

STATEMENT OF FINDINGS

SUN RIVER GREAT FALLS, MONTANA LOCAL FLOOD PROTECTION PROJECT

PURPOSE AND AUTHORITY

The project was authorized by the Flood Control Act of 1958 (Public Law 85-500) as modified by Public Law 89-298 in October 1965. House Document 343, 85th Congress, 2nd Session, 1958, contains a description of the authorized plan and is the project document. Other modifications to the project were made under Section 2 of the Flood Control Act of 1941.

Since creation of the West Great Falls Flood District in August 1967, a series of court actions have prevented implementation of the project. The final order of confirmation of the West Great Falls Flood Control and Drainage District was entered on 17 August 1970. This order was appealed to the State Supreme Court. The primary point of the appeal was on the method of assessment. The Court ruled in December 1971. Legislation was then passed by the Montana Legislative Assembly which changed the method of assessment. In the case of Great Falls, a new election was required before the Drainage District could make use of the new statutes. An election was held in the latter part of 1974. It failed. Following the flood of 1975, local interests petitioned the Court to (1) hold a new election and (2) exclude from the District the right bank area where the flood threat is less severe and where the majority of the project opposition rests. The election was held on 26 October 1976 and passed 3 to 1 in favor of proceeding with construction of the left-bank levee on the Sun River. In January 1977, the Omaha District was notified about the election results.

Approximately 10 years had passed since an economic evaluation of the project had been done and 7 years since an environmental statement had been written. In order to update the information and comply with current evaluation criteria, I initiated an economic and environmental review. The economic reevaluation resulted in a project change. Uneconomic portions of the project were placed in an inactive status. The only part of the project with a benefit-to-cost ratio greater than 1.0 that had local support is the Sun River left-bank levee. A draft of a supplemental environmental statement was circulated 10 February 1978. The original environmental statement was circulated in 1971.

A public notice announcing a public hearing on 24 May 1978 was circulated to all interested parties on 24 April 1978. A copy of the notice was sent to 63 agencies, groups, organizations and individuals. Approximately 350 people attended the public hearing including two members of the Montana legislature. Thirty-seven people made comments at the public hearing and 122 written statements were submitted to become part of the official record.

Agencies involved in the formulation of the project include the following:

- U. S. Environmental Protection Agency
- U. S. Department of the Interior
- U. S. Department of Housing and Urban Development
- U. S. Department of Agriculture
- Montana Department of Fish and Game
- Montana Department of Natural Resources and Conservation
- Montana Environmental Quality Council
- Montana Department of State Lands
- City of Great Falls
- Cascade County, Montana
- Cascade County Soil Conservation District
- West Great Falls Flood Control and Drainage District
- Concerned Citizens of the Sun River

SOURCES OF INFORMATION

The most significant sources of information used in the study were:

Sun River and Tributaries, Montana. House Document 343, 85th Congress, 2nd Session, 1958 is the project document and contains a description of the authorized levee project.

Sun River, Great Falls, Montana, Flood Protection Project, Design Memorandum No. MGF-1. U. S. Army Engineer District, Omaha, July 1966, reaffirmed the plan of improvement recommended in the project document with three exceptions.

Sun River, Great Falls, Montana, Flood Protection Project, Supplement to Design Memorandum No. MGF-1. U. S. Army Engineer District, Omaha, March 1967, presented three revisions to Design Memorandum MGF-1, submitted July 1966.

Sun River, Great Falls, Montana, Supplement No. 2 to Design Memorandum No. MGF-1, Flood Protection Project. U. S. Army Engineer District, Omaha, April 1967, reviewed upstream reservoir storage feasibility. The completed studies indicated that construction of any of the potential reservoir projects

would not obviate the need for a local flood protection project at Great Falls.

Sun River, Great Falls, Montana, Supplement No. 3 to Design Memorandum No. MGF-1, Flood Protection Project. U. S. Army Engineer District, Omaha, March 1968, presented the results of additional foundation investigations that more adequately defined the foundation conditions. The proposals for the control of underseepage resulting from this supplemental exploration and reevaluation program did not vary appreciably from those recommended in Design Memorandum MGF-1.

Draft and Final Environmental Statements, Sun River, Great Falls, Montana, Great Falls Flood Protection Project. U. S. Army Engineer District, Omaha, was filed with C.E.Q. on 6 May 1971 and 12 August 1971, respectively.

Sun River, Great Falls, Montana, Supplement No. 4 to Design Memorandum No. MGF-1, Flood Protection Project. U. S. Army Engineer District, Omaha, April 1978, Economic Reevaluation. This project economic reevaluation concludes that certain portions of the authorized project should not be constructed at this time. The authorized levee project was separated into five units, each of which would operate independently to protect five distinct areas. Only two of the units, one that would protect the entire left bank of the Sun River, including Watson Coulee Drain, and the one protecting the entire left bank of the Missouri River are economically feasible. Due to lack of local support and significant adverse environmental impact, the levee unit that would protect the left bank of the Missouri River has been placed in an inactive status along with the economically infeasible units which would protect the right bank of the Sun River and the right bank of the Missouri River.

Sun River, Great Falls, Montana, Draft Supplemental Environmental Statement, Flood Protection Project. U. S. Army Engineer District, Omaha, January 1978 recommends construction of levees along the left bank of the Sun River and the conduit structure beneath 27th Street to drain Watson Coulee.

EVALUATION AND TRADEOFF ANALYSIS

Due to the large Sun River drainage basin and the intensity of rainstorms and their duration, a high level of flood protection is required for the West Great Falls area. The most recent floods in West Great Falls occurred in 1975, 1964 and 1953. Respectively, these flood discharges were measured at 31,000 c.f.s.; 53,500 c.f.s. and 17,900 c.f.s. Measured at 1978 price levels, this area suffered approximately 11 million dollars

damage during the 1975 flood and approximately 12 million dollars damage during the 1964 flood.

Much of the project area land use is transitional between urban and agricultural uses. The characteristic land use pattern in the project area is a single-family house on a large lot. In the western portion of the project area, some parcels serve as pasture and cropland.

I have considered several alternatives. The first, a flood control reservoir alternative, was not selected because it was not economically justifiable and still would require levees to contain uncontrolled flows through West Great Falls. The second, a channelization alternative, was not selected due to high right-of-way and maintenance costs and adverse environmental effects.

I considered nonstructural alternatives such as floodproofing or relocating existing structures, strict enforcement of flood plain regulations, and an evacuation plan. Annualized costs of floodproofing or relocating existing structures are much greater than equivalent average annual benefits because there are 474 structures currently occupying the flood plain. The strict enforcement of flood plain regulations or an evacuation plan allow a threat of \$1,199,000 in average annual damages to remain. Consequently, I discarded these alternatives as a solution.

The only levee unit remaining in the active category is the left bank Sun River Levee. This consists of the levee, drainage structures, riprap bank protection, a channel modification; the Watson Coulee drainage conduits, interceptor ditch and levee; and project beautification. This is the proposed action. It would withstand a Standard Project Flood discharge design of 65,000 c.f.s. with 3 feet of freeboard and essentially eliminates flood damages in West Great Falls on the left bank of the Sun River. At current price levels and discount rate, the proposed action has a benefit-to-cost ratio of 1.9.

The proposed action would eliminate the entire \$1,199,000 in average annual damages on the left bank of the Sun River flood plain. This plan will protect approximately 469 family structures, 3 businesses, 1 church, and 1 grade school located within the 500-year flood plain. The plan would require displacement of eight families who live along the potential levee alignment. Approximately 221 acres of land will be permanently committed to the project. Twenty-eight acres of cropland and 125 acres of

pastureland will be taken out of production. Approximately 87 acres of land will be required for borrow. This land will be graded and revegetated for future land use except in the area of Wadsworth Park where deep borrow is proposed.

As designed, the project induces flood damages on the right bank of the Sun River upstream from Interstate 15 and on both banks upstream from the levees during major flood events. The levee may reduce the esthetic value of the river. No wetlands are on or near the project site. Any area disturbed by construction activity will be revegetated with native grasses.

Residents of the Country Club Subdivision on the right bank of the Sun River oppose the project. They also fear induced flooding from the Sun River. However, no induced flooding would occur in that area.

Persons who live upstream of the project area oppose the project. They fear the effects of induced flood elevations that would occur with the levee's construction. A 100-year flood would induce approximately \$40,000 in additional damages and a 500-year flood would induce approximately \$20,000 in additional damages. Due to the infrequent occurrence of such storms, average annual damages increase approximately \$2,000.

Other homeowners who live between Sixth Street and the Missouri River on the left bank of the Sun River also oppose the project. They feel they would be taxed for an equal share of the project cost without benefiting equally from the flood protection provided by the levee. The project has been modified accordingly.

Before construction can begin, the local sponsor may have to obtain permission to build from the State of Montana. The City of Great Falls requires a Conditional Use Permit under provisions of the city's flood plain regulations. Under the State of Montana's regulations, any obstruction in the flood plain that raises the elevation of the 100-year flood more than 0.5 feet at any point requires a zoning variance. This is available from the Montana Department of Natural Resources and Conservation for Cascade County.

CONCLUSIONS

I have reviewed and evaluated, in light of the overall public interest, the documents concerning the proposed action, as well as the stated views of other interested agencies and the

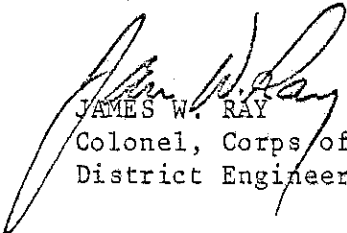
concerned public. The active portion of the Sun River Flood Protection Project, the Left Bank Sun River Levee, with the conduits draining Watson Coulee, is economically justified. I find there is no practicable alternative to this construction as defined by Executive Order 11988. The proposed action includes practical measures that minimize harm to the affected flood plain. Future development in the flood plain will not be induced by construction of this project. Therefore, construction of the active portion of the Sun River Flood Protection Project will be initiated as soon as possible.

RECOMMENDATIONS

Acting in the public interest, I recommend the active portion of the Sun River Flood Protection Project for flood control be constructed as authorized.


I also recommend that the City of Great Falls and Cascade County furnish assurances satisfactory to the Secretary of the Army that they will provide the items of local cooperation as presented in the Supplemental Final Environmental Statement.

Date: 14 Feb 79


JAMES W. RAY
Colonel, Corps of Engineers
District Engineer

I concur with the findings of the District Engineer.

Date: 8 Mar 79


C. A. SELLECK, JR.
Colonel, Corps of Engineers
Division Engineer

Date: _____

HUGH G. ROBINSON
Brigadier General, USA
Deputy Director of Civil Works

SUPPLEMENTAL
ENVIRONMENTAL STATEMENT
SUN RIVER
FLOOD PROTECTION PROJECT
GREAT FALLS, MONTANA

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A	Coordination Pursuant to Section 404 of the Federal Water Pollution Control Act Amend- ments of 1972
B	Coordination of the Draft Supplemental Environmental Statement
C	Section 404(b) Report

SUN RIVER
FLOOD PROTECTION PROJECT
GREAT FALLS, MONTANA

() Draft (Supplemental) (X) Final Environmental Statement
(Supplemental) Responsible Office: U.S. Army Engineer District, Omaha, Nebraska

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

2. Description of the Action. The active portion of the authorized project recommended for construction at this time consists of a levee, drainage structures, a channel modification on the left bank of the Sun River and riprap bank protection; a collector ditch, interceptor levee, and buried conduits that will carry runoff from Watson Coulee (an interior drainage area) into the Sun River; and project beautification. This project will provide flood protection for a large part of West Great Falls, Montana. The levee will be 31,800 feet long. The levee will average 15.5 feet in height adjacent to the Sun River and 6 feet in height adjacent to Sixth Street. Sixteen drainage structures will be constructed. A total of 1,237,000 cubic yards of fill material will be required. About 1,600 feet of channel immediately downstream from Interstate 15 will be moved westward as much as 300 feet to provide room for the levee on the western side of 14th Street. The Watson Coulee collector ditch will be approximately 3,200 feet long and the interceptor levee will be approximately 2,300 feet long. This small levee will require 5,300 cubic yards of fill which will be obtained from the collector ditch. There will be two 84-inch conduits which will carry runoff from Watson Coulee along 27th Street to the Sun River. Approximately 200 tons of riprap will be required around the Watson Coulee inlet and another 29,000 tons of rock will be required to riprap 6,250 linear feet of bankline along the Sun River. Flooded areas and depths will increase in some of the unprotected areas in West Great Falls. The City of Great Falls should continue to enforce flood plain regulations in these areas. Since regulations are not part of the Federal action, they are not addressed in the environmental statement. The project is shown on plate 1.

3. a. Environmental impacts. The levee will provide protection against the 500-year flood event for a large portion of West Great Falls, Montana. Based on present development, the levee will prevent \$1,199,000 in average annual damages and drainage from Watson Coulee will be improved. The levee will eliminate requirements for prohibitive zoning in portions of the flood plain except in designated ponding areas; these areas may

be rezoned for urban development. A 33-acre lake with an average depth of 12 feet will result from a deep borrow area in Wadsworth Park.

b. Adverse environmental effects. Approximately 211 acres of land will be committed to the project. A total of 33 acres of cropland and 125 acres of pastureland will be taken out of production. Approximately 27 acres of trees and shrubs and 26 acres of natural grasses will be eliminated; however, nursery grown trees will be planted in other areas and in the project right-of-way. Material for the levee will be obtained from an upstream 29-acre shallow excavation and a 33-acre deep borrow area in Wadsworth Park; material from excavation of the Watson Coulee collector ditch may also be used. Each drainage structure will have a ponding area behind the levee. Eight families will be displaced and the tax base will be slightly reduced. Induced flood stages will occur to unprotected areas on the right bank of the Sun River upstream from Interstate 15 and to agricultural areas upstream from the levee. Channel modifications immediately downstream from Interstate 15 will reduce the stream length by about 350 feet. Construction activities will cause a temporary increase in noise levels and temporary degradation of air and water quality. Trucks and other heavy equipment will cause temporary traffic congestion and an undetermined amount of roadway deterioration.

4. Alternatives. Alternatives considered in the original Design Memorandum and supplements thereto included levees, flood control reservoirs, channelization, and no action. During the economic reevaluation of this project, other solutions were considered. These included flood proofing of existing structures, strict enforcement of flood plain zoning regulations, removal of structures from the flood plain, and an emergency evacuation plan.

5. Comments Requested.

U.S. Environmental Protection Agency
U.S. Department of the Interior, Office of the Secretary
U.S. Department of Health Education and Welfare, Public
Health Service
U.S. Department of Transportation
U.S. Department of Housing and Urban Development
U.S. Department of Agriculture
Federal Energy Regulatory Commission
Missouri River Basin Commission
Old West Regional Commission
Montana, Office of the Governor
Montana Department of Fish and Game

Montana Department of Natural Resources and Conservation
Montana Environmental Quality Council
Montana State Department of Health and Environmental
Sciences
Montana Recreation and Parks Division
Montana Wildlife Federation
Montana Association of Conservation Districts
Montana Wildlife Society
City of Great Falls
Cascade County, Montana
Cascade County Soil Conservation District
West Great Falls Flood Control and Drainage District

6. Draft Statement to CEQ on 6 May 1971.

Final Statement to CEQ on 12 August 1971.

Supplemental Draft Statment to EPA on 10 February 1978.

Supplemental Final Statement to EPA on 4 May 1979.

I. PROJECT DESCRIPTION

AUTHORIZATION

1.01 The Great Falls Flood Control Project was authorized by the Flood Control Act of 1958 (Public Law 85-500). Following the flood of 1964, the City of Great Falls expressed an interest in sponsoring the project. Later, the project was modified by the Flood Control Act of 1965 (Public Law 89-298). Other modifications to an authorized project are allowed under conditions prescribed in Section 2 of the Flood Control Act of 1941. The authorization was made subject to the condition that no expenditures would be made until local interests gave assurances, to the satisfaction of the Secretary of the Army, that they would:

(a) Provide without cost to the United States all lands, easements, and rights-of-way necessary for construction of the project, including lands necessary for ponding of interior drainage;

(b) Hold and save the United States free from damages due to the construction works;

(c) Perform without cost to the United States, in conjunction with furnishing rights-of-way, all necessary removal or alteration of existing buildings and other improvements, and all necessary alterations to bridges and approaches, roads, streets, sewers, and other utilities;

(d) Contribute \$179,000 toward the cost of the Watson Coulee Interceptor;

(e) Zone the unleveed portion of the floodway through the damage area to preserve its capacity and to prevent further encroachments; and

(f) Maintain and operate all the works after completion.

PROJECT HISTORY

1.02 Congress appropriated funds for construction of the project in Fiscal Year 1967. The West Great Falls Flood Control and Drainage District was created in August 1967 to sponsor the project. Construction of the project was about to begin in July 1968 when the local sponsor encountered legal difficulties. The final order of confirmation of the District was appealed in the State Supreme Court. The primary point of the appeal was on the method of assessment in the District. Meanwhile, a Final Environmental Statement was filed with CEQ on 12 August 1971.

1.03 After the lengthy dispute in the courts and State legislature, the West Great Falls Flood Control and Drainage District abandoned all efforts to act as sponsor for the project in January 1975.

1.04 After the flood of 1975, there was renewed local interest in the levee project. The local sponsor petitioned the court to: (1) hold a new election and (2) exclude from the District the Country Club area where the flood threat is less severe and where the majority of the project opposition rested. The election was held on 26 October 1976 and passed 3 to 1 in favor of proceeding with construction of the left-bank levee on the Sun River. In January 1977, the Corps was notified of the new election and funds were transferred to the project; this enabled the Omaha District Corps of Engineers to work with the local interests in reviewing the design of the project.

1.05 Prior to final design it was determined that the project should be reevaluated. The reevaluation report concluded that only one of the five levee elements that were included in the authorized project should be constructed at this time. This is the left-bank Sun River levee. The other levee elements have been placed in an "inactive" status.

1.06 At the public meeting held on 24 May 1978, residents on the left bank of the Sun River downstream from Sixth Street expressed opposition to the proposed project. Later, the Corps of Engineers consulted the Montana Department of Fish and Game. As a result, a channel realignment was designed to follow the old channel more closely. The levee alignment also was changed at the request of the local sponsor to eliminate protection of the left-bank area downstream from Sixth Street. The project is shown on plate 1.

1.07 As a supplement to the original EIS, this document describes the conditions associated with construction of the left-bank Sun River levee. The remaining levee units have been placed in an inactive status. In the future, if a decision is made to return any of the remaining levee units to active status, another supplemental EIS to the original EIS will have to be written for each levee unit considered for construction.

LOCATION

1.08 The project will be located on the left bank of the Sun River in West Great Falls, Montana. The location is shown on plate 1.

LOCAL SPONSORS

1.09 The local sponsor for the left-bank Sun River levee is the West Great Falls Flood Control and Drainage District.

PROJECT DESCRIPTION

1.10 The Sun River Flood Control Project consists of all levee units displayed on plate 2. These levee units include the left-bank Sun River levee, the right-bank Sun River levee, the left-bank Missouri River levee which will protect the Country Club subdivision and the right-bank Missouri River levee protecting the Great Falls municipal water facilities. A Final Environmental Statement (EIS) for this entire project was filed with CEQ on 12 August 1971. The subsequent decision to use provisions of the Flood Control Act of 1941 to reduce the scale of the project requires this document.

1.11 The flood protection project recommended for construction at this time consists of the left-bank Sun River levee, drainage structures, riprap bank protection, and a channel modification; the Watson Coulee drainage conduits interceptor ditch and levee; and project beautification. The project is shown on plate 1.

1.12 The left-bank Sun River levee will be 31,800 feet in length. Adjacent to the Sun River, the levee will average 15.5 feet in height. It will average 6 feet in height where it follows Sixth Street and Crescent Drive. Approximately 1,237,000 cubic yards of fill material will be required for levee construction. Channel realignment will relocate a 1,600-foot section of the current Sun River channel immediately downstream from Interstate 15 westward about 300 feet; this will provide room for the levee west of Fourteenth Street. The levee will be set back from the existing channel a minimum distance of 50 feet, except in the channel modification area.

1.13 Sixteen (16) interior drainage structures will be installed. Fifteen will be through the levee at all required locations to provide adequate facilities for discharging interior stormwater drainage from the project area. Another drainage structure is part of the Watson Coulee drainage system (see plate 1.) The number of drainage structures may change slightly after further study. The structures are designed to convey the peak discharge of the 100-year design rainfall storm and less frequent storms emanating from each of the drainage areas intercepted by the levee. Each drainage structure is sized to convey the 100-year peak discharge through the levee without requiring supplemental ponding storage. A headwater elevation that would not cause any material damage in the vicinity of each structure location is used. All drainage structure outlets would be equipped with

automatic flap gates and manual slide gates to prevent Sun River floodwaters from entering the protected area by reverse flow through the structures. If a floodgate is closed when it rains in the project area, ponding would occur behind the levee. According to the historic sequence of flood events, the protected area would be drained before flood stages are experienced on the Sun River. The relationship between the hydrograph timing of the small drainage areas at the project location and the much larger Sun River basin upstream from Great Falls make a coincident occurrence of the 100-year flood peaks a very remote event in a probability range far exceeding the criteria for stormwater drainage protection.

1.14 Certain areas along the Sun River have severe erosion problems. Approximately 29,000 tons of riprap will be required to armor 6,250 linear feet of bankline to control erosion. The areas to be riprapped are shown on plate 1.

1.15 The location of the two borrow sites are shown on plate 1. Twenty-nine acres will be used for shallow borrow to a depth of 8 feet on the site near the levee's upstream tieoff. The site in Wadsworth Park which will be used for deep borrow is 33 acres in size and 24 feet deep. This second site will become a lake with a mean depth of 12 feet which can be used for recreational purposes.

1.16 The quality of the water within the lake is uncertain at this time. Ground water quality testing indicates that the area when the lake is to be excavated may be in an "alkali seep". Ground water in "alkali seeps" is typically very high in alkalinity, hardness, and total dissolved solids. Since ground water will be the principal source of water for the lake, the water in the lake is expected to measure high in these particular parameters. In spite of the probable alkaline conditions, the lake should be marginally suitable for either a cold-water or warm-water "put and take" fishery depending upon maximum water temperatures.

1.17 Runoff from the Watson Coulee will be routed by a collector ditch and interceptor levee; it will then drain into two 84-inch conduits which will pass the water through the project area to the Sun River. Approximately 28,500 cubic yards of material will be removed to form the ditch which will be 3,200 feet in length. A drainage structure located under Watson Coulee Road will allow interior drainage to flow into the collector ditch. The interceptor levee will be 2,300 feet long with an average height of 3 feet. It will be composed of 5,300 cubic yards of compacted fill material. Two hundred tons of riprap will be used to armor the Watson Coulee inlet.

1.18 Project beautification includes tree plantings which will be located to the west of the deep borrow site in Wadsworth Park. Single trees will be planted elsewhere in Wadsworth Park for landscaping purposes.

ECONOMIC SUMMARY

1.19 Estimated total cost of the project is \$10,122,000 of which \$8,070,000 will be Federal cost. The estimated average annual cost is \$704,300. This is computed at a 6.875-percent interest rate and includes \$7,500 annual operation and maintenance costs. Average annual benefits under existing conditions are \$1,199,000 and \$1,305,600 under future conditions. Benefit-cost ratios are 1.7 to 1.0 under existing conditions and 1.9 to 1.0 under future conditions.

ACTIVITIES SUBJECT TO REGULATION

1.20 It has been determined that certain construction activities proposed in this project are subject to regulation under Sections 401 and 404 of the Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977, the State of Montana Stream Preservation Act of 1963, and the Montana Administrative Code 16-2.14(10)-S14480, Water Quality Standards and 26-2-10(6)-S10140. Activities subject to regulation include channel slope modifications and placement of riprap for bank protection on the Sun River and placement of permanent fill in the Sun River in conjunction with the channel modification. All construction activities are subject to State of Montana air quality regulations.

1.21 Flood plain regulations that apply to the project area include the Flood Plain Zoning Ordinance of the City of Great Falls and the Montana Floodway Management and Regulation Act administered by the Department of Natural Resources and Conservation. Under the Montana Floodway Management and Regulation Act, the Sun River levee may be subject to regulation.

1.22 Executive Order of the President 11988, Flood Plain Management; specifies the conditions under which Federal projects may be constructed in a flood plain.

1.23 This project is also subject to the requirements of the Endangered Species Act, the Fish and Wildlife Coordination Act, the Historical Preservation Act, and Executive Order 11990 on Protection of Wetlands.

II. THE ENVIRONMENTAL SETTING WITHOUT THE PROJECT

TOPOGRAPHY

2.01 West Great Falls is located within the flood plains of the Missouri River and the Sun River. The Sun River begins at the Continental Divide and flows down the eastern slope of the Rocky Mountains in a general southeastward direction for 34 miles to Gibson Dam. It flows in an eastward direction for 86 miles and enters the Missouri River on the left bank at Great Falls. A diversion dam is located about 4 miles downstream from Gibson Dam. The western portion of the basin is in the main range and foothills of the Rocky Mountains with an average stream slope above Gibson Dam of 107 feet per mile. From Gibson Dam to the diversion dam, the stream slope reduces to about 50 feet per mile as it goes through a transition from the mountains to the broad rolling plateau of the lower basin. The slope of the stream below the diversion dam averages slightly less than 14 feet per mile. The total contributing drainage area is estimated to be 1,927 square miles at Great Falls. The lower Sun River valley is approximately 1 to 1.5 miles wide and is bordered by upland hills which are 200 to 300 feet above the flood plain.

GEÓLOGY AND SOILS

2.02 The soils of the valley are alluvial and consist of sandy clay to sand depending on depth. Ground water levels are encountered at an average depth of 7 feet. According to the Soil Conservation Service, there is no unique farmland in the vicinity of the project. However, there are approximately 180 acres of prime farmland in close proximity to the proposed levee. This acreage is located in low areas adjacent to the river. Any of the 33 acres of cropland designated for the levee right-of-way would qualify as prime farmland if irrigated.

CLIMATE

2.03 The climate of the Sun River basin is classified as semi-arid. Summer days are generally hot and dry with cool nights; the winters are cold. Winter precipitation is in the form of snow and is moderately heavy, especially in the mountainous areas. The basin is subject to chinooks which normally occur several times a winter. Precipitation and temperatures vary somewhat between the mountainous area and the plateau region. This is the result of the extreme differences in elevation which range from 3300 feet to 9500 feet mean sea level (m.s.l.).

POPULATION

2.04 Great Falls and surrounding Cascade County comprise the Great Falls Standard Metropolitan Statistical Area (SMSA). Population for the SMSA was 53,027 in 1950, 73,418 in 1960, and 81,804 in 1970. This represents 38 percent and 11 percent growth for the 10-year periods from 1950 to 1960 and 1960 to 1970, respectively.

2.05 The population for the City of Great Falls increased 47 percent between 1950 and 1960 and 4 percent between 1960 and 1970. Great Falls had a population of 39,214 in 1950, 57,629 in 1960, and 60,091 in 1970.

2.06 Local planners prepared a special population projection for the "1976 Great Falls Urban Transportation Study" which indicates Great Falls had a 1975 population of 76,076, a 26-percent increase from 1970. Projections to the year 2020 are shown in table 1.

Table 1
PROJECTED POPULATION - GREAT FALLS

<u>Year</u>	<u>Population</u>
1980	79,956
1990	88,321
2000	97,562
2010	107,766
2020	119,025

EMPLOYMENT

2.07 The labor force in Cascade County numbered 24,184 in 1960 and 32,804 in 1970, an increase of 36 percent. At the same time, the Great Falls labor force increased 24 percent from 19,452 in 1960 to 24,183 in 1970. For both the city and the SMSA, the employment population ratio was 40 percent in 1970.

2.08 The two economic sectors employing the most persons are retail and wholesale trade and the armed forces. Great Falls is the retail trade center for a large market area which includes several surrounding counties. Nearby Malmstrom Air Force Base is the other source.

INCOME

2.09 Income comparisons for Great Falls and Cascade County are shown in table 2.

Table 2
INCOME
(U.S. Census, 1970)

	<u>Median Family Income</u>	<u>Per Capita Income</u>
United States	\$9,957	\$3,119
Montana	8,509	2,696
Cascade County	8,952	2,860
Great Falls	9,475	3,065

2.10 Great Falls has a higher median family income than Cascade County and the State of Montana but is below the United States average.

2.11 Measured in constant 1967 dollars by OBERS, the Great Falls SMSA per capita income increased by 22 percent from 1962 to 1970 from \$2,773 to \$3,385. It is expected to increase another 28 percent by 1980 to \$4,600.

LAND USE

2.12 The corporate limits of Great Falls consist of 10,415 acres which include 3,100 acres for streets and 500 vacant acres. Public parks occupy 700 acres within the city. The 240-acre Wadsworth Park is in the Sun River flood plain and is outside the corporate limits of Great Falls. Public buildings occupy another 15 acres and include the community civic center, city hall, the courthouse, and fire stations. Public and private schools from the elementary to college level occupy another 300 acres.

2.13 Residential land use occurs on 5,000 acres. The city has zoned more land for commercial and industrial uses than is actually used for those purposes. There are 300 acres zoned for commercial use of which only 100 acres is being used. The remainder is in residential use.

2.14 The city has zoned 400 acres for industrial land use but only 100 acres is actually in use for this purpose. The remainder is in commercial and residential use.

RECREATION

2.15 The Great Falls area has good water-based recreational opportunities. The Missouri River represents the most convenient location for boating, waterskiing, and fishing. The Sun River also offers some fishing opportunities during certain

times of the year. The largest body of water near the Great Falls metropolitan area is Holter Lake. Great Falls lies within the North Central Region in the 1979 Montana Statewide Comprehensive Outdoor Recreation Plan (SCORP). According to the SCORP report, the North Central Region has high demand but only limited opportunities for sightseeing, fishing, bicycling, boating, camping, nature walks, hiking, waterskiing, hunting, sailing, mountain climbing, canoeing, and snow skiing.

THE FLOOD PROBLEM

2.16 Flood of record. During the period 7 through 13 June 1964, northwestern Montana experienced the worst flood in the State's history. Heavy rainfall, centered near the Continental Divide, coupled with high snowmelt runoff caused unprecedented flooding in the Sun River basin. At Vaughn, the peak flow was estimated at 53,500 cubic feet per second (c.f.s.). This flow was nearly three times the previous record flow of 17,900 c.f.s. which occurred in June 1953. In Great Falls, residential damage was estimated to be more than \$3,160,000, commercial damage was estimated to be nearly \$200,000, and damage to streets and utilities exceeded \$1,000,000. Varying degrees of damage were sustained by 681 homes and 24 business establishments. There were approximately 3,000 persons evacuated from the flooded area. Rescue operations, flood fighting, and welfare assistance had a total cost close to \$47,000. Other floods which have occurred in the potential project area include the following.

2.17 May and June 1948. During the periods from 22 to 26 May 1948 and from 4 to 18 June 1948, the Sun River overtopped its banks generally throughout its entire length. The peak flow during the May flood was 14,300 c.f.s. at the gage located approximately 4 miles southeast of Vaughn. The peak flow during the June flood was 13,600 c.f.s. at the same gage.

2.18 May and June 1953. A heavy rainstorm occurred over the basin from 23 May to 4 June 1953 causing flooding along the entire length of the Sun River from near Augusta, Montana, to its confluence with the Missouri River at Great Falls. The peak discharge of 17,900 c.f.s. and a gage height of 16.38 feet were recorded at about 1 p.m. on 4 June 1953 at the river gage located 4 miles southeast of Vaughn.

2.19 June 1975. Flooding in the western part of Great Falls resulted from high stages on the Sun River and from backwater effects on the Missouri River caused by high inflows from the Sun River. The peak flow was estimated at 31,000 c.f.s. Flood depths as great as 12 feet occurred in low-lying areas. Urban

damages at Great Falls were estimated to be \$9,459,000. Residential damage was estimated to be more than \$8,700,000; damage surveys conducted by the Corps of Engineers reported that 552 residences were flooded. Commercial damage amounted to \$1,000,000, and damages to streets and utilities were in excess of \$650,000. Approximately 570 families (2,000 persons) were evacuated before flooding occurred in the western part of Great Falls. The estimated cost of rescue, evacuation, and welfare assistance amounted to about \$691,000. Plates 3 and 4 are aerial photographs of this most recent flood.

FLORA AND WILDLIFE HABITAT

2.20 The immediate project area is predominantly urbanized. The western portion of the project area, however, is interspersed with open space and farmland. Trees and shrubs dominate low-lying areas along the Sun and Missouri Rivers; native grasses, forbs, and yucca dominate the surrounding uplands. The dominant tree species is boxelder. Other tree species include eastern cottonwood, green ash, russian olive, chokecherry, peach-leaved willow, and sand-bar willow. Ground cover plants include crested wheatgrass, smooth broom grass, intermediate wheatgrass, tall wheatgrass, reed grass, wild rose, and a number of various forbs and legumes. Wild rose is the principal understory species in and near wooded areas.

2.21 The best wildlife habitat in the immediate project area exists in the upstream portion of the project area along the Sun River. In this area there is a relatively dense stand of about 23 acres of trees and understory. Also located in this area is Wadworth Park, an undeveloped area owned by the City of Great Falls. The principal vegetation in this area includes native grasses and forbs.

BIRDS AND MAMMALS

2.22 Great Falls lies within the combined Pacific and Central flyways. Principal migratory bird species include green-winged and blue-winged teal, mallard, pintail, cinnamon teal, shoveler, gadwall, mottled duck, wood duck, American widgeon, canvasback, lesser scoup, redhead, goldeneye, ring-necked duck, bufflehead, ruddy duck, mergansers, American coot, lesser and greater Canada geese, white-fronted geese, snow geese, Ross' geese, trumpeter and whistling swans, and blue heron.

2.23 Upland bird species include the ring-necked pheasant, Hungarian partridge, and sharp-tailed grouse. Raptors include the bald and golden eagles; the rough-legged, red-tailed, American kestrel (sparrow), and ferruginous hawks. Many species of songbirds and other birdlife are also abundant in the area.

2.24 Some mammals that can be found in the area include the mink, muskrat, beaver, badger, raccoon, skunk, cottontail rabbit, squirrel, a large number of other small furbearers, fox, coyote, and white-tailed and mule deer.

FISH

2.25 The fish species found in the lower Sun River differ greatly from those found in the upper Sun River or the Missouri River. This is largely because of the heavy silt load entering the Sun River from Muddy Creek near Vaughn. Muddy Creek has always had a heavy silt load; however, return flows from the Greenfields Irrigation Project have increased the base flow on Muddy Creek and its tributaries, causing a greater silt load and poor water quality in the lower portion of the Sun River. Studies are being conducted by the Bureau of Reclamation to determine the amount and source of the silt load contributed by return flows from the Greenfields Irrigation Project and to provide remedial measures. Fish species found in this lower portion of the Sun River include carp, long nose and white sucker, yellow perch, black bullhead, and numerous species of minnows and shiners. Fish species found on the Sun River above Vaughn, however, are more typical of a cold-water fishery. They include the brown, brook and rainbow trout, white fish, yellow perch, mottled sculpin, carp, suckers, and minnows. Fish species found in the Missouri River include the brown and rainbow trout, white fish, perch, large mouth bass, crappie, black bullhead, burbot, carp, suckers, and minnows.

AMPHIBIANS AND REPTILES

2.26 Species of amphibians and reptiles found in the area include the western toad, leopard frog, chorus frog, western painted turtle, horned lizards, gopher snake, red-sided garter snake and prairie rattlesnake.

THREATENED AND ENDANGERED SPECIES

2.27 Endangered species that may occur in Cascade County include the rocky mountain wolf, black-footed ferret, peregrine falcon, and the bald eagle. With the exception of the bald eagle, none of these endangered species are known to utilize habitat in the immediate project area. Although bald eagles are known to migrate through the area, none are known to frequent the immediate project vicinity because it is urbanized. The Montana Department of Fish and Game also lists other threatened or "unstable" species as possibly occurring in Cascade County. Although none of these species are known to frequent the immediate project area, listed birds include the marsh; pigeon; sharp-shinned, Cooper's, and ferruginous hawks; prairie falcon;

osprey; mountain plover; sanderling; semipalmated sandpiper; western sandpiper; knot; dunlin; black-necked stilt; and screech, snowy, burrowing, and long-eared owl. Mammals included on the State's list are the black-tailed prairie dog, dwarf and merriam shrews, long-eared and big-eared bats, least weasel, wolverine, swift fox, and Canadian lynx. Reptiles and fish included are the hog-nosed snake, blue sucker, and fine-scaled dace.

HISTORICAL AND ARCHEOLOGICAL RESOURCES

2.28 The "National Register of Historical Places" and its monthly supplements and the "Montana Historic Preservation Plan with Historic Sites Compendium" have been consulted. There are no known National Historic sites or sites of State significance in the levee, riprap or borrow areas; however, there are three National Register Sites in the Great Falls vicinity.

2.29 One cultural resources survey has been completed for the levee, riprap, and borrow areas. A second cultural resources survey for the Watson Coulee area and the upstream and downstream levee areas will be completed prior to construction.

2.30 The survey determined that an archeological site exists in a potential borrow area to the west of the proposed project. Its size is approximately 250 feet by 250 feet. Appropriate State agencies are being consulted to determine the effect of construction activity on the site.

WETLANDS

2.31 No wetlands exist on project land or any adjacent territory. Executive Order of the President 11990, Protection of Wetlands, specifies that impacts to wetlands be considered if applicable.

III. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 Population increases in Great Falls will result in a need for additional residential lots. If the project is not implemented, the additional land will be in areas outside the city and outside the 100-year flood plain due to the flood hazard and enforcement of flood plain regulations. If the project is implemented, these constraints will be removed on vacant residential lots protected by the project.

3.02 Specific land use plans for which the project will have an impact include the Great Falls Community Facility Plan and the Projected Land Use Plan which are part of the city's Comprehensive Plan. This document was published in 1970 but is currently being reviewed and updated by the City-County Planning Board in Great Falls. At present, local authorities have not projected any future land use in the project area pending construction of the levee system.

3.03 With the project in place, land that is already partially urbanized would probably be more desirable for development than other areas some distance from the city limits. Such factors as existing street rights-of-way, utilities, sanitary sewers, electricity, natural gas lines and water lines would attract development. There are also other locational advantages. The protected areas opened to development are in a close proximity to Interstate 15, the airport, and the central business district.

IV. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

4.01 General impacts of the project include the following:

- . Flood Control
- . Residual Flood Hazard
- . Induced Flooding
- . Land Use Impacts
- . Economic Impact
- . Tax Revenues
- . Ecological Effects
- . Loss of Flood Plain Esthetics
- . Temporary Impacts
- . Displacement of People
- . Historic and Archeological Resources

FLOOD CONTROL

4.02 The proposed project will provide protection against the 500-year flood event as defined by extrapolating the discharge-probability curve. The project will reduce the average annual damages in West Great Falls by 98 percent. Average annual damages will be reduced by 92 percent in the City of Great Falls. There are approximately 469 single-family structures, 3 businesses, 1 church, and 1 grade school located within the 500-year flood plain that will be protected by the levee project. The project will prevent \$1,199,000 in average annual damages to existing development. The project will also provide other unquantifiable benefits such as the improved safety and well being for 469 families residing in the 500-year flood plain. In protecting these families from flooding, the project has a significant, beneficial impact.

4.03 The Watson Coulee conduits will significantly reduce the flood hazard in Watson Coulee and provide an outlet for local storm drainage. Runoff from Watson Coulee is presently conveyed through the West Great Falls area by inadequate, open ditches. The project would capture this runoff before it enters the developed area and convey it to the Sun River through two buried 84-inch conduits. In reducing the flood threat from Watson Coulee to the project area, this project element has a significant, beneficial impact.

RESIDUAL FLOOD HAZARD

4.04 Although the project will reduce the average annual flood damage in West Great Falls, residual flood hazards will still exist in three areas. The first of these is the right bank of the Sun River. The second is the left bank of the Missouri River above its confluence with the Sun River. The third is a

small area on the left bank of the Sun River downstream from Sixth Street. Since there is little local support for levees in the three areas, local interests should enforce flood plain regulations and otherwise comply with the findings of the flood insurance study so that flood insurance can be obtained. It would also be advisable for local interests to formulate a flood contingency plan for emergency evacuation and cleanup. The project does not significantly affect the residual flooding.

INDUCED FLOODING

4.05 After the levee is constructed, subsequent large floods will have greater stages and cover an increased number of acres on the right bank of the Sun River between Interstate 15 and the upstream end of the levee and on both banks upstream from the levee. The 100-year flood will be approximately 2 feet deeper than under existing conditions at the upstream end of the levee (see plate 5). From the upstream end of the levee, the induced flood depth decreases gradually to nothing at a point approximately 5 miles upstream from the levee. Downstream from the levee's upstream tieoff, the depth will decrease to approximately 0.3 foot less than existing conditions at the Interstate 15 bridge. Approximately 63 more acres will be flooded during the 100-year flood (see plate 5.) This 100-year flood can be expected to cause approximately \$2,400,000 in damage in the area between Manchester and the levee's upstream tieoff with no levee in place. In the same area, total flood damages will increase by approximately \$40,000 with the levee in place. In the area downstream from the upstream tieoff on the right bank, a 100-year flood will cause approximately \$92,000 damage under existing conditions. Chances of a 100-year flood occurring are 0.01 in any year.

4.06 Under design conditions, the standard project flood of 65,000 c.f.s. will be approximately 3.5 feet deeper than under existing conditions at the upstream end of the levee. From this end of the levee, the induced flood elevation decreases gradually to nothing at a point approximately 5 miles upstream from the levee and downstream to the Interstate 15 bridge (see plate 5.) Approximately 35 more acres will be flooded. Under existing conditions, a standard project flood in the area between Manchester and the levee's upstream tieoff can be expected to cause approximately \$3,500,000 in damage. Under design conditions, total flood damages will increase by approximately \$20,000 in the same area. In the area downstream from the upstream tieoff on the right bank, the standard project flood will cause approximately \$107,000 damage under existing conditions and \$170,000 damage under design conditions. The chance of a standard project flood occurring are .002 in 1 year. Because the 100-year and standard project floods are infrequent

storms, the equivalent average annual induced damages amount to only \$2,000. The induced damages are sufficiently minor, using an average annual equivalent measurement; the induced depths are an insignificant impact, even though the subject is controversial.

4.07 Levee Drainage Structures. The past history of recorded rainfall and stream gage information in the project vicinity has not indicated a coincidental occurrence of a significant rainfall over the project and a Sun River flood stage that would block surface drainage. If this did happen, the gates on the drainage structures would be closed to prevent river water from backing through the structures; the coincident rainfall over the protected area would result in some potential flooding from ponding water in the area behind the levee. Portable pumps could be utilized to alleviate potential flooding in the areas behind the levee.

4.08 In the design of the drainage structures, ponding storage was not utilized to augment the discharge of the design storm runoff. Therefore, it is only necessary that the stormwater inflow on the landward side of the levee reach an elevation high enough to provide each structure with the hydraulic capability to handle the peak discharge of the 100-year design storm. This is referred to as the structure design headwater elevation. Under existing development conditions, the headwater elevations chosen for the drainage structures would cause shallow inundation of low-lying land and streets adjacent to the levee alignment for short periods of time without serious damage.

4.09 The contour limits showing the potential areas of inundation for each drainage structure headwater elevation operating under the 100-year design storm will be delineated on a map and included in the project Operation and Maintenance Manual. The local sponsor will be required to notify the local jurisdiction with zoning authority every year, providing them with a map of the potential flooded areas that would result from the operation of the drainage structure during the occurrence of a 100-year storm over the protected area. These local bodies will be responsible for making sure that any new development constructed within these areas of potential inundation is on fill dirt to an elevation above the headwater elevation or flood proofed to that same elevation. If this action is taken, the interior flooding will be an insignificant impact.

LAND USE IMPACTS

4.10 Approximately 211 acres of land will be committed to the project. This consists of 33 acres of cropland, 125 acres of pastureland, 27 acres of trees and 26 acres of natural grasses.

Cropland is considered prime farmland if irrigated. In addition, the only practical location for the levee is in its proposed site in the flood plain. The area to be protected is already urbanized. As a result, the impact of using the levee at its proposed location is minimal.

4.11 The levees built on the Sun River flood plain will provide flood protection to 830 acres that are now part of the "floodway" under flood plain zoning regulations. All but 178 acres are currently developed. No further construction is currently allowed in this area. With protection, this area will most likely have more single-family, large-lot development. This is presently the characteristic land use in the area. Possibilities exist for a limited number of multifamily structures and small, quick-service stores. These land use changes are a positive impact. Such development can add to the tax base. This development may create a demand for some public services which are not now provided. Since the project area is now urbanized, most public services are already in place. In rural Cascade County outside the project area, there is a negligible amount of development in the flood plain. The State of Montana strictly enforces flood plain regulations on the Sun River flood plain. New urban development will remain insignificant.

4.12 Other possibilities include the development of an industrial park on property belonging to the Burlington Northern railroad. Most of this land is in the 500-year flood plain and not affected by flood plain zoning. Levee construction might provide a slight impetus for development of the park. This is an insignificant impact.

4.13 Two sites will be required for borrow. One site is located to the west of the levee near the upstream tieoff and south of the Burlington Northern railroad tracks. A 43-acre easement has been obtained for this site. Twenty-nine acres will be used for borrow to a depth of 8 feet. The bottom of the pit will be 2 feet above the water table. A drainage ditch will be dug so that water does not collect in the pit. The second site is located in Wadsworth Park. This site requires a 45-acre easement. The borrow pit will utilize 33 acres to a depth of 24 feet. The bottom of the pit will be approximately 12 feet below the level of the water table. The actual depth may vary depending on geological factors. The impact of the first site will be insignificant. The pit will be sloped and contoured to drain incoming water. All soil will be reseeded with native grasses. The second site may have a significant, positive impact. It will become a fresh water lake.

ECONOMIC IMPACT

4.14 Secondary economic benefits from the project would include "spin-off" effects such as local and regional purchases related to construction expenditures. The impact on the local economy will be minor.

4.15 It is possible that the increased level of protection provided by the project would increase economic activity in the protected area, but there is no evidence that the flood threat is the determining factor for the presence or lack of commercial or industrial activity in West Great Falls. This impact is insignificant because it may not occur and if it does, it will be very minor.

TAX REVENUES

4.16 The left-bank levee will occupy 200 acres of which 153 acres are now in the private sector. Twenty acres are part of the Wadsworth Sun River Park owned by the City of Great Falls. Another 17 acres are in the public sector. Watson Coulee will use 11 acres of land now in the private sector. Table 3 gives the amount of land removed from taxation by the levees.

Table 3
LAND REMOVED FROM TAXATION
(acres)

	<u>Urban</u>	<u>Agricultural</u>
Left-Bank Levee		
Outside Great Falls	20	33
Inside Great Falls	100	0
Publicly Owned Land	17	20
Channel Modification	0	10
Watson Coulee	0	11
Total	<u>137</u>	<u>74</u>

4.17 Land classed as urban is taxed on the basis of assessed value per lot. Agricultural land of the type found in the vicinity of the levee is assessed at approximately \$23 per acre. In West Great Falls, lots outside the city limits have average assessments of \$400. Similar lots within the city limits average \$450. Total loss in annual tax revenue amounts to \$6,100 at the current tax rates.

4.18 Local school budgets affected include the high school, \$10,991,000; elementary school, District 1, \$15,762,000; and vocational-technical center, \$860,000. Amounts lost to each

budget come to less than one-tenth of 1 percent. The affect will be minimal as the urban property will probably not be reappraised and lost agricultural land accounts for less than 16 percent of the tax loss. If land behind the levee becomes attractive for residential development, greater revenues from an increase in total taxable value would more than compensate expected losses. The overall impact is not significant.

ECOLOGICAL EFFECTS

4.19 Ecological effects will be insignificant. Terrestrial and aquatic environmental losses and degradation will be small. No wetlands, threatened or endangered species or important nesting, spawning, rearing or resting sites for terrestrial or aquatic species will be affected by the project.

4.20 Terrestrial Environment. Approximately 53 acres of native vegetation, which includes trees, shrubs, forbs and natural grasses, will be cleared from the levee right-of-way. An additional 62 acres of native grasses and forbs will be destroyed by shallow and deep borrow operations. Any loss of native vegetation is unavoidable. To avoid displacement of homes and other improvements, the proposed levee alignment closely follows the river channel where the native vegetation is located.

4.21 One of the project elements is beautification. An area to the west of the proposed lake in Wadsworth Park will be planted with a thick band of nursery grown trees. The trees will be native species. Other trees will be planted throughout Wadsworth Park for landscaping purposes. The City of Great Falls plans to develop recreational facilities in the park.

4.22 The vegetation along the river provides habitat for pheasants, songbirds, rodents, and some furbearers. These wildlife species may be displaced from the cleared areas into adjoining areas with suitable habitat where competition with their own kind and other species may lead to a nominal reduction in their populations. Because impacts on the terrestrial environment are so small, no plan has been established to mitigate habitat and wildlife losses. Any mitigative effect the beautification plantings in Wadsworth Park may have will be small.

4.23 Effects on the aquatic environment. A channel modification on the Sun River just downstream from Interstate 15 will reduce the length of the Sun River by 350 feet. Riprap bank protection will be provided at four locations along the Sun River. Approximately 6,250 lineal feet of bankline will be affected by the bank protection.

4.24 The riprap bank protection is required as the levee must be protected from the undercutting effects of erosion. The channel modification is also required as only one other feasible, alternate levee alignment exists that does not involve a channel modification. That alignment would follow the left bank of the existing Sun River channel. It would require the relocation of 14th Street and the displacement of 15 houses and 14 other buildings. The proposed alignment will result in less overall impact.

4.25 The placement of rock and fill material in conjunction with the bank protection will cover established benthic and macro-invertebrate communities. The rock and fill material, however, will be a suitable environment for reestablishment of these communities. These activities will have no permanent effect on the aquatic environment of the Sun River or any aquatic species inhabiting the river. Because the impacts on the aquatic environment are not significant, no plan has been established to mitigate losses.

LOSS OF FLOOD PLAIN ESTHETICS

4.26 Much of the natural habitat along the Sun River is typical of an urban area. Most of the levee alignment will lie in urban and agricultural areas and will not cause a significant loss of esthetics. The levee will, however, be an unnatural addition to some relatively undisturbed areas along the Sun River and may tend to detract from the natural beauty of these areas. Any esthetic loss that may occur is unavoidable. Steps will be taken to minimize esthetic losses. Incorporated into the project is a beautification plan whereby native species of trees and shrubs will be planted along the landward side of the levee and in the Wadsworth Park area. Plantings in the Wadsworth Park area will be primarily in a thick band on the landward side of the levee to the west of the lake. Some trees will also be planted throughout the park for landscaping purposes.

TEMPORARY IMPACTS

4.27 All temporary impacts related to construction of the levee project, whether social, economic, or ecological, will be insignificant. By their very nature, all are unavoidable and cannot be completely eliminated. Remedial and protective measures, however, will be employed wherever possible to minimize adverse effects.

4.28 Increased noise level. Levee construction operation will cause increased noise levels from heavy equipment. As required by State law, noise will be kept within acceptable levels

through the use of noise retarding equipment. This impact will be minor.

4.29 Degradation of air quality. Cleared and excavated areas will be subject to erosion by the wind. The windblown dust will degrade air quality. During construction any dust problem will be controlled by using water.

4.30 Emissions from construction equipment will be in compliance with the State air quality regulations. Burning of the cleared trees and brush by the contractor will not be permitted.

4.31 Degradation of water quality. Runoff from excavated areas can degrade water quality of the Sun and Missouri Rivers during construction.

4.32 The channel will be modified and riprapped under dry conditions. In doing this, soil particles entering the Sun River will be minimal. Clean, durable riprap will be taken from non-streambed sources as will any fill material to prevent channel disturbance. In addition, the use of construction machinery in the wetted channel will be kept at a minimum and will be approved in advance by the contracting officer.

4.33 Disposal of any materials, chemicals, wastes, effluents, trash, garbage, fuels, oils, and grease will not be allowed in or adjacent to streams. Such materials will be properly disposed of in areas designated by the contracting officer.

4.34 Erosion control. Seeding, mulching, and grading will be used to control erosion from open areas when necessary. Permanent erosion control measures will include seeding and mulching of all disturbed areas. The contractor will have to provide the contracting officer with an erosion control plan before construction begins.

4.35 Traffic congestion. Heavy equipment will move material over the right-of-way and across thoroughfares in West Great Falls. This may cause an undetermined amount of congestion on these streets. Crossovers will be infrequent but will cause traffic to go at a slower rate than usual when the crossovers occur.

4.36 Twenty-seventh Street will be closed in sections during the construction of the Watson Coulee drainage conduits. Traffic will have to be rerouted around construction.

DISPLACEMENT OF PEOPLE

4.37 Eight families will be displaced. They will be completely reimbursed for costs incurred in moving. This is to be done in accordance with the Uniform Relocation Act. If, however, individuals personally object to being moved, personal stress could result. Every effort will be made to accomplish the necessary moves in a manner that will eliminate or minimize personal stress.

HISTORICAL AND ARCHEOLOGICAL RESOURCES

4.38 A cultural resources reconnaissance was conducted during 1978 in the early fall. The research team found no physical surface evidence of historic sites. No structure or buildings in the area fit National Register of Historic Places criteria. A possible prehistoric site was found near one of the borrow areas. A second survey will be done by May 1979. During this survey, a thorough examination of the potential prehistoric site will be done. The land to be used for the new levee alignment adjacent to Eighth Street and Crescent Drive will be surveyed. Project funds will be allocated to either salvage or relocate the potential site or other sites determined to be significant. The project may be modified to avoid such sites.

V. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT
BE AVOIDED

INDUCED FLOODING

5.01 After the levee is constructed, induced flood stages would increase flood damage during the 100-year flood and standard project flood. This is an insignificant impact.

LAND USE IMPACTS

5.02 The levee right-of-way will occupy 211 acres with an additional 88 acres to be used for borrow. This impact is insignificant.

TAX REVENUE

5.03 An insignificant though unavoidable circumstance with construction of this project is the annual loss of \$6,100 in tax revenue.

ECOLOGICAL EFFECTS

5.04 An insignificant loss will occur to the terrestrial and aquatic environment.

TEMPORARY IMPACTS

5.05 Temporary impacts to air quality and water quality which are related to actual construction of the levee project will be insignificant.

DISPLACEMENT OF PEOPLE

5.06 Eight families will be displaced. They will be reimbursed in accordance with the Uniform Relocation Act; this minimizes the impact to an insignificant level.

HISTORIC AND ARCHEOLOGIC RESOURCES

5.07 If significant archeologic sites are found, the site will be relocated or the project modified to avoid the sites.

VI. ALTERNATIVES TO THE PROPOSED ACTION

ALTERNATIVES CONSIDERED IN EARLY REPORTS

6.01 Levees. Early Design Memoranda recommended levees for Great Falls. The levee plan recommended is presented on plate 2. Funds for the construction of these levees were appropriated in Fiscal Year 1967, and construction was about to begin when litigation over local sponsorship issues stopped the project. Based on the economics at that time, the project cost was estimated at \$4,756,000 of which \$4,338,200 was Federal cost. Average annual benefits attributable to the project were \$254,600. Based on a 3.125-percent interest rate and including \$6,000 in annual maintenance cost, the average annual cost was estimated at \$194,600, yielding a benefit-cost ratio of 1.3 to 1.0 for the overall project.

6.02 Based on the current economic conditions, the estimated project cost for all five levees of the authorized project is now \$14,898,000 of which \$12,613,000 is Federal cost. Average annual benefits under existing and future conditions are \$1,199,000 and \$1,305,600, respectively. The average annual cost is \$1,035,500, based on a 6.875-percent interest rate and includes \$9,900 in annual maintenance. Benefit-cost ratios for existing and future conditions are, therefore, 1.3 and 1.4, respectively.

6.03 The impacts of the authorized project would be similar to those described in this document except for the additional right-of-way requirements and relocations and significant adverse environmental impacts related to the channel blocks on the Missouri River at Park Island. This is still the authorized project but it is not recommended for construction at this time.

6.04 Flood control reservoirs. The Corps of Engineers, in cooperation with the Bureau of Reclamation, completed a report on flood control requirements and benefits for the following potential systems on the Sun River: (1) Existing Gibson Reservoir and potential Lower Sun Butte Reservoir; (2) potential Castle Reef Reservoir; and (3) existing Gibson Reservoir and potential Lowry Reservoir which is the same as the Corps' Flowree Butte site. The approximate locations of these sites are shown on plate 6. The results of the analyses indicated that construction of any of the potential reservoir projects would not alleviate the need for a local protection project at Great Falls. Uncontrolled flows would still require levees to eliminate flooding at Great Falls. Construction of the Gibson - Lower Sun Butte System or the Castle Reef project would have only minor effects on the design of the Great Falls project

because of the large, uncontrolled area downstream. Construction of the Flowree Butte or Lowry Reservoirs would permit substantial reductions in the height of the levees at Great Falls. Because of the opposition to the Lower Sun Butte project, the marginal feasibility of the Castle Reef project and the submarginal feasibility of the Flowree Butte and Lowry projects, construction of reservoirs in the Sun River Basin is unlikely.

6.05 Channel modifications. Channel enlargement, channel straightening, and the removal of sandbars were considered. This plan was dropped due to high maintenance costs which would cost considerably more than the levee and would create significant adverse environmental impacts.

REEVALUATION OF THE AUTHORIZED PROJECT

6.06 A reevaluation report of the authorized levee plan was prepared concurrently with the preparation of this supplemental environmental statement. The primary purpose of the reevaluation was to determine if the authorized project was economically feasible using current evaluation criteria and data collected during the 1975 flood.

6.07 For the purpose of this evaluation, the authorized levee plan was divided into five separate elements with the areas protected by each of these elements separated into study areas. Study area 1 is the area protected by the left-bank Sun River levee. Study area 2 is the area protected by the right-bank Sun River levee upstream from Interstate 15. Study area 3 is the area protected by the right-bank Sun River levee downstream from the 14th Street bridge. Study area 4 is the area protected by the left-bank Missouri River levee. Study area 5 is the area protected by the right-bank Missouri River levee. These study areas are shown on plate 2.

6.08 Average annual flood damages and associated flood costs were determined for existing and future development. Cost estimates were updated for the respective levees in each study area. Table 4 shows a summary of the reevaluation results. Induced damages were subtracted from the benefits in study area 1.

THE PROPOSED ACTION

6.09 Only two of the five levee elements authorized levees are economically feasible (see table 4). These are the left-bank Sun River levee (study area 1), and the left-bank Missouri River levee (study area 4). Currently there is only strong local support for a levee unit to protect study area 1.

Table 4
 ECONOMIC SUMMARY: 6.875 PERCENT
 (\$1,000)

Study Area	Cost	Average Annual Cost	Existing Average Annual Benefits	Benefit/Cost Ratio	
				Without Futures	With Futures
1	\$10,122.0	\$704.3	\$1,199.0	1.7	\$1,305.6
2	687.0	47.7	11.2	0.2	22.1
3	1,724.0	119.3	1.7	0.01	1.7
4	2,003.0	139.1	97.0	0.7	140.6
5	362.0	25.1	0.1	0.004	0.1
Total	\$14,898.0	\$1,035.5	\$1,309.0	1.3	\$1,470.1
					0.004
					1.4

6.10 As a result of these findings, the levee element in study area 1 is the only element of the authorized project recommended for construction at this time. All other levee elements of the authorized project have been placed in an inactive category. Construction of the levee in study area 1 is more thoroughly described in Section I.

6.11 The selected plan includes two different borrow sites (see plate 1). One of these sites lies within Wadsworth Park on the western edge of the city. Deep borrow will be taken from this site. This will result in a lake with a mean depth of 12 feet.

NO ACTION

6.12 This alternative would mean no specific action would be taken to change the existing flood threat at Great Falls. A flood plain regulation program has been adopted for the Great Falls area and the State of Montana has set up a program for Cascade County. These flood plain regulations will prevent further development in the designated "floodway" and will force structures in the "flood fringe" to be placed 1 foot above the elevation of the 100-year flood. The flood plain regulation program, however, will not provide any relief for those persons already living in the flood plain and damage potential will continue to rise because of new structures constructed in the flood plain above the elevation of the 100-year flood.

OTHER ALTERNATIVES

6.13 Four other alternatives were examined briefly. These included flood proofing of existing structures, enforcement of flood plain zoning, removal of structure from the flood plain, and emergency evacuation. If existing structures are flood proofed or removed from the flood plain, average annual costs exceed average annual benefits. Enforcement of flood plain regulations and emergency evacuation would reduce flood damages to future development, but would allow a threat of \$1,199,000 in average annual damages to remain to existing development.

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

7.01 The completed project will significantly reduce the threat of flooding, thereby improving the living conditions for residents of Great Falls. A levee will also reduce the "floodway" area in the Great Falls flood plain, keeping Great Falls a compact community. The flood protection provided may tend to accelerate land use change by raising the economic and social values of protected lands. Short-term use of the environment will be emphasized for the benefit of mankind.

7.02 Riparian vegetation valuable as long-term wildlife habitat will be disrupted by the project and in some areas destroyed. Natural vegetation losses, however, will be relatively small.

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

8.01 The time, materials, and supplies used in the construction of the proposed Federal levee are irretrievable commitments of resources.

8.02 Approximately 211 acres of land will be committed to the levees for the life of the project. Of this total, 33 acres are cropland, 125 acres are pastureland, and 53 acres are trees and grasses. The 33 acres of cropland could be considered prime farmland if irrigated.

IX. COORDINATION AND COMMENT AND RESPONSE

THE AUTHORIZED PROJECT

9.01 Previous EIS's. The first draft EIS was filed with CEQ on 6 May 1971 and was circulated per regulations for comment. Comments on the draft EIS were received from the following entities.

Bureau of Outdoor Recreation
Bureau of Reclamation
Bureau of Sport Fisheries and Wildlife
Montana Department of Fish and Game
Montana Council on Natural Resources and
Development
Great Falls City-County Planning Board

9.02 The agencies that commented on the draft EIS expressed no objections to the authorized project which consisted of all five levee elements including the proposed levee. These comments were addressed in the final EIS filed with CEQ on 12 August 1971.

SINCE THE 1975 FLOOD

9.03 Following the 1975 flood, local interests held one public meeting in July and the second in December 1975. In addition, court hearings were held in November 1975 and June 1976 which were well attended by the local citizens. There were also a number of small neighborhood meetings held prior to the elections in October 1976. Approximately 80 percent of the voters participated in the 1976 election and citizens on the left bank of the Sun River voted 3 to 1 to proceed with the left-bank levee project.

PUBLIC HEARING

9.04 A public notice announcing a joint public hearing on 24 May 1978 was circulated to all interested parties on 24 April 1978. The meeting was sponsored by the U.S. Army Corps of Engineers and the Montana Department of Natural Resources and Conservation. It served three purposes; the first was to discuss the Section 404 action and the second was to discuss the Draft Supplemental EIS. Thirdly, it served as a preliminary hearing for the Montana Department of Natural Resources and Conservation (DNRC). The DNRC agency will conduct a regular hearing in Great Falls after this Final Supplemental EIS is filed. A copy of the notice was sent to 63 agencies, groups, organizations, and individuals.

9.05 Approximately 350 people attended the public hearing on the Great Falls Flood Protection Project. Two members of the Montana legislature and several representatives of the Montana DNRC were present. Mr. Ted Doney, Director of DNRC, explained the State of Montana's requirements for the project in the first presentation. Of the 37 people who made comments, 11 spoke in favor of the project and 26 people expressed opposition. A total of 122 written statements were submitted to become part of the official record. Of this number, 116 favored the project and 6 expressed opposition. Those expressing opposition were concerned about induced flood stages from the 100-year and standard project floods with the levee in place. Residents of the Country Club Subdivision were concerned about being flooded from the Sun River. There are no induced stages in that area. Many of those opposed to the project reside in the area on the left bank of the Sun River downstream from Sixth Street which has since been eliminated from the project.

COORDINATION PURSUANT TO SECTION 404 OF THE FWPCA AMENDMENTS OF 1972

9.06 Activities involving the discharge of dredged or fill material in navigable waters of the United States are subject to regulation pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act of 1977. Certain construction activities proposed in this project are subject to regulation under Section 404. These include channel fill in conjunction with the channel modification and placement of riprap for bank protection. Appendix A contains the public notice circulated pursuant to Section 404 dated 24 April 1978; five letters were received in response to the public notice. Four Federal and State agencies responded and discussed statutory requirements that must be met prior to and during construction. One private citizen from Great Falls responded and expressed opposition to the project.

9.07 An exclusion from further regulation under Section 404 will be sought pursuant to Section 404(r) of the Clean Water Act of 1977. Section 404(r) amended Section 404 of the FWPCA Amendments of 1972 to allow an exclusion from regulation under Section 404 for Federal projects specifically authorized by Congress; information on the effects of the discharge, including consideration of the Environmental Protection Agency water quality guidelines developed under subsection 404(b)(1) must be included in an EIS prior to either authorization or an appropriation of funds. Pursuant to Section 404(r), a 404(b) evaluation report has been included with this EIS as Appendix C. If an exclusion is not allowed pursuant to Section 404(r), the Omaha District could follow the Corps permit issuance procedures. A

public notice announcing this proposed construction has already been coordinated with State and Federal agencies. State water quality certification was received on 15 May 1978 and a Section 404b(1) evaluation has been completed.

COORDINATION OF THE FINAL SUPPLEMENTAL ENVIRONMENTAL STATEMENT

9.08 This final supplemental environmental statement has been distributed to the following Government agencies, elected officials, citizen groups, and other organizations. This statement has also been sent to individual citizens who have expressed interest in such matters.

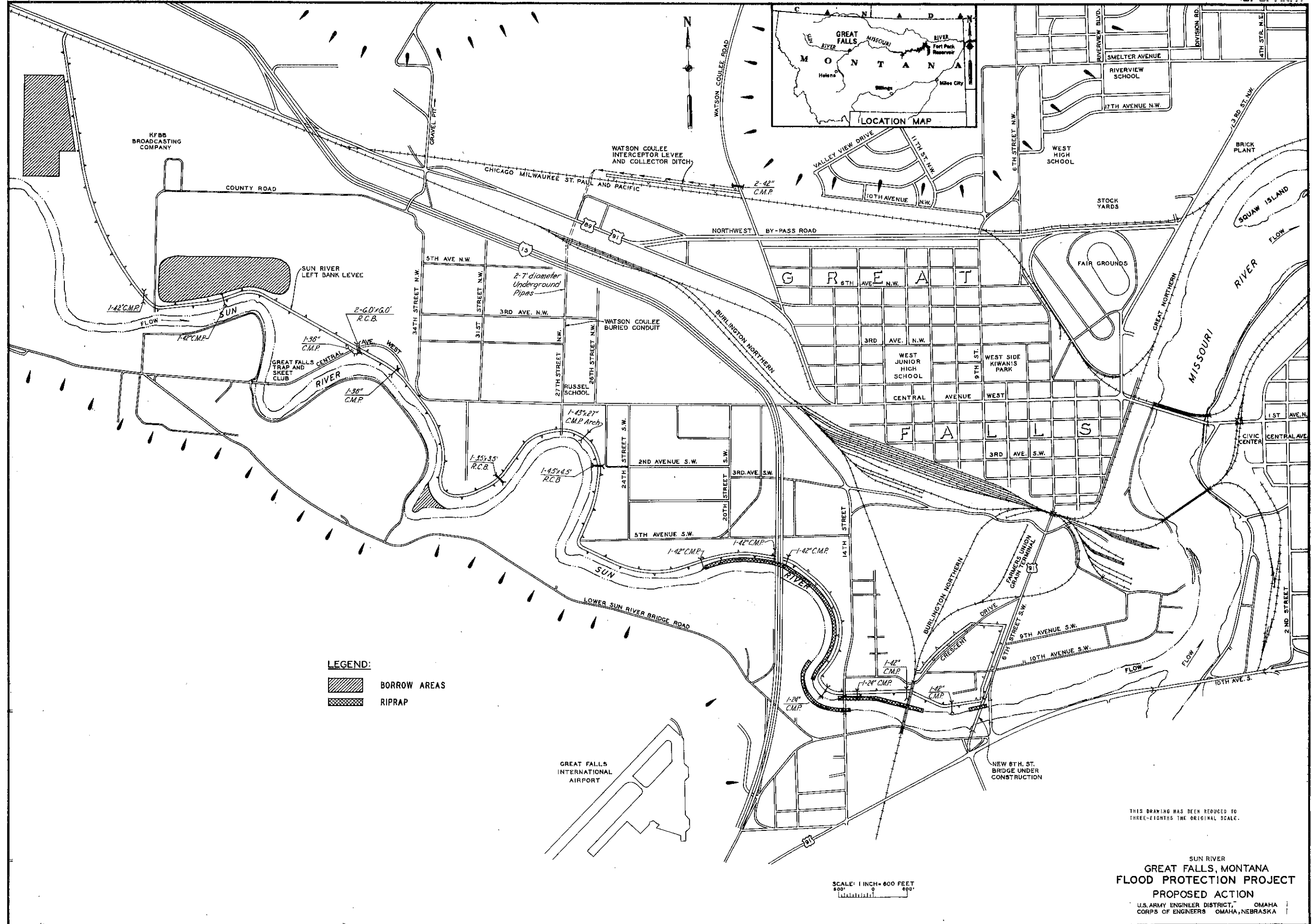
- U.S. Environmental Protection Agency
- U.S. Department of the Interior, Office of the Secretary
- U.S. Department of Health, Education and Welfare, Public Health Service
- U.S. Department of Transportation
- U.S. Department of Housing and Urban Development
- U.S. Department of Agriculture
- Federal Energy Regulatory Commission
- Missouri River Basin Commission
- Old West Regional Commission
- Montana, Office of the Governor
- Montana Department of Fish and Game
- Montana Department of Natural Resources and Conservation
- Montana Department of State Lands
- Montana Environmental Quality Council
- Montana State Department of Health and Environmental Sciences
- Montana Recreation and Parks Division
- Montana Wildlife Federation
- Montana Association of Conservation Districts
- Montana Wildlife Society
- City of Great Falls, Montana
- Cascade County, Montana
- Cascade County Soil Conservation District
- Concerned Citizens of the Sun River
- West Great Falls Flood Control and Drainage District

A copy of the cover letter circulated with the draft of this document prefaces appendix B. Reviews and comments received after circulation of the draft copy of this document are in appendix B. Replies appear adjacent to the comments expressed.

COORDINATION OF EXECUTIVE ORDER 11988

9.09 The public notice for the hearing held 24 May 1978 discusses E.O. 11988, Flood Plain Management. Executive Order of the President 11988, Flood Plain Management, specifies that

Federal agencies thoroughly analyze the effects of locating projects in the 100-year flood plain. Since the levee is to be built for purposes of flood protection, no location outside the 100-year flood plain is practicable (see plate 1). Before construction can begin, the local sponsor may have to obtain permission to build from the State of Montana and the City of Great Falls in order to comply with flood plain regulations. The City of Great Falls requires a Conditional Use Permit under provisions of a city ordinance. Under the State of Montana's regulations, any obstruction in the flood plain that raises the elevation of the 100-year flood more than 0.5 feet at any point requires a variance. This permit may have to be obtained from the Montana Department of Natural Resources and Conservation. Only 21 percent of the flood plain that will be protected by the levee is available for development. There is, therefore, little area remaining which has natural flood plain value. The levee will extend upstream only far enough to protect existing buildings to allow maximum preservation of the natural flood plain. Land clearing will be limited to the minimum necessary and nursery grown trees will be planted to replace those that must be cleared for the levee. The effect of increased flood depths in unprotected areas is discussed in paragraphs 4.05 and 4.06. Alternatives to this project are discussed in Section VI.



SUN RIVER
 GREAT FALLS, MONTANA
 FLOOD PROTECTION PROJECT
 PROPOSED ACTION
 U.S. ARMY ENGINEER DISTRICT, OMAHA
 CORPS OF ENGINEERS OMAHA, NEBRASKA

