to the Lagoons residents because river pollution and sediment would be trapped between the east pier and the proposed groin. This would render the Lagoons beach useless for recreational swimming.

However, the emergency funds which have been used for emergency dredgings should be employed to construct temporary groins, possibly of the vinyl tube type, to hold the beaches east of the channel. Land based excavating equipment could also be used to push sand away from the pier. These measures would be less expensive than continued "emergency" dredging.

Since the breakwater portion of the project was unauthorized as constructed and it has caused many long-term, high-magnitude, potentially irreversible and adverse environmental impacts, I strongly recommend removal of the structure at the earliest possible time.

Thank you for the opportunity to review and comment upon the draft environmental statement. This report has been forwarded to those organizations on the mailing list, where an address is available, for their comment.

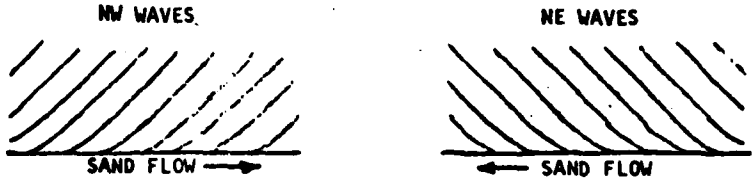
Sincerely yours,

George W. Grossman

SHORE AND HARBOR PHYSICAL PROCESSES
AT VERMILION, OHIO
by
George W. Grossman September, 1975

SHORE PROCESSES

1. A sand beach protects a shoreline from erosion and it is also a desirable recreational facility. Sand moves back and forth along a shoreline in a direction determined by the waves.

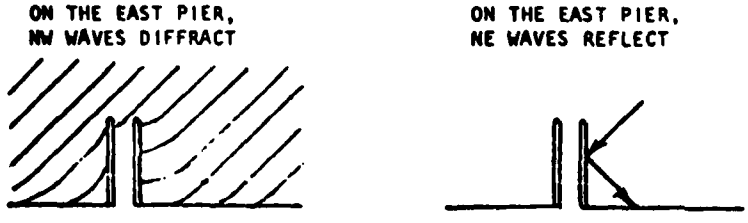


Refraction, bending of the waves as they reach shallow water, holds the sand into the shoreline. Westerly waves at Vermilion refract to become light NW waves. Easterly waves become light NE waves at the shore.

2. The greatest sand flow results when water levels are the highest as more beach is under water. The highest short-term water levels at Vermilion occur in NE storms. Therefore, sand has a net westerly flow here. High rates of sand flow also occur when lake levels are high on a long-term basis because of excessive rainfall in the Great Lakes Basin.

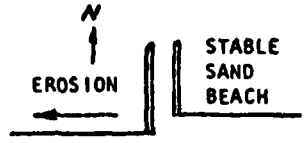
3. Prior to 1839, sand flowed across the mouth of the Vermilion River, blocking the 6' to 7' deep river channel. In 1839, the Corps of Engineers dredged the mouth of the river and constructed parallel piers 100' apart. This prevented westward sand movement across the harbor entrance.

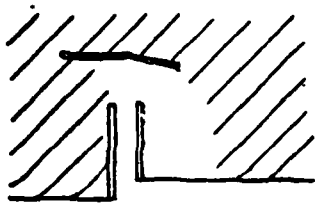
4. One might expect the net westerly sand flow to cause sand to pile up at the east pier and eventually cover the pier and block the river. However, diffraction of NW waves and reflection of NE waves balances the westerly flow, creating a stable beach in a dynamic equilibrium.



A 3700' long stable beach was thus held on the east side of the Vermilion Channel. Surveys over 118 years from 1854 to 1972 indicate no substantial gain or loss in this beach.

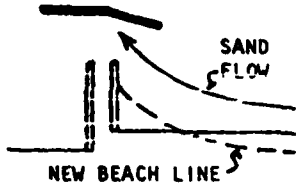
5. The net westerly sand flow continued west of the Vermilion Channel. With no replacement sand moving across the mouth of the river, "a wide sand beach extending west from the river to the township line" in the early 1800's moved west to Huron. Erosion of the shoreline for 1-1/2 miles west of the river occurred.





6. The construction of an 860' breakwater across the mouth of the Vermilion River in 1973 altered shore processes. NW waves were reflected by the breakwater and could no longer scour the beach adjacent to the east pier. The old dynamic equilibrium was destroyed, and new sand movement processes were started.

7. Without the counter effect of NW waves, NE waves pushed sand in behind the breakwater. As sand piled up on the pier, 200' in one year, NE wave reflection from the pier was eliminated. In two years, the corner of the east pier and the beach has been completely filled with sand. Sand is present underwater along the entire length of the east pier to its outer end.



Sand is now being pushed around the end of the east pier, causing shoaling. Dredging to maintain channel depth and disposition of the dredged sand west of the channel completes the destructive process.

The beach erosion will continue in the next few years until about 700' to 1000' of the 3700' Lagoons-Linwood-Nakomis beach remains. Without the protection of a sand beach, very slow erosion will occur at Nakomis Beach as it has a durable shale bluff. Rapid shore erosion will occur at Linwood Park in low clay bluffs. No erosion will occur in the Lagoons area because it will be protected by a beach. Similar offshore breakwaters constructed in Lorain and Cleveland, Ohio years ago caused similar erosion of beaches and shore.

Prompt removal of the Vermilion Harbor breakwater will halt this destructive process and bring about a natural restoration of the Lagoons-Linwood-Nakomis beach to about 60-70% of its 1971 level. No other remedial action will cause natural restoration. The cost of artificially restoring Linwood and Nakomis beaches after complete erosion should exceed $1,000,000.

HARBOR PROCESSES

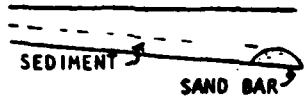
1. For boats, a straight-in approach is the most desirable method of making the transition from rough lake water to smoother harbor water. Sailboats with a keel or centerboard can make the transition under almost any conditions. Power boats with less draft should have the power to come in faster than the waves to avoid broaching.

A relatively narrow entrance channel with a length to width ratio of more than 4-1 or 5-1 is the most efficient for reducing wave action. Diffraction of waves within the confines of the channel walls will reduce wave action in a distance of 2 - 3 times the width. This provides a gradual, rather than abrupt, change from rough water to smooth water.

A 60' wide channel width is adequate for recreational craft at many harbors on the Great Lakes. A 100' channel width, such as at Vermilion, is suitable for entry under almost any wave condition that a craft can withstand in open water.

2. Although waves are reduced at the mouth of a channel, their effect continues as swells for a considerable distance. This phenomenon, sometimes called surging, causes bottom turbulence and keeps bottom silt in suspension. River flow then carries it out into the lake. Fresh water streams, lacking tidal currents to sweep out sediment, can be kept clean by surging. From about 1913 to 1973, a period of sixty years, the Vermilion River channel from Huron Street to Liberty Street did not require dredging.

3. The breakwater brought wave action or surging to a halt. Rapid silting or sedimentation has occurred, reducing channel depth. Sand bar shoaling between the piers contributed to sedimentation. The river bottom has a natural slope of about 8' per mile and is estimated to slope 3' - 4' between Liberty Street and the channel entrance. A sand bar near the mouth causes sediment to back up behind it.



Sedimentation reduces the capacity of the river to discharge water and ice.

4. Harbor ice jamming behind the breakwater will be more extensive. Although ice pushed by wave action can pile up 15' high as it meets the solid obstruction of a beach, ice at the harbor entrance is rarely pack ice. It commonly is surface ice floe which can be displaced by the force of the river.

Ice pushed into the breakwater by river flow will be pushed back with equal and opposite reaction. Relatively slow river flow, which was incapable of removing ice from a narrow unobstructed channel, will not shove ice into the lake. Unless Newton's Third Law is found invalid, ice jams and subsequent flooding are inevitable. The only requirement for an ice jam flood is an adequate supply of ice.

5. Pollution of drinking water and beaches by the breakwater is an extremely serious public health problem. It is so serious it cannot be adequately covered in a report on physical beach and shore processes.

CONCLUSION

If we accept the 1839 decision to create a harbor by building piers and agree that the advantage of a port outweighed the disadvantage of shore erosion for 1-1/2 miles west, then:

1. The Vermilion channel, from 1839 to 1972, had a desirable straight-in approach. A natural self-cleaning mechanism maintained the river channel without dredging. The channel was wide enough for the size of boat that could be accommodated by the channel depth.

2. A stable recreational sand beach, 3700' long, was maintained east of the channel for 133 years.

3. The only problem with the Vermilion Harbor is that the river channel is reduced from an average width of 120' - 130' in the Huron Street to Liberty Street reach to 100' between the piers. This restriction has caused floods.

The Vermilion Harbor, from 1839 to 1972, was a very desirable ecological balance of the river, the lake, and the adjacent beaches. This balance made the port of Vermilion one of the best, if not the best, recreational boating facility on the Great Lakes.

This balance of natural forces has been eliminated by the breakwater. The beaches will be destroyed. The businesses and homes in the flood plain may be destroyed by flooding.

The Vermilion Harbor breakwater should be removed at the earliest possible time.

REFERENCES: The basic processes of wave refraction, diffraction, and reflection are discussed in PSSC Physics, a high school text. Practical illustration of actual effects is discussed by R. P. Hartley, "Effects of Large Structures on the Ohio Shore of Lake Erie", Division of Geological Survey, State of Ohio.

NCBED-PE

10 November 1975

Mr. George W. Grossman
17125 Amber Drive
Cleveland, OH 44111

Dear Mr. Grossman:

This is in response to your letter of 4 November 1975 requesting a 15-day extension in the 45-day review period for the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH.

We have received your letter of 6 October 1975 with comments on the Draft Statement. These comments will be addressed in the Final Statement. If we receive additional comments after the 45-day review period has expired, every effort will be made to address them in the Final Statement within our time constraints.

Sincerely yours,

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBRO

AD-A101 549 CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT F/G 13/2
OPERATION AND MAINTENCE, VERMILION HARBOR, ERIE COUNTY, OHIO.(U)
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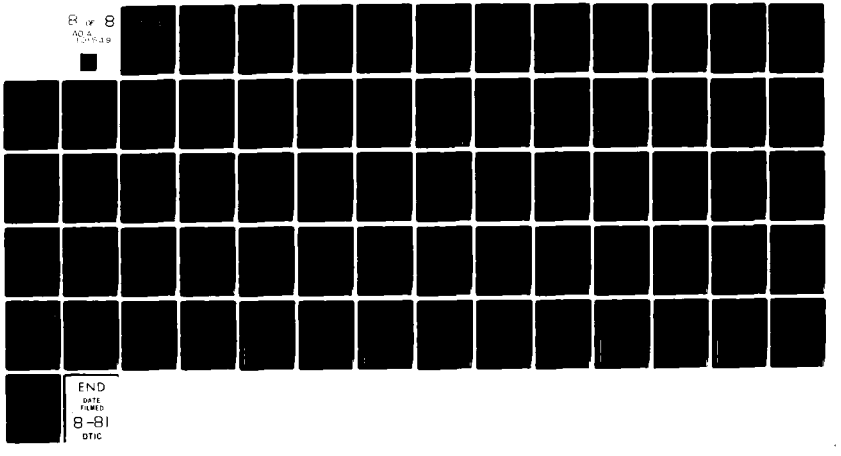

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VERMILION HARBOR

My dear Lt. Col. Walker,

Please help us restore it! 11-5-75

The ecology of this area has suffered untold loss! Our own little ones are the 5th generation of our family to love Linwood Park. Public Law 91-110 was

P.S. Thank you for reading my plea!

designed to protect us. Will it fail, as a result of the bungling of the Engineer Corps? Will Linwood's 93d year [illegible] to materialize as the haven it has been for nearly a century? due to the breakwall which is polluting our [illegible] & destroying our beach? bringing on the [illegible] [illegible] damage? Sincerely,

Hazel Cramer

Bankers Security
LIFE INSURANCE SOCIETY

RICHARD K. BROWN
GENERAL AGENT

17413 Hilliard
Lakewood, Ohio
Phone: (216) 22

Nov. 5, 1975

Hon. Ronald Mottl
1233 Longworth House Office Bldg
Washington, D.C. 20515

Dear Sir:

I write to you about a problem not inyour immediate District but in Ohio where I own a summer home. We have since 1937 owned property at Linwood Park in Vermilion, Ohio. Linwood has always been noted for its excellent beach--we always thought that Linwood was second only to Cedar Point in beaches . If you have ever visited Linwood--and almost everyone on the West side of Cleveland has, you know what I am talking about.

In 1972 or 73 the Corps of Engineers built an appliance in the Lake just off the two piers that jutted out at the mouth of the Vermilion River. From the air it would look like the top part of a "T" that was separated from the base. The purpose was to provide a refuge for small boats in case of storms. In my over 30 years of visiting this area I know of no boats that have been dashed against the piers.

The effect of this appliance has been to completely devoid Crystal and Nakomis beaches of their sand(opening the remaining cliff to erosion) and to take millions of tons of sand from the beach at Linwood and deposit it in the mouth of the river.

It was never necessary to dredge Vermilion River in the past. Now the mouth is so filled with sand that you can stand ten feet to the water side of the pier.

We want our beach back. We want the pollution that the appliance causes in making the river flow toward the beach stopped. The corps of engineers turns deaf ears to us and we do not vote in the district where we are injured. Can you suggest any remedies?

Sincerely,

Richard K. Brown

61

G-96

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PS

17 November 1975

Honorable Ronald M. Mottl
House of Representatives
Washington, DC 20510

Dear Mr. Mottl:

Thank you for you letter dated 10 November 1975 requesting information to assist you in replying to Mr. Richard Brown's letter of 5 November 1975.

The Buffalo District is currently conducting a study under Section 111 of the River and Harbor Act of 1968 to determine shoreline damage as it might relate to the Vermilion Harbor structures. This study is scheduled for completion in December 1975. If this study determines that the detached breakwater is, in fact, causing erosion problems, the Corps will analyze different alternatives to alleviate the problem. In addition, under the authority of Section 111, an environmental impact statement and detailed project report are required for any recommended alternatives. The current study is funded as a feasibility study and does not permit detailed design of possible alternatives. The study will recommend that a detailed project report be made if the findings are positive as to the impact of the Federal structures. Until these actions are taken, the Corps cannot take any action with respect to the detached breakwater at Vermilion Harbor.

I will also initiate an investigation to determine the possible impact of the Vermilion Harbor structures on other local problems such as water supply degradation.

I trust this information will assist you in responding to Mr. Brown.

Sincerely yours,

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

62
0-97

STUART P. CRAMER
ATTORNEY AT LAW
5813 HURON STREET
VERMILION, OHIO 44089

November 5, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
Buffalo, New York 14207

Dear Colonel Walker:

Will you kindly include the following comments in the Section III study and final environmental impact report on Operation and Maintenance of Vermilion Harbor per notice Federal Register, Sept. 26 1975, p. 44349; and in Section III of the study due in December:

As a long time cottage owner at Linwood Park, and a lifelong user of this beach, I wish to state that before the present breakwall was contructed there was never any sand build-up at the east side pier.

Nor was there beach erosion dispite NE storms.

Nor was there sandbar in the river,

I therefore believe that this sand should be returned to Linwood beach and not dredged up and dumped into the lake.

I demand a removal of the breakwall to prevent further polution and the inevitable flooding that will result from ice backing up in the river.

Sincerely yours,

Stuart P. Cramer

1c/238

NCBED-PE

18 November 1975

Mr. Stuart P. Cramer
Attorney at Law
5613 Huron Street
Vermilion, OH 44089

Dear Mr. Cramer:

This is in response to your letters of 4 and 5 November 1975 on Vermilion Harbor. Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested in your 4 November 1975 letter. Please note that the 45-day public review period for this document ended on 10 November 1975, and the Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is therefore unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Comments in your 5 November 1975 letter concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 Study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of your additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

504 Stewart Ave. #5
Ithaca, N.Y. 14850
November 8, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Dear Colonel Walker,

Every year since I was born I have spent the summer at Linwood Park in Vermilion, Ohio. I would very much appreciate your sending me a copy of the draft environmental impact statement for operation and maintenance of the Vermilion Harbor, (Sept. 1975). I understand

that the Corps disclaims responsibility for the heart-breaking erosion that has occurred only since the harbor was blocked by the breakwall. There did not used to be a sand bar in the river, the beach used to be 3 times wider, there was no black gum on the sand and the shoreline was completely different. I protest violently that such damage has been done to our beach, and I would very much like to know what I can do as a very frustrated, helpless-feeling, angry citizen.

Sincerely yours,
Hazel Games

NCBED-PE

lc/238
18 November 1975

Ms. Hazel Cramer
504 Stewart Avenue, #5
Ithaca, NY 14850

Dear Ms. Cramer:

Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested in your letter of 8 November 1975. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is therefore unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 Study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of your additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
✓NCBED-PE
NCBED-PS

Mrs. Carl Vrestek
25905 Kilburgh Drive
Farmington Hills, Mich
48024

Lt. Col. Bryon G. Walker
Department of the Army.
Buffalo District Corps of Engineers.

Dear Lt Col. Walker,

I am a cottage owner at Linwood Park, Vermilion, Ohio. I have been going to Linwood Park for over fifty years. In all those years I have not missed spending some time of each summer at the Park.

Bringing up our family we went to Linwood Park every year and now our sons are spending their summers with their families at Linwood. Most of the time we were there was always spent on the beautiful sandy beach. With as much pride we would have our relatives and friends come and we spent much of the time with them on our beautiful beach. But now in just a few years it has all been changed. The beach isn't beautiful now. It is unbelievable what has happened in this short time.

Last year half of our beach was gone and now this year it is still worse. All on account of the breakwater put in at the Vermilion River.

For years now we used to go down to the pier and watch the cruisers going in and out of the river into the lake and there was no difficulty. Why after all these years without any accidents or any lives lost or any emergencies did this breakwater have to be put in?

Now the sand of our beach is being dumped into the Vermilion River and our beach is being polluted. Before our beach is completely gone that breakwater should be removed and our sand, trapped in the Vermilion River, should be returned to our beach.

I would like to have my comments included in the Section 111 study and also the final environmental impact report

Sincerely

Florence M. Prestel

1c/238

NCBED-PE

18 November 1975

Mrs. Carl Prestel
25905 Kilreigh Drive
Farmington Hills, MI 48024

Dear Mrs. Prestel:

This is in response to your recent letter on the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH.

Your comments about Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Impact Statement, and comments concerning shoreline damages related to the Federal harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH. The Buffalo District is presently investigating alternative authorities for further study of your other concerns related to the Federal navigation project.

Sincerely yours,

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
√NCBED-PE
NCBED-PS

November 7, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attn: Lt. Col. Byron G. Walker

RE: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349

About 1908 my father, C. A. Persons, Sr. resided in Oberlin, Ohio some eighteen (18) miles from Linwood Park in Vermilion by way of a horse drawn carriage. It was a normal frequent exciting trip for the family to go to Linwood for swimming and a picnic. They would pass the "Grove" beside Linwood Avenue, proceed north on Poplar Street to Front Street (now vacated) and then go east along the beach front to the picnic area. It was the cottage, #40 at the time, that took my father's eye. He bought his dream cottage in 1945. Since his seasonal business did not allow a summer vacation, our family of five and many house guests fully utilized the facility, now 5261 Front St., during the summer.

Now my two brothers and I own the cottage and our families number seventeen who share this with our friends in the Spring, Summer, Fall, and sometimes during the winter for beach activities on a tri-wheeler or snowmobile, and a picnic. We've used a day sailer and an out board motor boat docked in the Vermilion River area as family activities changed.

Our family has been involved at Linwood! We have seen the waters rise and fall and the winds blow from all directions.

Not since the breakwater was installed has the Linwood Beach been the same. We had no sand, only rocks and some dead fish and debris at the pier, we had no sand in the river, we had no roots of the trees exposed, nor did we have beach erosion.

At times of low water we have had a drop off in the beach edge but the water was cleaner and presumably the sand was cleaner. Environmental pollution from sewage, farmlands fertilizer and silt continued to build up. Now we trust the E.P.A. is reducing the surge resulting from greater habitation and faster run off. But the point is that the "dam" in front of the mouth of the river is definitely changing the shoreline of

Department of the Army
Buffalo District, Corps of ENgineers

Attn: Lt. Col Byron G. Walker

the Linwood Beach. We are losing our sand, we are starting to lose our trees, we will feel the impact of swimming in polluted water which is slanted to the east against our beach.

Our environment has changed to the detriment of the proud, peaceful, law abiding citizens of Linwood Park.

It is a crime to cast Linwood beach sand, which has drifted westward against the pier, out into the lake west of the pier or anywhere except from where it originated.

The prevailing N.W. winds cannot perfrom their stabilizing effect after a northeaster. The daming effects of the recently installed breakwater is positive and continuing.

The Corps is morally bound to return this valued asset from where it came, the Linwood Beach. I demand that this be done at a time when swimming will not be adversely effected by stirred up pollution. Summer time dredging is probably most convenient, but scheduling for this seriously effected area should be in the Spring or Fall. Please send the sand back to "New Castle". Eliminate the breakwater, acknowledge an error and let nature rebuild its cyclical happenings.

Only once in thirty (30) years of sailing have I found it difficult to enter the mouth of the river. A line squall had hit, our boat was knocked down, but lives were not endangered. Within fifteen minutes we were assisted by power boats who took us in tow back to the harbor. Exposed to the weather yes, but not polluted on each swim.

Since the July 4th 1969 flood we have missed the range lights. We certainly don't need them now with the dam in front of the mouth. They did do a fine job. The "protection" of the breakwater creates confusion with river traffic.

One item that has not happened recently is the severe ice jams and resulting flood waters from the Lagoons up the river to the other lowland homes, more and more of which we are year round housing. How often will an ice jam be caused mechanically by the breakwater, and choked by the sand build up in the river channel?

Department of the Army
Buffalo District, Corps of Engineers

Attn: Lt. Col Byron G. Walker

Enough silt flows to the Vermilion River mouth to create a problem with ice jams without compounding the problem with daming configuration of a breakwater.

I deplore you to rid the community of Vermilion and particularly the Linwood Park residents of this nemisis.

(1) Remove the breakwater to eliminate all the varied problems it causes.

(2) Eliminate the summer time dredging for the health of all concerned.

(3) Return the beach sand from where it came. Please do not waste it into the Lake, Save our environment, save our beach.

I respectfully request that my thoughts, ideas and statements be included in the Section III study as well as in the final environmental impact report forth coming.

I am doing my best to eliminate water, air, eye, and ear pollution.

What can you do to better our environment in Vermilion to bring it at least back to normal?

Very truly yours,

George F. Persons

George F. Persons
643 Washington Avenue
Elyria, Ohio 44035

1c/238
18 November 1975

NCBED-PE

Mr. George F. Parsons
643 Washington Avenue
Elyria, OH 44035

Dear Mr. Parsons:

This is in response to your two letters of 7 November 1975 on Vermilion Harbor. Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is therefore unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 Study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of your additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON C. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
✓NCBED-PE
NCBED-PS

November 6,1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York

Attention: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement
on Operation and Maintenance of Vermilion
Harbor per Notice Federal Register, Sept.
26, 1975, p. 44349

Gentlemen:

It has come to my attention that the Corps of Engineers feels no responsibility for the erosion of the beach at Linwood park in Vermilion Ohio and places the cause to weather.

My experience at Linwood goes back to 1944, and with time out for the Navy and college, I have visited or rented in the park until 1970, when I purchased a cottage there and make it my summer residence. All those years I kept going back and finally purchased, mainly, because of the beach. Never a change - until the breakwater went in. It is so evident that a change has occurred, the whole basin the beach is in has tilted with a build up of beach on the west end and no beach on the east. It is so bad now that I have to wear my tennis shoes when I go swimming because of the rocks. Up to the time the breakwater was built I would play ball (keep away) with the children and my daughters in the shallow water on smooth sand. And the beach is getting narrower. Where there was beach wide enough for baseball and football games by the youngsters, it now is looking more like a bowling alley.

As a registered engineer I am quite often asked if I believe the breakwater has effected our beach. I tell them you don't have to be an engineer to realize this.

Please, do something to save our beach.

Very truly yours,

Robert Prochaska

Robert Prochaska
14411 S. Woodland Rd.
Shaker Heights, Ohio 44120

P.S. Would you include my comments in the Section III study and the final environmental impact report.

c.c. Senator John Glenn, Senator Robert Taft, Rep. Charles Vanik

3678 Traver Rd.
Shaker Hts., Ohio 44122
Nov., 6, 1975

Dept. of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attn. Lt. Col. Byron G. Walker
Ref. Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor.

Dear Sir,

The breakwall at the mouth of the Vermilion River is a cause of distress and hardship to us at Linwood Park, Vermilion, Ohio, where my husband and I maintain a secondary home at 5079 Elm St.

The path of the river is diverted at the mouth . This has caused two problems of which I am aware. First, the water intake is affected. The city assures me that the water is safe for human consumption, but water should also be palatable. I question the additives with regard to our physical well being which are necessary for safe consumption. Secondly, the river carries the waste from the Vermilion disposal plant, and now flows along the shoreline. The pollution from this flow can not be diluted and washed away at an adequate rate for safe swimming.

The sand build up at the mouth of the river is dangerous to the purpose for which it is said the breakwall was constructed, namely, a safe refuge for small craft. The sand bars do not allow free use of the river channel. At times, the boats are fortunate to have a channel at all. The dredging necessary to maintain this channel is a harassment to those of us who live near the channel. It is also an addem expense for us, the taxpayers, to assume.

I have been a resident at Linwood for 26 years. Prior to that time, I had spent some part of the summer at Linwood for over 60 years. In spite of severe storms, hurricane, flood, high water or low water, the beach east of the pier to the bluff at Crystal has remained fairly stable. I cannot remember ever seeing any part of the Linwood beach devoid of sand as it now appears. The one new factor which has entered the picture is the breakwall, which would seem to be responsible for the above discribed situations.

Will you please consider the above critique in your final draft which you are planning for December 1975. Thank you for this consideration.

Sincerely,
Ruth E. Peterka

Ruth E Peterka

L. L. Ludwig
1760 Karg Drive
Akron, Ohio 44313
November 7, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

I am writing in reference to the Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, page 44349. My comments are directed at the relatively new breakwater in Lake Erie at the mouth of the Vermilion River, and the effect it has had on the adjacent Linwood Park Beach.

My family has been vacationing at Linwood Park since 1954. The attraction has been the excellent beach there. However, since erection of the breakwater, a continual decline in the Linwood Park beach has occurred. The breakwater obviously has created several detrimental effects to the Linwood Park Beach, including the following:

1. Beach sand apparently no longer shifts East and West naturally. It now moves only West, from the Linwood Park Beach into the Vermilion River. As needed to maintain the river, the original Linwood Park Beach sand is then dredged out of the Vermilion River, and dumped into the open lake.

2. Very serious erosion has occurred at the East end of the Linwood Park Beach, all since erection of the breakwater.

3. Linwood Park Beach polution has increased, at least as measured by eye, since erection of the breakwater.

I can't help but ask the following questions:

1. Why, at the very least, can't the sand dredged from the Vermilion River be returned from whence it came, back to Linwood Park Beach?

2. On a larger scale, why must an apparently environmentally damaging structure like the Vermilion breakwater have to be retained when it is obvious, at least to the local citizens, that it accomplishes very little if any good, and causes very obvious and widespread damage to a natural asset; the Linwood Park Beach?

I request that my comments and questions be included in the Section III study, and the final environmental impact report.

I have never heard of the Corps of Engineers engaging in environmental protection projects. I only hear of their involvement in projects that are environmentally damaging. Of course, neither is the actual case. However, the evidence apparent to the public is very negative. This issue at Vermilion, Ohio is a prime example. I hope that good judgement can prevail, and that a reasonable solution to the problems posed by this breakwater can be reached, and soon.

Sincerely,

L. L. Ludwig

vh
cc: Senator John Glenn
Senator Robert Taft
Representative John Seiberling
George W. Grossman

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334 BOULEVARD OF THE ALLIES
PITTSBURGH, PA 15222

November 7, 1975

Dept. of the Army,
Buffalo District Corps of Engr.,
1776 Niagara Street
Buffalo, N. Y. 14207

Attention: Lt. Col. Biram G. Walker

Subject: Draft Environmental Impact Statement operation and maintenance of Vermillion Harbor per notice federal register 9/26/75 page 44349

Gentlemen:

As a lease holder in Linwood Park, Ohio for a period of eleven years and a vacationer at that spot for a period of thirty years the writer feels called upon to comment relative to the upcoming Draft Environmental Impact Statement that is expected in December, 1975.

Over the past several weeks I have heard and been advised of various comments relative to the above and the general contents of it. If some of the information is correct somebody is going to draw some very invalid conclusions. As an individual who is cognizant of the lake action on the Linwood Park beach at Vermillion I can say there have been many changes over the years but nothing as drastic, since the installation by the Corps of Engineers of the monstrosity at the mouth of the Vermillion River, a North West Lake action has been null and void as far as the Linwood Park beach is concerned, for this reason the north eastern storm done nothing but wash the beach away. The authorities have been plagued with a pile up of Linwood Park sand against the East pier of the Vermillion river which extends out to the entire length of the pier. Prior to the installation of the monstrosity the immediate beach area to the East of the East pier was practically nothing except rock and stony area. Because of the monstrosity, sand movement from Linwood beach has not only built up against the pier but has gone over the pier and clogging the river on several occations.

Quite frankly, there is no permanent remedy for this problem and the damage that is being brought on the property owners of Linwood Park, other than the complete elimination of the monstrosity. As a resident of the area I personally can guarantee the elimination of the monstrosity someday in the near future, whether it be from our action or from the pressure of others.

The installation of this monstrosity has caused fear among the residents of the Vermillion Lagoon and one of these days there will be a drastic flood heaping ruin of many, many thousands of dollars on the property. If and when this happens, the Corps undoubtly will be forced to take action and remove it. Prior to that we are hoping the Corps will see the light and realize the damage and threat this monstrosity poses for the people of the area and take immediate action for its removal.

We certainly hope flood damage and even possible loss of life as a result of such a flood is not necessary to bring about correction of this. The Corps of Engineers has certainly had enough pressure brought to them over the past two years relative to this installation that somebody along the line should realize the truth and the mistake that took place. Why do we need to go long enough to have a disaster before we can get action on our request.

In the latter part of 1974 and thus far in 1975 there has been upwards of approximately 18 to 20,000 cubic yards of sand passed over the East pier of the Vermillion River from Linwood Park beach in the river bed that has had to be dredged from the river by the Corps. We ask that you check your records and determine how many times and at what period the Corps ever had to dredge the Vermillion River prior to 1974 and the installation of this monstrosity.

The writer would like to request the Corps realize the disaster they have heaped upon the people of this area and that they take immediate steps of restitution and of restoring the Linwood Park beach by the return of the beach sand which has washed away and by the elimination of the monstrosity.

In addition the mouth of the river has had its flow diverted by the monstrosity to the point that all of the waste and pollution from the river is now being directed and pushed directly across the face of the Linwood Park swimming area.

I would like to request that the comments made in this letter be included in the section three study of the Environmental report when it is released.

I wish to thank you for your consideration and cooperation in this matter.

Yours very truly,

J. W. Rutledge

JWR:eob

2341 McNary Blvd.
Pittsburgh, Pa. 15235
Nov. 10, 1975.

Lt. Col. Byron G. Walker
Dept. of the Army
1776 Niagara St.
Buffalo, N. Y.

Dear Sir:

As a cottage owner in Linwood Park, Vermilion, Ohio, I am writing in regard to the condition of our beach in the past several years.

I have not missed a year since 1924 in spending our summers at Linwood and previous to the building of the breakwall I would say we had the finest beach on Lake Erie. We enjoyed a beach with beautiful sand which measured about 75 yards in width. In the past two years this picture changed to where our beach was reduced to about 10 yards in width, with no sand but plenty of stones and debris.

The removal of the breakwall will solve all our problems, but until this is done our beach will be helped immensely by returning to our beach the sand dredged from the Vermilion River. I also wish to object to the summertime dredging of sand as this makes swimming off our beach impossible.

I will appreciate your kindness in having my comments included in the Section 111 study and the final environmental impact report.

Sincerely,

Walter C Waite

Ref: Draft Environmental Impact Statement on Operation and maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, P. 44349.

841 Spring Rd.
Charleston, W.Va 253[illegible]
Nov 8, 1975

Dept. of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, N.Y. 14207
Attn: Lt. Col. Byron W. Walker

Ref: Draft Environmental Impact Statement on Operation & Maintenance of Vermilion Harbor per notice Federal Register, Sept. 26, 1975, p 443[illegible]

Dear Sir:

Please consider this letter a response to the above reference subject.

As a property owner at Linwood Park, Vermilion, O. I believe the recently constructed breakwater off the mouth of the Vermilion River in Lake Erie is extremely detrimental to the Linwood Park beach and request the removal at once.

My family has been associated with Linwood Park for five generations. During

this time we have thoroughly enjoyed the social, religious and environmental amenities that the park has created. To see this natural park being torn apart in just the past two years by a breakwater that offers absolutely nothing is truly incomprehensible.

Linwood Park beach has withstood the ravages of Lake Erie storms down thru the ages. Over the past 100 yrs we had no sand filled up at the pier, no sand in the river and no beach erosion or pollution.

I am opposed to the continued open lake disposal of our sand dredged from the river. And to ... the return of our beach sand. I am in opposition to summertime dredging ... all swimming.

The removal of the breakwater is the only solution to all of the problems it has caused.

I request my comments be included in the Section III study and in the final environmental Impact Report.

Sincerely,

B. H. Kreps

1c/238

NCBED-PE

18 November 1975

Dear :

This is in response to your letter of November 1975 on the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH.

Your comments about Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Impact Statement, and comments concerning shoreline damages related to the Federal harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH. The Buffalo District is presently investigating alternative authorities for further study of your other concerns related to the Federal navigation project.

Sincerely yours,

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
✓NCBED-PE
NCBED-PS

LETTER WAS SENT TO THE FOLLOWING:

Mr. Robert Prochaska
14411 S. Woodland Road
Shaker Heights, OH 44120

Ms. Ruth E. Peterka
3678 Traver Road
Shaker Heights, OH 44122

Mr. L. L. Ludwig
1760 Karg Drive
Akron, OH 44313

Mr. J. W. Rutledge
Rutledge Equipment Company
334 Boulevard of the Allies
Pittsburgh, PA 15222

Mr. Walter C. Waite
2341 McNary Boulevard
Pittsburgh, PA 15235

Mr. D. H. Kreps
841 Spring Road
Charleston, WV 25314

133 Brookhaven Road
North Kingstown, R. I. 02852
7 November 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N. Y. 14207

Attn: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349

Dear Sir:

My wife and I own a summer cottage at Linwood Park in Vermilion, Ohio, and we are concerned over the apparent effect the Vermilion Harbor Breakwater is having on the Linwood Beach. Would you please send us: (a) a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept, 1975, (b) a copy of the final environmental impact statement, and (c) a copy of the Section III study of Vermilion Harbor due in December.

My wife's family has derived pleasure from the park and beach since its inception in the late 1880s, and we are continuing the family tradition in enjoying the park immensely ourselves. Upon my retirement from the United States Navy in some years to come, we plan to use our cottage in Linwood Park at 5225 7th St. full time in the summers. Currently, and prior to that time we are renting the cottage for the majority of the summer season using the revenue to maintain and improve the cottage. The majority of our tenants have also loved Linwood Park and its beach for many, many years. Thus, we have a long term interest in the condition of the Linwood Beach.

In commenting on the Draft Environmental Impact Statement on the Operation and Maintenance of Vermilion Harbor per the Notice in the Federal Register, Sept. 26, 1975, p. 44349, I request that my letter be included in the Section III study and the final environmental impact report. In our collection of early Linwood Park mementos we have several postcards of Linwood Beach and the Vermilion Lagoons, showing the beach contour over a period of decades prior to the erection of the breakwater. The dominant feature in these pictures is the small beach at the Vermilion Lagoons with no sand pileup at the pier. My wife remembers as a child burning her feet on the hot sand before reaching the waters edge. Our children now don't have the same sensation because there is considerably less beach. The sand from our beach in Linwood Park now surrounds the pier due to the erection of the breakwater and fills the river until it is dredged by the Corps and dumped out in Lake Erie. The summertime dredging of our sand in the river pollutes our beach making swimming unpleasant. The loss of our sand and the pollution of our beach must stop. The solution is simple - remove the breakwater and all the problems it causes.

Currently, there are others deeply involved in making your office aware of the problems caused in Vermilion, Ohio by the Vermilion Harbor breakwater. As a future resident of Vermilion, Ohio, I trust your office will listen to the facts presented by those deeply involved in investigating this matter and will arrive at a satisfactory solution for the removal of the breakwater and restoration of the Linwood Park Beach. Copies of this letter will be sent to the Mayor and City Council of Vermilion, Ohio, and the congressional representatives for that district.

Yours,

Raymond A. BOAS

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THE BENJAMIN P. FORBES COMPANY

2000 WEST FOURTEENTH STREET CLEVELAND, OHIO 44113

November 6, 1975

Department of the Army
Buffalo District, Corp of Engineers
1776 Niagara St.
Buffalo, New York 14207

Attention: Lt. Col. Byron G. Walker

Dear Lt. Col. Walker,

Having owned a cottage at Linwood Park, Vermilion, Ohio, for the past 10 years and having spent a part of each summer there for more than 25 years, our family is very much concerned about the effects which the Breakwater recently constructed at the mouth of the Vermilion River has had on the beaches to the East.

We are aware of the changing conditions of the Lagoons beach, the Linwood Park beach and the Nakomis beach, all of which are to the east of the Vermilion River. We have observed the tremendous build up of sand in front of the Lagoons, the lessening of the Linwood beach and the elimination of the beach at the easterly end of the Linwood Beach as well as the elimination of the Nakomis beach.

There is now an actual sand bar in the Vermilion River channel between the two piers, something we have never seen before. We can positively vouch for the changes, all bad in our opinion, since the erection of breakwater across the mouth of the Vermilion River. There never used to be such sand build up and/or erosion, beach pollution, etc. in all the years we've been there nor in the past 100 years or so according to conversations with some of the older folks during the time we've been going to Vermilion.

The dredging of the river has been and will be a tremendous continuing taxpayer expense. Summertime dredging will make our beach a terrible place to swim and I believe the many bad environmental changes caused by the new structure proves that it should be removed.

We feel that this was a dreadful mistake and I am requesting a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September, 1975. I would also appreciate receiving a copy of the final environmental impact statement.

It is also my understanding that there is a study of the Vermilion Harbor due to be released in December of this year and I would request that our family's comments be included in that study and that a copy of the study be sent to us as well, when released.

There are a large number of people who have sufferred loss of property value because of the building of this breakwater and likewise there are a large number of innocent people who may suffer further from the installation of this breakwater structure. Again, I sincerely believe this structure should be removed.

Thank you in advance for sending me information requested.

Very truly yours,

Benj F. Forbes

BFF/jas

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PITTSBURGH, PENNSYLVANIA 15219 · TELEPHONE: 281-9700

representing
The TRAVELERS
Insurance Companies

November 6, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
ATT: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 28, 1975 p. 44349

Gentlemen:

I have spent more than fifty summers at Linwood Park, Vermilion, Ohio and I am appalled at what the Corps of Engineers has done to our beach in the name of progress and a haven for small craft! I have operated small boats in and out of the Vermilion Harbor for more than twenty-five years and never found it impossible to get in or out. What you have really accomplished is the absolute destruction of a once magnificent beach, the pollution of our waters and the thoughtless creation of a "safe" harbor for all the incompetent small craft operators on Southern Lake Erie.

I am irrevocably opposed to dredging our sand out of the river and placing it on the West side of the pier, in fact, to <u>any</u> dredging during the summer!

I ask for the removal of the breakwall with all due haste, since its continuance spells nothing but doom for our beach, pollution of our waters and a great threat of flooding in the Spring.

I request that my comments be made a part of the Section III study and the final environmental impact report. In addition, I am hereby requesting a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept., 1975 and a copy of the final environmental impact statement as well as a copy of the Section III study of Vermilion Harbor due in December.

On behalf of all of us who have lived at and enjoyed the beautiful beach at Linwood Park and the quiet harbor at Vermilion for all these many, many years, I appeal for a fair hearing of our problem and a prompt disposal of that monstrous breakwall.

Very truly yours,

Lois R. Moelter

2309 Haymaker Road
Monroeville, Pennsylvania
November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Lt. Col. Byron G. Walker

Gentlemen:

Would you please give serious consideration to the removal of the breakwater built at Vermilion, Ohio?

As a property owner at Linwood Park, I want my daughter to have memories of happy summers enjoying what was once a wide, wide beach and swimming in an unpolluted Lake. Literally hundreds of Pittsburghers sought out Linwood Park as a perfect family vacation spot. You can't imagine the shock on their faces when they saw the beach since the breakwater was built!

I would appreciate it if you would send me a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975, a copy of the final enviromental impact statement, and a copy of the Section III study of Vermilion Harbor due in December.

Sincerely,

Lois W Johnson

(Mrs.) Lois W. Johnson

FRANKLIN P. JOHNSON, M. D.
1600 JAMES STREET
MONROEVILLE, PA. 15146
VA 3-3777

November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Attention: Lt. Col. Byron G. Walker

Gentlemen:

I, as many others, am greatly disturbed about the condition of the beach at Linwood Park, Vermilion, Ohio. I own a cottage at Linwood Park and as well as seeing the "most beautiful beach on Lake Erie" being destroyed I am, also, greatly concerned about the decrease that might occur to our property values.

For as long as some of my family can recall (seventy-five years) there had never been a problem with the beach until the breakwater at the entrance of the Vermilion River was built. I'm sure that nature wrecked havoc with storms then as it does now, but the beach was never destroyed.

At a time when environmentalists are working to preserve, I believe that the removal of the breakwater would stop the erosion to the beach and would stop the problem of pollution that comes from the Vermilion River and is no longer going out into the Lake but is sent along the shore line.

Would you please send me a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September 1975, a copy of the final environmental impact statement, and a copy of the Section III study of Vermilion Harbor due in December.

Thank you.

Yours very truly,

F. P. Johnson M.D.

Franklin P. Johnson, M. D.

law

Edward A. and Virginia R. Peters
3387 Hollister Road,
Cleveland Heights, Ohio 44118

November 7, 1975

Department of the Army
Buffalo District, Corps of Engineers,
1776 Niagara Street,
Buffalo, New York 14207

Attn: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per notice Federal Register, September 26, 1975, p 44349

Dear Lt. Col. Walker:

We have been a cottage owner and a summer resident of Linwood Park, Vermilion, Ohio for sixty two years. Our two sons and four grandchildren have also enjoyed their summers there.

The beach at Linwood Park, through these many years, has enjoyed the reputation of being one of the finest beaches along Lake Erie. Before the breakwater was built we had no sand pileup at the pier, no sand in the river, no beach erosion or beach pollution, nor any rocky beach.

In two short years, since the breakwater, we have seen our lovely sand beach deteriorate until there is very little beach sand left. We would like to protest the wrong that has been done. As tax payers we appeal for help from you and Public Law 91-110, the National Environmental Protection Act, which Law was enacted for the protection of the Public.

Would you please have our comments included in the Section III study and the final environmental impact report? Would you please send us a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated September, 1975 and a copy of the final environmental impact statement, also a copy of the Section III study of Vermilion Harbor due in December, 1975?

Thank you very much, Lt. Col. Walker. We will appreciate your consideration.

Sincerely yours,

Edward A. + Virginia R. Peters

Edward A. and Virginia R. Peters

G-128

1101 Lindsay Road
Carnegie, Pa. 15106
November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
Attn: Lt. Col. Byron G. Walker
Dear Sir,

I have been going to Linwood Beach in Vermilion, Ohio for the past fifteen (15) years, my wife has been going to Linwood Park for the past thirty-nine (39) years.

There have been many severe storms batter the beach during these years, which I thought would destroy it completely but my wife and some old timers assured me that the beach would come back. The laws of nature always prevailed.

On the other hand when man interferes with nature man usually loses. Since the breakwater has been constructed, man has managed to destroy a beautiful beach in two (2) years. There has been erosion along the shoreline of Lake Erie because of high water and wind but thanks to the kindness of nature Linwood has always survived.

My wife has spent her summers swimming at the Linwood Beach since she has been two (2) years of age. We both want our children to be able to do the same. However with the mud slick and debris from the river being diverted along the beach it makes it very undesirable to swim in the waters of Lake Erie.

Engineers have done some wonderful things to improve this beautiful land in which we ALL live. No matter how great a man may be, it still takes a big one to admit his faults and errors. If this error is not corrected in the near future Linwood Park will be no more, instead it will be the site of some multiple family housing or some commercial or industrial usage. Undoubtingly, causing more pollution to a struggling body of water.

Sir, all my family and I ask of you is to CARE just a little.

Please sent to me the following information: (a) the draft of environmental impact statement of operation and maintenance of Vermilion Harbor dated Sept., 1975, (b) a copy of the final environmental impact statement, and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

Sincerely,

Gary F. Morgan

CANTON FREIGHT TRAFFIC SERVICE

CFTS

~~Post Office Box 1277 – Station~~ Box 381

~~Canton, Ohio 44718~~ Vermilion, Ohio.

November 6, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N.Y. 14207

INDUSTRIAL TRAFFIC CONSULTANTS • FREIGHT BILL AUDIT • RATE AND TARIFF INFORMATION • IMPORT-EXPORT • CLASSIFICATION AND PACKAGING • TRANSPORTATION COST STUDIES • ROUTING AND DISTRIBUTION • CLAIM SPECIALISTS • MARKET ANALYSIS AND DEVELOPMENT • I.C.C. PRACTITIONERS

Attention: Lt. Col. Byron G. Walker

Gentlemen:

I have been comming to Linwood Park for well over [illegible] years and bought a cottage here about 10 years ago. The Linwood Beach was always the prime attraction and also the main attraction as the Park has no amusements or concessions.

Now our beach is being destroyed by the building of a break-water which benefits nobody. In fact we as property owners were not even notified of this project and to this day I do not know who is responsible for this monstrosity and the expenditure of thousands of dollars of our tax money.

I am interested in restoring our beach and I understand it can only be done by removing this breakwater.

Therefore I request that a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept. , 1975 [illegible] a copy of the final environmental impact statement and a copy of [illegible] study of Vermilion Harbor [illegible] December.

Why was this done to our beach? For years Linwood [illegible] Point had the best beaches on Lake Erie. When this break-water is removed promptly, the only beach left [illegible] Point.

Can you let me know who was responsible for this [illegible] nature and who was it supposed to benefit?

I am against to the disposal of our beach [illegible] from the river. To compound this action, it is being [illegible] the summer when we are swimming.

Lets remove the breakwater and solve all these problems and I would appreciate your including these facts and [illegible] in the Section 111 study and the final environmental impact report.

Very truly yours,

John A Herrold
415 Walnut Street, Linwood Park

Hugh J. Pugsley
1437 North Highland Avenue
Pittsburgh, Pennsylvania 15206

Nov. 7 - 1975

Corps of Engineers,
Buffalo, N.Y.
Attn Lt. Col. Byron G Welker.

Gentlemen -

Reference - Breakwater at Vermilion, Ohio

Our family has a history of over 65 years at Lindwood Park - in Vermilion, and we have seen the conditions of the beach over all these years. There have been minor changes because of storms - but nothing like the horrible things which have happened since the installation of the breakwaters. Besides erosion, the west of the beach is building up with silt and debris coming down the Vermilion river, and being directed our way. Pollution in the river can be corrected, but the other material cannot be.

We feel so very helpless that a misfortune like the breakwaters

(2)

has been forced upon us.

We have had a power boat for many years, and at no time in the past have I had any trouble getting into the entrance to Vermilion harbor - regardless of the weather.

Will you please send me a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor, dated Sept - 1975? - also any other related statements?

Yours very truly

[illegible signature]

Pittsburgh, Pa. 15214
16 E. Marshall Avenue
November 12, 1975

In Re: Breakwater - Vermilion OHIO

Department of the Army
Buffalo District - Corps of Engineers,
1776 Niagara Street, Buffalo, New York 14207

Attention of Lt. Col. Byron G. Walker

Sir:

I have owned a cottage at Linwood Park, Vermilion, OHIO, for the Past 26 years and have been visiting the Park with my family since 1931. We have enjoyed our summer vacations at this Park all those years.

Linwood Park has been known all over the State of OHIO and Western Pennsylvania for having the best and finest beach on Lake Erie. However, since the construction of the breakwater at the mouth of the Vermilion River, it will be known, no doubt, as the worst and most contaminated beach on the Lake. Surely the persons who designed the construction and had to do with the location of the breakwater should have visualized what the conditions would be in the event of northwestern and northeastern winds and storms on the lake; and too in the Spring time when the ice runs out from the river to the lake that there would be a jam at the mouth of the river as the debris from the river together with the ice would spread itself either towards the west to the City of Vermilion's Beach or to the east to the beach of Linwood Park.

I still remember the floor in Vermilion which flooded all the streets and cottages, except a few, in the Lagoons and the damage caused by the swift current of the water when it flowed fromthe high points to the lake. This flood occurred just a few years ago - I believe it was around the 4th of July.

I do not recall during the past forty years or more that the mouth of the Vermilion River ever had an island in the middle of the stream - the reason for the island no doubt being due to the construction of the breakwater which in my opinion should have been constructed perhaps four or five hundred feet out in the lake instead of its present location, which to me looks like about 75 feet or less. According to some of the residents of Vermilion, all of whom live there winter and summer, the plans which they had seen for the construction of the breakwater showed it to be located many hundred feet out in the lake. The present breakwater, as mentioned above, and as your engineers are aware, moves the water either in the western or eastern direction and during heavy rains and high winds the water from the lake is blown back into the river causing some of the homes and streets in the lagoons to be flooded.

Many thousands of persons together with their children, grandchildren and great grandchildren, have had the pleasure of bathing at Linwood Park but due to the conditions now existing at the Park and due to the breakwater there is less sand and more rocky beach which creates a hazard for those persons who wish to swim and especially for the younger children. I feel certain that your corps of engineers would not like a situation of that kind to exist.

I wish you would send me a copy of (a) draft environmental impact statement for the operation and maintenance of the Vermilion Harbor dated Sept. 1975; (b) copy of the final enfironmental impact statement and (c) a copy of Section III study of Vermilion Harbor due in December.

Yours truly,

Frank J. Holub

G-134

THE DEARTH AGENCY
Insurance

WILLIAM E. DEARTH

6151 WILSON MILLS ROAD, #188
HIGHLAND HEIGHTS, OHIO 44143
461-1767

November 11, 1975

Department of Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York, 14207

Attention Lt. Col. Byron G. Walker

Sir:

Please forward to the sender the following at your earliest convenience

a. Copy of Draft Environmental statement of operation and maintenance of Vermilion, Ohio Harbor dated September, 1975.

b. Copy of final environmental impact statement

c. Copy of section three study of Vermilion Harbor due in December

As a cottage owner at Linwood Park, Vermilion, Ohio, I am most interested in the pending action regarding the Breakwall installed at the mouth of the Vermilion River.

In the past year I have seen the Beach sand gradually washed away and deposited in the river, then dredged and redeposited on the West Shore. Linwood Park at one time was envied by many other Lake front cottage owners, however, if this erosion continues, we will be faced with the loss of beach and needless to say, a considerable financial loss as far as the valuation of our cottage is concerned.

Prior to the erection of the Breakwall we had no pollution problem or loss of beach. High or Low water or the Northeast storm did not effect the over all picture of the beach line.

I would appreciate your personal attention in this matter, to help return Linwood Park to the summer pleasure spot it once was.

Very truly yours,

William E. Dearth

HIGHEST STANDARDS OF PROFESSIONAL SERVICE

G-135

100

NCBED-PE

fts/238
18 November 1975

Dear :

Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested in your letter of November 1975. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is, therefore, unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 Study will be forwarded when available. The Buffalo District is presently investigating alternative authorities f further study of your additional concerns related to the Federal navi project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
✓ NCBED-PE
NCBED-PS

LETTERS WERE SENT TO THE FOLLOWING:

Mrs. Lois W. Johnson
2309 Haymaker Road
Monroeville, PA 15146

Ms. Lois R. Moelter
Doege-Moelter Agency
505 Chatham Center Office Building
Pittsburgh, PA 15219

Mr. Benjamin F. Forbes
The Benjamin P. Forbes Company
2000 West Fourteenth Street
Cleveland, OH 44113

Mr. Raymond A. Boas
133 Brookhaven Road
North Kingstown, RI 02852

Dr. Franklin P. Johnson
1600 James Street
Monroeville, PA 15146

Mr. & Mrs. Edward A. Peters
3387 Hollister Road
Cleveland Heights, OH 44118

Mr. Gary F. Morgan
1101 Lindsay Road
Carnegie, PA 15106

Mr. Dean A. Herrold
415 Walnut Street, Linwood Park
Vermilion, OH 44089

Mr. Hugh J. Pugsley
1437 North Highland Avenue
Pittsburgh, PA 15206

Mr. Frank J. Holub
16 East Marshall Avenue
Pittsburgh, PA 15214

Mr. William E. Dearth
6151 Wilson Mills Road, #109
Highland Heights, OH 44143

Lt. Col. B. G. Walker
Buffalo, N.Y. - 14207

Dear Sir,

As an owner and summer resident of a cottage at Linwood Park, Vermilion, Ohio, I am deeply concerned about the erosion of our once lovely Beach that has been caused by that unsightly breakwater erected at the entrance to the River from Lake Erie. Before I was old enough to know where I was, I was taken to Linwood and it and the town of Vermilion and its friendly folk have been home to me all those years - I'm 80!! (:) Our Beach has shrunk terribly in 2 years' time - when a N.E. storm hits, it carries our sand to the River and if this isn't remedied, we're just going to lose our Beach, one of the finest along L. Erie, until that monstrosity was put up. Certainly you wouldn't want that to happen to property you own! Nor do we! I don't like noise, but I'm sure the sound of the Corps' dynamiting that thing would be music to my ears - I'll never understand its being put there in the first place! A heinous eyesore!

Please put me on record as being one who wants our rights against erosion and destruction of our property protected and restored to its former and natural condition.

Very truly yours,

(Miss) Esther L. Mitchell

849 Coast Blvd.
La Jolla, Calif. 92037
7 November, 1975.

Dr. John A. New II
4837 Doverdell Drive
Pittsburgh, Pa. 15236

November 8, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Sir,

I am a cottage owner at Linwood Park, Vermilion, Ohio. I have been going there for the past 69 years. We rented a cottage until we bought ours in 1946.

My family has been going to Linwood Park, for about 75 years.

I remember the large beach we had and at one time there used to be a pierout from the old hotel.

I grant you there has been erosion over the years, but since the breakwall has been built, the erosion in the past two years has done the job of 65 years.

Pollution has also been a factor. Everytime there is a heavy rain, the muddy water pours out in the river and hits the breakwall and is deflected to our beach, and the water is muddy for three or four days. Then become a silt problem and last summer the water was so dirty, I wouldn't permit my two grandchildren to go swimming. If this keeps up the whole beach will be contaminated and will make bathing dangerous.

I wish to have my comments included in the Section III study and the final environmental impact report.

I do hope the breakwall will be removed, if not, Linwood Park will become a housing area and a wonderful park will be destroyed.

Sincerely

John A. New M.D

1c/238

NCBED-PE

18 November 1975

Dear :

This is in response to your November 1975 letter on Vermilion Harbor.

Your comments about Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Impact Statement for the operation and maintenance of the harbor. Your comments concerning shoreline damages related to the Federal harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH. The Buffalo District is presently investigating alternative authorities for further study of your other concerns related to the Federal navigation project.

Sincerely yours,

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
✓NCBED-PE
NCBED-PS

LETTER WAS SENT TO THE FOLLOWING:

Ms. Esther S. Mackel
849 Coast Boulevard
La Jolla, CA 92037

Dr. John A. New II
4837 Doverdell Drive
Pittsburgh, PA 15236

Linwood Park Cottage Owners Association

The purpose of LPCOA shall be the maintaining and preserving of Linwood Park as the outstanding family summer vacation area complete with religion, and sun and shore and sea.

November 9, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Lt. Colonel Byron G. Walker;

I am writing this letter on behalf of the Linwood Park Cottage Owners Association, Vermilion, Ohio. Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, September 26, 1975, p. 44349.

The Linwood Park Cottage Owners Association (LCOA) represents the leasees who maintain property in the park. Our membership includes people from across the United States. Linwood Park is a tradition. It has been built by 92 years of dedicated work and direction by the directors of Linwood Park Company, LCOA, and the religious council of Linwood. It represents a unique place in our lives and those of thousands of others who came to Linwood to enjoy its sandy beaches and clear waters for a variety of recreational purposes.

Today, however, Linwood is different, and for most of us that difference is for the worst. In 1973 the U.S. Army Corps of Engineers built a breakwater at the mouth of the Vermilion River. We feel that this wall is the cause of "that difference." The reasons for erecting the wall were probably sound at the time, but events of the last few years suggest that any proposed benefits from the wall have been overshadowed by actual results.

As a concerned leasee and President of the LCOA, I feel that you should understand what has happened to our environment since the construction of the breakwall...

I. Acres of our sandy beach have eroded drastically in many areas;

II. Our clear waters have become polluted and unsafe for swimming;

III. The natural flow of the Vermilion River has been diverted away from the center of the lake to our shoreline;

IV. The river channel is narrow and shallower, which hampers our boaters' access to the lake proper; and

V. Our drinking water has become unpalatable.

The net result to our environment since 1973 has been detrimental to our area and caused many adverse feelings among our residents. All of us come to Linwood for a great many reasons; the Corps of Engineers came for a specific one. Yet, if we examine the stated goals of the Corps we find their goals not unlike our own, for each of us are concerned about the environment and its enjoyment by all people.

The stated missions of the Corps are dedicated to accomplishing basic environmental goals which include the following:

I. Be responsible to the full range of social, economic, and other needs in use of water and related resources;

II. Balance environmental quality and development by providing the widest possible range of beneficial uses of the environment without environmental abuse, risk to health or safety, or other unintended, unanticipated, and undesirable consequences;

III. Arrest and abate the degradation and deterioriation of our physical, biological, and cultural environment;

IV. Give environmental values full consideration in decision-making along with technical and economic considerations;

V. Consider a full range of alternatives to solving mans problems and meeting his needs;

VI. Apply non-structural solutions where practical; apply technology creatively and imaginatively with concern for their impacts on environmental quality.

I'm sure you'll agree that the situation warrants a solution...a solution which will be ameanable to all parties concerned. I am confident that through mutual cooperation with your department, the Corps of Engineers, and the LCOA, we can once again enjoy the benefits Linwood Park has to offer its leasees and guests.

I would like to suggest that this letter be included in the final environmental impact report due in December of this year (1975). Please feel free to contact me for any reasons concerning the issues stated above. Thank you for your time and cooperation.

Sincerely yours,

Dr F Peterka

Dr. F.F. Peterka

cc: Mr. Norman White, First Vice-President
Dr. George Reidel, Second Vice-President
Mrs. Hazel Cramer, Secretary
Mrs. Adelle Baker, Treasurer

Linwood Park Cottage Owners Association

fts/238

NCBED-PE

18 November 1975

Dr. F. F. Peterka
President, Linwood Park Cottage
Owners Association
3678 Traver Road
Shaker Heights, OH 44122

Dear Dr. Peterka:

This is in response to your letters of 9 and 10 November 1975 on Vermilion Harbor. Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested in your 10 November 1975 letter. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is therefore unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Comments in your 9 November 1975 letter concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of your additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

November 10, 1975

Department of the Army
Buffalo District Corp. of Engineers
1776 Niagara St.
Buffalo, New York, 14207

Attn: Lt. Col. Byron G Walker

Ref: Draft Enviremental Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register Sept. 26, 1975 P 44349

Dear Sir:

Per above reference we would like to request a) a copy of the draft enviromental impact statement for operation and maintenance of Vermilion Harbor dated Sept. 1975. (b) a copy of the final enviremental impact statement and (c) a copy of the Section 111 study of Vermilion Harbor due in December.

As residents of Linwood Park, Vermilion, Ohio for the past six years, we are concerned about the drastic erosion and loss of sand off our beach since the breakwall was built at the mouth of the Vermilion river. We are opposed to the continued open lake disposal of our sand dredged from the river and feel that this beach sand should be returned to Linwood Park Beach.

The buildup of sand to the west of Linwood started when the breakwall was built and each year increases the beach at the Vermilion lagoons until eventually it will reach the breakwall itself.

The divertion of the Vermilion river caused the bacterial results in polluted water to flow across our beaches and prevents sanitary swimming conditions during the summer months.

We feel it is the responsibility of the Army Corp. of Engineers to remedy this problem by removing the breakwall or by other engineering methods stop the erosion and pollution of the Linwood Park beach. We are requesting to have our comments included in the Section 111 study and final enviromental impact report.

Yours truly,

5131 Fifth St.
Linwood Park
Vermilion, Ohio 44089

G-145

NCBED-PE

1c/238
18 November 1975

Resident
5131 Fifth Street
Linwood Park
Vermilion, OH 44089

Dear Sir:

I have received a letter, dated 10 November 1975, from the above address concerning the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, OH. Unfortunately, the letter was unsigned and did not have your name on it, but I would like to provide the writer with the following information.

Inclosed is a copy of the subject Draft Environmental Statement as requested. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is therefore unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 Study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of your additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

04147

1

Fred W. Fussner
9301 West 105th St.
Cleveland, Ohio 44111

404 Markle St. Linwood Pk.
Vermilion Ohio - 44089

Dept. of the Army -
Buffalo Dist. Corps of Engineers
776 Niagara St.
Buffalo, N.Y. 14207
Attn: Lt. Col. Byron G. Walker

Re: Draft Environmental Impact statement on Operation and Maintainance of Vermilion Harbor in Notice Federal Register. Sept. 26, 1975, P. 44349 -

Before the breakwater we had the sand pile up at the pier.
No sand in the river -
No beach erosion or beach pollution
[illegible] of high & low water [illegible]

2.

Fred W. Fussner
9301 West 105th St.
Cleveland, Ohio 44111

I have been coming to Linwood for over 75 years. Our Beach was always the finest on Lake Erie until recently.

We oppose the continued open lake disposal of our sand dredged from the river.

We demand for the return of our beach sand.

We oppose summertime dredging when we are swimming - Its not fair nor healthy.

We sincerely demand the removal of the breakwater as a solution to all the problems it causes including beach pollution.

3.

Our property values have been reduced. The beach has been [illegible] degraded. The Vermilion River will be diverted across our beach as long as the Breakwater stands.

I request to have my comments included in Section III study and the final environmental impact report.

Kindly help us to keep our beach at Linwood. We love Linwood and regard it as a Second Haven. My father, Fred Fussner, Sr. was one of its founders. In his name we appeal for any help you can give. F.W. Fussner

fts/238

NCBED-PE

18 November 1975

Mr. Fred W. Fussner
3301 West 165th Street
Cleveland, OH 44111

Dear Mr. Fussner:

This is in response to your recent letters on Vermilion Harbor. A copy of Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, OH is inclosed as requested. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement for operation and maintenance activities is currently in preparation and is therefore unavailable for distribution. However, a copy of the Final Environmental Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH, which is also currently being prepared. A copy of the Section 111 study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of the community's additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

FRED S GALOVICH
FINANCIAL ADVISORY SERVICES

3358 babcock blvd pittsburgh pa 15237 (412) 367-1650

November 12, 1975

Department of Army
Buffalo District
Corps of Engineers
1776 Niagra Street
Buffalo, N.Y. 14207

Atten: Lt. Col. Byron G. Walker

Dear Col. Walker:

As a concerned cottage owner in Linwood Park, I would like to request a copy of the following:

1. A Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September, 1975.

2. A copy of the final Environmental Impact Statement.

3. A copy of the Section III study of Vermilion Harbor due in December, 1975.

It is my hope that the Army Corps of Engineers will work extremely close with the Linwood Park Association in correcting the breakwater problem that now exists.

One of the reasons I was so impressed with Linwood Park was the privacy and cleanliness of the beach, and if the Corps of Engineers does not correct the situation that will deteriorate our beach, it is my firm belief as well as the belief of many other cottage owners, that our property will, in fact, decrease.

Sincerely,

Fred J Galovich

Fred S. Galovich

CHRYSLER KOPPIN Company
SINCE 1883
7000 INTERVALE / DETROIT, MICHIGAN 48238 / PHONE: (313) 491-7100
REFRIGERATORS • FREEZERS / manufacturers • contractors • consultants • engineers

November 14, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N.Y. 14207

Attn: Lt. Col. Byron G. Walker

Re: Vermilion Harbor
Vermilion, Ohio

Gentlemen:

I am one of several partners with real estate holdings in Linwood Park, Vermilion, Ohio and are most concerned regarding the deterioration, erosion and increased water pollution problems that have been reported since the construction of the Vermilion River breakwater.

As a concerned property Owner and citizen please forward copy of the following reports for our evaluation and subsequent action.

1. Draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept., 1975.
2. Final environmental impact statement
3. The Section III study of Vermilion Harbor due in December.

Very truly yours,

Dean M. Koppin

Dean M. Koppin
25302 Stonycroft
Southfield, MI 48075

DMK:ko

Nov. 13, 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207
Attn: Lt. Col. Byron O. Walker

33 Conestoga Drive
Bethel Park, Pa.
15102

Dear Sir,

I am writing to you in reference to the Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349.

There are several things I feel impelled to tell you. Before we had the breakwater we had no problems as we now have. We had intermitant changes in the beach with the cycle of water levels in Lake Erie, but these were minor and over a period of years the beach remained constant. I can speak to this because we have owned property in Linwood Park for over 50 years. Previous to the building of the breakwater we had not had a problem with pollution as we have constantly had since the breakwater was built. You can stand at the top of the land on the lakefront and see very distinctly by the color of the water coming out of Vermilion River that the breakwater is re-directing it toward our beach. During those 50 years, never have I seen water washing over the pier as it now does, never has the sand piled at the pier and never, never has sand been washed over the pier into the river. As a matter of fact the things that have happened in the last 2 years are so foreign to what has been the standard pattern that I can hardly believe that what I am seeing today is fact! I am certainly in opposition to the disposal of our sand (as you dredge it from the river) anywhere except back on our beach where it came from, and think it is your responsibility to return it. Further, I see no reason why you should be dredging this all during the summer when this is the only time the beach facility can be used.

This whole problem has come about since the building of the breakwater by the Corps of En[illegible]rs. The way to eliminate all the problems of water pollution, beac[illegible]sion, river dredging, is to eliminate the breakwater and to do it [illegible]diately.

We have traveled some and have seen some famous beaches of the world: Miami, Bradenton, Clearwater, Sanibel Island, Waikiki and Kamakura, Japan. The beach at Linwood Park compares favorably with them. On Lake Erie there are few beaches that compare with our beach at Linwood Park (possibly Presque Isle and Headlands Beach State Park) and here is a fine beach like this one being systematically destroyed because of a man made disturbance.

I request that my comments be included in the Sectin III study of the final environmental impact report. I would also request a copy of the draft environmental impact statement for operation and maintenance of Vermilion Harbor dated Sept., 1975 - - a copy of the final environmental impact statement, and a copy of the Section III study of Vermilion Harbor due in December.

Very truly yours,

Mrs. George M. Thomas

Mrs. George M. Thomas

212 Mohawk Drive
Pittsburgh, Pa. 15228
November 12, 1975

Department of Army
Corps of Engineers
1776 Niagra Street
Buffalo, N. Y. 14207

Atten: Lt. Col. Byron G. Walker

Dear Col. Walker:

I am a cottage owner in Linwood Park and am seriously concerned with the breakwater problem that presently exists. For this reason I would like to request a copy of the following:

1. A Draft Environmental Impact Statement for Operation and Maintenance of Vermilion Harbor, dated September, 1975.

2. A copy of the final Environmental Impact Statement.

3. A copy of the Section III study of Vermilion Harbor due in December, 1975.

I strongly urge the Corps of Engineers to correct the deteriorating condition of our beaches.

Sincerely,

Murray Cook

NCBED-PE

mld/238
24 November 1975

Dear :

Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested in your letter of November 1975. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of the community's additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

THE ATTACHED LETTER WAS SENT TO THE FOLLOWING:

Mr. Fred S. Galovich
3358 Babcock Boulevard
Pittsburgh, PA 15237

Mr. Dean M. Koppin
25302 Stonycraft
Southfield, MI 48075

Mrs. George M. Thomas
33 Conestaga Drive
Bethel Park, PA 15102

Mr. Murray Cook
212 Mohawk Drive
Pittsburgh, PA 15228

Mrs. G. Robert Thomson
3400 Wooster Road Apt. 111
Rocky River
Ohio 44116

Nov. 14, 1975

Army, Corps of Engineers
Buffalo, New York

Dear Sirs,

This is concerning Mr. Geo. Grossman's proposals for Vermilion Breakwater.

We are greatly disturbed by the adverse changes made in our beach and water. We have a cottage at Linwood and provide healthy recreation for 19 in our family and all of our Cleveland friends.

Please we beg of you to remove the breakwater before all recreation is lost to Vermilion

Yours truly,
Ruby G. Thomson

and family

NCBED-PS

mld/236
28 November 1975

Mrs. G. Robert Thomson
3400 Wooster Road Apt. 111
Rocky River, OH 44116

Dear Mrs. Thomson:

This is in reply to your letter dated 14 November 1975 concerning Mr. George Grossman's proposals for the Vermilion detached breakwater.

My staff is currently preparing a report that will address the erosion problems in relation to the Vermilion Harbor. The report is scheduled to be completed in December 1975.

The Buffalo District is presently investigating alternative authorities for further study of additional concerns related to the Federal navigation project. I have no authority to take any action with reference to the Vermilion Harbor structures until the cause of the apparent problem has been clearly defined, a solution has been found that is environmentally and economically acceptable, and the Congress has authorized and funded such action.

I trust that this response explains my position in this matter.

Sincerely yours

BERNARD C. HUGHES
Colonel, Corps of Engineers
District Engineer

CF:
NCBED-PS

153 Pickwick Drive
Northfield, Ohio 44067
November 21, 1975

Lt. Col. Byron G. Walker
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14027

Dear Col. Walker,

We are owners of a summer cottage located in Linwood Park at Vermilion, Ohio. As we understand that a Section III study of the Vermilion Harbor is to be completed in December of this year, it is apprppriate that we write you at this time.

We would appreciate receiving a copy of the draft environmental impact statement regarding Vermilion Harbor that was circulated in September. We also wish to receive copies of the final environmental statement and the Section III study.

The Corps of Engineers' installations at Vermilion Harbor affect the quality of the beach area that we use during the summer months. In particular, the breakwater installation is causing a continuing degradation of the beach area.

a. The sand beach that was once abundant at the East end of Linwood Beach is disappearing. It is obvious that this sand is piling up in front of the Vermilion Lagoons area and spilling around the East pier to fill up the river channel. The beach was relatively stable in all the many years Linwood Park has existed prior to installation of the breakwater and it is a logical correlation that degradation of the beach is caused by the breakwater.
b. The breakwater installation has changed the flow of water out of the river channel such that this water is now diverted across the beaches on both sides of the river. It is apparent that the water in front of the beaches is contaminated by river debris where previously the water was relatively clear.
c. If dredging of the river channel is conducted during the summer months, the water in front of the beach areas will be polluted, turgid, and unusable for swimming. Our property would lose much of its usefulness, value, and recreational attractiveness. Dredging should definitely <u>not</u> be conducted during the summer months.
d. The Corps of Engineers is responsible for taking positive action to prevent any further degradation of the beach areas at Vermilion and to restore the beach areas to the configuration that was prevelant prior to installation of the breakwater.

We ask that these comments be taken into account in the final environmental impact report and the Section III study.

Cordially yours,
David T. Berns
David T. Berns
Roberta A. Berns
Roberta A. Berns

G-157

sk/239

NCBED-PE

3 December 1975

Mr. David T. and Ms. Roberta A. Berns
153 Pickwick Drive
Northfield, OH 44067

Dear Mr. and Ms. Berns:

Inclosed is a copy of the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH, as requested in your letter of 21 November 1975. Please note that the 45-day public review period for this document ended on 10 November 1975. The Final Environmental Impact Statement will be forwarded to you after it has been filed with the President's Council on Environmental Quality.

Your comments concerning Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Statement. Comments concerning shoreline damages related to the Federal Harbor structures will be addressed in the Reconnaissance Report on Section 111 Study and will be forwarded when available. The Buffalo District is presently investigating alternative authorities for further study of the community's additional concerns related to the Federal navigation project.

Sincerely yours,

Incl
as stated

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

Concord Square G4
Route 2
New Concord, Ohio 43762
23 Nov., 1975

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
Attn: Lt. Col. Byron G. Walker

Ref: Draft Environmental Impact Statement on Operation and Maintenance of Vermilion Harbor per Notice Federal Register, Sept. 26, 1975, p. 44349.

Dear Sir:

I would like to inform those with responsibility for the Vermilion Harbor breakwall (completed by the Corps of Engineers in 1973) of my intimate knowledge of the environmental situation, both past and present, and of my immediate personal concern. Also, I wish that my observations be included in the Section III study and the final environment impact report.

Members of my family have been visiting Vermilion, Ohio, and Linwood Park (directly east of the Vermilion Harbor piers) for the past seventy years, and for more than my 30 years have owned a "cottage" on the lakefront. No one in the family nor I can remember a greater disaster befalling Linwood Park or the small community of Vermilion than the end results of the above mentioned breakwall.

There has always been a Nakomis Beach to the east of Linwood Park, sometimes reduced and sometimes enlarged due to the prevailing weather conditions and water levels, but always present. Now it is gone along with half, if not more, of Linwood Park's half mile of beach (one of the few safe swimming beaches of its size on Lake Erie).

The east Vermilion Harbor pier, always a fine fishing spot, is now so buried in Nakomis and Linwood Park sands that there is virtually no water in which to fish. The need for extensive dredging of the harbor and the river almost defies recollection, but now seems destined to become a major biannual event. In the past, beach closings due to Vermilion River water pollution have never been seriously considered (even at the height of many other Lake Erie beach closings) and now they appear to be an imminent possibility every year due to the diversion of river water flow and dredging.

Concerning one of the breakwater's supposed benefits, "boating safety," I have not seen nor heard of one accident in the Vermilion Harbor which the present breakwater could have averted. I have personally passed through the Vermilion Harbor, and many others, in just about every type of boat and weather condition imaginable, and frankly believe that the harbor is less safe now than it was before the breakwall was constructed. The wall sets up cross wave patterns and is a visual barrier

making it particularly hazardous to small watercraft.

With these liabilities so closely at hand it seems imperative that immediate action be taken to replace the sand to the natural beaches, eliminate all dredging during the summer swimming season, and remove the ultimate problem, the breakwall itself.

As there has been a great deal of controversy over the relative merits of the Corps of Engineers' projects, it is very hard for anyone person to completely assess the Corp's peacetime mission. However, due to a person's particular knowledge of any one project, a fairly objective assessment can be made. Regarding the Vermilion Harbor breakwall and my first hand knowledge of its consequences, I would have to say that my faith and respect for the Corps (as a 1LT reserve officer, graduate of Ft. Belvoir, 1974) would be greatly shaken if a mistake is not admitted and a humble reversal of damages actively sought.

Thank you for your help.

Sincerely,

Redge A. Wilde

*Of the approcimately 150 Linwood Park "cottages" few, if any, are valued at less than $30,000. apiece.

1605 N. Fillmore Street
Arlington, Virginia 22201
November 23, 1975

Department of the Army
Buffalo District Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207
attn. Lt. Col. Byron G. Walker

Dear Sirs:

I am writing in reference to the draft environment impact statement on the operation and maintenance of Vermilion Harbor per Notice Federal Register, September 26, 1975, page 44349.

I have spent every summer for thirty-two years at our family place in Vermilion, Ohio. Recently there has been substantial and deplorable damage done to the beach, harbor, and lake area by the breakwater constructed at Vermilion. The harmful effects listed below have never been observed by me in thirty years before the breakwater went up, and I am sure the breakwater is their cause.

The beach has eroded drastically. The breakwater has obviously interfered with the natural processes that have maintained the beach essentially unchanged for many more years than I have been going there. I have never seen such loss of beach at Vermilion, even when other areas of the South Shore were experiencing serious erosion. This erosion, thus, cannot be attributed to unusual natural circumstances.

It is quite evident where the sand is going. It is piling up at the piers and is clogging the mouth of the river, whence it is being hauled to the shore west of the piers or out in the lake. It is thus being permanently lost to the beach east of the piers.

Pollution has also become a problem. The breakwater has caused the river to silt much more than in the past, and the necessary dredging in the summer is a serious source of pollution for the whole area. Furthermore, the breakwater directs the flow of river water directly at the beach, making the beach and shore line substantially less clean.

In thirty years of boating, swimming, and using the beach at Vermilion, I never missed having a breakwater there. This was a stable, naturally self-sustaining recreational area. The breakwater is ruining it. I believe the breakwater must be removed.

I request that my comments be included in the Section III study and in the final environmental impact report being made on this subject.

Sincerely yours,

W. Craig Wilde

ak/239

NCBED-PE

3 December 1975

Dear :

This is in response to your letter of 23 November 1975 on the Draft Environmental Impact Statement, Operation and Maintenance, Vermilion Harbor, Erie County, OH.

Your comments about Corps maintenance of the Federal channels and structures at Vermilion Harbor will be addressed in the Final Environmental Impact Statement, and comments concerning shoreline damages related to the Federal harbor structures will be addressed in the Reconnaissance Report on Section 111 Study of Vermilion Harbor, OH. The Buffalo District is presently investigating alternative authorities for further study of your other concerns related to the Federal navigation project.

Sincerely yours,

BYRON G. WALKER
LTC, Corps of Engineers
Deputy District Engineer

CF:
NCBED-PE
NCBED-PS

A COPY OF THIS REPORT WAS SENT TO THE FOLLOWING:

Mr. Redge A. Wilde
Concord Square G4
Route 2
New Concord, OH 43762

Mr. W. Craig Wilde
1605 North Fillmore Street
Arlington, VA 22201


DATE
ILME