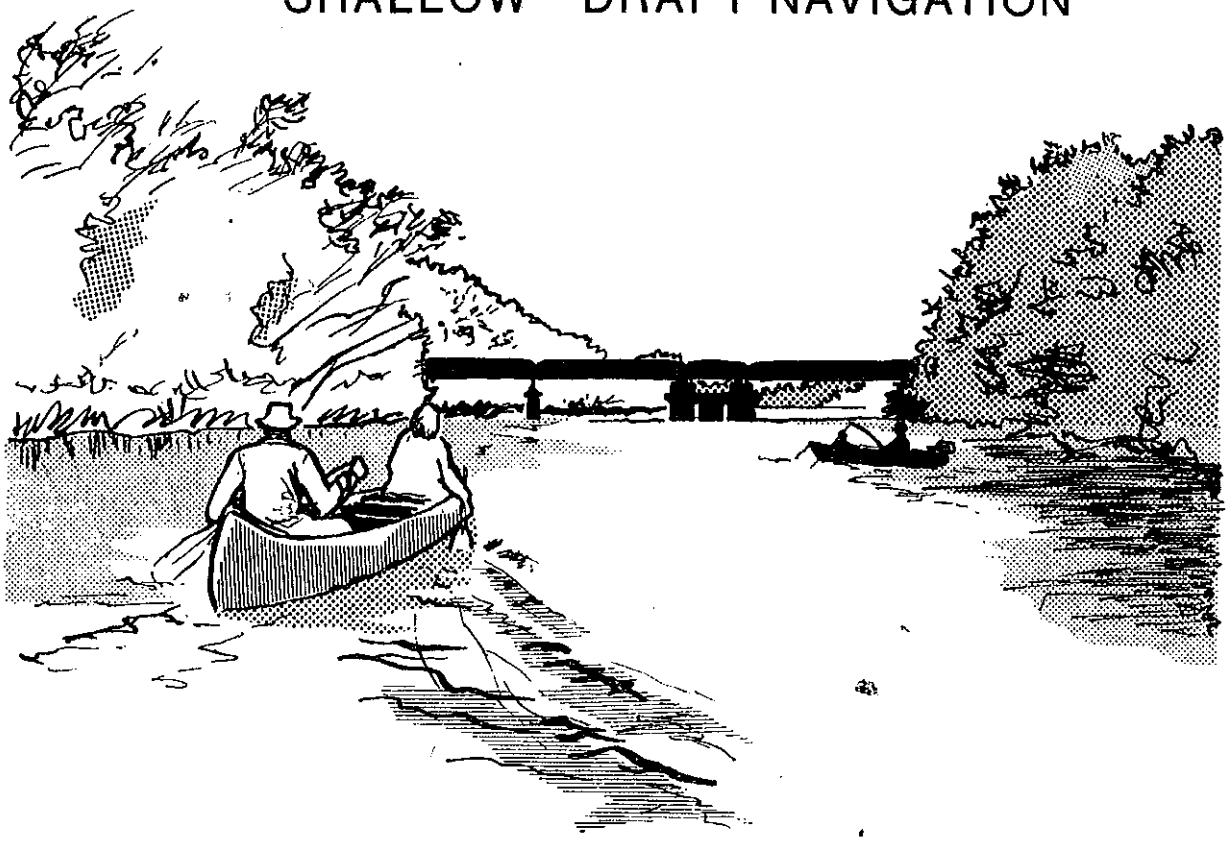
PRELIMINARY

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.

A set of planning objectives and constraints will be used as a general guideline for the formulation process. These planning objectives were identified from an analysis of the problems, needs, concerns, and opportunities within the area. The objectives not only reflect national development and environmental quality objectives but also the objectives of local, State, and regional interests (as expressed at the 25 May 1976 public meeting and written contact). Planning objectives and constraints are as follows:

Planning Objectives:

a. To provide for safe passage of power boats along the study reach.

b. To evaluate a preservation-recreation plan for the study area.

c. To preserve wildlife habitat spawning grounds, and wetland areas for water fowl and fur-bearing animals.

d. To improve the water quality of the Grand River.

Planning Constraints:

a. Minimize any adverse environmental impacts while identifying boating needs.

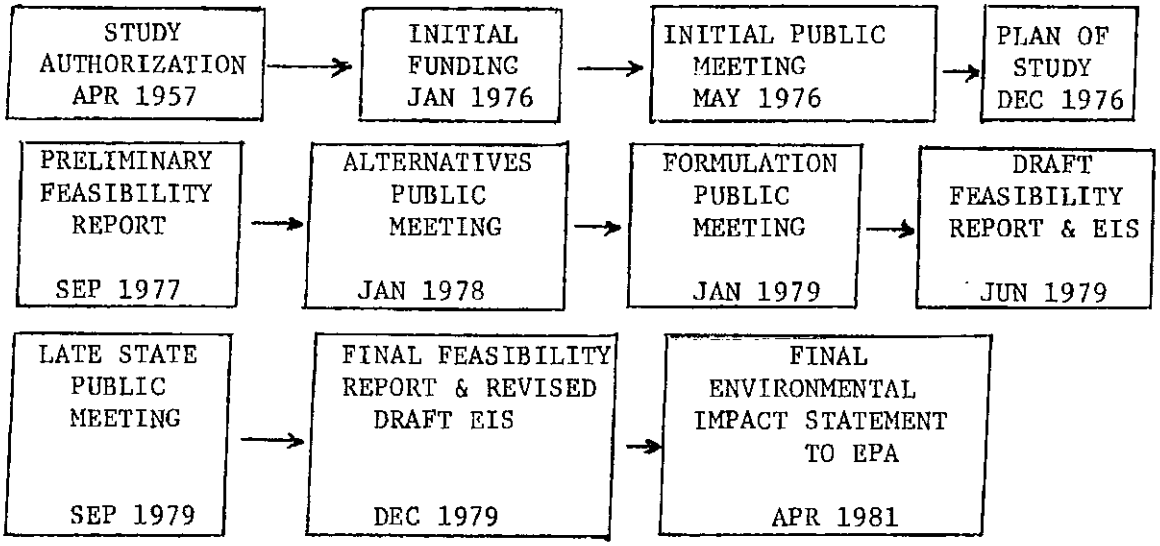
b. Minimize the annual maintenance dredging on any selected plan for boating needs.

c. To preserve or enhance fishing that may be impacted upon by alternative plans.

STUDY PROGRESS

Three stages are used in the planning process to develop alternative measures throughout the study. The study progress and direction

are highlighted by significant events during the planning stages which include public meetings and preparation of report documents. Stage 1 entailed the development of a Plan of Study in December 1976. Stage 2 identifies essential components of plan effects and presents environmental assessments of alternative plans. Analysis within Stage 2 makes use of existing available information for evaluation of alternatives. This Preliminary Feasibility Report presents the Stage 2 study findings. Stage 3 planning provides emphasis on modifying and reducing the number of alternatives in order to produce detailed, implementable plans. Based upon anticipated funding, these events, and their respective completion dates, are shown as follows:



SCOPE OF THE STUDY

This study encompasses the lands, facilities, industries and populace, employed and resident, around the appropriate reach of the Grand River under investigation. The 22.5 mile section of the Grand River from the Bass River to Grand Rapids presently has a controlling depth of two feet and passes through or near the communities of Grand Rapids, Wyoming, Grandville, Walker, Lamont, Eastmanville and Georgetown, Tallmadge, Allendale and Polkton Townships. The study limits are shown on Plate 2.

The Preliminary Feasibility Report is a document which presents information on a broad range of potential courses of action for managing resources in the study area. Use is made of existing economic, engineering, and environmental information to describe existing conditions, identify problems that are present, determine needs, and evaluate alternative solutions. Studies made for the Preliminary Feasibility Report allow for the selection of alternatives for further consideration. Preliminary estimates of costs and benefits are presented and environmental and socio-economic effects discussed. Detailed investigations will subsequently be made in Stage 3 planning for a complete analysis. The specific type, depth and detail of those investigations are presented in later sections of this Preliminary Feasibility Report.

STUDY PARTICIPANTS AND COORDINATION

On 25 May 1976 a public meeting was held at Grand Rapids, Michigan. The purpose of the meeting was to seek available information for the planning process and define the problems and needs as seen by the people of the area. The meeting was attended by persons representing State and local governmental agencies, regional planning organizations, environmental groups, and interested citizens. A list is provided in Appendix D along with a digest of the meeting.

A public meeting is scheduled for January 1978 to review with the public the contents of this Preliminary Feasibility Report. The problems and needs as defined in the report and the alternative plans and programs being considered will be displayed. Discussions of the economic, environmental and social impacts of the alternatives will be held. Public response will be documented and incorporated in the planning process. A subsequent public meeting will be held by January 1979 to present specific details on the best plans selected for final evaluation. A final public meeting is scheduled for September 1979 to inform the public about the proposed final report.

In order that the plans to be developed are in accordance with the desires of various interest groups, a public Study Committee has been formed in an attempt to insure complete consideration of public interests. The Study Committee includes representatives from all sides of the issue. Representatives of 8 communities, 2 counties, 2 planning commissions, and 5 organized interest groups have been invited to participate. Meetings are held periodically to allow members to express their views concerning potential solutions, suggest alternatives, identify types of impacts to be considered, and indicate desirable and undesirable trade-offs. To date, two committee meetings have been held and are discussed in further detail in Appendix D.

The following is a list of interested Agencies and groups for the Grand River Shallow-Draft investigation:

Federal

U. S. Department of the Interior
- Fish and Wildlife Service
- National Park Service
- Bureau of Outdoor Recreation
- Bureau of Indian Affairs

U. S. Environmental Protection Agency

U. S. Department of Transportation

U. S. Department of Commerce

U. S. Coast Guard

State of Michigan

Office of the Governor - Division of Inter-Governmental Relations (State Clearinghouse)

Department of Natural Resources

Department of Highways and Transportation

Michigan HIstorical Preservation Office

Local

Ottawa County
Kent County
City of Grand Rapids
City of Wyoming
City of Grandville
City of Walker
City of Grand Haven
Grand River Area Navigation Development Committee
Michigan Bass Federation
Grand River Valley Steelheaders
Georgetown Charter Township
Tallmadge Township
Allendale Township
Polkton Township
West Michigan Regional Planning Commission (Clearinghouse)
West Michigan Shoreline Regional Development Commission (Clearinghouse)
West Michigan Environmental Action Council
Lake Michigan Federation
North West Ottawa County Chamber of Commerce
Michigan Trailfinders Club
Michigan United Conservation Clubs
Great Lakes Commission
Great Lakes Basin Commission

In addition to the above list, boating groups, additional fishing interests and home-owner associations will be contacted to obtain data that would be useful in the planning process.

The degree of participation varies with the individual organization listed above. The minimum input is the submission of comments on each

phase of the report. Additional input includes representation and active participation on the Study Committee. The level of continuing input will be determined by the requirements of the plan formulation and evaluation process.

THE REPORT

This report for shallow-draft navigation presents information obtained and conclusions drawn during the preliminary phase of study. The report is basically divided into two parts. The first part presents a broad view of the overall study. Included are descriptions of the study area, resources and economy, and problems and needs. This part of the report sets the foundation and direction of the study. The second part discusses the various activities of the study directed at the solution of the problems and needs. Included in this part are the formulation of a plan, the selected plan, economics of the selected plan, division of plan responsibilities, plan implementation, views of Federal and non-Federal interests, and the report summary, statement of findings and recommendations.

PRIOR AND ONGOING STUDIES AND REPORTS

Prior studies and reports dealing specifically with authorization for construction or modification of the Grand River within the study limits are displayed in Table 1. In addition, two Flood Plain Information Reports have been prepared which provide useful data for the study area. The first report, dated 1972, explores an area which extends 21 miles upstream from the Kent County-Ottawa County line (mile 33.7) through the communities of Grandville, Walker, Wyoming and Grand Rapids. The second report, prepared in 1974, extends 11.3 miles upstream from the downstream city limit of Lamont (mile 22.4) to the Kent County-Ottawa County line (mile 33.7).

TABLE 1

PRIOR REPORTS

Year of Report	Report Document	Work Recommended
1892	H. Ex. 197, 52nd Cong., 1st Sess.	Report was favorable for a channel 10 feet deep below Grand Rapids.
1903	H. Doc. 216, 58th Cong., 2nd Sess.	Project between Grand Rapids and Grand Haven should be modified to a 6-foot channel, 100 feet wide.
1915	H. Doc. 667, 64th Cong., 1st Sess.	Abandonment of navigation project above Lamont and continuance of maintenance dredging between Lamont and Grand Haven Harbor.
1925	H. Doc. 103, 70th Cong., 1st Sess.	The section of Grand River above Bass River be eliminated from the existing Grand River Project.
1930	S. Doc. 88, 71st Cong., 2nd Sess.	Eliminated that portion of Grand River above Bass River from Navigation Project.
1932	H. Doc. 80, 73rd Cong., 1st Sess.	The Federal Government should continue the existing river and harbor project and that no project above the existing project upstream limit (Bass River) be provided.

Summaries of recent and/or ongoing reports that are pertinent to this study are presented as follows:

a. Great Lakes Basin Framework Study. This study was conducted by the Great Lakes Basin Commission. There are 24 appendices to the Framework Study, each of which describes studies of a specific area associated with economic, social, environmental and physical fields related to the Great Lakes Basin. Appendix R9 to the report relates to recreational boating in the Great Lakes Region. The report provides information useful in supplementing boating statistics for the study reach. It indicates that if demands progress at current rates there will be a shortage of approximately 2 million potential boat days of use by the year 2020 for River Basin Group (RGB) 2.3 which includes, in addition to the Grand River Basin,the St. Joseph River Basin, the Black River complex and the Kalamazoo River Basin. However, energy problems related to fuel resources and local market conditions are factors which must be considered in estimating future boating projections during upcoming economic investigations in the detailed Stage 3 planning phase. The report also noted that periodic low flows and the lack of stream improvements and maintenance limit the amount of canoeing and small-boat opportunity on the streams in RBG 2.3. Further, it was stated that because waters in this area are already being used to capacity, a positive boat management program is essential to protect the existing water resource and meet the projected needs.

b. Grand River Basin Comprehensive Water Resources Planning Study. This study was conducted under the auspices of the Water Resources Council. The study report comprises eleven volumes containing the main report and 17 appendices. The primary objectives were to determine the short-term and long-term water and land resources problems and needs of the basin; develop alternative plans to provide for the use of the Basin's resources; and to select an optimum

plan from these alternatives to meet the Basin's needs. The study was a joint effort of integrated planning by the Department of Agriculture (Economic Research Service, Forest Service and Soil Conservation Service); Corps of Engineers; National Weather Service, Public Health Service; Department of the Interior (Bureau of Mines, Bureau of Outdoor Recreation, Fish and Wildlife Service, Geological Survey and National Park Service); Bureau of Public Roads, Environmental Protection Agency; Federal Power Commission; Great Lakes Commission; and the State of Michigan (Departments of Agriculture, Commerce, Health, Highways, Natural Resources, and the Office of the Attorney General). Although a Draft of the Grand River Shallow-Draft Plan of Study was provided to the above Agencies for review in October 1976, no additional reports were noted that would provide supplemental data to the Comprehensive Water Resources Planning Study. The Comprehensive Study included discussion on Water Quality, Water Supply, Navigation, Outdoor Recreation, Sport Fishing, Public Health, and Land Use. Findings in this Grand River Basin Comprehensive Water Resources Planning Study indicate projected boating needs in the entire Basin for the year 2020 of 12 million occasions of use and for the Grand Rapids subarea 2,350,000 occasions of use. Related acreage requirements for the Basin for this use are 880 acres of land for parking and 176,000 acres of water surface area development. Requirements for the Grand Rapids subarea are 177 acres of land and 35,400 acres of water surface development.

c. Grand Haven Harbor and Grand River, Michigan Study. The purpose of this ongoing study is to determine the engineering, economic, environmental, and social feasibility of providing improvements in the interest of commercial navigation for Grand Haven Harbor. The study investigates a section of the Grand River from its mouth to its junction with the Bass River. The existing navigation project for Grand Haven Harbor was authorized by the River and Harbor

Act of 23 June 1866 and subsequent Acts. The Grand River improvement was originally a separately authorized project, but was consolidated with the Grand Haven Harbor project by the River and Harbor Act of 3 July 1930. The most recent modification of the Federal navigation project was approved by the Act of 2 March 1945, and is described in House Document 661, 76th Congress, 3rd Session. Existing provisions allow for protecting the mouth of the river with piers, and revetments; for a channel 23 feet deep, 300 feet wide from that depth in Lake Michigan to a point 1,000 feet inside the pier ends; thence 21 feet deep, 300 feet wide, 2-1/2 miles long to the Grand Trunk Railway bridge at Ferrysburg with a turning basin 18 feet deep on the south side of the channel immediately downstream of the bridge; thence a channel 18 feet deep, 100 feet wide, 3,100 feet long to Spring Lake; and a channel in the Grand River 8 feet deep, 100 feet wide and 14-3/4 miles long. The existing project was substantially complete in 1949. A Draft Feasibility Report was prepared in February 1977 which recommends modifications to the deep draft harbor in the vicinity of Grand Haven, Michigan. However, no modifications are recommended in the Draft Feasibility Report for the 8-foot deep, 14-3/4 mile long shallow-draft section between Spring Lake and the Bass River. Until such time as the Final Report is prepared and approved, these recommendations are subject to revision and/or rejection.

d. Georgetown Township Community Development Plan. This report, prepared by the Kent-Ottawa Regional Planning Commission, provides a guide to direct capital improvements and developments as they occur. The plan is a study of the assets, liabilities, and potentials of Georgetown Township, much of which is based upon statistical analysis and projection. The land use concept for the year 2000 provides for the Georgetown Township river frontage to be devoted to undeveloped land purposes.

e. Other Reports. Assorted reports of value are available on boating, recreation and related purposes for the Grand River. One such report is a 1975 publication entitled "The Story of the Grand River" which discusses the history of boating on the river. Other reports to be considered would include those which discuss implications that recreational boating may have on our fuel resources. A 1970 Fisheries Survey conducted by the Michigan Department of Natura Resources is also useful in presenting the effects that various alternatives may have on fish populations. Regional Planning and Development Commissions within the study area are currently in the process of developing publications which will present land use projections in their respective regions.

RESOURCES AND ECONOMY OF THE STUDY AREA

A general survey of the geography, resources development and economy of the Grand River area between Grand Rapids and Eastmanville provides a backdrop against which recreational navigation is to be evaluated. If deficiencies are found to exist, the means to reduce or eliminate the deficiencies are evaluated to select appropriate solutions. Resource considerations extend to both those of the environment and to the population of the area.

WATERSHED CHARACTERISTICS

The Grand River and its tributaries drain an area of about 5,572 square miles. This drainage area is oval in shape, and is about 135 miles long, with a maximum width of 70 miles, as shown on Plate 3. It is bounded on the north by the Muskegon River and the Saginaw River Watersheds and on the south by the Kalamazoo River Watershed. The Grand River is 260 miles long and drops 460 feet

from its source. It has a steep slope from its source to the vicinity of Ionia, over half its length, but has a very flat slope from Ionia to Lake Michigan, a distance of about 88 miles. The surface deposits of the Grand River basin are permeable glacial drift of great depth so that the major part of precipitation run-off ordinarily reaches the stream by percolation. Therefore, low flows are high and well-sustained (in comparison with streams such as the Rio Grande in the southwest section of the country).

Riverbed widths of the Grand River vary from over 500 feet near its mouth to under 100 feet downstream of Jackson. Water depths vary considerably during high, low, and normal flows. During flood stages, channel depth may increase between 6 to 10 feet before the immediate banks are overtopped.

The Grand River is fed by six major tributaries upstream of the study limits: the Rogue, Flat and Maple Rivers entering from the north, the Thornapple entering from the south, and the Lookingglass and Red Cedar Rivers entering from the east. The drainage areas of these tributaries are 255, 550, 970, 875, 290 and 402 square miles respectively, comprising 60 percent of the total drainage area of the basin.

The study area considered in this Report covers 22.5 miles of the Grand River between the Bass River and Grand Rapids and is located within Kent and Ottawa Counties, Michigan. The Grand River is approximately 500 to 600 feet wide as it passes through the City of Grand Rapids. Stream banks have an average elevation of about 590 feet in the southwestern portion of the city, which is approximately 12 feet above the channel bottom. The downstream area of Grand Rapids extends along the left bank of the River immediately adjacent to a floodwall. Present urbanization downstream of Grand Rapids within

the Study limits is confined to the Jenison area. Within the developed area exist service businesses, large and small industries and residential units. Other than the development in the Jenison area, the study reach is free of encroachments. Typical sections of the study area are shown on Figures 1 and 2.

The Grand River is approximately 350 to 600 feet wide as it passes through Georgetown and Tallmadge Townships. Stream banks vary from an average elevation of 584 feet to 590 feet and are about 10 feet above the stream bottom. The relatively flat gradient retards flow, as the average stream slope is about 0.33 foot per mile. The low banks are about 5 feet above the water surface.

The head of navigation for this study is considered to be the Fulton Street Bridge in Grand Rapids, at river mile 40.7. Downstream of Fulton Street, 6 highway and 3 railroad bridges cross the Grand River within the project limits. These bridges and location are presented in Table 2.

TABLE 2

BRIDGE DATA

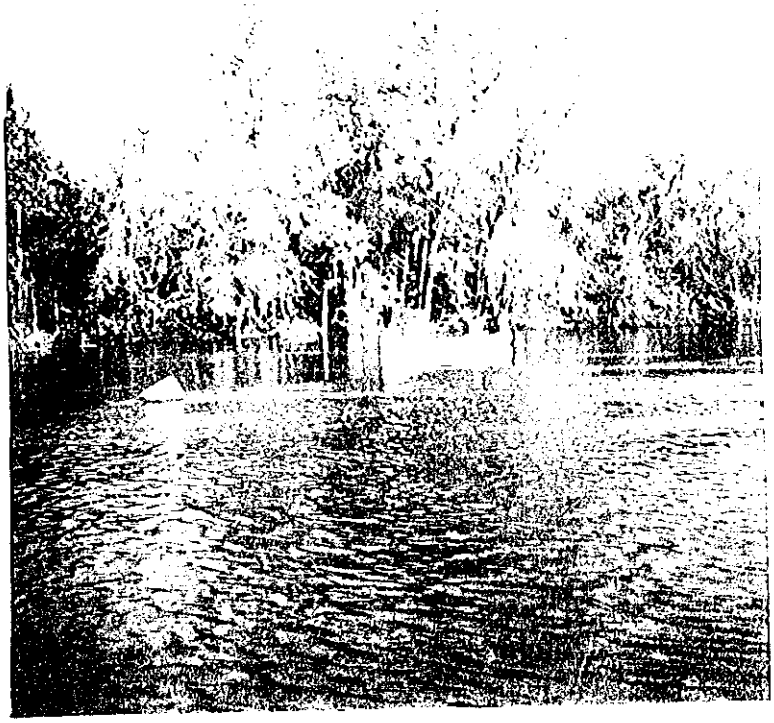
Identification	River Mile	Underclearance Elevation (U.S.G.S.)
68th Street	20.2	606.4
M-45	25.7	600.2
M-11	34.6	610.3
Penn Central RR	37.7	602.1
I-196	38.6	608.1
Penn Central RR	39.9	612.6
Wealthy Street	40.1	610.8
Penn Central RR	40.3	604.6
I-296	40.6	611.1
Fulton Street	40.7	612.0

Records of river stages and discharges on the Grand River have been maintained since March 1901 when a staff gage was installed by the United States Geological Survey (USGS) 500 feet downstream of

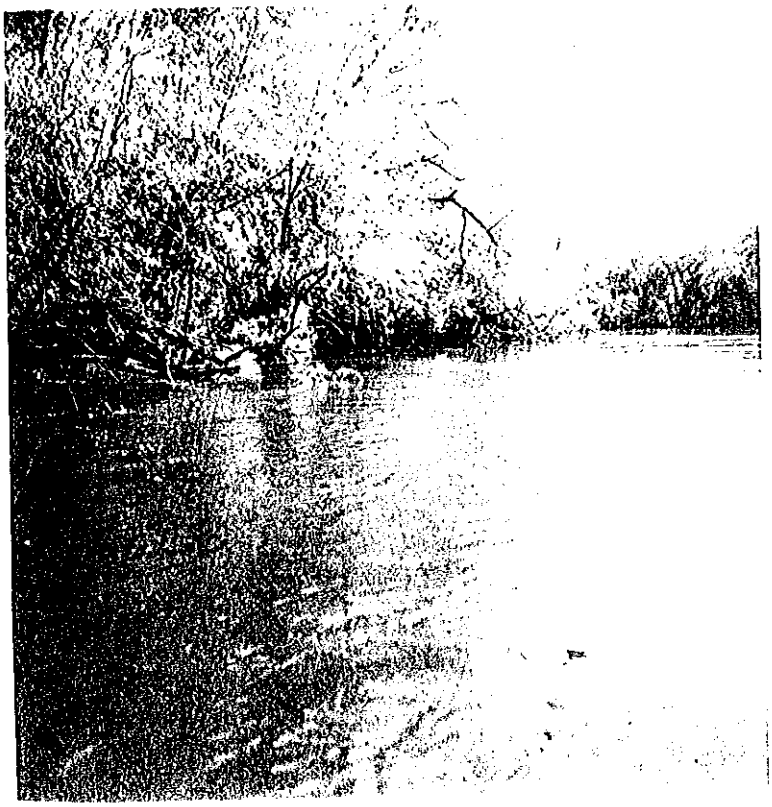
Upper Photo - Looking downstream at I-196 Bridge (River Mile 38.6)

Lower Photo - Looking upstream in the vicinity of M-11 Bridge (River Mile 34.6). Canoeists shown are participants in the Grand River Watershed Council's CC-76 canoe trip between Jackson, Michigan, and Grand Haven. Held in May 1976, the event highlighted one activity for which the river is currently used.

FIGURE 1



Upper Photo - Looking at typical river bank immediately downstream of M-45 Bridge in Talmadge Township. Obstruction protrudes from water.



Lower Photo - Looking upstream at typical section of river with island developed from dredging prior to 1910.

FIGURE 2

the Fulton Street Bridge until August 1918. The average discharge for 48 years of record is 3,500 cubic feet per second at the Grand Rapids gage.

The USGS also maintains a bubbler gaging station at Eastmanville, Michigan. The gage has both a graphic and digital recorder and was installed on 28 April 1976.

The Kent-Ottawa County area is well-endowed with mineral resources. No significant metallic mineral deposits are known to exist. The most significant non-metallic minerals are cement, stone, clays, sand and gravel, peat, petroleum and natural gas.

HUMAN RESOURCES

In 1970 the populations of Ottawa and Kent Counties were 128,181 and 411,044, respectively. These amounted to increases of 30 percent and 13 percent in the population since 1960. Selected communities within the study limits had 1970 populations as shown in Table 3.

TABLE 3

POPULATION DISTRIBUTION

Community	Population 1970	Population 1960	Percent Change
Grand Rapids	197,649	177,313	11.5
Wyoming	56,560	45,829	23.4
Grandville	10,764	7,975	35.0
Allendale Township	3,554	2,238	58.8
Georgetown Township	17,615	7,989	120.5
Jenison	11,266	--	--
Tallmadge Township	4,883	3,243	50.6

The 1969 mean annual incomes for Ottawa and Kent Counties were $10,445 and $10,692. Of the counties population over 16 years of age, 203,873 were employed in 1970. Table 4 shows the occupational distribution of these persons according to the 1970 census.

Within the two counties, 272,281 persons are over 24 years old. Of this number, 42,187 have completed 8 years of education, 89,469 are high school graduates and 26,449 have college degrees.

Housing within the study reach has been predominately owner-occupied. In 1970, owner-occupied homes amounted to 82.9 percent and 75.6 percent of the total dwelling units in Ottawa and Kent Counties. Total dwellings in the two counties were 159,760 units.

DEVELOPMENT AND ECONOMY

A significant portion of the study area is relatively undeveloped near the Grand River or is used for farming or other rural activities

TABLE 4

OCCUPATIONAL DISTRIBUTION - 1970

OCCUPATION	EMPLOYEES		
	OTTAWA	KENT	TOTAL
Professional, Technical and Kindred	5,760	20,631	26,391
Managers and Administrators	3,136	12,160	15,296
Sales	2,974	14,373	17,347
Clerical and Kindred	6,742	27,213	33,955
Craftsman and Foreman	8,124	22,686	30,810
Operatives	9,302	26,498	35,800
Laborers (except farm)	1,940	6,402	8,342
Farm Laborers	1,654	1,547	3,201
Service Workers	5,501	17,760	23,261
Household Workers	365	1,323	1,688
Transport Operatives	2,016	5,766	7,782

The rural population within Ottawa County in 1970 totaled 66,007 people. Almost all of the land within the Ottawa County reach of the project area is undeveloped, while the Kent County reach of the study area is devoted to residential, commercial and industrial developments. Grand Rapids, at the upstream limit of the project area, is by far the most significant urban community in the area.

Grand Rapids is a manufacturing city, a wholesale trade center, and a regional shopping center serving a large area just outside the reaches of Chicago and Detroit. It is nationally famous for furniture manufacture. The fabrication of automobile bodies and other auto parts now employs about as many persons as the furniture factories. Other factories manufacture refrigerators, plumbing supplies, numerous items of machinery, foundry products, and items fabricated of metal. Although no basic steel is produced here, steel is readily available from nearby sources. Merchants throughout much of the Lower Peninsula depend on Grand Rapids as a wholesale supply depot. Its wholesale grocer business is especially large due in part to the large fruit and vegetable farming enterprises along the Lake Michigan shore. Of the civilian labor force of Grand Rapids employed in 1970, 30.9 percent were involved with manufacturing, 24.7 with wholesale and retail trade and 14.1 percent as craftsmen or foremen.

ENVIRONMENTAL RESOURCES

The section of river under investigation is characterized by tree-lined banks throughout the study limits. Few homes or farms are visible from the river, which has a natural setting. Islands occasionally are present within the study area.

Several species of fish exist along the Grand River study reach. Based upon a 1970 Fisheries Survey conducted by the Michigan Department of Natural Resources, the game fish population includes channel catfish, bluegill, northern pike, largemouth bass and pumpkinseed. Non-game fish observed included significant amounts of carp, white sucker, and norther redhorse. Data from the sampling indicate that 31.8 percent of the total fish between Eastmanville and Grandville are game fish. Downstream of Eastmanville to Bass Island, game fish represented 33.8 percent of the total fish sampling. The Michigan Department of Natural Resources states that the recreational fishery

on the Grand River from Lyons, Michigan, to the mouth (approximately 95 miles) is valued in excess of $2 million annually. In 1975, angler days spent on anadromous fishing was reported at 82,280. During the same period, 124, 780 angler-days were expended on fish native to the Grand River. The angler harvest of steelhead was 9,180, coho 33,150 and chinook 31,960 in 1975.

WATER QUALITY

The water quality of the Grand River within the study reach can generally be classified as good, based upon cleanup efforts in recent years, according to the 208 Areawide Waste Treatment Management Planning Commission (Region 8). The full use of the Grand River for body contact recreational activities cannot be realized, however, until discharge of pollutants is controlled. The West Michigan Regional Planning Commission (representing Kent County) and the West Michigan Shoreline Regional Development Commission (representing Ottawa County) have been designated as Water Quality Management Planning Agencies to undertake a Section 208 Areawide Waste Treatment Management Planning Program. Under Section 208 of Public Law 92-500, the Agencies are charged with devising methods whereby all the waters of the region are made "fishable and swimmable" by 1 July 1983. Three municipal Waste Water Treatment Plants, in Grand Rapids, Wyoming and Grandville, release treated wastewater (volume estimated at 60 million gallons daily for 1977) between river miles 39 and 34. Based upon the Grand River's existing waste assimilation capacity, plans are being developed and some construction is in process for an increase in current treatment capacity of the three plants. A detailed water quality assessment of the Grand River is provided in Appendix C. Under present conditions, toxic metals which have been discharged over a period of many years in the Grand Rapids area have settled and are reasonably stable on the river bottom. A survey to obtain bottom samples will be conducted in the Stage 3 planning phase to

determine the extent of heavy metals such as cadmium, chromium, copper, cyanides, nickel, silver and zinc. The samples would be analyzed by the Environmental Protection Agency to determine the impact that the alternatives could have on the river bottom.

NAVIGATION - COMMERCIAL

Commercial navigation on the Grand River is confined primarily to within the existing project limits for Grand Haven Harbor. Within the study limits above Bass River, no waterfront facilities for commercial navigation currently exist along the river. No known industry or commercial establishment up to Grand Rapids has plans to accommodate prospective commerce, should channel modifications be made. This does not preclude, however, commercial needs from being investigated in the future if this is found warranted during the study process.

NAVIGATION - RECREATION

Little information concerning existing recreational boating on the Grand River is available. However, an inventory conducted in August 1977 by the Detroit District noted that 811 berths existed at 11 commercial marinas at Grand Haven, Spring Lake and Ferrysburg. Although no statistics are available on recreational boating for upstream portions of the Grand River, it is known that a significant number of recreational boaters make use of the improved section downstream of Bass River. The unimproved sections of the river to Grand Rapids are used mainly by small, local craft whose operators are familiar with the local hazards of navigation. Within Ottawa and Kent Counties, there were over 38,000 registered boats as of December 1974. In addition, there are over 30,000 registered boats in the six counties bordering Kent and Ottawa Counties. It is estimated that over 95 percent of these boats are of a size that could navigate any reasonably-sized channel dredged in the Grand River.

Table 5 shows the registered small craft for Ottawa and Kent Counties as of 1974. Surveys are proposed, to be conducted by letter, during Stage 3 Planning to determine the extent and frequency with which these boats would make sue of a modified channel within the study reach. Appendix B depicts the current estimate to date of recreational craft that would improve the study reach.

The reach of Grand River within Ottawa County and Kent County presently has 9 launching facilities. Within the study limit there are two launch access points, located in the vicinities of Deer Creek (river mile 22) and Grandville.

Recreational boating's rise to popularity has been rapid. In 1958, the year the State first began registering boats, there were 217,553 craft in Michigan. By 1974, Michigan's registered boats growth in the popularity of recreational boating which has occurred in only a few years time. That this rapid growth will continue in the future is an opinion shared by most agencies, organizations, and persons concerned with the future of recreational boating, according to the Michigan Department of Natural Resources. However, the North West Ottawa County Chamber of Commerce states that the economic welfare of their communities will be adversely affected unless additional marinas and boating facilities are provided on the Grand River.

TABLE 5

REGISTERED SMALL CRAFT - 1974

		Length					
County	Type	12' and Under	12'-20'	20'-30'	30'-40'	40' and Over	Total
Ottawa	Outboard	2,815	5,632	159	3	0	8,609
	Inboard	51	676	489	84	21	1,321
	Sailboat	25	88	149	17	0	279
	Total	2,891	6,396	797	104	21	10,209
Kent	Outboard	9,880	14,983	796	18	10	25,687
	Inboard	106	1,370	580	172	31	2,259
	Sailboat	37	151	203	24	5	420
	Total	10,023	16,504	1,579	214	46	28,366

The optimistic future predicted for recreational boating is based not only on past growth statistics, but on future population projections, rising per capita income which provides the consumer with more money to spend on recreational pursuits, and the trend toward shorter workweeks and more holidays which allows more free time to devote to boating activities. Experience has shown that river and harbor improvements or the construction of new facilities results in an increase in the number of locally-based and transient boats. Another factor contributing to heavy use at existing river and harbor improvements is the rapid increase in the number of trailer-drawn craft being used. These craft, usually 16 to 25 feet long, have no home port, but are generally stored on land at the owner's home or any other accessible location and transported to and from the harbors and waterways on trailers.

Future growth of recreational boating on the Grand River would be severely restricted under existing channel conditions. The Grand River is shoaled and unimproved upstream of the upper limit of the existing Federal project at the Bass River. There are no aids to navigation and the numerous bars, snags and other hazards to navigation make the river dangerous even for local boaters familiar with local river conditions. However, if the river were improved, there is little doubt that it would be used extensively by locally-based, transient, and trailer-drawn craft since the time and distance to alternate locations would be eliminated. The highly populated Grand Rapids area provides the demand and support of recreational boating facilities and may also serve as an attractive destination for craft cruising on Lake Michigan. Some indication of the potential use that an improved Grand River might receive is based on a forecast of the number of craft expected to be registered. Based on projections prepared by the Michigan Waterways Division, Ottawa and Kent Counties are expected to have 70,195 boats registered by 2027. Although modifications to the river could supplement boating needs

of the Grand River, the carrying capacity of the river for various-sized craft would be limited by channel depth, channel width, natural constrictions, and man-made structures such as bridges. Based upon a inventory of commercial and private berths in the Grand Haven, Spring Lake and Ferrysburg area, and coordination with the Michigan Department of Natural Resources, the maximum number of user days which the river could support has been estimated in Appendix B. A determination of the anticipated number of user-days that could be expected by a variety of recreational craft for various alternative was needed to establish whether modification of the Grand River upstream of Bass River would be economically feasible. Benefits to be derived for existing locally-based transient crafts and trailer-drawn boats are equivalent to the net return on the depreciated investment in the boats after all expenses have been paid.

IMPROVEMENTS DESIRED

A public meeting was held at Grand Rapids, Michigan, on 25 May 1976, for the purpose of obtaining available information and hearing views on project improvements as seen by the concerned public. In addition to officials of State and local governments, representatives of boating interests, environmentalists, and other concerned citizens were also present. A digest of the proceedings is included in Appendi D. Although several groups and individuals requested that the reach of river to be studied be left in its natural setting, other organizations and individuals requested the following modifications and related project needs:

a. Provide a channel extending from Bass River to Grand Rapids with adequate capacity to handle recreational boating of the area.

b. Remove obstructions in the river such as training walls, pilings and wingwalls constructed in conjunction with the abandoned project and avoid extensive channel dredging.

c. Implement a valley preserve concept and evaluate the stream as a natural system.

d. Address the water quality of the Grand River to insure that any potential solution is in conformity with regional managment plans to control sources of water pollution.

e. Avoid modifications that could adversely affect bank stability.

f. Provide suitable measures for disposal of dredged material.

g. Determine the effect that modifications could have on toxic metals located on the river bottom.

h. Provide fishing and other recreational opportunities in the Grand River Basin, if found warranted.

i. Provide flood relief.

PROBLEMS AND NEEDS

Due to the tremendous growth in boating activity in recent years, there is a need for more water surface that could accommodate shallow-draft craft in the west Michigan area. The Grand River is shoaled and unimproved upstream of the upper limit of the Federal project (Bass River). There are no aids to navigation and the numerous bars, snags and other hazards to navigation make the river dangerous to even local boaters familiar with local river conditions.

Future growth of recreational boating on the Grand River would be severely restricted under existing channel conditions. The Grand River Basin Comprehensive Water Resources Study states that there is no apparent feasible way to provide any substantial part of the surface water needed for outdoor recreational needs of the Basin by the year 2020. The report concludes that although some additional facilities will become available, boaters will either need to accept more crowding on available water surfaces, seek opportunities on water surfaces outside of the Basin, or participate in some substitute activity, if existing conditions were maintained. The 1970 Comprehensive Study will be reviewed to determine if any changes in the projected needs for increased water surface and related land facilities for boating and water skiing have occurred. The projections of the 1970 Report indicate that 35,500 water surface acres and 179 land acres would be needed by year 2020. Although Lake Michigan provides an almost unlimited supply of water surface for most boating needs, limitations on its use are very substantial. Wave action limits the use of small craft on the Lake Michigan water surface to about one day out of four during the recreation season.

STATUS OF EXISTING CHANNEL

The first examination and survey of the Grand River upstream to Grand Rapids was authorized by the River and Harbor Act of 1880. A report by the Detroit Engineer Office, dated 12 February 1881, and published as Senate Ex. Document No. 50, 46th Congress, 3rd Session, indicated the city of Grand Rapids could prosper by being opened to general lake commerce. It also indicated that an adequate ship channel, preferably 10 feet deep and 100 feet wide, could be constructed either entirely or partially within the banks of the river. The work, which in effect would be similar to the construction of a canal, would require careful and complete site examinations to determine the most economical alignment. The report concluded that existing light-draft

navigation, then consisting of a single steamboat drawing not more than 2-1/2 feet loaded, could more adequately handle the river commerce if a 4-foot deep channel could be provided. The 4-foot deep channel concept was adopted by the River and Harbor Act of 1881. By July 1884, 2-1/2 miles had been completed. By July 1886, a 60-foot wide and 4-1/2 foot deep channel had been dredged 11-1/4 miles below Grand Rapids. The dredged channel was not considered permanent and further appropriations were not recommended.

A preliminary examination report dated 29 January 1887 concluded, in view of the extreme range between high and low water stages and the shoaling tendency of the river bottom material, that a deep-water connection from Lake Michigan to Grand Rapids could not be accomplished entirely within the banks of the river. Such a connection would require the construction of a canal outside of the river banks, but would utilize the river water.

Following additional surveys, a report was prepared on 11 April 1892 which was based on a thorough investigation of the Grand River below Grand Rapids, recommending the construction of a 10-foot navigable channel downstream from the city. The report was published as House Ex. Document No. 197, 52nd Congress, 1st Session.

The River and Harbor Act of 3 June 1896 authorized construction of the 10-foot deep channel, 90 to 100 feet wide, through the bars of the river, as recommended by the above 1892 survey report. The act of 13 June 1902 extended the upstream terminus of the project about 3,200 feet further to Fulton Street in Grand Rapids. Subsequently, the Board of Engineers for Rivers and Harbors prepared a report in 1903 which recommended the project be modified to provide a 6-foot deep channel, 100 feet wide, downstream from Fulton Street.

No work has been done on the Grand River between Bass River and Grand Rapids since 1910 when a project was undertaken for a 6-foot deep, 100 feet wide channel. The project was subsequently abandoned via the 1930 River and Harbor Act due to an absence of commerical uses. It is presently estimated that the normal depth of the river upstream of Bass River is between 2 to 4 feet. The bed of the river is practically all sand and fine gravel, with clay at a few points at depths of 10 feet to 15 feet below the river bed. The channel width at low water normally varies between 280 feet to 820 feet, although wing dams and training walls placed in the river in the early 1900s have narrowed the channel in places to between 160 and 180 feet. These training walls are buried in sand bars located between Eastmanville and Jenison and present an occasional problem to canoe and small craft attempting to navigate up to Grand Rapids. As of 1910, brush and pile training walls constructed in the river amounted to 132,624 linear feet of material. No work has been done in the study reach since that time. The wing dams that were constructed extended from the bank out into the river and were made of 12-inch posts, 8 to 10 feet apart. Long mattresses of poles and woven brush 10 inches thick were wired and stapled to the tops of the posts. Stones and other heavy material were used to weigh the bottom of the mattress down to the river bottom. Retaining walls that were built were used to keep dredged material from the bottom from sliding back into the channel. These walls were built in the river and consisted of double rows of 6 to 8 inch oak or maple posts. Woven mattresses 10 to 14 inches in diameter and 8 feet long were placed between the posts and a rider post wired on top to hold the mattress in place. As a result of sand being placed behind the walls, some have developed into large islands supporting many trees and heavy vegetation. An example of such an island is shown on the lower photograph depicted on Figure 2.

Following assorted reports discussing the causes that led to the decline of waterborne commerce on the Grand River, a preliminary examination report dated 8 October 1925 and a survey report dated 6 December 1926, both published in House Document No. 103, 70th Congress, 1st Session, recommended, among other things, that the section of Grand River upstream from the mouth of the Bass River be eliminated from the overall Grand River project. Recommendations made in these reports were published, with modifications, in Senate Document No. 88, 71st Congress, 2nd Session, and adopted by the River and Harbor Act of 3 July 1930. No work in the interest of navigation has been undertaken since 1930 for the study limits being considered in this report, since the area was de-authorized and is no longer a part of the Federal project.

FORMULATION AND EVALUATION CRITERIA

The formulation and evaluation of alternatives will be conducted within the context of the Water Resources Council's "Principles and Standards" formulation and evaluation criteria as set forth in Volume 38 of the Federal Register on 10 September 1973. Such criteria, technical, economic, and environmental considerations, enables the development and selection of justifiable plans that best respond to the problems and needs.

TECHNICAL CRITERIA

The following technical criteria are being adopted for use in formulating alternatives. The list is not final. Other criteria may be added as determined by additional detailed studies.

a. Structural and non-structural alternatives will attempt to accommodate expected users for a 50-year project life.

b. The improvements required to implement an alternative should be sound, practicable, and engineeringly feasible.

For additional information on engineering studies, see Appendix A.

ECONOMIC CRITERIA

The economic criteria which will be applied in formulating a plan are those specified in Senate Document No. 97, 87th Congress, entitled "Polciies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources," and are as follows:

a. Tangible benefits must exceed project economic costs.

b. Each separable unit of improvement must provide incremental benefits at least equal to its incremental cost.

c. The scope of the development will provide the maximum net benefits if local objectives can be satisfied in the selection process.

d. There is no more economical means, evalutated on a comparable basis, of accomplishing the same purpose or purposes which would be precluded from development if the plan were undertaken. This limitation refers only to those alternative possibilities that would be physically displaced or economically precluded from development if the project were undertaken. The plan resulting from application of the foregoing criteria provides a baseline for consideration of the numerous other factors which are not reflected in quantifiable economic terms, but which may warrant modification of the plan.

e. Benefits will be derived from a comparison of the projected "without-project" conditions to the projected "with-project" conditions.

f. Intangible benefits will be evaluated in quantified terms, where possible, and will include health, safety and welfare of the residents of the project area. Although it is difficult to place an economic value on these items, they will be considered in the social impact assessment.

The costs for alternative plans of development will be based on preliminary layouts, estimates of quantities, and current unit prices. The benefits and costs will be expressed on comparable quantitative economic terms to the fullest extent possible. Annual costs will be based on a 50-year period of analysis and an interest rate of 6-5/8 percent. No interest during construction will be included if the project could be completed within two years. The annual charges, however, will include the cost of maintenance. Sensitivity analysis will be included in Stage 3 Planning to indicate the conditions (mostly growth rates) under which the benefit-cost ratio would be reduced to 1.0. An assessment of these conditions occurring will also be provided. Additional information on economic studies is included in Appendix B.

ENVIRONMENTAL AND OTHER CRITERIA

The following will be considered in formulating a plan:

a. The use of natural resources to effect implementation of a plan will be minimized.

b. Adverse social impacts (noise, esthetic values, and health) should be minimized to the maximum possible extent.

c. Activities attracted to the project area after plan implementation should be in consonance with activities of the surrounding area, and be environmentally and socially acceptable.

d. Measures which protect, preserve, or enhance environmental qualit in the project area will be incorporated in the selected plan.

e. The possible disruption of toxic materials on the river bottom due to project alternatives will be considered and measures will be taken to minimize adverse impacts.

f. The adverse impacts on fish and wildlife resources should be minimized to the maximum possible extent.

Additional information on environmental studies is presented in Appendix C.

PROJECTED "WITHOUT" CONDITIONS

Vacant lands and marsh areas immediately adjoining the Grand River have occassionally sustained severe floods, and for this reason, these wetland areas have remained essentially undeveloped. Within Ottawa County, present urbanization of the flood plain region is confined to the Jenison area, and only one bridge, State Route 45, at river mile 25.7, crosses the river. The Kent County section of the project area is more extensively developed into residential, commercial, and industrial land uses, becoming highly urbanized at the upstream study limits within the City of Grand Rapids. Except within the downtown area of Grand Rapids, the lands immediately adjacent to the river are undeveloped zones.

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.

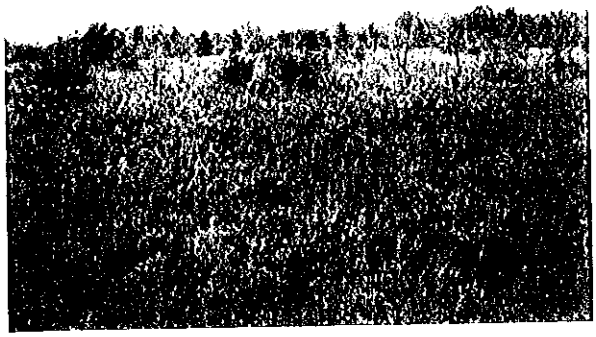
Two disposal sites for the dredged material are proposed, one near Eastmanville in a flat, agricultural area, and one located in the vicinity of Grandville, in a mining quarry. Use of the second site would allow for land reclamation on the site of the abandoned quarry. Both disposal sites are maintained 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.



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.

Figure 3

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, aesthic, 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 regions 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.

1973 Comprehensive Study, Grand River Concept of Valley Preserve

The 1973 Grand River Michigan Comprehensive Water Resources Study, noted previously, includes a recommendation for a valley preserve plan. The report advised that sections of the Grand River, including the study area, be designated as a natural river system to preserve and enhance its values. As one alternative, the report recommended the establishment of a valley preserve system and the acquisition of nine recreation areas along the system. The proposed system would extend along the main stem of the Grand River from its mouth at Lake Michigan to the vicinity of Jackson. This area includes Kent and Ottawa Counties. It also includes portions of major tributaries extending upstream from their confluences with the Grand River. This extensive system comprises 450 miles of flood plains adjacent to stream areas.

The plan provides for:

1. Enhancement of stream water quality.

2. Wildlife Habitat.

3. Extensive low-key recreation.

4. Zoning controls eliminating flood damages.

5. Forestry programs.

Nine recreation areas were considered for development in conjunction with the valley preserve system to accommodate the demand for recreational opportunities. Among the nine recreational nodes designated in the Comprehensive Study, only the Grandville-area node is included within the scope of this report. The recreation site lies along the

Grand River downstream from Grandville and would include the flood plain and adjacent land from the State Route 11 bridge downstream to the confluence of Sand Creek with the Grand River in Ottawa County. It would include nearly seven miles of the Grand River. The total area would comprise about 2,000 acres, of which about 300 acres are river-water surface.

Cooperation in the management and uses of the valley preserve area would be encouraged for the concerned cities and villages of Grand Rapids, Grandville, Walker and Wyoming. Outside the limits of the incorporated municipalities, State zoning laws would be used to implement the valley preserve plan. Lands or interests in lands would be acquired only with consent of the owner.

Low-key recreational activities compatible with the valley preserve include fishing, hunting, canoeing, hiking, horseback riding, winter sports, and bird watching. Such activities are of a nature as would not be subjected to structural or occupational damage should floods occur.

Valley Preserve-Recreation Plan of this Preliminary Feasibility Report

The Valley Preserve-Recreation Plan as developed in this report is built upon the 1973 Comprehensive Study recommendations. The plan involves acquisition of 1,300 acres of land in strips extending up to 50 feet from both banks of the stretch of river under investigation. Approximately 265 acres of this land would be maintained, essentially, in its natural condition, with allowances made for low-key recreational activities such as sightseeing, hunting and fishing. Additionally, a recreation "node" would be planned, to be located in the vicinity of Grandville. Land totaling 1,035 acres would be purchased for development into 139 acres of playgrounds, 124 acres

Upper Photo - Walker Park (in Walker) recreation facilities. This concept of development is proposed in the Valley Preserve Plan.

Lower Photo - Walker Park along Grand River. This type of development is proposed in the Valley Preserve Plan.

Figure 4

of hunting areas, 61 acres of picnic grounds, and 35 acres of campsites. A total of 676 acres of the recreation "node" would be allowed to remain in an undeveloped, natural state, for preservation of the diverse ecological zone of the flood plain region. Examples of the development of areas for use in a Valley Preserve Recreation alternative are shown on plan sites pictured in Figure 4.

Navigation would be limited to the degree of utilization which is possible under the present unimproved conditions of the river, with most of the boat traffic coming from non-motorized craft such as canoes and rowboats. Currently, boating is made dangerous by numerous obstructional hazards in the river, including pilings, wingwalls, and extensive shoaling of the river bottom.

Economic analysis has determined the benefits, costs, and economic justification for the Valley Preserve recreation alternative. The total costs for construction of roadways and facilities and needed items such as trails, comfort stations, playgrounds, a nature center, and picnic tables, are estimated at $1,944,400. Costs associated with the purchase and acquisition of lands are a non-Federal responsibility, estimated at $4,550,000. Total Federal costs are computed at $972,200, and total non-Federal costs are computed at $5,522,200. Annual benefits are determined from an estimate of potential user-days, at a total of $969,900. When compared with annual costs of $858,600, a benefit/cost ratio of 1.13 is derived.

Basis for Corps Participation and Coordination with Other Agencies

a. Corps responsibility:

Corps of Engineers participation in recreational resource management activities is designed to insure continued public enjoyment and maximum sustained use of lands, waters, forests and associated recreational resources, consistent with their carrying capacity and their biological and aesthetic values. Actions emphasize the need for preserving and enhancing the qualitites of potential outdoor recreation areas created by water resource projects, for the benefit of present and future generations. Outdoor recreational facilities are provided, subject to requirements of local cooperation.

The Federal Water Project Recreation Act of 1965 (P.L. 89-72) established the development of potential recreational developments at water resource projects as a full project purpose. This Act authorizes land acquisition for the preservation of potential recreation areas. Non-Federal public entities must agree by Letter of Intent to participate in recreational development.

Public Law 89-72 defines the basis for cost-sharing in joint Federal - non-Federal development, enhancement and management of recreation and fish and wildlife resources of Federal water projects. The Federal Government assumes joint costs allocated for recreation to the extent of not more than one half of the separable first costs of construction and recreation activities, including one half of the costs of any project lands required, specifically for recreation. The Corps acquires and retains title to all lands and facilities not leased to non-Federal interests.

b. Potential Agency responsiblity:

The following Federal Agencies have potential responsibility for the sharing of costs for the Valley Preserve/Recreation Plan:

(1) Land and Water Conservation Fund:

The Bureau of Outdoor Recreation (BOR) provides assistance in preparing and maintaining comprehensive Statewide Outdoor Recreation Plans, required by P.L. 88-578 for State participation in the Fund. The Fund provides for the acquisiton of lands for Federally administered parks, wildlife refuges and recreation areas, matching grants for State as well as local land acquisition and development.

(2) Community Development Program:

Title I of the Housing and Community Development Act of 1974, P.L. 93-383, establishes a program of community development grants. Eligible activities include the acquisition of real property, and the construction of public works, facilities, utilities, roads and parks.

(3) National Trails System:

P.L. 90-543 establishes procedures for setting up National recreation and scenic trails. This law applies to all National Scenic Trails so located as to provide a maximum outdoor recreation potential, so established by Acts of Congress. The Corps recognizes that the scenic attractiveness of certain natural areas can be enhanced by the incorporation of trails.

(4) Historic and Archaeological Sites:

Identification, preservation and administration of any such sites included within Corps projects is made in coordination with the State Historical Preservation Officer, the Regional Director of the National Park Service, and the Advisory Council on Historic Preservation, as warranted.

(5) State of Michigan:

As stated in a letter dated 3 May 1977 from the Michigan Department of Natural Resources, the State of Michigan administers Act 231, P.A. 1970, the Natural Rivers Act. The Act is intended to protect selected free-flowing rivers, which still largely possess natural qualities, from land uses and practices which could have an adverse impact on the river. To implement this program, a river management plan is developed by the Michigan Department of Natural Resources, with assistance from local citizens and Government agencies. The plan recommendations will usually include setback requirements, minimum lot sizes, a vegetation strip along the river and so forth, to guide future land uses along the river. These recommendations are then implemented through local zoning ordinances. Failure of local citizens to adopt adequate zoning may mean the State will enact zoning rules for protection of the river.

Presently, the State does not have the necessary funds available for acquisition of lands for a comprehensive valley preserve system. However, royalties from oil and gas drillings within the State will eventually be available and could possibly be used for purchase of lands for recreation and associated purposes under the State's Recreational Trust Fund. One possible source of revenue in addition to the above is that from hunting license fees for use in leasing hunting lands. A copy of the State of Michigan's 3 May 1977 letter is referenced in Appendix E, Letters of Correspondence.

NO-ACTION PLAN

A no-action plan is identical in scope to the Projected "Without" Conditions, detailed previously in this Report.

PLAN SELECTION

To provide a broad basis for the selection of the best possible plan, a number of alternative solutions have been developed for this study. Using these alternatives, the overall formulation process which leads to the final plan consists of a series of trade-offs, so that conflicts are minimized and compatibility is maximized between the technical, economic, environmental and social well-being factors involved. Analysis determines the beneficial and adverse effects of each plan as compared to the projection of future conditions that would exist if the plan were not put into effect.

The social, economic, and environmental factors included within each alternative are interdependent and thus are best evaluated concurrently. To more accurately weigh the positive effects of each plan against the negative consequences, a summary of the key projected trade-offs inherent to each alternative is provided as follows:

a. Channel dredging:

Channel dredging allows for the greatest improvement in the navigational potential of the river, so that the greatest number of shallow-draft craft can make use of it. However, the greatest adverse environmental impacts result from the dredging plan. Fish spawning, benthic floral and faunal habitats, and the waste assimilation capacity of the river are altered.

b. Piling Removal/Limited Dredge:

To date, best estimates reveal that this plan is the most economically feasible alternative. Under this plan, most craft under 49 feet in length could make use of the river. Alterations of the natural environment are less severe than for the channel dredging plan. Larger craft and sailboats would basically be excluded from the use of the river, and some adverse environmental impacts would result from moderate disruptions to the river bottom.

c. Piling Removal:

Minor improvements in the navigational capacity of the river would be provided by elimination of pilings and other boating hazards. Dangerous shoaled conditions of the river bottom would not be accounted for, thus only slight improvements in boater usage would result. Adverse environmental impacts would be minimal.

d. Valley Preserve - Recreation:

Quality of the environment is improved by the preservation of lands adjacent to the study area and by limiting the use of the river to non-motorized craft. Erosion, shoaling, and bottom disruption are kept to a minimum. Additional plans call for a recreational area to be provided adjacent to the preserve. Navigation of the river is limited to the present degree of use, thus, under this plan, utilization of the study area by most motorized craft is inhibited.

e. No action:

Environmental impacts are minimal, though some degradation may occur. Navigation is not extended to most motorized craft, thus severely limiting the use-potential of the river.

A detailed summary of the five alternative plans, their implications, and their potential impacts, is provided in Tables 6-11, System of Accounts.

ECONOMICS OF ALTERNATIVES

Costs and benefits associated with each of the five alternatives will be compared to determine the optimum plan from an economic standpoint. For complete evaluation, the following tables display the initial costs, annual charges, benefits and economic justification for the Grand River study plans.

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
A. PLAN DESCRIPTION					
1. Area	Area of 22.5 mile reach of the Grand River from Bass River to Grand Rapids.	Area between Grandville and Eastmanville, with dredging to Grand Rapids.	Area of 22.5 mile reach of the Grand River from Bass River to Grand Rapids.	Area of 22.5 mile reach of the Grand River from Bass River to Grand Rapids.	Area of 22.5 mile reach of the Grand River from Bass River to Grand Rapids.
2. Structures	None	None	None	Nature Centers, (gravel) paved parking lots, launching ramps.	None
3. Dredging	22 total miles - 100 feet wide, 7 feet deep channel.	400,000 c.y. - 50 feet wide, 5 feet deep channel.	None	None	None
4. Land Use	Same as Alternative 2	22 acres dredging material disposal site at Grandville. 5 acres dredging material disposal site at Eastmanville.	None	10' to 50' from shoreline, both sides.	No change

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
B. SIGNIFICANT IMPACTS					
1. Social Effects					
a. Community Cohesion*	No Change	Same as Alternative 1	Same as Alternative 1	Maintain and enhance community stability.	No change
b. Community Growth*	Increase recreational growth and related service activities.	Some increase in recreational use. No community growth foreseen.	No change	Same as Alternative 1	No change
c. Displacement of people	None	None	None	None	None
d. Noise*	Temporary construction noise. Increased level from power boats.	Temporary construction noise. Increased level from power boats.	Temporary construction noise.	Same as Alternative 1	No change
e. Recreational	Allows for sizable increase in power craft.	Limited growth of boating activities.	No change	A substantial increase in land recreation. No change for boating activities.	No change

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
f. Public Safety	Improved for boating related activities.	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Continued semi-hazardous due to obstructions.
*g. Aesthetic Values	Possible requirement of a confined dredge disposal facility.	Same as Alternative 1	No change	Improved	No change
h. Transportation	Nominal increase in boat traffic.	Same as Alternative 1	No change	Minor increase in land traffic; nominal water traffic increase.	No change
i. Education Opportunities	No change	No change	No change	Nature Study opportunities enhanced.	No change
j. Leisure Opportunities (recreation, active and passive)	Recreational boating increase	Same as Alternative 1	No change	Significant increase	No change
*k. (Desirable) Community Growth	No change	No change	No change	No change	No change

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
2. Economic Effects					
a. Regional Growth*	Improves growth potential.	Same as Alternative 1	No change	Same as Alternative 1	No change
b. Property Values*	No change	No change	No change	Increased because of recreational activities and related development.	No change
c. Tax Revenue*	Increased boating would generate additional tax revenues	Same as Alternative 1	No change	Increased because of higher valuations on improved properties.	No change
d. Public Facilities and Services	Increased usage of water, roadway and sanitary facilities.	Same as Alternative 1	No change	Same as Alternative 1	No change
e. Private Facilities and Services	Limited increase along river corridor.	Same as Alternative 1	No change	Possible adverse effects.	No change
f. Employment/ Labor Force*	Increase anticipated in retail and service oriented jobs.	No change	No change	Same as Alternative 1	No change

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
g. Business and Industrial Activity*	Anticipated growth in service-oriented activities.	Same as Alternative 1	Same as Alternative 1	Limited activity	Continued normal activity.
h. Lease Income	Increased with development of docking facilities.	Same as Alternative 1	Same as Alternative 1	Increase with development of land.	Continued normal activity.
i. Commercial Revenue	Increased minimally from additional boat sales and servicing.	Same as Alternative 1	No change	Increased same as Alternative 1 plus recreational services income.	No change
j. Displacement of Farms	No effect	No effect	No effect	No effect	No effect
3. Environmental Effects					
a. Natural Resources*	River bottom would be disturbed by dredging and pile removal. Dredging of contaminated sediments could re-release polluted materials.	Same as Alternative 1	River bottom may be temporarily disturbed.	Minor impact on vegetation and natural land habitats due to recreational development. Long term preservation benefit.	No change

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
b. Man-made Resources*	No change	No change	No change	No major impact anticipated after construction complete.	No change
c. Air quality*	No change	Same as Alternative 1	No change	No significant adverse impact.	No change
d. Water Quality	Temporary turbidity during removal of piling and dredging. Possible pollutant release. Increased turbidity due to more traffic of larger boats.	Same as Alternative 1	Temporary turbidity during construction.	No change	No change
e. Aquatic Habitat	Adverse impact on fish from removal of potential shelter and food structures. Benthic and plant organisms would be removed with dredging. Possible re-release of contaminated dredged material.	Same as Alternative 1	Same as Alternative 1, but without dredging.	No change	No change

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
f. Terrestrial Habitat	Limited adverse effect.	Same as Alternative 1	No change	Adverse effect due to recreational contact with natural community areas.	No change
g. Noise	Temporary construction noise. Minimal long term increase in noise due to additional boats. Neither is expected to significantly disrupt routine activities of the area.	Same as Alternative 1.	No change after temporary construction.	Increased due to use of area for camping and nature trails.	No change
C. PLAN EVALUATION					
1. Contribution to Planning Objectives					
a. Enhance National Economic Development (NED)	No	Yes	Yes	Yes	No
b. Reduce Boat Damage	Yes	Yes	Yes	No	No

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
c. Enhance Sport Fishing	Yes	Yes	Yes	Yes	No
d. Encourage Investment in Boats	Yes	Yes	No	No	No
2. Relationship to National Economic Development Costs					
a. Federal First Cost	$4,353,300	$ 812,800	$107,150	$ 972,200	0
Non-Federal First Cost	$5,163,000	$1,590,100	$107,150	$5,522,200	0
Total First Cost	$9,516,300	$2,402,900	$214,300	$6,494,400	0
b. Federal Annual Cost	$ 435,600	$ 131,100	$ 7,400	$ 67,100	0
Non-Federal Annual Cost	$ 356,500	$ 109,800	$ 7,400	$ 791,500	0

TABLE 6 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 1 of WRC Principles and Standards)

SUMMARY COMPARISON OF ALTERNATIVE PLANS

Description	Alternative 1 Channel Dredging Plan	Alternative 2 (Limited Dredge) Pile Removal Plan	Alternative 3 Pile Removal	Alternative 4 Valley Preserve Recreation Plan	Alternative 5 No Action Plan
Total Annual Cost	$ 792,100	$ 240,900	$ 14,800	$ 858,600	0
c. Benefits					
Recreational Boating (Annual)	$ 331,800	$ 313,400	0	$ 946,400	0
Boat Damage (Annual)	Not determined	Not determined	Not determined	0	0
Fishing Benefits (Annual)	Not determined	Not determined	Not determined	Not determined	0
Redevelopment (Annual)	$ 113,500	$ 28,500		$ 23,200	
Total Benefits (Annual)	$ 445,300	$ 341,900	Not quantified	$ 969,600	0
Net Annual Benefit	-$ 346,800	$ 101,000	Not quantified	$ 111,300	0
Benefit/Cost Ratio	0.56	1.42	Not quantified	1.13	--

Note: * Indicates impacts specified in Section 122 of P.L. 91-611.

TABLE 7 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 1 - CHANNEL DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating (annual)	$331,800			
Boat Damage Reduction (annual)	0			
Land Enhancement (annual)	0			
Fishing Benefits (annual)	0			
Total NED Benefits	1] $445,300			
b. Adverse:				
Project Costs (annual)			$792,100	
Total NED Costs (annual)			$792,100	
2. ENVIRONMENTAL QUALITY				
a. Enhanced:				
Man-made Resources*	No effect	Same as study area		
Aquatic Habitat	No enhancement	Same as study area		
Terrestrial Habitat	Possible re-vegetation of gravel pit disposal area			
b. Degraded:				
Natural Resources*	No significant impact	Same as study area		

1] Includes redevelopment benefits.

TABLE 7 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 1 - CHANNEL DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
Water Quality	Degradation during dredging, possible release of contaminated sediments. Boating increase would cause minor amount of water degradation.	Same as study area		
Air Quality	Insignificant degradation from construction equipment and boaters.	Not significant		
Noise	Increased noise during construction and from boaters.	Not significant		
Aquatic Habitat (benthic)	Destruction of bottom dwelling organisms.	Not significant		
Terrestrial Habitat	Possible adverse impact at the disposal site(s).	Not significant		
SOCIAL WELL-BEING				
a. Beneficial: Desirable Community Growth*	Increase	Insignificant		

TABLE 7 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 1 - CHANNEL DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
Community Cohesion*	Increase			
Recreational	Increased opportunities.	Same as study area		
Aesthetics	Potential for land reclamation at gravel pit.	Same as study area		
Water-based Traffic	Increase	Same as study area		
Sport Fishing	Increased	Same as study area		
Public Safety	Increased due to removal of obstructions in river.	Same as study area		
b. Adverse:				
Land-based Traffic	Increased due to recreational boater traffic	Same as study area		
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	Increased-no estimate	No effect		
Value of Increased Employment	Increased-no estimate	No effect		

TABLE 7 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 1 - CHANNEL DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
b. Adverse:				
Value of Income Lost	No loss expected	No loss expected		
Quantity of Jobs Lost	No loss expected	No loss expected		
Undesirable Growth	No	No		

TABLE 8 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS

ALTERNATIVE 2 - PILE REMOVAL/LIMITED DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating (annual)	$313,400			
Boat Damage Reduction (annual)	0			
Land Enhancement (annual)	0			
Fishing Benefits (annual)	0			
Total NED Benefits	1] $341,900			
b. Adverse:				
Project Costs (annual)			$240,900	
Total NED Costs (annual)			$240,900	
2. ENVIRONMENTAL QUALITY				
a. Enhanced:				
Man-made Resources*	No effect	Same as study area		
Aquatic Habitat	No enhancement	Same as study area		
Terrestrial Habitat	Possible improvement at dredge disposal site(s).	Same as study area		

1] Includes redevelopment benefits.

TABLE 8 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 2 - PILE REMOVAL/LIMITED
DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
3. SOCIAL WELL-BEING				
a. Beneficial:				
Desirable Community Growth	Increase	Insignificant		
Community Cohesion*	Increase	Insignificant		
Recreational	Increase in recreational opportunities.	Same as study area		
Aesthetics	Minor visual impact from pile removal.	Insignificant		
Water-based Traffic	Increase	Same as study area		
Sport Fishing	Increase	Same as study area		
Public Safety	Increase in public safety due to removal of obstruction	Same as study area		
b. Adverse:				
Land-based Traffic	Increase due to recreational boater traffic	Same as study area		

TABLE 8 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 2 - PILE REMOVAL/LIMITED
DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	Increased-no estimate	No effect		
Value of Increased Employment	Increased-no estimate	No effect		
b. Adverse:				
Value of Income Lost	No loss expected	No loss expected		
Quantity of Jobs Lost	No loss expected	No loss expected		
Undesirable Growth	No	No		

1] Redevelopment benefits.

TABLE 9 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 3 - PILE REMOVAL

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
1. NATIONAL ECONOMIC DEVELOPMENT				
a. Beneficial:				
Recreational Boating (annual)	Not applicable for this alternative			
Boat Damage Reduction (annual)	"			
Land Enhancement (annual)	"			
Fishing Benefits (annual)	"			
Total NED benefits				
b. Adverse:				
Project Costs (annual)			$14,800	
Total NED Costs (annual)			$14,800	
2. ENVIRONMENTAL QUALITY				
a. Enhanced: Man-made Resources*	No enhancement	Same as study area	-	

TABLE 9 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 3 - PILE REMOVAL

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
Aquatic Habitat	No enhancement	Same as study area		
Terrestrial Habitat	No enhancement	Same as study area		
b. Degraded:				
Natural Resources*	Loss of fish habitat	Insignificant	-	
Water Quality	Minor degradation during removal operation.	Insignificant		
Air	"	Insignificant		
Noise	"	Insignificant		
Aquatic Habitat (benthic)	Adverse impacts on organisms associated with the pilings.	Insignificant		
Terrestrial Habitat	No impact.	No impact		
3. SOCIAL WELL-BEING				
a. Beneficial:				
Recreational	Limited increase.	Insignificant	-	
Aesthetics	Visual impact when piles are removed	Insignificant	-	
		Insignificant	-	

TABLE 9 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 3 - PILE REMOVAL

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
Water-based Traffic	Nominal increase	Insignificant	-	
Sport Fishing	Nominal increase	Insignificant	-	
Public Safety	Increased due to removal of pilings.	Insignificant	-	
b. Adverse:				
Land-based Traffic	Insignificant increase.	Insignificant	-	
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	Not analyzed			
Value of Increased Employment	Not analyzed			
b. Adverse:				
Value of Income Lost	Not analyzed			
Quantity of Jobs Lost	Not analyzed			
Undesirable Growth	Not analyzed			

TABLE 10 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 4 - VALLEY PRESERVE
RECREATION PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation
1. NATIONAL ECONOMIC DEVELOPMENT			
a. Beneficial:			
Recreational Boating (annual)	0		
Boat Damage Reduction (annual)	0		
Land Enhancement (annual)	0		
Fishing Benefits (annual)	0		
General Recreation (annual)	$946,400		
Total NED Benefits	1] $969,900		
b. Adverse:			
Project Costs (annual)			$858,600
Total NED Costs (annual)			$858,600
2. ENVIRONMENTAL QUALITY			
a. Enhanced:			
Man-made Resources	No significant change	Same as study area	
Aquatic Habitat Developed	No change	Same as study area	
Terrestrial Habitat Developed	Terrestrial habitat would be preserved	Same as study area	

1] Includes redevelopment benefits.

TABLE 8 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 2 - PILE REMOVAL/LIMITED
DREDGING PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
b. Degraded:				
Natural Resources*	Fish habitat would be lost by removing the piling.	Same as study area		
Water Quality	Degradation during construction, possible release of contaminents during dredging. Increased boat would have a minor impact on water quality.	Same as study area		
Air Quality	Insignificant degradation during construction and boating.	Not significant		
Noise	Increased noise during construction and from increased boating.	Not significant		
Aquatic Habitat (benthic)	Some destruction of aquatic organisms	Not significant		
Terrestrial Habitat	Possible adverse impacts at disposal site(s)	Not significant		

TABLE 10 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 4 - VALLEY PRESERVE
RECREATION PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
b. Degraded:				
Natural Resources*	Minor amount of degradation from recreational development and public use.	Same as study area		
Water Quality	No change	Same as study area		
Air Quality	No change	Same as study area		
Noise	No significant effect	Same as study area		
Aquatic Habitat (benthic)	No change	Same as study area		
Terrestrial Habitat	Minor amount of degradation from recreational development and public use.	Same as study area		
3. SOCIAL WELL-BEING				
a. Beneficial:				
Desirable Community Growth*	No significant impact	Increase		
Community Cohesion*	Enhance community cohesion	Increase		
Recreational	Increase in recreational activities and opportunities.	Increase		

TABLE 10 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 4 - VALLEY PRESERVE
RECREATION PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
Aesthetics	Increase in visual effects with valley preserve	Increase		
Water-based Traffic	Nominal increase in water-based traffic	Increase		
Sport Fishing	Potential increase	Increase		
b. Adverse:				
Land-based Traffic	Increase	Increase		
Noise	Increase due to use of area by people	Increase		
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	Increased-no estimate	No effect		
Value of Increased Employment	Increased-no estimate	No effect		
b. Adverse:				
Value of Income Lost	No loss expected	No loss expected		
Quantity of Jobs Lost	No loss expected	No loss expected		
Undesirable Growth	No	No		

TABLE 11 SYSTEM OF ACCOUNTS

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 5 - NO ACTION PLAN

Impact Accounts	LOCATION OF IMPACTS		
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation
1. NATIONAL ECONOMIC DEVELOPMENT			
a. Beneficial:			
Recreational Boating (annual)	0	0	0
Boat Damage Reduction (annual)	0	0	0
Land Enhancement (annual)	0	0	0
Fishing Benefits (annual)	0	0	0
Total NED Benefits	0	0	0
b. Adverse:			
Project Costs (annual)			
Total NED Costs	0	0	0
2. ENVIRONMENTAL QUALITY			
a. Enhanced:			
Man-made Resources*	No change	No change	No change
Aquatic Habitat Developed.	No change	No change	No change
Terrestrial Habitat Developed	No change	No change	No change

TABLE 11 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 5 - NO ACTION PLAN

Impact Accounts	LOCATION OF IMPACTS: Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation
b. Degraded:			
Natural Resources*	None	None	None
Water Quality	None	None	None
Air Quality	None	None	None
Turbidity	None	None	None
Noise	None	None	None
Aquatic Habitat (benthic)	None	None	None
Terrestrial Habitat	None	None	None
3. SOCIAL WELL-BEING			
a. Benefical:			
Desirable Community Growth*	No significant effect	No significant effect	No significant effect
Community Cohesion*	"	"	"
Recreational	"	"	"
Aesthetics	"	"	"
Water-based Traffic	"	"	"
Sport Fishing	"	"	"
b. Adverse:			
Public Safety	Continued water safety hazard due to obsturctions	"	"

TABLE 11 SYSTEM OF ACCOUNTS (Con't)

(Consistent with requirements for Table 2 of WRC Principles and Standards)

BENEFICIAL AND ADVERSE EFFECTS
ALTERNATIVE 5 - NO ACTION PLAN

Impact Accounts	LOCATION OF IMPACTS			
	Within the Grand River Study Area	Within the West Michigan Area	Within the Rest of Nation	
4. REGIONAL DEVELOPMENT				
a. Beneficial:				
Value of Increased Income	None	None	None	
Value of Increased Employment	None	None	None	
b. Adverse:				
Value of Income Lost	None	None	None	
Quantity of Jobs Lost	None	None	None	
Undesirable Growth	None	None	None	

Initial Costs

The estimated first costs for alternative recreational and navigational plans are summarized in Table 12. The estimated costs for each plan is based on September 1977 prices.

TABLE 12
ESTIMATED FIRST COSTS

Alternative	Total Cost	Federal Cost	Non-Federal Cost
Channel Dredging	$9,516,300	$4,353,300	$5,163,000
Pile Removal/Limited Dredging	2,402,900	812,800	1,590,100
Pile Removal	214,300	107,150	107,150
Valley Preserve Recreation	6,494,400	972,200	5,522,200

Annual Charges

In order to provide a basis for comparision of the construction cost of each plan alternative with the annual benefits expected to be derived, it is necessary to evaluate the annual charges for each alternative. The annual charges, as shown in Table 13 have been computed at an interest rate of 6-5/8 percent based on an estimated project life of 50 years.

TABLE 13
AVERAGE ANNUAL CHARGES

	ALTERNATIVE			
ANNUAL CHARGES	CHANNEL DREDGING	PILE REMOVAL/ LTD. DREDGING	PILE REMOVAL	VALLEY PRESERVE REC.
(Total First Cost)	$9,516,300	$2,402,900	$214,300	$6,494,400
Interest & Amort.	657,100	165,900	14,800	448,400
Oper. & Maintenance	135,000	75,000	-	410,200
TOTAL ANNUAL COST	$ 792,100	$ 240,900	$ 14,800	$ 858,600

Benefits

It is expected that modifications in the navigational capacity of the Grand River would result in increased usage of the river for recreational purposes. To accurately assess the river's potential capacity for recreational boating, a data collection form has been drafted and is scheduled to be sent to the public in 1978, providing that approval is obtained from the Office of Management and Budget. Until complete data regarding potential recreational boat usage of the river is obtained, it is difficult to provide a precise assessment of the potential benefits resulting from implementation of the plan alternatives. An estimate of probable benefits, determined from extrapolations of existing data, is provided in Table 14.

TABLE 14
AVERAGE ANNUAL BENEFITS

	ALTERNATIVE		
BENEFITS	CHANNEL DREDGING	PILE REMOVAL/ LTD. DREDGING	VALLEY PRESERVE REC.
Recreation	$331,800	$313,400	$946,400
Redevelopment	113,500	28,500	23,200
TOTAL ANNUAL BENEFITS	$445,300	$341,900	$969,900

1] Benefits are not displayed for the PILE REMOVAL alternative since the plan could not satisfy the recreational navigation needs or the general recreational needs of the study area.

Economic Justification

The benefit/cost (B/C) ratio for each alternative plan is shown in Table 15. A B/C ratio greater than 1.0 justifies consideration of the proposed plan of improvement as meeting minimum economic criteria.

TABLE 15
BENEFIT-COST RATIO COMPARISON

	ALTERNATIVE		
	CHANNEL DREDGING	PILE REMOVAL/ LTD. DREDGING	VALLEY PRESERVE REC.
ANNUAL BENEFITS	$445,300	$341,900	$969,900
ANNUAL COSTS	$792,100	$240,900	$858,600
B/C RATIO	0.56	1.42	1.13

DESIGNATION OF THE NED AND EQ PLANS

Evaluations of the project objectives, analyzed with respect to the benefits vs. costs of each alternative plan, result in the eventual selection of the plan which best meets the needs of the area under investigation. The Principles and Standards of the Water Resources Council require that a national economic development (NED) plan and an environmental quality (EQ) plan be identified. The NED Plan satisfies the planning objectives from the standpoint of maximizing the net economic benefits. The EQ Plan meets the planning objectives to the extent that the environmental quality of the Grand River study section is maximized by preserving, maintaining, restoring, or enhancing the significant environmental attributes of the area, with minimal regard to costs incurred. To date, based on information that is available, economic analysis has indicated that the following is most likely candidate for the designations of an NED Plan and EQ Plan:

NED Candidate Plan:

Implementation of the Valley Preserve Recreation Plan, Alternative 4, is the plan which maximizes net economic benefits. This alternative provides for net economic benefits of $111,300. The Pile Removal/ Limited Dredging Plan was close to Alternative 4 with net economic benefits of $101,000. Accordingly, the Valley Preserve Recreation Plan is considered to be the NED plan based upon preliminary studies conducted to date.

EQ Candidate Plan:

The Valley Preserve Recreational Plan, Alternative 4, would call for the purchase of 1,300 acres of land in strips extending up to 50 feet from both banks of the Grand River. Approximately 265 acres of this land would be maintained in essentially its natural condition, with provisions made for bike/hike and nature trails. A "node" of land adjacent to the Valley Preserve could be purchased for development into 1035 acres of recreational area. Playgrounds, hunting areas, picnic sites, camping areas, and a winter activity area with toboggan slopes would be provided within the "node". Navigation would be limited only to that which can currently be accomplished in the study section of the Grand River, chiefly non-motorized craft such as canoes and rowboats. The cost of this alternative is estimated at $7,000,000, with a benefit/cost ratio of 1.13.

FUTURE STUDIES

This report on study progress to date will be distributed to all study participants and interested Federal, State and local agencies, groups and individuals. Comments and inputs received through letters and meetings will be incorporated into the project planning, where appropriate. Such input will be used to supplement, modify and direct future study effort to insure the selection of a plan which best meets the needs of the Grand River study region.

Based upon the study results and public input to date, the following studies are planned to further evaluate the alternatives under consideration.

a. Engineering Studies:

(1) Field Surveys:

Cross-sectional information will need to be obtained as an addition to existing data. The cross-sections would be used to supplement hydraulic studies and cost estimates for training wall removal and/or dredging quantities. The supplemental cross-sections would be taken between the Bass River and Lamont. A reconnaissance will also be made to pinpoint the location of wingwalls and pilings that would require removal if such an alternative was subsequently recommended as the plan of improvement to pursue. Verification of mapped topography at potential disposal sites would be made to insure that capacity would be available for disposed of dredged material, if needed. These studies would be conducted at an estimated cost of $8,000.

(2) Soils:

Soil borings within the study reach would be required for any structural solution being considered. Alternatives involving dredging and/or piling removal require soil borings to properly evaluate the engineering feasibility of modifying the river bottom. It is anticipated that 10 borings would be necessary to evaluate the alternatives under consideration. Most of the borings would be obtained in Spring 1978 and supplemented, where needed, with additional borings in 1979. Estimated cost for borings, testing and overview is $17,000.

Hydraulic analysis will be made to determine the effects that would occur due to modifications of the existing river configuration from alternative plan recommendations. A prediction of the scour and deposition process along the river would be made. The hydraulic

analysis would be used to determine if wingwalls are needed to maintain adequate "low flow" stages. River hydraulics will also address the effects that disposal site locations have on upstream river stages. The hydraulic analysis and subsequent design of alternative plans leading to the selection of the most acceptable solution is estimated at $12,000.

b. Economic Studies:

It is essential that a reliable estimate be made of potential benefits to be derived from alternative plans which are selected for further consideration during Stage 3 Planning. Accordingly, a sampling survey will be conducted from boaters within Ottawa and Kent Counties to derive benefits that would be expected from use of the Grand River study area by locally-based craft within the two-county area. Prior to transmission of the sampling form, approval of its use must be received from the Office of Management and Budget (OMB). Data necessary to evaluate other recreational opportunities within the study area will also be obtained. Considerations of a valley preserve-recreation area plan will be based upon an analysis of recreational-user days. The total economic analysis for Stage 3 will reflect refined cost estimates and benefit determinations. This work will be conducted by the Detroit District at an estimated cost of $9,000. The Detroit District plans to transmit a sampling survey to area boaters in 1978, if approval is received from OMB, with major economic input to be completed prior to the public meeting scheduled for January 1979.

c. Fish and Wildlife Service Coordination:

Coordination with the Fish and Wildlife Service is maintained throughout the study by forwarding copies of all reports, notices, meeting minutes and other information sheets from the Detroit District. Input

provided during each phase of study is incorporated into the Corps reports. Funds in the amount of $6,000 will be provided in Fiscal Year for the Service to prepare their assessment of potential impacts on fish and wildlife from the alternatives under consideration.

d. Multidiscipline Studies:

In order to define in detail the potential impacts which could result from alternatives to be considered further so that an adequate evaluation can be made, numerous studies will be undertaken. Where possible, attempts will be made to meet State water quality standards when considering the design of potential projects. A comparison between existing water quality conditions, State water quality standards and projected conditions under alternative plans will be presented. Sampling data of the river study section will be obtained in Stage 3 Planning to determine present water quality conditions. Concern has been voiced throughout the study that high concentrations of heavy metals which presently lie stable in bottom sediments may be re-released into the river system as a result of dredging and/or removal activites, thus having significant adverse impacts on the aquatic flora and fauna.

Sediment samplings will also be obtained and analyzed to determine if all, or part, of the river under investigation is classified as polluted. The extent of polluted material will be considered as the basis for determining the size of containment sites, for alternatives that would require dredging.

A cultural resource survey will be conducted if the Michigan State Preservation Officer determines that existing data is insufficient. The construction zones would be of major concern.

Additional studies will also be made to develop recreation areas as part of the valley preserve-recreation concept. Social, cultural, biological and archaeological data will be summarized in the Stage 3 outputs. The estimated cost for the multidiscipline studies and associated planning effort is $48,000.

e. Planning and Public Contact:

Future planning efforts include continued coordination, public meetings and workshop preparation, review and incorporation of comments, report preparation and associated tasks. The estimated costs are $31,000.

f. Study Management:

Study management involves supervision and administration of the work items, reproduction, financial overview and related tasks at an estimated cost of $59,000.

RECOMMENDATION

The Grand River study encompasses a complex intermix of navigational, recreational, and environmental concerns. These competing interests must be reconciled in order to develop a plan which is mutually satisfactory to all parties involved. The plans presented in this report demonstrate multi-objective planning efforts by participating public interests. All plans appear to demonstrate sufficient merit to permit further study in Stage 3 Planning. It is, therefore, recommended that detailed studies be conducted to further evaluate the feasibility of these modifications with a view towards determining the best overall plan to meet the needs of the area.

PROPOSED LOCAL COOPERATION

The distribution of first cost between Federal and non-Federal interests is based on the relationship between general and local benefits to be derived from the improvement. The equitable non-Federal share in the first cost of the general navigation facilities is a cash contribution equal to 50 percent of the estimated first cost of the channel works. The first cost for dike disposal facilities is a non-Federal obligation. The equitable non-Federal share in the first cost of the recreational land-based facilities is also a cash contribution equal to 50 percent of the estimated first cost of the additional facilities necessary for that purpose.

Prior to construction of facilities associated with recreational boating, local interests would be required to give assurances satisfactory to the Secretary of the Army that they will:

a. Contribute in cash 50 percent of the first cost of construction of the general navigation facilities, to be paid in a lump-sum prior to initiation of construction;

b. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of dredged material and any necessary retaining dikes, bulkheads, and embankments therefor or the cost of such retaining works;

c. Hold and save the United States free from damages that may result from the construction works, and maintenance of the project, except for damages due to the fault or negligence of the United States or its Contractors;

d. Establish a competent and properly constituted public body empowered to cooperate financially and regulate the use, growth, and free development of the navigational facilities with the understanding that said facilities will be open to all on equal terms;

e. Provide and maintain without cost to the United States an adequate public landing or wharf with provisions for the sale of motor fuel, lubricants, and potable water, available to all on equal terms;

f. Accomplish, without cost to the United States such alterations as are required to submarine utility crossings;

g. Establish regulations prohibiting discharge of pollutants into the waters by users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control; and

h. In acquiring lands, easements and rights-of-way for construction and subsequent maintenance of the project, local interests will comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970; Public Law 91-646, approved 2 January 1971.

In plans of improvement which include provisions for recreation-oriented facilities as well as facilities associated with boating, the required local cooperation would be in accordance with current Federal policy. It is specified that no Federal recreation construction shall be commenced until responsible local agencies have given satisfactory assurances to the Secretary of the Army that they will, without cost to the United States:

a. Provide without cost to the United States all additional lands, easements and rights-of-way needed in connection with the recreation development including adequate access for the public.

b. Where the appraised value of the land provided under a, above, amounts to less than 50 percent of the total first cost of the recreational development, make additional contributions sufficient to bring the non-Federal share to at least that level; which additional contribution may consist of the actual cost of carrying out an agreed-upon portion of the development, or a cash contribution, or a combination of both.

c. Operate and maintain for the life of the Federal project the recreational area and all facilities installed pursuant to the agreement.

d. Assure access to all on equal terms.

An Attorney's Certificate covering the pertinent conditions in Section 221 of Public Law 91-611 shall be attached to the above items of local cooperation. The provisions of Section 221, Public Law 91-611 are as follows:

a. After the date of enactment of this Act, the construction of any water resource project by the Secretary of the Army, acting through the Chief of Engineers, or by a non-Federal interest where such interest will be reimbursed for such construction under the provisions of Section 215 of the Flood Control Act of 1968 or under any other provisions of law, shall not be commenced until each non-Federal interest has entered into a written agreement with the Secretary of the Army to furnish its required cooperation for the project.

b. A non-Federal interest shall be a legally constituted public body with full authority and capability to perform the terms of its agreement and to pay damages, if necessary, in the event of failure to perform and to deal with private corporations or companies and be responsible for their performance.

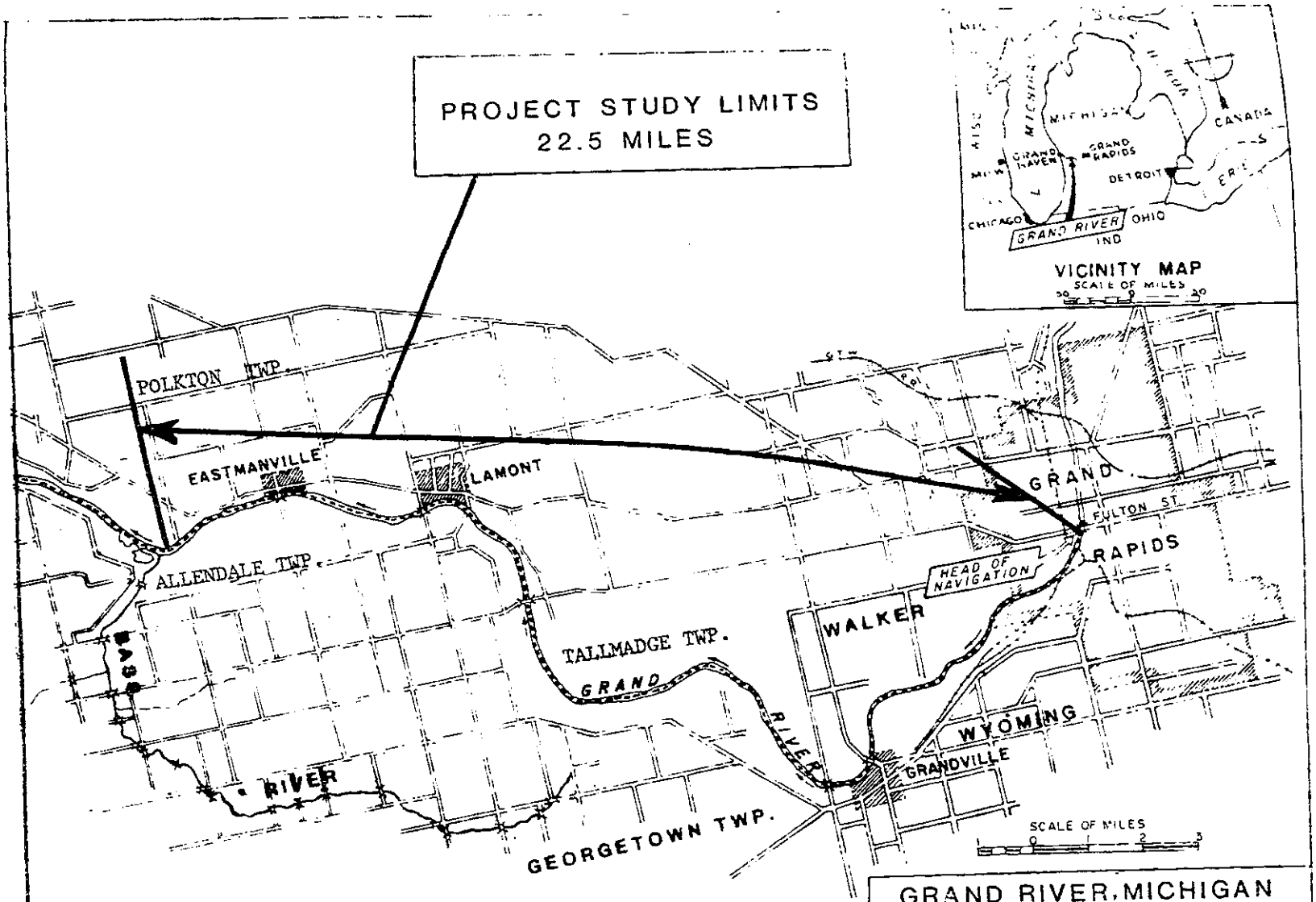
c. Every agreement entered into pursuant to this section shall be enforceable in the appropriate district court of the United States.

d. After commencement of construction of a project, the Chief of Engineers may undertake performance of those items of cooperation necessary to the functioning of the project for its purposes, if he has first notified the non-Federal interest of its failure to perform the terms of its agreement and has given such interest a reasonable time after such notification to so perform.

e. The Secretary of the Army, acting through the Chief of Engineers, shall maintain a continuing inventory of agreements and the status of their performance, and shall report thereon annually to the Congress.

f. This section shall not apply to any project the construction of which was commenced before January 1, 1975.

MELVYN D. REMUS
Colonel, Corps of Engineers
District Engineer



NOTE:

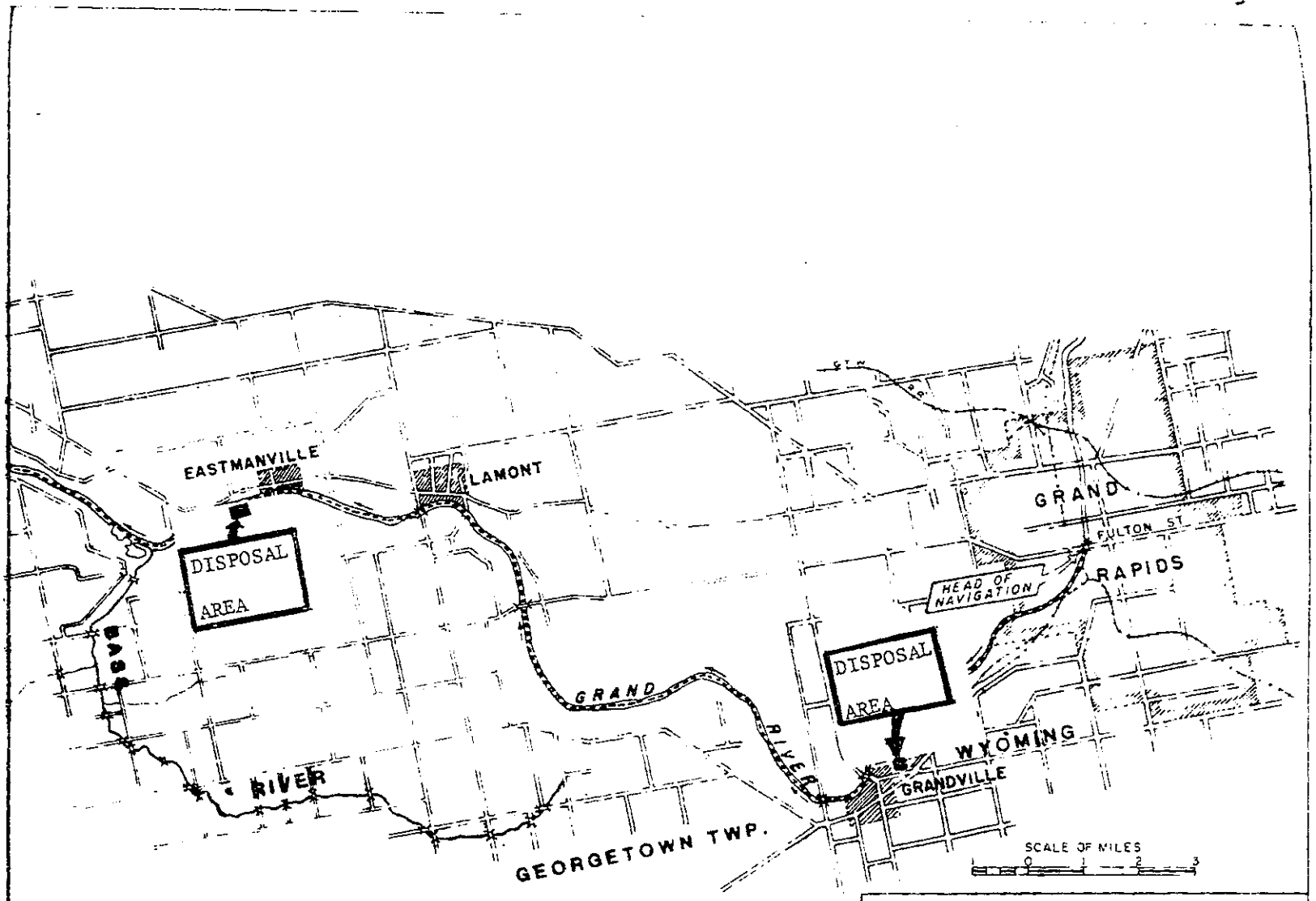
EXISTING PROJECT DOWNSTREAM FROM STUDY LIMITS PROVIDES FOR 8-FOOT CONTROLLING DEPTH FOR 14.5 MILES TO THE DEEP DRAFT CHANNEL IN GRAND HAVEN, MICHIGAN.

SEE PLATE I FOR CHANNEL LOCATION DOWNSTREAM OF BASS RIVER.

GRAND RIVER, MICHIGAN
SHALLOW-DRAFT NAVIGATION REACH
UNDER CONSIDERATION

U.S. ARMY ENGINEER DISTRICT, DETROIT

PLATE 2



GRAND RIVER, MICHIGAN SHALLOW-DRAFT NAVIGATION

PROPOSED DISPOSAL AREAS

U. S. ARMY ENGINEER DISTRICT, DETROIT

PLATE 4

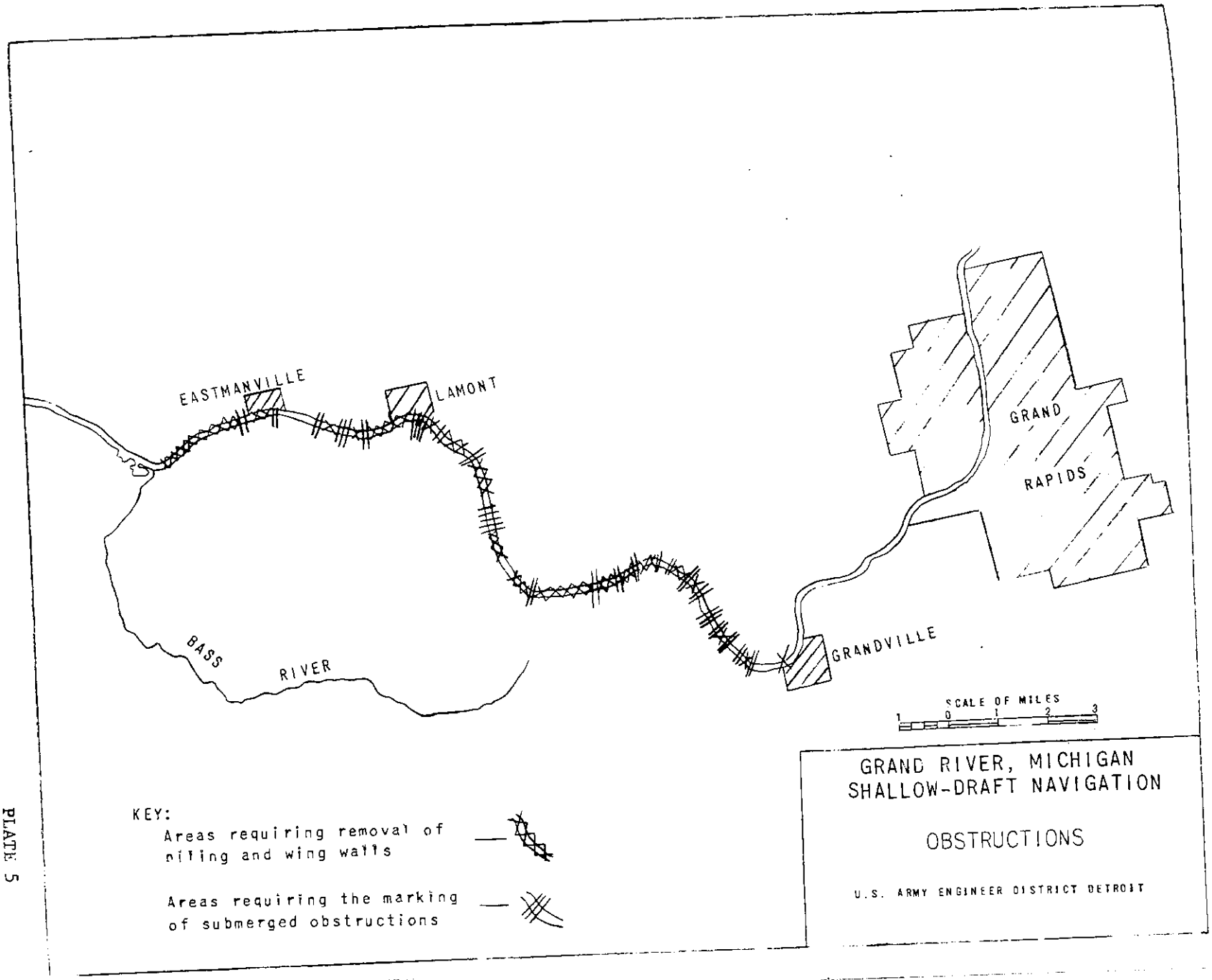

EASTMANVILLE
LAMONT
GRAND
RAPIDS
BASS
RIVER
GRANDVILLE
SCALE OF MILES
1 0 1 2 3
KEY:
Areas requiring removal of piling and wing walls
Areas requiring the marking of submerged obstructions
GRAND RIVER, MICHIGAN
SHALLOW-DRAFT NAVIGATION
OBSTRUCTIONS
U.S. ARMY ENGINEER DISTRICT DETROIT

PLATE 5

ENGINEERING STUDIES

GENERAL

1. Engineering studies will continue to be conducted by Detroit District personnel on each alternative solution or measure which addresses the study objectives. These studies are for the purpose of evaluating the engineering feasibility and physical impacts of the measure and estimating the cost of implementing the measure.

2. Initially, the studies utilized existing engineering information for the evaluations. This preliminary evaluation has eliminated some alternatives but, more importantly, it has indicated what additional information, whether field or computational, is required for future evaluations.

3. Engineering studies include the following: foundation analysis to determine the ability of soil to support structural measures, analysis of the stability of existing structures and the possible effects of alternative measures on these structures, soil condition analysis and classification to determine dredging and construction techniques, surveys and mapping to determine quantities of cuts and fills as well as proper structural locations, structural analysis and design, and hydraulic studies to determine the effects of structures and channel modifications.

EXISTING INFORMATION

4. Field surveys have been conducted along the study reach between Lamont and Grand Rapids in conjunction with Flood Plain Information Reports prepared in 1972 and 1974. Between Lamont and the Ottawa-Kent County line, 15 cross sections were obtained in 1972. Upstream

of the county line to Fulton Street, 22 cross sections are recorded from a 1969 field survey. The relative location of the sections is shown on Plates A-1 and A-2. In order to determine the present condition of the river, a sounding-run between Bass River and Grand Rapids was made in October 1976. The October 1976 field investigation also attempted to document the location, size and extent of training walls and other obstructions upstream of Eastmanville. Additional cross sections and field studies will be undertaken in October 1977 to firm up hydraulic studies and cost estimates for training wall removal and/or dredging quantities. The Detroit District would use the computer program HEC-6, "Scour and Deposition in Rivers and Reservoirs," to predict the scour and deposition process that would occur from potential channel modifications following during the Stage 3 Planning Process.

5. Stream flow data dating back to 1901 have been collected by the U. S. Geological Survey for the Grand River at Grand Rapids, Michigan. Results of the data are published by the U. S. Geological Survey in a series of water-supply papers and in their Surface Water Records Booklet for Michigan, published annually.

6. Recent hydrographic surveys on the study reach are limited to those conducted for the Flood Plain Information Reports from Lamont to Grand Rapids. Land topography is available from the U. S. Geological Survey 15-minute and 7-1/2-minute quadrangle maps of the area. These maps are the Nunica (1972), Ravenna (1947), Allendale (1958), Grandville (1958), and Grand Rapids West (1967) quadrangles. A profile of the river bottom based on the Flood Plain Information Reports indicates that Lake Michigan's stage at low water datum (elevation 576.8 feet, International Great Lakes Datum (1955) would extend up the Grand River to mile 38.3, upstream of the Penn Central Railroad Bridge. Past reports indicate that controlling depths between

Eastmanville and Grand Rapids at low water are normally only 2 to 3 feet. During the October 1976 field survey, spot soundings were taken in an attempt to determine the low water depths that could be anticipated, under present channel conditions. This preliminary survey was used for preliminary determinations of dredging requirements for alternative measures requiring these studies.

7. Additional studies that will be warranted following the preparation of a favorable Preliminary Feasibility Report would include Real Estate investigations. These studies are dependent upon alternatives that may be selected for detailed investigation. An alternative that would require dredging and subsequent disposal site location would entail greater effort than a non-structural solution. Accordingly, the extent of real estate services will be defined following preparation of the Preliminary Feasibility Report. Additionally, a water quality study and a bottom sediment study have been planned to supplement plans which call for dredging. These studies, to be conducted in Stage 3 Planning, would determine the potential hazard involved if dredging disturbances would re-release toxic materials, which presently lie stable within bottom sediments, to pollute Grand River waters.

8. Maintenance studies have indicated that semi-annual dredging would be required to maintain the original channel depths for alternative plans which call for dredging. Such maintenance dredging would be continued for 10 years following completion of the project. The studies also indicate the necessity of additional land area at the proposed disposal sites for the additional dredged material. At the Eastmanville site, 10 additional acres of land would be required to contain the semi-annual disposal of 16,000 cubic yards of maintenance dredging material, totaling 80,000 cubic yards over the 10 year period; 34,000 cubic yards of material dredged semi-annually would total 170,000 cubic yards in 10 years for disposal in an additional 10.5 acres of the Grandville site. The above figures are developed for maintenance of the channel to a depth of 5 feet.

ESTIMATE OF PROJECT FIRST COSTS

9. Costs for each alternative plan are displayed on Tables A-1 through A-4. Costs for dredging, construction and disposal were compiled to determine the individual costs for the Channel Dredging, Piling Removal/Limited Dredge, and Piling Removal Alternatives. Table A-4 for the Valley Preserve Recreation Plan was prepared from estimates of costs for the acquisition and purchase of lands and provisions for necessary facilities.

COST ALLOCATION

10. The distribution of first cost betweeen Federal and non-Federal interests is based on the relationship between general and local benefits to be derived from the improvement. The equitable non-Federal share in the first cost of the general navigation facilities is a cash contribution equal to 50 percent of the estimated first cost of the channel works. The first cost for dike disposal facilities is a non-Federal obligation. The equitable non-Federal share in the first cost of the recreational land-based facilities is also a cash contributuion equal to 50 percent of the estimated first cost of the additional facilities necessary for that purpose.

The cost allocation for the various alternatives under consideration is shown in Tables A-5 through A-8.

TABLE A-1

PROJECT FIRST COST - CHANNEL DREDGING PLAN

ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
Dredging	2,000,000	C.Y.	$ 3.00	$6,000,000
Contingencies (25%)				1,500,000
SUB-TOTAL				$7,500,000
Diked Disposal #1 Eastmanville				
Clay	26,700	C.Y.	$ 8.00	$ 213,600
Weir Outlet	1	EA.	20,000.00	20,000
Contingencies (25%)				58,400
SUB-TOTAL				$ 292,000
Diked Disposal #2 Grandville				
Clay	40,000	C.Y.	$ 8.00	$ 320,000
Weir Outlet	1	EA.	20,000.00	20,000
Contingencies (25%)				85,000
SUB-TOTAL				$ 425,000
Sub-total Construction Costs				$8,217,000
Engineering and Design (8%)				657,000
Supervision and Administration (7%)				622,500
Aids to Navigation				19,800
Total Project First Costs				$9,516,300

TABLE A-2

PROJECT FIRST COST - PILE REMOVAL/LIMITED DREDGING PLAN

ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
Dredging	316,500	C.Y.	$ 3.00	$ 949,500
Contingencies (25%)				237,400
SUB-TOTAL				$1,186,900
Diked Disposal				
#1 Eastmanville				
Clay	25,860	C.Y.	$ 8.00	$ 199,000
Weir Outlet	1	EA.	20,000.00	20,000
Contingencies (25%)				54,700
SUB-TOTAL				$ 273,700
Pile Removal				
(1) Floating Plant	70	DAYS	$1,680.00	$ 117,600
(2) Shore Plant	70	DAYS	440.00	30,800
Contingencies (25%)				37,100
SUB-TOTAL				$ 185,500
Diked Disposal				
#2 Grandville				
Clay	39,100	C.Y.	$ 8.00	$ 312,800
Weir Outlet	1	EA.	20,000.00	20,000
Contingencies (25%)				83,200
SUB-TOTAL				$ 416,000
Sub-total Construction Costs				$2,062,100
Engineering and Design (8%)				165,000
Supervision and Administration (7%)				156,000
Aids to Navigation				19,800
Total Project First Costs				$2,402,900

TABLE A-3

PROJECT FIRST COST - PILE REMOVAL

ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
Pile Removal				
(1) Floating Plant	70	DAYS	$1,680.00	$ 117,600
(2) Shore Plant	70	DAYS	440.00	30,800
Contingencies (25%)				37,100
Total Construction Costs				$ 185,500
Engineering and Design (8%)				$ 14,800
Supervision and Administration (7%)				14,000
Total Project First Costs				$ 214,300

TABLE A-4

PROJECT FIRST COST - VALLEY PRESERVE RECREATION PLAN

ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
Access Roads	1,510	SY	$ 4.50	$ 7,300
Parking Lots	580	Space	200.00	116,000
Facilities				
Picnic Tables	240	EA.	100.00	24,000
Playfield Items	-	(Varies)	-	-
Field Games Area	140	Acres	2,500.00	350,000
(1) Playgrounds - 5				
(2) Fields - 135				
Landscaping	3	Acres	1,000.00	3,000
Nature Center	1	Job		150,000
Maintenance Bldg.	1	Job		40,000
Comfort Stations	3	EA.	30,000.00	90,000
(Canoe Rest Areas)				
Canoe Rental Station	1	Job		20,000
Trailer Camp Sites	280	EA.	1,500.00	420,000
Signs				
Small	100	EA.	25.00	2,500
Large	4	EA.	300.00	1,200
Trails	43,400	L.F.	1.20	52,100
Picnic Shelters	10	EA.	7,000.00	70,000
TOTAL FACILITIES				$1,222,800
LAND ACQUISITION	1,300	Acres	3,500.00	$4,550,000
CONSTRUCTION COSTS				
1. Access Roads & Parking Lots				$ 123,300
2. Facilities				$1,222,800
CONSTRUCTION SUB-TOTAL				$1,346,100
3. Contingencies (15%)				$ 336,500
SUB-TOTAL				$1,682,600
4. Engineering & Design (8%)				$ 134,600
5. Supervision & Administration (7%)				$ 127,200
TOTAL CONSTRUCTION COSTS				$1,944,400
Land Acquisition				$4,550,000
TOTAL PROJECT COSTS.....				$6,494,400

TABLE A-5

COST ALLOCATION - CHANNEL DREDGING

ITEM	TOTAL COST	FEDERAL COST	NON-FEDERAL
Dredging	$7,500,000	$3,750,000	$3,750,000
Diked Disposal	717,000	0	717,000
	$8,217,000	$3,750,000	$4,467,000
Engr. & Design (8%)	657,000	300,000	357,000
Supervision & Adm. (7%)	622,500	283,500	339,000
Gross Const. Costs	9,496,500	4,333,500	5,163,000
Aids to Navigation	19,800	19,800	0
TOTAL PROJECT FIRST COSTS	$9,516,300	$4,353,300	$5,163,000

TABLE A-6

COST ALLOCATION - PILE REMOVAL/LIMITED DREDGING

ITEM	TOTAL COST	FEDERAL COST	NON-FEDERAL
Dredging	$1,186,900	$ 593,450	$ 593,450
Diked Disposal Areas 1 & 2	689,750	0	689,750
Pile Removal	185,500	$ 92,750	92,750
	$2,062,150	$ 686,200	$1,375,950
Engr. & Design (8%)	165,000	54,900	110,100
Supvervision & Adm. (7%)	155,950	51,900	104,050
Gross Construction Costs	2,383,100	793,000	1,590,100
Aids to Navigation	19,800	19,800	0
TOTAL PROJECT FIRST COSTS	$2,402,900	$ 812,800	$1,590,100

TABLE A-7

COST ALLOCATION - PILE REMOVAL

ITEM	TOTAL COST	FEDERAL COST	NON-FEDERAL
Pile Removal	$ 185,500	$ 92,750	$ 92,750
Engr & Design (8%)	14,800	7,400	7,400
Supervision & Adm. (7%)	14,000	7,000	7,000
TOTAL PROJECT FIRST COSTS	$ 214,300	$ 107,150	$ 107,150

TABLE A-8

COST ALLOCATION - VALLEY PRESERVE

RECREATION PLAN

ITEM	TOTAL COST	FEDERAL COST	NON-FEDERAL
Land Acquisition	$4,550,000	0	$4,550,000
Construction Costs	1,944,400	$ 972,200	972,200
TOTAL	$6,494,400	$ 972,200	$5,522,200

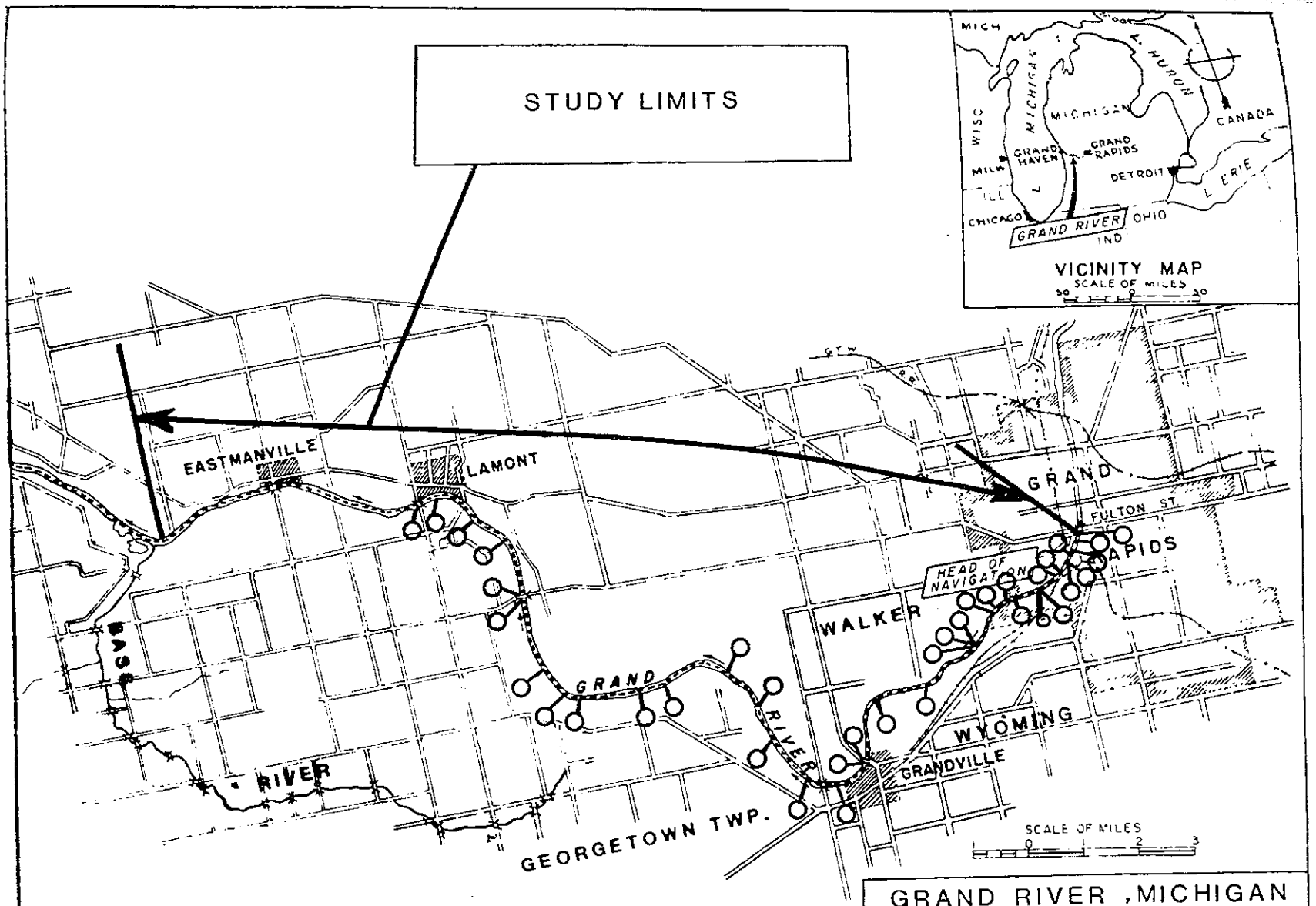
ANNUAL CHARGES

11. In order to determine the annual charges for the various alternatives, the investment cost for each alternative was amortized over a 50-year project life and an interest rate of 6-5/8 percent was applied. Finally, the annual Maintenance Charges were added to determine the resultant annual cost totals. Annual charges for the alternatives are summarized in Table A-9.

TABLE A-9

ANNUAL COST SUMMARY

ANNUAL CHARGES	ALTERNATIVE			
	CHANNEL DREDGING	PILE REMOVAL/ LTD. DREDGING	PILE REMOVAL	VALLEY PRESERVE REC.
(Total First Cost)	$9,516,300	$2,402,900	$214,300	$6,494,400
Interest & Amort.	$ 657,100	$ 165,900	$ 14,800	$ 448,400
Oper. & Maintenance	135,000	75,000	-	410,200
TOTAL ANNUAL COST	$ 792,100	$ 240,900	$ 14,800	$ 858,600



NOTE:

INDICATES CROSS SECTION LOCATION.

GRAND RIVER, MICHIGAN
SHALLOW-DRAFT NAVIGATION
EXISTING CHANNEL
CROSS SECTIONS

U. S. ARMY ENGINEER DISTRICT, DETROIT

PLATE A-1

APPENDIX B

ECONOMIC STUDIES

TABLE OF CONTENTS

TABLES

TABLES (continued)

TABLES (continued)

APPENDIX B

ECONOMIC STUDIES

PART I - RECREATIONAL NAVIGATION/GENERAL RECREATION BENEFITS OF ALTERNATIVE PLANS

GENERAL

This section of the appendix presents the determination of the recreational navigation and general recreation benefits which are expected to result from the various alternative plans to improve the Grand River study reach. Recreational navigation benefits associated with the various alternative plans to improve the Grand River study reach for boating are evaluated as the gain in annual return which owners of pleasure craft would receive if their boats were used as for-hire vessels. General recreation benefits associated with the valley preserve alternative are based on the value of the number of recreational user-days which would accrue from this plan. By comparing the average annual recreational benefits associated with each of the alternative plans with its average annual charges (developed in Appendix A), the economic feasibility of each alternative can be determined. Average annual benefits, as is the case for average annual costs, are based on economic life of 50 years and a Federal interest rate of 6-5/8 percent.

ALTERNATIVE 1 - CHANNEL DREDGING PLAN

This alternative plan involves the dredging of the Grand River Channel between Bass River and Grand Rapids to 7 feet, as well as removing all pilings and wing walls which are hazardous to navigation. Recreational navigation in this area is restricted at the

present time due to the obstructions and submerged objects which are present in scattered areas of the river. The number of existing and projected recreational boats, either moored at marinas and private docks or launched from boat ramps, that would use the study section of the Grand River if it were dredged is discussed in the following paragraphs.

Existing Traffic - Moored Boats

In August 1977 the Detroit District made a preliminary inventory of boating and mooring facilities in the Grand Haven, Spring Lake and Ferrysburg areas (tri-cities area), which are located at the lower reach of the Grand River. It is expected that many users of the proposed channel dredging improvements to the Grand River would come from cruising craft located in these areas. As a result of the inventory, it is estimated that there are currently 811 recreational boats berthed at 11 marinas in the tri-cities area, of which 760 are powered craft and 51 are sailboats. Since sailboats are generally confined to operating on lakes only, they are not expected to use the improved study reach. Therefore, the following benefit analysis will concentrate on powered craft only.

In addition to the boats berthed at marinas, an analysis of Corps of Engineers' dock permits in the area indicates that there are approximately 400 craft moored at the private properties in the tri-cities area, of which 372 are powered craft. The majority of these craft are moored in the affluent Spring Lake area, which has a proportionately greater number of moored craft over 20 feet in length than are berthed at the marinas.

A third source of use of the proposed channel dredging improvements to the Grand River study reach would come from powered craft moored at other recreational boat harbors along the coast of Lake Michigan (primarily Muskegon, White Lake, Holland, South Haven, and

Saugatuck) which would be attracted to the river. Because of the distance these craft would have to cruise to get to the study reach, it is estimated that these boats would primarily be 20 feet and over in length. In a 20 May 1977 letter (see Appendix E - Pertinent Correspondence), the Waterways Division of the Michigan Department of Natural Resources estimated that the number of cruising craft from Lake Michigan harbors that would use the Grand River study reach would be approximately equal to the number of craft berthed at Grand Haven/Spring Lake/Ferrysburg marinas. Of the 760 powered craft berthed at tri-cities marinas, 565 are 20 feet and over in length. It is estimated, therefore, that approximately 565 existing powered craft from other Lake Michigan harbors would use the improved section of the Grand River.

Table B-1 below summarizes the number of existing powered recreational craft, by length, class and boat type, moored at Grand Haven/Spring Lake/Ferrysburg marinas, at private properties in this tri-cities area, and at other Lake Michigan recreational boat harbors that it is estimated would use the study reach if the channel were dredged to 7 feet.

TABLE B-1

CHANNEL DREDGING PLAN -
NUMBER OF EXISTING MOORED BOATS
THAT WOULD USE STUDY REACH

Location of Moored Boats	Outboards/Inboards/ Inboard-Outdrives		Inboards			
	16'-19'	20'-29'	30'-39'	40'-49'	50' & Over	TOTAL
Tri-Cities 1] Marinas						
No. of Boats	195	228	240	88	9	760
Tri-Cities 1] Priv. Prop.						
No. of Boats	64	124	132	48	4	372
Lake Michigan Harbors						
No. of Boats	-	228	240	88	9	565
TOTAL	259	580	612	224	22	1,697

1] Grand Haven, Spring Lake and Ferrysburg.

In its 20 May 1977 letter, the Michigan DNR Waterways Division estimates that approximately 3 to 5 trips per year, with each trip being an average of 2 days in duration, would be generated by each of the existing moored craft expected to use the improved Grand River study reach. This is probably true for craft berthed at marinas and private properties in the Grand Haven/Spring Lake/Ferrysburg area (an average of 4 trips was used for the benefit analysis) because, as the State mentions in its letter, the Grand River study section is quite attractive and there would be additional times during the year when bad weather would preclude use of Lake Michigan by these craft. However, for cruising craft coming from other Lake Michigan harbors, it is more conservatively estimated that only 2 to 3 trips per year (an average of 2-1/2 was used for the benefit analysis) would be made. This is based on the longer distance these craft would have to travel to get to the Grand River study section and the fact that craft from other harbors would not have access to the study reach during bad weather. Table B-2 depicts the estimated number of boat days that would be generated by the existing number of moored craft that are expected to use the study section of the Grand River if the channel is dredged to 7 feet.

By dividing the total boat days shown in Table B-2 by the estimated 120 days in the tri-cities recreational boating season, it is possible to derive the equivalent number of boats that would be permanently-based at a marina or private dock during an entire boating season. For those existing (1977) moored boats that would use the Grand River study reach if the channel were dredged, Table B-3 shows what the equivalent number of permanently-based craft would be.

TABLE B-2

CHANNEL DREDGING PLAN -
BOAT DAYS GENERATED BY EXISTING MOORED
BOATS THAT WOULD USE STUDY REACH

Location of Moored Boats	Outboards/Inboards/ Inboard-Outdrives		Inboards			Total Boat Days
	16'-19'	20'-29'	30'-39'	40'-49'	50' and Over	
Tri-Cities 1] Marinas						
No. of Boats	195	228	240	88	9	
Trips per yr	4	4	4	4	4	
Days per trip	2	2	2	2	2	
Boat Days	1,560	1,824	1,920	704	72	6,080
Tri-Cities 1] Priv. Prop.						
No. of Boats	64	124	132	48	4	
Trips per yr	4	4	4	4	4	
Days per trip	2	2	2	2	2	
Boat Days	512	992	1,056	384	32	2,976
Lake Michigan Harbors						
No. of Boats	-	228	240	88	9	
Trips per yr	-	2-1/2	2-1/2	2-1/2	2-1/2	
Days per trip	-	2	2	2	2	
Boat Days	-	1,140	1,200	440	45	2,825
TOTAL BOAT DAYS	2,072	3,956	4,176	1,528	149	11,881

1] Grand Haven, Spring Lake and Ferrysburg.

TABLE B-3

CHANNEL DREDGING PLAN -
EQUIVALENT PERMANENTLY-BASED CRAFT,
FOR EXISTING MOORED BOATS THAT WOULD USE STUDY REACH

	Outboards/Inboards/ Inboard-Outdrives		Inboards			
Category	16'-19'	20'-29'	30'-39'	40'-49'	50' & Over	Total
Boat Days	2,072	3,956	4,176	1,528	149	11,881
Equiv. Perm. Based Craft [1]	17	33	35	13	1	99

1] Based on 120 day recreational boating season.

Projected Traffic - Moored Boats

Recreational boating has experienced unprecedented growth in recent years in the United States. The popularity of boating can be attributed to improving standards of living and more leisure time. The industry has also made improvements by developing greater horsepower motors, fiberglass boat construction, and self launching boat trailers. In 1958, the year the State of Michigan first began registering boats, there were 217,553 craft in Michigan. By 1974, Michigan's boating population was about 535,000, an annual increase of 5-3/4 percent. These figures show the tremendous growth in the popularity of recreational boating which has occurred over a relatively short period of time.

In a 14 April 1977 letter (see Appendix E) the State of Michigan projected that boat registrations in Kent and Ottawa counties would increase from 38,575 in 1974 to 70,195 in year 2027. This represents a rather conservative 1-1/8 percent annual rate of increase over this period. Extrapolating the State's projected 1-1/8 percent annual growth rate for boats in these two counties over the 50-year

project life, Table B-4 depicts what the existing (1977) number of equivalent permanently-based boats (for moored boats that would use the Grand River study section) would increase to in year 1985, the base year of the project, and year 2035.

TABLE B-4

CHANNEL DREDGING PLAN -
EQUIVALENT PERMANENTLY-BASED CRAFT,
FOR PROJECTED MOORED BOATS THAT WOULD
USE STUDY REACH IN 1985 and 2035 [1]

Equiv. Perm. Based Craft	Outboards/Inboards Inboard-Outdrives 16'-19'	20'-29'	30'-39'	Inboards 40'-49'	50' & Over	Total
1977	17	33	35	13	1	99
1985 [2]	19	36	38	14	1	108
2035	33	63	67	25	2	190
Increase 1985-2035	14	27	29	11	1	82

1] Based on projected 1-1/8% annual growth rate.
2] Base year of 50-year project life (1985-2035).

In addition to the natural growth in existing moored boats that would use the improved study section, another source of use would come from new marina development in the Grand Rapids area of the study reach. In its 14 April 1977 letter, the Michigan DNR Waterways Division estimates that at least 100 additional boat slips would be needed in the Grand Rapids area assuming navigability upstream in the Grand River. Since it is against the policy of the Waterways Division to participate in the construction of mooring facilities for boats less than 20 feet, it is expected that all these berths would be for boats 20 feet and over in length. In addition, because of Grand Rapids upstream location on the Grand River, it is unlikely that any sailboats would be moored at this new marina development. Assuming the same percentage mix of moored boats over 20 feet in length that exists at Grand Haven/Spring Lake/Ferrysburg marinas, it is

estimated that the breakdown of new locally-based boats that would be moored at Grand Rapids would be as shown in Table B-5. Because of the heavy demand for mooring facilities in the Grand Rapids area that would occur if the study reach were dredged, it is estimated that these 100 new boat slips would be constructed within 10-years after completion of the Grand River project.

TABLE B-5

CHANNEL DREDGING PLAN -
NEW LOCALLY-BASED BOATS MOORED IN GRAND RAPIDS AREA

New Boats Moored at Grand Rapids	Outbards/Inboards Inboard/Outdrives		Inboards		
	20'-29'	30'-39'	40'-49'	50' & Over	Total
No. of Boats	40	42	16	2	100

Existing Traffic - Launched Boats

In addition to the boats moored at marinas and private properties, another source of use of the study section of the Grand River would come from smaller craft entering the river from launching sites. There are currently 9 launching sites downstream on the Grand River which provide access to the study reach. In its 20 May 1977 letter, the Michigan DNR Waterways Division states that only one of these facilities has available use statistics and is considerably downstream from the study area. Estimated use for this facility was approximately 300 boat launches in the summer of 1976. With 8 other facilities providing similar use to the river, the State estimates that between 2,000 and 3,000 days of boating use of the study area would be generated by these existing facilities if the channel were dredged. For purposes of the benefit analysis, an average of 2,500 days was used (278 days per ramp). Based on a 120 day boating season, this equates to 21 equivalent permanently-based craft. Launched boats are generally between 16 and 25 feet in length.

Projected Traffic - Launched Boats

As discussed earlier, the State of Michigan projects a 1-1/8 percent annual rate of increase in boat registrations in Kent and Ottawa Counties over the 1974-2027 period. Extrapolating this growth rate over the 50-year project life, it is estimated that the existing equivalent number of permanently-based craft (21), for those launched boats that would use the improved study reach, would increase to 23 boats in 1985 and 40 boats in 2035.

Since most of the existing launching ramps on the Grand River are concentrated toward the lower stretches of the river, some additional launching capacity would be required upstream if the study reach channel were dredged. In its 14 April 1977 letter, the Michigan DNR Waterways Division states that their long range Capital Outlay Plan points out the need for an additional 10 river access launching sites in the two state planning regions which surround Ottawa and Kent Counties. Because of their upstream location, these new ramps might, in fact, be used more intensively than the existing boat ramps if the study reach channel was dredged. However, for the benefit analysis it was assumed that the same amount of boating use per ramp as was estimated for the existing downstream ramps (278 days per ramp per year) would be generated by the 10 new ramps. This would result in 2780 boating days of use of the study area, or 23 equivalent permanently-based craft over the 120 day boating season. As was the case with the estimated 100 new boat slips in the Grand Rapids area which would be built if the study section of the Grand River were dredged, it is expected that, due to heavy demand, these new upstream launching ramps would be constructed within 10 years after completion of the Grand River project.

Benefits - Moored Boats

Recreational navigation benefits which would accrue to projected moored boats as a result of the considered channel dredging alternative are evaluated as the gain in annual return which owners of pleasure craft would receive as a result of the considered improvement if their boats were used as for-hire vessels. The benefits are equivalent to the net return on the depreciated investment in boats after all expenses have been paid. The depreciated value of the present and future boats used in the Grand River study section has been assumed to be 50 percent of the market value of boats in each length class. Results of a study of recreational boating conducted throughout the United States by the Corps of Engineers indicate the approximate range of the net percentage return on the depreciated investment in boats will vary from 10 to 15 percent for outboards, 8 to 12 percent for inboards and 6 to 9 percent for cruisers (percentage returns for inboard-outdrives were not specified in this study). These net returns for the various boat types vary according to length class, purchase price and annual operating costs (fuel, maintenance and repair, insurance, summer and winter storage, and boat registration costs).

For those projected moored craft (in terms of equivalent number of permanently-based craft) that it is estimated would use the Grand River study section if the channel were dredged, Table B-6 shows the percent distribution of boat types contained in each of the various length classes (depicted in Tables B-4 and B-5). In addition, this table shows the typical size of each boat type contained in the various length classes, its average 1977 price and its ideal rate of return. Average 1977 boat values are based on a survey of boat prices conducted by the Corps of Engineers, Chicago District, in 1975 and subsequently updated to reflect 1977 price levels. Since all boats

are not new, average 1977 values reflect the estimated age distribution of boats in the fleet, and their respective 1977 market values. The ideal rates of return were selected from the specified ranges listed in the preceeding paragraph and are based on the typical length, the average price, and the estimated operating expenses of each boat type contained in the various length classes. (Since the range for inboard-outdrives was not specified, the range for outboards was used.)

TABLE B-6

CHANNEL DREDGING PLAN -
PERCENT DISTRIBUTION AND CHARACTERISTICS
OF PROJECTED MOORED BOATS [1] THAT WOULD USE STUDY REACH

Length Class (Feet)	Boat Type	Percent of Class	Typical Size (Feet)	Average 1977 Boat Model Price	Ideal Rate of Return
16-19	Outboards	62%	17	$5,200 [2]	15%
	Inboard-Outdrives	20%	17	6,900	15%
	Inboards	18%	17	8,000	12%
	TOTAL	100%			
20-29	Outboards	17%	23	8,200 [2]	13%
	Inboard-Outdrives	33%	23	12,100	13%
	Inboards	50%	24	13,800	10%
	TOTAL	100%			
30-39	Inboards	100%	32	37,000	8%
40-49	Inboards	100%	42	103,700	8%
50 & Over	Inboards	100%	50	179,800	8%

1] Equivalent number of permanently-based craft.
2] Includes average cost of motor of $2,000.

In order to determine the recreational navigation benefits to moored craft that would result from the considered channel dredging alternative, an estimate was made of the percent of the ideal rate of return which is received at present by boats that would use the Grand River study reach and the percent of the ideal rate of return which could be received with the considered improvement. The difference is considered to be the percent gain in the ideal rate of return resulting from dredging the Grand River study reach. Since motorized boats 16 feet and over in length are currently restricted from using the Grand River study reach, the current percent of ideal rate of return is zero. With the considered channel dredging improvement, owners of moored craft that would use the Grand River study reach would be able to realize 100% of the ideal rate of return on the depreciated investment in their boats. Therefore, by multiplying the full 100% of the ideal rate of return for each boat type by the total depreciated investment in the boats, the recreational boating benefit is obtained. Drafts for the various boat types and length classes expected to use the Grand River study section if the channel is dredged are as shown in Table B-7.

TABLE B-7

CHANNEL DREDGING PLAN -
DRAFTS FOR VARIOUS BOAT TYPES AND
LENGTH CLASSES THAT WOULD USE STUDY REACH

Length Class (Feet)	Draft (Inches)	
	Outboards/ Inboard-Outdrives	Inboards
16-19	13 to 15	25 to 28
20-29	16 to 23	29 to 35
30-39	-	36 to 41
40-49	-	42 to 47
50-65	-	48 to 56

The detailed derivation of recreational navigation benefits that would accrue to moored boats from the considered dredging alternative is shown in Table B-8. It should be noted that benefits to the estimated 100 new craft that would be locally-based at Grand Rapids have been reduced by an appropriate percentage, which corresponds to the estimated number of days per season these craft would be away on cruise. (This is because while on cruise these craft would not be taking advantage of the improvements to the Grand River study reach.) In addition, future recreational navigation benefits stemming from both the natural growth in moored boats and the addition of new locally-based craft at Grand Rapids were discounted at 6-5/8%

TABLE B-8

CHANNEL DREDGING PLAN
ANNUAL RECREATIONAL NAVIGATION BENEFITS TO MOORED BOATS
THAT WOULD USE STUDY REACH

A. MOORED BOATS IN BASE YEAR 1985

Length Class (Feet)	Boat Type	No. of Boats 1]	Depreciated Investment Ave.	Depreciated Investment Total	Return on Depreciated Investment Percent of Ideal: Ideal	Present	Future	Gain	Value
16-19	Outboards	12	$2,600	$31,200	15%	0	100%	15%	$4,700
	Inboard-Outdrives	4	3,450	13,800	15%	0	100%	15%	2,100
	Inboards	3	4,000	12,000	12%	0	100%	12%	1,400
Subtotal		19		$57,000					$8,200
20-29	Outboards	6	$4,100	$24,600	13%	0	100%	13%	$3,200
	Inboard-Outdrives	12	6,050	72,600	13%	0	100%	13%	9,400
	Inboards	18	6,900	124,200	10%	0	100%	10%	12,400
Subtotal		36		$221,400					$25,000
30-39	Inboards	38	$18,500	$703,000	8%	0	100%	8%	$56,200
40-49	Inboards	14	$51,850	$725,900	8%	0	100%	8%	$58,100
50 & Over	Inboards	1	$89,900	$89,900	8%	0	100%	8%	$7,200
TOTAL		108							$154,700

1] Equivalent number of permanently-based craft.

B. NATURAL GROWTH IN MOORED BOATS (1985-2035)

Length Class (Feet)	Boat Type	No. of Boats1]	Depreciated Investment Avg.	Depreciated Investment Total	Return on Depreciated Investment Percent of Ideal Ideal	Present	Future	Gain	Value
16-19	Outboards	9	$2,600	$23,400	15%	0	100%	15%	$3,500
	Inboards-Outdrives	3	3,450	10,350	15%	0	100%	15%	1,600
	Inboards	2	4,000	8,000	12%	0	100%	12%	1,000
	Subtotal	14		$41,750					$6,100
20-29	Outboards	5	$4,100	$20,500	13%	0	100%	13%	$2,700
	Inboard-Outdrives	9	6,050	54,450	13%	0	100%	13%	7,100
	Inboards	13	6,900	89,700	10%	0	100%	10%	9,000
	Subtotal	27		$164,650					$18,800
30-39	Inboards	29	$18,500	$536,500	8%	0	100%	8%	$42,900
40-49	Inboards	11	$51,350	$570,350	8%	0	100%	8%	$45,600
50 & Over	Inboards	1	$89,900	$89,900	8%	0	100%	8%	$7,200
TOTAL		82							$120,600

Equivalent Average Annual Benefits = $120,600 X (growth pattern factor 0.28) = $33,800

1] Equivalent number of permanently-based craft.

C. NEW LOCALLY-BASED BOATS AFTER IMPROVEMENTS

Length Class (Feet)	Boat Type	No. of Boats 1]	Depreciated Investment Avg.	Depreciated Investment Total	Ideal	Return on Depreciated Inv. Percent of Ideal Present	Future	Gain	Value	On Cruise During 120 Day Season Days	Average % of Seas.	Value
16-19	Outboards	7	$4,100	$28,700	13%	0	100%	13%	$3,700	15	12.5%	$500
	Inboard-Outdrives	13	6,050	78,650	13%	0	100%	13%	10,200	15	12.5%	1,300
	Inboards	20	6,900	138,000	10%	0	100%	10%	13,800	15	12.5%	1,700
Subtotal		40		$245,350					$27,700			$3,500
30-39	Inboards	42	$18,500	$777,000	8%	0	100%	8%	$62,200	20	16.7%	$10,300
40-49	Inboards	16	$51,850	$829,600	8%	0	100%	8%	$66,400	30	25.0%	$16,600
50 & Over	Inboards	2	$89,900	$179,800	8%	0	100%	8%	$14,400	30	25.0%	$3,600
TOTAL		100		$2,031,750					$170,700			$34,000

Equivalent Average Annual Benefits = ($170,700-$34,000) X (accelerated growth pattern factor 0.85) = $116,200

1] Equivalent number of permanently-based craft.

over the 50-year project life on the basis of their expected growth patterns. In this manner, equivalent average annual benefits were obtained. It is estimated that the projected natural growth in moored boats over the 1985-2035 period of analysis would occur in a straight-line fashion. As far as the 100 new boat slips at Grand Rapids are concerned, it is expected that they would be fully constructed and utilized within 10 years of completion of the considered channel dredging improvements to the Grand River study reach.

Benfits - Launched Boats

Recreational navigation benefits which would accrue to prospective launched boats as a result of the considered channel dredging alternative were evaluated in the same manner as for moored boats. Table B-9 shows the percent distribution of boat types contained in the 16-25 feet launch boat category. This table also shows the typical size of each boat type, its average 1977 price and its ideal rate of return.

TABLE B-9

CHANNEL DREDGING PLAN -
PERCENT DISTRIBUTION AND CHARACTERISTICS
OF PROJECTED LAUNCHED BOATS 1] THAT
WOULD USE STUDY REACH

Length Class (Feet)	Boat Type	Percent of Class	Typical Size (Feet)	Average 1977 Boat Model Price 2]	Ideal Rate of Return
16-25	Outboards	76%	17	$7,900 3]	14%
	Inboards-Outdrives	17%	19	10,900	12%
	Inboards	7%	19	12,000	10%
TOTAL		100%			

1] Equivalent number of permanently-based craft.
2] Includes cost of trailer.
3] Includes cost of motor.

The detailed derivation of recreational navigation benefits which would accrue to launched boats from the considered channel dredging improvements is shown in Table B-10. As was the case for moored boats, future benefits to launched boats stemming from both the natural growth in launched boats and the addition of 10 new launch ramps along the Grand River study reach were annualized at 6-5/8% over the 1985-2035 project life on the basis of their expected growth patterns. It is expected that the projected natural growth in launched boats over the 50-year project life would occur in a straight-line fashion. In addition, it is estimated that the 10 new launch ramps would be fully constructed and utilized within 10 years of completion of the considered dredging improvements to the Grand River study reach.

TABLE B-10

CHANNEL DREDGING PLAN - ANNUAL RECREATIONAL NAVIGATION BENEFITS
TO LAUNCHED BOATS THAT WOULD USE STUDY REACH

A. LAUNCHED BOATS IN BASE YEAR 1985

Length Class (Feet)	Boat Type	No. of Boats 1]	Depreciated Investment Avg.	Depreciated Investment Total	Return on Depreciated Inv. Ideal	Percent of Ideal Present	Percent of Ideal Future	Percent of Ideal Gain	Value
16-25	Outboards	17	$3,950	$67,150	14%	0	100%	14%	$9,400
	Inboard-Outdrives	4	5,450	21,800	12%	0	100%	12%	2,600
	Inboards	2	6,000	12,000	10%	0	100%	10%	1,200
	TOTAL	23		$100,950					$13,200

B. NATURAL GROWTH IN LAUNCHED BOATS (1985-2035)

16-25	Outboards	13	$3,950	$51,350	14%	0	100%	14%	$7,200
	Inboard-Outdrives	3	5,450	16,350	12%	0	100%	12%	2,000
	Inboards	1	6,000	6,000	10%	0	100%	10%	600
	TOTAL	17		$73,700					$9,800

Average Annual Benefits = $9,800 X (growth pattern factor,0.28) = $2,700

C. NEW LAUNCHED BOATS AFTER IMPROVEMENTS

16-25	Outboards	17	$3,950	$67,150	14%	0	100%	14%	$9,400
	Inboard-Outdrives	4	5,450	21,800	12%	0	100%	12%	2,600
	Inboards	2	6,000	12,000	10%	0	100%	10%	1,200
	TOTAL	23		$100,950					$13,200

Equivalent Average Annual Benefits = $13,200 X (accelerated growth pattern factor, 0.85) = $11,200

1] Equivalent number of permanently-based craft.

Summary of Benefits - Channel Dredging Plan

The annual recreational navigation benefits to moored boats and launched boats from the channel dredging alternative are summarized in Table B-11.

TABLE B-11

CHANNEL DREDGING PLAN -
SUMMARY OF ANNUAL RECREATIONAL NAVIGATION BENEFITS

Benefit Category	Annual Benefits
Moored Boats in 1985	$154,700
Natural Growth in Moored Boats (1985-2035)	33,800
New Locally-Based Boats After Improvements	116,200
Subtotal	$304,700
Launched Boats in 1985	$ 13,200
Natural Growth in Launched Boats (1985-2035)	2,700
New Launched Boats After Improvements	11,200
Subtotal	$ 27,100
TOTAL BENEFITS	$331,800

ALTERNATIVE 2 - PILE REMOVAL/LIMITED DREDGING PLAN

This alternative plan involves removal of the key navigational obstructions (pilings and wing walls) in the Grand River study reach, as well as dredging selected sections of the river to provide a uniform minimum depth of 5 feet. Implementation of this plan would still benefit large motorized recreational craft up to 49 feet in length, which have an estimated maximum draft of 47 inches, or just under 4 feet (see drafts for different boat types shown in Table B-7). However, for purposes of the benefit analysis, it is assumed that craft 50 feet and over in length would not be provided enough safe clearance to use the study reach.

Summary of Benefits - Pile Removal/ Limited Dredging

Recreational navigation benefits for the pile removal/limited dredging plan would be the same as those shown in Tables B-8 and B-10 for the channel dredging plan, with the exception that benefits to moored craft 50 feet and over in length would be eliminated. On this basis, the annual recreational navigation benefits to moored and launched craft from the pile removal/limited dredging alternative are summarized in Table B-12.

TABLE B-12

PILE REMOVAL/LIMITED DREDGING PLAN -
SUMMARY OF ANNUAL RECREATIONAL NAVIGATION BENEFITS

Benefit Category	Length Class (Feet) 16-19	20-29	30-39	40-49	Return on Depreciated Investment	Equivalent Average Annual Benefits
Moored Boats in 1985	$ 8,200	$25,000	$56,200	$58,100	$147,500	$147,500
Natural Growth in Moored Boats (1985-2035)	$ 6,100	$18,300	$42,900	$45,600	$113,400	$ 31,800[1]
New Locally-Based Boats After Improvements	-	$24,200	$51,900	$49,800	$125,900	$107,000[2]
					SUBTOTAL	$286,300
	16-25					
Launched Boats in 1985	$13,200	-	-	-	$ 13,200	$ 13,200
Natural Growth in Launched Boats (1985-2035)	$ 9,800	-	-	-	$ 9,800	$ 2,700[1]
New Launched Boats After Improvements	$13,200	-	-	-	$ 13,200	$ 11,200[2]
					SUBTOTAL	$ 27,100
					TOTAL BENEFITS	$313,400

1] Based on straight-line growth pattern factor of 0.28.
2] Based on accelerated growth pattern factor of 0.85.

ALTERNATIVE 3 - PILE REMOVAL 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, major obstructional hazards to safe boating would still remain; therefore, navigation of the Grand River study reach would still be limited primarily to the small motorized craft (under 16 feet) and non-motorized craft (canoes and rowboats) which currently use the river in its unimproved state. As a result, recreational navigation benefits attributable to the pile removal plan would be very 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.

ALTERNATIVE 4 - VALLEY PRESERVE RECREATION PLAN

The valley preserve recreation plan as developed in this report is built upon the 1973 Grand River, Michigan Comprehensive Water Resources Study recommendations. The plan involves acquisition of lands in strips extending up to 50 feet from both banks of the stretch of river under investigation. The lands would be maintained, essentially, in their natural condition, with allowances made for low-key general recreational activities, such as sightseeing, hunting and fishing. Additionally, a recreation "node" would be planned, to be located in the vicinity of Grandville. A total of 1,035 acres of land would be purchased for development into 139 acres of playgrounds, 124 acres of hunting areas, 61 acres of picnic grounds, and 35 acres of campsites. The remaining 676 acres would be allowed to remain in an undeveloped, natural state.

Recreation Days of Use

An estimate was made of the annual recreation days of use that would be associated with each of the recreational facilities to be developed under the valley preserve plan. Table B-13 provides a summary of the (1) types of facilities; (2) design loads; (3) daily turnover factors; (4) design days of use and (5) conversion factors utilized in calculating the estimated annual visitations. These items are explained below:

a. Types of Facilities. This item is self explanatory.

b. Design Load. The design load is the number of individuals who could be accommodated at each facility unit at any one time.

c. Daily Turnover Factor. The turnover factor is the number of times a given facility will be used during a design day.

d. Design Days of Use. The period of use is expressed in terms of design days per year. The calculation of the number of design days is based on a methodology used by the Bureau of Outdoor Recreation for the Great Lakes Region. The summer season was assumed to span a period of 14 weeks extending from Memorial Day through the Labor Day weekend, for an average of 98 days. The 15 Sundays and 3 holidays are assumed to represent average design days. It was assumed that three week days would be equivalent to one design day; therefore, the 80 remaining days other than Sundays or holidays would equal 27 design days, for a total of 45 summer design days. The gross number of summer design days was adjusted downward by 20 percent to allow for adverse weather conditions. Thus a net of 36 design days was used in the calculation of seasonal use. Likewise, this was also appropriate for the periods of the month of May, and Labor Day through October 15. In May there are 3 Sundays besides the week including Memorial Day and 24 week

days which account for 8 design days. Between Labor Day and 15 October there would be an average of 4 Sundays, and 30 week days which account for 10 design days. This gives a total of 25 design days for the month of May and the Labor Day-October 15 period. Adjusting downward 20 percent for inclement weather gives a net of 20 design days for this period. Similarly, the winter season was assumed to extend from 15 December to 1 March, or about 10 weeks with a total of 34 design days. Adjustment downward by 20 percent to allow for adverse weather conditions, resulted in a planning figure of 27 winter season design days.

e. Conversion Factor. The conversion factor is the number used to convert recreation occasions to recreation days. This step is necessary to compensate for the fact that visitors may engage in more than one activity during a recreation day.

TABLE B-13

VALLEY PRESERVE RECREATION PLAN -
SUMMARY OF USER DESIGN LOADS AND CALCULATION OF
ANNUAL RECREATION DAYS OF USE

Facility	No. of Units	Design Load Per Unit	Instant Load	Daily Turn-over Factor	Design Load	No. of Design Days	Total Activity Days	Conversion Factor	Recreation Days
Picnic Tables	240	5/Table	1,200	2	2,400	36 Memorial Day-Labor Day	86,400	2	43,200
Field Game Areas	135 Acres	20/Acre	2,800	3	8,400	36 Mem. Day-Labor Day;20 May; Labor Day-15 Oct.	302,400	2	131,200
							168,000	1	168,000
Bike-Hike Trails	43,400/in ft. (8.2 mi)	20/Mile	164	4	656	36 Mem. Day-Labor Day; 20 May; Labor	23,616	2	11,808
a) Bicycling									
b) Hiking		80/Mile	656	2	1,312	Day-15 Oct.	13,120	1	13,120
Nature Center	1	200	200	2	400	36 Mem Day-Labor D.	14,400	2	7,200
		200	200	1	200	20 May; Lab. D.-15Oct.	4,000	1	4,000
		200	200	1	200	56 During School Year	11,200	1	11,200
Canoeing	315 Acres	1 Canoe/ac	630	8	5,040	36 Mem D-Lab D.	181,440	2	90,720
Camping	280	5/Site	1,400	1	1,400	36 Mem D-Lab D.	50,400	2	25,200
Parking	530 sps.	4/car	2,320	varies					
Playfields	5 Acres	20/Acre	100	3	300	36 Mem D-Lab D.	10,800	2	5,400
Tobagganing	6 Acres	3/Tobg. 10/Acre	130	2	360	27 15 Dec-1Mar.	9,720	1	9,720
						Total Recreation Days =			540,768
						Say =			540,800

Summary of Benefits - Valley Preserve Recreation Plan

The demand for outdoor recreation opportunities in the study area is so great that it is anticipated that optimum use of the features under the valley preserve recreation plan would be achieved in the first year after development and that this maximum use would continue throughout the life of the project, assuming a good quality recreation experience for the user is provided through appropriate user controls and adequate maintenance. Considering the types of recreational activities that would be available, a value of $1.75 per recreation day has been assigned to the proposed development. Table B-14 indicates the annual general recreation benefits that can be realized from the valley preserve recreation plan.

TABLE B-14

VALLEY PRESERVE RECREATION PLAN -
SUMMARY OF ANNUAL GENERAL RECREATION BENEFITS

Recreation Days	Value Per Day	Annual Benefits
540,800	$1.75	$946,400

SUMMARY OF ANNUAL RECREATIONAL BENEFITS AND COSTS OF ALTERNATIVE PLANS

Table B-15 presents a summary of the average annual recreational benefits (either recreational navigation or general recreation) and average annual costs for the various alternative plans considered. It should be noted that benefits and costs are not displayed for the pile removal alternative, since it has been determined that this plan is not a viable solution to meeting either the recreational navigation needs or the general recreation needs of the study area. Estimated annual costs are as developed in Appendix A. As can be evidenced from this table, both the pile removal/limited dredging alternative

(1.30 benefit/cost ratio) and the valley preserve recreation plan (1.10 benefit/cost ratio) are economically justified. However, the channel dredging alternative is economically unjustified with a benefit/cost ratio of only 0.42.

TABLE B-15

SUMMARY OF AVERAGE ANNUAL RECREATIONAL BENEFITS AND COSTS OF ALTERNATIVE PLANS[1]

Alternative Plans	Benefit Category	Avg. Ann. Benefits	Avg. Ann. Costs	Benefit/Cost Ratio
Channel Dredging	Recreational Navig.	$331,800	$792,100	0.42
Pile Removal/ Ltd. Dredg.	Recreational Navig.	$313,400	$240,900	1.30
Valley Preserve	Gen. Recreation	$946,400	$858,600	1.10

1] Benefits and cost not displayed for pile removal alternative since it is not considered to be a viable solution to meeting study area's needs.

PART II - ECONOMIC REDEVELOPMENT BENEFITS OF ALTERNATIVE PLANS

DERIVATION OF REDEVELOPMENT BENEFITS

Based on U. S. Department of Labor unemployement statistics, the Economic Development Administration of the U. S. Department of Commerce has officially designated Kent, Muskegon, Newaygo and Ionia Counties as areas with persistent unemployment (Title IV redevelopment areas). In addition to the above mentioned counties which are officially designated, Ottawa, Allegan, Barry and Montcalm Counties are listed as currently qualified but not yet officially designated. It should be noted that all of these counties are located within a reasonable commuting distance (50 miles or less) of the Grand River study reach. In accordance with present policy, economic redevelopment benefits may be attributed to the various alternative plans of improvement.

In view of the pool of unemployed manpower available, it is a reasonable estimate that at least 20 % of the direct construction costs of the alternative plans would be wages paid to workers who reside in these counties. After deducting engineering and design, supervision and administration, and similar items from the first costs of the alternative plans direct construction costs are obtained, of which 20% is eligible for redevelopment benefits. By multiplying 20% of direct construction costs by the capital recovery factor for 6-5/8 percent (.06905), average annual equivalent benefits over the 50-year project life are obtained. Table B-16 shows the derivation of redevelopment benefits for the various alternatives considered.

TABLE B-16

REDEVELOPMENT BENEFITS ASSOCIATED WITH ALTERNATIVE PLANS[1]

Alternative Plans	Project First Costs	Direct Construction Costs	Wages Paid Unemployed Labor[2]	Average Annual Redevelopment Benefits[3]
Channel Dredging	$9,516,300	$8,217,000	$1,643,400	$113,500
Pile Removal/ Limited Dredging	$2,402,900	$2,062,100	$ 412,400	$ 28,500
Valley Preserve	$6,494,400	$1,682,600	$ 336,500	$ 23,200

1] Redevelopment benefits not displayed for the pile removal alternative since it is not considered to be a viable solution to meeting study area's needs.
2] Estimated to be 20% of direct construction costs.
3] Based on 50-year, 6-5/8% capital recovery factor of .06905.

SUMMARY OF TOTAL ANNUAL BENEFITS AND COSTS OF ALTERNATIVE PLANS

A summary of the total average annual benefits and costs of the alternative plans is presented in Table B-17. As this table shows, the inclusion of redevelopment benefits in the total project benefits increases the benefit/cost ratio for the pile removal/limited dredging alternative to 1.42, while it raises the B/C ratio for the valley preserve plan to 1.13. However, even with redevelopment benefits included, the channel dredging alternative is still economically unjustified with a benefit/cost ratio of 0.56.

TABLE B-17

SUMMARY OF TOTAL AVERAGE ANNUAL BENEFITS AND COSTS OF ALTERNATIVE PLANS[1]

Alternative Plans	Average Annual Benefits			Average Annual Costs	Benefit/Cost Ratio
	Recreation	Redevelopment	Total		
Channel Dredging	$331,800[2]	$113,500	$445,300	$792,100	0.56
Pile Removal/Ltd. Dredging	$313,400[2]	$ 28,500	$341,900	$240,900	1.42
Valley Preserve	$946,400[3]	$ 23,200	$969,900	$858,600	1.13

1] Benefits and costs not displayed for the pile removal alternative, since it is not considered to be a viable solution to meeting the study area's needs.
2] Recreational navigation benefits.
3] General recreation benefits.

APPENDIX C

ENVIRONMENTAL STUDIES

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TABLES

ENVIRONMENTAL STUDIES

ENVIRONMENTAL ASSESSMENT

General Baseline data involving a general description of the study area, including hydrology, demography and recreation, are addressed in other sections of this Preliminary feasibility Report and therefore are not duplicated in this Appendix.

Cultural Resources

The Grand River Basin was historically important to various Indian Tribes. Ottawa, Chippewa and Pottawatomie Tribes all inhabited the area and enjoyed its rich fur-bearing resources. Native tribes were eventually displaced by French and English settlers. In the last half of the Nineteenth Century, the timber resources of the Grand River basin began to be exploited, leading to the rise of Grand Rapids as a furniture producing center. Agriculture became increasingly important in the area as the forests were cleared. Archaeological research is scanty but provides general evidence of the history of the region. Most archaeological sites discovered are in flood plains, especially at the confluence of waterways.

A principal point of interest in the area is the Norton Mound Group National Historic Landmark. Included are a number of Indian burial sites which are under the jurisdiction of the National Park Service. The landmark encompasses sections of Kent County, Wyoming Township in the City of Grand Rapids. As the Grand River flows within the boundaries of the landmark, all project alternatives would include an assessment of impacts to this cultural resource.

Wildlife

The Grand River supports a population of both game and non-game fish. The lower Grand River area has developed into an intensively used sport fishing region as a result of the MDNR stocking program. About 300,000 chinook, 201,900 coho salmon, 50,000 lake trout, and 40,000 steelhead have been planted in the lower reaches of the Grand River. Other game fish species include largemouth bass, northern pike, black and white crappies, catfish, bluegill and pumpkinseed sunfish. Non-game fish found are alewives, bowfin, carp, northern red horse, quillback carp sucker, and spotted and white sucker.

Hunting for waterfowl and upland game birds is a popular recreational activity in Ottawa and Kent Counties. The low-lying, marshy areas found along the Grand River near Lake Michigan are described as major concentration sites for waterfowl, whether originating from or passing through the Grand River Basin during the seasonal migrations, bound for the Mississippi Flyway. A tabulation of birds sighted in the Grand Haven State Game Area, which encompasses a reach of the Grand River from river miles 7 to 10, and the surrounding area includes mallards, black ducks, blue-winged teal, wood ducks, coots, scaup, and green-winged teal. Canadian geese, swans and occassionally eagles and ospreys have been sighted. Pheasants, snipes, rails, ruffed grouse, woodcocks, hawks, gulls, herons, gallinules, bitterns, egrets and owls are also found in the area.

Other wildlife found along the Grand River in fairly large numbers include the white-tailed deer, cottontail rabbit, fox and gray squirrels, muskrat, oppossum, red fox, woodchuck, racoon, skunks and various species of amphibians and reptiles.

Threatened and Endangered Species

The peregrine falcon (Falco peregrinus), the eastern timber wolf (Canus lupus lycaon), the longjaw cisco (Coregonus alpenae) are species on the official U. S. List of Endangered and Threatened Wildlife and Plants, 27 October 1976 Federal Register, that are reported to have ranges in the project area. The peregrine falcon is considered an occasional migrant, and the only known timber wolves in Michigan are located on Isle Royale. Though the longjaw cisco formerly was found in Lakes Michigan, Huron and Erie, it was last reported from Lake Erie in 1961 and is considered extinct in Lakes Michigan and Huron.[1] In addition to the above listed species, the list of endangered species as listed in Michigan's Endangered and Threatened Species Program[1] include the deep water cisco (Coregonus johannae), blackfin cisco (Coregonus migripinnis), and the shortnose cisco (Coregonus reighardi). All but the shortnose cisco are considered extinct in Lake Michigan.[1] The shortnose cisco primarily inhabits deep water (greater than 200 feet) and should not be affected by the project. No known threatened or endangered plan species are expected to be impacted by the proposed plan.

Vegetation

The project area lies in the border area between the two broad forest zones dividing the lower peninsula of Michigan. The deciduous forest formation runs approximately as far north as 43 degrees latitude and the mixed conifer-northern hardwood forest above this range. The lowland mesophytic forest community is formed primarily within the project area. Here primary dominants are willow, cottonwood, ash, aspen, and red maple. Common secondary dominants are black cherry and sassafras with yellow poplar, blackgum, and eastern hemlock included among incidental dominants.

1] Michigan's Endangered and Threatened Species Program, Michigan Dept. of Natural Resources, 1976.

The shrub-sapling strata is commonly dense, often occupying 100% ground cover. Spicebush is common as are swamp rose (button-bush, and meadowsweet. The grass-forb strata is dominated by ferns, trillium and sweet cicily.

Common aquatic plants include pondweed, smartweed and pondlillies.

Marshes are common in the Grand River Basin. Marshes contain diverse and complex food chains, controlled by water fluctuations, light, temperature and wave action. The marshes are noted as major concentration areas of migrating waterfowl and habitat for furbearing mammals, spawning fish and juvenile fish.

Submergent and emergent vegetation supply aquatic organisms, semiaquatic wildlife and waterfowl with an important food source and shelter. Numerous species of phytoplankton and filamentous algae are consumed by small fish and lower aquatic animal organisms, such as snails, flatworms and insect larvae. Emergent plants, such as cattails (Typhus), bulrushes (Scirpus) and arrowheads (Sagittaria), are used as food and shelter by waterfowl, various songbirds and amphibious mammals.

The marsh provides a vital food production zone and spawning area for numerous fish, especially yellow perch, white bass and forage fish. Many adult fish move inshore to feed on vegetation, aquatic invertebrates and smaller fish.

Water Quality

Water quality problems are principally related to organic or oxygen-consuming wastes created by municipalities, industries and agricultural sources. Sediments, evolving from erosion, contribute nutrients from fertilizers and pesticides which add to the degradation process. Degraded water quality restricts water use for water

supply, fishing, and body contact recreation. It also discourages development of the adjacent areas, especially for recreational purposes.

Specific water quality problems are identified as high bacteria counts, low dissolved oxygen levels, thermal loadings, high turbidity, nutrient (nitrogen and phosphorus) concentrations at levels that stimulate algae growth and development, and significant concentrations of pesticides and toxic metals.

Erosion and sedimentation increase the water quality problem. Because of the insufficient amount of organic matter returned to the soil from crop rotation, the soil does not retain the water as readily. Housing developments and road construction also contribute heavily to the sediment problem. Consequently, there is excessive surface runnoff that transports loads of suspended sediments to the river. Due to the nature of the sediments (fine, clay soils) they remain in suspension for long periods of time.

Noncompliance with State of Michigan Water Quality Standards has been noted for several parameters within the study reach. Temperature limits were exceeded in late 1975 and early 1976. Chloride levels were exceeded in August 1976. Coliform levels were violated periodically during 1974, 1975, and 1976, though data suggests a general improvement towards the last half of 1976. The 0.020 mg/1. standard for ammonia is consistently violated throughout the study, with readings as high as 0.550 mg/1., and an average of 0.288 mg/1., reported. Levels of phenol are also high, averaging 4.33 vg/1., violating the maximum limit of 1 og/1. Levels of CaCO3 are consistent with the high levels of hardness typical of Michigan surface waters, averaging 242 mg/liter between 1974 and 1976.

In 1976, the West Michigan Regional Planning Commission published a report on the area Clean Water Project which discussed water quality

in the Grand River. Their findings indicated that the river downstream of Grand Rapids, due to the high population level, is in a somewhat eutrophic state. Dissolved oxygen readings appeared satisfactory with violations occurring occasionally in the area of Eastmanville. Average BOD levels ranged between 3.0 and 4.0, however, downstream readings were as high as 16.0. Nitrate nitrogen averaged approximately 1.0 mg/l. as N, and mean downstream values of total phosphorous were approximately 0.2 mg/l. as P. Solids data indicated low turbidity and suspended solids, averaging in the 300-400 mg/l. range. Fecal Coliform organism sampled between 1967 and 1975 at the Grandville Station ranged from 10 to 12,000 organisms per 100 ml. with a mean of 890/100 ml., frequently exceeding the limit of 1,000/100 ml. Levels of cyanide in Grandville were approximately 0.2 vg/l. Heavy metals data indicated, in most cases, only minute quantities. On occasion, however, somewhat elevated nickel and zinc values were observed.

State Water Quality Standards are given below:

TABLE 1
WATER QUALITY STANDARDS

	State Standards	Existing Conditions
Dissolved Solids	500 mg/month	
pH	6.5-8.8	8.5
Dissolved Oxygen	5 mg/1	10.4 mg/1
Fecal Coliform	1000 organisms/ 100 ml	1057/100 ml

The water quality would not be affected by alternatives that require no dredging or construction (Alternatives 4 and 5). However, dredging and to some extent pile removal could have an adverse impact on the water quality. The degree of impact would vary depending on the extent of dredging. The kind and degree of contaminants in the sediments to be dredged have yet to be determined. The resuspension of heavy metals however could be a major adverse impact.

Air Quality

The Michigan Air Pollution Control Division monitors air quality at selected stations throughout the state. National Ambient Air Quality Standards as set forth in the Federal Clean Air Act define the "maximum allowable ambient concentrations for six pollutants: suspended particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, photochemical oxidants, and hydrocarbons. These six pollutants have come to be known as criteria pollutants. There are two standard or goal levels for each of these pollutants (See Table 2). The primary standard is established to protect the public health. The stricter, secondary standard is designed to protect public health and welfare, which includes damage to buildings, plants and animals, and impairment of visibility."

"A county is considered to be in violation of the standard if at any site, (a) the annual average is exceeded or (b) two or more excursions of an applicable 24-hour, 8-hour, 3-hour, or 1-hour average are detected. When criteria (b) is applied, two excursions constitute one violation, three excursions mean two violations and so on, since one excursion is allowed by the standards."[1]

"All sampling sites are selected and approved by the Air Quality Division. Selection of site location and type of sensors is based on scientific evaluation of locale, need, and nearby sources. Monitors are placed in all counties containing significant air pollution sources. No monitors in a county indicates the county is presumed in compliance with air quality standards."[1]

TABLE 2
NATIONAL AMBIENT AIR QUALITY STANDARDS[1]

Suspended Particulates	Primary	Secondary
(micrograms/cu. meter)		
annual geometric mean	75	
max. 24-hr. conc.*	260	150
Sulfur Oxides		
(micrograms/cu. meter)		
annual arith. aver.	80 (.03 ppm)	
max. 24-hr. conc.*	365 (.14 ppm)	
max. 3-hr. conc.*	-	1300 (.5 ppm)
Carbon Monoxide		
(milligrams/cu. meter)		
max. 8-hr. conc.*	10 (9 ppm)	10
max. 1-hr. conc.*	40 (35 ppm)	40
Photochemical Oxidants		
(micrograms/cu. meter)		
max. 1-hr. conc.*	160 (.08 ppm)	160
Nitrogen Oxides		
(micrograms/cu. meter)		
annual arith. aver.	100 (.05 ppm)	100
Hydrocarbons		
(micrograms/cu. meter)		
max. 3-hr. conc.* (6-9 A.M.)	160 (.24 ppm)	160

* Not to be exceeded more than once a year per site.

1] Air Quality Report Michigan Department of Natural Resources 1974

TABLE 3

Michigan Air Sampling Network
1974 Suspended Particulate Summary
(Concentrations Expressed in Micrograms Per Cubic Meter)

Site Location: County, City Address	No. Month Smpld.	No. of Smpls.	Max. 24-Hour	2nd High 24-	Ann. Geo. Mean	Standards Primary Ann. 24-Hr.	Exceeded Sec. 24-Hr.
Kent, Grand Rapids City Sewage Treat Plant	12	56	244	222	56		2

Michigan Air Sampling Network
1974 Sulfur Dioxide Summary
(Concentrations Expressed in Micrograms Per Cubic Meter and Parts Per Million (in Parenthesis))

Site Location: County, City/ Address	No. Month Smpld.	No. of Smpls	Max. 1 Hour	Max. 3 Hour	Max. 24 Hour	Ann. Arith. Mean	Standards Exceeded Primary Ann. 24-Hr.	Sec. 3-Hr.
Kent, Grand Rapids Fire Training Station	12	6968	540 (.21)	190 (.07)	130 (.05)	50 (.02)		

Michigan Air Sampling Network
1974 Nitrogen Dioxide Summary
(Concentrations Expressed in Micrograms Per Cubic Meter and Parts Per Million (in Parenthesis))

Site Location: County, City/ Address	No. Month Sampld	No. of Smpls	Max. 1 Hour	Max. 3 Hour	Max. 24 Hour	Ann. Arith. Mean	Standards Exceeded Pri. & Annual	Sec.
Kent, Grand Rapids Fire Training Station	12	56			130 (.07)	50 (.03)		

Michigan Air Sampling Network
1974 Carbon Monoxide Summary
(Concentrations Expressed in Milligrams Per Cubic Meter and Parts Per Million (in Parenthesis))

Site Location: County, City/ Address	No. Month Sampld	No. of Smpls	Max. 1 Hour	Max. 3 Hour	Max. 24 Hour	Ann. Arith. Mean	Standards Exceeded Pri. & 1-Hr.	Sec. 8-Hr.
Kent, Grand Rapids Fire Training Station, Fourth & Front Street	12	6933	16.1 (14.0)	8.0 (7.0)	5.0 (4.4)	0.9 (0.8)		

CONSIDERATION OF ALTERNATIVES

Background

Implementation of the five proposed project alternatives can be discussed in forms of general impacts, beneficial and adverse impacts, dredging and disposal impacts, and recreational land-use impacts.

General Impacts

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

The area climate, physiography and topography, geology, and soils are not significantly affected by project alternatives, rather, they have influence on development of the alternative plans. Favorable seasons for plan implementation, type of user-activities developed within each plan, designation of particular areas for particular use, dredging feasibility and disposal of dredged materials all hinge upon area conditions. Natural environmental components affected by implementation of the alternative plans include terrestrial wildlife and vegetation, aquatic flora and fauna, hydrology, and water quality. The impacts associated with these components are discussed in relation to each alternative.

Survey launches, and tugs are powered by inboard, outboard, or inboard-outboard motors and can, therefore, be expected to release a very minor amount of oil and lead into river waters, as well as gaseous pollutants, especially hydrocarbons and carbon monoxide, into the atmosphere of the project area, producing temporary, low magnitude adverse impacts area. 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. A temporary adverse aesthetic impact of low magnitude would result from the presence of construction equipment. Launches utilized for survey, inspection and construction operations would cause a temporary inconvenience of low magnitude to those navigators who must avoid the work areas. Operation of project vessels is expected to increase noise levels in the immediate area.

Direct primary adverse impacts of the proposed modifications on terrestrial wildlife involve low-magnitude disruptions during construction of recreational and navigational facilities for alternatives involving dredging, and/or the valley preserve concept. It is anticipated that improvements in the navigational capacity of the river would require that additional boating facilities, such as marinas, be constructed as well as provisions for public access to the river. Dredge disposal would, at a proposed site located near Grandville in an abandoned mining quarry, allow for land reclamation and thus would have a positive net effect. The disposal at the Eastmanville site would have minimal adverse impacts on wildlife. Since the site is located in barren field with minimal vegetative cover. The Valley Preserve Plan would actually benefit wildlife through preservation of the habitats. Construction of recreational facilities and roadways would, however, temporarily displace some wildlife from the area.

Demographic and cultural resources would be indirectly affected by proposed alternatives on a long-term basis. Modifications involving dredging would allow for increased use of the Grand River for recreational boating by the local populace. There are no commercial fisheries based within the study area, therefore, proposed project modifications would have neither a beneficial nor an adverse effect upon local revenue, employment, and earnings within this industry. However, proposed alternatives involving dredging would allow for increased use of the river

for recreational fishing by local and regional residents. The project alternatives would have an indirect, long-term beneficial effect of limited magnitude on the revenue, employment and earnings of retail trade industries due to the generally stimulating effect recreational facilities bring to local businesses.

Modification of the Grand River would have an immeasurable long-term impact on the total energy used in the region. The fuel consumed during survey and inspection, construction and maintenance would be irretrievably lost.

Modification of the Grand River would have an insignificant impact upon Kent and Ottawa County population parameters such as rate of population growth and total population. Continued project activities would tend to encourage present residents to remain, and serve to attract new residents to the community areas. The projects would have little direct or indirect short or long-term adverse effects on local parameters indicative of community cohesion such as private club and civic group participation.

The proposed projects would have neither a beneficial nor an adverse short-term effect on most local housing parameters such as repair and maintenance of existing structures, changes in home ownership or percent of owner occupied homes. This project, alternatives and future operation and maintenance would have a moderate long-term beneficial effect on these parameters by preserving the desirability of the river as a recreation facility.

No significant impacts on water supply are anticipated. No deleterious effects on ground water are anticipated as a result of the proposed project alternatives.

There is one known site of archaeological importance adjacent to the river, The Norton Mound Group National Historic Landmark. Should construction personnel discover objects of possible archaeological significance, operations would cease and consultation would be sought with the State of Michigan to evaluate the find and to supervise salvage operations if needed.

Possible adverse impacts on highway structures could result since increased recreational attractions would bring greater traffic to and from the study area.

Dredging Impacts

Physical alteration of the sediment-water interface in the dredging area would have several immediate impacts. Bottom dwelling organisms would be decimated or displaced; sediments would be resuspended resulting in a reduction of transparency; toxic metals and nutrients of sediments unsuitable for open water disposal could be released into the environment; organic material could be reintroduced, reducing the oxygen level.

A negative impact of concern is the turbidity attributed to the overflow from the hopper dredge as sediments are stirred up from the dredging operation. This problem is acute due to the silt composition of the sediments. Methods of controlling turbid overflows have been investigated in the past but no practical solutions have been attained. In similar fashion, propeller wash from vessels would stir the bottom increasing turbidity in the channels.

Removal of the existing bottom habitats for fish and benthic macroinvertebrate communities would also result from dredging. Recolonization of these areas would generally be dependent on the species' nature and mobility or organism inhabiting the affected areas and the subsequent type of substrate.

During dredging operations, nutrients are reintroduced into solution or suspension from sediments. These additional nutrients would be available for aquatic plant growth until oxidation of the reduced nutrient forms occurred, thus removing the nutrients by natural chelation or incorporation into organic matter. Contaminated sediments could also be re-introduced to the aquatic ecosystem. The kinds and degree of contaminants will be investigated in the next phase of study.

Plans involving channel modification would present periodic, short-term, localized problems attributed to turbidity, suspended solids, and sedimentation. During dredging, nutrients and toxic materials could be released into the aquatic ecosystem. The sediments, the toxic materials may presently be in a stable non-reactive state. Water quality and benthic habitats would also be adversely affected. Although benthic organisms would eventually recolonize the species composition and population could be increased or reduced.

The Valley Preserve/Recreation Plan would best promote the environmental quality of the study area by protecting the river and adjoining lands in essentially their natural condition. Limitations on the navigational capacity of the river would encourage the environmental interests of the study area by minimizing disturbances within the river. Public access would be allowed to the Valley Preserve, with low-key recreational activities such as fishing and sightseeing made available.

The proposed alternative/modifications of the Grand River would result indirectly in social and economic benefits to the area. Section 122 of Public Law 91-611 presents possible areas of impact

that should be considered in relation to the proposed operations. These areas include, but are not limited to:

Noise	Public Services
Displacement of People	Desirable Regional Growth
Aesthetic Values	Employment
Community Cohesion	Business and Industrial Activity
Desirable Community Growth	Displacement of Farms
Tax Revenues	Man Made Resources
Property Values	Natural Resources
Public Facilities (including water supplies)	Air Pollution

During subsequent stages in the planning process, these aspects will continue to be evaluated.

ENVIRONMENTAL TRADE-OFFS/REMEDIAL/MITIGATIVE MEASURES

Where adverse effects are significant, project modifications would be considered. For each significant adverse effect the possibility of (1) eliminating the effect; and (2) mitigating the effect by minimizing or reducing it to an acceptable level of intensity; or (3) compensating for it by including counter-balancing positive effects, would be investigated in Stage III. The costs of such measures, as well as any costs of reduced project performance, would provide a further basis for comparing alternatives and for deciding how or whether to modify them or to accept the adverse effects.

The Grand River area supports a rich diversity of interconnecting ecosystems, which maintain their fragile balance in the midst of an expanding Metropolitan area. The population expansion is accompanied by a corresponding need for more recreational areas to serve the boating, fishing and sightseeing interests expressed. Historically, the

Grand River has been very productive, with an active sport fishery. Many game species inhabit the river system. Recreational boating is a rapidly-expanding pastime in the area, and there is a need for more quiet water surface.

All plan alternatives must involve careful consideration of the ecological importance of the study area as well as the need for various types of recreational services. Specific provisions within each plan allows for measures designed to protect the environment, while at the same time, promote the recreation interests expressed. Dredging operations may be limited to those seasons when spawning and hatching of fish is not occurring. Where necessary, dredged material would be contained in such a way as to prevent leaching of toxic sediment materials into the surrounding area. Removal of the rotting wooden pilings, as well as disposal of the polluted sediments, may actually serve to improve the water quality of the river. "No-wake laws" may be enacted, to protect the stream banks from erosion if the channel is deepened. Land-based recreational plans are designed such that only activities which would not have a severe impact on the environment, such as hiking, fishing, and sightseeing, would be promoted. Such provisions would help protect the ecological value of the river and its surrounding wetlands for the enjoyment of present and future generations.

COORDINATION

Effect assessment procedures require a variety of information sources as well as continuous feedback. Therefore, informal exchanges with Federal, State, and private groups and with individuals have been initiated at the beginning of this investigation and will be maintained throughout the planning process. In addition, pursuant to the Fish and Wildlife Coordination Act of 1958, as well as the Corps mandate to preserve and/or enhance water quality, and to record and

preserve historical/cultural/archaeological resources, more formal discussions have already occurred in the course of initial formulation in Stage II and will continue through late-stage public meetings in Stage III. These discussions will coordinate an inter-disciplinary planning effort with those agencies having a vested responsibility for preserving/maintaining some segment of our Nation's valuable natural resources. Coordination will also continue with the Grand River Study Committee with regard to environmental aspects.

The Fish and Wildlife Coordination Act of 1958 (P.L. 624-85) provides that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Adverse effects on fish and wildlife resources and opportunities for improvement of fish and wildlife have been initially examined in Stage II and will be further examined, albeit in greater detail, in Stage III. To this end, all pre-authorization and post-authorization planning or project development, without exception, shall continue to be coordinated with the U. S. Fish and Wildlife Service of the Department of the Interior, the National Marine Fisheries Service of the Department of Commerce, as appropriate, and the agency administrating the fish and wildlife resources of the state wherein construction is contemplated, in this case, the Michigan Department of Natural Resources.

In addition to following normal coordination procedures with the Environmental Protection Agency (EPA), Section 1500.g(b) of CEQ "Guidelines" (38 F.R. 20555) require that the comments of the EPA Administrator or his designated representative will accompany each final (RDES) environmental statement on matters related to air or water quality, noise control, solid waste disposal, pesticides, or other provisions under the authority of EPA.

Finally, pursuant to the Corps' final mandate for preserving our Nation's historical/cultural/archaeological resources, pertinent correspondence has been initiated with the State Historic Preservation Officer regarding the effect of the proposed action upon the aforementioned heritage resources within the possible project area. In addition to necessary coordination with state officials prior to preparation of the revised Draft Environmental Statement, a DES will be provided them and the Advisory Council on Historic Preservation for review and comment.

The environmental statements will include a discussion of the steps taken to comply with Sections 2(b) and 1(3) of Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971. The ES will also include information indicating that the National Register of Historic Places has been consulted and that no National Register properties will be affected by the project, or, if any are located during Stage III, a listing of the properties affected, an analysis of the nature of the effects, a discussion of the ways in which the effects were taken into account, and an account of steps taken to assure compliance with Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665; 80 Stat. 915; 16 N.S.C. 470f) in accordance with procedures of the Advisory Council on Historic Preservation as they appear in the Federal Register of 25 January 1974 and subsequent issues.

Thus, consultation with a wide range of interests (not limited to the specific agencies previously mentioned) will test the adequacy of identification of effects, while at the same time validating their (effects) designation as beneficial or adverse. In addition, continued coordination will provide the needed commentary on measures

considered for project modification.

Finally, because public participation is viewed as an integral part of the planning and administrative process of all Corps of Engineers civil works activities, public participation will be planned and incorporated into the conduct of this study. Public participation is a continuous two-way communication process which involves keeping the public fully informed on the status and progress of studies and findings of plan formulation and evaluation activities; actively soliciting from all appropriate concerned agencies, groups and individuals their opinions and perceptions of objectives and needs; and determining public preferences regarding resources use and alternative development or management strategies plus any other information and assistance relevant to plan formulation and evaluation. For this survey study, known effects and the possibilities for project modifications to overcome adverse effects of alternatives will be introduced at the Initial Public Meeting to be conducted in Stage III of the plan formulation process. Subsequently, alternatives and their effects will be discussed in general terms at the Formulation Stage Public Meeting (Stage III) to be held prior to publication of the DES, and detailed at the Late-Stage Public Meeting (also Stage III) to be held after the DES is published, but prior to publication of the RDES.

This Section, including the inclosed Environmental Assessment, and the Preliminary Feasibility Report of which this forms a part, represents the visible output of Stage II of the plan formulation process for this study. A Draft Environmental Statement will accompany a Draft Feasibility Report as part of the initial output of Stage III of this study. The final output of Stage III will be a Final Feasibility Report and Revised Draft Environmental Statement.

APPENDIX D

PUBLIC INVOLVEMENT AND COORDINATION PROGRAM

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FIGURES

PUBLIC INVOLVEMENT AND COORDINATION PROGRAM

INTRODUCTION

1. Public involvement in the planning process is the key to public acceptance and eventual implementation of the plans. An effective public involvement program is one that creates awareness and stimulates interest in the study. It is designed to open channels for two-way communication and to encourage public participation and involvement in the planning and decision-making processes of the study. An effective public involvement program also sets up procedures for evaluating the results of the public communication process.

2. The process of identifying water resources issues, exploring alternatives, and selecting a feasible and desirable plan requires a continuous two-way communication process between the study planners and identifiable groups--public officials, public and private organizations, and the study-area citizenry. The main goal of the public involvement program is to establish this two-way communication process which will:

a. Acquire sufficient information from the broadest practical cross-section of concerned citizens, groups, and governmental agencies to identify area problems, issues, needs, priorities, and preferences regarding alternative resource usage, development, and management strategies;

b. Inform the public and promote full public understanding of the Grand River Shallow-Draft Navigation Study--the study process, progress, implications, and results; and

c. Develop a process of interaction and instill in the public a desire to participate and become involved in the study.

OBJECTIVES

3. The public involvement program for the Grand River Shallow-Draft Navigation Study is designed to promote and encourage full citizen participation and involvement in the planning process as well as the communication process. The public involvement program has as its major objectives:

a. Identifying affected and interested individuals and groups within the study area, which includes determining and describing channels of communication to be used in involving them in the study.

b. Providing sufficient information to the identified groups to create awareness and stimulate interest in the study.

c. Encouraging substantive participation and involvement of identified individuals and groups in the planning process, and

d. Promoting wide public review and evaluation of the planning process and study results at the end of each stage of planning, so that public desires and expectations guide the scope, nature, and direction of the study.

SCOPE

4. Public involvement is a continuous process beginning early in Stage 1 and ending only after Stage 3 tasks have been completed. Initial contacts by means of written communication, a public meeting, appearances at organized group meetings, and a review of the Draft Plan of Study have been made with agencies and groups who are interested in water resources and who can provide information about problems and issues in the region. In addition to being asked to suggest alternative

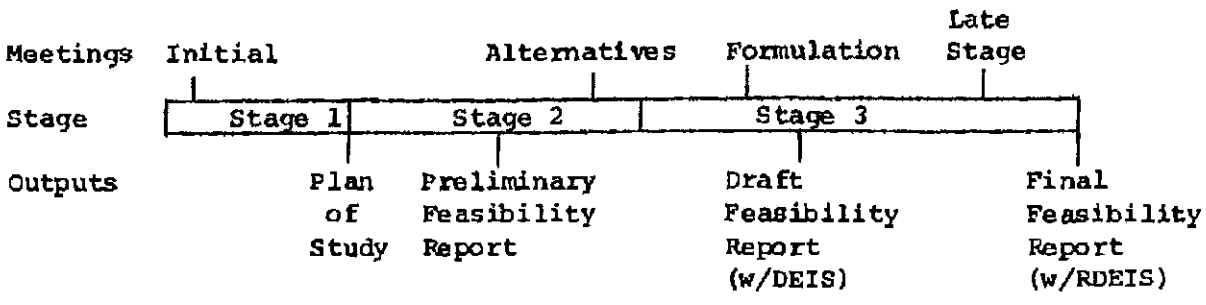
solutions to problems, individuals and representatives of groups and agencies also will be asked to evaluate those plans and suggest modifications that would make the plans more responsive to area needs. Evaluation of the study process, progress, and results also will be open to public review. Principal forms of public involvement are routine informal and formal meetings, interviews, workshops, news releases, media, and written correspondence. While the general nature of public involvement remains the same during each planning stage, the forum for involvement and the intensity of interactions change due to the "cumulative curve" of involvement and to the different decisions that must be made at each stage.

PUBLIC INVOLVEMENT PROGRAM

5. Figure D-1 displays the stages of the planning process and their related report outputs. Public involvement will be used extensively throughout the study stages. The primary public meetings to be held during the course of the study are noted in Figure D-1. Additional involvement of the public is presented in future sections of this Appendix.

Figure D-1

Stages and Outputs of Planning Process



CRITERIA

6. Several important criteria were considered in the design of the public involvement program. The public involvement program should be designed to obtain information from the public which will be useful in meeting study objectives. There will be a purpose for each contact with the public, so that information collected will be pertinent to the study.

7. The needs of the study change as planning progresses, and as various planning tasks become more or less important. Therefore, some kinds of public involvement techniques will be more useful than others at various stages of the study. For example, the major objective during Plan of Study preparation (Stage 1) was to identify the range of issues that the overall study involved rather than to seek solutions to area problems. Therefore, a public meeting and interviews were utilized to determine public views. As the study has progressed into Stage 2, the major objective has changed to identifying and analyzing the range of alternative ways for addressing the planning objectives; therefore, workshops, where people can interact to resolve differences, have been one of the techniques used. To insure complete consideration of public views, a citizens advisory committee has been formed. Some involvement techniques, such as mass media coverage or newsletters, meet the needs of the study at any stage and will be used throughout. The public involvement program will attempt to satisfy the needs of the public. The individuals and groups participating in the study must be well-informed, and need to feel that they are being heard when expressing opinions or voicing concerns over problems.

8. Needs of the various public segments vary, depending on many factors, such as people's interests, place of residence, education, age, and so on. Because the public responds differently to different public involvement techniques, several techniques have been utilized to satisfy public

needs. For example, small group workshops are appropriate techniques for both special interest groups and general citizenry. Coverage in mass media is an especially good technique to reach the general public that may not participate in other involvement activities. Personal interviews and small informal meetings are effective techniques for canvassing public officials. Newsletters are effective in dispensing information to public officials, special interest groups and individuals.

BACKGROUND

9. Public involvement in the Shallow-Draft Navigation Study was initiated actively in the early 1970's prior to receipt of study funding. A concerted effort by various community groups was undertaken to have the Grand River cleaned out within the study limits under investigation. This effort resulted in subsequent funding for the project depicted in this Plan of Study. The effort was spearheaded by the Georgetown Township Bicentennial Committee, with support from Georgetown Township officials, Grandville-Jenison Jaycees, Jenison Ambucs, Jenison Kiwanis, Jenison Historical Association, and the Jenison Community Education Citizens Advisory Council.

10. Following receipt of funding in 1976, a mailing list of Congressional, Federal, State, county and local officials; navigation and business interests; environmental and conservation groups; media; and other interested individuals was developed. A public meeting held on 25 May 1976 was announced by letter and local news media to these parties and a request was made that they express their views, ideas, and concerns toward the need for the study. A digest of the 25 May 1976 meeting summarizing statements presented is attached at the end of this appendix.

11. Assorted correspondence and telephone communications have been received from the public since the beginning of the study, expressing opinions and concerns as well as support of the study. This type of correspondence and communication is necessary to provide two-way flow of information.

12. Because of the large and diverse nature of this study and interested groups associated with this study, it is necessary to provide a program to obtain and encourage further public involvement in each of the stages of the planning process for each of the interim reports scheduled for the future.

PROGRAM

Stage 1 - Plan of Study

13. This stage of the study emphasizes problem identification with public involvement directed towards obtaining a wide variety of viewpoints so that they may be considered in the planning process. A "target" public was selected consisting primarily of people who have a continuing interest in water resource management of the Great Lakes-St. Lawrence Seaway System. Organized groups that expressed an interest in the study at the 25 May 1976 Public Meeting were also included in the "target" public requesting review and comments on the document and also requesting that these parties express the degree of participation that they would be willing to provide in the study.

14. Information and the concerns of local residents and other individuals who presented statements at the 25 May 1976 Public Meeting, in addition to comments from agencies and organized groups, were used in the preparation of the Plan of study. Agencies

and organizations that are considered to be key groups for active participation in the study process are as follows:

FEDERAL

Environmental Protection Agency

U. S. Department of Interior

- U. S. Fish and Wildlife Service
- Bureau of Outdoor Recreation
- Bureau of Indian Affairs
- U. S. Geological Survey
- National Park Service

U. S. Department of Agriculture

National Oceanic and Atmospheric Administration

U. S. Department of Transportation

U. S. Coast Guard

STATE OF MICHIGAN

Department of Natural Resources

Waterways Commission

Department of Highways and Transportation

State Historical Preservation Office

Division of Inter-Governmental Relations (State Clearinghouse)

REGIONAL

Great Lakes Basin Commission

Great Lakes Commission

ORGANIZED GROUPS; OTHERS

Michigan United Conservation Club

West Michigan Regional Planning Commission (Region 8 Kent County Clearinghouse)

West Michigan Shoreline Regional Planning Commission (Ottawa County Clearinghouse Region 14)

Grand River Valley Steelheaders
Michigan Trailfinders Club
Lake Michigan Federation

Ottawa County Board of Commissioners
Michigan Bass Federation
North West Ottawa Chamber of Commerce
Grand River Area Navigation Development Committee
West Michigan Environmental Action Council
Cities and communities which border on the Grand River that may be affected by alternative proposals for navigation

15. These agencies and groups were considered to be a representative mix of public based upon location to the study area, written communication submitted to the Detroit District office and statements presented at the May Public Meeting. The organizations appear to be knowledgeable on the problems and issues that are pertinent to this study. As the study progresses, this list of agencies and groups will be reviewed and updated as interest is expressed in the study.

Stage 2 and 3 - Development of Intermediate and Detailed Plans

16. The following paragraphs describe the public involvement tasks and techniques which are undertaken in Stages 2 and 3 of the study.

17. Identifying the Various Public Segments. To insure an effective public involvement program, all interests, values, and concerns must be represented. To reduce the chance of some individual or group being excluded from the planning process, the first task in each planning stage is to

identify the people who must be reached during that stage. The number of people who must be reached usually increases with each successive planning stage. As the study progresses, a larger, more broadly-based public will normally become involved.

18. For the purposes of this study, the public is considered to include all non-Corps of Engineers entities and can be classified into three main groups: organized groups, the general public, and governmental agencies and units. These groups, initially identified in Stage 1, are expanded as the study progresses. A brief discussion of each group follows:

a. Organized Groups. These groups usually have varied interests and concerns. Some have major interests in navigation proposals and others have only peripheral interests. Many groups have been identified during Stage 1 of the study and are included in the listing noted previously in the Appendix. They include: recreational, fraternal, business, conservation, wildlife, professional, educational, and community interests. These groups have been identified because they may have some impact on, or may be effected by, the study results. A citizens study committee has been formed by the Detroit District and has maintained a significant degree of involvement and input with organized groups. Representatives to the committee have been contacted by telephone and/or letter to establish appropriate meeting dates.

b. General public. Many individuals, not represented by any groups and organizations, may become interested or be affected by the study. Riverfront residents, for instance, have a prime interest in study report findings. These residents and other individuals will have opinions and attitudes about the study and will develop positions with regard to the study. These positions are important because people

may tend to align themselves with others having similar interests. Representatives of these interests can be very influential in the final approval or rejection of study plans, and the public involvement program will attempt to involve them in the planning process. Public meetings and workshops provide a good opportunity to obtain the views of individuals concerned with the study progress. Newspaper coverage of a 16 November 1976 meeting between the Corps of Engineers Grand Haven Project Office Chief and the West Michigan Environmental Action Council resulted in a total of 12 telephone calls and written letters from individuals. These people provided information and requested to participate in the study process in the future. The meeting, which discussed the status of the study, resulted in additional requests to the Detroit District for copies of the Draft Plan of Study. Mrs. Jean Laug, local resident of Coopersville, was provided five copies for distribution to interested parties and she mentioned additional groups to be included in the target public. Contact with these individuals is handled mainly by letter and through news releases to the local media. The Preliminary Feasibility Report, upon approval by the Division Office, will also be distributed for their information.

c. Governmental agencies and units. Many Federal, State, regional, and local agencies, as well as elected officials, will be interested in the study progress and will contribute to the public involvement process. One such group, the Grand River Watershed Council, volunteered to present the project to the local communities in an impartial and objective manner as noted in the digest of the 25 May 1976 Public Meeting, attached at the end of this Appendix. Contact has been maintained through direct meetings, telephone contacts and letters with interested agencies in order to obtain factual data in their particular expertise.

19. As the study progresses, identification of additional people will be necessary. The following identification techniques will be employed:

(1) Evaluation of existing data; for example, political, environmental, socio-economic, geographic, etc. This evaluation will allow the staff to determine additional groups and individuals who may be affected by the study.

(2) Evaluation of existing mailing lists and directories. An evaluation of this sort will allow staff to add and delete names as necessary.

(3) Direct meetings or telephone contact with opinion leaders, advisory group members, and other influentials. These contacts will help to identify other people who may have interests in water resources.

(4) Letters sent to people on existing mailing lists requesting names of interested individuals and groups known to them.

20. Determining and describing the channels of communication. To insure adequate participation by the public, public involvement techniques that are being used during the study will be carefully evaluated to insure that relevant input from the public is being obtained. Other techniques will be implemented as the study progresses and as the planning tasks change in their importance during the various stages of study. The public involvement program will be flexible enough to accommodate changes if it is necessary. A timetable for utilizing the techniques, which have been selected to create awareness, stimulate a two-way communication process, and encourage public participation and involvement in the planning and decision-making processes of the study, is shown on Figure D-2. The techniques to be aimed at the various publics and their primary function are shown on Table D-1. The techniques are explained in detail in the following paragraphs.

Figure D-2

PUBLIC INVOLVEMENT TIMETABLE

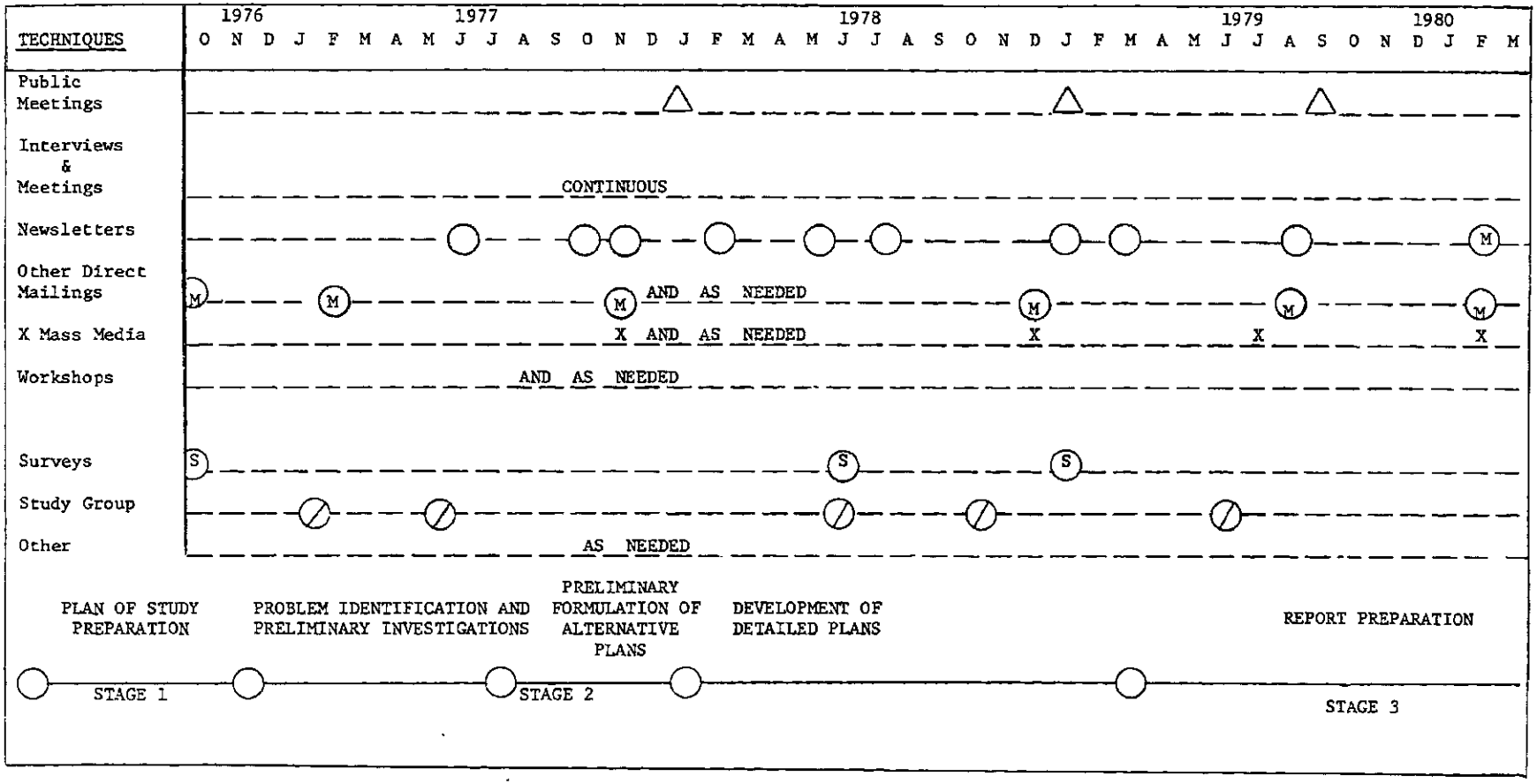


TABLE D-1

PUBLIC INVOLVEMENT TECHNIQUES -
ANTICIPATED PUBLICS AND PRIMARY FUNCTION

Techniques	Anticipated Publics[1]	Primary Function[2]
Public Meetings	1. Public Groups 2. Individuals and Property Owners 3. Federal, Local, and Stage Governmental Agencies	Review-reaction
Interviews and Small informal Meetings	1. Public Groups 2. Local, Federal, and Stage Governmental Agencies 3. Individuals and Property Owners	Interaction-dialogue
Newsletters, and Other Direct Mailings	1. Individuals and Property Owners 2. Public Groups 3. State, Local, and Federal Governmental Agencies	Information-education
Mass Media	1. Public Groups 2. Individuals and Property Owners 3. Local, Federal, and State Governmental Agencies	Information-education
Small Group Workshops	1. Public Groups 2. Federal, Local, and State Governmental Agencies 3. Individuals and Property Owners	Interaction-dialogue
Surveys	1. Individuals and Property Owners 2. Public Groups 3. Local, State, and Federal Governmental Agencies	Review-reaction
Study Groups	Representatives of All Publics	Interaction-dialogue
Other	Dependent on Specific Technique	Information-education

TABLE D-1 (continued)

[1]The anticipated publics are listed in order from greatest expected participation to least expected participation for each technique.

[2]Each technique may have more than one function, but only the primary function has been listed. The information-education function is a one-way communication process which will provide the public with sufficient information to become aware and interested in the study, and will be necessary to achieve effective public involvement. The interaction-dialogue function is a two-way communication process which will provide information exchange in planning between the public and the study team. The review-reaction function is also a two-way communication process which will allow the public to review the study process and results, comment, and guide the future nature, scope, and direction of the study.

a. Public meetings. As part of the planning process, three formal public meetings are required during Stages 2 and 3 as a minimum. These are more specifically referred to as Alternatives, Formulation, and Late Stage Meetings. The main purpose of these meetings is to inform the public about studies and proposals related to the study and to give all interested persons an opportunity to publicly express their views and exchange information which will assist in arriving at sound conclusions and recommendations. For all these meetings, a wide range of Agencies, organized groups, and individuals would be requested to attend. The list of attendees at the Initial Public Meeting held during Stage 1 will be used as a base list. Individuals and groups that have shown interest in the study since the May 1976 meeting would also be invited to participate. A notice of the meeting would be transmitted by direct mailing one month prior to meeting dates. Newspapers, radio and television stations would also be notified by letter in order that additional people may become aware of the study and incorporated into the planning process. The purpose of the first meeting will be to review the contents of the Preliminary Feasibility Report. The total

problem and needs, and the alternative plans and programs considered will be displayed. The Formulation Meeting is intended to present specific details on the two or three best plans selected from those discussed at the Alternatives Public Meeting. The Late Stage Public Meeting will be held to inform the public about the contents of the proposed final report and allow for public review and comment on the entire planning effort.

The meetings will include a brief informational presentation, a period for formal statements, and an informal question and answer period. A wide variety of media will be used to present the information to the audience at these meetings--slides, maps with overlays, handouts, and others.

The strengths of public meetings are: They allow large numbers of people to get together and express and exchange their views; the information flow between the audience and the agency can be flexible and two-way; public meetings are highly visible and can lend credibility to the study; public views are officially and permanently recorded; oral comments allow a sensing of the importance given to the ideas held by members of the audience. The weaknesses of public meetings are: They can be difficult to conduct; some people may abuse their speaking opportunities while others may not speak at all; people may suppress their views when asked to speak at a public meeting; and public meetings can intensify polarization of existing views.

b. Direct mailings. Throughout the study effort, much information is sent through the mail in the form of newsletters, brochures, letters and public notices. The strengths of direct mailings are: They allow much information to be dispersed to a large number of people in a short period of time; and they help to inform the public of important study milestones and checkpoints. The weaknesses of these techniques are: They do not allow for full two-way communica-

tion; people who are not on the mailing list will not receive information regarding the study; and if there is a great deal of information to be distributed, organizing and mailing the information may be time-consuming.

Mailings, especially newsletters are one of the most important feedback mechanisms used in the study. The newsletters inform the public of meetings and workshops; provide the public with the results of studies, meetings, workshops, etc.; establish a point of contact between the Corps and the public; and, in some cases, include a simple response form. In general, mailings are used extensively to inform the people of study progress, results, etc. and are supportive of other kinds of public involvement techniques used in the study.

The first in a series of Memos to the Public, dated 9 June 1977, provided information for concerned citizens regarding the initial feasibility of various alternative plans for the Shallow-Draft Navigation Study. The channel dredging, obstruction removal, valley preserve, and no-action plans were designated in this fact sheet. For the public's interest, a revised Study Schedule, a report on the Study Committee and its activities to date, and a mention of the upcoming Data Survey on Recreational Boating were included in the memo. To insure the public's thorough involvement in the plan formulations procedure, a request for public input of the information regarding the extent of canoe use on the Grand River, and regarding possibilities for disposal sites for dredged material, was also placed in the memo. A copy of the memo is provided on page D-25 of this Appendix.

c. Small informal meetings or interviews with key individuals or groups. The main emphasis in these meetings and interviews has been and will be on gathering opinions about issues and problems. The strengths of this technique are: Input can be obtained on a one-to-one, in-depth, and detailed basis; involvement of these individuals can contribute to public understanding and acceptance of decisions; and

these individuals can indicate community values and attitudes, as well as inform others about issues and help stimulate input into the study. The weaknesses of this technique are: It is difficult to document these informal discussions for later analysis; it is easy to introduce bias in selecting contacts; and other individuals, groups, and agencies not contacted may feel resentment in being bypassed.

During preparation of the Preliminary Feasibility Report, a special effort was made to assure that contacts reflect representative and differing viewpoints. Input received from the initial contacts has been summarized and used in later analysis. Small meetings and informal interviews will continue to be used throughout the study, and will be particularly useful in Stage 3 for resolving conflicts regarding specific plans. During the study, points of contacts will change with shifts in emphasis within the study work tasks.

During one such meeting, held in May 1976, a detailed summary of study procedures and report progress was provided for the Spring Lake Rotary Club. A meeting was held in East Lansing on 29 April 1977 for the purpose of obtaining comments and suggestions pertinent to the study from the U. S. Fish and Wildlife Service, the 208 Planning Agencies, and the Michigan Department of Natural Resources. Discussion centered on the possible environmental impacts of the various plan alternatives.

d. Mass media. Presentation of information through the media will be a basic participatory technique used throughout the study. Notices of public meetings will be directed to newspapers, and radio and television stations in the study area region. Four newspapers, four television and five radio stations were notified of the 25 May 1976 Public Meeting. Newspaper coverage has also discussed the status of the study as reported by the Corps' Grand Haven Project Office. To supplement information provided by the Grand Haven Office, the Detroit

District's Public Affairs Office will disseminate information that could prove useful to newspapers, radio and television in reporting current events on key study activities. The strengths of using mass media are: It is a fast and efficient mode of communication; the mass media can reach large segments of the population; and it can present a large amount of information in an interesting way. The weaknesses of this technique are: It is difficult to get prime-time or front-page coverage; a distorted statement or lack of coverage could be detrimental to the study; and use of the media does not allow for full two-way communication. Funding limitations also impose restrictions on the use and frequency to which certain media can be used.

Because of the large amount of information that must be disseminated to the public, the media has been and will be used extensively throughout the study. News releases through radio, television, and newspapers all will be used.

e. Surveys. Surveys will be used throughout the study to inform and to elicit responses from the public about issues and alternatives. The strengths of this technique are: It provides input from the public which is easy to analyze, because each respondent is answering the same topics; and it encourages input from large numbers of people within and outside the study area. The weakness is: Many people do not respond to surveys, so there is often a large "no response" category; and it is difficult to structure and conduct an effective survey.

In order to evaluate the economic merits of alternative plans developed further in the detailed planning phase (Stage 3), a survey is planned to compile data on potential recreational boat usage of the study area of the Grand River. The survey form would be transmitted to a random sampling of 40,000 registered boaters in Kent and Ottawa Counties. The collected data would then be analyzed to derive the benefits that would be expected from locally-based craft if the area

were modified in the interest of shallow-draft navigation. Currently awaiting authorization from the Office of Management and Budget, the proposed survey will possibly be released to the public during the Stage 3 planning phase.

f. Small group workshops. Workshops are a technique that are used in Stage 2 and 3 of the study. People involved in the workshops will be divided into small, mixed-interest groups for the purpose of discussing issues and recommending solutions to problems. The strengths of this technique are: A workshop can be an interesting experience to the participants and can encourage further participation; it is a technique which allows opposing viewpoints to be aired and allows acceptable trade-offs; and it is a good way of informing the public and getting input for developing various alternatives. The weaknesses of this technique are: It is costly and time-consuming for both the study team and the public; local, special-interest groups can predominate and could possibly bias input; and requiring participants of the workshop to reach a compromise could hide the full range of conflicting opinions. The frequency of workshops and target publics to be invited will depend, to some degree, on study input desired and study progress. Target publics will often be selected during advisory group meetings discussed below. Three informal meetings to discuss the study status have been held to date by the Grand Haven Project Office Chief. Two meetings, held 18 May 1976 and 16 November 1976, have been with the West Michigan Environmental Action Council. The third meeting was held 18 November 1976 with the Grand Rapids Engineers Club. Announcements of workshop meetings will be made through mailings for small meetings, and mailings and media notification for moderate-sized group sessions.

g. Study group. A citizens study committee has been established to suggest alternatives, identify types of impacts to be considered and evaluate final plans and indicate desirable and undesirable trade-offs. Strengths of study groups are: They may function as sounding

boards reflecting public opinion, and they can be an effective means of dispensing information to the general public. Weaknesses of the study groups are: They may not reflect the full range of interests; they may tend to represent only local or special interest viewpoints; and the general public may not feel that it is being adequately represented. The citizens committee has obtained representation from organized groups, civic concerns, and local governmental interests who showed an interest through a review of the Draft Plan of Study dated October 1976. The Detroit District has contacted additional interested parties to establish their desire for participation in the committee to insure active representation from all sides of the issue. Although the agenda for committee meetings is established by the Corps of Engineers based upon study progress, the citizens selected the operational procedures and methods of conducting the sessions at the initial meeting. Citizen participation is voluntary.

To date, two Study Committee Meetings have transpired, and a third meeting is planned. The initial meeting, held on 24 February 1977, was moderated by the Corps of Engineers. The status of the Grand River study project was detailed for the committee, and the general study procedure was outlined with the aid of handouts. Two requests were made by the Corps of Engineers for information pertinent to the study. First, land-use projections data for communities bordering the Grand River study area were requested, and representatives of the West Michigan Regional Planning Commission offered the needed information to the Corps of Engineers. Second, a request was made for a list of riverfront property owners, so as to identify riverfront usage and provide a basis from which the views of individuals who would be directly affected by future project actions could be determined. The representatives of the affected communities offered property rolls to the Corps of Engineers for extraction of the needed data. To obtain inputs on public involvement procedures, a handout of a suggested letter and DATA FORM, which would collect information on potential recreational boat usage of the Grand

River by 40,000 randomly sampled area boaters was provided, and suggestions for modification were made.

During the second meeting, dated 10 May 1977, further suggestions for revision of the DATA FORM were proposed. For the information of the Study Committee economic procedures for calculations of plan benefits, key to plan-selection procedure, were discussed, and a revised time schedule for the Grand River project was revealed. A discussion of three alternative plans of action for the study centered on (a) piling removal, (b) the valley preserve recreation concept, and (c) channel dredging plans. It was the general concensus of the Study Committee that a memo be transmitted by the Corps of Engineers to the general public, for the purpose of informing concerned citizens of the progress of the Grand River Study. A copy of the minutes of the two study committee meetings is included on pages D-28 through D-39 of Appendix D.

h. Other techniques. Evaluation of the effectiveness of the above techniques during the study may suggest that other techniques are more suitable to the objectives, publics, etc. At that time, other techniques may be considered and may include:

(1) Public field trips or tours of the study area,

(2) Speeches and presentations to interested groups,

(3) Displays and exhibits,

(4) Seminars,

(5) Special publications and use of the public group's newsletters, and

(6) Others.

21. Analyzing public input. Analysis of public input consists of summarizing, describing, and arranging the large quantities of information that are received from the various publics. It involves the identification of underlying values, attitudes, and opinions held by the people involved in the study. The content, nature, and extent of public input will have to be summarized before evaluation of that input can be accomplished, and before recommendations and decisions based on public input can be made.

22. The following principles will guide the analysis:

a. Specific questions, to be posed to the public will be carefully prepared so answers received will be in a form that can be effectively analyzed. As public involvement documents are being prepared, thought will be given as to what the value of responses might be in identifying issues, alternatives, and impacts. By proper structuring of public involvement materials, public input can be focused on the most important issues, and the collection efforts will be greatly reduced. With smaller amounts of irrelevant public input, analysis will be a much easier task to perform.

b. All information which is received from the public is useful, regardless of its form or detail, and will be analyzed. Some people's views will be emotional arguments for or against various plans, while others will be well-reasoned, logical arguments; both are useful in the planning process and should be summarized for later evaluation.

c. All input which is received will be analyzed systematically and objectively. If it is summarized logically, the result will be a better and more consistent analysis, and greater understanding will be developed with outside agencies and public groups.

d. People's views received in earlier phases of the study may change in later phases; therefore, analysis will be continuous, to insure that these changes are recorded, and to insure they will be incorporated into the decision-making process.

23. Evaluating public input and the public involvement program. Two kinds of evaluation will be required: First, appraisals of the importance of the public input itself will be performed; and second, interpretations of the effectiveness of the public involvement program and the various techniques used to collect public input will be made.

a. Evaluation of public input. Determining the importance of different kinds of public input is an integral part of the decision-making process. Public views are as important to the process as other factors, such as economic impacts, cost, and environmental considerations. Weighing the different kinds of public input against one another, and against other factors, is necessary if decisions are to be accepted by the various publics.

Two basic assumptions regarding the value of public input have been made. By recognizing these assumptions, there is a better chance that all input will be evaluated consistently. Also, by explicitly stating the assumptions, the public has an opportunity to understand, review, and comment on the decision-making process during the study, rather than only at its completion.

Assumption #1 - All public input expresses underlying values and therefore is important. If, for example, emotional views unsupported by facts are screened out, then the public involvement process no longer will be an accurate indicator of acceptable decisions.

Assumption #2 - Both the quantitative and qualitative aspects of public input are relevant. It is as important to know how people feel about the plans and why they feel as they do, as it is to know how many people support or reject certain plans.

b. Evaluation of the public involvement program. Determining the effectiveness of the public involvement program and the techniques designed to carry it out is another purpose of evaluation. Merely counting the numbers of people involved is not an adequate evaluation, nor is it an indicator of an effective involvement program. The numbers are important; however, the quality of the input and the results of the interaction between the study team members and the public are just as important as the number of people.

24. The best opportunities for evaluating the effectiveness of public involvement in the study will be given during the public meetings that are scheduled in Stage 3. At these meetings, the public will have the opportunity to comment on the public involvement program, as well as on other planning activities. These meetings also will allow the study team to evaluate the effectiveness of the one-way information effort; that is, how much knowledge the public has of the study. The study group which was discussed previously will also play a role in evaluation of the public involvement program.

GRAND RIVER SHALLOW-DRAFT Memo

A public information fact sheet describing the status of the Grand River shallow-draft navigation study.

28 OCT 1977

DETROIT DISTRICT, U.S. ARMY CORPS OF ENGINEERS

(This is the second in a series of Memos to concerned citizens dealing with the Grand River shallow-draft navigation study.)

The Preliminary Feasibility Report (PFR), to investigate the engineering, economic, and environmental practicability of modifying the Grand River in the interest of shallow-draft navigation for the 22.5 mile reach from Bass River to Grand Rapids, Michigan, has been completed. This PFR was forwarded to higher authorities for review and approval in late September.

Following approval, copies of the Preliminary Feasibility Report will be sent to all known interested citizens, key governmental agencies, local libraries and special interest groups. Copies will also be sent to other interested parties upon request.

Five alternative plans are considered in the PFR:

a. Channel Dredging Plan - 22 total miles of the Grand River would be dredged to a depth of 7 feet and a width of 100 feet. In addition to the dredging, major navigation obstructions would be removed.

b. Pile Removal with Limited Dredging Plan - Key navigation obstructions (pilings and wing walls) would be removed and a channel 50 feet wide and 5 feet deep would be dredged.

c. Pile Removal Plan - Pilings and wing wall obstructions which are a definite hazard to safe navigation would be removed with no dredging operation.

d. Valley Preserve Recreation Plan - Nature centers, picnic areas and recreational facilities would be constructed in designated areas. This development on both sides of the 22.5 mile stretch of the Grand River would promote enhancement of the natural surroundings in the area.

e. No Action Plan - (do nothing.)

Specific details on each alternative will be discussed at a public meeting scheduled for January 1978. An announcement regarding the meeting will be mailed at a later date.

Comments on the study progress or information pertinent to the study effort can be directed to the U.S. Army Corps of Engineers Detroit District, P.O. Box 1027, Detroit, Michigan 48231, or Study Committee Representatives. A list of the committee is attached.

The Detroit District, U.S. Army Corps of Engineers, will continue to keep you informed through Memos on the progress of the Grand River Shallow-Draft Study.

GRAND RIVER SHALLOW-DRAFT STUDY COMMITTEE

City of Grand Rapids
300 Monroe N. W.
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(616) 456-3060

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263 Church Street
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Polkton Township
289 Danforth Street
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Development Commission
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City of Grandville
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(616) 895-6295

Tallmadge Township
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Grand River Area Navigation Development
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North West Ottawa Chamber of Commerce
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Grand Haven, MI 49417
(616) 842-4910

Michigan United Conservation Clubs
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County of Ottawa
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Grand Haven, MI 49417
(616) 846-8235

Grand Rapids Area Chamber of Commerce
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Grand Rapids, MI 49502
(616) 459-7221

Corps of Engineers
Grand Haven Area Office
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Grand Haven, MI 49417
(616) 842-5510

Grand River Shallow-Draft Committee (Con't)

Corps of Engineers
Detroit District
Box 1027
Detroit, MI 48231
(313) 226-6757 (Philip Gersten)

GRAND RIVER SHALLOW-DRAFT Memo

A public information fact sheet describing the status of the Grand River shallow-draft navigation study.

9 JUN 1977

DETROIT DISTRICT, U.S. ARMY CORPS OF ENGINEERS

(This is the first in a series of Memos to concerned citizens dealing with the Grand River shallow-draft navigation study.)

The investigation to determine the engineering, economic, and environmental feasibility of modifying the Grand River in the interest of shallow-draft navigation between Bass River and Grand Rapids, Michigan, is currently in the preliminary study phase. During this phase, preliminary studies for this section of river covering 22.5 miles are being conducted to determine the initial feasibility of various alternatives and to identify plans for further consideration.

The Grand River Shallow-Draft Plan of Study, prepared in February 1977, set forth the direction and schedule of events for accomplishment of study tasks. The study schedule has subsequently been revised, due to adjustments in the President's Budget for Fiscal Year 1978. As a result, significant activities are programmed as follows:

Complete Preliminary Feasibility Report	Sept 77
Conduct Alternatives Public Meeting	Jan 78
Conduct Formulation Public Meeting	Jan 79
Complete Draft Feasibility Report and Draft Environmental Statement	Jun 79
Conduct Late Stage Public Meeting	Sept 79
Complete Final Feasibility Report and Environmental Statement	Dec 79

As you may know, a Study Committee has been formed to monitor the study progress to insure that the overall desires of the general public are being addressed, and also to provide a source of input into the study effort. Due to the number of individuals that expressed a desire to participate on the Study Committee, it was decided that the committee should be limited to regional groups in order to be effective. Accordingly, representatives of eight communities, two counties, two planning commissions, and five organized interest groups have been invited to participate and are listed at the end of this memo. To date, two committee meetings (24 February 1977 and 10 May 1977) have been held. In addition to constructive suggestions received on alternative plans under investigation, information concerning land-use and property ownership has also been obtained through the committee. The committee has also aided in the development of a Survey Form which will be transmitted to boaters and riverfront property owners during the upcoming detailed study phase. The information to be collected from the sampling will be used to determine local desires and evaluate the

potential boating benefits that could be expected to occur from alternative plans. Prior to transmission of the Survey Form to the public, approval for use of the form will be requested from the Office of Management and Budget in accordance with the Federal Reports Act.

For your information, alternative plans that are being considered in the preliminary study phase generally range within the following four categories:

a. Provision of a channel extending from Bass River to Grand Rapids with adequate capacity to handle recreational boating of the area. (Preliminary studies are investigating channel dimensions varying between 5-foot and 7-foot depths and 80-foot to 100-foot widths.)

b. Removal of existing obstructions in the river, such as training walls, pilings and wingwalls with only limited channel works, if needed.

c. Implementation of a valley preserve concept which would evaluate the river as a natural system. (This concept has the purpose of preserving or enhancing the river for fish, wildlife, ecologic, historic and recreational values and uses. Adjacent lands to the river would be included as appropriate and designated for hunting, fishing, hiking, sight-seeing and nature walks. Non-motorized boating would be acceptable as a water-oriented activity.)

d. No action (do nothing).

Comments on the study progress or information pertinent to the study effort are welcome anytime and can be directed to the U.S. Army Corps of Engineers Detroit District, P.O. Box 1027, Detroit, Michigan 48231, or Study Committee representatives. Information that would be helpful in our preliminary phase of study would include: (a) data concerning the extent of canoe usage along the Grand River and (b) suggestions for site locations that could prove acceptable for disposal of dredge material resulting from channel modification.

A listing of organizations invited to participate on the Study Committee follows:

City of Grand Rapids	Kent County
City of Walker	Ottawa County
City of Wyoming	Sierra Club
City of Grandville	Michigan United Conservation Clubs
Georgetown Township	West Michigan Regional Planning Commission
Allendale Township	West Michigan Shoreline Regional Development Commission
Polkton Township	West Michigan Environmental Action Council

Tallmadge Township
North West Ottawa County Chamber of Commerce

Grand River Area Navigation Development

The Detroit District, U.S. Army Corps of Engineers, will continue to keep you informed through memos such as this on the progress of the Grand River Shallow-Draft Study.

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

GRAND RIVER SHALLOW-DRAFT
STUDY COMMITTEE
MEETING MINUTES
24 FEBRUARY 1977

1. GENERAL

The initial meeting of the Grand River Shallow-Draft Study Committee was held at the Georgetown Charter Township Office, 263 Church Street, Jenison, Michigan. Individuals representing the counties, communities, and organized groups with a known interest in the study were invited. A list showing the attendees is attached.

2. COMMITTEE ORGANIZATION

Mr. Dale Monteith opened the meeting by indicating that it would be conducted in an informal manner. It was noted that the committee was organized so that interested parties would be able to monitor the study progress to insure that the overall desires of the public are being addressed, and also to provide a source of input into the study effort.

Mr. Monteith suggested that the committee should nominate a moderator, other than himself, to conduct the meetings since they are intended to be mutually beneficial to all parties. It was also suggested that a secretary be nominated to prepare minutes of the committee meetings. Dr. Norris recommended that a few meetings be held so that the attendees become familiar with other group members and the overall purpose of the meetings are known. No opposition was voiced to this proposal and Mr. Monteith stated, therefore, that the Corps would moderate the first few meetings and prepare draft minutes for review. Mr. Monteith requested that each representative name an alternate from their organization in the future to attend in their absence.

Mr. Monteith stated that several individuals in the Grand River area had expressed a desire to participate in the study. A handout listing these individuals was provided. A suggestion was made that Dr. William Yerkes be included on the committee since he has valuable technical knowledge with respect to water quality. It was noted that Mr. Jay Wabeke was in attendance as a representative of the Grand Rapids Chamber of Commerce. Mr. Monteith explained that Corps of Engineers' public meetings

and workshops would be held during the study process and those individuals that had expressed a desire to participate would be invited.

3. STUDY STATUS

Handouts were provided which summarized the three stages of the feasibility report process. Stage 2 planning underway was explained as basically a literature search phase which is used to outline alternative plans without concentrating on detailed engineering or design considerations. A Preliminary Feasibility Report (PFR), to be prepared in September 1977, will identify plans for further consideration. A System of Accounts will be presented in the report to relate significant beneficial and adverse contributions of the various alternatives. The PFR will not select a plan for implementation. The overall study time frame was presented with the stipulation that its reliability is dependent upon several factors, one being future anticipated funding by Congress. It was explained that Stage 3 planning (Development of Detailed Plans) would involve detailed field investigations that would include surveys, soils, sediment sampling, water quality and environmental data collection. Specific Federal guidelines would need to be followed in the planning process. These guidelines include compliance with the 1973 Water Resources Council's Principles and Standards and Section 122 of Public Law 91-611, which stipulates that 17 possible areas of impacts be addressed for the various alternative plans to be developed. Alternative plans would include the development of a National Economic Development (NED) plan and an Environmental Quality (EQ) plan.

4. COMMITTEE DISCUSSION

A request was made by the Corps for information pertinent to land use projections of the communities along the Grand River Study reach between Bass River and Fulton Street in Grand Rapids. Representatives of the "208 Planning Agencies" stated that they had this information and would make it available to the Corps. It was agreed that the Corps representatives should contact the Planning Agencies for the needed data. The projections would be used as a basis to portray future conditions without any project action.

Mr. Monteith expressed a desire to obtain a listing of riverfront property owners. This listing would be used to identify riverfront usage and provide a basis for determining the views of individuals that could be affected by future report recommendations. The representatives of the communities stated that the property rolls would be available for extraction of the needed information by the Corps.

A handout of a suggested letter and DATA FORM for collection of information on potential recreational boat usage of the Grand River by 200 area boaters was provided. Mr. Monteith requested suggestions for modification

of the DATA FORM. It was envisioned that the responses to the FORM would be collected by county representatives and provided to the Corps as part of participation on the Study Committee. Several suggestions and comments concerning the DATA FORM follow:

a. The FORM should indicate the city or township location of respondee.

b. The FORM should allow for an indication of the current and potential use (fishing, recreation, etc.) of the river by the respondee.

c. Questions to be included on the FORM should include:

(1) If applicable, why don't you presently use the river reach?

(2) If a navigation channel to Grand Rapids was provided, would you use the river reach? If not, why?

(3) What section of the Grand River would you desire to have modified in the interest of boating?

(4) How far from the river is your boat normally stored?

(5) If launching facilities other than those at Grandville and Deer Creek were provided, where would you desire the facilities?

d. The FORM should allow for "additional remarks" by the respondees.

e. Several concerns were voiced on use of the FORM. Dr. Norris warned that no extrapolation for projections would be methodologically sound. He also felt that telephone contacts for collection of needed data would prove more beneficial. A request was made to increase the sampling size and provide for verification of the accuracy of the sampling. Concern was also voiced that the FORM could be slanted since it was directed toward only known Kent and Ottawa County boaters. Mr. DeWindt stated a somewhat conflicting viewpoint by requesting that the FORM be confined to boaters residing within a six mile distance of the river.

Mr. Monteith stated that the above concerns would be presented to the Detroit District economist for his consideration. He further stated that, unless deemed otherwise by the economist, the subject letter would be used and followed by telephone contact, if the responses are inadequate in number. Mr. Monteith requested support in distribution and collection of the boating data. Mr. John Koches stated that his organization (Region 14-WMSRDC) would provide support for collection of Ottawa County data. Dr. Norris was asked if his organization (Region 8-WMRPC) would provide support for collection of Kent County data. Dr. Norris requested that the Corps contact him at a later date to verify WMRPC's participation in this matter. Several committee members stated a desire that they be advised when the DATA FORMS are distributed to the public.

With respect to disposal sites that could be required for certain alternatives that would be investigated, Mr. Monteith suggested that committee members be thinking of potential areas for such use. A preliminary estimate of dredge quantities will be presented by the Corps at the next committee meeting. Mr. Ross Kittleman suggested that several old quarry sites be given consideration by the committee for disposal of material, since such a situation would allow for land reclamation.

With respect to water quality, fish sampling, archeological and historical data that would be required for the Grand River study, Mr. Dodyk stated that we are currently conducting a literature search to obtain information. During Stage 3 planning, field investigations and detailed analysis would be conducted. According to the "208 Agency" representatives, the major objections to any channel modifications would be disruption of the bottom sediments. The 208 directors are of the opinion that 40 years of metal plating and other industrial operations have resulted in discharges to the river that would violate present day discharge standards. They cite the fact that the water quality of Grand River at Eastmanville, 20 miles downstream from Grand Rapids, does not meet water quality standards due to discharges from the Grand Rapids area. They feel that heavy metals and other toxic materials have stabilized in the river bottom. Any disruptions that would occur as a result of channel modifications could cause these materials to re-enter the water and cause harmful effects to aquatic life and water quality. They want assurances that dredging actions and resultant dredged material disposal would not harm the environment. As a start, they want sediment sampling and analysis to be performed at the present time during the Stage 2 planning. A suggestion was made that Dr. Yerkes of Grand Valley State College be contacted with respect to information on water quality sampling.

With respect to contacts that should be made concerning archeology and history, Mr. Weldon Frankfurter (Grand Rapids Public Museum) and Mr. Richard Flanders (Historical Societies) were suggested. Mr. John Kennaugh was recommended as a source of information concerning extent of canoe usage along the Grand River. Mr. Kennaugh was previously associated with the Grand River Watershed Council.

It was the consensus of the attendees that the next meeting should be held in approximately two months. Mr. Monteith indicated that the Corps would make contact with attendees when a date had been selected. Mr. DeWindt volunteered the use of the Georgetown Charter Township Hall for future meetings, due to its central location with respect to the study area.

2 Attachments
1. Study Committee
2. Committee Contact

GRAND RIVER SHALLOW-DRAFT STUDY COMMITTEE

City of Grand Rapids
300 Monroe N. W.
Grand Rapids, MI 49502
(616) 456-3060

City of Walker
4243 Rememberance Road, N. W.
Grand Rapids, MI 49504
(616) 453-2463

Georgetown Charter Township
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Polkton Township
289 Danforth Street
Coopersville, MI 49404
(616) 837-6403

West Michigan Shoreline Regional
Development Commission
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Muskegon, MI 49441
(616) 722-7878

City of Wyoming
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Wyoming, MI 49509
(616) 534-7671

City of Grandville
3195 Wilson S. W.
Grandville, MI 49418
(616) 531-3030

Allendale Township
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Allendale, MI 49401
(616) 895-6295

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Grand River Area Navigation Development
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North West Ottawa Chamber of Commerce
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Michigan United Conservation Clubs
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(517) 371-1041

County of Kent
333 Monroe Street, N. W.
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County of Ottawa
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Grand Haven, MI 49417
(616) 846-8235

Grand Rapids Area Chamber of Commerce
17 Fountain Street, N. W.
Grand Rapids, MI 49502
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Corps of Engineers
Grand Haven Area Office
P.O. Box 629
Grand Haven, MI 49417
(616) 842-5510

Grand River Shallow-Draft Committee (Con't)

Corps of Engineers
Detroit District
Box 1027
Detroit, MI 48231
(313) 226-6757 (Philip Gersten)

GRAND RIVER SHALLOW-DRAFT STUDY COMMITTEE

24 FEBRUARY 1977

Initial Groups Contacted:

City of Grand Rapids
City of Walker
City of Wyoming
City of Grandville
Georgetown Township
Allendale Township
Polkton Township
Tallmadge Township
Kent County
Ottawa County
West Michigan Regional Planning Commission (WMRPC)
West Michigan Shoreline Regional Development Commission (WMSRDC)
West Michigan Environmental Action Council (WMEAC)
North West Ottawa County Chamber of Commerce (NWOCCC)
Grand River Area Navigation Development (GRAND)
Michigan United Conservation Clubs (MUCC)

24 Feb 77 Group Attendees:

Richard L. Connell (Grand Rapids)
John Hornbach (Grand Rapids)
Gerald Snyder (Wyoming)
Kornelis Platteschorre (Grandville)
Gerald DeWindt (Georgetown Twp.)
Roger Rycenga (Allendale Twp.)
Kenneth Raak (Ottawa County)
Dr. Donald R. Norris (WMRPC)
John K. Koches (WMSRDC)
Jean Laug (WMEAC)
Bud Wynne-Parry (NWOCCC)
Marian Stevens (GRAND)
John W. Maring (GRAND)

Others Present:

Jay A. Wabeke (representing Grand Rapids Chamber of Commerce)
George W. Boynton (Jenison resident)

Corps of Engineers Staff Present:

John R. Vogel (Grand Haven)
Ross B. Kittleman (Grand Haven)
David Foster (Grand Haven)
Michael Dodyk (Detroit)
Dale Monteith (Detroit)

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

Minutes of the Grand River Shallow-Draft Study Committee

Date

Tuesday, 10 May 1977; 7:00 P.M.

Location

Georgetown Charter Township Hall

Study Members Present:

Kornelis Platteschorre (Grandville)
Gerald DeWindt (Georgetown Twp)
Roger Rycenga (Allendale Twp)
Jay Wabeke (Polkton Twp)
Paul LeBlanc (Region 8-WMRPC)
Jack Koerper (Region 14-WMSRDC)
William Yerkes (Sierra Club)
Jean Laug (WMEAC)
Stew Myers (MUCC)
Marian Stevens (GRAND)
Robert Winkle (GRAND)
Thomas Winkle (GRAND)

Others Present:

George Boynton (Concerned Citizen)
Charles Gregory (Concerned Citizen)

Corps of Engineers Staff Present:

Ross Kittleman (Grand Haven)
David Foster (Grand Haven)
Les Weigum (Detroit)
Mike DiGiovanni (Detroit)
Dale Monteith (Detroit)

Committee Business:

Minutes of the 24 February 1977 meeting were reviewed and found to be acceptable with the following name corrections:

Mr. William Yerkes should be Dr. William Yerkes;
Mr. Richard Flatters should be Mr. Richard Flanders; and
Mr. Kornelis Flattesborn should be Mr. Kornelis Platteschorre.

Rev. Wabeke stated that the Grand Rapids Area Chamber of Commerce did not want to be formally represented on the Study Committee and, therefore, he would represent Polkton Township. It was requested that Rev. Wabeke provide confirmation on his appointment by the Polkton Township Supervisor.

Mr. Monteith discussed revised procedures that would be undertaken with respect to navigational data collection. Prior to submitting a survey to public individuals, clearance on the DATA FORM needs to be obtained through the Office of Management and Budget. Ms. Laug suggested that the revised FORM be revised by the Study Committee prior to forwarding to OMB. Suggested revisions to the FORM, to be transmitted to boaters and property owners along the river, included the following questions and comments:

a. The FORM should include a glossary of terms.

b. Do you expect to continue to participate in recreational boating in future years?

c. Are you aware that a Department of Army permit is required prior to the construction of docks and other structures in navigable waters?

d. Would you be interested in utilizing the river within the study limits for motorized boating if a "no wake" law was enacted?

e. Attempts should be made to contact boaters who are not registered or individuals who do not own property along the river.

f. If your property fronts the river, would you be willing to sell a sectional strip along the river if a valley preserve concept were undertaken?

Dr. Yerkes stated that he would provide a listing of local boating clubs and canoeing clubs which would include individuals that would not have registered small-craft.

Mr. DiGiovanni discussed the procedures by which benefits are calculated for recreational boating. Rev. Wabeke questioned whether recreational boating uses are compatible with

the energy crisis and if the energy crisis actually makes boating unfeasible. However, Mr. Platteschorre stated that gasoline consumption by boat operation often proved to be far more energy-attractive than automobile usage for recreational pursuits. In response to a question concerning benefit-cost ratios, it was noted that a project must have a ratio which is at least 1 to 1 when comparing average annual benefits to average annual costs in order for a project to be considered economically feasible.

Mr. Monteith discussed a revised time schedule for the shallow-draft study. The tentative revisions result from funding proposals contained in the President's Fiscal Year 1978 Budget.

ALTERNATIVE PLAN DEVELOPMENT

A discussion of three alternative plans centered on the following:

Piling Removal

Estimates of pilings and wingwalls within the study limits range between 98,400 and 132,000 lineal feet. Mr. Boynton presented a sketch map indicating locations along the river that should have pilings removed, portions dredged, and areas marked. These activities would be in only those areas that could present a problem to navigation and would require limited work. Mr. Boynton suggested that consideration be given to cutting off the pilings rather than pulling them out. Mr. Myers suggested that extensive removal of the pilings could create significant silting in downstream channel areas. Mr. Kittleman noted that piling removal could change the river's current or have other effects resulting from a "restabilization" of the channel bottom materials. Mr. Myers questioned whether silting problems associated with upstream areas of the watershed would be investigated and was informed they would not. A Federal-State study is currently underway which is attempting to determine siltation-loading areas.

Valley Preserve

The valley preserve concept was discussed with respect to low-key recreation that would be appropriate for the Grand River study area. A summary of the Grand River Comprehensive Study with respect to a valley preserve concept was also discussed. Mr. Monteith read a 3 May 1977 letter from the Michigan Department of Natural Resources which indicates that the State does not have the necessary funding or responsibility for acquisition and regulation

of lands for a comprehensive valley preserve system. Mr. Monteith did relate, however, that royalties from oil and gas drillings within the State would eventually be available and could be used for purchase of lands for recreation and associated purposes under the State's Recreational Trust Fund. Mr. Myers noted that one source of revenue that may be applicable is that from hunting license fees for use in leasing hunting lands. Mr. Kittleman suggested that possible sources of funding be listed in the Preliminary Feasibility Report. The study of a valley preserve should also discuss which lands could come under State Act 231 or which are excluded. Dr. Yerkes suggested that the low lying areas adjacent to the river be considered as a floodway and only be used for seasonal activities. Ms. Stevens raised concern that lands provided for recreational activities would increase owners' taxes and could outweigh the monetary amount provided for a use easement. Ms. Laug suggested that a valley preserve concept would not be realistic below Riverside Park located downstream of the Bass River.

Channel Dredging

Tentative quantities for selected channel dimensions were discussed. Mr. Monteith discussed the problems associated with finding adequate sites for confinement of polluted dredging. The applicability of utilizing cost-sharing under the authority contained in Section 123 of P.L. 93-611 to the Grand River study was presented. Section 123 essentially allows the major (or all) costs for construction of the confined disposal facilities to be a Federal responsibility. If Section 123 does not apply, the facilities would be a local responsibility. Mr. Platteschorre suggested that old gravel pits near I-196 and upstream of M-11 be considered for potential disposal of material. Mr. Rycenga stated that low regions in the vicinity of Eastmanville Road could show potential for disposal of material, dependent upon the make-up of the dredged material. Mr. Weigum explained that the effects of filling would need to be examined to determine if adverse impacts, such as significantly altered water stages, would occur. Mr. Kittleman suggested that existing wing dams and some pilings would need to be removed. Mr. Boynton felt that a 30-foot wide channel could be acceptable to boating interests and would only require about 5 miles of dredging for adequate depths to be obtained. In response to a question, Mr. Kittleman stated that the study limits were not close enough to Lake Michigan to be considered within the Shorelands Protection Region.

It was the general consensus that a MEMO be transmitted by the Corps of Engineers to the general public to inform them of study progress.

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

DIGEST OF PROCEEDINGS OF THE FIRST PUBLIC MEETING CONCERNING THE NEED FOR IMPROVEMENT FOR SHALLOW-DRAFT NAVIGATION ALONG THE GRAND RIVER FROM GRAND RAPIDS TO IMMEDIATELY DOWNSTREAM FROM EASTMANVILLE, MICHIGAN

1. GENERAL

The first public meeting on the Grand River Project Study was held on 25 May 1976 by the District Engineer, Detroit District, Corps of Engineers, at Calvin College, Gezon Auditorium, Grand Rapids, Michigan. The meeting began at 7:30 p.m. and terminated at 10:20 p.m. A total of 115 people were present, representing various Federal and State agencies, business, conservation, and environmental interests, et al.

2. MEETING

The meeting was opened by Colonel James E. Hays, District Engineer, Detroit District, U.S. Army Corps of Engineers. Colonel Hays introduced the members of his staff who would be involved in the study and stated that the purpose of the meeting was to give all interested parties an opportunity to express their views as to the need for shallow-draft navigation improvements on the Grand River from Grand Rapids downstream to the Bass River point.

3. The meeting was held because the U.S. House of Representatives adopted a resolution on 9 April 1957 requesting that the Corps of Engineers make a survey with a view to modifying the existing authorized Grand River, Michigan, navigation project.

Colonel Hays presented the major steps that a Corps of Engineers study must go through before implementing any project. He also reviewed the breakdown of funding on recreation projects and the assurances that local interests are usually required to provide.

Colonel Hays discussed the kinds of information that the Corps of Engineers was interested in obtaining from those attending the meeting.

4. Statements presented during the session are summarized in the following paragraphs.

a. Michigan Department of Natural Resources, Harry Doehne, Federal-State Project Coordinator, submitted a written statement requesting that all of the values of recreational boating and navigation, both positive and negative, including the dredging and spoil disposal problems, should be evaluated against all of the values of the fishery and environmental quality.

b. Region 8, West Michigan Regional Planning Commission, Dr. Donald Norris, Director, 208 Areawide Waste Treatment Management Planning Program, submitted a written statement. He urged that the Corps project study be closely coordinated with the 208 Program. He asked that both the negative and positive effects of the project be considered, and added that the West Michigan Regional Planning Commission has taken no formal position on the project study.

c. Georgetown Township, Gerald DeWindt, Township Supervisor. He expressed the interest of the Township for improved recreation usage and relief of flooding through this project. Mr. DeWindt provided the Corps with a copy of the Community Development Plan and volunteered his Township's cooperation.

d. Grand River Watershed Council, Winfred Ettesvold, Chairman, volunteered the cooperation of the Watershed Council in presenting the project to the local communities in an impartial and objective manner. He urged the public not to decide on the project until the facts have been evaluated.

e. Local citizen, Morris Hinken, advocated that the Grand River be returned to its original form, and that the abandoned spiles be removed from the river.

f. West Michigan Environmental Action Council, Robert Grooters, stated that the Corps should retain the area of the Grand River under study as one of the few quiet and natural places available. He also suggested that data in the Comprehensive Water Resources Study of the Grand River Basin be considered in this study.

g. Local citizen, Neal Platteschorre, recommended that Grand River be dredged so that it can be used by motorboats and yachts and that the riverfront should be accessible to all.

h. Local citizen, Charles Gregory, favors the use of the Grand River for canoes only as the increased use of motorboats would increase shoreline erosion.

i. Resident of Ottawa County, John Langeland, felt that the river should be dredged for motorboat traffic; that it would economically benefit the area.

j. Land owner on Grand River, Barbara Collins, said that if the spilings in the river were removed, more boats could go down the river. Such an action would cost less than dredging.

k. Grand River Area Navigation Development, Marian Stevens, Corresponding Secretary, submitted a written statement urging that the Grand River be cleaned out for shallow-draft navigation purposes for the benefit of the area and the State of Michigan.

l. Michigan Trailfinders Club, Robert Veenstra, representing 300 members, advocated leaving the river in its natural state. He felt that the cost of the dredging would far exceed the benefit.

m. Michigan Bass Federation, Stan Arnold, representing 4,000 members, expressed concern about what would be done with the dredged spoils, the effect of increased boat traffic, and the effect on the bass population.

n. Region 14, West Michigan Regional Planning Commission, Patrick Tyson, Director, 208 Areawide Waste Treatment Management Planning Program, stated that the Planning Commission has no position on the Grand River Project Study. He urged that all aspects of the project be considered.

o. Resident of Grand River, Jan Prawdzik, expressed concern for a site for dredgings, loss of wetlands, density of future boat traffic, and the effect, both economically and environmentally, on neighboring communities.

p. Resident of Eastmanville, Reverend Wabeke, stated that he, as a riverfront resident, does not want the Grand River dredged.

q. Resident, Pat Spitzig, advocates leaving the river the way it is.

r. Michigan United Conservation Club, Wayne Schmidt, Member, stated that the Corps should consider impact to the area when polluted material is disturbed, a site for dredged material, who will benefit and who will pay, and the long-term implications.

s. Resident of Eastmanville, Jean Laug, stated that the project will cause increased erosion and a higher cost to local citizens to enforce river traffic regulations.

t. Barbara Collins asked when the project proposal would be decided upon.

u. Robert Grooters asked how the interest rate was included in the funding of the project.

v. Wes Jankowski, representing the Grand River Valley Steelheaders, asked if the project would affect the salmon and steelhead in the river.

w. Mike Cary, private citizen, urged that the Corps of Engineers consider the Michigan Inland Lakes and Streams Act before deciding on a project.

x. Charles Gregory questioned the carrying capacity for boats in the Grand River and wanted to see details of how the figures were arrived at.

y. David Forney, West Michigan Environmental Action Council, asked if there would be other opportunities for citizen input, and volunteered his organization's assistance.

z. Robert Blackburn suggested that the Corps consider removing pilings and obstructions in the river as an alternative to dredging or not dredging.

5. DISCUSSION

Following the presentation of formal statements, Colonel Hays opened the meeting for a question and answer period. Questions were asked about dredging, erosion, environmental concerns, State and Federal coordination, definition of local government, annual maintenance cost of the project, and pollution in the Grand River.

6. CONCLUSION

Colonel Hays concluded the meeting by indicating that the Corps of Engineers encouraged the formation of a public advisory group to assist the Detroit District in the Grand River Project Study.

7. Following the public meeting, the Township of Polkton advised the Detroit District Corps of Engineers by letter dated 31 May 1976 that they are opposed to dredging of the Grand River.

ATTENDANCE LIST - PUBLIC HEARING - GRAND RAPIDS, MICHIGAN
TUESDAY, MAY 25, 1976

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Carl Argiroff

Nancy Dunn

Less Weigum

U. S. Army Corps of Engineers

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

East Lansing Area Office
1405 South Harrison Road
East Lansing, Michigan 48823

November 8, 1977

Colonel Melvyn D. Remus
U.S. Army Engineer District,
Detroit
P.O. Box 1027
Detroit, Michigan 48231

Attention: Dale Monteith

Dear Colonel Remus:

This letter concerns the proposed Grand River Shallow Draft Navigation Study and the anticipated effects of the project on fish and wildlife resources. In order to determine the possible effects of the proposed project, we have conducted a survey of fish populations near the piling areas and a general census of wildlife population densities in the project area.

Four trips to the project area to survey fish populations were conducted during August and September, 1977. It was determined that the pilings proposed for removal are providing excellent fish habitat and are supporting significant fish population.

During our first trip, in August, a majority of the pilings were visible. We constructed general maps noting their locations. These pilings could be adequately marked with either new, higher piling spaced 100' apart, or with buoys to facilitiate navigation. Removal would only be required in very small areas to facilitate small boat traffic. These openings could also be marked.

Our sampling operation was conducted during a period of low (August) and seasonally normal (September) water conditions. We utilized a 21 foot shocking craft and experienced no difficulty navigating the river between Grandville and the lower reach of the project. Electro-sampling was done along piling areas, shoreline areas (control), and in open water sections (control) of the river. Nine locations were chosen at random for sampling. When catch comparisons were made between the control station adjacent to the sampled piling areas, only two control series yielded more fish. The other seven piling locations produced 1.4 to 32 times more fish than the control locations.

In our opinion, any attempt at "wholesale" removal of the piling and associated channel construction will adversely affect or destroy a major portion of the fishery habitat in this section of the Grand River. For this reason, we recommend against any such proposal. Any attempt to develop this section of the river for high speed/large boat traffic will seriously degrade the area's habitat for both fish and wildlife.

Wildlife activity along the river was also documented on these field trips. The portion of the proposed navigation channel reach lying between Grandville and Eastmanville, being generally undeveloped, supports a large and diverse population of birds, mammals and reptiles. No such populations were in evidence in areas where the river's depth (below Eastmanville) now allow large, high speed boat traffic and where urbanization has taken place.

The alternative of a wildlife preserve system for the area would be a definite plus, helping to retard any large scale development of the shoreline areas and to control the bank erosion that is being precipitated by over-grazing of cattle along the river bank at this time.

We hope these comments will assist you in project development and look forward to continued coordination.

Sincerely,

Richard A. Winters

Acting Area Manager

cc: Regional Office, Twin Cities, MN (ES)
Director, Michigan DNR, Lansing, MI

April 14, 1977

Serial No. 655-77
File No. OTT

Mr. P. McCallister, Chief
Engineering Division
Detroit District, Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

This letter is in response to your letter of April 5, 1977, concerning the dredging of the Grand River from Bass River to Grand Rapids. Your first request of us was for a 50-year projection of fleet size in the two county area. We have taken the liberty of revising the categories of boats slightly to correspond with available boat registration data. The following table gives our best estimate of what the fleet size might be by 2027 in that area. This estimate is based on the average annual growth of 3.43% per year for 53 years (53 years from the base year of 1974) or a total growth of 181.97% over 1974 registrations. This assumes that those factors which influence fleet size will continue to have the same effect as in the past. Although we are certain that the creation of an improved boating resource will have some impact on fleet growth we cannot say what that impact would be.

Type of Craft		(1974) Present Fleet Kent Co.	Ottawa Co.	Totals	2027 Fleet 181.97%
Outboards	under 20'	24,863	8,447	33,310	60,614
Inboards	under 20'	1,476	727	2,203	4,009
Cruisers	20'-30'	1,376	648	2,024	3,683
Cruisers	30' & over	231	108	339	617
Sailboats	under 20'	188	113	301	548
Sailboats	over 20'	232	166	398	724
		28,366	10,209	38,575	70,195

As for potential dredge disposal sites, we cannot offer any specific site suggestions. It is quite probable that bottom materials are polluted and would therefore have to be contained. Also, marshes and low areas would be eliminated as potential disposal sites. This leaves only onshore disposal possibilities.

Additional marina development would be in demand assuming the dredging option were selected. Our estimates of additional slip needs are geared toward Great Lakes needs and are therefore invalid for this purpose. However, we would estimate a need for at least 100 additional wells in the Grand Rapids area assuming navigability upstream as proposed in this project. Some additional launching capacity would also be required since most Ottawa County ramps on the Grand River are concentrated toward the lower stretches of the river. Our long range Capital Outlay plan points out the need for an additional 10 river access sites in the two state planning regions which surround Ottawa and Kent Counties.

The last two questions you pose relating to the valley preserve system we must refer to our Land Resource Programs Division since that office handles the Department of Natural Resources' responsibilities under the valley preserve program. We are therefore forwarding a copy of your letter and our response to them for further action.

If you have any questions regarding our response, please feel free to contact me.

Sincerely yours,

Raymond J. Lawson

for Keith Wilson, Chief
Waterways Division

KW:jeo:efg
cc: Karl Hosford

West Michigan Regional Planning Commission

"A Voluntary Association of Local Governments"

April 25, 1977

Mr. P. McCallister
Chief, Engineering Division
U.S. Army, Corps of Engineers
Detroit District
Box 1027
Detroit, MI 48231

RE: Grand River, Michigan
Shallow Draft Navigation
Study

Dear Sir:

Three items should be addressed in your preliminary feasibility report on the above named project. They are:

1. The probable impact that disturbing the river bottom as a result of dredging and/or removal of pilings will have on aquatic flora and fauna particularly in light of possible high concentrations of heavy metals in bottom sediments. The heavy metals to which specific attention should be paid include cadmium, chromium, copper, cyanides, nickel, silver and zinc. These materials have been deposited via municipal and industrial wastewater effluent discharged into the Grand River in the Grand Rapids area for forty or more years as a result of metal plating activities. Presently, these materials are sequestered on bottom sediment and inactive. Once disturbed, however, they could become active and, hence, potentially toxic to aquatic flora and fauna. Some sediment sampling data are available through Dr. Charles Knop, Chairman, Chemistry Department, Grand Valley State Colleges, Allendale, Michigan and through the Michigan Department of Natural Resources or Water Resources Commission.

2. The probable impact that changes to the configuration of the river channel and to the flow regime of the river resulting from dredging and/or removal of pilings will have on the waste assimilation capacity of the river downstream from the outfall of the Grand Rapids Wastewater Treatment Plant. Presently, three municipal WWTP's (Grand Rapids, Wyoming and Grandville) release treated wastewater (60 MGD estimated total for 1977 and 67 MGD estimated total for 1982) into the Grand between roughly river miles 39 and 34. Plans are being developed and some construction is already underway to add treatment capacity

1204 People's Bldg., 60 Monroe at Ionia / Grand Rapids, Michigan 49502 / Phone (616) 454-9375

to these plants. Said plans are predicated on the river's existing waste assimilation capacity and could be adversely affected by changes thereto.

3. Dredge spoil disposal should be suitably contained during dredging and suitably disposed in environmentally safe disposal sites. Attention should be given now to potential disposal locations.

Currently, millions of dollars and hundred of man-years of effort are being expended in the Grand Rapids area to improve water quality in the stretch of the Grand River under study by the Corps. It would be my position that no project should be undertaken on the Grand, particularly one of the magnitude of a shallow draft navigation project, which would have the net effect of retarding or undermining these efforts. Consequently, the three questions raised above deserve serious consideration and should be answered as completely as possible in your preliminary feasibility study. To proceed without answers to these questions would be to continue spending public dollars on one water project without knowing its probable effects on another publicly funded water project. At the very least an early determination of whether these projects are compatible should be made. Such a determination would facilitate decisions which may be necessary to alter project(s) to provide compatibility or to discontinue a project(s) which would produce negative environmental effects.

Sincerely,

Donald F. Norris, Ph. D.
Director
Clean Water Project

DFN:jsz

cc: T. Lera, EPA
C. Harvey, DNR
J. Hornbach, City Engr., G. R.

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, BOX 30028, LANSING, MICHIGAN 48909
HOWARD A. TANNER, Director

May 3, 1977

Mr. P. McCallister, Chief
Engineering Division
Detroit District
Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

This is in response to your letter of April 5, 1977 to Mr. Keith Wilson, Chief of the Waterways Division, concerning the dredging of the Grand River from Bass River to Grand Rapids.

One of the questions you posed to Mr. Wilson was regarding responsibility for designation, acquisition and regulation of lands for a valley preserve system among federal, state and local units of government. The state does not have the necessary funding or responsibility for acquisition and regulation of lands for a comprehensive valley preserve system.

However, the Department of Natural Resources does administer Act 231, P.A. 1970, Michigan's Natural Rivers Act. This Act is intended to protect selected free-flowing rivers which still largely possess natural qualities, from unwise land uses and practices which can have an adverse impact on the river. To implement this program, a river management plan is developed by the Department of Natural Resources with assistance from local citizens and governmental agencies. The plan recommendations will usually include setback requirements, minimum lot sizes, a vegetation strip along the river and so forth to guide future land uses along the river. These recommendations are then implemented through local zoning ordinances. Failure of local governments to adopt adequate zoning may mean the state will enact zoning rules for protection of the river.

Presently, there are no funds available for acquisition of lands or interests in lands.

Although no time frame has been developed, the Grand River is proposed to be studied for possible inclusion in the natural rivers system. Without having developed a river management plan, it is difficult for us to determine whether that particular portion of the Grand exhibits sufficient values to be included in the system.

MICHIGAN
THE GREAT LAKE STATE

R1026 10/76

As for what types of recreation would be desirable in a valley preserve zone, again, since we have not developed a river management plan, it is impossible to determine what types of recreation are most suited for that particular portion of river, what kind of recreation is needed in the area, and what would be acceptable to local residents. Section 3 of the Natural Rivers Act reads in part that the Natural Resources Commission may designate a river or portion"for the purpose of preserving and enhancing its values for water conservation, its free-flowing conditions, and its fish, wildlife, boating, scenic, aesthetic, flood plain, ecologic, historic and recreational values and uses". Our river management plan will usually make recommendations with regards to boating and recreation activities in the river district.

I might also point out that our statutory authority under this Act is limited to 400 feet from the river's edge, and does not include incorporated villages and cities.

If you have any questions regarding our response, please feel free to contact me.

Sincerely,

Karl R. Hosford, Chief
Land Resource Programs Division

KRH:DJH:jg

May 20, 1977

Serial No. 870-77
File No. OTT

Mr. Phillip McCallister, Chief
Engineering Division, Detroit District
U.S. Army, Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231

Dear Mr. McCallister:

This is in response to your letter of May 5, 1977, concerning the shallow-draft navigation study of the Grand River. Specifically, you asked what additional use might result from existing boats if the study reach of the Grand were improved.

This is a very difficult question to answer and we have little in the way of hard data to help us. Our best judgment is that many users would come from cruising craft currently moored in the lower reaches of the river. Our marina inventory indicates there are five facilities in Grand Haven with a combined capacity of 317 slips. Since the study section of the Grand is quite attractive and there would be additional times during the year when bad weather would preclude use of Lake Michigan by these craft, we think it is reasonable to assume that three to five trips a year would be generated for each of these craft. If each trip is two days in duration, six to ten boat days per slip would result or a total of 1,900 to 3,100 days of boating. In addition, we are certain that additional craft from both directions up and down the coast would be attracted to the river. These craft could easily double the number of boating days on the river.

In addition to the craft berthed at marinas, there are at least an equal number berthed at private properties in the Grand Haven-Spring Lake area. Accordingly, we would expect a similar response from this class of ownership which should generate from 1,900 to 3,100 days of boating use of the study area.

Another source of use would come from smaller craft entering the river from launching sites downstream from the subject area. There are nine such facilities which provide access to the study reach. Only one of these facilities has available use statistics and is considerably downstream from the study area. Estimated use for this facility was approximately 300 boat launches last summer. With eight other facilities providing similar use

to the river, even if only 20-25% went upstream to the study reach, an added 2,000 to 3,000 boat days would not be unreasonable.

In summary, our field people have indicated that this area of the Grand is very scenic and offers an excellent fishery potential. Many additional boating days could be provided if its navigability could be improved. If you have any further questions, please do not hesitate to call upon me.

Sincerely yours,

Keith Wilson

Keith Wilson, Chief
Waterways Division

KW:JO:jaw

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7423 MWR DCL

JUN 15 1977

Study Committee
U. S. Army Corps of Engineers
Detroit District
P. O. Box 1027
Detroit, Michigan 48231

Gentlemen:

In reference to your memo of June 9 concerning the Grand River in Michigan, the National Park Service has one area of interest on the Grand River. Norton Mound Group National Historic Landmark is located in Kent County, Wyoming township, T6N, R12W, Sections 3 and 4, in the city of Grand Rapids, Michigan. The boundaries of this landmark are shown on the enclosed map. As you will note, the Grand River is within the landmark boundary. Therefore, any project within the landmark will require Section 106 clearance. You may want to consider this in your planning process.

We look forward to future reports on this study.

Sincerely yours,

Merrill D. Beal

Merrill D. Beal
Regional Director

Enclosure

1977 JUN 17 AM 9 30

GEN. REG. BR.
DETROIT DISTRICT

MONICAL MACHINERY CO.
315 COMMERCE AVENUE, S.W.
ADDRESS REPLY: P.O. BOX 2367
GRAND RAPIDS, MICHIGAN 49501
TELEPHONE (616) 458-1571

August 4, 1977

U.S. Army Corps of Engineers
Detroit District
P.O. Box 1027
Detroit, Michigan 48231

Gentlemen:

As a property owner along the Grand River in Ottawa County, I received your June 9, 1977 memo. Although selfishly I can see the benefits of keeping the river pristeen and discouraging motorized boating, I don't believe the overall desires of the general public would best be served in this manner. It is a large body of water in a heavily populated area and I believe dredging a boat channel would open this up to general recreational activity. As for nonmotorized boating, I believe this stretch of the Grand River to be too large and the current too slow for canoeing. Except for a few areas near Grand Rapids, the wind fetch is too large for canoeing and yet the wind is totally inadequate for sailing except near Spring Lake.

Motorized boat traffic will lead to inevitable complaints from me and other property owners about bank erosion and I believe relaxed and easily attainable seawall construction and bank reinforcement permits would be a better solution than 20 odd miles of difficult to enforce "no wake" zoning.

Although my land requires no filling, I would not object to dredged material being deposited on my property if I was allowed to redistribute it upon my land as I saw fit. I would strenuously object to dredged material being deposited in a dike along my bank if I had to draw proposals and file papers with the DNR, the Corps, and whoever, before I could dispose of it. I agree with the general concept of retaining the "natural" contours of the bank but cannot see the justification of obtaining permits to move "unnatural" dredged material.

Yours truly,

W. L. Warber

WLW/bmw

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

HOWARD A. TANNER, Director

WATER QUALITY DIVISION
State of Michigan Office Building
350 Ottawa Avenue, N. W.
Grand Rapids, Michigan 49503

August 10, 1977

Mr. G. B. DeCook
Department of the Army
Corps of Engineers
Detroit District
P. O. Box 1027
Detroit, Michigan 48321

Dear Mr. DeCook:

We have reviewed our files of previous river studies and conferred with our Biological Studies Section in Lansing for actual data on sediment sampling. Despite the amount of data on water quality, fish sampling, etc., there are no data on actual mud or sediment samples.

The only passing reference is from a collection of bottom soil samples for sifting of benthic organisms. Generally, observations stated the bottom was often compacted sand or gravel. These observations apply to the stream segment from Grand Rapids downstream to below Eastmanville. Silty clays were occasionally found in and near both banks but were underlaid with compacted sand or gravels.

Very few comments were made on any significant amounts of organic sludges in this stretch. An occasional deeper hole would have some deposition of organic material.

The river in the stretch cited above apparently would not vary from the type of material normally dredged from the upper shipping lane near the Bass Island gravel area. If there are data on the type of bottom encountered the last time this channel was dredged, the area upstream appears to be similar.

Very truly yours,

WATER QUALITY DIVISION

Chester Harvey

Chester Harvey,
District Engineer

CH/mc

MICHIGAN
THE GREAT LAKE STATE
R1026-1 1/75

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (oan)
Ninth Coast Guard District
1240 East 9th St.
Cleveland, Ohio 44199
Phone: 216-522-3992

16500
Ser 424
29 August 1977

From: Commander, Ninth Coast Guard District
To: District Engineer, Detroit District, U. S. Army Corps of Engineers

Subj: Grand River Shallow-Draft Navigation Study

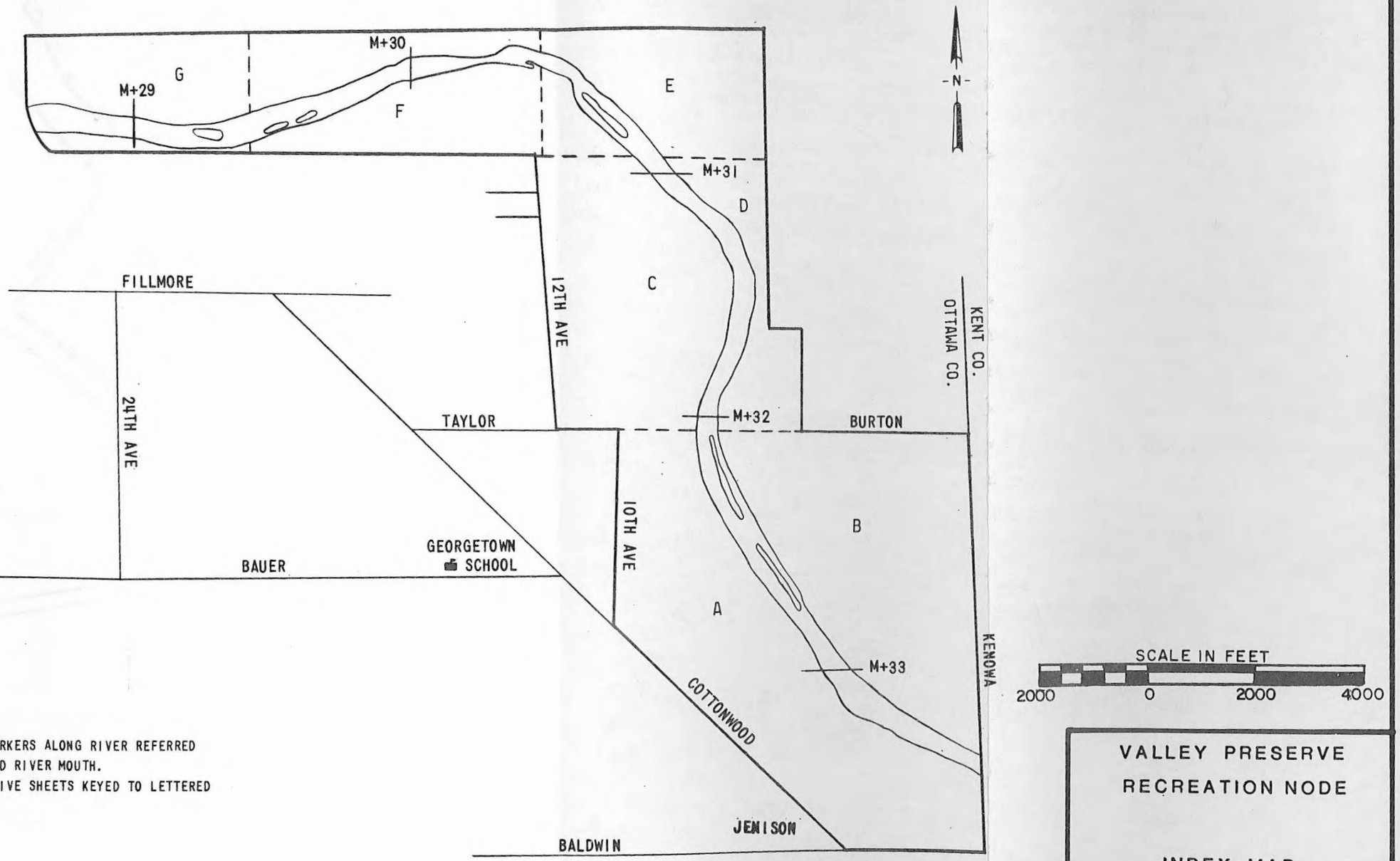
Ref: (a) NCEED-PB dtd 12 August 1977

1. Without a detailed drawing or chart showing proposed channel limits it is difficult to devise an aid to navigation marking system. However, using as a basis the density of aids marking the upper 10- mile reach of the existing Grand River Channel, we estimate that approximately 88 plastic buoys will be needed. Present cost per buoy including moorings is $225.00. Annual maintenance cost for each buoy is $25.00. The project's total estimated cost would be $19,800.00 for initial procurement of equipment and $2,200.00 for annual maintenance.

2. Proper placement of the buoys each year requires accurate navigation charts. It is essential therefore that the National Ocean Survey Charts for the Grand River be extended to include the reach under consideration for improvement.

3. Please keep us informed of the project's status.

H. H. KOTHE
By direction



NOTES

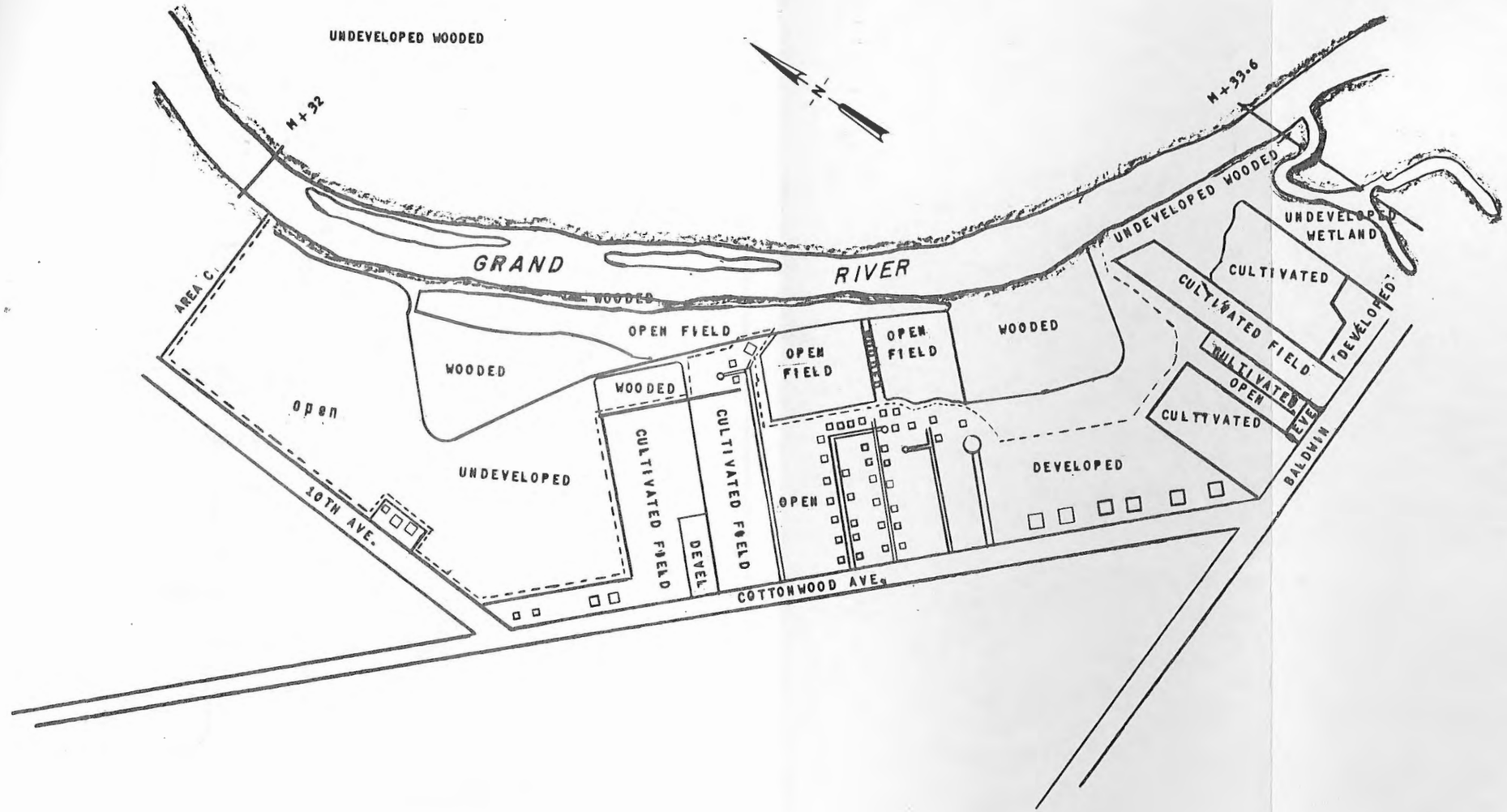
1. MILE MARKERS ALONG RIVER REFERRED TO GRAND RIVER MOUTH.
2. SUCCESSIVE SHEETS KEYED TO LETTERED AREAS.

VALLEY PRESERVE RECREATION NODE

INDEX MAP

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-1



SCALE IN FEET

1000 0 1000 2000

NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

EXISTING CONDITIONS

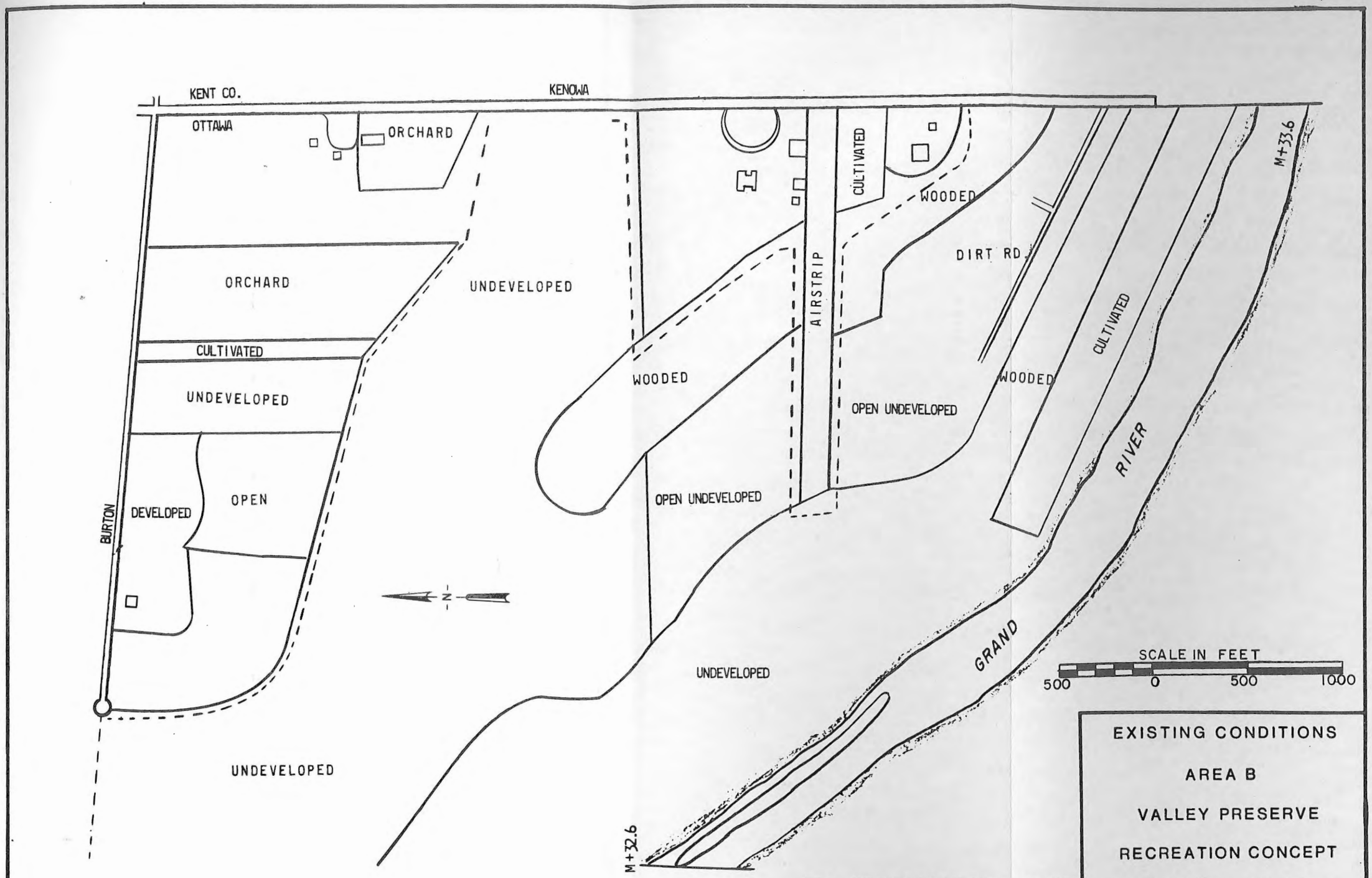
AREA A

VALLEY PRESERVE

RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT

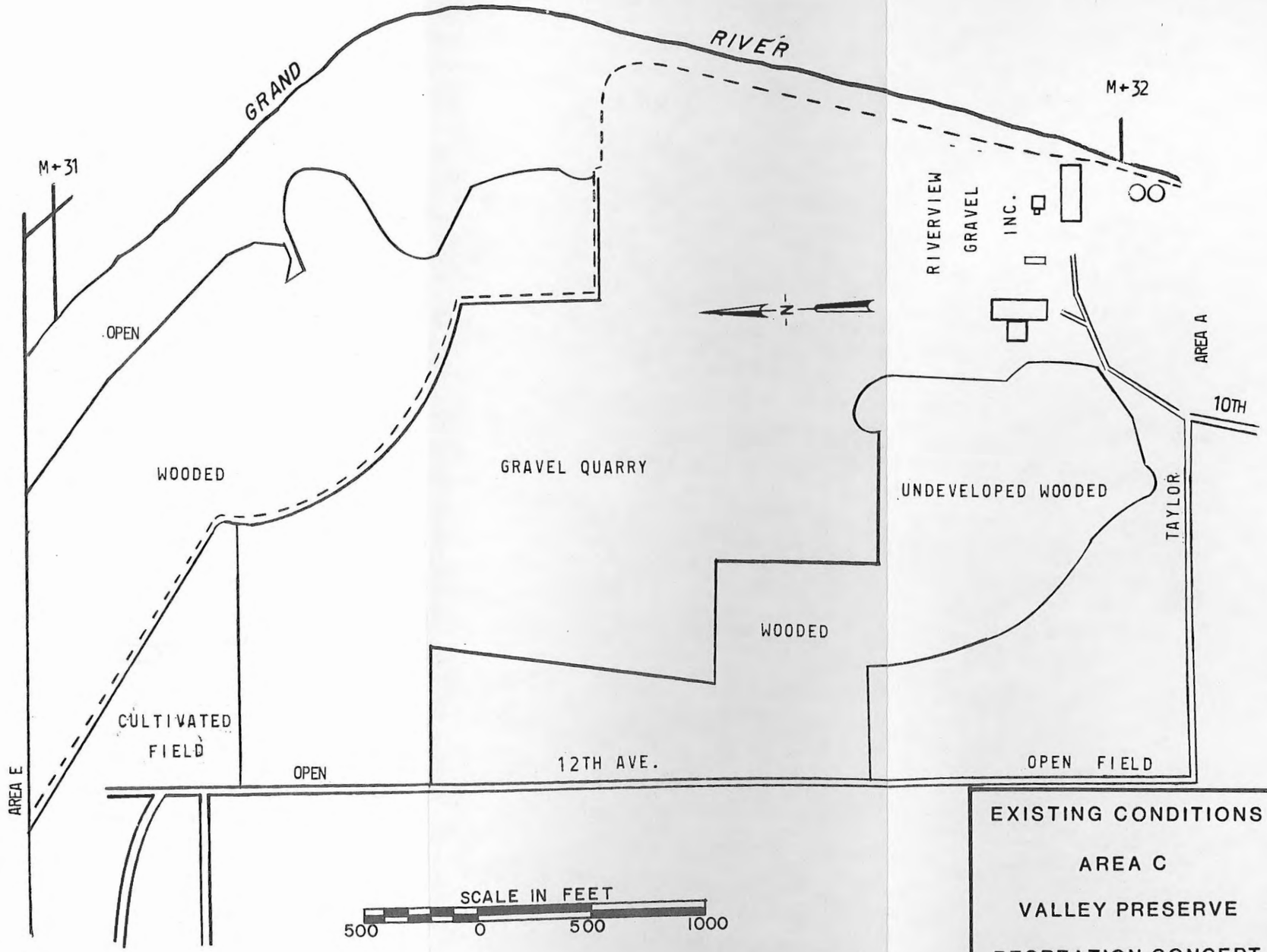
PLATE F-2



EXISTING CONDITIONS
AREA B
VALLEY PRESERVE
RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-3



NOTE : SEE PLATE F-1 FOR GENERAL LOCATION

EXISTING CONDITIONS

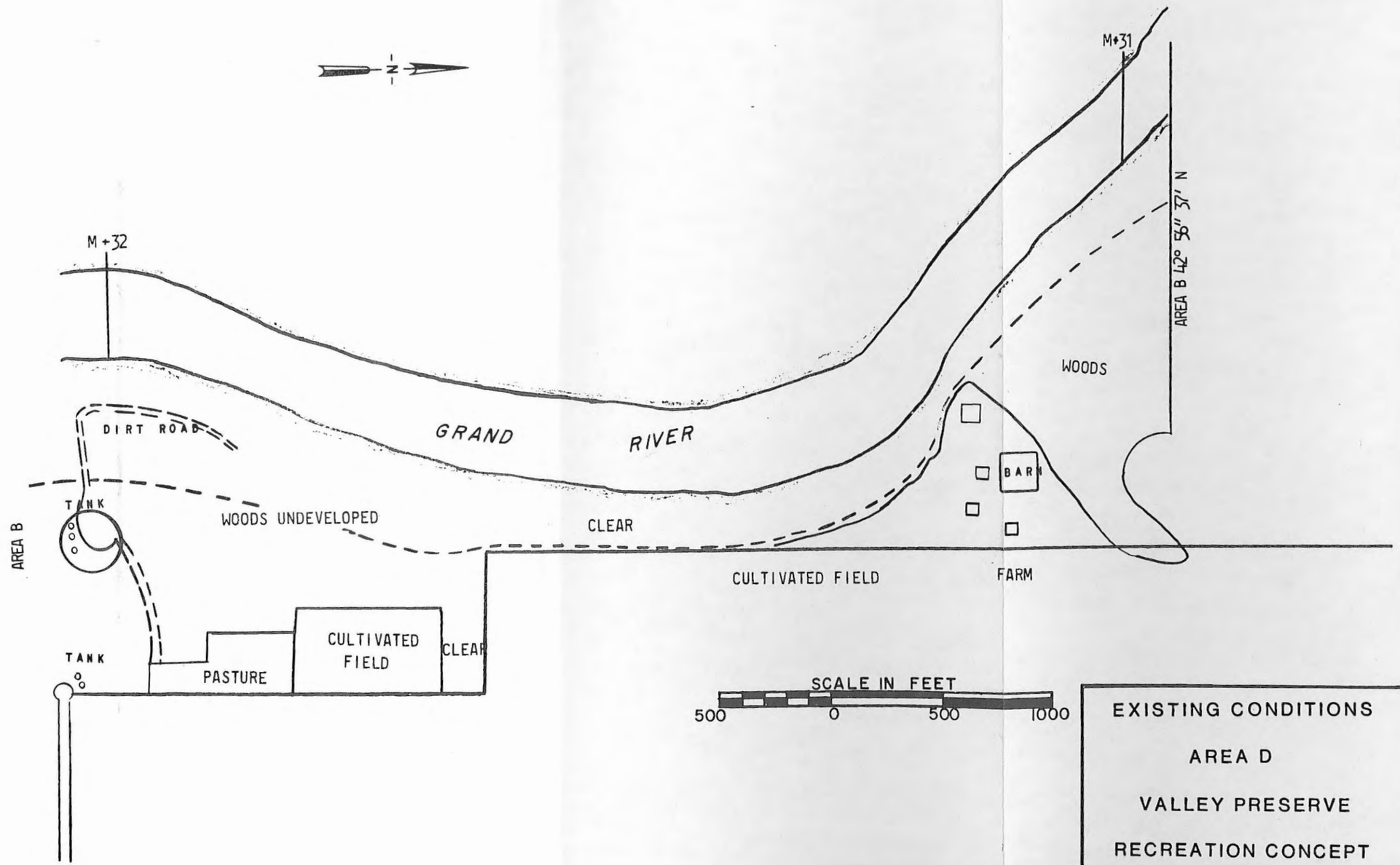
AREA C

VALLEY PRESERVE

RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT

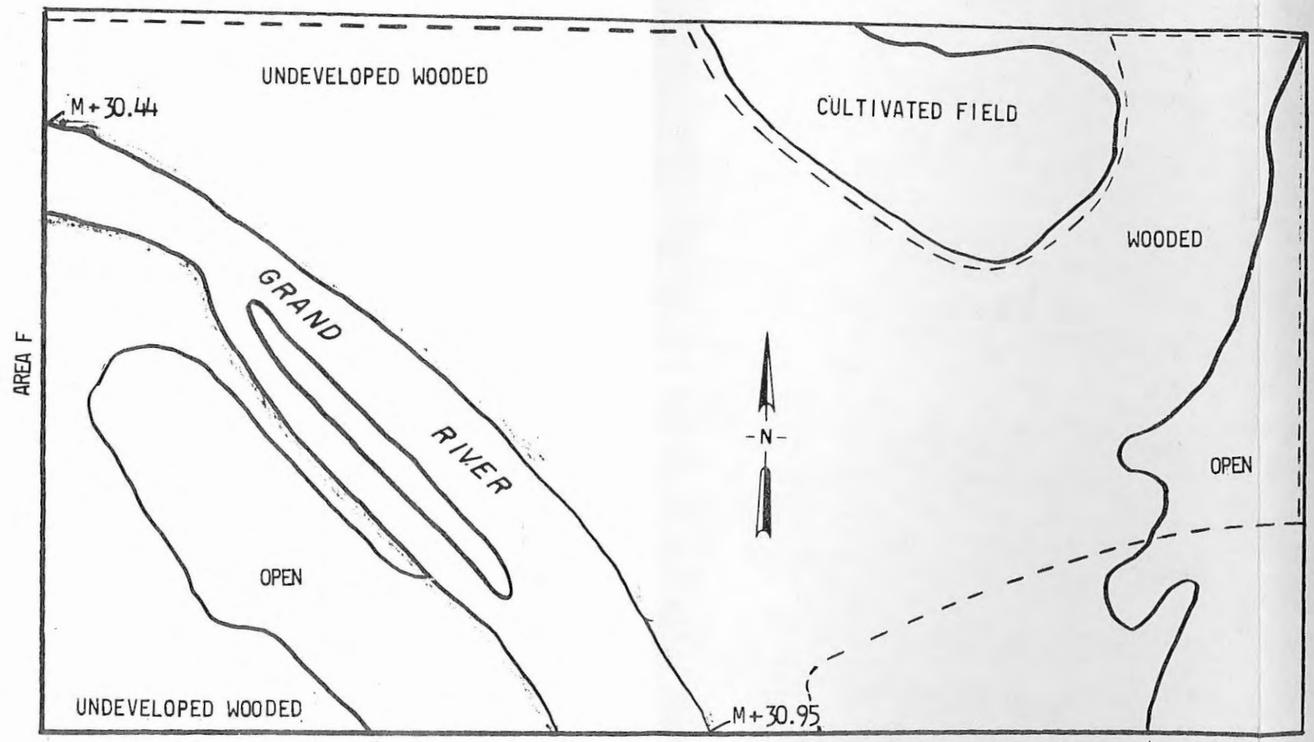
PLATE F-4



NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

EXISTING CONDITIONS
AREA D
VALLEY PRESERVE
RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT



NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

EXISTING CONDITIONS

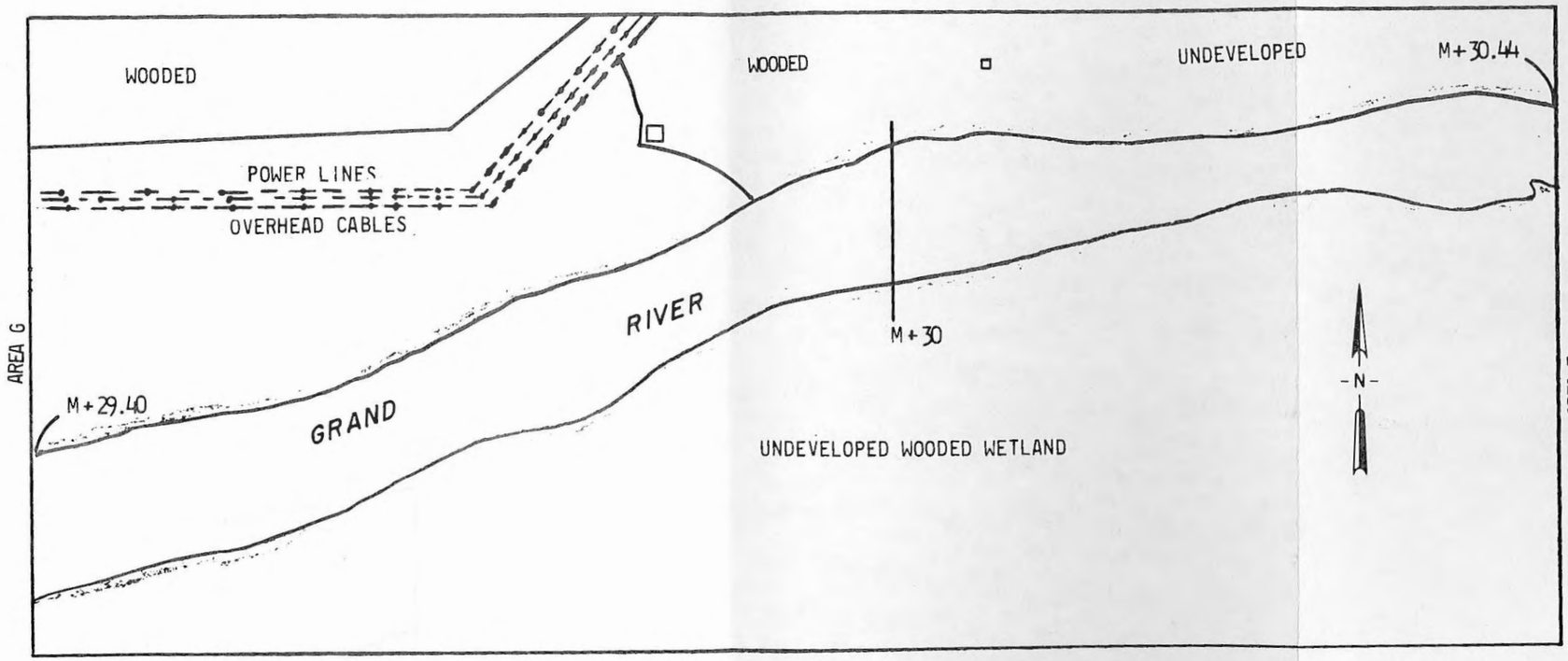
AREA E

VALLEY PRESERVE

RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-6



SCALE IN FEET

500 0 500 1000

NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

EXISTING CONDITIONS

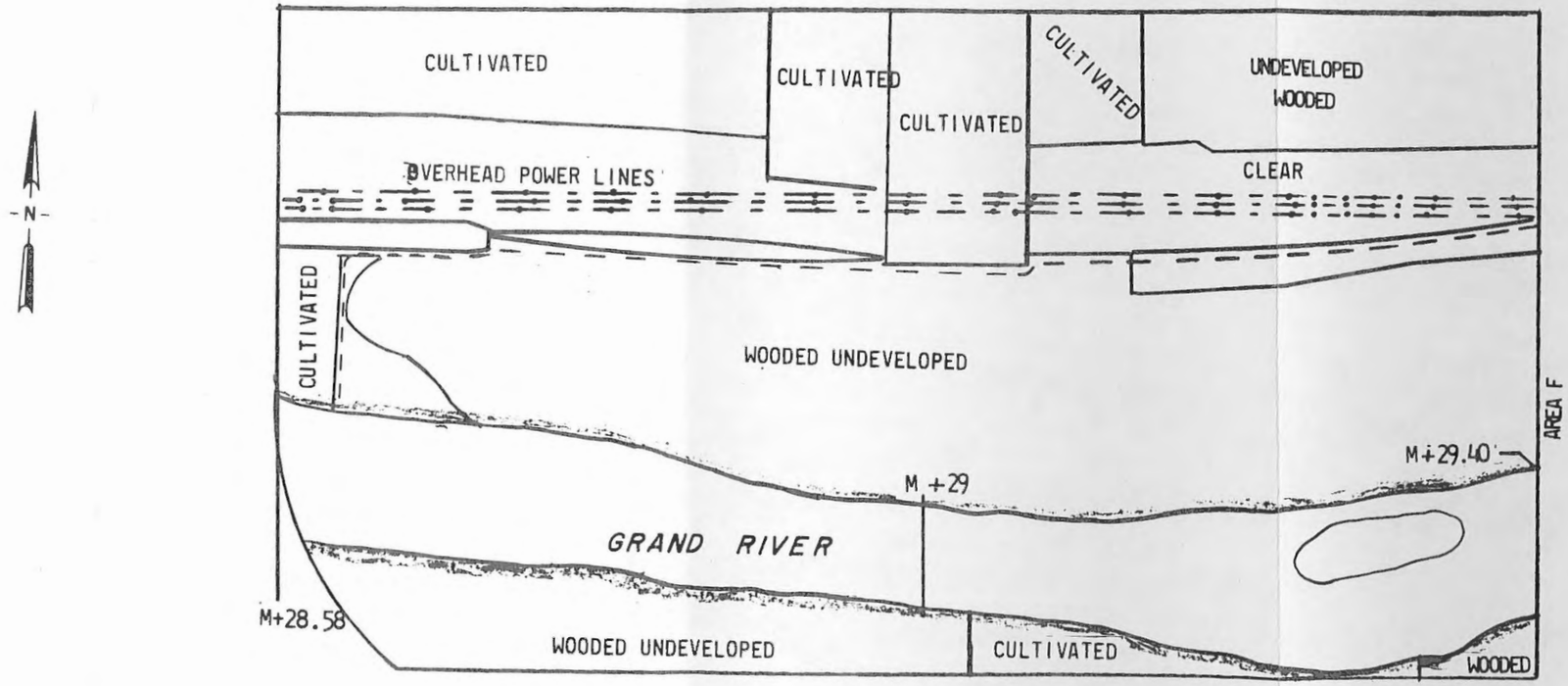
AREA F

VALLEY PRESERVE

RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-7



NOTE: SEE PLATE F-1 FOR GENERAL LOCATION.

EXISTING CONDITIONS

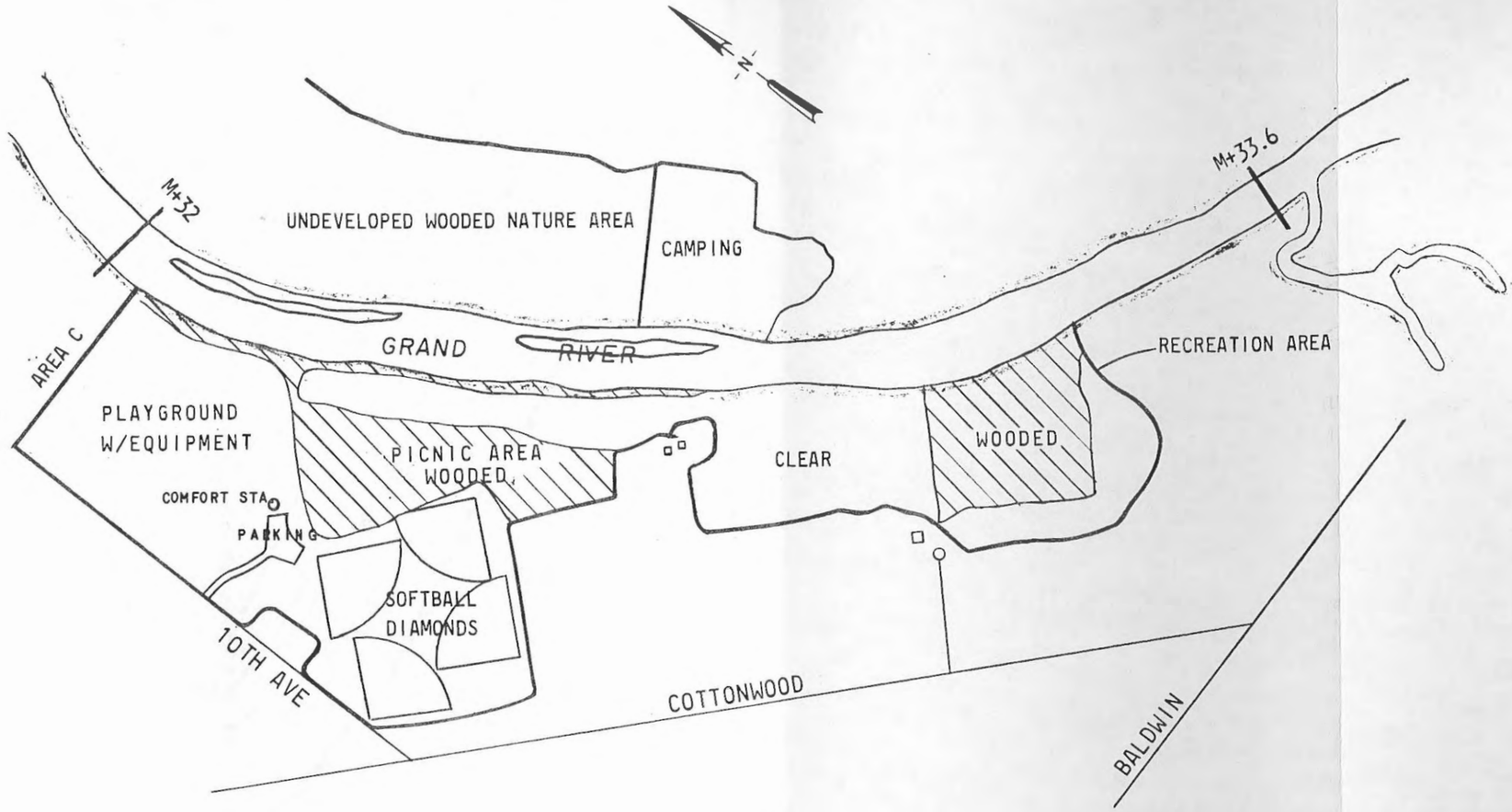
AREA G

VALLEY PRESERVE

RECREATION CONCEPT

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-8



SCALE IN FEET

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NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

RECREATION NODE

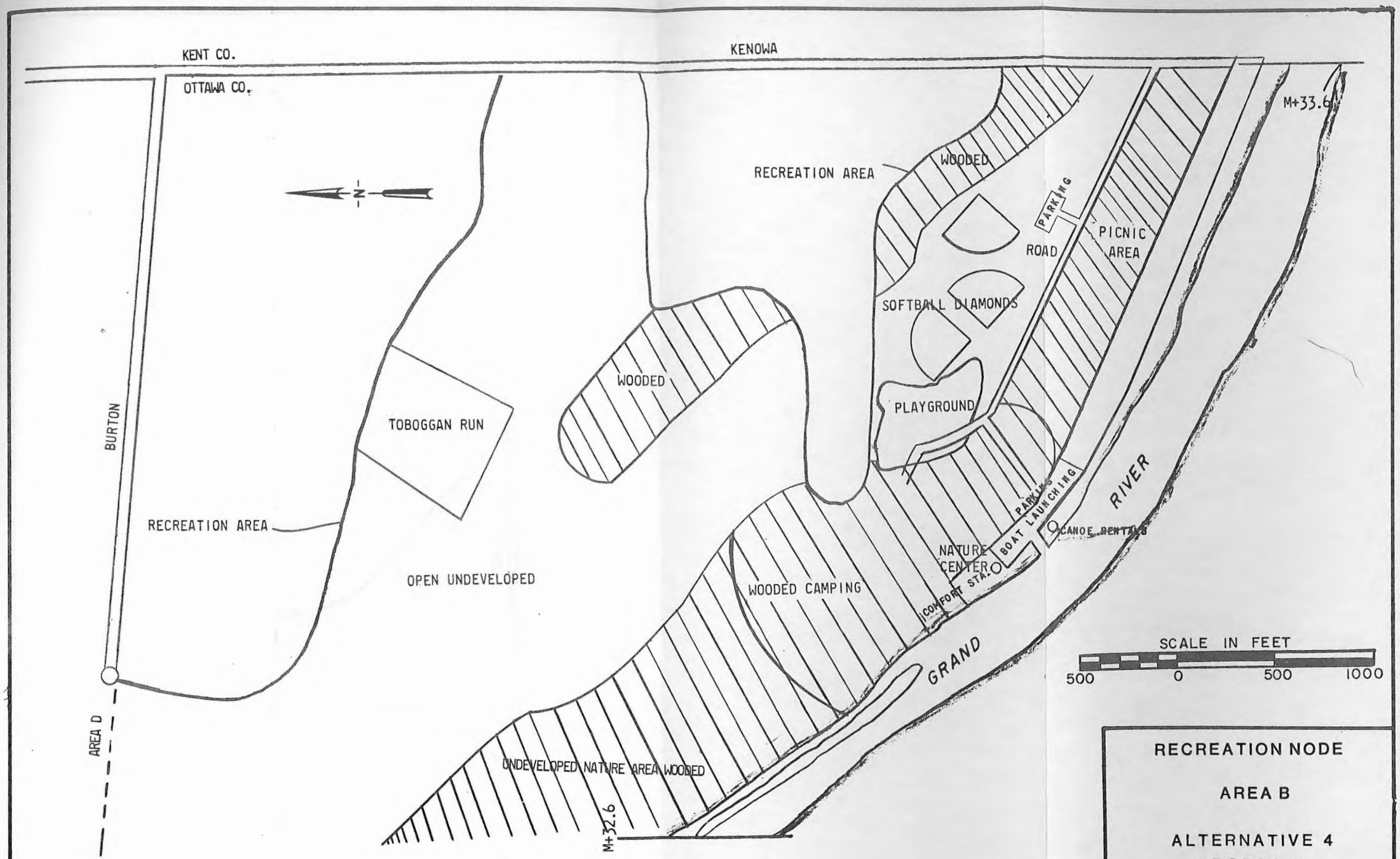
AREA A

ALTERNATIVE 4

PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-9



RECREATION NODE

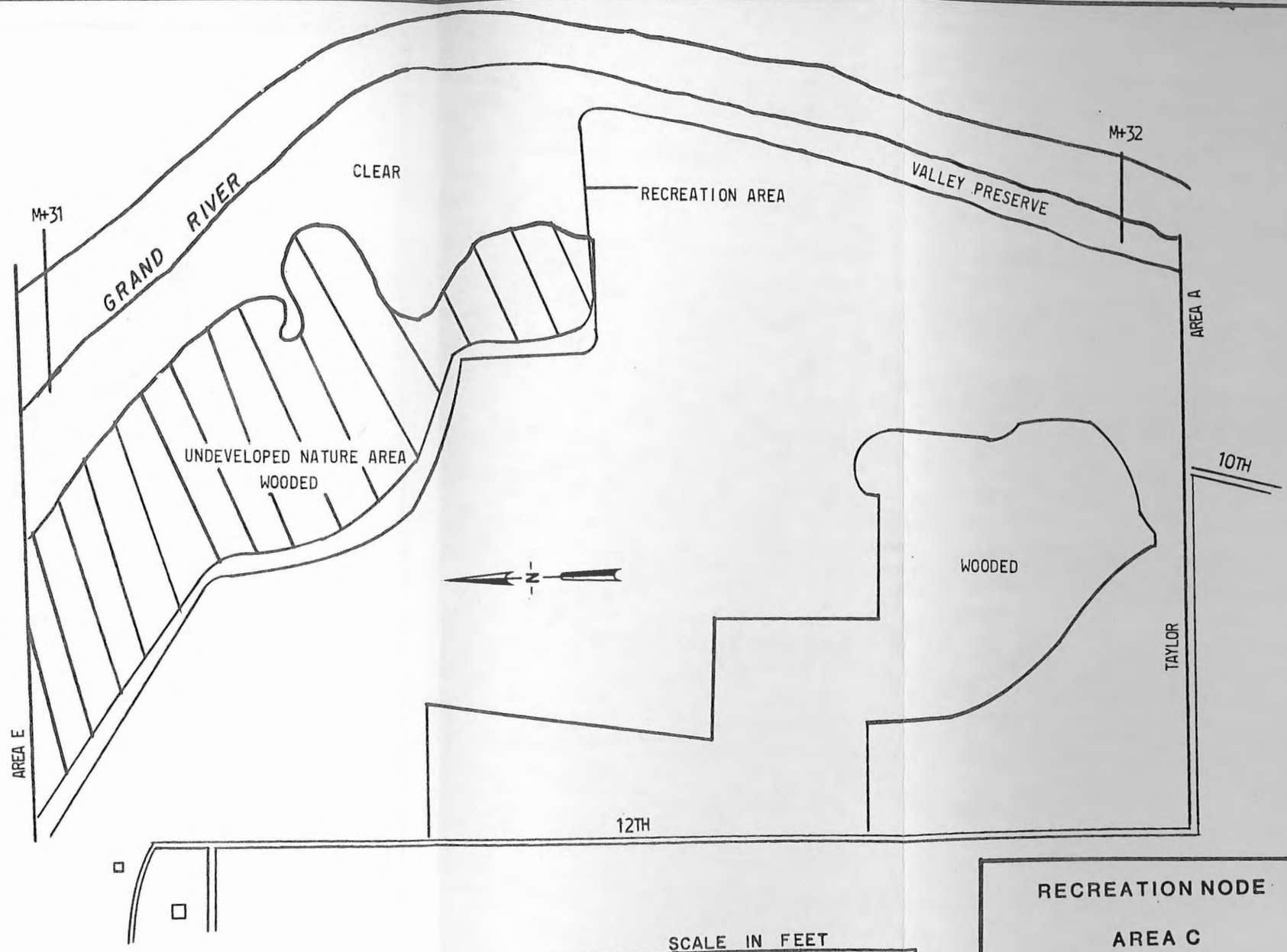
AREA B

ALTERNATIVE 4
PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT

NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

PLATE F-10



NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

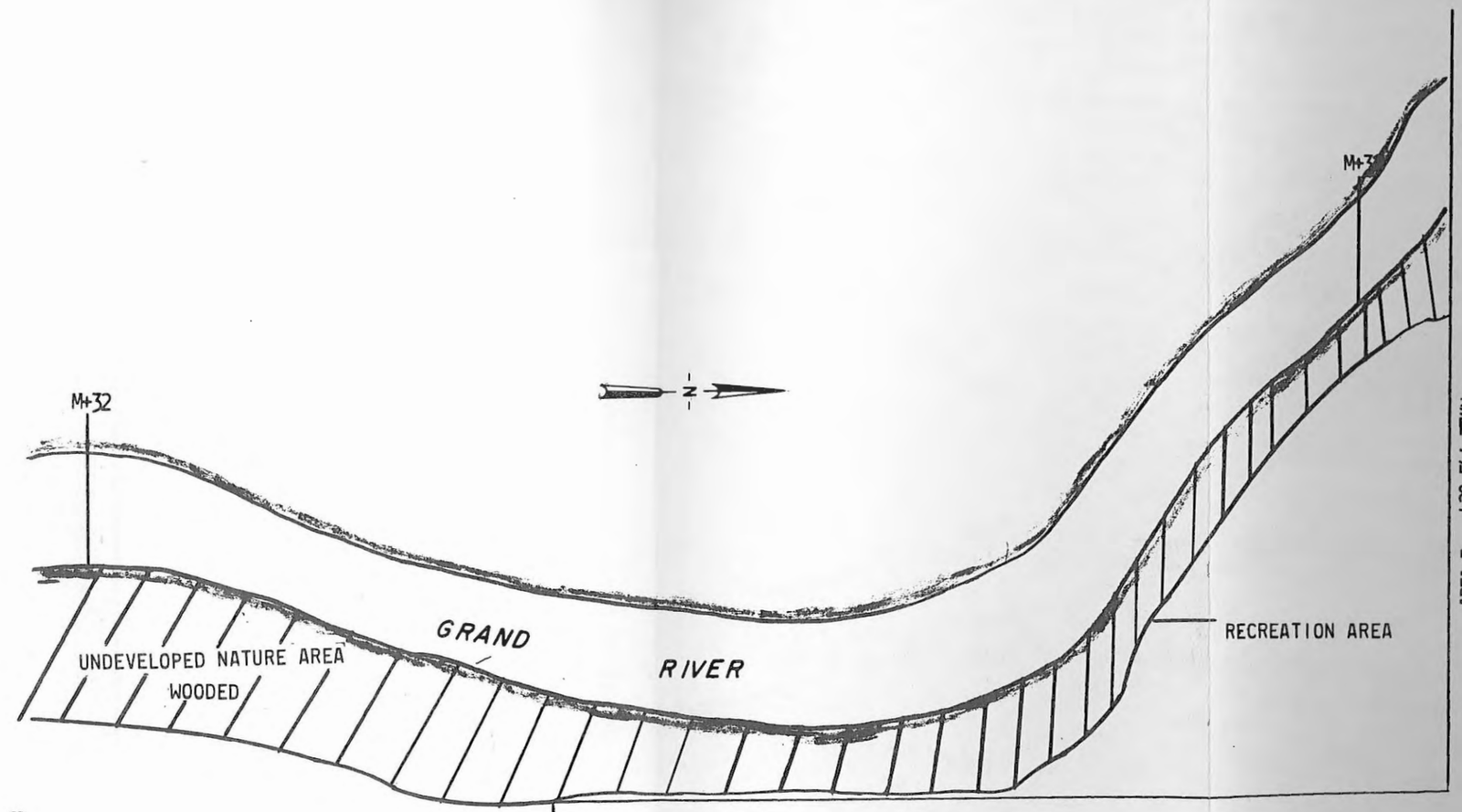
RECREATION NODE

AREA C

ALTERNATIVE 4
PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-11



NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

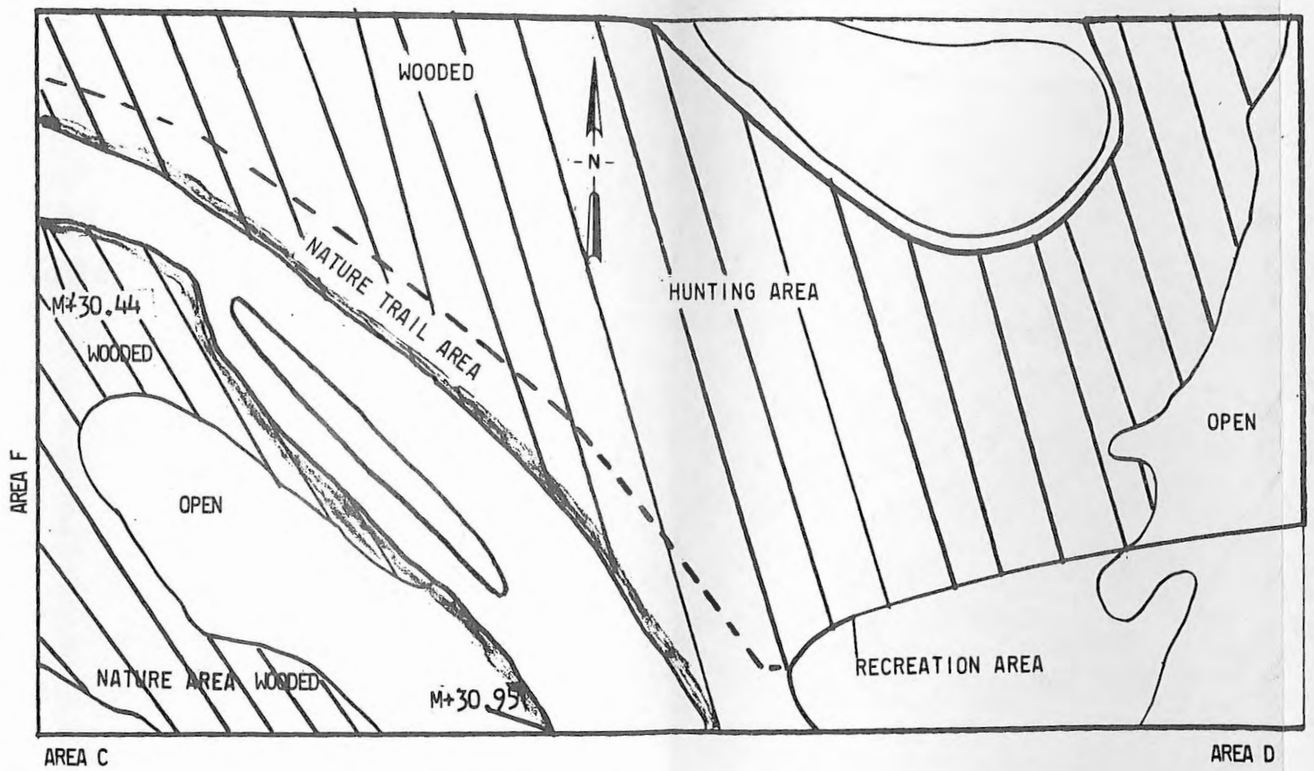
RECREATION NODE

AREA D

ALTERNATIVE 4
PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-12



SCALE IN FEET

500 0 500 1000

NOTE : SEE PLATE F-1 FOR GENERAL LOCATION

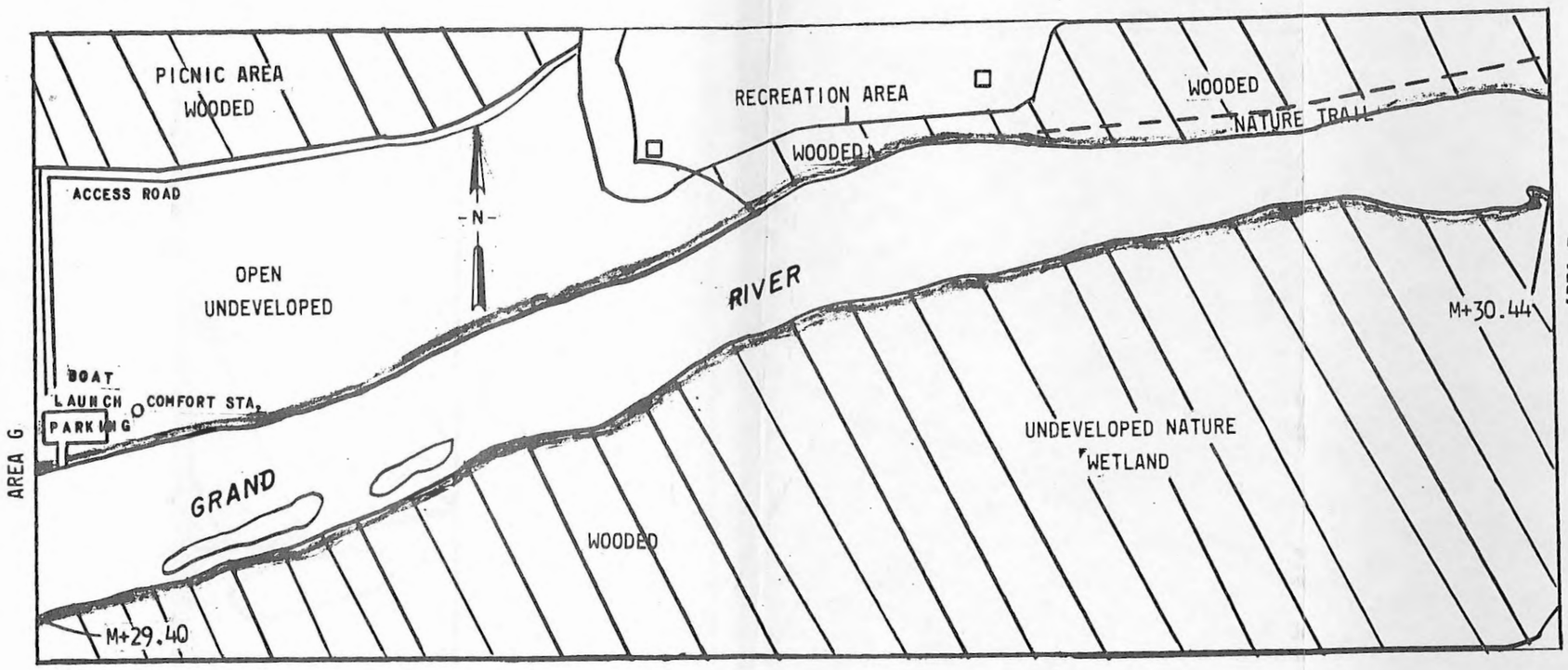
RECREATION NODE

AREA E

ALTERNATIVE 4 PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-13



SCALE IN FEET

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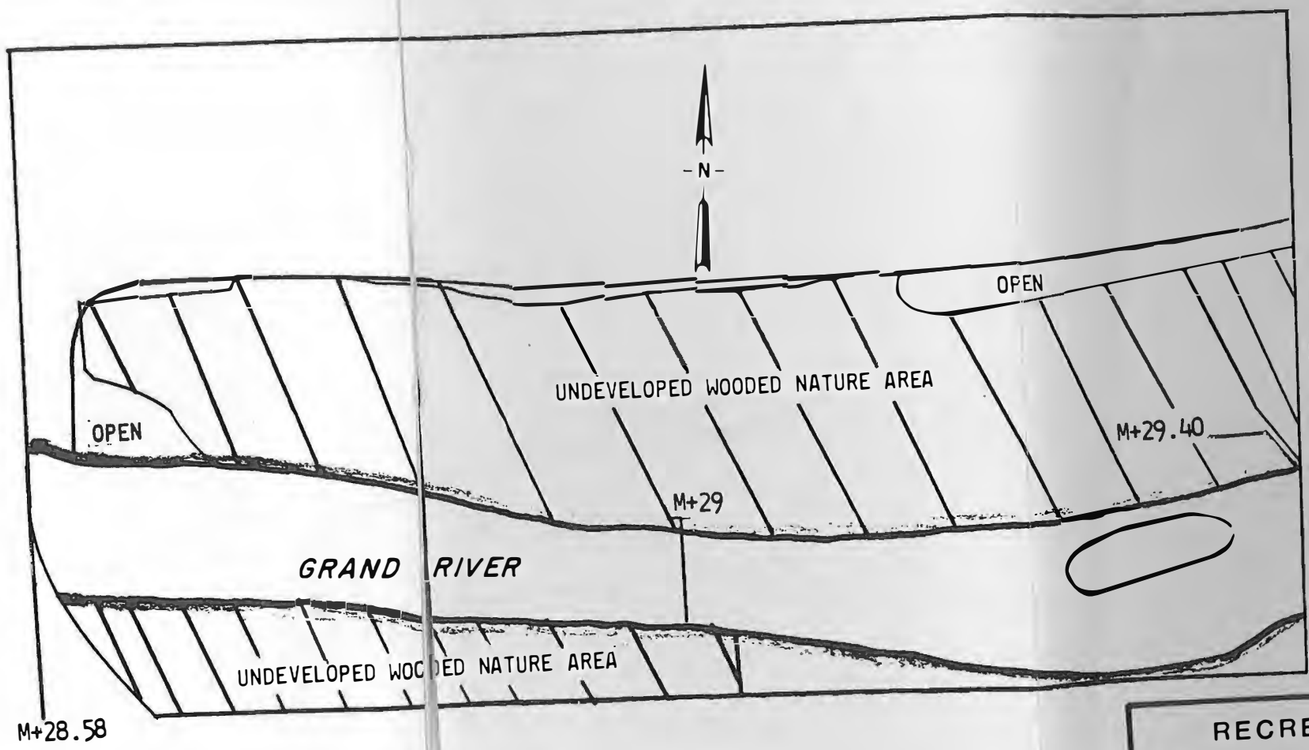
NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

RECREATION NODE

AREA F

ALTERNATIVE 4
PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT



SCALE IN FEET

500 0 500 1000

NOTE: SEE PLATE F-1 FOR GENERAL LOCATION

RECREATION NODE

AREA G

ALTERNATIVE 4
PROPOSAL

U.S. ARMY ENGINEER DIST. DETROIT

PLATE F-15