PRELIMINARY
FEASIBILITY REPORT ON
SHALLOW - DRAFT NAVIGATION

GRAND RIVER
MICHIGAN

U. S. ARMY
ENGINEER DISTRICT DETROIT
CORPS OF ENGINEERS
DETROIT, MICHIGAN

JANUARY 1978
PRELIMINARY FEASIBILITY REPORT
FOR
SHALLOW-DRAFT NAVIGATION
GRAND RIVER, MICHIGAN

Provision for shallow-draft navigation has long been a key service to commercial and recreational development in the Great Lakes Region. In the downstream 17.5 miles of the Grand River, Michigan, below Bass River, channel works have been maintained for recreational and commercial shallow-draft craft, as shown in Plate 1. The section of the Grand River upstream of Bass River to Grand Rapids runs through portions of Ottawa and Kent Counties. As of December 1974, there were 37,000 boats registered in these two counties with the vast majority being of such a size that could navigate any reasonably sized channel developed for shallow-draft vessels. The existing channel conditions upstream of Bass River currently limit the use of the river in this reach to most shallow-draft craft. This study examines various alternatives considered applicable to shallow-draft navigation and discusses their economic and environmental impacts on the area.

PURPOSE AND AUTHORITY

The purpose of the study is to develop a document which includes adequate information to evaluate available data on shallow-draft navigational needs for the Grand River between Bass River and Grand Rapids, Michigan. The study also presents the engineering, economic and environmental feasibility of possible alternative plans for improvement to satisfy these needs. Options and trade-offs concerning alternative resource uses of the river will need to be investigated to achieve desired outputs in the overall public interest. The authority for this study is the following resolution:

"Resolved by the Committee on Public Works of the House of
Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on Grand Haven Harbor and Grand River, Michigan, published in Senate Document No. 88, 71st Congress, 2d Session, and previous reports, with a view to determining whether any modification of the existing authorized project is advisable at this time."

The above resolution was sponsored by Representative Gerald R. Ford, Jr., and adopted 9 April 1957.

Until 1930, the authorized project on the Grand River extended upstream from Lake Michigan to Grand Rapids. Senate Document 71-88 eliminated that portion of Grand River between Bass River and Grand Rapids from the Federal project. Therefore, the current authorized project extends upstream from Lake Michigan for a distance of 17.5 miles to the vicinity of the Bass River outlet. A review of Senate Document 71-88 would allow for study of navigational needs up to Grand Rapids which was the Federal project limits prior to 1930. In this regard, Congressman Richard Vander Veen, with the Support of Congressman Guy Vander Jagt, obtained funds in 1976 to initiate the study discussed in this report.

PLANNING OBJECTIVES AND CONSTRAINTS

A plan will be formulated to provide the best uses or combination of uses of water and related land resources to meet the identified needs of the Grand River study region, consistent with the scope of investigations permitted under this study authority. The formulation process, therefore, involves identification and development of alternative measures, evaluation and comparisons of alternative plans and their impacts, and eventual selection of a plan. A "no development" alternative will be given equal consideration with other potential plans during the formulation process.
Existing conditions on the Grand River restrict safe navigation. The river is extensively shoaled, and the numerous pilings and wingwalls constructed in 1904 constitute serious hazards to even local boaters who are familiar with the dangerous river conditions. At present, only non-motorized shallow-draft craft such as rowboats and canoes are considered able to make use of the river.

From a practical and economical standpoint, because of potential flooding hazards, future projections of the river with no plan action anticipate that the lands adjoining the river would continue to remain in an undeveloped state. Except for moderate bank erosion, little environmental degradation would be expected to occur. Population of the Grand Rapids area is expected to increase, but it is not anticipated that development will expand significantly into areas adjacent to the river.

It is expected that the river bottom will continue to accumulate sediments, and further shoaling will create additional hazards to boaters. For this reason, recreational navigation would be even more severely restricted to small, non-motorized shallow-draft craft. Even this small degree of utilization will involve serious risks, due to the numerous bars, snags, pilings and wingwalls within the river.

POSSIBLE SOLUTIONS

During the preliminary phase of this study, alternative solutions have been developed for consideration and evaluation. To insure that the best overall plan is selected, a range of plan alternatives will be developed based on the formulation criteria as displayed in the previous paragraphs. This task provides for the development of alternative resource management systems that address the planning objectives of the study.
In order to compile this list of resource management measures, a review has been made of all existing development plans and master plans developed by Federal, State and local agencies, as well as measures suggested and/or requested by local interests at the public meetings.

The following is a listing of the five alternative plans formulated from the initial compilation of suggested solutions:

Alternative 1: Channel Dredging Plan

Alternative 2: Pile Removal/Limited Dredge Plan

Alternative 3: Piling Removal Plan

Alternative 4: Valley Preserve-Recreational Plan

Alternative 5: No Action Plan

For complete evaluation of each of the five alternative plans a detailed description of each of the possible solutions follows.

CHANNEL DREDGING PLAN

Of the five alternatives under consideration, the one which best addresses the needs of the motorized navigational interests expressed is the Channel Dredging Plan. This plan utilizes a combination of dredging and piling removal operations for the construction of a channel 22.5 miles long, 100 feet wide, and 7 feet deep, requiring a total of 22 miles of channel dredging.
Two disposal sites for the dredged material are proposed, one near Eastmanville in a flat, agricultural area, and one located in the vicinity of Grandville, in a mining quarry. Use of the second site would allow for land reclamation on the site of the abandoned quarry. Both disposal sites are maintained under private ownership. Therefore, disposal site costs would be a non-Federal responsibility. Plate 4 and Figure 3 illustrate the planned disposal site locations. The channel dredging plan would require the disposal of 2,285,000 cubic yards of material covering 115 acres of the Grandville site and 215,000 cubic yards of material would be contained within 12 acres at the Eastmanville site.

Within the dredging plans, provisions have been made for the elimination of navigational obstructions from the river. An estimated 50,000 lineal feet of pilings and wingwalls would be removed. Detailed hydraulic studies to be conducted in Stage 3 planning may indicate that provisions for the construction of wingwalls along the river bank would be required for the channel dredging plan under consideration to help maintain a minimum water level in the channel during periods of low flow. Implementation of the channel dredging plan would bring about the greatest effects on the environment. According to the Michigan Department of Natural Resources, the sandy bottom of the Grand River provides excellent natural spawning conditions for several species of game fish and extensive dredging may serve to alter the natural fish habitat. In addition, three municipal waste water treatment plants presently release treated wastewater within the study limits. Changes in the Grand River's waste assimilation capacity, brought about by alternations of the channel configuration, would possibly establish a need for additional treatment facilities.
Should waste treatment modifications be required, the economic feasibility of the channel dredging plan would be re-evaluated to include in the benefit-cost ratio any costs incurred from the purchase and construction of the needed facilities. At present, annual costs of the plan are evaluated at 792,100, with expected benefits of $445,300 deriving a benefit/cost ratio of 0.56.

PILING REMOVAL/LIMITED DREDGE PLAN

The Piling Removal/Limited Dredge Plan calls for removal of the key navigational obstructions in the Grand River. Under this plan, an estimated 20,000 lineal feet of pilings and wingwalls located along the river, shown in Plate 5 would be eliminated from locations which specifically pose hazards to safe boating through the channel. This alternative would also require the dredging of selected sections of the river in order to provide a uniform minimum depth of 5 feet.

A channel width of 50 feet is proposed in this preliminary study phase. Areas would be made available for disposal of the dredged material. Two sites detailed in Plate 4 and Figure 3, have been proposed for the disposal of an estimated 400,000 cubic yards of dredged material. One of the proposed sites is located at the upstream limit of the project, near Grandville; the other proposed location is near the downstream section of the study area, in the vicinity of Eastmanville. The dredged material would be removed to the site nearest to the dredging operations, for the greatest possible efficiency. An estimated 362,000 cubic yards of material would be disposed at the Grandville site, covering approximately 22 acres of the proposed disposal area. Approximately 5 acres would be needed at Eastmanville to contain an estimated 38,000 cubic yards of dredged material.
Economic feasibility includes and consists of the 5,300 tons of the plan, as which. This consists of the study phase, for the final the Manville project estimated area in an.

Upper Photo - Looking west over a section of the proposed disposal site at Eastmanville.

Lower Photo - Current dumping area and gravel pit in Grandville; proposed disposal site.
Implementation of this plan would still benefit large motorized craft up to 49 feet in length, which have an estimated maximum draft of 47 inches or just under 4 feet. Current reported conditions of the section of river under investigation are dangerous to small craft due to the submerged piles and unmarked shoals. Benefits to navigation are estimated at $341,900 and annual costs are estimated at $240,900, deriving a benefit/cost ratio of 1.42.

The Piling Removal/Limited Dredge Plan provides an option intermediate between the Channel Dredging Plan, which would require extensive dredging and alternation of the channel bottom, and the Valley Preserve Recreation Plan, which would involve only minor modification of the river for navigational purposes, and would essentially preserve the river in its natural state.

PILING REMOVAL

The Piling Removal Plan calls for elimination of the numerous pilings and wingwalls which currently pose hazards to safe navigation of the Grand River. The general location of these structures are shown in Plate 5. Under this plan, an estimated 20,000 linear feet of pilings and wingwalls would be removed from the sites which are determined as being particularly dangerous to boaters. No dredging would be required under this plan.

Implementation of this plan would lessen the hazards posed to shallow-draft navigation of the river in its present unimproved condition. However, due to the extensive shoaling along the river bottom, some obstructional hazards to safe boating would still remain. Therefore, the Piling Removal Plan is not considered compatible with the objective of improving the recreational boating capacity of the Grand River.
Recreational navigation benefits attributable to the pile removal plan would be minimal. Since this plan does not adequately satisfy either the recreational navigation needs or the general recreational needs of the Grand River study area, it is not considered to be a viable solution.

VALLEY PRESERVE - RECREATION PLAN

Description

The valley preserve concept designates a natural river area for the purpose of preserving and enhancing its values for water conservation, its free flowing condition, and its fish, wildlife, boating, scenic, aesthetic, flood plain, ecologic, historic and recreational values and uses. The area shall include adjoining or related lands as appropriate. A carefully planned and coordinated program is intended to provide maximum use of the region's resources while maintaining the environment in a natural and aesthetically-pleasing condition.

Certain river frontage would be protected in its existing state by acquisition, easement or other means. Within the State of Michigan, it is intended that local units of government and the Michigan Natural Resources Commission would establish zoning districts for the valley preserve concept in which certain uses of the rivers, related land and natural resources could be regulated or prohibited. This allows for the controlled use of the flood plain region. Options would be available to designate the natural river area for such activities as hunting, hiking, sight-seeing and nature walks.
NOTE:
EXISTING PROJECT DOWNSTREAM FROM STUDY LIMITS PROVIDES FOR 8-FOOT CONTROLLING DEPTH FOR 14.5 MILES TO THE DEEP DRAFT CHANNEL IN GRAND HAVEN, MICHIGAN.
SEE PLATE 1 FOR CHANNEL LOCATION DOWNSTREAM OF BASS RIVER.

PROJECT STUDY LIMITS:
22.5 MILES

GRAND RIVER, MICHIGAN
SHALLOW-DRAFT NAVIGATION REACH
UNDER CONSIDERATION
U.S. ARMY ENGINEER DISTRICT, DETROIT