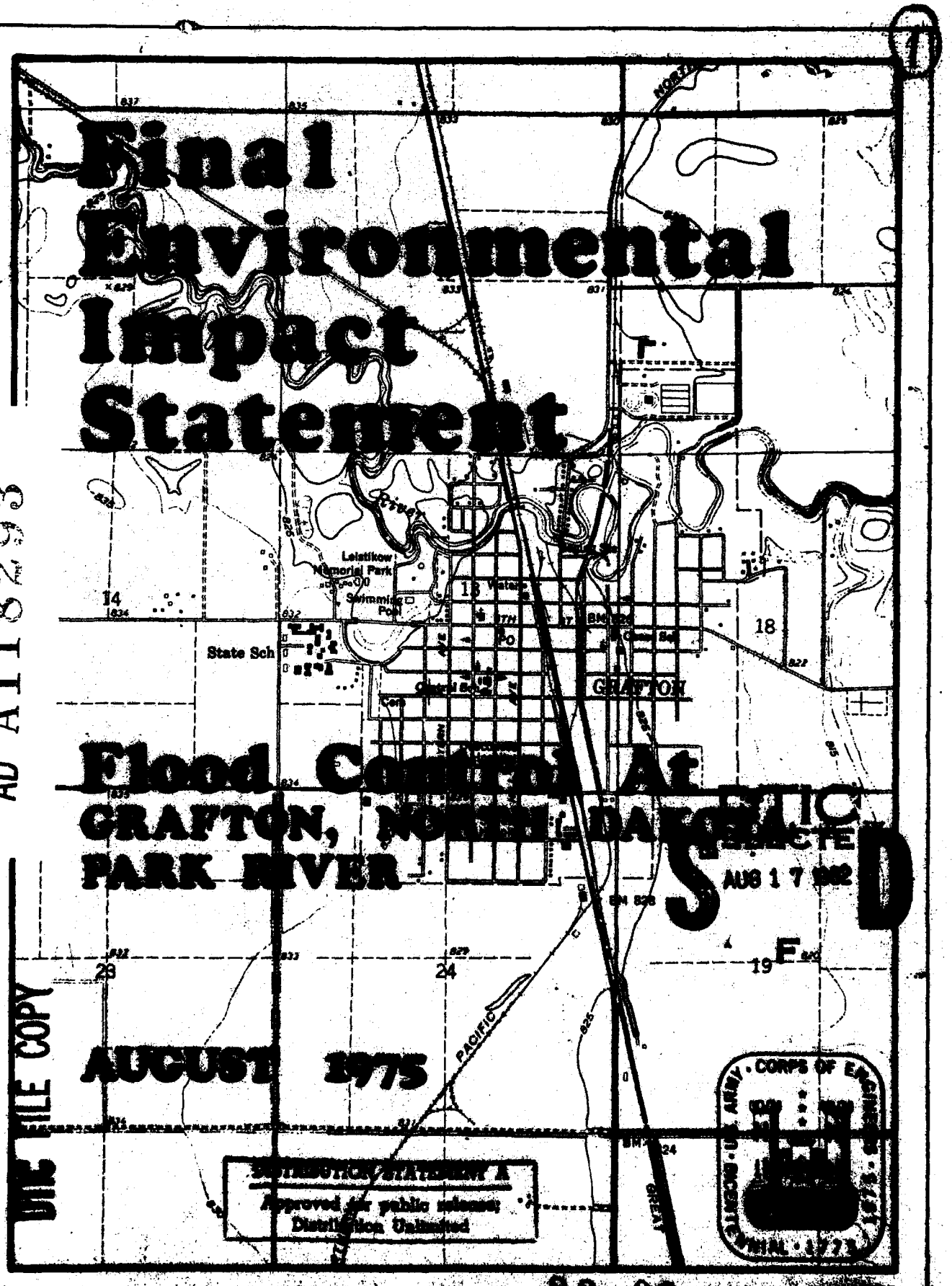
AD-A118 293 CORPS OF ENGINEERS ST PAUL MN ST PAUL DISTRICT F/G 13/2
FLOOD CONTROL AT GRAFTON, NORTH DAKOTA, PARK RIVER.(U)
AUG 75

UNCLASSIFIED NL

Final Environmental Impact Statement



Flood Control At GRAFTON, NORTH DAKOTA PARK RIVER

AUGUST 1975

AD A118293

DTIC FILE COPY

DTIC
ELECTE
AUG 17 1982
S D

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A118 293	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) FLOOD CONTROL AT GRAFTON, NORTH DAKOTA, PARK RIVER; Final environmental impact statement.		5. TYPE OF REPORT & PERIOD COVERED Final EIS
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Engineer District, St. Paul 1135 USPO & Custom House St. Paul, MN 55101		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Office of the Chief of Engineers Department of the Army Washington, D.C. 20314		12. REPORT DATE August, 1975
		13. NUMBER OF PAGES 160 p.
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

See also EIS-ND-73-1800-D (Draft EIS)

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Environmental Impact Statements
Flood Control
Park River, North Dakota

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The flood control plan consists of a levee surrounding Grafton, North Dakota, and vicinity, and a channel which would allow flood water to bypass the leveed area. The proposed plan would result in the direct loss of about 5 acres of floodplain forest and 230 acres of hightly fertile agricultural land. Another 130 acres of agricultural land would be used for spoil disposal, thereby reducing productivity temporarily. About 0.1 miles of natural river channel would be disrupted. Reduced flood frequencies along 8 miles of

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

by passed river channel would decrease biological productivity to varying degrees on about 330 acres of riparian vegetation and result in a species composition more like that of the drier uplands.

About 215 acres of native prairie grass species and about 10 acres of native trees and shrubs would be planted on project lands, providing some wildlife habitat.

FINAL
ENVIRONMENTAL IMPACT STATEMENT

FLOOD CONTROL AT
GRAFTON, NORTH DAKOTA, PARK RIVER
RED RIVER OF THE NORTH BASIN

Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A	

DTIC COPY INSPECTED

OFFICE OF THE CHIEF OF ENGINEERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 20314

AUGUST 1975

SUMMARY ENVIRONMENTAL STATEMENT
FLOOD CONTROL AT
GRAFTON, PARK RIVER, NORTH DAKOTA
RED RIVER OF THE NORTH BASIN

( ) Draft (X) Final Environmental Impact Statement

Responsible Office: U.S. Army Engineer District, St. Paul, Minnesota

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

2. Description of Action: The plan consists of a levee surrounding Grafton, North Dakota, and vicinity, and a channel which would allow flood water to bypass the leveed area. Normal and low flows would be allowed to pass through gated control structures at the two levee crossings and to follow the natural river channel within the leveed area. Interior drainage facilities would be included.

3. a. Favorable Environmental Impacts: The plan provides protection against the standard project flood for Grafton and vicinity, including about 6,000 persons, 1,700 residences, and 330 businesses. Local, regional, and national economic gain would result from protection of both developed and undeveloped lands. Reduced anxiety and hardships, and improved public health and safety, during flood seasons could also be expected. About 215 acres of native prairie grass species and about 10 acres of native trees and shrubs would be planted on project lands, providing some wildlife habitat.

b. Adverse Environmental Impacts: The proposed plan would result in the direct loss of about 5 acres of floodplain forest and 230 acres of highly fertile agricultural land. Another 130 acres of agricultural lands would be used for spoil disposal, thereby at least temporarily reducing their agricultural productivity.

About 0.1 miles of natural river channel would be disrupted. Reduced flood frequencies along 8 miles of bypassed river channel would decrease biological productivity to varying degrees on about 330 acres of riparian vegetation and result in a species composition more like that of the drier uplands.

4. Alternatives:

   a. No action.

   b. Flood warning.

   c. Floodplain evacuation.

   d. Flood proofing.

   e. Floodplain regulation.

   f. Flood insurance.

   g. Levees at Grafton.

   h. Flood bypass channel at Grafton.

   i. Combination levee and flood bypass channel at Grafton.

   j. Rural channel modification.

   k. Channel modification through Grafton.

   l. Upstream reservoir storage.

5. a. Comments Received (District Review):

   National Weather Service
   U.S. Environmental Protection Agency
   U.S. Department of Agriculture, Soil Conservation Service
   U.S. Department of Transportation, Federal Highway Administration
   U.S. Department of the Interior
   U.S. Geological Survey
   North Dakota State Water Commission
   North Dakota Game and Fish Department
   North Dakota Highway Department
   North Dakota Historical Society

North Dakota State Outdoor Recreation Agency
North Dakota Forest Service
Pembina County Commissioners

b. Comments Received (Departmental Review):

U.S. Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Health, Education and Welfare
U.S. Department of the Interior
U.S. Department of Transportation
North Dakota Highway Department
North Dakota State Water Commission
North Dakota State Outdoor Recreation Agency
Walsh County Board of Commissioners

6. Draft Statement to CEQ: 13 November 1973

Revised Draft Statement to CEQ: 5 November 1974

Final Statement to CEQ:

FINAL ENVIRONMENTAL STATEMENT

GRAFTON, PARK RIVER, NORTH DAKOTA

RED RIVER OF THE NORTH BASIN

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLES

TABLE OF CONTENTS (Continued)

TABLES (Continued)

FINAL

ENVIRONMENTAL IMPACT STATEMENT

FLOOD CONTROL AT
GRAFTON, PARK RIVER, NORTH DAKOTA
RED RIVER OF THE NORTH BASIN

1. PROJECT DESCRIPTION

LOCATION

The proposed project would be designed to reduce flood damages in the city of Grafton, which is located in Walsh County in northeastern North Dakota. Grafton is approximately 40 miles northwest of Grand Forks, North Dakota, and 200 miles northeast of Bismarck, North Dakota.

The Park River, which flows through Grafton, is fed by three headwater streams, the North, Middle and South Branches of the Park River. The location of these tributaries within the Park River basin is shown on plate 1. The Park River basin above Grafton totals 695 square miles.

GENERAL PROJECT DESCRIPTION

The proposed plan includes a ring levee around existing urban developments and lands proposed to accommodate future developments at Grafton. The levee crosses the Park River in two locations. A gated control structure would be included at each crossing to prevent flood flows from entering the leveed area. Lesser flows would be allowed to pass through the control structures and follow the natural river channel. Flood waters, blocked from their natural path by the levee, would be routed around the leveed area by a flood bypass channel. Flows of greater than the channel capacity would partially flow overland around the leveed area.

The project is designed to provide standard project flood protection for the leveed area. The probable maximum flood would also be contained within the levee freeboard range. Location of project features is shown on plate 2.

LEVEE

The proposed levee alignment is basically rectangular in shape, is 46,100 feet long, and provides flood protection for developed and undeveloped areas at Grafton. The proposed levee alignment encompasses undeveloped areas, some of which have specific plans for development. The areas for which no specific development plans exist are felt by local interests to be needed for future development. Pertinent data describing the levee are listed in table 1.

Table 1 - Data pertaining to the flood damage reduction plan proposed for the Park River at Grafton, North Dakota

FLOOD BYPASS CHANNEL	
Design flow	5,000 cfs*
Design velocity	3 fps**
Length	15,500 feet
Average design water depth	6 feet
Maximum design water depth	8 feet
Freeboard above design flow	2 1/2 feet
Bottom width	
Minimum	170 feet
Maximum	310 feet
Side slopes	1 on 5
LEVEE	
Type	Semi-compacted impervious fill
Length	46,100 feet
Average height	8.2 feet
Maximum height	13.5 feet
Freeboard above design flood	
Minimum	3 feet
Maximum	4 feet
Top width	10 feet
Side slopes	1 on 3
Degree of protection	Standard project flood
LANDS REQUIRED	
Spoil areas	130 acres
Project structures	235 acres
Flood bypass channel	150 acres
Levee	85 acres
Total	365 acres
Agricultural	360 acres
Woodland	5 acres
LANDS PROTECTED FROM FLOODING	2,700 acres
COSTS	$8.8 million
ANNUAL CHARGES	$541,000
BENEFIT-COST RATIO	3.3

* cfs = cubic feet per second.
** fps = feet per second.

Of the 2,700 acres to be protected from floods as great as the standard project flood, about 800 acres are within the present city limits of Grafton and about 1,900 acres would be available for future growth. Local interests have indicated a desire to further extend the leveed area to the west.

The levee height would be based on the estimated standard project flood profile in the project area. The profile takes into account the presence of the project and a levee freeboard height of 3 feet. The top of the levee would be at constant elevation along the west and east alignments with the east alignment about 10 feet lower than the west alignment. The top of the levee along the north and south levee alignments would vary in elevation, gradually and uniformly decreasing in elevation from west to east. Road crossings of the levee would utilize ramps. Sandbag closures in the freeboard range would be included at all road ramps and the northern highway and railroad crossings. Stoplog closures would be constructed at the southern highway and railroad crossings.

Interior drainage facilities to accommodate storm water runoff within the levee would consist of ditches, ponding areas, and pumping stations. The existing river channel would be used as a ponding area for 57 percent of the leveed area, and a 26,500 gallons per minute (gpm) capacity pumping station would expell the storm water runoff. The remaining protected area would require two facilities, one a 6-acre ponding area and 17,500 gpm pumping station on the eastern side of the leveed area, and the other a 35,000 gpm pumping station where Highway 17 crosses the eastern edge of the levee (plate 2). The large interior drainage capacity would be needed to accommodate runoff from the rather large inclosed area.

FLOOD BYPASS CHANNEL

The flood bypass channel, located to the north of the levee, would be 15,500 feet long and reduce flooding along 8 miles of natural river channel. The bypass channel would average about 8 feet in depth, the bottom would range from 170 to 310 feet in width, and side slopes would be 1 on 5. Excavated soil not used in construction of the levee would be placed in spoil banks adjacent to the bypass channel. The diversion structure at the upstream end of the channel would consist of a board-crested weir which would allow water to flow into the channel when a water surface level of about 827 feet above mean sea level is reached (at about 2,000 cfs rate of flow).

Railroad and highway bridges over the flood bypass channel would be designed to pass the intermediate regional flood with about one-half foot backwater effect upstream of the bridges. The bottom of rail and bridge decks would be 1 to 2 feet below standard project flood levels, and their tops would be 1 to 2 feet above that level. Where U.S. Highway 81 would cross the channel, a bridge of about 350 feet in length would be required, the cost being non-Federal.

Relocation of two railroad tracks to the north of Grafton would be necessary to utilize a double-track railroad bridge across the flood bypass channel. Relocation of the northerly railroad tracks also would require additional railroad relocations within the leveed area, as the severance of access from the north would require modified switching and track routing in the northeastern and southern sections of Grafton.

PLAN OF OPERATION

The upstream gated control structure would normally remain open and allow river flows to pass through the natural river channel. When river flows in excess of 2,000 cfs are either anticipated or experienced, the upstream control structure would be closed, and the entire flow would be diverted into the flood bypass channel. The downstream control structure would be closed only when both the upstream control structure is closed and the river level at the downstream structure rises due to downstream backwater effect.

The storm water pumping station at the river would be activated only when the downstream gated control structure is closed and the water in the ponding area rises to a level requiring pumping. The other storm water pumping stations would be activated as necessary only when the water level outside the levee rises, requiring closure of gated storm water outfalls.

LOCAL COOPERATION REQUIREMENTS

In accordance with the Flood Control Act of 22 June 1936, as amended by subsequent legislation including section 221 of the Flood Control Act of 1970, the requirements of local cooperation are that local interests will:

a. Provide, without cost to the United States, all lands, easements, and rights-of-way necessary for construction of the project including ponding areas.

b. Hold and save the United States free from damages due to the construction works.

c. Maintain and operate the project after completion in accordance with regulations prescribed by the Secretary of the Army.

d. Prevent any encroachment on constructed works and ponding areas that would interfere with the proper functioning of the project and, if ponding is impaired, provide promptly and without cost to the United States substitute storage or equivalent pumping capacity.

e. Provide without cost to the United States all relocations of buildings and utilities, highway bridges and roads, sewers, and any special facilities resulting in local betterment, except as otherwise warranted for special reasons.

f. Provide in accordance with provisions of Public Law 91-646, the Uniform Relocation Assistance and Land Acquisition Policy Act, fair and equitable treatment for displaced persons toward the acquisition of decent, safe, and sanitary housing.

g. Provide a cash contribution for any additional costs required to provide flood protection to developable lands above the expected future growth land requirements of Grafton.

The city of Grafton has indicated its intent to meet the necessary requirements of local cooperation as evidenced by Resolution No. 685, passed 15 August 1973 by the Grafton City Council.

APPORTIONMENT OF COSTS

FIRST COSTS

Based on existing criteria and policies, costs associated with construction of channels, levees, railroads, interior drainage facilities, pumping stations, some utility relocations and landscaping are assigned to the Federal Government. Local interests would furnish all lands and rights-of-way, assume all highway bridge costs, make

necessary relocations of roads and some utilities, and maintain the project after completion. At the request of the city of Grafton, the proposed plan would provide flood protection for an area in excess of projected future growth and development requirements. The cost involved in providing flood protection for this additional area is considered to be a wholly non-Federal cost. The apportionment of first costs is summarized in table 2.

Table 2 - Apportionment of first costs

Item	Federal	Non-Federal	Total cost
Direct first costs[1]			
Levee	$556,000		$556,000
Channels	4,110,000		4,110,000
Drainage facilities	423,000		423,000
Pumping plants	610,000		610,000
Landscaping	35,000		35,000
Lands and rights-of-way		$328,000	328,000
Bridges	590,000	586,000	1,176,000
Relocations	524,000	34,000	558,000
Total direct first costs	6,848,000	948,000	7,796,000
Indirect first costs			
Engineering and design	514,000	42,000	556,000
Supervision and administration	408,000	40,000	448,000
Total indirect first costs	992,000	82,000	1,004,000
Total first costs	7,770,000	1,030,000	8,800,000
Cash contribution adjustment[2]	-75,000	+75,000	0
Adjusted total first costs	7,695,000	1,105,000	8,800,000

(1) Includes contingencies.

(2) That portion of Federal costs attributable to providing flood protection for developable lands in excess of projected future growth requirements and considered to be a wholly non-Federal cost.

ANNUAL CHARGES

The apportionment of annual charges between Federal and non-Federal interests is shown in table 3. The interest and amortization charges are based on a 5 5/8-percent interest rate, a 100-year economic life, and the apportioned first costs, including interest during construction. The entire operation, maintenance, and replacement costs for the proposed plan are assigned to non-Federal interests.

Table 3 - Apportionment of annual charges

Item	Federal	Non-Federal	Total
Interest and amortization[1]	$459,000	$67,000	$526,000
Operation, maintenance, and replacements		15,000	15,000
Total	459,000	82,000	541,000

(1) Based on an interest rate of 5 5/8-percent, a 100 year economic life, and interest during construction of $510,000. Interest and amortization factor is 0.056487.

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

CLIMATE

Climatic data from January 1893 to the present are available from the Grafton Weather Bureau station. Mean monthly temperatures for Grafton vary from 69°F in July to 3°F in January. Extremes of 108°F and -47°F have been recorded in July 1936 and February 1914, respectively. The average growing season of approximately 120 days extends from about 22 May to 19 September.

Average annual precipitation is about 18 1/2 inches, of which some 19 percent occurs as 36 inches of snowfall. The maximum recorded yearly precipitation of 28 inches occurred in 1909, and the minimum of 11 inches occurred in 1910. Monthly precipitation ranges from 3 inches during June to about one-half inch during December. Average annual surface water evaporation for the basin is about 27 inches, for an excess of evaporation over precipitation of 8 1/2 inches. Prevailing winds are from the southeast during June and August and from the northwest during other months.

TOPOGRAPHY AND GEOLOGY

The western and eastern portions of the South Branch and Park River basins are separated by the Pembina Escarpment. The western South Branch drains a moderately rolling ground moraine which slopes gradually eastward toward the escarpment. This western part of the basin ranges in altitude from 1400 to 1600 feet above mean sea level, and the surface is covered by a 5- to 10-foot-thick layer of glacial till overlying thick shale deposits of the Pierre Formation of Upper Cretaceous age. The glacial till is a mixture of silt, clay, and sand with a few boulders.

The underlying shale is exposed in the riverbed and at various places along the valley wall. These exposures are of the Odonah Member, the uppermost member of the Pierre Formation in this region. The Odonah is a hard, gray shale that readily fragments into chips. At points of undercutting by the river, the shale erodes into small fragments and produces a talus slope. The shale is found along the river upstream of Homme Dam and is not found along the downstream reaches due to preglacial erosion.

At the Pembina Escarpment, the South Branch Park River passes through a moderately dissected outwash plain. In this region the river valley is about one-half mile wide and 130 to 140 feet deep. The river then passes through the ancient but recognizable beach ridges of glacial Lake Agassiz. As the South Branch emerges from the escarpment, its valley diminishes rapidly until the channel banks are at the same or a somewhat higher elevation then the adjacent plain. Lower members of the Pierre Formation are exposed in this region. In section 13 of Vesta Township, Walsh County (about 24 miles west of Grafton), the lower members of the Pierre shale, the DeGray, Gregory, and Pembina Members, are exposed.

The DeGray and Gregory Members are gray shale containing a few yellow bentonite beds. The Pembina Member is black shale and contains seven beds of bentonite, ranging from 1 to 6 inches in thickness at the base. The Pembina Member overlies the Niobrara Formation, a calcareous shale. The Pierre shale disappears due to preglacial erosion about 24 miles west of Grafton on the South Branch, at which point the Niobrara Formation is briefly exposed.

The easterly half of the basin lies within the very fertile heart of the Red River Valley. This area has unusually flat terrain with sluggish drainage. The lower South Branch and main stem Park River cuts through deposits of glacial till and lacustrine clay which reach a combined thickness of about 300 feet in the eastern part of the basin.

SOILS

The soils adjacent to the upper half of the South Branch are of the Buse Series which is characterized as a loam or clay loam soil having a thin (2 to 6 inches) black surface layer (A1) with a grayish brown, calcareous subsoil.(1)

The soils adjacent to the South Branch along the roughly 30 river miles upstream of Grafton, and adjacent to the main stem of the Park River, are of the Fairdale Series which are silt loams to fine sandy loams. The surface layer (A1) is usually dark gray to grayish brown, 3 to 8 inches thick, and generally calcareous. The subsoil may extend to a depth of 5 feet and consists of slightly calcareous layers ranging in color from dark brown to light brownish gray.

The upper 15 to 20 feet of soil in the immediate project area are composed of lacustrine, laminated silt and clay. The material has medium to high plasticity and a moderately high moisture content. This material is weathered and oxidized above the water table and grades from brown near the ground surface to dark gray near its base. It is fairly stable in excavations but is easily eroded.

The laminated silt and clay is underlain by approximately 80 feet of soft, dark-gray clay which is highly plastic and has a high moisture content. This clay has poor foundation qualities and poor stability in excavations.

---

(1) D.D. Patterson, G. A. Johnsgard, M. D. Sweeney, and H. W. Omodt. 1968. Soil survey report, county general soil maps, North Dakota. North Dakota Agricultural Experiment Station Bulletin 473. 150 pp. and Walsh County map.

HYDROLOGY

Runoff from melting snow and rains accounts for almost all of the flow of the South Branch in the spring and early summer. In the upper reaches above Homme Dam, discharge is provided year round by springs and seeps. In summer and fall this groundwater discharge accounts for all the streamflow during periods of little or no precipitation. In some years streamflow has totally stopped during dry periods. Below Homme Dam, low flows are supplemented by releases from the reservoir.

GROUNDWATER

According to Downey,[1] the Pierre shale yields highly mineralized water. Seeps and springs in the valley suggest that some of this water reaches the South Branch. Water of better quality is found in several glacial drift aquifers in Walsh County, the most important being the Fordville and Edinburg aquifers. Only the Edinburg aquifer, located along North Dakota Highway 32 northwest of the Homme Reservoir, is a potential source of water for the South Branch, and that only in the area of the Homme Reservoir.

RIVER CHANNELS

The Park River rises in the Drift Prairie of southeastern Cavalier County at an approximate elevation of 1,600 feet above mean sea level. The three principal headwater streams, the South, Middle, and North Branches, emerge from the Pembina Escarpment about 13 miles west of Grafton and flow in a general southeasterly and easterly direction to a nearly common confluence about 2 to 3 miles west of Grafton. From this point the Park River main channel follows a meandering course eastward across the flat bed of Glacial Lake Agassiz and joins the Red River of the North 36 miles south of the international boundary at

(1) Downey, J. S. Groundwater resources of Walsh County, Northeastern North Dakota. Report in preparation for the U.S. Geological Survey.

about elevation 760. As the headwater branches emerge from the escarpment, their valleys become more shallow until the channel banks are at the same or a somewhat higher elevation than the adjacent plain. The depth of the Park River main stem channel averages about 15 to 20 feet, and the channel width averages about 100 to 125 feet. The slope of the Park River averages about 1.5 feet per mile, and those of the tributaries range from about 18 feet per mile in the escarpment to 5 feet per mile at their confluence. Channel capacities for the lower reaches of the tributaries range from 500 to 1,000 cfs, and for the Park River from approximately 2,000 to 3,000 cfs.

WATER SUPPLY

The communities of Park River and Grafton rely upon water carried by the South Branch of the Park River as their major source of water. Homme Dam, located on the South Branch (see plate 1), was placed in operation in 1951 by the Corps of Engineers to alleviate downstream water shortages at the communities of Grafton and Park River. Its ancillary functions of diluting pollution and reducing flood flows are of relatively minor importance. Present and future demands of these two communities exceed the capability of the Park River and Homme Dam to provide an assured water supply during a drought period. The large water demand of Grafton, 0.7 million gallons per day (mgd), plus the water losses involved in transmission of the water via the 32 miles of natural river channel, result in Homme Dam being incapable of providing Grafton with an assured water supply. The water supply problem will be compounded in the future by sediment accumulation in Homme Reservoir, which is occurring at a much higher rate than originally anticipated. The city of Park River experiences few problems with water from Homme Dam, as both the relatively small water demand of Park River (0.1 mgd) and the efficient pipeline for transporting the water

from Homme Dam to the treatment plant circumvent many of the problems involved in the water supply to Grafton.

Investigations have shown that increased water supply needs at Grafton could be met by an additional reservoir(s) on the South Branch, an off-channel storage reservoir at Grafton, or a pipeline from either the Red River of the North or a nearby groundwater aquifer. A water supply pipeline from the Red River of the North or off-channel storage at Grafton appear to be the most economical alternatives.

WATER QUALITY

Surface water and groundwater in the study area are naturally high in dissolved solids, especially containing ions of iron, manganese, chlorine and sulfur. Total dissolved solids generally range from 738 to 1,872 parts per million (ppm)[1]. These values exceed United States Public Health Service standards of 500 ppm for drinking water. In general the chemical quality appears better in surface water than in groundwater, and release of groundwater into surface water may degrade the quality of surface water. The physical characteristics of the groundwater are usually fair. The water does not generally present problems with taste, odor, color or turbidity. It is usually slightly alkaline in chemical reaction and is quite hard.

Water quality data from the Park River at Grafton for the period December 1969 through August 1970 indicate that nitrates range from 0 to 7.1 ppm. Since the seasonal processing of potatoes at Grafton contributes to overloading of the Grafton sewage treatment lagoons, these data are probably not representative of the nutrient levels in surface waters for the upper watershed. In the absence of further data, it can be assumed that agricultural activity and urban waste probably contribute nutrients to the South Branch, the Park River, and their tributaries.

---

(1) Souris, Red, Rainy River Basins Commission. Comprehensive Framework Study. Appendix G, Water Supply and Health Aspects.

AQUATIC BIOTA

Two groups of aquatic animals, fishes[1] and mussels[2], have previously been studied in the Park River. The records of fish are reproduced in table 4. Aquatic invertebrates, such as mussels and caddisfly and mayfly larvae, were found living in the South Branch of the Park River both above and below Homme Dam. Specimens of mussels below the dam were identified as Anodontoides ferussacianus. While turtles are uncommon in the river proper, they can be locally abundant in slackwater areas having suitable conditions. The following discussion on biology is generally based on an environmental study conducted by the University of North Dakota.[3]

(1) Copes, F. A. and R. W. Tubb. 1966. Fishes of the Red River tributaries in North Dakota. University of North Dakota. Contributions, Institute for Ecological Studies. 1:1-26.

(2) Cvancara, A. M. 1970. Mussels (Unionidae) of the Red River Valley in North Dakota and Minnesota. U.S.A. Malacologia 10(1):57-92.

(3) Kannowski, P. B. 1971. Environmental aspects of two water management alternatives in the Park River subbasin, North Dakota. University of North Dakota, Institute for Ecological Studies. 60pp.

Table 4 - Presence of fish in the South Branch and main stem Park River

Species		Station					
Common name	Scientific name	18	19	20	21	22	23
Northern pike	Esox lucius		X			X	X
Carp	Cyprinus carpio						X
River shiner	Notropis blennius						X
Common shiner	Notropis cornutus	X	X	X	X	X	
Fathead minnow	Pimepheles promelas	X		X	X	X	X
Blacknose dace	Rhinichthyes atratulus	X		X	X		
Creek chub	Semoiilus atromaculatus	X	X	X	X	X	X
Quillback carp-sucker	Carpoides cyprinus						X
Common white sucker	Catostomus commersoni	X	X	X		X	X
Black bullhead	Ictalurus melas		X	X		X	X
Brown bullhead	Ictalurus nebulosus						X
Channel catfish	Ictalurus punctatus						X
Brook stickleback	Eucalia inconstans	X		X	X		
Trout-perch	Percopsis omiscomaycus						X
Largemouth bass	Micropterus salmoides		X				
White crappie	Pomoxis annularis		X	X	X	X	X
Black crappie	Pomoxis nigraomaculatus		X			X	X
Johnny darter	Etheostoma nigrum	X		X	X		X
Yellow perch	Perca flavescens		X				
Blacksided darter	Percina maculata			X	X		
Sauger	Stizostedion canadense						X
Walleye	Stizostedion vitreum		X				X

Station 18 - 21 miles west of Grafton.
Station 19 - Homme Reservoir (16 miles west of Grafton).
Station 20 - Stream below Homme Dam.
Station 21 - 9 miles west of Grafton at Highway 18.
Station 22 - City of Grafton.
Station 23 - 6.5 miles northeast of Oakwood (about 12 miles east of Grafton.)

The South Branch of the Park River has a sandy to rocky bottom, has large fluctuations in flows, and during frequent low flows supports a limited stream fishery of suckers, crappies, bullheads, chubs, shiners, darters, and various minnows. During periods of adequate flow the South Branch sustains a much more diverse and productive fishery.

Homme Dam supports a lake-type fishery consisting of crappies, bass, bluegills, and small populations of northern pike and walleye. The quality of the warmwater fishery has been generally disappointing as compared with its potential; the severe fluctuations in water level and turbid water conditions make the reservoir difficult to manage effectively for a fishery.

There are other reservoirs and lakes within about 35 miles of Grafton (table 5). Whitman Dam is located 1 1/2 miles north and 3 miles east of Whitman, North Dakota, on the Forest River, and Matejcek Dam is about 7 miles downstream. Both of these reservoirs are successfully managed for rainbow trout. The fish grow rapidly, and the reservoirs attract many fishermen from local areas and Grand Forks. Bylin Dam, located 3 miles south and 2 miles east of Adams, North Dakota, on a tributary of the Forest River, supports a warmwater fishery.

Table 5 - Existing reservoir and lake fisheries within about 35 miles of Grafton

	Area (acres)	Drainage	Type of fishery
Bylin	60	Forest River	Warmwater
Homme	193	Park River	Warmwater
Whitman	143	Forest River	Rainbow Trout
Matejcek	137	Forest River	Rainbow Trout
Renwick	-	Tongue River	-
Lake Ardock	-	Forest River	-

Several additional small multipurpose reservoirs are being cooperatively planned by the Grand Forks and Walsh County Water Management Boards and the North Dakota Game and Fish Department. These are expected to be completed within 5 years and should add to reservoir fishery opportunities in the area.

None of the aquatic biota in the area are classified by the U.S. Department of the Interior as endangered or threatened. Although the State of North Dakota does not have an endangered fish species list, the State does recognize those species listed by Miller(1) as being rare, endangered, depleted or as status undetermined. The trout-perch, as one of these species, occurs in the Park River. Trout-perch spawn in May or June, usually selecting sand bars for spawning. They feed largely on insects and crustacea. The affects of the project on this species are unknown.

TERRESTRIAL BIOTA

The non-agricultural vegetation and associated wildlife of the terrestrial environment of the project area are influenced by climate, soil, water, topography, fire and man. These factors act to form three basic terrestrial non-agricultural systems in the project area: grassland, a bur oak-dominated forest, and a flood-plain forest. The general discussion of herbaceous vegetation to follow does not include those species characteristic of the spring flora because the inventory of vegetation was done in fall.

GRASSLAND

Because of low rainfall and the influence of prairie fires, extensive forests have not developed in the region surrounding the project area. Grasslands are, however, easily supported by the available moisture and are tolerant of, and in this area generally depend upon, fire.

---

(1) Miller, Robert Rush, "Threatened Freshwater Fish of the U.S.", Transactions of the American Fisheries Society, 1972, Volume 101, page 249.

Some distinctions can be made between the eastern and western portions of the grassland of the Park River watershed. The eastern portion occurs on the bed of ancient glacial Lake Agassiz and is now within the floodplain of the Red River of the North and lower reaches of its tributaries. It is separated from the western portion by an escarpment area which marks the edge of a more highly elevated glacial outwash plain. The potential vegetation[1] of the eastern grassland is a dense growth of tall grasses dominated by big bluestem, switchgrass, and Indian grass. The soil is fertile in this area. The soils west of the escarpment have a thinner layer of topsoil and are well drained. The potential vegetation to the west is a mixture of medium and tall grasses dominated by western wheatgrass, big bluestem, and needlegrass.

Little of this potential vegetation exists in the Park River watershed today. As indicated in the Land Use section, most of the land in this area has been taken over for agricultural use. Biologically productive wetlands, which were common in eastern North Dakota prior to its settlement, have largely been drained for agricultural use. Some prairie potholes which are difficult to drain remain in the western portion of the basin. Today, characteristic prairie vegetation is largely restricted to roadsides, railroad rights-of-way, fence lines, deforested riverbanks and slopes, abandoned farmland, and country churchyards and cemeteries. Some grassland pastures also still maintain characteristic prairie vegetation.

A great diversity of animal species utilize the grasslands, although their present species diversity may be lower than in the past. Insects occur in large numbers and are significant consumers of herbage in grasslands. Birds commonly found in this type of ecosystem include the sparrows, meadowlarks, upland plover, killdeer, chestnut-collared longspur, and horned lark. The short-eared owl, several hawk species, prairie chicken, sharp-tailed grouse, and pheasant are also found. Golden eagles may also visit this ecosystem and surrounding areas. Garter snakes and leopard frogs are common. Mammal species include mice, voles, rabbits, weasels, ground squirrels, deer, skunk, badger, and fox.

(1) Kuchler, A. W. 1964. Potential Natural Vegetation of the Conterminus United States. American Geographical Society, Special Publication No. 36.

BUR OAK FOREST

The bur oak forest occurs in the escarpment area (13 miles or more to the west of Grafton). Trees of the escarpment area include bur oak (which occurs on the dry slopes), aspen (which dominates some moist slope areas which are somewhat protected from sunlight), box elder, green ash, and some paper birch. Historically, bur oaks also occurred in the oak savanna in the glacial drift upland above the river slopes. They were able to survive fires in this area whereas they could not survive the more severe fires which periodically swept the denser, taller grasses of the floodplain of the Red River of the North.

Most of the trees of the oak savanna have been cleared to make room for agricultural use. The extensive development of oaks on the river slopes, and species requiring or tolerating the higher moisture levels near the river, remain today because the terrain of the escarpment area is too rugged for agricultural use. Portions of this forest area are used for the grazing of cattle, however.

Common shrub species of the bur oak forest include snowberry, downy arrowhead, dwarf juniper, wild rose, beaked hazel, chokecherry, American hazel, red raspberry, Juneberry, and high-bush cranberry. The most common herb species are Pennsylvania sedge, arrow-leaved aster, wild strawberry, northern bedstraw, black snakeroot, goldenrod, early meadow rue, meadow parsnip, and various grasses.

The bur oak forest evidently dates from a severe fire which occurred 85 to 90 years ago. Records from Grand Forks, Walsh, and Pembina Counties in North Dakota refer to a severe prairie fire in the fall of 1879. Tree ring counts of eight trees within the bur oak forest indicated their ages to be 41 to 81 years.

The garter snake was the only reptile observed in the bur oak forest. Toads, leopard frogs and wood frogs also occur there. Insects are important consumers of vegetation in this forest.

A wide variety of songbirds utilize the forest during nesting and migration. Ruffed grouse, wintering sharp-tailed grouse, Hungarian partridge, nesting mourning doves, and wood ducks also occur there. Mallards, pintail, blue-winged teal, and the great blue heron have been observed in the river area within the forest. The downy woodpecker, several hawk species, and the saw-whet and short-eared owls also inhabit the escarpment forest.

Mammal species known, or expected to occur, in the escarpment forest include mice, shrews, voles, bats, rabbits, squirrels, muskrat, woodchuck, beaver, pocket gopher, ground squirrels, weasel, mink, fox, badger, skunk, raccoon, and whitetail deer. Farmers in the area also mentioned the occurrence of coyotes and wolves. The coyote appears to be rare in the area and has a remnant population. U.S. Bureau of Sport Fisheries and Wildlife personnel have no record of timber wolves in this area since 1955-56.

The whitetail deer is an important game animal in this area. The bur oak forest has been relatively unaffected by man and receives only light to moderate use by livestock. Consequently, a well-diversified species composition of shrubs and small trees has been able to develop and furnish high quality browse. Each fall there is a substantial influx of deer from outlying areas which overwinter in this protected, well vegetated area. A North Dakota State Game and Fish Department deer census on 8 February 1971 (table 6) indicated the bur oak forest to be the prime deer habitat in Walsh County.

Table 6 - Whitetail deer census for the forests bordering the South Branch of the Park River, North Dakota, 8 February 1971

Area	Number seen	Estimated total population	Comments
Floodplain forest			
Sections 7 and 18, Grafton Township (4 to 5 miles west of Grafton)	7	9	Moderate snowmobiling.
West of sections 7 and 18 to Highway 32 (5 to 20 miles west of Grafton)	41	51	Light to heavy snowmobiling.
Bur Oak forest			
Area 20 to 25 miles west of Grafton	92	115	No snowmobiling.
Located on tributary of South Branch, near Adams, N.D., about 30 miles west of Grafton	19	24	Very little snowmobiling.
Potential reservoir area (except Adams tributary)-25 miles west of Grafton	33	41	Moderate to heavy snowmobiling.

FLOODPLAIN FOREST

The floodplain forest occurs in a relatively narrow band along the branches and main stem of the Park River in the area between the escarpment and the Red River of the North. The formation and maintenance of this biological system are dependent on abundant moisture and periodic inundation by floodwaters which supply additional nutrients and result in selection against species intolerant of flooding. Occasional accumulation of new sediments keeps the soils relatively young as regards development of a soil profile.

Tree species characteristic of the Park River floodplain include American elm, box elder, basswood, green ash, cottonwood, aspen, and willow. Bur oak is also abundant here, but generally occurs on the upper portion of the riverbank on relatively well drained soil. The floodplain forest generally exhibits lesser dominance by a single species as compared with the bur oak forest.

Shrubs do not seem to be well developed within the floodplain forest, probably due to periodic flooding and to the shading effect of the tree canopy. Representative shrub species include chokecherry, gooseberry, Virginia creeper, and prickly ash. A light herbaceous cover exists and includes such species as Pennsylvania sedge, meadow rue, carrion flower, nettle, violets, and various grasses.

Tree ring counts of 10 trees in the floodplain forest indicate ages of from 50 to 155 years. Parts of the floodplain forest, therefore, predate the settlement of this area. These trees not only escaped destruction by the fire that evidently burned through the bur oak forest, but also escaped the axes of early settlers who cleared much of the area's woodlands for rough lumber and firewood. The floodplain forest trees are taller than those of the bur oak forest. This is probably due to a greater availability of nutrients and water, competition which forces them to grow tall, and their greater age. Extensive commercial exploitation of the forests of the Park River watershed is unlikely because of a combination of low-to-moderate supply and demand.

The fauna of the floodplain forest is quite similar to that of the bur oak forest. As was the case with the bur oak forest, the floodplain forest serves as a wintering ground for such species as deer and sharp-tailed grouse which utilize grasslands and fields during the remainder of the year.

The North Dakota Game and Fish Department deer survey referred to earlier (table 6) indicates a lower deer population in the floodplain forest than in the bur oak forest. This may be due to the narrow expanse of this forest and to the greater incidence of snowmobiling which may tend to drive deer away from this area.

Another important characteristic of a floodplain forest is its function as an ecotone or "edge". Because such a forest occurs at the edges of grassland, agricultural lands, and aquatic habitats, it supports life forms representative of all four habitat types. This creates a great diversity of species concentrated within a relatively small area. Some species are actually dependent on this edge effect. For example, deer and sharp-tailed grouse may feed in the grasslands and fields during warmer months but require the protection and browse of the forest in the winter. Similarly, such species as the mink, raccoon, beaver, wood duck, and heron require habitat features of both the aquatic and forest environments. One indication of the productivity of floodplain forests (but not necessarily that of the Park River) is the estimate for the Wild Rice River basin in Minnesota that an average of 300 to 500 breeding pairs of woodland birds exist per 100 acres of floodplain forest. The range of breeding pairs for deciduous forests in Eastern North America is 100 to 750 per 100 acres of forest with the highest density in bottomland and floodplain forests.(1)

HISTORY AND ARCHEOLOGY

The prehistoric and protohistoric periods of human occupancy and use of the Red River basin involved bands or tribes of nomadic and seminomadic peoples. Big game hunting was important, but there were not as many of the large herd animals as were present on the western plains. In earlier times, much importance was attached to the gathering of plants and wild seeds for food. In later prehistoric and protohistoric times, maize became important. At about 5500 B.C. there was a disastrous climatic change, known among prehistorians as the Altithermal Event, which resulted in a 2,500-year drought. It is believed that human occupation of the Red as well as

(1) Hibbard, E. 1973. Environmental impact study of the Wild Rice River, the South Branch of the Wild Rice River and Felton Ditch. Center for Environmental Studies, Tri-College University, Fargo, North Dakota.

the Souris and Rainy River basins was curtailed or perhaps eliminated until about 3000 B.C. The available outlines of prehistory in the Red River basin are based on sparse data, and experts in these fields feel that there are logical reasons to expect the existence of undiscovered or unreported sites with archeological value in the area.

The Red River basin was inhabited by various Indian groups at the time of first contact with Europeans. By 1863, the end of the Sioux wars, the remnants of the original Indian population had either been driven out or placed on reservations. With the completion of major rail lines, a flood of European settlers entered the area in the period 1870 to 1890. Historians point out that most of the important records were made by soldiers, traders, Indians, or commercial interests. There is a need for more historical work on pioneer farms.

Information pertaining to the locations of historical and archeological sites in the South Branch and Park basins upstream of Grafton was gathered as part of the University of North Dakota environmental study. The recognized sites are discussed in the following paragraphs.

Evidences of Indian utilization of land in western Walsh County are limited, and old settlers who have first-hand knowledge of Indian activities in this area are few. Several farmers living in a proposed reservoir site in the escarpment area mentioned the existence of Indian trails. Carl Troftgruben, who has lived on a farm in that area since 1887, stated that the Indians had a well-developed trail in that region between his land and the river. He mentioned that the Indians would usually camp beside a pond in Section 22 of Tiber Township (about 32 miles west of Grafton) and that Indian artifacts were frequently found there. Other evidences of Indian occupation were found on the Gryde Brothers farm in Section 34 of Tiber Township but these were disturbed some years ago when the land was broken for cultivation. The pond campsite area is evidently the only such site which is still identifiable in this area. However,

Henry Lundene, who operates a farm in Section 4 of Vesta Township (about 30 miles west of Grafton) stated that he knew of a circle of rocks in the river valley which was apparently used by Indians as a council place. This particular site has since been obscured by periodic flooding. Mr. Lundene also stated that in all probability the Indians utilized the river valley area extensively during the winter months because it provided shelter, firewood, and game.

A large Indian mound is located in section 22 of Golden Township, just east of North Dakota Highway 32 at the crossing of the South Branch of the Park River (about 16 miles west of Grafton). In the mid-1930's, this mound was partially excavated by students and faculty from the University of North Dakota, but the study was never finished. Mr. Kenneth Fjeld, who lives in section 21, Golden Township, knows of the existence of several other mounds north of the river but outside of a possible reservoir area. None of these mounds has been excavated. It is likely that other mounds and campsites existed elsewhere along the South Branch.

Section 21 of Golden Township (about 15 miles west of Grafton) is of historic interest for several reasons. First, the area along the south side of the river was the site of the town of Garfield which existed in the early 1880's. It disappeared as a community in the mid-1880's when the railroad bypassed it. There are three houses presently in the original townsite, all of which are of more recent origin. One of the houses, however, includes, as an attached shed, the old building which served as a post office. Other evidences of the town include the foundation of a general store and the excavation created for one of the houses. In section 16, Golden Township, along the south side of the river just west of North Dakota Highway 32, is an old cemetery and the foundation of an old church. The

church building was moved many years ago to a new site on Highway 32 about 3 miles south of Edinburg, North Dakota. The building was dismantled in the fall of 1970. The cemetery is densely overgrown with trees and shrubbery and is unrecognizable from the highway.

Also in the area of the Garfield townsite is an undisturbed section of an oxcart trail where it crossed the river. Kenneth Fjeld, who lives in one of the houses along the river, states that his grandfather, an early settler, knew the trail to be the main oxcart trail between St. Paul, Minnesota, and St. Joseph, Dakota Territory (now Walhalla, North Dakota). The trail was in use in the 1860's and 1870's. However, Lounsberry[1] states that this trail was in use at least back to 1801. Dana Wright[2] recorded the trail taken by Captain William J. Twining, U.S. Army Corps of Engineers, from Stump Lake in Nelson County to St. Joseph in August 1869. His record shows that Twining joined the oxcart trail on the south side of the river in section 21. The St. Joseph Trail north of the river has been almost completely removed now due to cultivation. However, two small segments of this trail are recognizable in pastures in section 7 of Golden Township, property now owned by Lennert Almen. Mr. Mikkel Hylden,[3] an early settler in Vernon Township just south of Golden Township, recorded the passage of the St. Joseph-St. Paul trail across his land. "The ruts in the trail were so deep that it was with difficulty that they could be crossed with a wagon." Evidence of the trail on the Hylden farm has now been destroyed by cultivation.

---

(1) Lounsberry, C. A., 1896. The record 1(9):19.

(2) Wright, Dana. Notes on trail use by Captain William J. Twining, U.S. Army Corps of Engineers, August 1869, when making a reconnaissance from Stump Lake to St. Joseph, now Walhalla, N. Dak. Report on file North Dakota State Historical Society, Bismarck, N. Dak.

(3) Hylden, Mikkel. Family History. On file in the Public Library, Grafton, N. Dak.

All the areas on which these sites are located are owned by private individuals. Up to the present, preservation has been maintained by these individuals and their predecessors. Except for residents of the immediate areas, probably few people know about these areas. There is no guarantee of their continued preservation in the future without intervention by historical and/or scientific organizations.

The location of the sites described are to the west of Grafton. The lands included in the proposed project area were not surveyed because at the time of the investigation the most likely flood control alternatives were a large upstream reservoir or rural channelization, each with a large flood bypass channel at Grafton. Discovery of historical and archeological sites on proposed project lands is unlikely since most of the lands involved have been disturbed by agricultural activity.

AESTHETICS

Although the Park River watershed is mostly in agricultural use, it contains many features of aesthetic appeal: topographic variation; color, shape, and pattern of vegetation; a diversity of wildlife; and, in some areas, a low degree of disturbance. Autumn is noted for its exceptional beauty due to color variation. Sounds created by wind, flowing water and wildlife and the odors of flowering vegetation add to the aesthetic qualities of the area.

The significance of the aesthetic qualities of the streams and woodlands is amplified by the contrasting flat and generally treeless landscape of most North Dakota lands. North Dakota has the lowest percentage of woodlands of the 50 States. Because of declining woodland acreage, North Dakota has recently ennacted legislation providing a woodland tax allotment for maintaining woodlands. Unfortunately, the clearing of woodlands is continuing. The significance of remaining forested areas, such as those of the Park River watershed, for aesthetic and other values can, therefore, be expected to increase in the future.

RECREATION

The Park River basin is within North Dakota planning regions 3 and 4 as indicated in the 1970 North Dakota Recreation Plan.(1) Since no other specific recreational use studies have been made for this basin, an estimate of recreational use and facilities was based upon information in the Plan. A breakdown of the amount of recreational lands and waters in State planning regions 3 and 4 and the counties within which the Park River basin lies is presented in table 7.

Table 7 - Recreational areas for counties and State planning regions related to the Park River basin, North Dakota(*)

State planning region	Recreational area (acres)		
	Land	Water	Total
Region 4			
Pembina County	4,300	420	4,720
Walsh County	3,290	1,290	4,580
Other counties	10,880	5,630	16,510
Total	18,470	7,340	25,810
Region 3			
Cavalier County	3,670	1,160	4,830
Other counties	14,580	10,720	25,300
Total	18,250	11,880	30,130

(*) Approximately 22 percent of Pembina County, 42 percent of Walsh County, and 14 percent of Cavalier County are within the Park River watershed.

An estimate of recreational land and water resources within the Park River basin was based upon the percentage the Park River basin is of the total land area in the three counties. Based upon this estimate, the Park River basin contains about 2,800 acres of recreational lands and about 800 acres of recreational waters, or a total recreational area of about 3,600 acres.

(1) 1970 North Dakota State Outdoor Recreation Plan, North Dakota State Outdoor Recreation Agency. Bismarck, North Dakota.

These total basin recreational area figures include Homme Lake, which is about 20 miles west of Grafton on the South Branch Park River. Homme Lake, with a water surface area of about 200 acres and recreational land area of about 140 acres, receives heavy recreational use throughout the year. Estimates indicate that in 1972 over 90,000 people visited and utilized recreation facilities at, and associated with, Homme Lake.

The 1970 North Dakota State Outdoor Recreation Plan shows that major recreational needs for region 4 consist of water surface area for fishing, boating, and water skiing, and additional facilities for camping, bicycle trails, picnicking, hiking, nature study, and scenic driving and sightseeing. The major needs of region 3 consist of additional facilities for camping, bicycle trails, picnicking, hiking, and nature study. The summary of recreational needs in regions 3 and 4 for 1969, 1980, and 1985 is shown in table 8.

Table 8 - Recreational needs in State planning regions 3 and 4

	Recreation needs					
	Region 4			Region 3		
Activity	1969	1980	1985	1969	1980	1985
Fishing (acres)	4,450	6,370	7,270	0	0	0
Boating and water-skiing (acres)	2,730	3,780	4,330	0	0	0
Swimming[1] (beaches)	0	0	0	0	0	0
Camping (units)	354	622	767	155	238	286
Bicycle trails (miles)	98	130	146	42	49	53
Picnicking (tables)	0	72	136	176	206	231
Hiking and nature study (miles)	37	48	53	2	4	5
Scenic driving and sightseeing (miles)	37	48	52	0	0	0

(1) Existing beaches meet present demand, but some need to be replaced by higher quality beaches and facilities.

The ratio of estimated existing recreational areas in the Park River basin portion of each planning region to the total existing recreational areas in each region was used in determining that portion of the regional needs which could be attributed to the Park River basin. The percentages used for determining Park River basin recreational needs include 13 percent recreational lands, 9 percent recreational waters, and 11 percent recreational area for region 4; and 3 percent recreational lands, 1 percent recreational waters, and 2 percent recreational area for region 3. Estimated recreational needs for the Park River basin for the years 1969, 1980, and 1985 are shown in table 9.

Table 9 - Recreational needs for the Park River basin

Activity	1969	1980	1985
Fishing (acres)	400	573	654
Boating and water skiing (acres)	246	340	390
Camping (units)	51	88	109
Bicycle trails (miles)	14	19	21
Picnicking (tables)	5	15	25
Trails, hiking and nature (miles)	4	5	6
Scenic drive (miles)	4	5	6
Swimming	Upgrade poor facilities		

Local recreational facilities include Leistikow Memorial Park which is comprised of about 20 acres adjacent to the Park River in the northwestern corner of Grafton. It includes some recreational facilities and is approximately one-fourth wooded. Ball parks have been established elsewhere in the city, and a golf course is located just east of the city limits.

LAND USE

Results of a Walsh County land-use survey[1] taken during July 1970 are presented in table 10. About 42 percent of Walsh County is located in the Park River basin. It is expected that agriculture will continue to be a dominant force in the Walsh County economy.

(1) Stanley Consultants. 1972. Plan and Implementation Program. Walsh County, North Dakota.

Table 10 - Land-use summary, Walsh County, 1970

Use	Acres	Percent
Residential	820	0.1
Commercial	140	nil
Industrial	350	0.1
Public/semipublic	480	0.1
Recreational	4,980	0.6
Streets, roads, and alleys	20,620	2.5
Railroads	2,270	0.3
Agricultural or vacant	793,380	96.4
TOTAL	823,040	100.0

A more detailed land-use study[1] was made for a 2-mile-wide strip of land along the South Branch of the Park River in areas which could be affected by the alternative plans of flood damage reduction. Four areas were studied, and a breakdown of land use in those areas is given in table 11.

Table 11 - Land use along a 2-mile-wide strip of land in potential project areas (in percent)

Land use	Oakwood to Grafton	0-10 miles west of Grafton	0-9 miles west of Homme Dam	Potential reservoir area more than 9 west of Homme
Forest	8	8	23	24
Shelterbelt	*	1	*	*
Grasslands	1	2	8	12
Cropland	87	85	65	61
Farmstead	1	1	1	1
Road	2	2	2	1
Streambed, legal drain	1	1	1	*
Other	*	*	*	*

(*) Indicates something less than 1 percent of the 2-mile wide strip.

(1) Kannowski, P. B. 1971. Environmental Aspects of Two Water Management Alternatives in the Park River Subbasin, North Dakota. University of North Dakota, Institute for Ecological Studies. 60 pp.

The area between the cities of Oakwood and Park River has the heaviest agricultural use, reflecting the high quality of the soil and the ease of cultivation on level terrain. This corresponds to the first two columns of table 9. Natural forest vegetation covers only 8 percent of the area studied, and grassland 1 to 2 percent. The forested lands in this area are almost exclusively floodplain types, occurring in a narrow band along the river. The floodplain forest between Park River and Oakwood has been greatly reduced in size in order to utilize the land for agriculture. Much of what remains is fenced and used for grazing. Since the soils in the area are very fertile, continued clearing for agriculture is likely in the future. Grassland is very limited, occurring mostly on the river valley slopes which have been deforested.

The percentages of forest and grassland in the 2-mile-wide strip above Homme Reservoir are much greater than in downstream areas, reflecting a more rugged topography which is not suited to cultivation. This includes the latter two columns of table 11. Forest covers 23 to 24 percent of lands in those two areas while grassland covers 8 to 12 percent.

Land use on the 2,700 acres which would be protected was classified as residential, commercial, industrial, recreational, public, vacant land suitable for development, and vacant land unsuitable for development. Table 12 shows land use for 1970 and projected land use for 2030. Land-use projections were based on a combination of population index (OBERS) and number of persons per acre.

Table 12 - Use of floodplain land in the project area at Grafton, N. Dak.(1)

Land use	1972 conditions			2030 conditions
	Area in Acres	Percent of total floodplain	Percent of developed land	Area in Acres
Developed land				
Residential	390	14.4	52.0	1,180
Commercial	90	3.3	12.0	290
Industrial	85	3.2	11.3	250
Public, excluding recreational land	155	5.7	20.7	400
Recreation	30	1.1	4.0	100
Total developed land	750	27.7	100.0	2,220
Undeveloped land(2)				
Land suitable for future development	1,770	65.6		270
Land unsuitable for future development	180	6.7		110
Total undeveloped land	1,950	72.3		480
Total floodplain land	2,700	100.0	100.0	2,700

(1) Land to be protected by proposed levee.
(2) Includes agricultural lands, marginal land, and other vacant land.

In the area to be protected, only 27.7 percent has been developed. Of the developed land, the principal land use is residential, which accounts for 390 acres or 52 percent. Public land accounts for 155 acres, including hospitals, schools, streets, city and county buildings, and the State institution for mentally retarded persons.

The undeveloped land was classified as suitable or unsuitable for future development. About 1,770 acres, or 65.6 percent of the protected area, was level, presently used for agriculture, and suited for future development. Land classified as not suited for development amounted to approximately 180 acres, or 6.7 percent of the protected area. A city plan for Grafton and Walsh County prepared in 1972 by Stanley Consultants of Muscatine, Iowa, recommended that 1,325 acres be annexed by the city, all in the floodplain.

TRANSPORTATION

The Park River basin and Walsh County are served by the Burlington Northern and Soo Line Railroads and by one U.S. highway and three State highways which connect the area with a regional transportation system. State Highway 17 extends east and west through Grafton, and U.S. Highway 81 is a north-south arterial through the city. Both of these highways would intersect the project structures. By 1975 the basin will be served by Interstate Highway 29, linking Walsh County with Grand Forks and Fargo, North Dakota, and the nation's interstate highway system. Good secondary roads also serve the basin. Walsh County presently maintains approximately 440 miles of highways, 85 miles of which are paved.

POPULATION

The Park River basin had a 1970 population of 16,255 and an area of 1,010 square miles for a population density of 16.1 per square mile. The area of the basin in Walsh County, 521 square miles, is 52 percent of the total basin area and reflects the population trends in the Park River basin. Of the 16,251 persons in the county in 1970, 10,317 (63 percent) resided in incorporated towns, and 5,934 (37 percent) resided in rural areas. Grafton, the largest city in the basin, had 5,946 inhabitants; Park River had 1,680; and Minto had 636. Table 13 shows the population of each incorporated community in Walsh County and the county's total population.

Table 13 - Historic population of incorporated communities and rural areas, Walsh County, N. Dak.(1)

Category	Population			
	1940	1950	1960	1970
Incorporated communities				
Adams	355	411	360	284
Ardoch	119	137	106	70
Conway	120	107	67	57
Edinburg	378	343	330	315
Fairdale	137	131	126	102
Fordville	439	376	367	361
Forest River	207	236	191	161
Grafton	4,070	4,901	5,885	5,946
Hoople	346	447	334	330
Lankin	283	287	303	221
Minto	630	592	642	636
Park River	1,408	1,692	1,813	1,680
Pisek	242	215	176	154
Total incorporated communities	8,784	9,875	10,700	10,317
Rural areas	11,963	8,984	7,297	5,934
Total Walsh County	20,747	18,859	17,997	16,251

(1) Sources: 1940-1970 Census of Population, North Dakota, prepared by U.S. Department of Commerce, Bureau of the Census; and Stanley Consultants, Muscatine, Iowa.

Walsh County's population declined by 22 percent between 1940 and 1970, from 20,747 to 16,251. This decline is attributed to migration from farms and small towns to urban areas. OBERS projections indicate that Walsh County's population will remain stable until 1990 and then increase by 18 percent from 1990 and 2030. The anticipated increase would occur primarily at Grafton and Park River. Grafton is expected to grow from 5,946 in 1970 to approximately 10,900 by the year 2030. This growth of 83 percent will increase the potential for loss of life and property during time of flood.

EMPLOYMENT

Employment in Walsh County increased for all recorded categories except agriculture during the 1940-1970 period (table 14). The decline in agricultural employment more than offset the increase in nonagricultural employment, with the result that total employment declined. Agricultural employment decreased from 3,930 in 1940 to 1,343 in 1970. This decrease of 2,587 agricultural workers during the 30-year period reflects the continued out-migration of persons from farms due to technological advance in agriculture. The largest increase in employment was in the services category, which had 587 more workers in 1970 than in 1940, and the second largest increase was in wholesale and retail trade. In 1970, services, the largest employment category, accounted for 30 percent of total employment. Agriculture and wholesale and retail trade accounted for 25 percent and 23 percent of employment, respectively.

Table 14 - Employment in Walsh County, N. Dak., 1940-1970(1)

Industry	1940		1950		1960		1970	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Agriculture, forestry, and fisheries	3,930	60.0	3,504	52.8	2,159	36.1	1,343	25.2
Mining	2	Negligible	2	Negligible	0	-	11	0.2
Construction	136	2.1	270	4.0	280	4.7	246	4.6
Manufacturing	62	1.0	72	1.1	200	3.4	211	4.0
Transportation, communications, and utilities	275	4.2	410	6.2	352	5.9	382	7.2
Wholesale and retail trade	813	12.4	1,077	16.2	1,193	20.0	1,227	23.1
Finance, insurance, and real estate	55	0.7	85	1.3	165	2.8	136	2.6
Services	1,010	15.4	874	13.2	1,263	21.2	1,597	30.0
Government	143	2.2	183	2.8	225	3.8	165	3.1
Industry not reported	124	2.0	160	2.4	127	2.1	(2)	(2)
TOTAL	6,550	100.0	6,637	100.0	5,964	100.0	5,31[illegible]	100.[illegible]

(1) Source: Growth patterns in Employment by County, U.S. Department of Commerce, 1965, and General Social and Economic Characteristics, North Dakota, U.S. Department of Commerce, 1972.

(2) The 1970 census' revised reporting procedure left out the "industry not reported" category.

The 1970 census indicated a total employment of 2,040 workers in Grafton, a 36-percent increase from the 1950 total of 1,498 workers. The population increased by 46 percent during the same period. The principal categories of employment in Grafton in 1970 were the services and wholesale and retail trades, with 37 percent and 24 percent of the labor force, respectively. During the 1950-70 period, employment in services increased by 300 workers, an increase of 66 percent. Employment by industry in Grafton is shown in table 15. With the exception of agriculture, a comparison of Walsh County employment with Grafton employment shows a close correlation.

Table 15 - Employment in Grafton, N. Dak., 1950-1970

Industry	1950 Number	1950 Percent	1960 Number	1960 Percent	1970 Number	1970 Percent
Agriculture, forestry, and fisheries	96	6.1	99	5.2	-	-
Mining	1	-	-	-	-	-
Construction	111	7.5	117	6.2	93	4.6
Manufacturing	45	3.1	119	6.3	102	5.0
Transportation, communications, and utilities	136	9.1	107	5.7	151	7.4
Wholesale and retail trade	528	35.2	548	29.0	490	24.4
Finance, insurance and real estate	49	3.4	71	3.8	96	4.7
Services	451	30.1	736	37.5	751	36.8
Government	67	4.5	93	4.9	95	4.7
Industry not reported	14	1.0	27	1.4	243	12.1
TOTAL	1,499	100.0	1,887	100.0	2,040	100.0

Sources: U.S. censuses of 1950, 1960, and 1970.

The 1968 OBERS projections indicate that total employment in the Grand Forks economic area will increase from 83,738 in 1959 to 110,600 in 2030. Most of the increase in employment in the economic area is likely to occur in Grand Forks with some increase in cities such as Grafton.

FLOODS AND FLOOD DAMAGES

The portions of the Park River basin which are susceptible to flooding lie below the escarpment in the flat glacial lake bottom. Due to the flat terrain and sluggish drainage patterns, the river, after breaking out of its banks, moves slowly overland eastward. The slow-rising nature of the river, once it has gone out of its banks, has meant no loss of life to date. Most of the larger flood flows have resulted from spring snowmelt, but occasional summer floods from heavy rains have been responsible for damage to maturing crops.

Floods of considerable magnitude occurred in 1897, 1916, 1948, 1949, 1950, 1956, 1962, 1965, and 1969. The largest recorded flood occurred in 1950 from spring snowmelt and coincidental rainfall. The 1950 flood inundated most of Grafton, more than 60,000 acres of cropland along the South Branch and main stem Park River, several thousand additional acres of cropland along the Middle and North Branch of the Park River, and low-lying developments at the city of Park River.

The flood damages in the South Branch and main stem Park River basin are concentrated primarily at Grafton (82 percent), with agricultural crop and rural development (17 percent) and development at Park River (1 percent) constituting the remainder of flood damages. Approximately 95,000 acres of land, mainly agricultural; 6,700 persons; and 2,000 residences, including about 300 farmsteads, are located in this floodplain area. Much of the Red River Valley to the east, including much of Grand Forks, is also in a floodplain.

U.S. Geological Survey discharge records are available for the Park River at Grafton (drainage area approximately 695 square miles) since 1931. The maximum discharge observed for the period of record was 12,600 cfs recorded on 19 April 1950. The discharge of a flood having a probability of occurring at Grafton once in 100 years is about 22,100 cfs. The discharge rate for the standard project flood at Grafton is estimated to be 38,800 cfs.

Federal or State law strongly relating to the project or the project area is essentially limited to Executive Order 11296 which requires evaluation of flood hazard in locating federally owned or financed buildings, roads, and other facilities, and in disposing of Federal lands and properties.

OVERVIEW OF THE DEVELOPMENT OF THE PARK RIVER BASIN

The early settlers in North Dakota followed the State's watercourses and established their communities along them to take advantage of sources of water power, transportation, water supply, and other water-related benefits. In the case of the Park River, the watercourse was probably not very important for water transportation although the river functioned in keeping the traveler oriented in the landscape. Water power was probably not an attraction of the area near Grafton because the Park River could not provide a high head nor sufficient flow for such use.

Later immigrants to the area tended to settle in or near the established communities, such as Grafton, because there they could find jobs or markets for their produce. Man is a gregarious creature, which also encouraged him to live near others of his kind.

In the early days in North Dakota, transportation was slow and inefficient, and thus many communities had to be scattered about the region to serve the State's growing, and largely agricultural, population. The development of efficient and relatively inexpensive transportation in recent years meant that many of the smaller communities were no longer so important in the region's economy. These trends in transportation were likely important in causing growth in larger communities while the smaller communities lost population. In the case of Walsh County, of 13 incorporated communities only Grafton and Park River registered appreciable gains in population between 1940 and 1970. During the same period Grand Forks grew considerably as the region's economic center. In the future, this imbalance between the smaller and larger communities could be expected to continue.

Thus, the reasons for Grafton to be at that location appear to be much less compelling than in the past. The location and growth of the city are due in large part to the history of the region and to man's desire to be near his own kind.

3. ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

The proposed project would change surface water characteristics of the Park River at Grafton during flood conditions. These changes would impact on the economic, biological, and social setting of the Grafton area.

IMPACT ON SURFACE WATER

The surface water of the Park River at Grafton would be affected by the proposed project only during those periods when flows exceed 2,000 cfs (probability of occurrence about 40 percent in any year). During such periods all water would be diverted around Grafton, and no flows would be routed through the river channel of the 2,700 acre leveed area. Water would pond in the river channel within the leveed area behind two existing low head dams in Grafton and behind the downstream gated control structure. Flood stages at the diversion structure would be elevated about 0.6 foot and 1.3 feet over present conditions for the 100-year and standard project floods, respectively. For lesser floods there would be no significant increase. Backwater effects from the diversion structure would extend upstream about 0.5 mile and 1.2 miles for the two floods. Water levels would be reduced along 3.7 river miles between the leveed area and the bypass channel outlet downstream of Grafton. No significant effect on water levels in the lower reaches of the Park River are anticipated. (See also the discussion of Impacts on Biological Systems.)

ECONOMIC AND SOCIAL IMPACTS

The proposed plan has a benefit-to-cost ratio of about 3.3, and it would reduce flood damages along the South Branch and main stem Park River by an estimated 76 percent. Flood damages within Grafton would be reduced by about 93 percent. Protection from the

standard project flood would extend over 390 acres of residential land; 175 acres of commercial and industrial land; 185 acres of public and recreational land; and 1,950 acres of undeveloped land (now mostly in agricultural use).

Based on July 1972 price levels, total estimated first costs of the project would be $8.8 million, of which approximately $1,105,000 would be non-Federal. Total average annual charges would be $541,000 based on a 5 5/8 percent interest rate over a 100-year period.

An improved social setting would result from the residents' perception of safety and reduced anxiety during high water seasons. Benefits would also result from less disruption to transportation and community services in the area.

The project is not projected to induce future development in Grafton.

In the judgment of the Federal Highway Administration, the following necessary highway adjustments would have a significant adverse effect on highway users. The ramps at the levee crossings of the roads and highways would introduce humps of from 1 to 4 feet in the otherwise level profile for roads in the area, producing a detrimental aesthetic effect as well as being an inconvenience for the driver. The new U.S. 81 bridge would have an economic impact on highway users due to its high cost.

The existence of another adverse social impact was pointed out at the late-stage public meeting in Grafton on 19 July 1973. The legal representative of a number of the area's citizens referred to the levee causing divisiveness between those living with the levee

and those living without. Some persons outside the levee seem to fear a backwater effect and would possibly feel alienated from Grafton since they would have no flood protection. As regards the feelings of the inhabitants of Grafton, the legal representative stated that his merchant clients feared that such alienation would adversely affect their businesses.

Only minimal amounts of mineral materials would be committed to the project, and there should be little or no adverse effect on mineral resources from the project in the vicinity of Grafton.

LAND USE IMPACTS

Future land use in the Park River basin is projected to continue to be based almost entirely on agriculture. The urban development of Grafton will continue to support that enterprise. Regionally, Grand Forks, about 40 miles southeast of Grafton, is the fastest growing and locally largest urban center supporting agriculture.

Providing flood protection for Grafton and its vicinity might tend to concentrate future development within the 2,700-acres leveed area as opposed to development in unprotected areas. Tentative plans apparently exist, however, for future developments to the west of the proposed area of protection.

Of 365 acres of land required for the project, all but about five acres of natural woodland is in agricultural use. About 235 acres of the required land is needed for construction of the flood bypass channel and ring levee. An additional 130 acres of land would be needed for spoil disposal associated with excavation of the bypass channel.

The project therefore involves a direct, permanent change in land use of 235 acres from agricultural production to flood control structures. About 225 of the 235 acres would be planted to native vegetation. The 130 acres needed for spoil disposal would be lost to agricultural production during the construction period but would be returned to agricultural use, with at least a temporary reduction in productivity.

The project would have no direct impact on land use outside the Grafton area, although it might indirectly shift some developments to Grafton. Because no floodplain regulations are in effect in the Park River basin, gradually increasing flood damages can be expected to continue in areas outside the levee.

IMPACTS ON BIOLOGICAL SYSTEMS

A total of 0.1 mile of natural river channel would be affected by construction at the ends of the flood bypass channel and at the two levee closure structures. Benthic organisms would be destroyed in the 0.1 mile directly affected by construction. Areas having a suitable substrate would be repopulated by drift of larval forms down the stream, although the amount of time required is unknown. Habitat covered by concrete would be lost for all practical purposes, and the below-water areas covered by riprap would support an aquatic community different from that which now exists.

Construction activities would result in temporarily increased sediments at and downstream from construction sites depending upon such factors as streamflow at the time of construction, rainfall, and the use of devices for silt detention. The sediment load would decrease downstream as suspended material gradually settled out. Suspended and settled material downstream from construction areas would limit or prevent light from reaching photo-synthetic bottom flora, thereby reducing their productivity.

Aquatic invertebrates may be affected through burial by sediment and hinderance of their ability to feed and respire. Fish, being more mobile, could leave the affected area but the likelihood of their doing so is not very high, even though suspended materials irritate and injure their gills. These impacts could be decreased by timing construction during the late summer low flow period and by using appropriate silt detention devices. Adverse effects of sediment on the hatching of fish eggs could also be alleviated in this way.

Operation of the proposed project would not be expected to significantly affect either the quality or species composition of the stream fishery. The probability of project operation in any given year is about 40 percent. According to U.S. Geological Survey data from 1950 to 1968, the longest period of flow diversion would probably be 25 to 30 days. An average period of flow diversion would likely be three to four days. Water would pond within the leveed area behind two low head water supply dams near the center of Grafton and behind the downstream gated control structure. Some fish would become temporarily isolated in these ponding areas, but could be expected to survive if the ponded water remained of suitable quality until flows were reestablished.

During the construction period, some water and wind erosion of the project lands could be expected. Some eroded soil would reach the river and add to the sediment load created by work within the river channel. Topsoil would be pushed aside and used to cover the levee, bypass channel, and spoil bank areas after construction. Upon completion of construction, all lands would be seeded to native vegetation to prevent long-term problems of erosion.

The spoil bank area would be returned to agricultural use after the construction period.

The direct loss of wildlife habitat resulting from removal of about five acres of natural floodplain forest would at least be partially compensated by planting about 10 acres to native trees and shrubs in the area between the levee and the bypass channel, at the two levee closure structures, and at six levee road crossings. Over the long-term the 10 acres of plantings might provide more wildlife habitat than the 5 acres to be lost.

Protection from flooding along 4.3 river miles within the leveed area and reduced flooding along 3.7 river miles between the levee and the bypass channel drop structure east of Grafton would result in changes in the vegetation along that reach of the river. The long-term productivity of the vegetation would be reduced because silt-laden flood waters would not periodically enrich the soils within the levee and flooding would be of reduced importance along the 3.7 river miles receiving some protection from flood waters. The species composition would also tend to change with invasion of species more typical of the uplands. Under natural conditions flooding selects against species which are capable of growing in the floodplain but are intolerant of flooding.

Elimination of flood water recharge might also tend to dry any productive, marsh-like, abandoned oxbows in the project area. Drying of the oxbows would speed their natural biological succession to vegetation more typical of drier upland sites. This would mean lower biological productivity as well as a gain by the more xeric (characteristic of drier conditions) community types at the expense of the relatively uncommon hydric ones. Although there are few abandoned oxbows within the leveed area, there is a large oxbow west of Leistikow Memorial Park in Grafton. The water level in that oxbow might be maintained, however, by the low head dam for water supply about two river miles downstream.

Successional changes in vegetation within the leveed area would not have time to occur if these woodlands were cleared and if backwater oxbows were drained and filled before such changes could take place. This is especially likely because these lands are adjacent to present developments and are considered some the richest in the nation. Loss of these woodlands would result in concomitant loss of values for recreation, aesthetics and wildlife. This loss would be especially significant to this area characterized by very few woodlands.

Woodland in the project area occurs on the river bank slopes and in five relatively large blocks of woodland above the river bank. Two of these blocks are developed: one, at the east end of the leveed area, for a housing project; and the other, just east of the leveed area, for a golf course. Most of the woodland remaining in those two areas will likely be preserved for the foreseeable future because of its aesthetic qualities. The woodlands' value to wildlife is, however, somewhat limited.

One of the undeveloped blocks of woodland is adjacent to Leistikow Memorial Park at the west end of the leveed area. The two remaining blocks of woodland occur between the leveed area and the bypass channel drop structure. None of these last three areas have been dedicated to public use and are therefore subject to clearing. Woodland of the river bank slope is not as subject to clearing because of its irregular terrain. Wooded slope areas, as well as above bank woodlands, have, however, been cleared in other areas of the Park River floodplain forest. About 10 acres of woodland between Grafton and the proposed drop structure have recently been cleared.

A land use study for Walsh County[1] suggested the annexation and preservation of nearly all wooded areas within the proposed levee alignment. This plan has not as yet been approved by city officials. Also, the Bureau of Sport Fisheries and Wildlife has recommended that indirect losses of natural areas be mitigated by acquiring, as part of this project, at least the floodplain forest and oxbow areas downstream from the levee to the confluence of the bypass channel with the Park River. This area would then be preserved as a greenbelt or environmental corridor. Plans could also incorporate the preservation of natural river areas along rural reaches of the Park River through appropriate floodplain zoning regulations. A combination of all suggestions could

(1) Stanley Consultants. 1972. Plan and Implementation Program, Walsh County, North Dakota.

provide a plan which would eventually result in the preservation of a feature, natural woodland acreage, which is more limited in North Dakota than in any other State in the Union. The preservation of the floodplain forest near Grafton is particularly desirable because of the scarcity of woodland in the area, and because this is the only natural woodland in the eastern portion of the Park River basin.

The ecological value of the floodplain woodland is greater than the value of a similar acreage of upland woodland. Because the woodlands occur in a strip along the river they contain species typical of the riverine areas, the woodlands, and the upland cultivated areas. Many species reach their greatest abundance, or are restricted to, such an "edge". Upland woodland is also very uncommon in the project area.

About 215 of the 235 acres dedicated to flood control would be planted to native prairie grasses. Their value to wildlife would be greater than that under their present use as agricultural land. This judgment is based upon the grasslands providing a type of habitat which is relatively uncommon in the area and their providing year round cover. The species of prairie grass used for planting could be either short species or a tall- and mid-grass mixture. Advantages of a suite of short species include:

1. Reduced need for maintenance such as mowing (although short-grass prairie would probably eventually be invaded by either taller tame grasses, such as brome, or taller native grasses).

2. The species would be well adapted to the dry soil conditions on the raised earthworks.

3. The structural integrity of the levee could be readily ascertained during periodic inspections.

Disadvantages of short-grass species primarily involve their lesser value as wildlife habitat although they may also be less aesthetically pleasing than tall-grasses and may have a smaller value in control of erosion. Both short- and tall-grass species therefore have their advantages and disadvantages. Although the plan as now proposed uses short species, this matter would be further investigated during postauthorization studies. Possibilities to be evaluated include seeding of taller species with mowing scheduled on a rotation basis, a third or fourth of the area being mowed each year with periodic inspections scheduled to coincide with the mowing. Some of the considerations would be important with any species mix. For example, short native species or mowing would provide desirable habitat for the smaller burrowing rodents. Taller grasses would provide them with less desirable habitat although the numerically less important but larger forms of burrowing wildlife may be encouraged. Burrowing wildlife would conflict with levee integrity. Consideration of such factors in postauthorization studies would be made in cooperation with other land management agencies.

The other 10 of the 235 acres would be planted to native trees and shrubs. The plants would be in clumps and would again provide habitat which is uncommon in the area. Their value as winter cover would depend upon their density and expanse.

IMPACTS ON AESTHETICS AND RECREATION

The proposed levee and flood bypass channel would be unnatural in appearance in being straight and of different elevation than the existing ground surface, and in that sense would be aesthetically disruptive. However, the existing roads and other cultural features in the area are also unnaturally straight and often elevated although the project features would generally be larger than other cultural features in the area.

Because the levee must be protected from sudden failure, trees and shrubs must be cleared from a strip up to 10 or more feet away from the levee depending upon the nature of the soil. The aesthetic impact of the straight levee would be partially mitigated by using excess material from channel excavation to construct "warps" along the levee at the road crossings and on the north side of the levee. These mounds of earth can be used to support trees and shrubs if they are large enough to prevent roots from penetrating the levee. The resulting curves along the levee should also render it less conspicuous in the landscape. Clearing would occur at the two river crossings.

Plantings of trees and shrubs would be made at the six levee road crossings and the two channel closure structures. Although the very size of the flood bypass channel would make it a conspicuous feature in the landscape, it would be somewhat screened from the city by the levee and scattered plantings of trees and shrubs.

An adverse aesthetic impact of the levee would be the levee's intrusion into the relatively unobstructed view of the countryside.

The clearing of about five acres of floodplain forest would involve some loss in the recreation potential of affected areas. Elimination of these woodlands would mean loss of their aesthetic recreational, and wildlife support qualities which are especially valuable in this sparsely wooded area. This loss should be compensated in time by plantings of native vegetation along the flood control structures, as described.

Several recreational features such as picnic areas, bicycle and hiking trails, nature study areas, or greenbelt areas could be incorporated into the proposed project although specific developments are not anticipated at this time. Such developments would require the cooperation of local governmental units. A significant recreational plan for the area could be developed with preservation of floodplain areas adjacent to the project area quite possibly being an integral part.

IMPACTS ON HISTORICAL AND ARCHEOLOGICAL SITES

The general project area is thought to have been utilized during prehistoric and protohistoric periods by tribes of nomadic and semi-nomadic peoples. The area was also important during the early settlement of the region. Evidence of that period has been found in the general area.

Investigation of potential historical and archeological sites would be required should further study be approved. At present, no historical or archeological sites in the project area are on the state or national registers of historic sites.

4. UNAVOIDABLE ADVERSE IMPACTS OF THE PROPOSED PROJECT

Unavoidable adverse impacts of the proposed project include the elimination of about five acres of floodplain forest and associated wildlife· alteration of 0.1 mile of stream bed with attendant effects on aquatic biological productivity; conversion of 235 acres of agricultural land to the levee and bypass channel; some negation of aesthetic quality due to the loss of some natural areas and to the unnatural appearance of the levee and bypass channel; and some inconvenience resulting from the division of properties by the levee and flood bypass channel.

Temporary unavoidable impacts would include the dust and siltation caused by construction, and the reduced productivity of the 130 acres of agricultural land used for disposal of excess material.

5. ALTERNATIVES

A number of nonstructural and structural measures could reduce the potential of flood damages in the project area. Nonstructural alternatives include no action, flood warning, floodplain evacuation, flood proofing, floodplain regulation, and flood insurance. Structural alternatives include levees at Grafton, flood bypass channel

at Grafton, combination levee and flood bypass channel at Grafton, channel modification in rural reaches of the South Branch and main stem Park River, channel modification through Grafton, and upstream reservoir storage. These alternate plans are considered in the following paragraphs. The major environmental impacts of each alternative are discussed, as well as the potential of each plan for solving the problems of flood damage at Grafton.

NONSTRUCTURAL ALTERNATIVES

a. No action. - This alternative would maintain, at least for the short-term, the present setting of the South Branch and main stem of the Park River. Periodic flooding would occur at Grafton, a small part of the Park River, and much of the rural area east of the escarpment.

Development which would occur is expected to be about the same as that with the project. Because no floodplain regulations are in effect in the Park River basin, future growth which does occur will result in a rising potential for flood damage. After each damaging flood, some urban growth which might otherwise occur within the floodplain might locate in less flood prone areas. The closest flood-free area for development is the city of Park River.

b. Flood warning. - Because of the slow-rising nature of floods in this area, usually a result of spring snowmelt, they can be reasonably predicted by the National Weather Service by methods which are currently available. The potential for loss of life is lessened by the slow flood rise, and, in fact, loss of life from flooding has not occurred in Grafton. Use of this alternative alone would mean anxiety for residents during flood seasons and inconvenience in the community during actual floods. Although the slow rise of the river would allow the removal or protection of some property, much damage to property would remain. The effects of this alternative on biological systems would be essentially the same as those for no action.

c. Floodplain evacuation. - Permanent evacuation of developed floodplain areas involves the acquisition of lands by purchase, the removal and relocation of structures, the evacuation and resettlement of population, and the permanent conversion of lands to uses less susceptible to flood damage. In the case of Grafton, the entire community would have to be evacuated. The cost of this alternative could range from $40 to $100 million, and the benefit/cost ratio is less than unity. Although the plan as presented is thus not economically feasible, this benefit-cost ratio cannot be directly compared with those for the structural measures because the benefits do not include anticipated future development as they do for the structural measures.

Floodplain evacuation does not deal very sensitively with a man's attachment to his home and its present site, however. It is for this reason that this alternative would be unacceptable to many residents. Because of these adverse social factors, there is a need to determine why people are living in a particular area and how strong their ties are to the area. This has not been studied in connection with this project. With this knowledge perhaps a sensitive and socially acceptable method of moving a community could be developed.

Against the disadvantages of an unfavorable benefit-cost ratio and the social unacceptability of evacuation as presently practiced must be weighed the advantages of this alternative. Moving the community out of the floodplain would:

(1) Give permanent protection from urban flood damage within the regulated floodplain.

(2) Attack the basic problem which is floodplain development having high damage potential, not flooding;

(3) Allow the floodplain lands to be used for a purpose commensurate with their high fertility, such as agriculture;

(4) Assure a greater freedom from worry during time of flood. (The "hazard of failure" of this alternative is small relative to other alternatives.)

An adverse impact of evacuation as compared with the proposed plan would be the greater expenditure of resources necessary for implementation, including additional commitments of construction materials and petroleum resources. Also, the development must be relocated to another area with consequent impacts in that area some of which may be severe.

The benefits of freedom from flooding must be weighed against the need for Grafton as a service center for the region. In view of the approximately 15 miles to the nearest flood-free area (the city of Park River), this need would be considered by some to be strong. They may feel that the disadvantages of being served at Park River would outweigh the advantages. Should historical trends in the improvement of transportation continue, this factor should become less important in the future; however, an additional commitment would be made to the use of fuel supplies.

The unfavorable benefit-cost ratio of less than unity constitutes one of the major reasons the evacuation alternative was not proposed. This is in keeping with policy to recommend only projects having economic feasibility. Once the Water Resources Council's proposed Principles and Standards are formally approved, exceptions to this policy, while unusual, could be made if there were overriding social considerations indicating that an economically infeasible plan was the most desirable.(1)

---

(1) Department of the Army, Office of the Chief of Engineers, Digest of Water Resources Policies and Activities. EP 1165-2-1. December 1972. P. A-18.

d. Flood proofing. - Flood proofing involves structural modifications of developments to reduce the potential for flood damages. Such modifications might include seepage control, sewer adjustment, permanent closure, protective coverings, protection for openings and interiors, watertight caps, proper anchorage, underpinning, timber treatment, deliberate flooding, structural design, reorganized use, appliance protection, utility adjustments, roadbed protection, elevation or raising, temporary removal, re-scheduling, and proper salvage. These measures would be easiest to apply to new buildings under construction and could be required in building codes, subdivision regulations, etc. Application to existing buildings would be more difficult, in part because most structures are not designed to withstand high water pressures. In the case of Grafton, however, the water levels are low enough to allow fewer engineering problems than are usually associated with this alternative.

This method would have a first cost of about $10 to $15 million and a benefit-cost ratio near unity. Future development would be more expensive because flood proofing would have to be built into new developments to be effective over a long period of time. This increased cost should slow development, thus preserving natural and agricultural lands in the area and slowing the increase in potential for flood damage associated with structural measures. The effect of this alternative on the physical environment would be essentially the same as that for the no action alternative.

This alternative would involve considerable, but short-term disruption while the structures were being flood proofed. After the flood proofing was finished there would still be some social impacts in time of flood such as disruption of transportation and potential dangers to public health and safety. These impacts would be slightly greater than those for the proposed plan because under the proposed plan transportation outside Grafton would not be protected and potential dangers to public health and safety would remain, albeit at a lower level.

Because this alternative could tend to discourage growth in Grafton and cause development to relocate elsewhere, it might not be very acceptable to Grafton. There could be advantages to society as a whole, however, if growth would be discouraged in the floodplain, thus slowing the rise in potential for loss of life and property. There also could be disadvantages to society as a whole because some of the services that Grafton performs would have to be performed by other communities such as Park River, 15 miles upstream. This would constitute an additional commitment of fuel supplies. Should historical trends in transportation continue, the proximity of the service area would be less important in the future.

e. Floodplain regulation. - Floodplain regulation would shape land use and development in the floodplain so as to lessen the damaging effects of floods. The regulatory approach is comprehensive and in general agreement with the goals expressed by the Federal flood insurance program, the Water Resources Council report, and the courts generally.(1) The goals include protecting life, minimizing public expenditures, and preventing or reducing flood damage to property. The cited report finds there is also general agreement that land use in frequently flooded areas can be severely restricted to non-damage prone uses such as open space, agriculture, storage, parking and playgrounds. Less frequently flooded areas can be opened to more damage-prone development provided that first floor elevations are subject to special uses and structural controls.

Zoning is an important part of floodplain regulation. An aspect of zoning which at the same time prevents damages to structures and prevents backwater effects from development is to not permit encroachment into the designated floodway. Designation

(1) Kusler, J. A. and T. M. Lee. 1972. Regulations for Flood Plains. American Society of Planning Officials. 68pp.

of the floodway and related regulations would not allow construction or landfill between the boundaries of the waterway which is reasonably required to convey floodwaters. Zoning ordinances can also regulate the floodplain areas outside the designated floodway by specifying elevations below which certain types of development cannot be constructed.

Subdivision regulations are also an important part of floodplain regulation. These regulations are used by local government to specify the manner in which a tract of land may be divided. They may state the required width of street, requirements for curbs and gutters, size of lots, elevation of land, freedom from flooding, size of floodways, and other points pertinent to the welfare of the community. Not only can public health and welfare benefit, but various municipal costs such as maintenance of street and utilities can be reduced during flood periods. Subdivision regulations are primarily applicable to presently undeveloped areas.

Building codes set forth construction standards for the purpose of protecting the health, safety and general welfare of the public. A well-written and properly enforced building code can effectively reduce damages to buildings in the floodplain. A few of the requirements which should be specified in a building code to reduce flood damages are:

1. Prevent flotation of buildings from their foundations by requiring proper anchorage.

2. Establish basement elevations and minimum first-floor elevations consistent with potential floods.

3. Require structural strength to withstand either water pressure or high velocity of flowing water.

4. Restrict the use of materials which deteriorate rapidly when exposed to water.

5. Prohibit equipment that might be hazardous to life when submerged, such as chemical storage, boilers, or electrial equipment.

Building codes would then include basically the same items and philosphy as alternative d, flood proofing. Building codes are most applicable to new development or redevelopment and flood proofing, to existing structures.

Wise dav-to-day policy and action to prevent construction of streets and utility systems in undesirable areas would deter damage-prone development in floodplains. Locating street improvements, schools, and other public facilities elsewhere discourage floodplain exploitation and encourage development toward higher ground.

The economic benefits and costs of this alternative for Grafton and the benefit-cost ratio have not been tabulated.

Floodplain regulation can take various forms and if appropriate regulations were drafted and enforced, can ultimately greatly reduce flood damages. Such restrictive regulation would probably not receive local acceptance because the future growth of the community would be curtailed. The economic and social impacts of this alternative would rest primarily on those living or doing business in the floodplain which includes the entire community of Grafton.

Although the local social setting could be adversely affected depending upon what regulations were drafted, the effect upon the physical environment would be positive. Because floodplain regulation would tend to discourage development in the floodplain, it would tend to preserve the floodplain forest and highly productive agricultural lands.

Although this alternative appears to lack local support, it has potential for solving the basic problem of floodplain development having high damage potential. It also has potential for effecting a very hazard-free solution to the basic problem. Impacts on the larger non-resident public would be positive because the costs of floodplain development would be in large part internalized while the basic problem would be scaled down in the long run.

Because floodplain regulation can slow the rise in potential for flood damages and because development only within an protected area is in the overall interest of society, regulation is considered a necessary supplement to structural protection. To date this has not been done in the Park River basin. Although floodplain regulation is not required under North Dakota law, the Interim Survey Report for this project concludes that local floodplain zoning would be highly desirable.

Effective floodplain regulation requires careful evaluation of the flooding potential and the determination of the effects upon flood flows of future floodplain use. These engineering determinations require technical expertise and information which most communities do not have. In response to this need, the U.S. Geological Survey, the Soil Conservation Service, and the Corps of Engineers have programs to assist communities and counties in instituting sound floodplain management.

f. Flood insurance. - The National Flood Insurance Program was created to curb the continually increasing annual losses from flood damage. According to the National Wildlife Federation,(1) it was meant to be an alternative to structural programs and a method for reducing direct Federal disaster relief. For structures already existing in the floodplain, a high percentage of the premium is presently paid by the Federal Government. Coverage on new structures is generally available at actuarial rates, and coverage can also be obtained on contents of the buildings.

Although it does not prevent flood damages from occurring, flood insurance would assist property owners in recovering from flood damages. Based on experience elsewhere, one of the major problems with this alternative is a general unwillingness of property owners to participate in the federally subsidized flood insurance program.

The lack of acceptance is due to the nature and intent of the program. The payment of full actuarial rates for new development in the floodplain would in many cases be prohibitively expensive, and thus participation is discouraged. The intent of the actuarial rates is to internalize the risks of floodplain development, that is, make those who would develop the floodplain pay the full costs of that development (instead of having Federal subsidies through some other type of program such as disaster assistance or structural flood control).

Another reason for lack of acceptance is that before a community may participate in the program, it must adopt and submit to the Secretary for Housing and Urban Development for approval a comprehensive zoning and land use plan for the floodplain. That is, the community must institute floodplain regulation which discourages development having high damage potential and encourages uses such as recreation, open space, and agriculture.

---

(1) National Wildlife Federation. 8 June 1973. Conservation Report. Number 21. p. 290.

The flood insurance program is presently totally voluntary. Although it is very sound in concept because it would internalize risks and costs of floodplain development, voluntary participation has rendered it ineffectual because a community's desire to develop its floodplain and its ability to obtain disaster relief presumably outweighs any motivation the community might have to get flood insurance. Stronger incentives to participate in the program would come into existence under a recently introduced bill (H.R. 6524).

Because flood proofing and floodplain regulation would be required for participation in a flood insurance program, the impacts of this alternative would basically be similar to those of plans d and e. The economic and social impacts for Grafton would probably be great under this plan since it would internalize the costs of floodplain development more than any other plan. The public not residing in the floodplain would correspondingly experience the smallest adverse social and economic impacts with this plan. The small impacts for the larger public would be due to the nature of the program which, for example, does not allow Federal relief for insured properties. This would reduce Federal costs to Federal subsidy of insurance payments while the developer would pay full actuarial rates for new development. As the existing structures became obsolete and were replaced, Federal participation through subsidy would disappear. Therefore, this plan would probably be the most desirable plan for the larger non-resident public.

The impacts of this alternative on the physical environment would be essentially the same as those for no action.

STRUCTURAL ALTERNATIVES

a. Levees at Grafton. - A levee system at Grafton would consist of two ring levees, one around the section of town to the north of the river and another around that section to the south of the river. The levees would be earthen embankments except those reaches adjacent to the river which would be concrete floodwalls. In the constricted reach of the river between the north and south floodwalls, about one mile of the river channel would be shaped and riprapped to increase the efficiency of water flow. Construction of this levee system and channel modification would require approximately 115 acres of land for rights-of-way, relocation of about 15 homes, 3 bridge raises, and 2 bridge removals. The total levee length would be 52,000 feet. The first cost of this levee system would be about $13 million and the benefit-cost ratio, about 2.1 to 1.

Construction of the floodwalls and levee would require disruption of about 15 acres of natural area along the present river channel. This is about 10 percent of the remaining natural area within Grafton. This plan would result in significant disruption of aquatic life in the one-mile section of river which would be altered by construction activities. Biological productivity would also be reduced by the loss of 15 acres of natural terrestrial habitat. The change in natural river characteristics and the blockage of view by the floodwalls would result in loss of aesthetic appeal. The straight, square-cornered levee system would also be unnatural in appearance but, although aesthetically disruptive, would be compatible with the existing pattern of development. In addition, the constriction of the river channel by the levees and floodwalls would cause upstream backwater effects during larger floods. Increased damage could therefore be expected in upstream areas although this will also be true with the proposed plan, but to a lesser degree. Damage downstream of Grafton could possibly be reduced.

The backwater effect could be reduced by increasing the distance between floodwalls. Such a modification of this alternative would require the relocation of additional developments and increased disruption of the riparian vegetation along the river.

b. Flood bypass channel at Grafton. - This alternative consists of a flood bypass channel to the north of Grafton, connected by tieback levees to an interceptor drain upstream and to the west of Grafton. The bypass channel inlet structure would allow low flows through the natural river channel to Grafton and divert flows in excess of channel capacity at Grafton into the bypass channel. The channel and associated features would require about 285 acres of rights-of-way, including 10 acres of natural woodland. This is about 3 percent of the woodland in the vicinity. About 0.2 mile of natural river channel would be modified. The bypass channel would cut off about 9 river miles from the normal flood channel. This alternative would cause floodwaters to bypass the city of Grafton, thereby greatly reducing the possibility of flooding in that area. The first cost of this plan would be about $13 million, and the benefit-cost ratio would be about 2.3 to 1.

The direct loss of some aquatic and terrestrial habitat would act to decrease biological productivity in affected areas. The diversion of floodwater away from 9 miles of river channel would tend to dry that area, and that section of the river within Grafton would be essentially flood-free. The drying effect of diverting flood flows could result in a decreased rate of tree growth such as that found by Johnson[1] on the Missouri River floodplain of North Dakota. Lago[2] has demonstrated significant changes in species composition resulting from loss of flooding in a floodplain forest in north central Minnesota. Any speculation of change in the

(1) Johnson, W.C. 1971. The forest overstory vegetation on the Missouri River floodplain in North Dakota. Ph. D. thesis. North Dakota State University, Fargo, N. Dak. 151 pp.

(2) Lago, P. R. 1971. The floodplain forests of the Upper Mississippi River, Minnesota. M. S. thesis. Bemidji State College, Bemidji, Minn. 71 pp.

species composition of this woodland is naturally based on the assumption that the area would not be cleared for development. Indirect habitat losses stemming from this alternative would reduce the value of this section of the floodplain forest for animal species dependent on wooded riverine habitat for their existence. Its recreation and aesthetic qualities could likewise be altered. The overall impact of this alternative on the physical environment would be similar in magnitude to that of the proposed plan although the specific factors vary.

c. Combination levee and flood bypass channel at Grafton. - This alternative constitutes the proposed plan and is described in other sections of this statement. Changing the levee shape to circular would eliminate unnatural appearing straight alignments and square corners and may improve project aesthetics. The circular pattern, however, would conflict with the existing cultural pattern that has developed in the area. Circular alignment woulld include greater division of properties and could affect costs of construction. Also, given the same area to be protected, the north-south expanse of the inclosed area could be shortened while the east-west diameter could be lengthened. The final levee alignment would be determined during post-authorization studies.

d. Rural channel modifications. - This alternative would consist of increasing the channel capacity in the rural reaches of the South Branch and main stem Park River from the city of Park River to Oakwood. The channel would require varying degress of modification to handle 10-percent design flows. About 290 acres of land would be required for rights-of-way, including 160 acres of natural woodland in a strip 200 feet on each side of the new channel west of Grafton and 44 acres of woodland in a strip 190 feet on each side of the new channel east of Grafton. This represents about 7 percent of the total natural area along the affected reach of river, an area of substantial scenic value in a region of few such features.

Channel modifications would alter 32 miles of normal stream channel. Although reduction of rural flood damages would be significant (53 percent), the total basin flood damages would be reduced by only about 9 percent. The deepening of the channel would result in a lowering of the water table in the soil adjacent to the channel. Drainage and aeration of the soil would be increased. Drier soils take on and lose heat more rapidly, providing broadened temperature fluctuations. Evaporation of water from the surface should increase, bringing more capillary water to the surface and leaving solutes in the surface horizon. Humus production may be reduced. This would affect the physical and chemical character of the soil.

Changes in the biota should occur as some moist-adapted species disappear and some dry-adapted species colonize. Aerobic microbial activity should increase. Trees such as cottonwood would likely decrease in abundance while bur oak should increase in abundance. This would probably not affect green ash and box elder, but the effects upon basswood and American elm are uncertain. Tree and shrub reproduction on the spoil banks would probably be slow.

This discussion of vegetative changes assumes no further clearing of natural floodplain vegetation for development. However, reduced flood flows could result in a more rapid rate of conversion of such areas to cropland and other developments than exists under present conditions. Again, this possibility is greatly increased by the fertility of these soils and the lack of floodplain regulations in the Park River basin. Both direct and indirect losses of floodplain woodland would have significant effects on the recreation, aesthetic and wildlife habitat qualities of the Park River basin.

Channelization would also have serious effects on the aquatic system. Loss of vegetative cover would increase water temperature and reduce the amount of fish food associated with shore vegetation. Siltation resulting from bank erosion would be likely to increase, productive backwater areas would be drained or stagnated by insufficient recharge, the function of the floodplain as a natural water reservoir would be eliminated, the variety of ecological niches required for a diverse and productive stream would be lost, periods of stream drought would be increased, and water levels would rise faster and higher in downstream areas during flood conditions.

The biological impacts of this alternative would then be severe. This alternative would be socially desirable to a smaller sector of the public (as compared with the proposed plan) because only a 9-percent protection from flooding would be achieved in the basin. Also, the benefit-cost ratio would be only about 0.3 to 1. All these factors make this alternative less acceptable than the proposed plan.

e. Channel modification at Grafton. - This alternative would require increasing the capacity of the natural river channel through Grafton to handle about 22,000 cfs (1-percent flow) and using tieback levees and an interceptor drain west of Grafton to contain and route overland flows to the enlarged channel. About 4 miles of natural river channel would be eliminated, and 145 acres of land would be required for rights-of-way, including about 45 acres of natural wooded area in the vicinity. Three bridges through Grafton, one highway, and two railroads would be raised. Extensive spoil banks would be formed from channel excavation.

Although channel modification through Grafton is economically feasible, the social effects associated with relocation of a number of homes would be considerable. Aesthetic impacts would also be significant as the result of unnatural appearing spoil banks and straight, square-cornered levees. Negative aesthetic impacts would also result from the loss of natural woodland and stream habitat. Aesthetic impacts would be at least partially mitigated

by inclusion of irregular overburden areas and planting of native species with consequent landscape diversity. Wildlife associated with these habitats would be lost, although some species could move to nearby habitat which remained. In view of the gradually decreasing extent of the floodplain forest in this area, the availability of appropriate and unoccupied habitat is doubtful.

f. Upstream reservoir storage. - The development of a single reservoir or series of upstream reservoirs would result in significant land-use changes. From 1 to 10 miles of free-flowing stream and from 60 to 1,100 acres of natural bur oak forest and grassland could be permanently or periodically inundated, depending upon construction of the reservoirs. Several hundred acres of woodland would be destroyed or seriously damaged by the storage of floodwaters. The most feasible reservoir site is judged to rank high in scenic value. An advantage of a reservoir with a permanent pool would be the possibilities for lake-type recreation.

The most obviously affected wildlife species would be the whitetail deer. Whitetail deer, as well as many other game and nongame species, depend on the forested escarpment area for food and cover. This area is critically important to regional wildlife populations during winter months.

Flooding would be reduced on some 2,800 acres of floodplain forest. This would cause a decrease in biological productivity and a change in vegetation to more closely approximate that of the drier uplands.

The effect of the reservoir's raising of the water table is difficult to predict. The soils near the reservoir would be expected to become wetter, and the lack of oxygen would cause the soil to become gray, sticky, compact and structureless. Because of the reduction in aerobic decomposition, organic matter building should increase. This would effect a change in forest composition away from bur oak, dwarf juniper, bearberry and others and toward aspen.

Because of the adverse effects of this alternative on biological systems, this alternative would cause considerably more disturbance of natural areas than the other alternatives.

Upstream reservoir storage would provide downstream flood damage reduction in the city of Park River and in rural areas along the South Branch of the Park River. Overall flood damages at Grafton would be reduced by about 50 percent. However, damages due to large floods would not be significantly reduced. Thus, most of the potential flood damages within the basin would remain. This plan could, however, augment the water supply of Grafton which could be very low during a drought period.

Reduction of flood flows in the rural reaches of the South Branch and main stem Park River would very likely result in an increasingly rapid rate of conversion to cropland of floodplain forests on about 2,800 acres. Thus, this plan would also indirectly result in the loss of floodplain woodland with attendant losses to the recreation, aesthetic, and wildlife support qualities of such areas. Land conversion from woodland to cropland would be limited to those areas with soils suitable for crop production.

Some of the adverse effects of the reservoir alternative could be mitigated by the development of an extensive greenbelt area. The woodlands and grasslands of potential greenbelt areas would have to be considerably enhanced to replace habitat lost through the construction of a reservoir. No high-intensity general recreational uses or other uses of such lands inconsistent with requirements of wildlife management could be allowed. Enhancement of the greenbelt area would also require fencing to exclude livestock. Some examples of uses not in conflict with wildlife management include stream fishing, hiking, and nature trails. Dedication of land to the greenbelt would require changes of land use away from agriculture. This would cause significant social effects.

No known historical ar archeological sites are within the most favorable reservoir locations, although a thorough study of the area would be necessary before implementation of this alternative. Some important sites are within greenbelt areas and would need to be preserved.

THE CHOICE AMONG ALTERNATIVES

The salient features of the alternate plans are presented in table 16. Portrayal of complex and unquantifiable information in tabular form results in inadequacies. The table's main value should be in crystallizing and clarifying public opinion although it should assist in comparing the features of each alternative.

Table 16 - Summary of impacts for alternatives discussed

	Nonstructural Alternatives						Structural Alternatives					
	No Action	Flood Warning	Flood-plain Evacua-tion	Flood Proofing	Flood-plain Regula-tion	Flood Insur-ance	Levees at Grafton	Flood Bypass Channel at Grafton	Levee and By-pass Channel at Grafton	Rural Channel Modifi-cation	Channel Modifi-tion at Grafton	Upstream Reservoir Storage
Land required (acres)	0	0	Variable	0	0	0	115	285	235	290	145	About 1,000 to 3,000
Natural area disrupted (acres)	0	0	Depends up-on area(s) chosen	0	0	0	15	10	5	200	45	60 to 1,100
Approx. tangible costs ($ million)(1)	0	-	$40 to $100	$10 to $15	-	-	$12.8	$12.8	$8.8	$5.5	$18.2	About $10 to $15
Flood damage reduction(2)	0	Small but undefined	83%	63%	0	(4)	70%	77%	76%	9%	77%	Up to 54%
Degree of Flood Pro-tection	None	Small but undefined	Very high (3)	High	Variable depending upon re-gulation	(4)	Very high	High	Very high	Medium	High	Medium
Benefit/cost ratio	-	-	Less than unity	Near unity	-	-	2.1	2.3	3.3	0.3	1.2	1.7
Public Acceptability												
Grafton	Low(5)	Neutral	Low	Low	Low	Low	High	High	High	Neutral	Neutral	High
Vicinity of Grafton	Low	Neutral	Low	High	Neutral	Low	Low	Low	Low	High	Low	Neutral
Wider sector of public	Neutral	Neutral	Neutral	Neutral	High	High	Neutral	Neutral	Neutral	Low	Low	Low

(1) July 1972 price levels.
(2) Expressed as percent reduction of existing, economically quantifiable flood damages along the South Branch and main stem Park River.
(3) Very high flood protection = less than 1 percent chance of damage in protected area, high = about 1 percent, medium = about 10 percent.
(4) Flood insurance does not remove damages but reimburses economic losses. Thus, there is less personal hardship.
(5) The categories "low", "neutral," and "high" are intended to be indicators of expected public opinion.

The proposed plan appears to be an acceptable alternative for Grafton. It combines a high degree of flood protection (93 percent reduction in flood damages at Grafton) with a small disturbance to the landscape (relative to several other plans, such as the reservoir). It also provides protection for a significant acreage of developable land.

People living in the floodplain upstream of Grafton who have commented favor either rural channelization or reservoir storage. Because of the severe adverse effects of these alternatives on the physical environment and their modest positive economic effects, these alternatives were not proposed.

The proposed plan may not as strongly appeal to a broader nonresident sector of the public, however, because of two basic factors. One is the size of the plan which protects 1,900 acres beyond the 800 acres presently within the city limits of Grafton. In going beyond protection of existing structures, the sizing of the plan provides for the protection of future development that will probably take place with or without the project. However, the proposed plan does encourage an increase in floodplain development in the newly protected floodplain area, and possibly in the area between the levee and drop structure which would experience reduced flooding.

The second factor concerns the basic issue of allowing development in the floodplain. Although human occupancy has been assumed to be the best and highest use of the floodplain, public responses to the Water Resources Council's proposed Principles and Standards[1] indicated that this is not in the best interest of overall land management. The responses indicated a strong desire to restrict

(1) United States Water Resources Council. July 1972. Summary and Analysis of Public Response to the Proposed Principles and Standards for Planning Water and Related Land Resources and Draft Environmental Statement. pp. 110-112.

development in the floodplain and, in fact, suggested that the Federal Government withhold monies for water and land development projects where the floodplains are "violated." That public response seems to be in accord with the conclusions of a recent conference in northeastern Illinois.(1) As regards solutions to problems of flooding and drainage in the area, the 550 elected and appointed officials and professionals ranked the feasible solutions in order of decreasing acceptability as: (1) retention of water where it falls; (2) halting of further construction on the floodplain; (3) flood control reservoirs and levees; (4) coordination of responsible governmental bodies; (5) preserving floodplains as natural reservoirs; (6) improving sewer and channel systems; and (7) elimination of obstructions to flow in stream.

Some of these measures may not be appropriate for the situation at Grafton such as items 1, 4, and 5. However, although the situation in Illinois differs from that at Grafton, the judgment of the conferees seems to support the public will as expressed in responses to the Water Resources Council's proposals.

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

For purposes of benefit-cost analysis, the proposed action must be regarded as a short-term use of lands and resources. It is expected, however, that the flood control structures and the developments protected by them would be maintained for a period well beyond the economic lifetime of the project of 100 years. The short-term benefits would consist of avoidance of adverse economic and social impacts of floods equal to, or of less magnitude than, the standard project flood, although the probable maximum flood should be contained within the freeboard range.

(1) Rockwell, M. L. 1973. Consensus: The First Step. Water Spectrum 5(1): 9-16.

Although flood control projects normally encourage the commitment of fertile floodplain lands in the project area to industrial and residential development, projections made for this project do not show increased future development. This is not to say that none would occur, however.

7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION

Labor and materials required for construction, operation, and maintenance of the project would be an irretrievable comittment of resources. About 5 acres of floodplain forest directly displaced by project structures, as well as aesthetic qualities adversely impacted by those structures, would be essentially irretrievable. Indirect effects of the proposed project would also constitute a commitment of resources. The major commitment of resources with the proposed plan would then be perpetuation of the basic problem of floodplain development having some residual damage potential.

As a result of the project, agricultural production on 235 acres would be permanently committed to flood control purposes, and production on an additional 130 acres would be foregone for an undetermined period of time.

8. COORDINATION

Environmental inputs of various Federal, State, and local governmental agencies, as well as the views of interested local individuals, were solicited and considered during the interim survey study of flood problems in the Park River basin. A public meeting was held at Park River on 3 March 1971. Also, a Citizens Advisory Committee was established by the Governor of North Dakota to make recommendations for selection of a plan for flood protection in the Park River basin.

In response to the National Environmental Policy Act of 1969 (Public Law 91-190), a draft Environmental Impact Statement was prepared and in June of 1973 was sent to the following agencies, citizen groups, and individuals for review and comment:

National Weather Service
U.S. Department of Agriculture, Soil Conservation Service
Environmental Protection Agency
Federal Highway Administration
U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
Office of Economic Opportunity
U.S. Department of the Interior
  Bureau of Sport Fisheries and Wildlife
  Bureau of Outdoor Recreation
  National Park Service
  Geological Survey
  Bureau of Land Management
  Bureau of Reclamation
U.S. Department of Commerce, Economic Development Administration
Souris-Red-Rainy River Basins Commission
Water Resources Council
North Dakota State Water Commission
North Dakota Department of Agriculture and Labor
North Dakota Game and Fish Department
North Dakota State Department of Health
North Dakota State Highway Department
North Dakota State Historical Society
North Dakota State Outdoor Recreation Agency
North Dakota State Forest Service
North Dakota State Planning Agency
North Dakota State Soil Conservation Committee
Walsh County Board of Commissioners
Walsh County Engineer
Walsh County Water Management District
Walsh County Citizens Advisory Committee
Walsh County Extension Agent
Cavalier County Board of Commissioners
Pembina County Board of Commissioners
Mayor, city of Grafton, N. Dak.
Mayor, city of Park River, N. Dak.
Mayor, city of Adams, N. Dak.
Mayor, city of Cavalier, N. Dak.
Mayor, city of Edinburg, N. Dak.
Mayor, city of Hoople, N. Dak.
President of Board of City Commissioner, Langdon, N. Dak.

Mayor, city of Lankin, N. Dak.
Mayor, city of Minot, N. Dak.
Mayor, city of Osnabrock, N. Dak.
Mayor, city of Walhalla, N. Dak.
Mr. Harold L. Johnson, Alderman, Crystal, N. Dak.
Burlington Northern Railroad
Izaak Walton League of America
Wildlife Management Institute
North Dakota League of Women Voters
North Star Chapter, Sierra Club
Dr. Robert B. Ditton, Water Resources, Literature Clearinghouse, University of Wisconsin, Green Bay
Dr. Leonard B. Dworsky, Water Resources Center, Cornell University
Dr. Paul B. Kannowski, Director for Ecological Studies, University of North Dakota
Mr. Luther Berntson, President of the Board, Park River Bible Camp
Mr. C. A. Cranna, Director, North Dakota Wildlife Federation
Mr. Lorne Hillier, Director, Nodak Rural Electric
Mr. Joe Kadlec, Commercial Club and Wildlife Club, Edinburg, N. Dak.
Mr. Ronald Monson, Edinburg Wildlife Club
Dr. Darwin Peterson, Vice President, North Dakota Wildlife Federation
Mr. Robert E. Sanders, Chairman, Water Resources Commission, North Dakota Wildlife Federation
Dr. Daniel E. Willard, Institute for Environmental Studies, Madison, Wisconsin
Mr. Ardell Almer, Grafton, N. Dak.
Mr. Jerome I. Axvig, Adams, N. Dak.
Mr. Joseph Axvig, Adams, N. Dak.
Mr. Knute Bjerke, Adams, N. Dak.
Mr. Magnus Bjerke, Adams, N. Dak.
Mr. Otto Bjerke, Adams, N. Dak.
Mr. Jan Bjorg, Adams, N. Dak.
Mr. Elton Brekke, Grafton, N. Dak.
Mr. John Brekke, Grafton, N. Dak.
Mr. Robert L. Burke, Grafton, N. Dak.
Mr. Arnold Clemenson, Grafton, N. Dak.
Mr. Leslie Chally, Adams, N. Dak.
Mrs. Louis Chally, Adams, N. Dak.
Mr. Antonio Collette, Grafton, N. Dak.
Mr. M. D. Collette, Grafton, N. Dak.
Mr. Robert E. Dahl, Grafton, N. Dak.
Mr. Edmond E. Demars, Grafton, N. Dak.
Mr. Ernest Dencker, Park River, N. Dak.
Mr. Vernon Drevecky, Adams, N. Dak.
Mr. George Egeland, Grafton, N. Dak.
Mr. Iver Egeland, Grafton, N. Dak.
Mr. Oscar Ellingson, Edinburg, N. Dak.

Mr. Willard Frovarp, Park River, N. Dak.
Mr. Harlan L. Grovom, Park River, N. Dak.
Mr. Elvin T. Gryde, Hoople, N. Dak.
Mr. James H. Gryde, Edinburg, N. Dak.
Mr. Orlando Gryde, Edinburg, N. Dak.
Mr. James Haug, Edinburg, N. Dak.
Mr. Norris Haug, Edinburg, N. Dak.
Mr. Arthur Jackson, Grafton, N. Dak.
Mrs. Clara Jasmer, Park River, N. Dak.
Mr. Lester Jasmer, Adams, N. Dak.
Mr. John L. Johnson, Park River, N. Dak.
Mr. Howard L. Johnson, Grafton, N. Dak.
Mr. Orville L. Johnson, Edinburg, N. Dak.
Miss Annie V. Kjelland, Park River, N. Dak.
Mr. Milton Kjelland, Park River, N. Dak.
Mr. Paul A. Larson, Grafton, N. Dak.
Mr. George Lindell, Adams, N. Dak.
Charles and Shirley Lindell, Park River, N. Dak.
Mr. Willie Laaveg, Park River, N. Dak.
Mr. Bill McIntyre, Grafton, N. Dak.
Mrs. Anna McIntyre, Park River, N. Dak.
Mr. David McLean, Adams, N. Dak.
Mr. Richard Madson, Jamestown, N. Dak.
Mr. D. U. Meberg, Park River, N. Dak.
Mr. Cliff Moquist, Crystal, N. Dak.
Mr. Fred Nottestad, Park River, N. Dak.
Mr. Johnny Nygard, Edinburg, N. Dak.
Mr. Ernest Olson, Edinburg, N. Dak.
Mr. Paul E. Olson, Adams, N. Dak.
Mr. Clarence Ordehl, Grafton, N. Dak.
Mr. and Mrs. Steve Perkerewicz, Grafton, N. Dak.
Mr. Alvin E. Peterson, Edinburg, N. Dak.
Mr. and Mrs. Henry Rud, Edinburg, N. Dak.
Mr. Vernon Rustan, Edinburg, N. Dak.
Mr. Willis Rustan, Edinburg, N. Dak.
Mr. Alfred Rusten, Edinburg, N. Dak.
Mr. Johnny O. Seim, Milton, N. Dak.
Mr. Clayton J. Setness, Adams, N. Dak.
Mr. Raymond P. Setnes, Adams, N. Dak.
Mr. Willard Setness, Adams, N. Dak.
Mrs. Stella Staven Skjerven, Park River, N. Dak.
Mr. Kenneth Stensland, Adams, N. Dak.
Mr. Harvey Tallackson, Grafton, N. Dak.
Mr. Charles G. Thompson, Grafton, N. Dak.
Mr. Chester T. Thompson, Grafton, N. Dak.
Mr. Harlan J. Thompson, Grafton, N. Dak.

Mr. Truman Thompson, Grafton, N. Dak.
Mr. Mark M. Thornton, Grand Forks, N. Dak.
Mr. and Mrs. Alton Thorson, Edinburg, N. Dak.
Mr. Carl Troftgruben, Edinburg, N. Dak.
Mr. Earl Troftgruben, Edinburg, N. Dak.
Mr. Elroy Troftgruben, Edinburg, N. Dak.
Mr. Harold Troftgruben, Edinburg, N. Dak.
Mr. John Wysocki, Minot, N. Dak.
Dr. Bill Barker, North Dakota State University
Dr. Mary Bromel, North Dakota State University
Dr. J. Frank Cassel, North Dakota State University
Dr. Keith Cassel, North Dakota State University
Mr. Wayne Colberg, North Dakota State University
Dr. Thomas Collins, Moorhead State College
Dr. Duane Dahlberg, Concordia College
Dr. Larry Falk, Moorhead State College
Dr. Del Helgeson, North Dakota State University
Dr. Richard Pemble, Moorhead State College
Dr. Gene Phillips, Moorhead State College
Dr. Robert Puyear, North Dakota State University
Dr. Juanito Ramirez, North Dakota State University
Mr. Roger Richman, Moorhead State College
Dr. Donald Scoby, North Dakota State University
Dr. Fred Shewman, North Dakota State University
Dr. Bob Stewart, Jr., North Dakota State University
Dr. Jerry VanAmburg, Concordia College

On 19 July 1973 a late-stage public meeting was held in Grafton. The Mayor of Grafton, Mr. Howard Hills, made a statement which indicated that the Mayor and City Council, as representatives of the city, supported the project. After Mayor Hills, a couple of citizens spoke briefly in support of the project. There were also a couple of individuals who believed that flood damages could be reduced by other means. Generally, they referred to increasing the opening at the Burlington Northern Railroad bridge so as to reduce backwater effects, installing larger culverts in rural roads so that they would not retard flood flows, and keeping the water on the land. (Past channelization of the North, Middle, and South Branches of the Park River as well as wetland drainage were believed to have increased flood flows and speeded their arrival at Grafton.) A legal representative of

several people from Grafton (including merchants) and from rural areas then questioned the hydrology and economics of the study and concluded that his clients did not want the project. Two other legal representatives later basically agreed, one presenting a petition with a considerable number of signatures against the project.

Subsequent to the late stage meeting the city council passed a resolution approving the project and assuring that the necessary local requirements for cooperation would be furnished.

Comments on the draft statement were received from the following interested parties:

National Weather Service
U.S. Environmental Protection Agency
USDA Soil Conservation Service
U.S. Department of Transportation,
Federal Highway Administration
U.S. Department of the Interior
U.S. Geological Survey
North Dakota State Water Commission
North Dakota Game and Fish Department
North Dakota Highway Department
North Dakota Historical Society
North Dakota State Outdoor Recreation Agency
North Dakota Forest Service
Pembina County Commissioners

The ensuing pages outline the Corps' response to comments received.

1. National Weather Service. -

Comment. - Paragraph b, Flood Warning, page 56 of draft environmental impact statement (EIS) appropriately states the capability of the National Weather Service to provide flood warning at Grafton and the public value of such forecast service.

Response. - Comment noted.

2. U.S. Environmental Protection Agency. -

Comment. - The EPA will categorize the proposed action and EIS as LO-1, which means a lack of objection to the project and an EIS which, in general, satisfactorily addresses the environmental impacts of the proposed action.

Response. - Comment noted.

3. U.S. Department of Agriculture, Soil Conservation Service. -

Comment. - Page 19 of draft EIS, first paragraph, add: Some grassland pastures still maintain characteristic prairie vegetation.

Response. - Comment has been incorporated.

Comment. - Page 70, last paragraph, add: Land conversion from woodland to cropland would be limited to those soil areas suitable for crop production.

Response. - Comment has been incorporated.

4. Federal Highway Administration. -

Comment. - A more detailed discussion of the necessary highway and road adjustments should be made. The levee and bypass channel would intersect several streets, county roads, and highways. Affected highways on the Federal-aid system are State Highway 17 extending east and west through Grafton and U.S. Highway 81, a north-south arterial highway serving Grafton. U.S. Highway 81 would cross the bypass channel where the bottom width is 170 feet with 5 to 1 sideslopes, requiring a bridge length of about 350 feet. Ramps are proposed for the levee crossings by the roads and highways. The responsibility for the cost of the road adjustments for the levee and for the U.S. 81 channel crossing should be included.

Response. - The comments have generally been incorporated into the Project Description and Existing Setting sections of the revised draft EIS. The cost for the U.S. 81 crossing is noted in the Project Description as being non-Federal while the responsibility for the costs of the levee crossings would depend upon the alternatives ultimately chosen.

Comment. - The ramps at the levee crossings of the roads and highways would introduce a pronounced hump in the otherwise level profile for roads in the area. This would have a detrimental aesthetic effect as well as being an inconvenience for the driver. The road ramps would cost about $13,000 while the U.S. 81 bridge would cost about $361,000, the latter a non-Federal responsibility which would be borne by local interests and, in turn, the State Highway Department. This would be a significant adverse impact on highway users.

Response. - The points raised have generally been incorporated in the Project Description Impacts Sections, except that the cost for the U.S. 81 bridge is now estimated at $486,483.

Comment. - Since floods at Grafton are rather infrequent, we would recommend for the two main highways that carry most of the traffic of about 2,000 vehicles per day, that an opening be left in the levee with provision for a gate or other type of closure at the time of floods.

Response. - The necessary height of the levee (average height 8.2 eet) would preclude some types of closures, such as sandbag closures, for reasons of structural stability. Some kinds of closures have a tendency to leak in contrast to ramps, particularly under high water pressures during large floods. The larger closure structures would also be more expensive and probably less aesthetically desirable than ramps. These matters would be further investigated during post-authorization studies.

5. U.S. Department of the Interior. -

Comment. - Our general impression of the draft EIS is that it is comprehensive, thorough, and well written.

Response. - Comment noted.

Comment. - There are important narrative portions of the statement which do not support, or are in conflict with, the proposed plans and conclusions contained in the draft Interim Survey Report for the Grafton project.

Response. - The two reports perform somewhat different functions and emphasize different aspects of man's environment; hence they sometimes do have different information. In this case they were also not prepared at the same time with implications for one or the other having new or revised information. All differences would be reconciled during postauthorization studies.

Comment. - The proposal would have no effect on any existing or proposed project of the Bureau of Reclamation.

Response. - Comment noted.

Comment. - The proposed plan seems to be very satisfactory as it provides a maximum of flood protection for Grafton and a minimum of environmental disruption compared to the other feasible alternatives.

Response. - Comment noted.

Comment. - The physical works would probably protect Grafton from all floods.

Response. - Concur; loss of structural protection through project failure would be problematical. Structural integrity requires the vigilance of local sponsors.

Comment. - The plan is well conceived, probably based on similar plans for other single-purpose fragmented river basin plans, and is similar to the constructed works at Sioux Falls, South Dakota.

Response. - Comment noted.

Comment. - The draft EIS lacks consideration of all cultural resources within the general project area, their relationship to affected areas, and any measures that may be necessary to mitigate defined adverse impacts.

Response. - Concur. The discussion of cultural resources has been revised as noted in following comments and responses.

Comment. - The "Plan of Operation" could be altered to allow a small flow from the west into the leveed area. The water could then be pumped out on the east. This would assure that the water in the ponding areas would remain of suitable quality for survival of fish and would prevent unsanitary conditions from developing during the longest periods of flow diversion. Since a pump already exists in the plans, the only additional expense would be for operation.

Response. - The proposal could be implemented whenever the interior drainage system is operating at less than full capacity. After the pond elevation stabilizes (following closure of both gates), a small flow could be allowed to pass through the pond, provided that pumping is accomplished at the same time. The total pumping station capacity is 39 cfs. However, the normal low flow for the Park River is on the order of 3 to 10 cfs, and perhaps approximation of the low flow would be more appropriate (than 39 cfs). A flow, and consequent pumping, of 10 cfs would require operation of one of the pumps. The likelihood of this measure being implemented is questionable since operation of the project is a local cost and responsibility. Therefore, we do not wish to mislead you into believing that the measure will be, in fact, be undertaken, although we appreciate your efforts in suggesting a measure which could minimize adverse effects. This matter will be further investigated during postauthorization studies.

Comment. - A section describing the mineral estate in the Park River basin could provide a little insight into potential future development of the area.

Response. - Except for the glacial, alluvial, and lacustrine deposits, the basin has no recognized mineral resources. As noted in table 14 in the EIS, employment in "mining" has engaged 0.2 percent or less of the work force in Walsh County.

Comment. - The EIS should discuss the erosional features of the soils which are disturbed during flood periods and the soils which would be disturbed by the project.

Response. - Greater discussion of the features of soils in the immediate project area has been incorporated in the Soils portion of section 2. Erosion would occur in areas of high flow velocities, and deposition would occur in slackwater areas. Further information on erosion is found in a following comment by the U.S. Geological Survey.

Comment. - The discussion of the existing environmental setting notes a number of archeological and historical sites within the general project area but fails to define their exact relationship to proposed project features. Such information is necessary to accurately assess any impact the proposed action may have on these resources. In addition, although these data are acknowledged to have been extracted from an environmental study by the University of North Dakota, the ultimate source of that information is not specified, nor is any indication provided that these remains constitute the total inventory of known cultural resources within the project area. Such information may be provided by Mr. James E. Sperry of the North Dakota State Historical Society.

Response. - The draft EIS has been revised to more specifically note the site locations and their relationships to the proposed project. The information was generally obtained during interviews. Possible existence of other cultural resources in the project area has been recognized, and these would be further investigated during post-authorization studies.

As regards more detailed cultural information, Mr. James E. Sperry was called on 13 August 1973 by the project biologist and project engineer. Mr. Sperry indicated that his main concern was to assure that sufficient lead time would be available prior to construction to conduct a thorough and adequate on-site inspection for historical and archeological sites. The project engineer indicated that at this point in the project developmental process, the channel and levee alignments are not firmly fixed and that during postauthorization studies the alignments may be changed. An inspection for historical and archeological sites on specific levee and channel alignments would best be conducted when the alignments are firmly fixed. Mr. Sperry was then asked if we were correct in assuming that no further studies were needed at this time but rather that coordination should be maintained on study progress so that the proper investigations could be made as necessary. Mr. Sperry indicated that this was a correct interpretation. Necessary coordination with the Historical Society will be maintained so that an on-site inspection for historical and archeological sites could be made with a maximum lead time prior to construction.

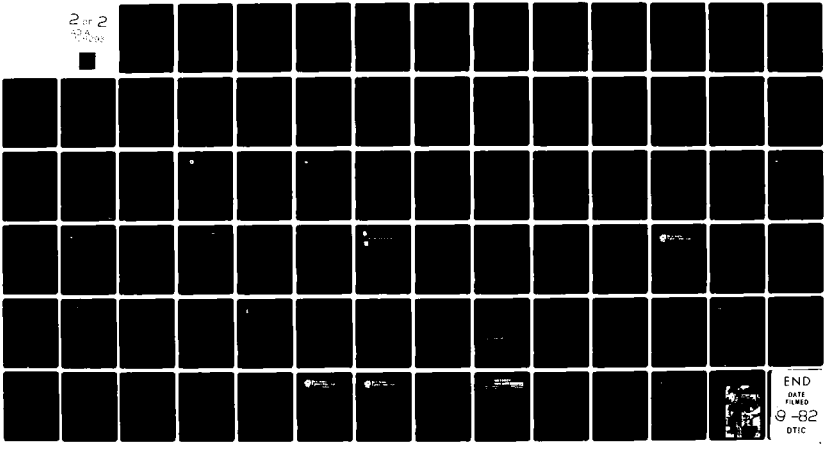
Comment. - The sections on Impacts on Surface Water and Land Use Impacts should include discussion of the downstream impacts on surface water and land uses due to the volume and velocity of water leaving the bypass channel during flood periods.

Response. - Since the bypass channel would not increase downstream flows (although the water would arrive at that point somewhat sooner) and since a stilling basin would be installed at the outlet of the channel to reduce velocities to nonerosive values for reentry of the flow into the Park River, the volume and velocity of water leaving the bypass channel during flood periods is not expected to have a significant impact on downstream surface water and land uses.

AD-A118 293 CORPS OF ENGINEERS ST PAUL MN ST PAUL DISTRICT F/G 13/2
FLOOD CONTROL AT GRAFTON, NORTH DAKOTA, PARK RIVER.(U)
AUG 75

UNCLASSIFIED NL

2 OF 2
AD A118 293



END
DATE FILMED
9-82
DTIC

Comment. - As regards Economic and Social Impacts and Impacts on Aesthetics and Recreation, the inhabitants of Grafton may be accustomed to an unobstructed view of the countyside. Thus, what will be the social and aesthetic impacts resulting from the construction of the levee on four sides of the town?

Response. - These impacts would be adverse, and the appropriate sections of the EIS have been revised in recognition of that.

Comment. - The statement appears general in nature. For instance, on page 51 of the draft EIS, "...the value of floodplain woodlands is greater than the value of a similar acreage of upland woodland". They are undoubtedly more diverse, but the statement should be clarified to indicate whether economic or ecological values are meant.

Response. - Ecological value was meant, and this has been specified in the revised draft. Because of poor quality, sparse stands, and limited markets, existing forests in the basin (mainly bur oak, American elm, and green ash) have little or no commercial value.

Comment. - Economic and social impact section is brief with no mention of value of flood protection.

Response. - The section is admittedly brief, but paragraphs 1 and 3 do discuss the value of flood protection.

Comment. - The last sentence of the first paragraph, page 50 of the draft EIS, states that "Wooded slope areas, as well as above bank woodlands, have, however, been cleared in other areas of the Park River floodplain forest." This acknowledgement of the possibility of clearing definitely supports Recommendation No. 1 in the Bureau of Sport Fisheries and Wildlife report of 30 March 1973. Language contained in the draft Interim

Survey Report does not indicate acceptance or proposed implementation of the recommendation. (Note that further explanation of this point may be found on pages 1 through 4 of the attached 31 August 1973 letter from the Department of the Interior.)

Response. - The referenced section of the draft EIS has been revised to note that about 10 acres of woodland between Grafton and the drop structure have recently been cleared.

While your recommendation is recognized as desirable, it cannot be incorporated into the project documents under our regulations since the acquisition of land is a local responsibility and normally limited to rights-of-way required for project construction. The only avenue by which the Corps could help implement the proposal is by recommending it in a letter to the local interests. This assumes that the land would not be required as a part of the project; i.e., is not required for compensation or mitigation.

Comment. - Second complete paragraph, page 51 of draft EIS. This paragraph, which comments on the planting of native prairie grasses and their value to wildlife, supports this Bureau's Recommendation No. 4 pertaining to the seeding of tall grasses. The conclusion expressed in the paragraph is inconsistent with the proposed short grass seeding plans. (Note that further discussion on this point is found on pages 1 through 3 of the Department of Interior letter.)

Response. - The section on Impacts on Biological Systems has been expanded to discuss the advantages and disadvantages of the different suites of grass species.

Comment. - There is a discrepancy in the acreages planted to trees and grass, 215 acres of grass and 10 acres of trees and shrubs not totalling the 235 acres dedicated to flood control.

Response. - The other 10 acres would be covered by structures not capable of supporting vegetation.

Comment. - Pages 54 and 71 of the draft EIS indicate a need for further study of cultural resources in the project area. Such study should include, in addition to consultation with Mr. James E. Sperry of the State Historical Society, a thorough inspection of all affected areas by a professional archeologist, in order to determine the presence of currently unrecorded archeological remains.

Response. - Concur.

Comment. - Should any cultural values be adversely affected by the project, a detailed plan for preservation or mitigation should be compiled and included in the final EIS.

Response. - Concur, except that such plans would not be drafted in time for inclusion in the final EIS. As noted earlier, we would work with Mr. James E. Sperry during postauthorization studies, and Mr. Sperry would be encouraged to help develop the plans for preservation or mitigation. If another draft EIS or a revision or supplement is prepared in the future, the plans would be described in that report.

Comment. - The Alternatives section is reasonably complete with a good discussion of floodplain evacuation. We are encouraged that four positive impacts of evacuation were recognized and discussed.

1. Provide permanent protection from flood damages.

2. Immediately attack the basic problem which is floodplain development having high damage potential, not flooding.

3. Allow the floodplain lands to be used for a purpose commensurate with their high fertility, such as agriculture.

4. Assure a true freedom from worry in time of flood. Although structural measures provide protection against floods of a certain size, larger floods could overtop the structures possibly causing a great loss of life and property.

Response. - Comment noted; the paragraph has been somewhat revised, however.

Comment. - The first full paragraph on page 67 of the draft EIS is a further acknowledgement that reduced flood flows, whether stemming from channelization or other features, could result in a conversion of downstream floodplain vegetation to cropland or other development. The paragraph adds credence to the contention that woodland habitat preservation downstream from the levee is a sound recommendation that should be implemented as a part of the project.

The last full paragraph on page 70 of the draft EIS gives additional support to that recommendation.

Response. - The recommendation would be a desirable adjunct to the proposed plan since it would preserve a resource which is scarce in the area and one which would be indirectly affected by the project.

Comment. - It is hoped that our comments are constructive and will result in an improved flood control plan for the Park River.

Response. - Your comments were constructive and should result in an improved plan. Again, these matters would be reconsidered during postauthorization studies.

6. U.S. Geological Survey. -

Comment. - The Pierre shale exposed at various places within the immediate project area (page 8 of draft EIS) is susceptible to slumping, particularily along steep river banks, as a result of grading or drainage changes and on low rolling hills where there is undercutting or overloading. It would be appropriate to indicate any particular design or engineering measures necessary to accommodate this potential geologic hazard.

Response. - The information on the Pierre shale has been incorporated into the revised draft and would be used in design. However, this shale would be implicated mainly in the upstream reservoir alternative, not in the proposed plan.

Comment. - Page 41, paragraph 1, line 6 of draft EIS. The value of 22,100 cfs given for the 100-year flood appears very high. Using a Log Pearson Type III curve, the value shouldn't be more than about 16,000 cfs.

Response. - The discharge-frequency curve for present conditions (with Homme Dam) for the Park River at Grafton was derived using the graphical method because of Homme's effects on downstream high flows. Plotting of positions followed the method of Leo R. Beard as described in the publication "Statistical Methods in Hydrology", January 1962. Because of the effect of Homme storage on high flows, the Log-Pearson Type III method was considered to be less appropriate than a graphical approach.

7. North Dakota State Water Commission. -

Comment. - The draft EIS has been reviewed, and it is felt that the report is very thorough and covers all areas affected by the proposed project.

Response. - Comment noted.

8. North Dakota Game and Fish Department. -

Comment. - Refers to a paragraph on page 51 of the draft EIS which states: "About 215 of the 235 acres dedicated to flood control would be planted to native prairie grasses. Their value to wildlife would be greater than that under their present use as agricultural land. This judgment is based upon grasslands providing a type of habitat which is relatively uncommon in the area and their providing year-round cover. The value of the grasslands would depend upon the height of cover (lower being generally less desirable) and the frequency and type of maintenance measures (frequent burning, mowing and rodent and weed control being less desirable)."

Response. - The paragraph in question has been expanded.

Comment. - The Corps has clearly stated in their draft EIS the reasons why the project should be required to preserve tracts of floodplain woodland.

Response. - Purchase of such lands would be a local expense. Possible preservation of floodplain woodland would be coordinated with your office, the Bureau of Sport Fisheries and Wildlife, and local interests. The present position of the St. Paul District is that such preservation is not required.

Comment. - On page 71, the draft EIS correctly states that: "The proposed plan may not as strongly appeal to the broader, non-resident sector of the public, however, because of two basic factors. One is the size of the plan which protects 1,900 acres beyond the 800 acres presently within the city limits of Grafton --- The second factor concerns the basic issue of allowing development in the floodplain."

Response. - Comment noted.

Comment. - We agree that the proposed alternative is the better choice, but we feel that it would be improved by consideration and application of the afore discussed points (seeding of tall prairie grasses instead of short ones and protection of tracts of floodplain woodland).

Response. - Comment noted. The recommendations will be further considered and will be implemented if judged to be desirable on the whole.

9. North Dakota Highway Department. -

Comment. - We do not have any comments on the draft EIS.

Response. - Comment noted.

10. North Dakota State Historical Society. -

Comment. - While the presence of archeological and historic sites in the area is recognized, no mention is made of a need for archeological survey prior to construction. An on-the-ground survey should be conducted in construction areas to determine potential destruction of unreported sites and the need for salvage archeology.

Response. - Concur. This matter has been discussed earlier as U.S. Department of the Interior comment-response No. 10.

11. North Dakota State Outdoor Recreation Agency. -

Comment. - We strongly encourage the acquisition of the floodplain forest and oxbow areas downstream from the proposed levee to the confluence of the bypass channel with the Park River as a mitigative measure incorporated in the project.

Response. - This matter would be reconsidered as noted earlier.

Comment. - We also encourage the development of a recreational plan relating to preservation measures taken for the floodplain areas adjacent to, and downstream from, the project area.

Response. - The detailed development of a recreational plan takes place in postauthorization phases of study. The recreational plan would apply to all project lands, including compensatory lands.

12. North Dakota State Forest Service. -

Comment. - We have reviewed the draft EIS and concur with your recommendations.

Response. - Comment noted.

13. Pembina County Board of Commissioners. -

Comment. - We urge and recommend that the Corps proceed with further study and ultimate construction and improvement of the Park River Subbasin, North Dakota, so that control of flood waters can be made, wildlife habitat can be improved, recreational facilities can be made available, and rural water supply can be assured for domestic and industrial water supplies.

Response. - Comment noted.

Comments were not received from the following:

U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
Office of Economic Opportunity
U.S. Department of Commerce, Economic Development Administration
Souris-Red-Rainy River Basins Commission
Water Resources Council
North Dakota Department of Agriculture and Labor
North Dakota State Department of Health
North Dakota State Soil Conservation Committee
Walsh County Board of Commissioners
Walsh County Engineer
Walsh County Water Management District
Walsh County Citizens Advisory Committee
Walsh County Extension Agent
Cavalier County Board of Commissioners
Mayor, city of Grafton, North Dakota
Mayor, city of Park River , North Dakota
Mayor, city of Adams, North Dakota

Mayor, city of Cavalier, North Dakota
Mayor, city of Edinburg, North Dakota
Mayor, city of Hoople, North Dakota
President of Board of City Commissioner, Langdon, North Dakota
Mayor, city of Lankin, N. Dak.
Mayor, city of Minot, N. Dak.
Mayor, city of Osnabrock, N. Dak.
Mayor, city of Walhalla, N. Dak.
Mr. Harold L. Johnson, Alderman, Crystal, N. Dak.
Burlington Northern Railroad
Izaak Walton League of America
Wildlife Management Institute
North Dakota League of Women Voters
North Star Chapter, Sierra Club
Dr. Robert B. Ditton, Water Resources, Literature Clearinghouse, University of Wisconsin, Green Bay
Dr. Leonard B. Dworsky, Water Resources Center, Cornell University
Dr. Paul B. Kannowski, Director for Ecological Studies, University of North Dakota
Mr. Luther Berntson, President of the Board, Park River Bible Camp
Mr. C. A. Cranna, Director, North Dakota Wildlife Federation
Mr. Lorne Hillier, Director, Nodak Rural Electric
Mr. Joe Kadlec, Commercial Club and Wildlife Club, Edinburg, N. Dak.
Mr. Ronald Monson, Edinburg Wildlife Club
Dr. Darwin Peterson, Vice President, North Dakota Wildlife Federation
Mr. Robert E. Sanders, Chairman, Water Resources Commission, North Dakota Wildlife Federation
Dr. Daniel E. Willard, Institute for Environmental Studies, Madison, Wisconsin
Mr. Ardell Almer, Grafton, N. Dak.
Mr. Jerome I. Axvig, Adams, N. Dak.
Mr. Joseph Axvig, Adams, N. Dak.
Mr. Knute Bjerke, Adams, N. Dak.
Mr. Magnus Bjerke, Adams, N. Dak.
Mr. Otto Bjerke, Adams, N. Dak.
Mr. Jan Bjorg, Adams, N. Dak.
Mr. Elton Brekke, Grafton, N. Dak.
Mr. John Brekke, Grafton, N. Dak.
Mr. Robert L. Burke, Grafton, N. Dak.
Mr. Arnold Clemenson, Grafton, N. Dak.
Mr. Leslie Chally, Adams, N. Dak.
Mrs. Louis Chally, Adams, N. Dak.
Mr. Antonio Collette, Grafton, N. Dak.
Mr. M. D. Collette, Grafton, N. Dak.
Mr. Robert E. Dahl, Grafton, N. Dak.
Mr. Edmond E. Demars, Grafton, N. Dak.
Mr. Ernest Dencker, Park River, N. Dak.
Mr. Vernon Drevecky, Adams, N. Dak.
Mr. George Egeland, Grafton, N. Dak.
Mr. Iver Egeland, Grafton, N. Dak.
Mr. Oscar Ellingson, Edinburg, N. Dak.

Mr. Willard Frovarp, Park River, N. Dak.
Mr. Harlan L. Grovom, Park River, N. Dak.
Mr. Elvin T. Gryde, Hoople, N. Dak.
Mr. James H. Gryde, Edinburg, N. Dak.
Mr. Orlando Gryde, Edinburg, N. Dak.
Mr. James Haug, Edinburg, N. Dak.
Mr. Norris Haug, Edinburg, N. Dak.
Mr. Arthur Jackson, Grafton, N. Dak.
Mrs. Clara Jasmer, Park River, N. Dak.
Mr. Lester Jasmer, Adams, N. Dak.
Mr. John L. Johnson, Park River, N. Dak.
Mr. Howard L. Johnson, Grafton, N. Dak.
Mr. Orville L. Johnson, Edinburg, N. Dak.
Miss Annie V. Kjelland, Park River, N. Dak.
Mr. Milton Kjelland, Park River, N. Dak.
Mr. Paul A. Larson, Grafton, N. Dak.
Mr. George Lindell, Adams, N. Dak.
Charles and Shirley Lindell, Park River, N. Dak.
Mr. Willie Laaveg, Park River, N. Dak.
Mr. Bill McIntyre, Grafton, N. Dak.
Mrs. Anna McIntyre, Park River, N. Dak.
Mr. David McLean, Adams, N. Dak.
Mr. Richard Madson, Jamestown, N. Dak.
Mr. D. U. Meberg, Park River, N. Dak.
Mr. Cliff Moquist, Crystal, N. Dak.
Mr. Fred Nottestad, Park River, N. Dak.
Mr. Johnny Nygard, Edinburg, N. Dak.
Mr. Ernest Olson, Edinburg, N. Dak.
Mr. Paul E. Olson, Adams, N. Dak.
Mr. Clarence Ordehl, Grafton, N. Dak.
Mr. & Mrs. Steve Perkerewicz, Grafton, N. Dak.
Mr. Alvin E. Peterson, Edinburg, N. Dak.
Mr. & Mrs. Henry Rud, Edinburg, N. Dak.
Mr. Vernon Rustan, Edinburg, N. Dak.
Mr. Willis Rustan, Edinburg, N. Dak.
Mr. Alfred Rusten, Edinburg, N. Dak.
Mr. Johnny O. Seim, Milton, N. Dak.
Mr. Clayton J. Setness, Adams, N. Dak.
Mr. Raymond P. Setness, Adams, N. Dak.
Mr. Willard Setness, Adams, N. Dak.
Mrs. Stella Staven Skjerven, Park River, N. Dak.
Mr. Kenneth Stensland, Adams, N. Dak.
Mr. Harvey Tallackson, Grafton, N. Dak.
Mr. Charles G. Thompson, Grafton, N. Dak.
Mr. Chester T. Thompson, Grafton, N. Dak.
Mr. Harlan J. Thompson, Grafton, N. Dak.

Mr. Trueman Thompson, Grafton, N. Dak.
Mr. Mark M. Thornton, Grand Forks, N. Dak.
Mr. and Mrs. Alton Thorson, Edinburg, N. Dak.
Mr. Carl Troftgruben, Edinburg, N. Dak.
Mr. Earl Troftgruben, Edinburg, N. Dak.
Mr. Elroy Troftgruben, Edinburg, N. Dak.
Mr. Harold Troftgruben, Edinburg, N. Dak.
Mr. John Wysocki, Minto, N. Dak.
Dr. Bill Barker, North Dakota State University
Dr. Mary Bromel, North Dakota State University
Dr. J. Frank Cassel, North Dakota State University
Dr. Keith Cassel, North Dakota State University
Mr. Wayne Colberg, North Dakota State University
Dr. Thomas Collins, Moorhead State College
Dr. Duane Dahlberg, Concordia College
Dr. Larry Falk, Moorhead State College
Dr. Del Helgeson, North Dakota State University
Dr. Richard Pemble, Moorhead State College
Dr. Gene Phillips, Moorhead State College
Dr. Robert Puyear, North Dakota State University
Dr. Juanito Ramirez, North Dakota State University
Mr. Roger Richman, Moorhead State College
Dr. Donald Scoby, North Dakota State University
Dr. Fred Shewman, North Dakota State University
Dr. Bob Stewart, Jr., North Dakota State University
Dr. Jerry Van Amburg, Concordia College

Comments on the revised draft statement were received from the following agencies:

U.S. Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Health, Education and Welfare
U.S. Department of the Interior
U.S. Department of Transportation
North Dakota Highway Department
North Dakota State Water Commission
North Dakota State Outdoor Recreation Agency
Walsh County Board of Commissioners

The ensuing pages outline the Corps response to comments resulting from State and Departmental review. Copies of the letters can be found in Appendix B.

U.S. Environmental Protection Agency

1. Comment. - EPA recognizes the concern and real losses the residents of Grafton have experienced from flooding by the Park River. Like most land and water resource management problems, no simple solution exists for the protection from floods of a town like Grafton which has grown up in a flood-plain area. EPA would, however, stress the need for those advocating a flood protection project to fully condider all the impacts of the proposal, with environmental quality given full evaluation.

Response. - Concur.

2. Comment. - EPA supports flood-plain uses that recognize and are compatible with environmental protection. Such uses would include location of sewage treatment facilities in non-flood prone areas, protection of the flood-plain as an aquifer recharge and a runoff control area, protection of the aesthetic and unique biological resource values of the flood-plains, etc.. For these, and many other environmentally based reasons, adequate regulation of flood-plain uses is most important.

Response. - Concur.

3. Comment. - The Draft EIS notes that no flood-plain regulations are in effect in the Grafton area nor in the whole Park River basin (page 46). The Draft EIS also points out that adequate flood plain regulations could be a very feasible alternative to the proposed levee project and that, unlike the proposed project, they would eliminate the environmental impacts associated with the loss of riparian woodlands, with the levee itself, with the loss of agricultural land, and with the probable loss of the river and riparian lands as a possible environmental corridor.

Though acceptability by local citizens is obviously a most important aspect of any project, Federal agencies must take a comprehensive approach. For this reason, and because the building of the proposed levee project could set further precedent against the enactment of flood-plain regulations in the Park River basin, EPA believes that the Corps of Engineers should further evaluate the flood-plain regulation alternatives to the levee proposal. This evaluation should expand the analysis of the flood-plain regulation alternative to place it in the larger context of the basin and probably the State. In the long run, regulations could very well be the most economical and least environmentally damaging of any flood protection program or system.

Response. - The discussion in the text of the status of floodplain regulation in the Park River basin is now somewhat dated because Grafton has adopted a resolution which gives emergency land use controls in the floodplain. It is our understanding that the regulations have not yet been approved and finalized, however. This current information has not been incorporated into the text of the EIS because the other aspects of the study have not been updated. Updating would be done during post-authorization studies, and the points you have raised above would be considered.

4. Comment. - The proposed levee project could nullify any future attempt to regulate and manage the river area through Grafton as an environmental corridor. The Draft EIS states that the proposed project is not expected to induce future development in Grafton (page 44). The problem is, however, with the levee in place the development that does take place could very well be at the expense of the proposed corridor. (This proposal was made by planning consultants in, 1972 Plan and Implementation Program, Walsh County, N.D., but has not been accepted by the town government). This potential problem needs full analysis.

Response. - The comment suggests that a purpose of floodplain regulation is to maintain the environmental integrity of the river corridor. It seems that environmental interests commonly try to build this purpose into floodplain management programs. This is understandable since there are many environmental opportunities in floodplain management. However, the basic purpose and thrust of floodplain management has been to prevent growth in flood damages, and those responsible for floodplain management are understandably reluctant to build environmental protection into the program if it could jeopardize the stability of the floodplain management program. As regards this question of preventing growth in flood damages-environmental protection, the most reasonable approach seems to be to first insure the integrity of the program aimed at flood damages and then to build in environmental protection where it will be functionally related to flood damage control. An example of environmental protection not strongly related to flood damage prevention could be the protection of rural woodlots under the flood-

plain regulation program. While this would be a worthy goal, such an "add-on" should be approached with caution since it is generally not strongly tied to prevention of growth in flood damages. In any case, environmental protection can be a "spin-off" from a basic floodplain management program and such "spin-offs" can be highly desirable and in the overall public interest.

It should be noted that protection and wise use of the river corridor is a local opportunity and responsibility in the case of either levee protection or floodplain management. In neither case can protection of the corridor be dictated from the Federal level under existing guidelines (although assistance in sound management of the corridor could result during implementation of Section 404 of Public Law 92-500). It is recognized that levee protection may result in less protection for the river corridor since development of specific sites along the corridor would generally be less costly, and hence more developable than under a floodplain regulation program.

During post-authorization studies, local interests will be encouraged to re-examine and take advantage of any opportunities afforded by the river corridor, and the Corps will try to help in this endeavor.

5. Comment. - The Draft EIS mentions the possible existence of "oxbows" in the present flood-plain area. Since oxbows are quite commonly valuable wetland type areas, the location and importance of these oxbows needs elaboration.

Response. - There are three or four abandoned oxbow lakes that could potentially be affected by the proposed project. These areas will be studied in detail during later phases of project planning and before any construction would commence.

6. Comment. - The Draft EIS correctly identifies the "uniqueness" of the riparian wood-land vegetation and associated wildlife along the Park River. The replacement of this vegetation with other species, as discussed (page 47), is not a straight trade of a certain amount of "ecosystem" for another like amount. The uniqueness of the present ecosystem is based on its riparian and wood-land nature -- any replacement would not have this same "unique" quality.

Response. - A straight trade was not implied nor are the proposed plantings assumed to be of equal quality to those which would be lost. It is accurate to state that some of the woodland amenities would at least be partially compensated or replaced in time, however.

In re-examining this section of the report, it becomes apparent that "unique" may be too strong an adjective. It is agreed that the species composition, woodland-water interface, successional stage, etc., of the riparian corridor make it a valuable natural resource, particularly since the overall trend for such resources is toward a loss each year without successional replacement. When the draft and revised draft EIS

were written, the values of the riparian corridor were not as well recognized as they are today, hence the choice of the rather strong word "unique", even though it is more properly applied to only the much more uncommon resources.

7. Comment. - In summary, EPA encourages the development of environmentally sound flood-plain regulations. The precedent setting possibility of the proposed levee project needs to be analyzed in this context. At the same time, future development in a possible environmental corridor based on the riparian area through Grafton, needs full analysis. Based on the EPA rating system for Environmental Impact Statements, found in, Review of Federal Actions Impacting the Environment, this project is assigned an ER-2 (Environmental Reservation - Insufficient Information). The reasons for the ER-2 rating are those listed.

Response. - The comment is basically concurred with. However, it must be pointed out that the thrust of floodplain regulation is toward prevention of growth in flood damages. The proposed project is consistent with this objective and with floodplain management guidelines, particularly since the project's design criteria indicate a high degree of flood protection with flood damages from the Park River being allowed, or induced by the project, only during very rare flood events. Even though a very rare flood, particularly if coincident with a rainfall that results in interior drainage problems, causes flood damages, the basic objective of flood damage reduction (which is common to both the levee and regulation programs) is achieved since damages from the more frequent floods are reduced and these are the damages which are economically more important. Since the levee project is consistent with floodplain management (and floodplain regulation) objectives, it is therefore not truly "precedent setting".

The second basic point, that of the riparian corridor needing further evaluation and the EIS containing "insufficient information", is concurred with. However, it should be recognized that, in any case, further studies will be done prior to construction with the objective of resolving problem areas. We are not asking whether the project has the unqualified concurrence of the EPA (or other interested parties); rather we are seeking concurrence as to the choice among conceptual plans with the understanding that further studies will be needed. It should be noted that Corps of Engineers regulations provide for examination and re-examination of alternatives several times during project development (although the breadth of consideration is reduced during each phase of study) and that the regulations do not indicate that preliminary decisions are "cast in stone" or that worthy alternatives will not be considered. Our regulations also provide for supplements and revisions to the EIS and require other more detailed project documents as project development proceeds. The mechanism is established for more detailed study of problems and coordination of the results with interested parties such as your Agency. In practice, we are going beyond our specific requirements in coordinating our activities with recognized, interested parties. The basic point of this discourse is to convey the idea that what we must determine at this point is what problems need

further study and whether the levee and bypass conceptual plan has any probable "overriding determinants" which make it unacceptable compared with the conceptual plan alternatives of no action by the Corps of Engineers, upstream reservoir(s) floodplain evacuation, etc.

In order to avoid future conflicts insofar as possible, we suggest that while evaluating conceptual plans, the commenting agency take into account the possibility that further study will uncover unanticipated adverse environmental effects. In suggesting this, we recognize that many environmental problems cannot be solved by providing for contingency factors in cost estimates, which can solve many unforeseen social or engineering problems. Tentative acceptance or rejection of the conceptual plan is therefore requested with allowances for a contingency plan, provision for more detailed studies, and/or a conservative judgment because more detailed studies will probably uncover some unforeseen, unresolveable problems.

U.S. Department of Agriculture.

8. Comment. - Forests are a scarce and important resource in the project area. For this reason, we suggest that the report and environmental statement specify the acreages of woodland in the project area that are expected to be converted to urban use. Also, the environmental statement and the interim survey report indicate that 360 acres of agricultural land will be required for the project and that 1,950 acres of undeveloped land, now mostly in agricultural use, will be urbanized as a result of the project. We suggest that the value of the agricultural production foregone, as a result of removing this land from production, be discussed under Irreversible and Irretrievable Commitments of Resources on page 75 of the environmental statement.

Response. - As you have apparently noticed, it is stated on page 43 that about 5 acres of natural woodland would be cleared during construction. It is recognized that additional clearing of wooded areas would occur during urbanization; however, we do not understand the need for tallying this acreage since our projections do not indicate that the flood control project would induce any of this development at Grafton. Nevertheless, this would be investigated further during post-authorization studies.

Reference to the "irreversible commitment" of agricultural production has been added to section 7.

9. Comment. - The plan and environmental statement indicate that 130 acres of agricultural land are needed for spoil placement and indicate that a temporary reduction in productivity will take place. Spoil banks are also mentioned on pages 5 and 45 of the environmental statement. A discussion of the location, method, and type(s) of material involved in spoil disposal would assist the reader in understanding the associated impact.

Response. - Because of the amount of material which would be excavated from the proposed flood bypass channel, it seems likely that "scrapers" would remove the material and caterpillar tractors would

assist in smoothing out the spoil banks with side slopes of probably about 1 vertical on 5 horizontal. Locations of the spoil banks would be constrained by factors such as avoidance of woodland and wetlands and/or the desires of the landowners involved. Because of the depth of cut, the types of material removed would include both topsoil and subsoil.

More detailed information would be generated during post-authorization studies, when, for example, alignments of project features are determined based on engineering and environmental studies and land use at that time. It should be recognized that estimates of quantities may be quite different at that time due to necessary changes in the project and in land use. Quantitative data are inserted at this phase of study only to assist in visualizing the alternate conceptual plans.

10. Comment. - The discussion of the alternative of upstream reservoir storage on page 70 of the environmental statement indicates that flood damages at Grafton would be reduced by about 50 percent. The next sentence seems to negate the importance of this reduction by stating that damages due to large floods would not be significantly reduced. You may wish to consider either omitting the latter sentence or quantifying the statement to eliminate the apparent discrepancy.

Response. - The estimate of reduction in flood damages of 50 percent is based on flood frequency-damage relationships. Damages due to the smaller floods, while perhaps not individually large, add up to nigh average annual damages due to the frequency of such events; therefore, economically speaking, most of the benefits of the reservoir(s) would be captured through control of the more frequent floods. Although the reservoir(s) would also attenuate peak flows during larger floods, the very large floods would not be affected. Because the infrequent flood events contribute relatively little to average annual flood damages, failure to control the larger floods has less economic consequence after damage annualization than might be expected. The two sentences in the text are therefore not really contradictory.

U.S. Department of Health, Education, and Welfare

11. Comment. - It appears that the impacts of the proposed action and the reasonable alternatives have been adequately addressed.

Response. - Comment noted.

U.S. Department of Transportation

12. Comment. - The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

Response. - Comment noted.

13. U.S. Department of the Interior

Comment. - The first paragraph, Page 19, discusses "several additional small multipurpose reservoirs" planned for the near future. There is no mention of what flood control benefits will be attributed to these new reservoirs. There are P.L. 566 and other reservoirs in place, extensive snagging and clearing operations have already been accomplished, and upstream channelization has been accomplished by Federal and local interests. The relationships of all these projects, including proposed P.L. 566 projects, to flooding at Grafton are not clearly defined, nor even discussed in the Section Land Use Impacts, pages 45 and 46.

Response. - For hydrologic information regarding the project please consult the Hydrology, Hydraulics and Interior Drainage appendix of the interim survey report. On page B-9 of that September 1973 report, for example, the effects of upstream Soil Conservation Service reservoirs are discussed. These analyses would be refined and expanded during post-authorization studies.

14. Comment. - The aquatic biota section (page 19) states that none of the aquatic biota are known to be rare, endangered, or locally uncommon. Presently, the State of North Dakota has not established an endangered fish species list, though the State does recognize those species listed by Miller (Miller, Robert Rush, "Threatened Freshwater Fish of the U.S.", Transactions of the American Fisheries Society, 1972, Volume 101, page 249) as being rare, endangered, depleted, or as status undetermined. The species considered as rare includes the trout-perch, which has been identified on page 17, Table 4, as occurring in the Park River.

Trout-perch spawn in May or June. They feed largely on small insects and crustacea, and usually select sand bars for spawning. We do not presently know what effects, if any, the project may have on this species.

Response. - The information has been incorporated on page 19 of the final EIS.

15. Comment. - On page 20 under the heading of Grassland, there is a brief discussion of wetlands in the basin. Notably omitted is any reference to relationships of wetlands, drained and undrained, to downstream flooding. The wetlands preservation program of the Fish and Wildlife Service and the presence of both fee title and easement Waterfowl Production Areas in the basin have also been omitted.

Response. - This comment and your first comment on the EIS both refer to the flood control capabilities of natural or artificial small impoundments. In terms of effects upon peak flows, small impoundments or wetland drainage are important factors in assessing peak flows from watersheds of, say, less than 50 square miles. On larger watersheds, such activities become secondary factors in causing large peak flows,

providing that drainage is not done by such major channels that "non-contributing" drainage areas become "contributing" areas in terms of large peak flows. The word "large" is of some significance because Corps flood control projects are generally concerned with large watersheds, large floods, and a high degree of flood control.

In terms of this proposed project, wetland drainage and small impoundments would hydrologically be of little consequence since the project would offer standard project flood protection plus 3 feet of levee freeboard (standard design criterion). Also the area has a very broad floodplain with a small incremental flood stage increase per unit volume of discharge during high flows. It is recognized, however, that wetland drainage and small impoundments generally have significant effects in terms of fish and wildlife habitat. If pertinent to with- and without-project projections, wetland programs would be considered in post-authorization EIS supplements or revisions. However, to assist in other studies we are trying to keep abreast of the literature on the relationship between wetland drainage and floodflows, water quality, etc.

16. Comment. - The Revised Draft Environmental Statement establishes on pages 25-29 that the country where this undertaking is contemplated is potentially rich in prehistoric and protohistoric resources. We have noted that it is believed that such sites are largely, if not entirely, in private ownership. Since the lands included in the proposed project area have not been surveyed according to the draft statement, such a judgment is an assumption only until confirmed by appropriate professional surveys. Such surveys should be initiated before the start of any construction.

The statement should clearly confirm consultation with the present State Historic Preservation Officer for North Dakota. He is Mr. James E. Sperry, Superintendent, State Historical Society of North Dakota, Liberty Memorial Building, Bismarck, North Dakota 58501. The final environmental statement should reflect that he was consulted to determine whether the proposal will affect any cultural site which may be in the process of nomination to the National Register of Historic Places and contain a copy of his response. Much time has passed since Mr. Gary Leppert's letter of comment of 19 July 1973.

Page 53 of the revised draft EIS establishes that the National Register of Historic Places was consulted; however, more clarification is needed. Since all properties on the National Register of Historic Places are published in the Federal Register, the statement should reflect consultation with the issue for 19 February 1974, and all subsequent monthly supplements. The supplementary listings of sites added to the National Register, subsequent to publication of the previous supplement, are cited in the Federal Register appearing on the first Tuesday of each month. The statement should also establish whether the proposed project will have an effect upon a National Register listing. Where this is found to be the case, the statement should reflect compliance with Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665), Executive Order 11593, and the procedures of 36 CFR 800.

The statement should further reflect procedures to be followed should previously unknown archaeological resources be encountered during project development. We would suggest that your final statement state that all construction activity be halted in that eventuality and profesional guidance sought.

Response. - Since the draft and revised draft statements were prepared, the Corps of Engineers has proposed an updated set of guidelines for dealing with cultural properties. Assuming that the years to come do not bring substantial revision to our procedures:

1. Phase I General Design Memorandum (GDM) studies will include a current records and literature search, a field surface survey, and limited "testing" by qualified personnel.

2. Phase II GDM studies will include any necessary updating of the phase I GDM, plus intensive testing of areas to be affected by the project.

3. Any subsequent or supplementary activities (such as when borrow areas are established or alignments are changed) will also involve survey and intensive testing.

4. The appropriate authorities will be consulted and coordinated with when new findings concerning prehistoric or protohistoric resources are involved.

This process (which would differ somewhat for other kinds of projects) should adequately consider cultural resources during project planning and design. We are still developing our program to protect these resources during construction. While we could provide incentives for the construction contractor to halt work if cultural materials are discovered, non-professionals probably could not recognize many such resources, particularly if they are certain lithic materials, for example. Accordingly, we hope to have a qualified observer periodically visit the construction site (such as an archaeologist on site when borrow areas are stripped of vegetation and soils), and if cultural materials are uncovered, provide for the halting of construction plus the appropriate recompense (or alternate construction activities) for the construction contractor. Since no other project-related studies (except for basic programs such as the continuation of stream gaging) are currently underway, updating of cultural coordination and consultation at this time would suggest an artificial completeness of compliance with current guidelines.

17. Comment. - On pages 35 and 36, it is indicated that there are 180 acres of land within the project area classified as not suited for development. There is no explanation of the criteria upon which this classification is based. We doubt if there are any physical limitations to 100 percent development, except for the river channel. Virtually the

entire protected area, in the absence of zoning restrictions or other administrative constraints, is subject to development as a result of this project.

Response. - There were no rigid criteria; rather the information is advanced on the basis of judgment of the practicability of building on the various parcels. While the entire protected area would theoretically be developable, practical factors of cost, suitability of the soils for construction, etc., were estimated as making 180 acres not suited to development.

18. Comment. - We were not able to determine from the statement how much material will be required to construct the levee or where this material will be obtained. If material is needed from a source other than the excavated bypass channel, a discussion of this impact would be in order.

Response. - Without data such as that from soil borings, positive identification of sources of material cannot be made. Although paragraph one, sentence three, page five, suggests that material for the levee would be obtained from flood bypass channel excavation, such a statement is somewhat speculative until more detailed studies of construction suitability are made. The statement in the text is not meant to indicate that there could be no other affected areas. However, judging from the limited available data, the excavated material should be suitable in quality and quantity for levee construction. The sources of, or needs for, other material such as riprap would be identified at a later date. As was indicated in the response to the comment on prehistoric and protohistoric resources, findings and recommendations regarding such matters will be coordinated with agencies such as yours.

19. Comment. - It has been noted that some structures are situated outside of the levee, but within the flood plain of Park River (p. 45). An estimate of adverse impacts of the project on such structures, as a result of higher flood levels outside the protected area, has not been found in the draft statement. Although it has been stated that "some persons outside the levee seem to fear a backwater effect" (p. 45, paragraph 1), we have found no quantitative estimate of the magnitude of such effects as a result of the project.

Response. - Present estimates of backwater effects are found in paragraph 2, page 43. These effects (and those referenced in the comment) are economically not of large magnitude; however, they are probably significant for those involved, those who think they are involved, those who fear substantial loss, and/or those who do not believe the flood stage forecasts. Because social and psychological fears may go beyond those based on purely physical data (but are not necessarily therefore invalid), the quoted sentence was inserted. Also, it takes into account a view expressed at the 19 July 1973 late-stage public meeting in Grafton.

20. Comment - The impact of decreased biological productivity on 330 acres of riparian vegetation, plus river oxbows, is recognized in the report. The impact of the project upon future development of these areas is recognized on page 45, paragraph 3, and page 73, paragraph 3. Contradictory statements appear on page 44, paragraph 4, and page 75, paragraph 1. These latter "no increased development" conclusions are unsupported and contrary to past experiences. We believe that reduction of flood flows will increase the rate of conversion and, therefore, is a project impact. The reports are replete with words about the high value, scarcity and endangered status of such habitats in North Dakota, and yet the plan provides no protection for these areas.

Response - The methods used to project land use did not indicate that induced development would occur, hence the wording "the project is not projected to induce ....". However, it is reasonable to assume some such effects, hence the apparently contradictory statements. We did not wish to ignore a possible effect even though we could not get measurements for it.

21. Comment - The last paragraph on page 46 mentions that adverse construction impacts to aquatic biological systems could be decreased by timing construction during the late summer low flow period and by using appropriate silt detention devices. These two measures should be employed. We therefore recommend changing the word could to will.

Response - It is expected that by the time the project is constructed, use of silt detention devices may be a standard practice for Corps construction. Minimizing siltation through the appropriate work scheduling may not be as easy to implement because scheduling is usually strongly influenced by the availability of funds, by a desire for expeditious project completion, etc. Proper siltation control would be one of our objectives, however.

22. Comment - Paragraph 2, page 74, states that item (1), retention of water where it falls, may not be appropriate for the situation at Grafton. We feel it is appropriate. Land use in the upper part of the basin—particularly drainage, stream channelization, and clearing—has effectively speeded the removal of water from the land where it fell, to proceed post haste to Grafton. We are not suggesting this is a complete solution, but it certainly is a partial solution and should be further discussed.

Response - The problem with this alternative is that it does not provide a degree of protection sufficient for an urban area, although it is recognized that some other basin needs, such as wildlife habitat, would also be partially met. See also the earlier comments/responses on this subject.

23. Comment - The selection of the proposed alternative is considered to be the structural alternative that is least damaging to wildlife. We feel this will be a sound consideration once the proposal contains the recommended habitat preservation.

Response - Comment noted.

24. Comment - The lack of mineral information is noted in the response to comments in the revised environmental statement (pages 84-85). We agree that minimal amounts of mineral materials will be committed to the project and that there should be little or no adverse impact on mineral resources from the project in the vicinity of Grafton. However, a statement of such noninvolvement of mineral resources should be included in both the survey report and the environmental statement. The final environmental statement should be revised so that the reader does not have to rely on gleaning this information from the response part of the statement.

Response - A statement on mineral resources has been added to page 45.

North Dakota Highway Department

25. Comment - Our letter of July 26, 1973 has been included in the revised draft EIS. However, our concerns about funding have not been addressed in the response to comments.

Response - The comments on funding in the 26 July 1973 letter referred to the feasibility report and were responded to in that document. (See the following response to comments addressed to the EIS at a later date.)

26. Comment - Statements in the revised draft EIS indicate the State Highway Department would be responsible for the costs of highway bridges needed to span the proposed flood bypass channel around the City of Grafton.

At the present time we do not have sufficient funds to accomplish all the needed maintenance and improvements in the State Highway System The estimated costs of highway bridges for this project is about $586,000. To commit this amount of highway funds to this project would certainly have adverse effects on highway programs in other parts of the State. This is recognized on page 44 of the revised draft EIS.

The adverse effect of this impact on the highway user and system can be mitigated by including the cost of the U.S. 81 bridge in the direct Federal costs for the proposed project. We do not believe the highway user should be expected to bear the costs of improvements which will not provide any benefits to the highway user. Since railroad relocations are considered a Federal cost, highway adjustments should also be considered as a Federal cost.

Response - Under current policy and law, costs associated with highway bridges and roads are borne by non-Federal interests.

North Dakota State Outdoor Recreation Agency

27. Comment - The Corps of Engineers responses to our earlier comments have been noted, and we would only add that we would appreciate receiving a copy of the detailed recreational plan associated with the project as indicated would take place during the post authorization phase of the study.

Response - Recreation planning efforts will be coordinated with the North Dakota State Outdoor Recreation Agency.

North Dakota State Water Commission

28. Comment - It is our opinion that the revised draft EIS is a very complete and thorough document.

Response - Comment noted.

Board of Walsh County Commissioners

29. Comment - We would like to point out to you that the plan would rather obviously affect county roads and bridges down stream from the City of Grafton. The commission anticipates that there would be considerable additional expenditure of money in order to lengthen and raise bridges and protect county roads from water damage.

It is the opinion of the Commissioners that the EIS does not adequately consider the impact upon the county. Therefore, the Walsh County Commission does hereby enter its objection to the plan.

Response - Effects on downstream bridges and roads are not anticipated. However, if there were project-related erosion jeopardizing bridges and roads, costs of correction would be a Federal responsibility. Costs associated with highway bridges and roads are normally borne by non-Federal interests under current policy and law.

APPENDIX A

LETTERS RECEIVED BY THE DISTRICT ENGINEER ON THE DRAFT ENVIRONMENTAL STATEMENT

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE CENTRAL REGION
Room 1836
601 East 12th Street
Kansas City, Missouri 64106

July 24, 1973

WFC2x1

Colonel Rodney E. Cox
District Engineer
Corps of Engineers
1210 U. S. Post Office
and Court House
St. Paul, Minnesota 55101

Subject: Draft Environmental Impact Statement, Flood Control at Grafton, North Dakota, Park River

Reference: NCSED-PB, June 29, 1973

Dear Colonel Cox:

In accordance with your letter of June 29, 1973, we have examined the Draft Environmental Impact Statement and offer the following comment.

Paragraph b, Flood Warning, Page 56, appropriately states the capability of the National Weather Service to provide flood warning at Grafton and the public value of such forecast service.

We are forwarding the draft statement to our headquarters for such further comment as may be appropriate.

Sincerely,

/Henry Richmond
for

Elroy C. Balke
Regional Hydrologist

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80203

October 18, 1973

Colonel Rodney E. Cox
District Engineer
Department of the Army
St. Paul District, Corps of Engineers
1210 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

The Environmental Protection Agency has made a brief review of the draft environmental statement for Flood Control at Grafton, North Dakota, Park River and finds that generally, it satisfactorily addresses the environmental impacts of the proposed action.

In accordance with current EPA guidelines, the proposed action and environmental statement will be categorized in the Federal Register as LO-1. Please send us a copy of the final statement.

Sincerely yours,

John A. Green
Regional Administrator

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Box 1458, Bismarck, North Dakota 58501

July 27, 1973

Colonel Rodney E. Cox
District Engineer
St. Paul District
Corps of Engineers
1210 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Sir:

The report draft and preliminary draft environmental impact statement on flood control and related purposes on the South Branch and main stem Park River basin at Grafton, North Dakota, was reviewed by this office. The following comments are for your consideration in completing the final draft statement.

Comments on Impact Statement:

Page 19, first paragraph: Add - Some grassland pastures still maintain characteristic prairie vegetation.

Page 70, last paragraph: Add - Land conversion from woodland to cropland would be limited to those soil areas suitable for crop production.

Comments on Interim Survey Report:

1. The interim survey primarily concerns the flood damage occurring to the city of Grafton. Yet, according to Table D-46, Souris-Red Rainy River Basins Study, Volume 3, Appendix D, 1967 damages are $708,000 to agriculture; $601,000 to urban, $105,000 to transportation; and other $137,000. Shouldn't the narrative sections be expanded to cover agriculture in more detail?

2. Page 11, Table 3: Footnote should read--
   (1) Existing conditions with Homme Dam and PL-566 local sponsor reservoirs in place.

3. Page 12 indicates the Park River floodplain "encompasses about 95,000 acres." Page H-2 indicates the 95,000 acres is in the South Branch and main stem. Yet, Table D in item 1 above totals 1,551,000 acres in the Park River basin. Clarification is needed.

4. Page 29, Table 7: The rating of "not acceptable -1" under the Economic development column (item 10 - Rural channel improvement) is misleading from an economic point of view. Channel improvement to reduce agriculture flood damages can be justified and will provide for economic development of agricultural sectors.

5. Page 33, Table 8: Plan 2 can not meet 100% of the economic development objectives when agricultural damages are not reduced. The 100% for item III, Environmental quality, under Plan 1 needs more explanation. Water supply is becoming more critical, thus human environment would degrade.

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

Sincerely,

Gerald K. Calhoun, acting

Allen L. Fisk
State Conservationist

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION EIGHT
BUILDING 40, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

July 26, 1973

IN REPLY REFER TO:

Colonel Rodney E. Cox
Department of the Army
St. Paul District, Corps of Engineers
1210 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

08-00.21

Dear Colonel Cox:

We appreciate the opportunity to review and comment on the Draft Environmental Impact Statement for the Flood Control Project for Park River at Grafton, North Dakota, and we offer the following comments for your consideration:

1. The levee around Grafton and the by-pass channel will intersect several streets, county roads and highways and require adjustments of the facilities. Those on the Federal-aid system are State Highway 17 extending east and west through Grafton and U.S. Highway 81, a major north and south arterial highway serving the City. U.S. Highway 81 will have to cross the by-pass channel where the bottom width is 170 feet and 5 to 1 slopes requiring an over-all bridge length of about 350 feet. Ramps are proposed for the levee crossings of the roads and highways which will introduce a pronounced hump in the otherwise level profile for roads in the area. This would have a deterimental aesthetic effect as well as an inconvenience to the driver.

2. With reference to the Draft Environmental Statement, we would recommend that a more detailed discussion of the necessary highway and road adjustments be included in a separate paragraph in the project description and environmental impact sections of the Statement. Since the floods are rather infrequent, we would recommend, for the two main highways that carry most of the traffic of about 2,000 v.p.d., that an opening be left in the levee with provision for a gate or other type of closure at the time of floods. The responsibility for the cost of the road adjustments for the levee and the bridge construction for U.S. 81 crossing of the channel should be included in the environmental impact statement.

3. It is noted that the final costs in the Interim Survey report includes an estimate (about $13,000) for the road ramps. The bridge for

(more)

U.S. 81 estimated at $361,00, however, is designated as a non-Federal cost that would become the responsibility of the local interests and, in turn, the State Highway Department. This is a significant adverse impact on highway users.

We are returning the two copies of the Drafts sent to us.

Sincerely,

W. H. Baugh
Regional Federal Highway
Administrator

Attachments (2)

By: Frank S. Allison, Director
Office of Environment and
Design.

United States Department of the Interior
OFFICE OF THE SECRETARY
MISSOURI BASIN REGION

BUILDING 67, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:
ER-73/915

AUG 31 1973

Dear Colonel Cox:

In response to your letter of June 29, 1973, we have reviewed the draft Interim Survey Report and Environmental Impact Statement on the Park River, North Dakota.

Our comments on the draft Report and draft Statement are treated in separate commentaries. The Environmental Impact Statement portion is handled in two sections; the first section gives an overview of the total statement while the second section provides more detailed comments on specific sections.

INTERIM SURVEY REPORT

The Bureau of Sport Fisheries and Wildlife is disappointed in the lack of acceptance by the Corps of specific recommendations contained in the report, dated March 30, 1973, from their Bismarck Area Office. It is apparent that little accommodation has been made for the recommendations, except as they incidentally fit within proposed Corps of Engineers' plans. Major points of concern are the negative responses to two of the recommendations contained in the above-mentioned report as follows:

Recommendation No. 1 - All timber and woody cover along the Park River and oxbows downstream from the ring levee in the NW 1/4 Section 18, T. 157 N., R. 52 W., to the confluence of the proposed flood diversion channel in the NE 1/4 Section 8, T. 157 N., R. 52 W., be acquired as a part of the project, fenced or monumented as necessary, and preserved as a "green belt" or environmental corridor. The area should be acquired with the following intent and purpose: (1) to restrict residential or industrial development in the "green belt" area, and (2) to preserve and protect the environmental integrity of the wooded habitat.

Recommendation No. 4 - Slopes of the diversion channel above the actual water prism and the slopes of the ring levee be planted to the following,

or similar recommended seed mixture, at the rate of 12 pounds of pure live seed per acre:

Side Oats Grama (Pierre)	- 3 lbs. PLS/A
Switchgrass (ND 965-98)	- 3 lbs. PLS/A
Holt Indian Grass	- 3 lbs. PLS/A
Big Bluestem (Bonilla)	- 3 lbs. PLS/A

The Bureau of Sport Fisheries and Wildlife is convinced that without acquisition and protection of the woodlands specified in Recommendation No. 1, exclusive of a public golf course, the flood protection afforded by the project will induce or stimulate agricultural clearing of downstream lands or accelerate the construction of homes or recreational cottages. Either or both situations will result in a deterioration of the existing flood plain forest ecosystem. The probability of these land changes stemming from flood reduction associated with various alternatives are indicated in several places in the Statement and have been amply demonstrated at numerous flood control projects throughout the nation. We see no exceptional circumstances to prevent this occurrence in the Park River.

Your response to the "green belt" or environmental corridor concept is particularly disturbing in view of proposed project plans to spend an estimated $35,000 to create aesthetic and beautification plantings at the project. It is difficult to understand an unwillingness to protect a much larger existing natural area at a fraction of the cost estimated for landscape treatment and beautification. Project economic feasibility cannot be a realistic concern when the benefit-cost ratio is approximately 3.8:1.

The plan for grass seeding is also a concern of the Bureau. The Bismarck Area Office, in cooperation with the North Dakota Game and Fish Department, recommended a specific native tall-grass seeding mixture (Recommendation No. 4) for the benefit of wildlife resources. It appears that a much different, short grass seeding mixture is being proposed. We question the seeding of short grasses in an area acknowledged to have a tall grass potential. In fact, language within the draft Statement supports the position on the tall grass recommendation. From a wildlife cover aspect, tall native grasses are much preferred and the recommendation should be reconsidered.

The draft Interim Survey Report contains language and stipulations in Appendix D relevant to landscaping and beautification. It is suggested that additional language be included under the appropriate sections to

indicate approved sources of plant materials. In the absence of specifically mentioned approved sources, such as commercial nurseries, it is conceivable that local contractors could supply native trees and shrubs by simply transplanting them from existing natural wooded areas along the Park River. The estimated high unit prices indicated in Table D-5, Appendix D, suggests that fairly large trees and shrubs would be needed for planting purposes. The exploitation of natural wooded areas for planting material to supply beautification and landscaping needs is not desirable.

Comments on the draft Report have been directed toward those areas of major concern. We strongly urge the Corps of Engineers to adopt the Bureau of Sport Fisheries and Wildlife Recommendations No. 1 and No. 4 as repeated above. Should these two major recommendations not be adopted, the Bureau of Sport Fisheries and Wildlife cannot fully support the project. The measures recommended are sound and reasonable and as such should be implemented as a part of the project, or compelling reasons should be presented to support the chosen plan.

Under the Discussion section on page 47, the report comments, "In addition to the immediate construction of the proposed plan of improvement, the following actions are deemed of immediate importance . . . (b) Implementation of sound flood plain zoning ordinances and regulations throughout the entire basin by state, county, and local governmental agencies. . ." We certainly agree with this statement. Instead of simply recommending implementation, it may be more appropriate to make such action a condition of project approval. We note that the proposed ring levee is large enough to provide for a town three to four times larger than the present size of Grafton. Since the proposed project allows for future growth of Grafton within the levee, the need to build in areas outside the levee is virtually eliminated. This situation greatly enhances the feasibility of enacting and enforcing sound flood plain zoning ordinances.

Structural flood control projects such as this should not be built unless combined with planning for effective control over development rights in the flood prone areas. Historically, improper flood plain development following on the heels of structural solutions to past problems has resulted in demands for further protection at a later date. There is little incentive for the local government to zone areas susceptible to flooding if they believe the Federal Government will later build structures to protect the developments.

The Bureau of Outdoor Recreation supports the recommendation of the Bureau of Sport Fisheries and Wildlife that all timber and woody cover along the Park River and oxbows downstream from the ring levee to the confluence of the proposed flood diversion channel to be acquired as part of the project. This proposal would provide an environmental corridor near Grafton and preserve the existing tree cover which is scarce in this area. Recreational development could be incorporated into this plan.

Although recreation is not a project purpose, the levees have potential for use as hiking and bicycle trails. Perhaps this possibility should be explored with the local citizens.

The report mentions other Federal enterprises within the Park River Watershed, but does not mention how much has been spent to date nor how much more is proposed to be spent. Most of the streams of this general region of North Dakota have Soil Conservation Service projects built and/or proposed. The Souris-Red-River Comprehensive Report, Appendix D lists five subbasin plans for this basin but the report makes no mention of this.

The Corps of Engineers has already undertaken clearing and snagging along many miles of the three branches of Park River as follows:

1. The North Branch from about 5 miles northwest of Hoople, North Dakota, to its junction with the Middle Branch.

2. The Middle Branch from about 6.5 miles southwest of Hoople to its junction with the South Branch.

3. The South Branch from the western limits of the City of Park River to its junction with the Middle Branch.

4. The Park River from the junction of the South and Middle Branches to a point about 10 miles above the mouth of the Park River.

Also, the Corps of Engineers completed building Homme Dam and Lake in 1951 for municipal and industrial water supply to the town of Park River and for Grafton, yet the report states there is an immediate and pressing need for an improved water supply for Grafton.

The Soil Conservation Service has built five flood-retarding structures on the Middle Branch of Park River with a total flow storage capacity of 12,570 acre-feet and 37.6 miles of channel improvements. Also,

the Soil Conservation Service has one flood-retarding structure with a capacity of 2,490 acre-feet and 56 miles of channel improvement in the Willow Creek Watershed. This tributary joins Park River downstream of Grafton.

It would seem that the report should show the total Federal expenditure in this remote and sparsely settled basin, a comprehensive plan of all projects of all Federal agencies and estimated implementation of such plans and that the plan to protect Grafton is a fragment of a much larger orderly developed plan.

In view of the large Federal expenditure, apparent lack of a master plan, the need for improved municipal and industrial water supply to Grafton, grants for sewage works, and need for water-based recreation and fish and wildlife enhancement, this report should be recast to show the relationship of the proposed project at Grafton to the several recognized problems of the Park River Basin.

ENVIRONMENTAL IMPACT STATEMENT

Overview

Our general impression of the draft Environmental Impact Statement is that it is comprehensive, thorough, and well written. There are, however, important narrative portions of the statement which do not support or are in conflict with the proposed plans and conclusions contained in the draft Interim Survey Report.

The proposal will have no effect on any existing or proposed project of the Bureau of Reclamation. The alternative chosen seems to be very satisfactory as it provides a maximum of flood protection for the city and a minimum of environmental disruption (compared to the other feasible alternatives).

The physical works will probably protect Grafton from all floods. The plan is well conceived, probably based on similar plans for other single-purpose fragmented river basin plans, and is similar to the constructed works at the City of Sioux Falls, South Dakota.

This draft statement lacks consideration of all cultural resources within the general project area, their relationship to affected areas, and any measures that may be necessary to mitigate defined adverse impact.

Comments on Specific Language

1. Project Description

The "Plan of Operation" could be altered to allow a small flow into the leveed area of the west which would then be pumped out on the east. This would assure that the water in the ponding areas would remain of suitable quality for survival of fish and would prevent unsanitary conditions from developing during the longest periods of flow diversion. Since a pump already exists in the plans, the only additional expense would be for operation (pages 6-7).

2. Environmental Setting Without The Project

A section describing the mineral estate in the Park River Basin could provide a little insight into potential future development of the area.

Soils, page 10: A discussion should be included on the erosional features of the soils which are disturbed during flood periods and the soils which will be disturbed by the project.

The statement provides (pp. 24-28) a discussion of a number of archeological and historical sites within the general project area but fails to define their exact relationship to proposed project features. Such information is necessary to accurately assess any impact the proposed action may have on these resources. In addition, although these data are acknowledged to have been extracted from an environmental study by the University of North Dakota, the ultimate source for the information is not specified, nor is any indication provided that these remains constitute the total inventory of known cultural resources within the project area. Such information may be provided by consultation with the State Historical Socity of North Dakota (Mr. James E. Sperry, Superintendent, Liberty Memorial Building, Bismarck, North Dakota 58501).

3. Environmental Impacts Of The Proposed Project

Impacts on Surface Water, page 43 and Land Use Impacts, page 45: A discussion of the downstream impacts on surface water and land uses due to the volume and velocity of water leaving the bypass channel during periods of flooding would be helpful.

Economic and social impact, page 43, and Impacts on Aesthetics and Recreation, page 52: The inhabitants of Grafton may be accustomed to an unobstructed view of the countryside. Thus, what will be the social and aesthetic impact resulting from the construction of the levee on four sides of the town?

The statement appears general in nature. For instance, on page 51, ". . . the value of flood plain woodlands is greater than the value of a similar acreage of upland woodland." They are undoubtedly more diverse, but the statement should be clarified to indicate whether economic or ecological values are meant. Economic and social impact section is brief with no mention of value of flood protection.

First paragraph, page 50, last sentence. It is stated that "wooded slope areas, as well as above bank woodlands, have, however, been cleared in other areas of the Park River flood plain forest." This acknowledgment of the possibility of clearing definitely supports Recommendation No. 1 in the Bureau of Sport Fisheries and Wildlife report of March 30, 1973. Language contained in the draft Interim Survey Report does not indicate acceptance or proposed implementation of the recommendation.

Second paragraph, page 50, third sentence. The word "recommended" should be substituted for the word "suggested."

Second complete paragraph, page 51. This paragraph, which comments on the planting of native prairie grasses and their value to wildlife, supports this Bureau's Recommendation No. 4 pertaining to the seeding of tall grasses. The conclusion expressed in the paragraph is inconsistent with the short grass seeding plans proposed in the draft Report.

Third and fourth full paragraphs, page 51. There appears to be a discrepancy in the number of acres to be planted to trees and grass. Two hundred and fifteen acres to be planted to native grass out of a total of 235 acres does not leave 10 acres planted to trees and shrubs as indicated.

Pages 54 and 71 of the statement indicate the need for further study of cultural resources in the proposed project area. Such a study should include, in addition to the above-mentioned consultations, a thorough inspection of all affected areas by a professional archeologist, in order to determine the presence of currently unrecorded archeological remains.

Should it be determined that any cultural values will suffer adverse impact as a result of the proposed action, a detailed plan for preservation or mitigation should be compiled and included in the final environmental statement.

4. Alternatives

This section is reasonably complete with a good discussion of flood plain evacuation. We are encouraged that four positive impacts of evacuation were recognized and discussed:

1. Provide permanent protection from flood damages.

2. Immediately attack the basin problem which is flood plain development having high damage potential, not flooding.

3. Allow the flood plain lands to be used for a purpose commensurate with their high fertility, such as agriculture.

4. Assure a time freedom from worry during time of flood. Although structural measures provide protection against floods of a certain size, larger floods could overtop the structures possibly causing a great loss of life and property.

First full paragraph, page 67. This paragraph is a further acknowledgment that reduced flood flows, whether stemming from channelization or other features, could result in a conversion of downstream flood plain vegetation to cropland or other development. The paragraph adds credence to the contention that woodland habitat preservation downstream from the flood control levee system is a sound recommendation that should be implemented as a part of the project.

Last full paragraph, page 70. This wording gives additional support to the Bureau of Sport Fisheries and Wildlife recommendation regarding downstream woody habitat preservation.

United States Department of the Interior

OFFICE OF THE SECRETARY

MISSOURI BASIN REGION
DENVER, COLORADO 80225

ER 73/915

September 12, 1973

Colonel Rodney E. Cox
District Engineer, St. Paul District
Corps of Engineers
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

By letter dated August 31, 1973 the Department of the Interior provided comments on the Draft Environmental Statement for Flood Control, Park and Red Rivers of North Basin, Walsh, Pembina and Cavalier Counties in Grafton, North Dakota. Subsequent to that date the attached comments were received from the Geological Survey of the Department of the Interior.

These comments are provided for your consideration in the preparation of the final environmental statement.

Sincerely yours,

John E. Rayburn

For: Special Assistant to the Secretary

Enclosure

We appreciate the opportunity to review and comment on this project. It is hoped that our comments are constructive and will result in an improved flood control plan for the Park River.

Sincerely yours,

John E. Parkman

Special Assistant to the Secretary
Missouri Basin Region

Colonel Rodney E. Cox
District Engineers, St. Paul District
Corps of Engineers
1210 U.S. Post Office And Custom House
St. Paul, MN 55101

United States Department of the Interior

GEOLOGICAL SURVEY
WASHINGTON, D.C. 20244

OFFICE OF THE DIRECTOR

August 23, 1973

ER-73/915

Memorandum

To: Regional Director, Bureau of Sport Fisheries and Wildlife, Denver, Colorado

Through: Assistant Secretary--Energy and Minerals

From: Director, Geological Survey

Subject: Review of Interim Survey Report and draft environmental statement for Flood Control, Park River, Red River of the North Basin, Walsh, Pembina and Cavalier Counties, Grafton, North Dakota

We have reviewed the subject documents as requested in a memorandum of July 6 from the Director, Office of Environmental Project Review. Our comments are as follows:

Geology

The Interim Survey Report indicates that detailed engineering-geology data are available for the project area, and post-authorization studies are also anticipated.

The Pierre shale exposed at various places within the immediate project area (p. 8, draft statement) is susceptible to slumping, particularly along steep river banks, as a result of grading or drainage changes and on low rolling hills where there is undercutting or overloading. It would be appropriate to indicate any particular design or engineering measures necessary to accommodate this potential geologic hazard.

Hydrology

The draft statement is believed to be reasonably adequate and accurate in regard to environmental impact of the proposed action on the hydrologic environment.

Page 41, paragraph 1, line 6: The value of 22,100 cfs given for the 100-year flood appears very high. Using a Log Pearson Type III curve, the value shouldn't be more than about 16,000 cfs.

Act' Director

NORTH DAKOTA STATE PLANNING DIVISION

STATE CAPITOL—FOURTH FLOOR—BISMARCK, NORTH DAKOTA 58501
701 224-2818

August 2, 1973

STATE INTERGOVERNMENTAL CLEARINGHOUSE "LETTER OF COMMENT"
ON PROJECT REVIEW IN CONFORMANCE WITH OMB CIRCULAR NO. A-95

To: Department of the Army/Corps of Engineers

STATE CLEARINGHOUSE PROJECT NUMBER: 7307034205

Colonel Rodney E. Cox, District Engineer
St. Paul District
Corps of Engineers
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

Subject: Draft Environmental Impact Statement for the Flood Control Project at Grafton, North Dakota, located on the Park River; and Draft Interim Survey for Flood Control and Related Purposes on the South Branch and main stem of Park River, North Dakota, and Red River of the North Basin.

The Draft Environmental Impact Statement and survey were received in our office on July 3 and July 5, 1973, respectively.

In the process of the A-95 review, the attached comments were received from the Game and Fish Department, Highway Department, Historical Society, State Outdoor Recreation Agency, Pembina County Commission and the State Water Commission.

This document and attachments constitute the comment of the State Intergovernmental Clearinghouse, made in compliance with OMB Circular No. A-95, and section 102(2) of the National Environmental Policy Act of 1969.

Sincerely yours,

Jack Neckels

Jack Neckels
Director

JN/BEA/ds

Attachments

Buy North Dakota Products

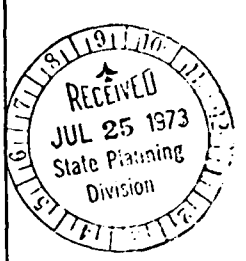
NDSIC FORM B (9/71)

PNRS NO.

Date Received

FROM: STATE INTERGOVERNMENTAL CLEARINGHOUSE
STATE PLANNING DIVISION
STATE CAPITOL
BISMARCK, NORTH DAKOTA 58501

ENVIRONMENTAL IMPACT STATEMENT TO BE REVIEWED



TO: Mr. Vernon Fahy

State Water Commission

Bismarck, North Dakota 58501

ISSUED
BY: Department of the Army, Corps of Engineers

DATE: July 6, 1973

NAME OF
PROJECT: Draft EIS-Flood Control at Grafton; Interim Survey Park River, Red River of the North, for Flood Control and Related Purposes.

The attached Environmental Impact Statement is referred to your agency for review and possible comments. If you consider it satisfactory, please check the box labeled, "no comment." Otherwise, please check one of the other appropriate boxes. Your cooperation is asked in completing this memo and returning it to the State Intergovernmental Clearinghouse within 10 days from date of receipt. If no response is received within 15 days of date of notification it will be assumed you have no comment.

☐ No comment

☐ Meeting desired with applicant

☒ Comments submitted herewith

1. Specific comments which are to be attached to the review statement which will be submitted by the State Intergovernmental Clearinghouse: (Use reverse side or separate sheets if necessary)

   The Environmental Impact Statement for flood protection at Grafton has been reviewed and it is felt that the report is very thorough and covers all areas affected by the proposed project.

2. Reasons why meeting is desired with applicant:

Reviewer's Signature: Walter D. Schmidt Date: July 24, 1973

Title: Director of Engineering Tele: 224-2750

NDSIG FORM B (9/71)

PNRS NO.

Date Recei

FROM: STATE INTERGOVERNMENTAL CLEARINGHOUSE
STATE PLANNING DIVISION
STATE CAPITOL
BISMARCK, NORTH DAKOTA 58501

ENVIRONMENTAL IMPACT STATEMENT TO BE REVIEWED

TO: Mr. Russell Stuart

Game and Fish Department

Bismarck, North Dakota 58501

ISSUED BY: Department of the Army, Corps of Engineers

DATE: July 6, 1973

NAME OF PROJECT: Draft EIS-Flood Control at Grafton; Interim Survey, Park River, Red River, of the North, for Flood Control and Related Purposes.

The attached Environmental Impact Statement is referred to your agency for review and possible comments. If you consider it satisfactory, please check the box labeled, "no comment." Otherwise, please check one of the other appropriate boxes. Your cooperation is asked in completing this memo and returning it to the State Intergovernmental Clearinghouse within 10 days from date of receipt. If no response is received within 15 days of date of notification it will be assumed you have no comment.

☐ No comment

☐ Meeting desired with applicant

☒ Comments submitted herewith 2 copies

1. Specific comments which are to be attached to the review statement which will be submitted by the State Intergovernmental Clearinghouse: (Use reverse side or separate sheets if necessary)

2. Reasons why meeting is desired with applicant:

Reviewer's Signature: Russell Stuart Date: 7-24-73

Title: Commissioner Tele:

NORTH DAKOTA GAME AND FISH DEPARTMENT

July 23, 1973

Colonel Rodney E. Cox
District Engineer
Corps of Engineers
St. Paul District
1210 U.S. Post Office and
Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

This Department has reviewed the Draft Environmental Impact Statement on Flood Control At Grafton, North Dakota (Park River) and the Draft Interim Survey, Park River, North Dakota (Red River of the North Basin) For Flood Control and Related Purposes as requested in your letter of June 29, 1973.

Our few comments on these two draft reports will pertain mainly to those points pertaining to wildlife habitat on the general floodplain environment. For purposes of brevity, we shall refer to the Draft Environmental Impact Statement Report as the D.E.I.S. Report and the Draft Interim Survey Park River Report as the D.I.S.P.R. Report.

1. The D.I.S.P.R. Report refers to seeding "native shortgrass prairie species" on the levees and flood control channel, and lists four reasons (p. D-6) for doing so.

   First, we would commend the Corps for using native prairie species to seed down project earthwork. However, we would urge the use of a medium to tall native prairie mix for the following reasons:

   a. Shortgrass prairie is not natural in this area.

      Page 18 of the D.E.I.S. Report states that -----
      "The potential vegetation of the eastern grassland is a dense growth of tall grasses dominated by big bluestem, little bluestem, switchgrass, and Indian grass. The soil is more fertile in this area. The soils west of the escarpment have a thinner layer of topsoil and are well drained. The potential vege-

RUSSELL W. STUART
COMMISSIONER

WILBUR BOLDT
DEPUTY COMMISSIONER

H. H. SPITZER
CHIEF, ENFORCEMENT DIVISION

DALE HENEGAR
CHIEF, FISHERIES DIVISION

C. R. GRONDAHL
LEADER, GAME INVESTIGATIONS

R. L. MORGAN
LEADER, HABITAT DEVELOPMENT

PERSHING CARLSON
CHIEF, PUBLIC RELATIONS DIVISION

tation to the west is a mixture of medium and tall grasses dominated by western wheatgrass, big bluestem, and needlegrass."

b. Short vegetation does not furnish as desirable wildlife habitat as does medium to tall vegetation.

Page 51 of the D.E.I.S.------"About 215 of the 235 acres dedicated to flood control would be planted to native prairie grasses. Their value to wildlife would be greater than that under their present use as agriculture land. This judgement is based upon grasslands providing a type of habitat which is relatively uncommon in the area and their providing year round cover. The value of the grasslands would depend upon the height of cover (lower being generally less desirable) and the frequency and type of maintenance measures (frequent burning, mowing and rodent and weed control being less desirable)."

c. Short grass prairie would eventually be invaded by either taller tame grasses (brome) or taller natives in this area.

Thus, the statement that "there would be significant savings in maintenance as there would be no need for cutting" is not (in our opinion) totally correct or accurate.

We would also question the erosion control value of <u>true</u> short grass prairie species.

Medium or tall prairie grasses should probably be disturbed by mowing or burning every three or four years. Thus, levee mowing could be put on a rotation basis - part could be mowed each year, if desired.

d. Medium or tall grass prairie species would be even more aesthetically and environmentally pleasing to the eye than short grass prairie species.

2. This proposed flood control project will definitely reduce flood frequencies along 8 miles of bypassed river channel. While the Corps of Engineers readily admits (P. 2 - D.E.I.S. Summary) that this action "would decrease biological productivity of about 330 acres riparian vegetation (including 180 acres of woodland) and result in a species composition more like that of the drier uplands," they have basically refused (Cox to Gritman 29 June 73) to consider a recommendation by the Bureau of Sport Fisheries and Wildlife (Gritman to Cox 3/30/73) that a certain portion of the woody floodplain be preserved along the Park River from the levee east to the flood diversion channel - a distance of 3.7 river miles involving approximately 70 acres of floodplain woodlands.

Our past experience with flood control projects in North Dakota clearly indicates that increased use (agricultural, industrial, housing, etc.) is made of the "protected" floodplain downstream from such a project, especially if the floodplain is wooded. Thus, we feel the project will result in increased use of floodplain habitat (including woody) with a subsequent loss of some wooded acres and a subsequent loss in wildlife values of some of the other wooded acres. We rather doubt that this loss of perpetual riverbottom hardwoods will be compensated for by planting 1980 trees and shrubs in selected clump plantings along project areas for landscape treatment and beautification at an estimated cost of $35,000.000 (D.I.S.P.R. Report - page D-8).

We feel the Corps of Engineers would do well to have these clump plantings put in by the local Soil Conservation District, and use the resulting savings in money to acquire in fee or easement the aforementioned floodplain habitat, as the "floodplain forest near Grafton is particularly desirable because of the scarcity of woodland in the area, and because this in the only natural woodland in the eastern portion of the Park River basin" (p. 51-D.E.I.S. Report - para. 1).

In discussing Alternative 6, Flood bypass Channel at Grafton (Pages 63, 64 and 65 - D.E.I.S. Report), the Corps clearly states reasons why the project should be required to preserve the floodplain habitat as recommended by BSFW. To quote from the Corps' own discussion - "The diversion of floodwater away from 9 miles of river channel would tend to dry that area, and that section of the river within Grafton would be essentially flood free. The drying effect of diverting flood flows could result in a decreased rate of tree growth ----- Indirect habitat losses stemming from this alternative appear to be of considerable magnitude. The value of this section of floodplain forest would then be lost to animal species dependent on wooded riverine habitat for their existence. Its recreation and aesthetic qualities would likewise be endangered. The overall impact of this alternative on the physical environment would be similar in magnitude to that of the proposed plan although the specific factors vary" (underlining ours).

On page 70 of the D.E.I.S. Report, in discussing the effect of an alternative of upstream reservoir storage, the Corps states ---- "Reduction of flood flows in the rural reaches of the South Branch of the Park River would very likely result in an increasingly rapid rate of conversion of rural floodplain forest to cropland. Thus this plan would also result in a loss of floodplain woodland with attendant losses to recreation, aesthetic, and wildlife support qualities of such areas".

On page 71 of the D.E.I.S. Report, the Corps clearly states ---- "the proposed plan does encourage an increase in floodplain development."

It would appear that the Corps of Engineers has clearly stated in their Draft Environmental Impact Statement Report the reasons why the project should be required to preserve these floodplain woodland tracts everywhere but in their discussion of the proposed project. Clearly the old adage that "if the shoe fits - wear it" should apply here.

3. The Corps of Engineers correctly states on page 71 of the D.E.I.S. Report that "The proposed plan may not as strongly appeal to a broader non-resident sector of the public, however, because of two basic factors. One is the size of the plan which protects 1,900 acres beyond the 800 acres presently within the city limits of Grafton --- The second factor concerns the basic issue of allowing development in the floodplain."

   Certainly, the taxpaying public of the U.S. would be even more upset with the proposed plan if they thought that floodplain woodland tracts would be lost because of the project. The only way to assure that this will not result from project action is to acquire those tracts in fee title on permanent easement.

4. We would agree that this proposed alternative is the better choice, but we feel that it could be improved by consideration and application of the afore-discussed three points.

We appreciate the opportunity to review and comment on these two reports.

Sincerely,

Robert L. Morgan

Robert L. Morgan, Chief
Lands and Development Division

RLM:la

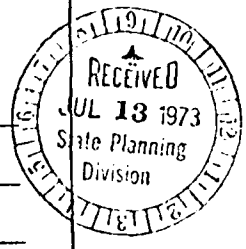
NDSIC FORM B (9/71)

PNRS NO.

Date Received

FROM: STATE INTERGOVERNMENTAL CLEARINGHOUSE
STATE PLANNING DIVISION
STATE CAPITOL
BISMARCK, NORTH DAKOTA 58501

ENVIRONMENTAL IMPACT STATEMENT TO BE REVIEWED



TO: Mr. Robert Bradley

Highway Department

Bismarck, North Dakota 58501

ISSUED
BY: Department of the Army, Corps of Engineers

DATE: July 6, 1973

NAME OF
PROJECT: Draft EIS-Flood Control at Grafton; Interim Survey Park River, Red River of the North, for Flood Control and Related Purposes.

The attached Environmental Impact Statement is referred to your agency for review and possible comments. If you consider it satisfactory, please check the box labeled, "no comment." Otherwise, please check one of the other appropriate boxes. Your cooperation is asked in completing this memo and returning it to the State Intergovernmental Clearinghouse within 10 days from date of receipt. If no response is received within 15 days of date of notification it will be assumed you have no comment.

☐ No comment ☐ Meeting desired with applicant

☒ Comments submitted herewith

1. Specific comments which are to be attached to the review statement which will be submitted by the State Intergovernmental Clearinghouse: (Use reverse side or separate sheets if necessary)

We are reviewing the statement and report. We expect to have comments prepared within the next 10 days. A copy of these comments will be provided your office at that time.

2. Reasons why meeting is desired with applicant:

Reviewer's Signature: R Bradley Date: 7-11-73

Title: Chief Engineer Tele: 224-2584

North Dakota
Highway Department
CAPITOL GROUNDS,
BISMARCK, NORTH DAKOTA

R. E. BRADLEY
Chief Engineer

ARTHUR A. LINK
Governor of North Dakota

WALTER R. HJELLE
Commissioner

July 26, 1973

LS

Col. Rodney E. Cox
District Engineer
St. Paul District
Corps of Engineers
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Col. Cox:

We have reviewed the Draft Report entitled "Interim Survey Park River, North Dakota Red River of the North Basin for Flood Control and Related Purposes", and the Draft Environmental Impact Statement for this same project.

On Page 43, Part e, of the draft Interim Survey Report it states that the required local cooperation for the selected plan includes:

> "Provide without cost to the United States all relocations of . . . utilities, highway bridges and roads, . . ."

For the diversion of the Park River to the Corps planned bypass flood channel north of Grafton a new bridge on U.S. Highway 81 would be required. The present Park River Bridge on U.S. 81 in Grafton was built in 1971.

The flood diversion bridge requirement would not be a highway improvement. The construction of a highway bridge across the diversion channel and other possible modifications to the existing highways are a direct result of the construction of the proposed flood control project and should be included as direct project costs, the same as for the modifications and relocations of the railroads which also are changed and disrupted by the proposed construction.

This flood control project does not contribute any benefit or betterment to the existing highways in this area and, therefore the highway users should not be required to pay for the cost of highway adjustments due to the flood control project. It is our recommendation that the cost of highway adjustments be made a part of the direct federal project costs.

We do not have any comments on the Draft Environmental Impact Statement.

Very truly yours,

Walter R. Hjelle
State Highway Commissioner

WRH:CAG:fas

cc: State Planning Agency

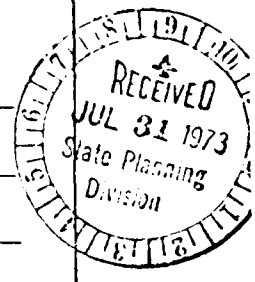
NDSIC FORM B (9/71)

PNRS N

Date Rec

FROM: STATE INTERGOVERNMENTAL CLEARINGHOUSE
STATE PLANNING DIVISION
STATE CAPITOL
BISMARCK, NORTH DAKOTA 58501

ENVIRONMENTAL IMPACT STATEMENT TO BE REVIEWED



TO: Mr. James Sperry

Historical Society

Bismarck, North Dakota 58501

ISSUED
BY: Department of the Army, Corps of Engineers

DATE: July 6, 1973

NAME OF
PROJECT: Draft EIS-Flood Control at Grafton; Interim Survey Park River, Red River of the North, for Flood Control and Related Purposes.

The attached Environmental Impact Statement is referred to your agency for review an possible comments. If you consider it satisfactory, please check the box labeled, "no comment." Otherwise, please check one of the other appropriate boxes. Your cooperation is asked in completing this memo and returning it to the State Intergoveri mental Clearinghouse within 10 days from date of receipt. If no response is receive within 15 days of date of notification it will be assumed you have no comment.

☐ No comment

☒ Comments submitted herewith

☒ Meeting desired with applican

1. Specific comments which are to be attached to the review statement which will be submitted by the State Intergovernmental Clearinghouse: (Use reverse side or separate sheets if necessary)

While the presence of archeological & historic sites in the area is recognized no mention is made of a need for archeological survey prior to construction. An on the ground survey should be conducted in construction areas to determine

2. Reasons why meeting is desired with applicant: Potential destruction of unreported sites and t Need for salvage archea

As above

Reviewer's Signature: Joseph E. Sperry Date: 7/26/73

Title: Superintendent Tele: 224-766

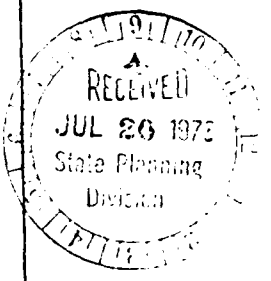
NDSIC FORM B (9/71)

PNRS NO.

Date Received

FROM: STATE INTERGOVERNMENTAL CLEARINGHOUSE
STATE PLANNING DIVISION
STATE CAPITOL
BISMARCK, NORTH DAKOTA 58501

ENVIRONMENTAL IMPACT STATEMENT TO BE REVIEWED



TO: Mr. Gary Leppart

State Outdoor Recreation Agency

Bismarck, North Dakota 58501

ISSUED
BY: Department of the Army, Corps of Engineers

DATE: July 6, 1973

NAME OF
PROJECT: Draft EIS-Flood Control at Grafton; Interim Survey Park River, Red River of the North, for Flood Control and Related Purposes.

The attached Environmental Impact Statement is referred to your agency for review and possible comments. If you consider it satisfactory, please check the box labeled, "no comment." Otherwise, please check one of the other appropriate boxes. Your cooperation is asked in completing this memo and returning it to the State Intergovernmental Clearinghouse within 10 days from date of receipt. If no response is received within 15 days of date of notification it will be assumed you have no comment.

☐ No comment

☐ Meeting desired with applicant

☒ Comments submitted herewith

1. Specific comments which are to be attached to the review statement which will be submitted by the State Intergovernmental Clearinghouse: (Use reverse side or separate sheets if necessary)

2. Reasons why meeting is desired with applicant:

Reviewer's Signature: Gary Leppart Date: 7/18/73

Title: State Liaison Officer Tele: 224-2430

NORTH DAKOTA
STATE OUTDOOR RECREATION AGENCY

STATE OFFICE BUILDING 900 EAST BOULEVARD
BISMARCK NORTH DAKOTA 58501

GARY LEPPART
Coordinator &
State Liaison Officer
Phone 224-2430

July 19, 1973

Rodney E. Cox
District Engineer
U.S. Army Engineer District
1210 U.S. Post Office & Custom House
St. Paul, MN 55101

Dear Colonel Cox:

This office has reviewed the draft environmental impact statement for flood control devices at Grafton, North Dakota, and is responding to your request dated June 29, 1973.

The State Outdoor Recreation Agency strongly encourages the acquisition of the floodplain forest and oxbow areas downstream from the proposed flood control levee to the confluence of the bypass channel with the Park River as a mitigation measure incorporated in the project. We also encourage the development of a recreational plan relating to preservation measures taken for the floodplain areas adjacent to and downstream from, the project area.

We appreciate this opportunity to comment on the draft EIS for flood control measures at Grafton.

Sincerely yours,

Gary Leppart
State Liaison Officer

brs

AGENCY MEMBERS

GOVERNOR ARTHUR A. LINK
Chairman

MILO W. HOISVEEN
Executive Officer
State Engineer
State Water Commission

WALTER R. HJELLE
Commissioner
State Highway Department

ROLF ERTRESVAAG
Acting Director
State Parks Service

[illegible]

GARY L. [illegible]
Executive [illegible]
State [illegible]

JOE SATROM
Director
State [illegible] Department

JAMES E. SPERRY
Superintendent
State Historical Society

DR. [illegible]
State Health Officer

[illegible]
State [illegible]

GENERAL [illegible]
State Adjutant General

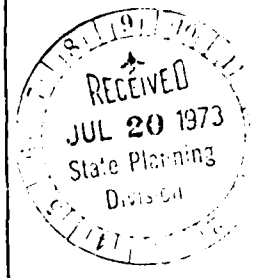
BUY NORTH DAKOTA PRODUCTS

NDSIC FORM B (9/71)

PNRS NO.

Date Received

FROM: STATE INTERGOVERNMENTAL CLEARINGHOUSE
STATE PLANNING DIVISION
STATE CAPITOL
BISMARCK, NORTH DAKOTA 58501



ENVIRONMENTAL IMPACT STATEMENT TO BE REVIEWED

TO: Mr. J. Oliver Johnson, Chairman

Pembina County Commissioners

Edinburg, North Dakota 58227

ISSUED BY: Department of the Army, Corps of Engineers

DATE: July 6, 1973

NAME OF PROJECT: Draft EIS-Flood Control at Grafton; Interim Survey Park River, Red River of the North, for Flood Control and Related Purposes.

The attached Environmental Impact Statement is referred to your agency for review and possible comments. If you consider it satisfactory, please check the box labeled, "no comment." Otherwise, please check one of the other appropriate boxes. Your cooperation is asked in completing this memo and returning it to the State Intergovernmental Clearinghouse within 10 days from date of receipt. If no response is received within 15 days of date of notification it will be assumed you have no comment.

☐ No comment

☐ Meeting desired with applicant

☑ Comments submitted herewith

1. Specific comments which are to be attached to the review statement which will be submitted by the State Intergovernmental Clearinghouse: (Use reverse side or separate sheets if necessary)

2. Reasons why meeting is desired with applicant:

Reviewer's Signature: J Oliver Johnson Date: 7-12-73

Title: Chairman Pembina County Commi Tele: 9935671

RESOLUTION REFERRING TO FLOOD CONTROL AND RELATED IMPROVEMENTS IN THE PARK RIVER SUBBASIN, NORTH DAKOTA

WHEREAS, the Pembina County Board of Commissioners in response to your invitation to a meeting to be held in Grafton on July 13, 1973, does wish to express certain views in regard to the proposed improvement of the Park River Subbasin, and

WHEREAS, we realize that a tremendous flood potential exists in such watershed area, and

WHEREAS, it is of great individual and community value to save the soil from washing away and to save all types of property, and,

WHEREAS, the Board is of the opinion that part of the flood water can be controlled by building small dams in the upper watershed area and by channel improvements in the flood plain to deep the flood water within channel banks, and,

WHEREAS, we, in Pembina County, are particularly interested in channel improvement and construction of dams in Cart Creek and the North Branch of the Park River Watersheds,

NOW, THEREFORE, The Board of County Commissioners of Pembina County, North Dakota, do urge and recommend that the U.S. Army Corps of Engineers do proceed with further study and ultimate construction and improvement of the Park River Subbasin, North Dakota, so that control of flood waters can be made, wildlife habitat can be improved, recreational facilities can be made available and rural water supply can be assured for domestic and industrial water supplies.

Above resolution proposed by Mr. Thexton, seconded by Mr. Hart and carried by unanimous vote of the Board.

Dated this 3rd day of July, 1973 at Cavalier, North Dakota.

J. Oliver Johnson

J. Oliver Johnson, Chairman
Board of County Commissioners
Pembina County, North Dakota

Attest:

Wm. J. Starlauyson

Wm. J. Starlauyson
Pembina County Auditor

NORTH DAKOTA FOREST SERVICE

701-228-2277

DEPUTY STATE FORESTER EXTENSION 35
STAFF AND FIELD SERVICES FORESTER EXTENSION 51
STAFF AND NURSERIES FORESTER EXTENSION 34

BOTTINEAU, NORTH DAKOTA 58318

July 27, 1973

Colonel Rodney E. Cox, Dist. Engineer
St. Paul Office, Corps of Engineers
1210 U.S. Post Office & Customs House
St. Paul, MN 55101

Dear Colonel Cox:

The State Forester appreciates having the opportunity to review and comment on the report draft and preliminary draft environmental statement on proposed structures at Grafton, North Dakota.

We have reviewed the drafts and concur with your recommendations.

Sincerely,

Walt Pasicznyk
Deputy State Forester

WP/njf

CC: Dr. Robert Johnson
State Forester

APPENDIX B

LETTERS RECEIVED AS A RESULT OF COORDINATION OF THE REVISED DRAFT ENVIRONMENTAL STATEMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER COLORADO 80203

FEB 6 1975

Colonel Max W. Noah
Corps of Engineers
St. Paul District
1210 U.S. Post Office and Customs House
St. Paul, Minnesota 55101

Dear Colonel Noah:

Thank you for the opportunity to review and to comment on the Revised Draft Environmental Impact Statement for Flood Control at Grafton, North Dakota. EPA recognizes the concern and the real losses the residents of Grafton have experienced from flooding by the Park River. Like most land and water resource management problems, no simple solution exists for the protection from floods of a town like Grafton which has grown up in a flood-plain area. EPA would, however, stress the need for those advocating a flood protection project to fully consider all the impacts of the proposal, with environmental quality given full evaluation.

The following comments are offered on the Draft EIS in the above context:

(1) EPA supports flood-plain uses that recognize and are compatible with environmental protection. Such uses would include location of sewage treatment facilities in non-flood prone areas, protection of the flood-plain as an aquifer recharge and a runoff control area, protection of the aesthetic and unique biological resource values of the flood plains, etc.. For these, and many other environmentally based reasons, adequate regulation of flood-plain uses is most important.

The Draft EIS notes that no flood-plain regulations are in effect in the Grafton area nor in the whole Park River basin (page 46). The Draft EIS also points out that adequate flood plain regulations could be a very feasible alternative to the proposed levee project and that, unlike the proposed project, they would eliminate the environmental impacts associated with the loss of riparian woodlands, with the levee itself, with the loss of agricultural land, and with the probable loss of the river and riparian lands as a possible environmental corridor.

Though acceptability by local citizens is obviously a most important aspect of any project, Federal agencies must take a comprehensive approach. For this reason, and because the building of the proposed levee project could set further precedent against the enactment of flood-plain regulations in the Park River basin, EPA believes that the Corps of Engineers should further evaluate the flood-plain regulation alternatives

to the levee proposal. This evaluation should expand the analysis of the flood-plain regulation alternative to place it in the larger context of the basin and probably the State. In the long run, regulations could very well be the most economical and least environmentally damaging of any flood protection program or system;

(2) The proposed levee project could nullify any future attempt to regulate and manage the river area through Grafton as an environmental corridor. The Draft EIS states that the proposed project is not expected to induce future development in Grafton (page 44). The problem is, however, with the levee in place the development that does take place could very well be at the expense of the proposed corrodor. (This proposal was made by planning consultants in, 1972 Plan and Implementation Program, Walsh County, N.D., but has not been accepted by the town government). This potential problem needs full analysis;

(3) The Draft EIS mentions the possible existence of "oxbows" in the present flood-plain area. Since oxbows are quite commonly valuable wetland type areas, the location and importance of these oxbows needs elaboration;

(4) The Draft EIS correctly identifies the "uniqueness" of the riparian wood-land vegetation and associated wildlife along the Park River. The replacement of this vegetation with other species, as discussed (page 47), is not a straight trade of a certain amount of "ecosystem" for another like amount. The uniqueness of the present ecosystem is based on its riparian and wood-land nature -- any replacement would not have this same "unique" quality.

In summary, EPA encourages the development of environmentally sound flood-plain regulations. The precedent setting possibility of the proposed levee project needs to be analyzed in this context. At the same time, future development in a possible environmental corridor based on the riparian area through Grafton, needs full analysis. Based on the EPA rating system for Environmental Impact Statements, found in, Review of Federal Actions Impacting the Environment, this project is assigned an ER-2 (Environmental Reservation - Insufficient Information). The reasons for the ER-2 rating are those listed.

Sincerely yours,

John A. Green
Regional Administrator

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

February 25, 1975

Lt. General William C. Gribble, Jr.
Chief of Engineers
Office of the Chief of Engineers
Department of the Army

Dear General Gribble:

This is in response to your letter of November 5, 1974, transmitting for our review and comments your proposed feasibility report with pertinent papers and the revised draft environmental statement for a flood control project for Grafton, North Dakota, and vicinity.

Comments on the report and draft environmental statement are enclosed. We appreciate the opportunity to review and comment on this report and statement.

Sincerely,

Paul A. Vander Myde

PAUL A. VANDER MYDE
Deputy Assistant Secretary

Enclosure

U. S. DEPARTMENT OF AGRICULTURE

Comments on Interim Survey Report and
Revised Draft Environmental Statement

Local Protection Project - Park River at Grafton, North Dakota

1. The forests are a scarce and important resource in the project area. For this reason, we suggest that the report and environmental statement specify the acreages of woodland in the project area that are expected to be converted to urban use. Also, the environmental statement and the interim survey report indicate that 360 acres of agricultural land will be required for the project and that 1,950 acres of undeveloped land, now mostly in agricultural use, will be urbanized as a result of the project. We suggest that the value of the agricultural production foregone, as a result of removing this land from production, be discussed under Irreversible and Irretrievable Commitments of Resources on page 75 of the environmental statement.

2. The plan and environmental statement indicate that 130 acres of agricultural land are needed for spoil placement and indicate a temporary reduction in productivity will take place. Spoil banks are also mentioned on pages 5 and 45 of the environmental statement. A discussion of the location, method, and type(s) of material involved in spoil disposal would assist the reader in understanding the associated impact.

3. The discussion of the alternative of upstream reservoir storage, on page 70 of the environmental statement indicates that flood damages at Grafton would be reduced by about 50 percent. The next sentence seems to negate the importance of this reduction by stating that damages due to large floods would not be significantly reduced. You may wish to consider either omitting the latter sentence or quantifying the statement to eliminate the apparent discrepancy.

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

January 9, 1975

W. C. Gribble, Jr.
Lt. General, USA
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Gribble:

Thank you for giving us the opportunity to review your Revised Draft Environmental Statement (EIS) for Flood Control at Grafton, North Dakota (Park River), dated December 1973, and the Interim Survey Report for Flood Control and Related Purposes, Park River Subbasin, North Dakota, dated September 1973.

We have reviewed these documents in accordance with the National Environmental Policy Act of 1969. It appears that the impacts of the proposed action and the reasonable alternatives have been adequately addressed.

Sincerely,

/ Rulon R. Garfield
Regional Director

cc: Office of Environmental Affairs
Attention: Phyllis Hayes (w/control slip)

Council on Environmental Quality
Attention: Warren Muir (two copies)

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: 426-2262

5 FEB 1975

Lieutenant General W. C. Gribble, Jr.
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Gribble:

This is in response to your letter of 5 November 1974 addressed to Secretary Brinegar concerning a draft environmental statement on the Park River Subbasin Flood Control Project, Grafton, Walsh County, North Dakota.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. We have no comments to offer nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

W. E. Caldwell

W. E. CALDWELL
Captain, U.S. Coast Guard
Deputy Chief, Office of [illegible]
Environment and Safety
By direction of the Commandant

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To:
PEP ER-74/1388

February 24, 1975

Dear General Gribble:

Thank you for your letter of November 5, 1974, requesting the Department of the Interior's comments on the revised draft environmental impact statement and interim survey report for Flood Control at Grafton, Walsh County, North Dakota. We offer the following comments on both documents.

Interim Survey Report

A discrepancy in proposed levee heights appears between the environmental statement and the interim survey report (ISR). The former document indicates that the levee would have an average height of 8.2 feet and a maximum height of 13.5 feet (Table 1, p. 3). However, the survey report indicates that the levee would reach heights of 20 to 30 feet near riverbanks (p. A-2, no. 6).

The hazard of slumping in cuts in the lacustrine sediments that underlie most of the proposed alignment of the bypass channel has been recognized. For example, it is stated that "the clay unit is notorious throughout the Red River valley for its poor foundation qualities and poor stability in excavations" (ISR, p. A-2, paragraph 1). Elsewhere the clay unit in the project area has been described as soft, wet plastic clay, which is generally overlain by 15-20 feet of drier silt and clay that is fairly stable in excavations, although it is easily eroded. It has been noted that cuts up to 30 feet deep would be required along a part of the bypass channel (ISR, p. A-2). Because of the high probability that unstable clay subject to slumping would be encountered near the bottom of a considerable portion of the bypass channel, it would be advisable to describe more fully what measures are proposed for stabilization of the bypass channel and for prevention of excessive turbidity downstream as a result of slumping or erosion. In addition, the foundation conditions beneath the proposed new bridges across the bypass channel should be described and evaluated in relation to proposed engineering designs, in view of the poor natural foundation conditions at most probable bridge site.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

We are pleased that your plan for flood control at Grafton, North Dakota, provides the structural alternative that is least damaging to the wildlife resources in the Park River Basin. We also are pleased that the plan provides for: (a) strongly encouraging the development of flood plain zoning ordinances and regulations for the flood prone areas thorughout the basin; (b) plantings of 10 acres of native shrubs and trees and 215 acres of native prairie grass species; and (c) channel and levee maintenance accomplished in a manner to provide benefits to wildlife as recommended by the Fish and Wildlife Service, consistent with operating constraints. The seeding mixture recommended has not been included in the plan; however, post authorization consultation will hopefully result in the adoption of a satisfactory mixture.

The wildlife habitat losses caused by the project will not be adequately compensated, however, unless your plan also provides for the preservation through acquisition of all timber and woody cover along the Park River and oxbows downstream from the ring levee to the confluence of the proposed flood diversion channel. In contrast to the opinion of the reporting officers and the Board of Engineers for Rivers and Harbors, we believe that the project will cause significant indirect wildlife habitat loss and that the acreages of native grass, shrub and tree species which would be planted on project lands will not adequately compensate for the loss of naturally occurring habitat.

Therefore, we recommend that your report be modified to include acquisition as a part of the project of all timber, woody cover, and oxbows along the Park River from the ring levee in the NW 1/4, Sec. 18, T. 157 N., R. 52 W., east to the confluence of the proposed flood diversion channel in the NE 1/4, Sec. 8, T. 157 N., R. 52 W., a distance of 3.7 river miles, involving approximately 70 acres of flood plain. The area should be acquired with the following intent and purposes: (1) to restrict residential or industrial development in the "green belt" areas, and (2) to preserve and protect the environmental integrity of the wooded habitat.

Existing timber, woody cover and oxbows along the 4.3 miles of river channel within the leveed area should likewise be preserved. Preservation of affected habitat along the eight river miles may be either by fee title acquisition,

restrictive easement, or a combination of both. Easement acquisition may be less costly and more acceptable to landowners, particularly in the developed area. Some uses could be allowed within the environmental corridor, so long as they are compatible with the basic preservation objectives. Details of permitted uses would be established during post authorization studies.

The plan of operation indicates that there may be occasions when the upstream control structure will be closed and the downstream control structure will be open resulting in a dewatering of the river between the two structures. Such a situation would destroy the aquatic values in this stretch of the river. We find this to be an unacceptable situation. Therefore, we further recommend that your proposed report be modified to provide a minimum flow (to be negotiated) down the river when the upstream control structure is closed and the downstream control structure is open.

Grafton needs flood protection which can be provided by a levee; however, the acreage to be included within the proposed works seems excessive in view of the population projections and the national trends toward nonstructural flood control measures and control of urban sprawl. The population of Grafton is nearly stable and is expected to grow only 83 percent over the next 55 years to 10,900 according to the EIS. Extending protection to 1,950 acres of undeveloped land while only 27.7 percent of the area within the proposed levee (750 acres) is presently developed seems questionable. In 2030, even with three times as much land devoted to residential use (for a population projected to be slightly less than twice the present size), 480 acres are expected to remain undeveloped within the levees.' A levee enclosing a much smaller acreage would seem adequate for providing needed flood protection, would be less costly, and would have significantly less environmental impact.

No mention of mineral resources is made in either report except for availability of construction materials (Appendix A-4-interim survey report) some 30 miles from Grafton.

The hydrologic data on which the report and statement are based are adequate. However, the only discussion of the impacts of increasing flood levels from 0.6 foot to 1.3 feet over present conditions at the diversion structure is incomplete and should be expanded.

Revised Draft Environmental Statement

The statement has been improved as a result of responding to comments received on the first draft statement. However, discussions of secondary or indirect impacts are scattered through the report lacking consolidation. Specific examples are delineated by sections.

Environmental Setting Without the Project

The first paragraph, Page 19, discusses "several additional small multipurpose reservoirs" planned for the near future. There is no mention of what flood control benefits will be attributed to these new reservoirs. There are P.L. 566 and other reservoirs in place, extensive snagging and clearing operations have already been accomplished, and upstream channelization has been accomplished by Federal and local interests. The relationships of all these projects, including proposed P.L. 566 projects, to flooding at Grafton are not clearly defined, nor even discussed in the Section Land Use Impacts, pages 45 and 46.

The aquatic biota section (page 19) states that none of the aquatic biota are known to be rare, endangered, or locally uncommon. Presently, the State of North Dakota has not established an endangered fish species list, though the State does recognize those species listed by Miller[1/] as being rare, endangered, depleted, or as status undetermined. The species considered as rare includes the trout-perch, which has been identified on page 17, Table 4, as occurring in the Park River.

Trout-perch spawn in May or June. They feed largely on small insects and crustacea, and usually select sand bars for spawning. We do not presently know what effects, if any, the project may have on this species.

On page 20 under the heading of Grassland, there is a brief discussion of wetlands in the basin. Notably omitted is any reference to relationships of wetlands, drained and undrained, to downstream flooding. The wetlands preservation program of the Fish and Wildlife Service and the presence of both fee title and easement Waterfowl Production Areas in the basin have also been omitted.

1/ Miller, Robert Rush, "Threatened Freshwater Fish of the U.S.," Transactions of the American Fisheries Society, 1972, Volume 101, page 249.

The Revised Draft Environmental Statement establishes on pages 25-29 that the country where this undertaking is contemplated is potentially rich in prehistoric and proto-historic resources. We have noted that it is believed that such sites are largely, if not entirely, in private ownership. Since the lands included in the proposed project area have not been surveyed according to the draft statement, such a judgement is an assumption only until confirmed by appropriate professional surveys. Such surveys should be initiated before the start of any construction.

The statement should clearly confirm consultation with the present State Historic Preservation Officer for North Dakota. He is Mr. James E. Sperry, Superintendent, State Historical Society of North Dakota, Liberty Memorial Building, Bismarck, North Dakota 58501. The final environmental statement should reflect that he was consulted to determine whether the proposal will affect any cultural site which may be in the process of nomination to the National Register of Historic Places and contain a copy of his response. Much time has passed since Mr. Gary Leppert's letter of comment of July 19, 1973.

The statement should further reflect procedures to be followed should previously unknown archeological resources be encountered during project development. We would suggest that your final statement state that all construction activity be halted in that eventuality and professional guidance sought.

On pages 35 and 36, it is indicated that there are 180 acres of land within the project area classified as not suited for development. There is no explanation of the criteria upon which this classification is based. We doubt if there are any physical limitations to 100 percent development, except for the river channel. Virtually the entire protected area, in the absence of zoning restrictions or other administrative constraints, is subject to development as a result of this project.

Environmental Impacts of the Proposed Project

We were not able to determine from the statement how much material will be required to construct the levee or where this material will be obtained. If material is needed from a source other than the excavated bypass channel, a discussion of this impact would be in order.

It has been noted that some structures are situated outside of the levee, but within the flood plain of Park River (p. 45). As estimate of adverse impacts of the project on such structures, as a result of higher flood levels outside the protected area, has not been found in the draft statement. Although it has been stated that "some persons outside the levee seem to fear a backwater effect" (p. 45, paragraph 1), we have found no quantitative estimate of the magnitude of such effects as a result of the project.

The impact of decreased biological productivity on 330 acres of riparian vegetation, plus river oxbows, is recognized in the report. The impact of the project upon future development of these areas is recognized on page 45, paragraph 3, and page 73, paragraph 3. Contradictory statements appear on page 44, paragraph 4, and page 75, paragraph 1. These latter "no increased development" conclusions are unsupported and contrary to past experiences. We believe that reduction of flood flows will increase the rate of conversion and, therefore, is a project impact. The reports are replete with words about the high value, scarcity and endangered status of such habitats in North Dakota, and yet the plan provides no protection for these areas.

The last paragraph on page 46 mentions that adverse construction impacts to aquatic biological systems could be decreased by timing construction during the late summer low flow period and by using appropriate silt detention devices. These two measures should be employed. We therefore recommend changing the word could to will.

Page 53 of the Revised Draft Environmental Statement establishes that the National Register of Historic Places was consulted, however, more clarification is needed. Since all properties on the National Register of Historic Places are published in the Federal Register, the statement should reflect consultation with the issue for February 19, 1974, and all subsequent monthly supplements. The supplementary listings of sites added to the National Register, subsequent to publication of the previous supplement, are cited in the Federal Register appearing on the first Tuesday of each month. The statement should also establish whether the proposed project will have an effect upon a National Register listing. Where this is found to be the case, the statement should reflect compliance with Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665), Executive Order 11593, and the procedures of 36 CFR 800.

Alternatives

Paragraph 2, page 74, states that item (1), retention of water where it falls, may not be appropriate for the situation at Grafton. We feel that it is appropriate. Land use in the upper part of the basin--particualarly drainage, stream channelization, and clearing--has effectively speeded the removal of water from the land where it fell, to proceed post haste to Grafton. We are not suggesting this is a complete solution, but it certainly is a partial solution and should be further discussed.

The selection of the proposed alternative is considered to be the structural alternative that is least damaging to wildlife. We feel this will be a sound consideration once the proposal contains the recommended habitat preservation.

Coordination

The lack of mineral information is noted in the response to comments in the revised environmental statement (pages 84-85). We agree that minimal amounts of mineral materials will be commited to the project and that there should be little or no adverse impact on mineral resources from the project in the vicinity of Grafton. However, a statement of such noninvolvement of mineral resources should be included in both the survey report and the environmental statement. The final environmental statement should be revised so that the reader does not have to rely on gleaning this information from the response part of the statement.

We hope these comments will be of assistance to you in preparing your final documents.

Sincerely yours,

Stanley D. Doremus

Deputy Assistant Secretary of the Interior

W.C. Gribble, Jr.
Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, D.C. 20314

North Dakota Highway Department

CAPITOL GROUNDS,
BISMARCK, NORTH DAKOTA 58501

R. E. BRADLEY
Chief Engineer

[redacted]
Governor of North Dakota
ARTHUR A. LINK

WALTER R. HJELLE
Commissioner
LS

January 28, 1974

Col. Rodney Cox
District Engineer
St. Paul District, Corp of Engineers
1210 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Re: Revised Draft EIS
Flood Control at Grafton, N.D.

Dear Col. Cox:

Statements in the "Revised Draft Environmental Impact Statement Flood Control at Grafton, Park River, North Dakota, Red River of the North Basin" indicate the State Highway Department would be responsible for the costs of highway bridges needed to span the proposed flood bypass channel arround the City of Grafton.

At the present time we do not have sufficient funds to accomplish all the needed maintenance and improvements on the State Highway System. The estimated costs of highway bridges is approximately one-half million dollars. To commit this amount of highway funds to this project would certainly have adverse effects on highway programs in the State. This is recognized on Page 44 of the revised draft.

The adverse effect of this impact on the highway user and system can be mitigated by including the cost of the U.S. 81 bridge in the direct Federal costs for the proposed project. We do not believe the highway user should be expected to bear the costs of improvements which will not provide any benefits to the highway user.

Your consideration of these comments will be appreciated.

Very truly yours,

R.E. Bradley
Chief Engineer

REB:CAG:fas

North Dakota
Highway Department
CAPITOL GROUNDS,
BISMARCK, NORTH DAKOTA 58501

R. E. BRADLEY
Chief Engineer

ARTHUR A. LINK
Governor of North Dakota

WALTER R. HJELLE
Commissioner

PS

December 9, 1974

Colonel Max W. Noah
District Engineer
St. Paul District, Corp of Engineers
1210 U.S. Post Office and Custom House
St. Paul MN 55101

Dear Colonel Noah:

Your letter of November 27, 1974 transmitted the revised Draft Environmental Impact Statement for Flood Control at Grafton, North Dakota Park River dated December, 1973. This is the third Draft EIS received on this project.

Comments were submitted on the previous two Draft Environmental Impact Statements. Comments are contained in our letters of July 26, 1973, and January 28, 1974.

The prior concern which was expressed in these two letters is the requirement that local interests be responsible for costs of highway bridges needed to span the proposed flood bypass channel. In the case of State Highways the burden of providing the funding falls on the State Highway Department. Since railroad relocations are considered a Federal cost, highway adjustments should also be considered as a Federal cost.

Our letter of July 26, 1973 has been included in the present edition of the Draft EIS. However, our concerns about funding have not been addressed in the response to comments.

Our letter of January 28, 1974 does not appear in this Draft EIS. Since we do not know the procedures which you use to develop Environmental Impact Statements we would appreciate knowing what disposition has been made of our January 28, 1974 letter.

The estimated costs of bridges is now $586,000. This will have an adverse effect on the highway improvements that can be undertaken in other areas of the State. This adverse effect can be mitigated by making highway bridge replacement costs a part of the Federal cost of this project.

It is requested this be considered in the development of the Final Environmental Impact Statement for this project.

Very truly yours,

R.E. Bradley
Chief Engineer

January 31, 1974

Col. Rodney E. Cox, District Engineer
St. Paul District
Corps of Engineers
1210 U.S. Post Office & Custom House
St. Paul, MN 55101

Dear Colonel Cox:

We appreciate the opportunity to comment on the Draft Environmental Impact Statement for flood control and related purposes on the south branch and main stem Park River basin at Grafton, North Dakota.

The Corps of Engineers responses to our earlier comments have been noted, and we would only add that we would appreciate receiving a copy of the detailed recreational plan associated with the project as indicated would take place during the post authorization phase of the study.

Sincerely yours,

Gary Leppart
Coordinator

brs

NORTH DAKOTA STATE WATER COMMISSION

300 east boulevard
701-224-2750
bismarck 58505
north dakota

January 31, 1975

Lt. General William C. Gribble, Jr.
Chief of Engineers
Department of the Army
Washington, D. C. 20315

RE: SWC Project #982

Dear Lt. General Gribble:

The following comments are offered on the Interim Survey Report for the Park River Subbasin in North Dakota which was provided this office.

The State Water Commission had initially endorsed a plan which would provide for upstream storage in the Park River and such works in the area of Grafton required for flood damage reduction. Our purpose in supporting upstream storage is that it would provide the area with the greatest beneficial use of the water resources.

Local hearings held by your regional office to assess public reaction to alternative proposals were somewhat inconclusive if judged by the number of persons who expressed opposition to the single purpose approach.

As recently as January 14, 1975, a citizens group known as the Park River Basin Management Association wrote you concerning its desire to include upstream storage as a part of the solution to the basin flooding problems. This seems to indicate there is no real agreement among the floodplain residents concerning flood control methods.

In the advance studies, the alternative of providing upstream storage in addition to such works around Grafton needed for flood protection, should be investigated further, versus obtaining water supply from the Red River or off stream storage through artificial reservoir works.

Although the State Water Commission favors a multiple use concept whenever possible, we would be willing to support the single purpose alternative, if the choice represents a consensus among the residents of the flood plain.

ALVIN A. KRAMER
Minot

GORDON GRAY
Valley City

MYRON JUST, EX OFFICIO MEMBER
Commissioner of Agriculture

VERNON FAHY, SECRETARY
Chief Engineer & State Engineer

Regarding the environmental impact statement, it is our opinion that it is a very complete and thorough document.

Sincerely yours,

Vern Fahy

Vern Fahy
Engineer-Secretary

VF:DDS:dm

cc: Senator Quentin Burdick
Colonel Max Noah
Mayor Robert Dahl, Grafton
Bill Depuy, Attorney, Grafton

RECEIVED
MAR 7 1974
State Planning Division

Board of County Commissioners
County of Walsh
Grafton, North Dakota 58237

March 6, 1974

State Intergovernmental Clearing House
State Planning Division
State Capitol Building
Bismarck, North Dakota 58501

Re: Revised Draft EIS - Flood Control at Grafton

Dear Sir:

The Walsh County Commission has recently received the above referred to draft on Environmental Impact Statement. This draft has been reviewed by the members of the County Commission.

We would like to take this means of pointing out to you that the plan would rather obviously affect county roads and bridges down stream from the City of Grafton. The Commission anticipates that there would be considerable additional expenditure of money in order to lengthen and raise bridges and protect county roads from water damage.

It is the opinion of the Commissioners that the above referred to Statement does not adequately consider the impact upon the county. Therefore, the Walsh County Commission does hereby enter its objection to the plan.

Please accept this letter as being our response which would normally be returned on NDSIC Form B.

Thanking you for your attention to our review of this plan, we remain,

Yours very truly,

BOARD OF WALSH COUNTY COMMISSIONERS

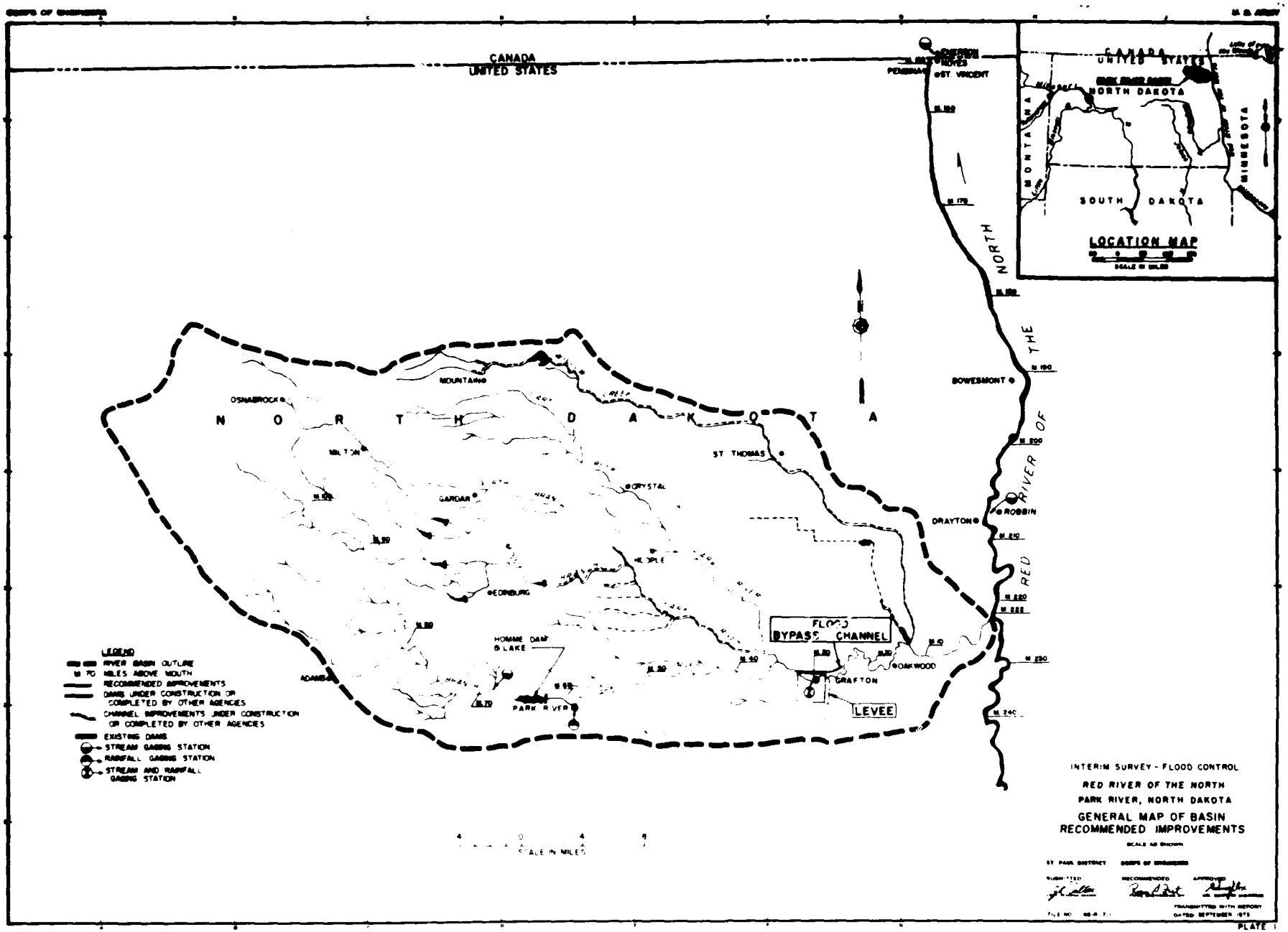
Glen Welter

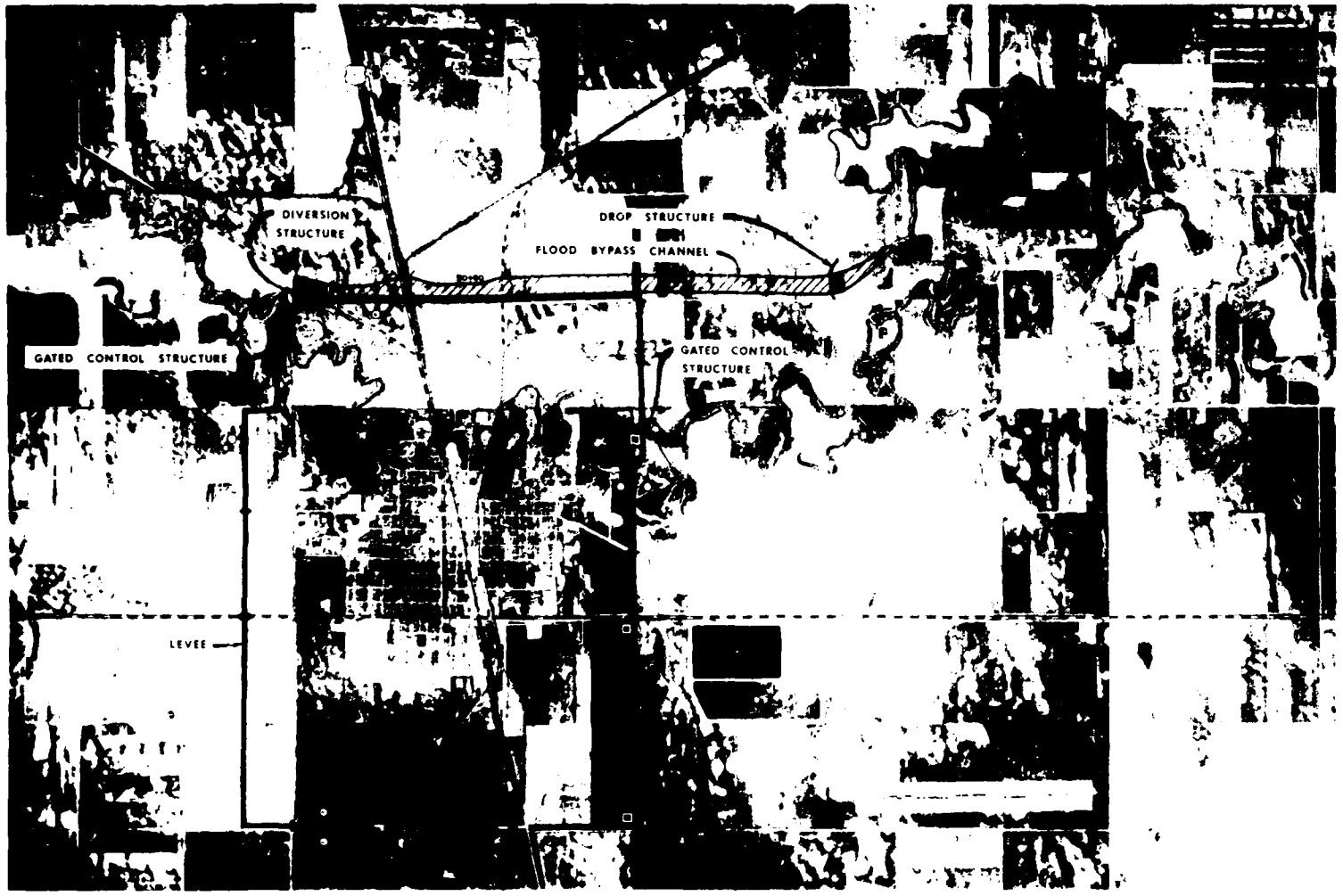
Glen Welter, Chairman

ldc

-7-74
Forwarded copy this date to Col. Cop with note attached indicating reference. B.

Copy available to DTIC does not permit fully legible reproduction


CANADA
UNITED STATES
ST. VINCENT
NORTH DAKOTA
MONTANA
MINNESOTA
SOUTH DAKOTA
LOCATION MAP
NORTH DAKOTA
RED RIVER OF THE NORTH
OSNABROCK
MOUNTAIN
MILTON
GARDAR
CRYSTAL
HILLSBORO
CEDARBURG
ST THOMAS
BOWESMONT
DRAYTON
ROBBIN
OAKWOOD
GRAFTON
PARK RIVER
HOMME DAM & LAKE
ADAMS
FLOOD BYPASS CHANNEL
LEVEE
LEGEND
RIVER BASIN OUTLINE
M 70 MILES ABOVE MOUTH
RECOMMENDED IMPROVEMENTS
DAMS UNDER CONSTRUCTION OR COMPLETED BY OTHER AGENCIES
CHANNEL IMPROVEMENTS UNDER CONSTRUCTION OR COMPLETED BY OTHER AGENCIES
EXISTING DAMS
STREAM GAGING STATION
RAINFALL GAGING STATION
STREAM AND RAINFALL GAGING STATION
SCALE IN MILES
INTERIM SURVEY - FLOOD CONTROL
RED RIVER OF THE NORTH
PARK RIVER, NORTH DAKOTA
GENERAL MAP OF BASIN
RECOMMENDED IMPROVEMENTS
PLATE 1


DIVERSION STRUCTURE
DROP STRUCTURE
FLOOD BYPASS CHANNEL
GATED CONTROL STRUCTURE
GATED CONTROL STRUCTURE
LEVEE