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Cover Letter

September 26, 2003

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U.S. Army Corps of Engineers, 10 W 15th St. Suite 2200, Helena, MT 59626
U.S. Fish and Wildlife Service, MT Field Office, 100 N. Park Ave. Helena, MT 59601

Ladies and Gentlemen:

The enclosed Environmental Assessment (EA) has been prepared for the North Fork of the Smith River Dam Rehabilitation Project and is submitted for your consideration. Please contact me at (406) 444-6622 (e-mail jdomino@state.mt.us) should you have any questions or comments. Comments will be accepted until 5:00 p.m., October 27, 2003. Comments can also be mailed to: MT Dept.of Natural Resources and Conservation, State Water Projects Bureau, 1424 9th Ave., P.O. Box 201601, Helena, MT 59620-1601, attn. James P. Domino. Copies of the EA are available upon request. The EA can also be viewed on the DNRC website at www.dnrc.state.mt.us. Thank you.

Sincerely,

James P Domino

James P. Domino
Environmental Specialist
State Water Projects Bureau

NORTH FORK OF THE SMITH RIVER DAM REHABILITATION DRAFT ENVIRONMENTAL ASSESSMENT

Prepared By the State Water Projects Bureau, MT DNRC

September, 2003

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Appendix B Estimated Project Cost
Appendix C Proposed Project Schedule
Appendix D Photographs / Fact Sheet
Appendix E HKM Feasibility Study (not attached)**

**Appendix E, the HKM Feasibility Study Report is available for review at the State Water Projects Bureau Helena Office, (406) 444-6646

List of Acronyms and Abbreviations

COE.....U.S. Army Corps of Engineers

DEQ.....Montana Department of Environmental Quality

DFWP.....Montana Department of Fish, Wildlife, and Parks

DNRC.....Montana Department of Natural Resources and Conservation

EA.....Environmental Assessment

EIS.....Environmental Impact Statement

MEPA.....Montana Environmental Policy Act

NHP.....Montana Natural Heritage Program

USFWS.....U.S. Fish and Wildlife Service

USGS.....U.S. Geological Survey

SHPO.....Montana State Historic Preservation Officer

SWCB.....State Water Conservation Board

SWPB.....State Water Projects Bureau

NFSWUA.....North Fork of Smith River Water Users Association

MBMG.....Montana Bureau of Mines and Geology

1.0 - PURPOSE AND NEED FOR ACTION

The North Fork Smith River Dam and Reservoir (Lake Sutherlin) are located in Meagher County, Montana, in Township 10N, Range 9E, sections 17 and 20. The dam is owned by the Montana Department of Natural Resources and Conservation (DNRC) and is managed by the State Water Projects Bureau (SWPB). The North Fork of Smith River Water Users Association (NFSWUA) operates the dam. The reservoir's principal use is for agricultural irrigation. Recreational use also occurs, with fishing the primary activity. The dam is a zoned earthfill structure. Associated structures include an 80-foot wide (tapering to 40-foot wide) by 135-foot long, uncontrolled reinforced concrete chute spillway, located on the right abutment, and a modified horseshoe reinforced concrete outlet tunnel, 5-feet wide by 5-feet high at the centerline. A 54-inch butterfly valve controls the flow in the tunnel, with a 54-inch slide gate valve serving as an auxiliary. The gates are operated from a small metal gatehouse located midpoint on the dam crest. The reservoir storage capacity at maximum pool is 11,500-acre feet. The reservoir has a natural drainage area of 71 square miles and a surface area of about 335 acres at normal pool. The dam is easily seen from U.S Highway 12.

The North Fork of the Smith River Dam was designed and constructed by the Montana State Water Conservation Board (SWCB). The project operator, the NFSWUA, was incorporated in November 1935. The storage project was financed with a loan and grant from the Public Works Administration and with SWCB funds. The construction contract was awarded to J.L. McLaughlin of Great Falls, MT in the spring of 1936. Construction work commenced on May 4, 1936 and the final inspection was held on November 6, 1936. The work was accepted as complete on November 19, 1936 subject to the contractor furnishing the SWCB with a guarantee as to satisfactory operation of the control gates. Over the years, occasional repairs have been made to the dam and associated structures. None of the repairs or improvements has substantially altered the original design.

The spillway condition has been deteriorating for many years. An inspection conducted by the Army Corps of Engineers (COE) in 1981 found that the dam has inadequate spillway capacity, with the spillway showing serious deterioration. For this reason, the Corps classified the dam as unsafe according to the standards set forth under the National Dam Inspection Act, Public Law 92-367. The spillway has since deteriorated to the point that replacement of the entire structure is needed.

The proposed action calls for the construction of a new spillway with dimensions similar to the existing structure. The new spillway will be designed to meet or exceed all current safety standards. The existing spillway structure would be removed and replaced with a new structure of similar design. All replacement concrete will meet current standards to improve the durability over the original construction. Additional seepage drains would also be installed around the outlet structure. Approximately 30,000 cubic yards of material will be utilized in the cut and fill operation, with a total of approximately 20 disturbed acres.

The overriding goal of this project is to improve the efficiency, safety and functionality of the Dam for it's continued use for agricultural irrigation and recreation. Public benefits from this project include the continued use of reservoir water for agricultural irrigation and water-based recreation. Greatly enhanced public safety is an additional and very significant benefit.

1.1 Project Goals and Objectives

Goals of the dam rehabilitation project include the following:

A. Reduce the likelihood of dam failure and the resulting potential loss of life.

B. Meet Montana Dam Safety's new spillway standards.

C. Control seepage to avoid potential stability problems.

D. Avoid spillway failure in the event of the design flood.

E. Conserve water resources for the benefit of water users and recreationists.

F. Extend the dam's useful life and its advantages another 50 to 75 years with minimal negative environmental or socio-economic impacts.

Project Objectives include:

1. Optimize design work for most cost effective rehabilitation option without compromising safety or causing significant environmental damage.

2. Replacement of the deteriorated spillway with a new spillway designed to meet spillway standards and preserve dam integrity.

3. Replacement of the outlet structure and installation of a seepage collection system to control seepage.

1.2 Project Location

The North Fork of the Smith River Dam and Reservoir are located in Meagher County, Montana, in Township 10N, Range 8E, in sections 17 and 20.

1.3 Scope of Environmental Analysis

Public and Agency Involvement

Other state and federal agencies have been contacted by the DNRC to discuss the project and to identify potential environmental issues. Representatives from the COE, DFWP, DEQ, MNP, and the SHPO were contacted. Representative from the NFSWUA were also involved in the planning process.

Issues Studied in Detail

The issues examined in detail in this draft EA were identified by the DNRC, communications with the NFSWUA, other agencies, and through comments received during the development of the feasibility study and the DNRC grant proposal process. Issues identified through the public comment period will be included and addressed in the final EA. Listed below are potential project-related impacts examined in this document.

- Effects on downstream water quality and quantity.
- Effects on Plant and Animal Threatened and Endangered Species, and Species of Special Concern, and effects to other wildlife and fisheries resources.
- Effects to agricultural water uses, land use and ownership.
- Effects to public safety, including traffic, noise, air quality, etc.
- Effects on stream bank and soil erosion due to project construction.
- Effects on recreation and esthetics.

- Effects on the local economy and government services.
- Effects on historic and cultural resources.
- Effects on vegetation, including weed proliferation.
- Cumulative and secondary effects due to project construction.

Issues Eliminated from Further Study

The issues beyond the scope of this EA and eliminated from further study are as follows:

- Breaching the dam

This issue was eliminated from further study due to the significant role the reservoir serves in providing water for agricultural use throughout the basin. With the removal of the dam, the area's agricultural-based economy would be severely impacted due to the unavailability of irrigation and stock water. Many of the area's farms and ranches would most likely experience severe economic hardship. The recreational opportunities associated with the reservoir would be lost. There could also be potentially serious short-term and long-term environmental consequences associated with the dam's removal, including increased sedimentation, stream bank erosion, and an increased likelihood of downstream flooding. The potential severity of the environmental consequences associated with breaching the dam would require a detailed Environmental Impact Statement (EIS) before such a project could proceed. The timeframe for the completion of an EIS is normally long and the condition of the dam would continue to deteriorate during that time, with an increasing risk to people and property downstream.

DNRC Decision Criteria

In addition to the requirements under the MEPA, when deciding on actions and management initiatives to address water storage project issues, the DNRC, by statute, must consider the following, as stated in Section 85-1-701(2) through (3):

(2) In setting priorities among new water storage projects, the governor shall consider whether a project:

(a) solves a severe water problem
(b) provides multiple uses and benefits
(c) provides for public uses
(d) shows strong evidence of broad citizen support
(e) is able to obtain non-state sources of funding
(f) protects and seek to enhance social, ecological, cultural and aesthetic values
(g) improves local and state economic development
(h) could resolve Indian and federal reserved water rights issues
(i) supports water conservation activities; and
(j) promotes the use of water reserved under Montana law.

(3) In setting priorities among water storage rehabilitation projects, the governor shall consider whether the project:

(a) is needed to protect public safety
(b) has impacts if not repaired or rehabilitated; and
(c) accomplished the goals listed in (2)(a) through (2)(j).

1.4 Applicable Regulatory Requirements

Montana Department of Natural Resources and Conservation (DNRC)

- Montana Dam Safety Act: 85-15-105 MCA – This act applies to the construction, repair, or removal of any dam that impounds 50 acre-feet or more at normal pool elevation. A Dam Safety Permit from the Dam Safety Section of the DNRC would be required.

Montana Department of Fish, Wildlife and Parks (DFWP)

- Non-game and Endangered Species Conservation Act: 87-5-101 MCA - "Species or subspecies of wildlife indigenous to this state which may be found to be endangered within the state should be protected in order to maintain and to the extent possible enhance their numbers."

- Montana Stream Protection Act: 87-5-501 MCA (SPA 124-Permit) – Applies to any project including the construction of new facilities or modification, operation, and maintenance of an existing facility that may affect the natural existing shape and form of any stream, its banks or tributaries.

Montana Department of Environmental Quality (DEQ)

- 318 Authorization: 75-5-308 MCA - The proposed construction would likely increase suspended sediment and turbidity to levels above established standards under all of the action alternatives. Therefore, a short-term exemption from surface water quality standards (318 authorization) from the Montana DEQ would be needed before project construction could commence.

- MPDES Permit: 75-5-401 MCA - If construction would require dewatering pumping, a Montana Pollutant Discharge Elimination System Permit (MPDES) would be required from DEQ.

- Storm Water Discharge: 75-5-401 MCA - A Storm Water Discharge Permit, issued by DEQ, may be required during construction under all of the action alternatives.

Montana State Historic Preservation Office (SHPO)

- Montana Antiquities Act: 22-3-421 through 442 MCA - Clearance from the SHPO indicating no adverse effects to cultural or historic resources as a result of the construction would have to be secured.

U.S. Army Corps of Engineers (COE)

- Federal Clean Water Act: 33 C.F.R. 209 and 40 (404-Permit) – This permit is required when a project will result in the discharge or placement of dredged or fill material in waters of the United States. "Waters of the United States" includes lakes, rivers, streams, wetlands and other aquatic sites. It is anticipated that some dredged or fill material may be placed below the high water level of the reservoir during the proposed construction.

U.S. Fish and Wildlife Service (USFWS)

- Endangered Species Act: 16 U.S.C 1531-1544 - Compliance and Consultation

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the alternatives that were analyzed in this EA.

2.1 Development of Alternatives

There are many possible variations or alternatives to any proposed action. However, the purpose of developing project alternatives is to address issues or potential problems raised by the proposed project. In addition to the No Action and the Proposed Action, other alternatives have been developed and are described in section 2.2. In 1989 the DNRC contracted with HKM Associates to conduct a Rehabilitation Feasibility Study of the dam for upgrading the dam to then current dam safety standards. The draft study was summarized in a 1995 report to DNRC (Appendix E). The study included the following elements:

- Land Resource and Ownership
- Flood Hydrology and Water Availability
- Geotechnical Investigation and Analysis
- Rehabilitation Plan with Alternatives and Cost Estimates
- Project Evaluation with Farm Budget Analysis and Economic Analysis

In early 2002 DNRC applied the newly adopted Montana Dam Safety spillway standards to the North Fork of the Smith Dam. The required spillway capacity was then determined by calculating the estimated loss of life in the inundation area below the dam, then computing the design floods. The dam was found to be unable to route the required design storm under the new rules. Consequently, the original Feasibility Study has been reviewed and modified to advance a preliminary design which would meet the new spillway standards. These alternatives were developed primarily through the feasibility study conducted by HKM.

Primary Issues

The primary issue that has emerged through the feasibility study and agency contacts is how the proposed project will alleviate public health and safety concerns related to the dam's unsafe condition, while continuing to provide economic benefits with the least amount of negative environmental impact. Primary to this issue is how the project may affect water quality, water flows, fisheries and stream bank erosion downstream from the dam. Some downstream irrigators are concerned that addressing water quality concerns will in some way effect their ability to divert and utilize the water they require for irrigation and stock watering. The DFWP is concerned about flows for reservoir and downstream fisheries resources. The DEQ expressed concerns on water quality and identified the need to continue collecting additional water quality data so baseline information can be established and the development of a Total Maximum Daily Load (TMDL) plan can proceed.

It is these concerns that have resulted in the inclusion of the proposed water quality protection recommendations as part of the action alternatives presented in Section 6.0.

Other Relevant Issues

As identified in Chapter 1.0, other relevant issues are raised by the proposed project. These include, among others, potential effects to land use, wetlands, soils, wildlife, cultural resources, recreational resources, and social and economic considerations. The effect of each alternative on these individual resource areas is examined and compared in the succeeding chapters.

2.2 Description of Alternatives

Various alternative spillway configurations were presented in HKM's 1995 Feasibility Report. The original alternatives were designed to meet the "probable maximum flood" (PMF) criteria for dam safety standards in effect at that time (0.75 of PMF of 40,000 cfs). The spillway configuration alternatives had to pass 30,000 cfs to meet these standards. Consequently, these alternatives represent configurations that are larger than now necessary to pass the design flood. Due to recent changes in criteria for setting Montana Dam Safety spillway standards, an additional alternative was developed by State Water Projects engineers in early 2002 to meet the new Montana spillway standards which are based upon loss of life factors. A summary of the alternative spillway and embankment configurations is provided in Table 1.

NORTH FORK OF THE SMITH DAM REHABILITATION
ALTERNATIVE SPILLWAY AND EMBANKMENT CONFIGURATIONS

(HKM 1995 Feasibility Study Alternatives for 0.75 PMF X 40,000cfs)

Auxiliary Spillways								
	Principal Spillway		Right Abutment		Left Abutment		Max. W.S. Elev	Top of Dam
Alternative	Crest Elev.	Crest Length	Crest Elev.	Crest Length	Crest Elev.	Crest Length	for 30,000 cfs	Elevation
1	5488.30	120	5490.3	278	NA	NA	5498.20	5500.5
1A	5488.30	120	5490.3	210	NA	NA	5499.20	5501.5
2	5490.00	130	5492.0	350	NA	NA	5499.20	5501.5
2A	5490.00	130	5492.0	240	NA	NA	5500.20	5502.5
3	5490.00	130	5492.0	249	5495.00	300	5498.70	5501.0
3A	5490.00	130	5492.0	175	5495.00	210	5499.70	5502.0
4	5488.30	120/70*	5493.9*	120	NA	NA	5497.80	5498.0

* Effective labyrinth crest length/channel width, with top of fuse plug elevation

(SWPB alternative preliminary design - 50 loss of life design flood at 18,100 cfs, modified from HKM alternative 4):

5	5488.30	120/70**	5492.0**	100	NA	NA	5497.87***	5498.0

**Effective labyrinth crest length/70-ft actual side-to-side width, crest elevation without fuse plug
***Maximum water storage elevation for 18,500 cfs

Table 1

The new alternative 5 spillway configuration is designed to pass an 18,000 cfs design storm (to account for future growth). This is twice the minimum occurrence interval. Alternative 5 is a modified version of HKM's alternative #4.

Alternatives 1, 1A, 4 and 5 maintain the principal spillway crest at the present top of flashboards elevation (5,488.3' feet). Storage capacity and reservoir operations will not be changed under these alternatives.

The remaining alternatives (2, 2A, 3, 3A) include raising the principal spillway crest 1.7 feet above the existing top of flashboards to elevation 5,490.0.

The alternatives are organized into five alternative spillway configurations (1 – 5) with alternatives 1 – 3 having two alternative embankment configurations. Alternatives 1 – 3 utilize rock fill over the downstream face at a slope of 1.85H:1.0V to raise the embankment. Two feet of rock riprap is added to the upstream face to improve the rapid drawdown stability. The second embankment configuration (alternatives 1A – 3A) utilizes 1.5H:1V slopes on the upstream and downstream faces for the raised area. The upstream face would also be covered with two feet of riprap.

Implementation of the alternatives (other than the No Action alternative) would follow the same procedures and schedules, as detailed in Appendix C. The action alternatives would have similar environmental impacts, since the proposed construction activities and schedules are essentially the same for each of the three action alternatives. Any variance of potential impacts with the action alternatives will be identified for each issue studied in detail as presented in section 4.

No Action

The *No Action Alternative* serves as a baseline description for current conditions at the project site. The current conditions at the project site would continue.

The no action alternative would result in continued degradation of the dam and associated structures, possibly resulting in partial or total failure of the dam in the event of a flood episode, thereby increasing the threat to property and people living downstream. Downstream water quality could be negatively impacted due to the erosion and turbidity that would result from partial or total failure of the dam, with possible negative impacts to reservoir and downstream aquatic habitats. Water available for agricultural and recreational use could also be negatively impacted if no action is taken.

Spillway Alternatives

Alternative 1

Alternative 1 utilizes a rock auxiliary spillway channel adjacent to the principal spillway on the right abutment with the principal spillway crest equal to the present top of flashboards.

Alternative 2

Alternative 2 also utilizes a rock auxiliary spillway adjacent to the principal spillway on the right abutment, but with the principal spillway crest 1.7 feet above the present top of flashboards.

Alternative 3

Alternative 3 utilizes two auxiliary spillway channels – one adjacent to the principal spillway on the right abutment and one on the left abutment. The principal spillway crest is 1.7 feet above the present top of flashboards.

Alternative 4

This alternative was designed for minimal raise of the embankment. The design utilizes a labyrinth crest principal spillway with an adjacent rock channel auxiliary spillway. The labyrinth crest elevation would be equal to the present top of flashboards. The rock channel would include a fuse plug dike designed to wash out at extreme flood events. The fuse plug, under the new spillway standards provides an auxiliary spillway with a larger capacity than needed to pass the design flood.

Alternative 5

The alternative 5 utilizes the labyrinth crest principal spillway with an adjacent rock channel auxiliary spillway as in HKM's alternative 4. However, the fuse plug dike is not used in the auxiliary rock channel because spillway design flood standards are achieved without the additional excavation and installation costs. The labyrinth crest elevation would be equal to the present top of the flashboards. The spillway would be designed for a flow capacity of 18,500 cfs (50 loss of life factor) with the reservoir water surface at the present top of dam. No tower modifications are required for this alternative.

3.0 - AFFECTED ENVIRONMENT

To evaluate potential impacts resulting from the proposed project and the other alternatives described in Chapter 2.0, it is necessary to understand the current environmental condition of the project area.

3.1 Geology

The dam and reservoir site lies in a narrow depression between the Castle Mountains on the south and the Little Belt Mountains on the north, through which the North Fork of the Smith River Flows. The rocks range in age from Belt (Pre-Cambrian) to late Tertiary. The entire reservoir, except a narrow strip above the dam, is in basalt. Geologic units that outcrop within the area include Tertiary sediments and recent alluvium.

3.2 Topography

The area consists of basin and range topography, completed by thrust faulting, with gentle to steeply sloping terrain. Landforms in the area are dominated by benchlands, rolling hills and buttes, with moderate to steep grades, bisected by entrenched stream courses and drainages. Elevations range from 5,400 to 6,300 feet.

3.3 Water Resources

Groundwater: Inventories conducted by the Montana Bureau of Mines and Geology (MBMG) indicates that groundwater exists in sufficient quantities within the Tertiary sediments common in the area for most stock and domestic needs. Shallow ground water in alluvium generally occurs under unconfined conditions. Flow rates as measured at several wells in the project area range from 9 to 79 gallons per minute, with ground water depths ranging from 1 to 89 feet. Ground water quality varies greatly within the area, with the median dissolved-solids concentrations ranging from .005 to 119 milligrams per liter. The pH of ground water in the area ranged from 6.8 to 8.5.

Surface Water: The main surface waters include the North Fork of the Smith River Reservoir (Lake Sutherlin) and the North Fork of the Smith River. The water in the North Fork of the Smith River is generally classified as fair to good quality. Surface water quality and quantity are highly variable, depending on the existing climitalogical and hydrological conditions. The amount of total dissolved solids (TDS) in water is an indication of the salinity. TDS concentrations are considered moderate in the North Fork of the Smith River. Dissolved oxygen is needed to sustain aquatic life, with concentrations of over 7 mg/l generally considered best for cold-water fisheries. Nitrogen and phosphorous are essential for aquatic plant growth, however, high concentrations can cause excessive algal growth, which depletes dissolved oxygen. Nitrogen concentrations of less than 5mg/l are desirable, while phosphorous concentrations of less than 0.1 mg/l are desirable. Water quality data for the North Fork of the Smith River is summarized in Table 2. The main surface water quality problems are caused by non-point type sources, which include agricultural runoff, irrigation returns and similar sources. Problems identified include high sediment loads, nutrient enrichment, and algal growth. The North Fork of the Smith River is listed by the DFWP as a chronically dewatered stream due to the significant flow variations experienced through the year.

Table 2

Water Quality Data for the North Fork of the Smith River

Total Dissolved Solids (mg/l)		Dissolved Oxygen		Nitrate	Phosphorous
Middle	Range	Middle	Range	Range	Range
268	181-366	9.2	6.6-13.6	<0.05-.21	<0.05-0.23

Source – unpublished USGS water quality data, 1982-1996 mg/l=milligrams per liter

Wetlands: Seeps immediately downstream from the dam have formed a small wetland (less than ½ acre). No other known wetlands exist within the project area.

Water Rights and Reservations: The North Fork Smith River Water Users Association currently has 11,000 acre-feet of water under contract, divided among 29 water users (i.e. farms and ranches). Approximately 100 people are served directly by the Project, while an estimated 1,300 are indirectly served (e.g. non-agricultural uses such as fishing). During the 1980s the MT Department of Fish, Wildlife and Parks (DFWP) applied for several flow reservations within the Smith River Basin. The purpose of the DFWP reservations was to set aside a minimum river flow to protect fisheries habitat. These reservations have no force and effect as provided in the Board of Natural Resources and Conservation Final Order concerning water reservations in the Upper Missouri River Basin because of the current basin closure. The DFWP reservations serve only as an indication of flows needed for fisheries habitat.

3.4 Soils

Soils are generally undifferentiated alluvium, shallow and well drained, with the major soil order of the area being the Mollisols-Entisols, comprised of alluvium and shale parent material. The most common soil types include loams and clay loams in shale, sandy clay and clayey sediments, with soil depths ranging from 20 to 40 inches. The soil-mapping units within the proposed disturbed area have not been specified as land of "statewide importance."

3.5 Vegetation

The plant communities present in the project area include pasture grassland, irrigated cropland, and floodplain vegetation, including sage, willow, cottonwood, water birch, dogwood, alder, rose, snowberry and buffalo berry. The shoreline of the reservoir and adjacent land supports good native grass, especially to the north.

Species of Special Concern: No rare, threatened or endangered plant species, species of special concern, or communities are known to exist in the project area.

Weeds: Spotted knapweed is broadly distributed around the shore of the reservoir, with the highest densities along the west shore. Canada thistle, musk thistle, houndstongue, and common mullein occur in varying densities around the entire shore. The south shore, which is where the majority of recreational use occurs, is the most significant problem area for weed infestations.

3.6 Wildlife

Wildlife commonly found in the vicinity of the project area include moose, elk, mule deer, white-tailed deer, pronghorn, beaver, muskrat, mink, Colombian ground squirrel, mountain lion, black bear, coyote, fox, raccoon, badger, sage grouse, sharp-tailed grouse, ruffed grouse, ring-necked pheasant, Canada geese, great blue heron, sand hill crane and a variety of duck and song bird species. Raptors that have been sighted in the area include bald eagles, golden eagles, great horned owls, turkey vultures, osprey and red-tailed hawks. Osprey, golden and bald eagles and great-horned owls are not year-round residents of the area.

Species of Special Concern: No threatened, endangered or species of special concern have been observed within the project area.

3.7 Fisheries

Fisheries resources found in the North Fork of the Smith River Reservoir include rainbow and brook trout, longnose sucker, white sucker, mountain whitefish, and burbot. An active stocking program for the Reservoir is in place, with approximately 12,000 rainbow trout stocked every two years under the direction of the DFWP. Fisheries resources found in the North Fork of the Smith River include brown, brook and rainbow trout, longnose sucker, mottled sculpin, mountain whitefish and white sucker. The North Fork of the Smith River is listed by the DFWP as a chronically dewatered stream due to the significant flow variations experienced through the year. The DFWP filed for an instream flow reservation of 9 CFS along the entire length of the river. The reservation has no force and effect as provided in the Board of Natural Resources and Conservation Final Order concerning water reservations in the Upper Missouri River Basin because of the current basin closure. The DFWP reservation serves only as an indication of flows needed for fisheries habitat.

Species of Special Concern: No threatened, endangered or species of special concern have been observed within the project area.

3.8 Ownership and Land Use

Land Ownership: Land ownership within the project area and immediate vicinity of the reservoir includes federal, state and private lands.

Land Use: Primary uses of the land in the vicinity of the project area include livestock grazing, farming (primarily hay and alfalfa), and recreational use associated with the North Fork of the Smith River Reservoir and surrounding lands. Lewis and Clark National Forest lands exist approximately 3 miles north and 5 miles south of the reservoir. Logging, mining and cattle grazing occur on national forest lands in the area. Cattle grazing also occurs within the project location. The land surrounding the state-owned reservoir is privately owned. U.S Highway 12 runs along the south side of the reservoir for approximately 2 miles.

Regulatory Restrictions on Private Property Rights: The North Fork of the Smith River Reservoir and Dam are owned by the State of Montana. The North Fork of the Smith River Water Users Association is in charge of the daily operation and routine maintenance of the dam. No regulatory restrictions on private property are associated with the normal operation and maintenance of the dam and reservoir.

Wilderness: No designated wilderness or wilderness study areas exist in the immediate area.

3.9 Cultural Resources

The North Fork of the Smith River Dam has been documented and recorded as a cultural resource (site number 24ME347) due to the dam's age. The dam was completed in 1936. An unpublished cultural resources inventory was completed in December, 1995 by Anthro Research of Livingston Montana. The inventory recorded 15 historic and prehistoric sites, including the dam itself. The sites are identified and described on the cultural site location map and Cultural Resource Site Forms in Appendix A.

Cultural Uniqueness and Diversity: No unique cultures or cultural diversities exist in the immediate project area.

3.10 Noise

Existing noise sources in the project area are from agricultural and recreational activities, traffic on Highway 12, and birds and animal life.

3.11 Air Quality

The air quality in the area is generally considered good. Significant reductions in visibility are generally weather related.

3.12 Transportation Facilities

The primary transportation facilities in the project area include U.S Highway 12 and several non-improved dirt access routes.

3.13 Socio - Economic

Economic activity:

Economic activity is almost entirely dependent on agriculture, with livestock production, grazing, hay and alfalfa being the major local commodities. Logging and mining occur within the Lewis and Clark National Forest and other state and private land in the area. Other economic activity is generally associated with the recreational use of the reservoir and surrounding area.

Employment:

Agricultural and agricultural related business account for the majority of the jobs in the area. Logging, mining, service sector businesses and government account for the remainder of the job base in the region.

Recreation

Recreational use at the North Fork of the Smith River Reservoir is light to moderate, with fishing the most common activity. Angling use varies depending on the local water conditions, with an average of 3,400 angler days annually, based on DFWP angling use surveys conducted every two years from 1991 to 2001. An undeveloped camping / day use area exists on the south shore of the reservoir. Other recreational activities in the area include boating, camping, picnicking, swimming, hunting, and wildlife viewing.

Communities:

Towns in the vicinity of the project include White Sulphur Springs (population 984), located 12 miles west of the dam, Checkerboard (population less than 50), located 10 miles east of the dam, Martinsdale (population less than 200), located 27 miles east of the dam and Harlowton (population 1,092) located 50 miles east of the dam.

Risks / Health Hazards:

The North Fork of the Smith River Dam has been classified as high hazard. A high hazard dam is one whose failure would endanger lives. This classification is not a reflection of the actual condition of the dam; however,

an inspection of the structure completed in 1981 by the Army Corps of Engineers classified the dam as "unsafe and in need of repair" due to deterioration and inadequate capacity of the spillway.

Emergency Response / Emergency Evacuation Plans

An Emergency Action Plan developed by the SWPB of the DNRC is in place.

Public Services / Taxes / Utilities:

Public services and utilities in the area include routine road maintenance and repair, police and fire protection, and electrical and telephone service. Small rural hospitals are located in White Sulphur Springs and Harlowton. The local tax base is primarily dependent upon agricultural land uses, outdoor recreation and related businesses.

4.0 - ENVIRONMENTAL CONSEQUENCES

This chapter is organized in the same order as Chapter 3.0, with the probable consequences of the action alternatives (effects of construction) described for each resource area, along with the probable consequences of the no action alternative. Please note that the probable consequences of the identified action alternatives are the same, since each action alternative would essentially involve the same construction activities in the same sequence. The exception is probable consequences to cultural and historic resources, fisheries, water rights and usage, and socio-economics, where differences do exist between the action alternatives. This is due to several action alternatives that would raise the storage capacity of the reservoir. This is discussed in detail in each respective section.

4.1 Geology

EFFECTS OF NO ACTION

No effect

EFFECTS OF CONSTRUCTION

No effect

4.2 Topography

EFFECTS OF NO ACTION

The potential for failure of the dam in the event of a major flood episode would be high due to the existing serious structural deficiencies with the spillway. Topography could potentially be altered downstream from the dam in the event of its failure due to the severe channel erosion and scouring that could occur from floodwaters.

EFFECTS OF CONSTRUCTION

Effects of construction on topography would be minor and very localized. The borrow area would be disturbed due to the removal of material for the cut and fill operation. The spillway area and outlet areas of the dam will

also experience disturbance because of the proposed construction. Approximately 20 acres would be disturbed surrounding the dam (see appendix A). All disturbed areas will be reclaimed upon project completion. Effects to topography are negligible and non-significant in the long term.

4.3 Water Resources

Ground Water:

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

No effects to ground water are anticipated.

Surface Water:

EFFECTS OF NO ACTION

The reservoir would be lost should the dam fail.

EFFECTS OF CONSTRUCTION

Short-term impacts to reservoir and downstream water quality may occur due to possible increases in turbidity during construction. The effects would be minimized by the majority of work being performed above the water level, and the placement of erosion control structures. Long-term impacts are negligible and non-significant. Historic minimum flows would be maintained throughout the duration of the project to the greatest extent possible. Low flows have been experienced in 2000, 2001 and 2002 due to an extended severe drought.

Wetlands:

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

No effects. It is not anticipated that the small wetland (less than ½ acre) formed by seepage immediately below the dam would be significantly impacted by the proposed rehabilitation project. No fill would be placed in the wetland during the construction.

Water Rights and Reservations:

EFFECTS OF NO ACTION

Water reservations and water rights could be affected if no action is taken should the spillway fail due to disrepair or excess stress on system components, such as what would be experienced during a major flood episode.

EFFECTS OF CONSTRUCTION

Alternatives 1, 1A, 4 and 5 maintain the principal spillway crest at the present top of flashboards elevation (5,488.3' feet). Storage capacity and reservoir operations will not be changed under these alternatives.

The remaining alternatives (2, 2A, 3, 3A) include raising the principal spillway crest 1.7 feet above the existing top of flashboards to elevation 5,490.0. The increased storage of 524 AF would potentially provide additional water for agricultural use.

No negative effects on water reservations and water rights to downstream water users are anticipated with any of the action alternatives. The project would have the beneficial effect of allowing for the continuing use of the reservoir for irrigation and recreation.

4.4 Soils

EFFECTS OF NO ACTION

Soils downstream from the dam could be negatively effected from excessive erosion should the dam fail.

EFFECTS OF CONSTRUCTION

Site disturbance would occur during construction, with approximately 20 acres encompassing the proposed construction zone. Some soil compaction may occur due to heavy equipment operation. Approximately 30,000 cubic yards of soil would be used in the cut and fill operation; however, no significant impacts are anticipated as a result of the construction. Effects would be minor in the short-term due to the majority of the work being performed above the water level and the placement of erosion control structures to minimize any potential surface runoff. Effects are negligible and non-significant in the long-term because of reclamation of all areas disturbed during construction.

4.5 Vegetation

EFFECTS OF NO ACTION

Vegetation would be lost due to flooding should the dam fail.

EFFECTS OF CONSTRUCTION

Some vegetation will be removed as part of the construction and for equipment access. Effects are negligible in the long-term due to reclamation and replanting / reseeding of all disturbed areas. Approximately 20 acres of vegetation would be affected by the proposed project.

Species of Special Concern:

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

No threatened, endangered or species of special concern will be affected as a result of the construction.

Weeds:

EFFECTS OF NO ACTION

Noxious weeds could be spread by floodwaters should the dam ever fail.

EFFECTS OF CONSTRUCTION

An increase in noxious weeds may occur due to soil disturbance and equipment operation. Effects are negligible in the long term due to reclamation and weed control implementation.

4.6 Wildlife

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

Effects would be minor to wildlife in the short-term due to the increased activity associated with the construction. Long term impacts to wildlife are negligible and non-significant.

Species of Special Concern:

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

No threatened, endangered or species of special concern will be affected as a result of the construction.

4.7 Fisheries

EFFECTS OF NO ACTION

Downstream fisheries could be negatively impacted should the dam fail due to increased turbidity and erosion. The reservoir fisheries would be lost should the dam fail.

EFFECTS OF CONSTRUCTION

Alternatives 1, 1A, 4 and 5 maintain the principal spillway crest at the present top of flashboards elevation (5,488.3' feet). Storage capacity and reservoir operations will not be changed under these alternatives. Consequently, new impacts on fisheries resources will not occur.

The remaining alternatives (2, 2A, 3, 3A) include raising the principal spillway crest 1.7 feet above the existing top of flashboards to elevation 5,490.0. The increased storage of 524 AF would potentially benefit fishery resources at minimum pool.

Short-term minor impacts to fisheries in the reservoir and downstream from the dam may occur with all of the

action alternatives as a result of a temporary increase in sediments during the construction phase of the project. The effect would be minimized by the placement of erosion control structures to reduce runoff and prevent sediments from entering the reservoir and river, and from all of the work being performed above the water level. Flow levels would be maintained at historic levels to the greatest extent possible throughout the duration of the project to protect downstream fisheries resources. The effect would be temporary and end upon project completion. Long-term impacts to fisheries are negligible and non-significant.

Species of Special Concern:

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

No threatened, endangered or species of special concern will be affected as a result of the construction.

4.8 Ownership and Land Use

Land Ownership:

EFFECTS OF NO ACTION

No effect

EFFECTS OF CONSTRUCTION

No short or long term negative impacts are anticipated with any of the action alternatives.

Land Use:

EFFECTS OF NO ACTION

The availability and delivery of agricultural irrigation water could be impacted if the spillway is not repaired.

EFFECTS OF CONSTRUCTION

The project will not interrupt the flow of water for agricultural irrigation. No land use changes would occur at the project site.

Government Regulatory Restrictions on Private Property Rights:

EFFECTS OF NO ACTION

No effect

EFFECTS OF CONSTRUCTION

The project will not impose any additional regulatory restrictions on private property rights

Wilderness:

EFFECTS OF NO ACTION

No effect

EFFECTS OF CONSTRUCTON

No effect (no designated wilderness or wilderness study areas exist in the area)

4.9 Cultural Resources

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

Cultural resource impacts are negligible under Alternatives 1, 1A, 4 and 5, as reservoir operations would not change. The remaining alternatives would potentially cause impacts to cultural sites due to inundation from higher water levels associated with raising the crest height of the dam and require mitigation. The cultural resources that exist near the project area above the new high water level associated with Alternatives 2, 2A, 3 and 3A would not be impacted by the construction. The dam has been recorded as an historic structure due to its age (site number 24ME346). The North Fork of the Smith River Dam will be maintained and operated into the foreseeable future. The general shape and structure of the dam will not be significantly changed with any of the action alternatives. Repairs, maintenance and modifications will be needed over time to protect public health and safety, and to insure the continued use of the reservoir for agriculture and recreation. The DNRC Archeologist has recommended that the dam is eligible for inclusion on the National Register of Historic Places under Criterion A. Any cultural resources discovered will be preserved or mitigated by the implementation of measures recommended by the SHPO.

Cultural Uniqueness and Diversity:

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

No effects (no unique cultures or cultural diversities would be impacted by the project)

4.10 Noise

EFFECTS OF NO ACTION

No effects

EFFECTS OF CONSTRUCTION

Noise levels will increase temporarily during the construction period. The increased noise will end upon completion of the project.

4.11 Air Quality

EFFECTS OF NO ACTION

No Effects

EFFECTS OF CONSTRUCTION

Some pollutants and odors will occur as a result of the equipment operation. The effects will be negligible and end with the completion of the project.

4.12 Transportation Facilities

EFFECTS OF NO ACTION

Portions of U.S. Highway 12 and various county roads downstream from the dam could be flooded should the dam fail.

EFFECTS OF CONSTRUCTION

Increased construction related traffic might be experienced on U.S. Highway 12. The effect would be minimal and cause no disruptions in regular traffic flow, or create any safety concerns. These impacts will be mitigated by the implementation of traffic control and safety procedures as recommended by the Montana Department of Transportation and the County Road Supervisor. The effect would be temporary and end upon completion of the project.

4.13 Socio – Economic

Economic Activity:

EFFECTS OF NO ACTION

Irrigation water flows could be disrupted if the dam's infrastructure is allowed to further deteriorate, thus potentially affecting the agricultural economy of the surrounding area.

EFFECTS OF CONSTRUCTION

Alternatives 1, 1A, 4 and 5 maintain the principal spillway crest at the present top of flashboards elevation (5,488.3' feet). Storage capacity and reservoir operations will not be changed under these alternatives.

The remaining alternatives (2, 2A, 3, 3A) include raising the principal spillway crest 1.7 feet above the existing top of flashboards to elevation 5,490.0. The increased storage of 524 AF would potentially provide additional water for agricultural use. This could have a beneficial effect on the area's agricultural based economy.

There would be no negative effect to the area's economy from the construction associated with any of the action alternatives. There would be a temporary beneficial increase in economic activity associated with the construction (e.g. motel and local restaurant use, temporary project related jobs, contractor purchases, etc.).

Quantity and Distribution of Employment:

EFFECTS OF NO ACTION

Local jobs related to agriculture could be negatively impacted should the dam fail.

EFFECTS OF CONSTRUCTION

Additional local employment opportunities may result from the construction. The jobs would most likely be temporary in nature and exist for the duration of the project.

Recreation:

EFFECTS OF NO ACTION

Recreational opportunities associated with the reservoir would be lost upon failure of the dam.

EFFECTS OF CONSTRUCTION

Some recreational use may be disrupted by the construction activity (i.e. fishing, boating, picnicking and camping). The area receives light to moderate recreational use throughout most of the year. Visitors to the area may also experience an increase in noise levels due to heavy equipment operation. One camping / access area within the construction zone would be temporarily closed for the duration of the project. These impacts are minor, temporary and non-significant in nature and would end with the completion of the project.

Community Impacts:

EFFECTS OF NO ACTION

White Sulphur Springs, population 984, located downstream from the dam could be seriously impacted during a flood episode due to the unsafe condition of the spillway, which increases the chances of structural failure of the dam.

EFFECTS OF CONSTRUCTION

No negative impacts are anticipated.

Risks / Health Hazards:

EFFECTS OF NO ACTION

White Sulphur Springs, population 984, located downstream from the dam could be seriously impacted during a flood episode due to the unsafe condition of the spillway, which increases the chances of structural failure of the dam.

EFFECTS OF CONSTRUCTION

The risk of failure of the dam would be greatly reduced with the proposed construction.

Emergency Response / Emergency Evacuation Plans

EFFECTS OF NO ACTION

No effect

EFFECTS OF CONSTRUCTION

No effect - The current Emergency Action Plan will not change as a result of the construction.

Public Services / Taxes / Utilities:

EFFECTS OF NO ACTION

Telephone and power lines could be washed out in various locations should the dam fail.

EFFECTS OF CONSTRUCTION

No effect

5.0 CUMMULATIVE EFFECTS

The EA to this point has discussed impacts that could result solely from the proposed rehabilitation project. This section will discuss impacts that may occur when the rehabilitation project is added cumulatively to other potential changes or developments.

No specific projects have been identified that, taken cumulatively with the dam rehabilitation, will cause any significant, long-term environmental impacts. Impacts associated with increased stream sedimentation could occur should any new, large-scale mining or logging operations or major road construction occur within the North Fork of the Smith River drainage. No projects or operations of this nature have yet been identified or are anticipated.

EFFECTS OF NO ACTION

No significant cumulative environmental impacts are anticipated at the present time. The impacts of no action involve increased risks to property and lives downstream and the possible disruption of irrigation water to downstream water users. There would be an increasing danger of failure of the dam should a major flood episode occur due to the existing inadequate spillway capacity. The no action alternative could also negatively

affect the use of the reservoir for recreational purposes. This could potentially have a negative affect to the area's economy, which is heavily dependent on agriculture and outdoor recreation.

EFFECTS OF CONSTRUCTION

All impacts cited are minor, temporary in nature, non-significant, and will end with the completion of the project. No cumulative environmental effects of the construction are anticipated. All areas disturbed will be reclaimed upon completion of the project. The project as proposed will not conflict with any local, state or federal laws, regulations or formal plans, and will not establish a precedent or likelihood that future actions with potential significant environmental impacts will be proposed. It is anticipated that the proposed action will not generate any substantial debate or controversy about the nature of any potential or identified impacts. The project as proposed would have long-term positive impacts, as detailed in the Comparison Table on page 25.

6.0 PREFERRED ALTERNATIVE AND PROPOSED MITIGATION

6.1 Preferred Alternative

The preferred alternative is Alternative 5, as discussed below, along with an explanation of why this alternative was selected over the other proposed action options.

Please note that the final construction design of the preferred alternative, as implemented, may vary somewhat from that described in the feasibility study. This is normally experienced in projects of this type due to problems and/or issues encountered during construction that necessitate engineering and design changes to fulfill project goals, objectives, and stay within established budgets and schedules. Any variances in the construction design and engineering of the project would not change any of the identified environmental affects or alter the significance of any identified impacts since the construction sequence, disturbed areas, access routes and construction schedule would not change.

Alternative 1 - No Action

The no action alternative would result in continued degradation of the dam and associated structures, possibly resulting in partial or total failure of the dam in the event of a flood episode, thereby increasing the threat to property and people living downstream. Downstream water quality could be negatively impacted due to the erosion and turbidity that would result from partial or total failure of the dam, with possible negative impacts to aquatic habitats in the North Fork of the Smith River and the Smith River. Water available for agricultural and recreational uses could also be negatively impacted if no action is taken. The no action alternative would not be acceptable due to the ever-increasing risk to the public and property downstream from the dam.

Action Alternatives

Seven alternative spillway configurations were presented in HKM's 1995 Feasibility Report. The original alternatives were designed to meet the "probable maximum flood" criteria for dam safety standards in effect at that time (0.75 of PMF of 40,000 cfs). The spillway configuration alternatives had to pass 30,000 cfs to meet these standards. Consequently, these alternatives represent configurations that are larger than now necessary to pass the design flood. Due to recent changes in criteria for setting Montana Dam Safety spillway

standards, an eighth alternative was developed by State Water Projects engineers in early 2002 to meet the new Montana spillway standards.

Although the original HKM alternatives were designed to pass a larger flood event than is now necessary, the alternatives were still considered in a relative sense for purposes of comparison and discussion in this EA. If the various configurations in the alternatives were downsized to meet current spillway standards, the most cost effective alternative would still be alternative #5 (see Appendix B).

The new alternative 5 spillway configuration is designed to pass an 18,000 cfs design storm (to account for future growth). This is twice the minimum occurrence interval. Alternative 5 is a modified version of HKM's alternative #4.

Alternatives 1, 1A, 4 and 5 maintain the principal spillway crest at the present top of flashboards elevation (5,488.3' feet). Storage capacity and reservoir operations will not be changed under these alternatives. Consequently, new impacts on wildlife, fisheries or cultural resources will not occur.

The remaining alternatives (2, 2A, 3, 3A) include raising the principal spillway crest 1.7 feet above the existing top of flashboards to elevation 5,490.0. Although the increased storage of 524 AF would benefit the fishery at minimum pool, and potentially benefit the local agricultural based economy by the availability of additional irrigation water, the raise in normal pool elevation would impact cultural resource sites around the perimeter of the reservoir.

Preferred Alternative 5

The preferred alternative 5 utilizes the labyrinth crest principal spillway with an adjacent rock channel auxiliary spillway as in HKM's alternative 4 (Figures 4 & 5). However, the fuse plug dike is not used in the auxiliary rock channel because spillway design flood standards are achieved without the additional excavation and installation costs. The labyrinth crest elevation would be equal to the present top of the flashboards. The spillway would be designed for a flow capacity of 18,500 cfs (50 loss of life factor) with the reservoir water surface at the present top of dam. No tower modifications are required for this alternative.

Cost estimates were originally prepared for seven alternatives by HKM based on 1995 unit prices. The original seven alternatives were designed for passing a 30,000 cfs flood event and the greater associated construction costs reflect the larger design criteria. Cost estimates based on current unit prices and quantities for the preferred alternative 5 are presented in appendix B. Alternative 5 represents the most cost effective option to meet the new spillway standards while factoring in a projected population growth at double the present population. The cost of the alternatives 2, 2A, 3 and 3A are significantly higher than the preferred alternative (see appendix B). The benefits to fisheries and economic activity by the increased storage capacity is offset by the significantly higher construction costs, and the negative impacts to cultural resources surrounding the reservoir. The benefits of increased storage would most likely not be experienced every year due to the highly variable hydrologic conditions in the basin.

The preferred alternative would not change existing operations at the project, minimizes any potentially negative environmental impacts to the greatest extent possible, and provides the most economically feasible alternative for rehabilitation.

6.2 Proposed Mitigation

Water Quality Protection:

The proposed project would include the implementation of erosion and stormwater containment and control measures, including, but not limited to: silt fencing, straw bales, check dams, drain inlet protection, dry ponds,

and drainage swales. These structures would be designed to prevent and/or minimize non-point water pollution. Best management practices would be also utilized, following the guidelines in the Montana Sediment and Erosion Control Manual (DEQ 1996).

Fisheries: To the greatest extent possible, historic minimum flows would be maintained throughout the duration of the project to protect downstream fisheries resources.

Recreation: Recreationists would be informed of any hazards associated with the project site by the use of on-site signs. News releases would also be issued and published in local newspapers informing the public of potential hazards or construction related recreational restrictions. The information and hazard signs would be no smaller than 4 feet by 6 feet in size, and positioned in prominent locations that are visible to recreationists.

6.3 Need for an EIS

Because no significant impacts were identified, DNRC believes this EA would be sufficient to comply with the MEPA and that an EIS would not be required. A comparison table for the action alternatives and the no action alternative follows: Note that all identified minor impacts are short-term and would end upon, or shortly after, completion of the project.

Comparison Table – No Action and Action Alternatives:

RESOURCE	ALTERNATIVE	
	No Action	Action
Geology	None	None
Topography	Potentially Adverse	Minor
Water Resources		
Groundwater	None	None
Surface Water	Potentially Adverse	Minor
Wetlands	None	None
Water Rights	Potentially Adverse	None
Soils	Potentially Adverse	Minor
Vegetation	Potentially Adverse	Minor
Species of Special Concern	None	None
Weeds	Potentially Adverse	Minor

Appendix A Project Location / Construction Diagrams / Cultural Resources Map

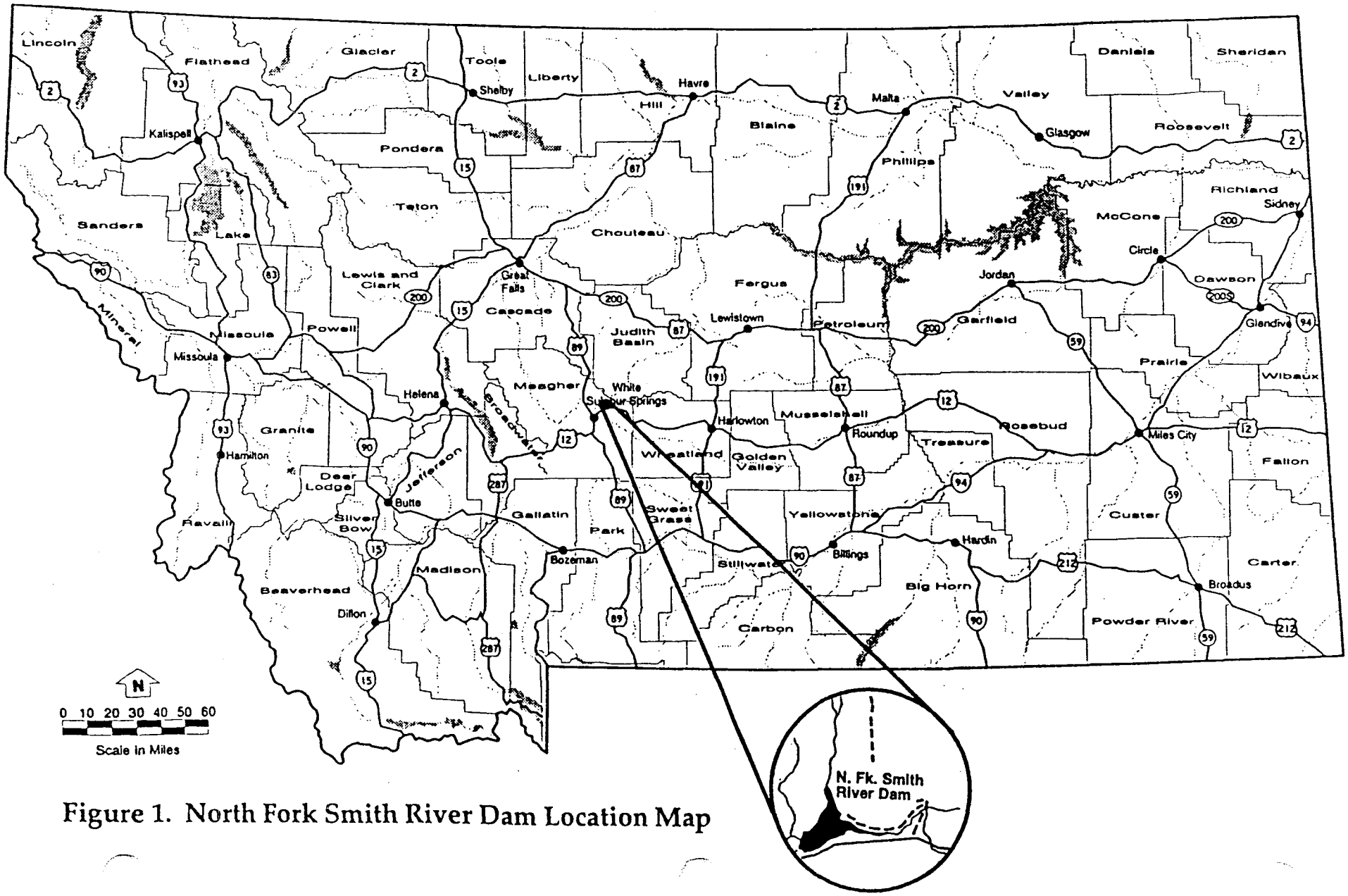


Figure 1. North Fork Smith River Dam Location Map

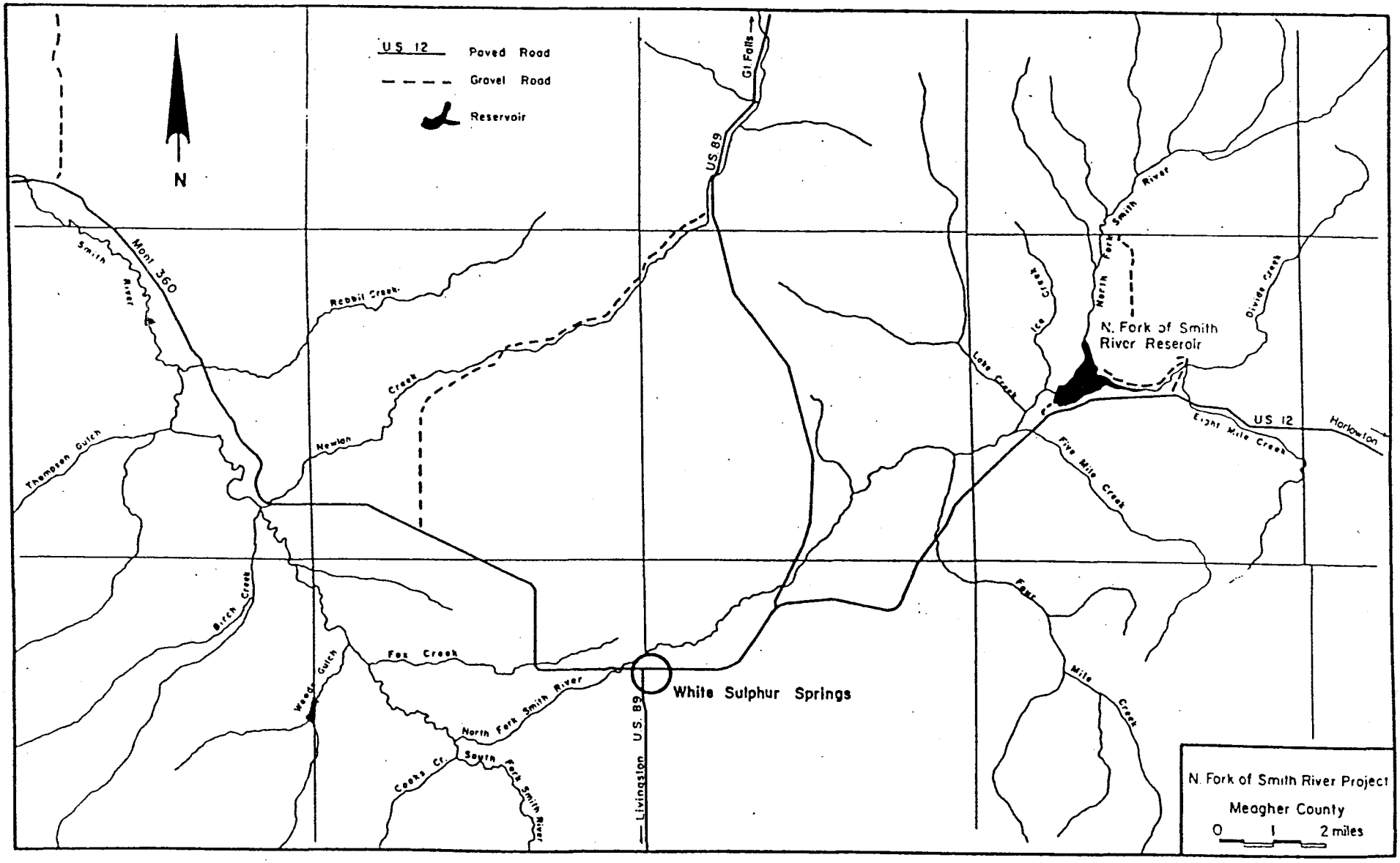
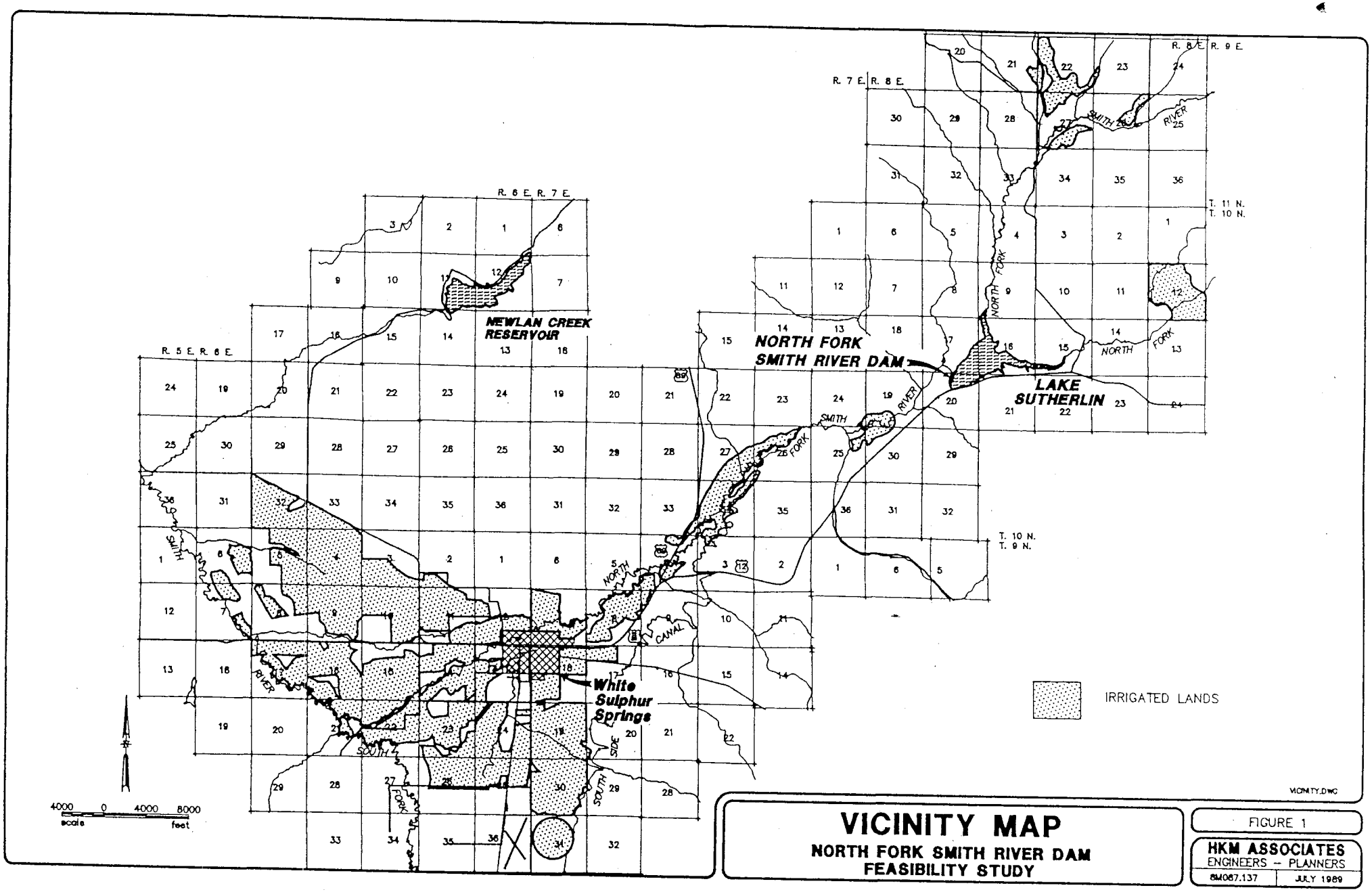


Figure 3. NORTH FORK SMITH RIVER DAM PROJECT



VICINITY MAP

NORTH FORK SMITH RIVER DAM
FEASIBILITY STUDY

FIGURE 1

HKM ASSOCIATES
ENGINEERS – PLANNERS

8M067.137 | JULY 1989

Appendix B Estimated Project Cost

Project Budget

Estimated Total Project Cost - Approximately $908,000 (including in-kind)

The costs of this project were originally estimated for seven rehabilitation alternatives in HKM's 1995 draft feasibility study. A new preferred alternative with associated quantities and updated unit costs was developed by State Water Projects engineering staff to meet new Montana Dam Safety spillway standards (Alternative 5). The individual cost breakdowns for the preferred alternative 5 are included in this section in Table 1.

The project is estimated to cost approximately $825,000 based on the updated feasibility calculations. This figure includes design and construction costs to be incurred in FY 2004 and 2005, commencing in July 2003. The design and construction cost estimates account for spillway demolition / new construction, auxiliary spillway excavation, drain installation and the embankment crest raise and leveling. An inflation factor of 8% over 2 years was applied, as well as a 20% contingency.

Engineering design and construction administration costs are estimated at $100,000, or about 12% of the projected total budget. Construction, which accounts for about 65% of the funding request at $537,625 would not begin until final design work, environmental permitting, and cultural resources work is completed.

A summary of funding sources and amounts includes the following:

EPP – FY2004 & 2005 (Water Storage Account)	$300,000
Renewable Resource Loan	$425,000
Renewable Resource Grant	$100,000
Total	$825,000

Total estimated project costs (including in-kind) are approximately $908,000

NORTH FORK SMITH DAM REHABILITATION - COST ESTIMATE
Alternative 5
Two Cycle Labyrinth Spillway, without fuse plug
Assumes 70-foot primary spillway and 100-foot rock auxiliary spillway

PRELIMINARY

Item No.	Item	Quantity		Unit Cost	Total Cost
1	**Raise Embankment**				
A	Excavation / Stripping	1000	CY	$3.50	$3,500
B	Rock Fill & Riprap	200	CY	$25.00	$5,000
C	Riprap Filter Gravel	200	CY	$25.00	$5,000
D	Road Surfacing Gravel	750	CY	$30.00	$22,500
E	Embankment Drains	800	LF	$30.00	$24,000
2	**Modify Spillway**				
A	Remove existing spillway	1	LS	$50,000	$50,000
B	Concrete Flatwork	120	CY	$250.00	$30,000
C	Concrete Walls	150	CY	$450.00	$67,500
3	**Excavate Auxiliary Spillway**				
A	Rock Excavation	20,000	CY	$13.00	$260,000
				Subtotal	$467,500
4	Mobilization & Misc	15%			$70,125
	Base Construction Cost				**$537,625**
5	Cultural Res. Mitigation		LS		$20,000
6	Design & Constr. Admin		LS		$100,000
7	Contingencies	20%			$107,525
Total Project Cost					**$765,150**
8	Inflation (2 yrs @ 4%)	8%			$61,212
TOTAL PROJECT COST (FY2004)					**$826,362**

Table 1

North Fork of the Smith Dam Rehabilitation
DNRC In-Kind Cost Estimate

Administrative and Technical Support:

- 0.8 FTE for approximately 18 months
- 2080 hrs. per year
- average administrative and technical support rate is approximately $30.00 per hour

(0.8 FTE) x (2080 hrs. / yr.) x 1.5 yrs. = 2496 hrs. x $30.00 =

Sub Total $74,880

Travel:

- 90 days field time primarily during construction
- 20 overnights
- 190 miles round trip from Helena
- assume rental rate of $0.34 per mile

75 days x 190 miles x $0.34 =

Sub Total $4,845

Motel at 20 nights x $36.40 =

Sub Total $728

Meals at $23/day x 90 days =

Sub Total $2,070

Estimated Total $82,523

RESOURCE	ALTERNATIVE		
	No Action		Action
Wildlife	None		Minor
Species of Special Concern	None		None
Fisheries	Potentially Adverse		Minor
Species of Special Concern	None		None
Ownership/Land Use	Potentially Adverse		Minor
Cultural Resources Unique/Diversity	None None		None None
Noise	None		Minor
Air Quality	None		Minor
Transportation	Potentially Adverse		Minor
Socio-Economic			
Economic Activity	Potentially Adverse		Minor
Quantity / Distribution of Employment	Potentially Adverse		Minor
Recreation	Potentially Adverse		Minor
Communities	Potentially Adverse		Minor
Risks / Health Hazards	Potentially Adverse		None
Emergency Response / Emergency Evacuation Plans	None		None
Public Services/ Taxes / Utilities	Potentially Adverse		None
Cumulative Impacts	None		None

6.4 Project Implementation

It is anticipated that this project will be completed with a traditional design-bid-build sequence. The DNRC State Water Projects Bureau will manage the project. A qualified consultant selected in conformance with state laws and regulations will complete the design and construction administration. One or two prime contractors selected through a competitive bidding process will complete the construction. Beginning in August 2003, the DNRC will begin the project with the selection of a consultant for the design and construction administration. A design / bid package would be developed in the fall of 2003, with a construction contractor selected in the winter or spring of 2004. Construction would begin in the summer of 2004, with project completion scheduled for the fall of 2004. The new spillway would be operational prior to spring runoff in 2005.

The DNRC State Water Projects Bureau will provide staff for management and oversight of the project. As previously noted, the design, construction administration and construction will be contracted services. The details of the administration and schedule will be refined during final design. Appendix C provides a proposed project development schedule.

7.0 GLOSSERY OF TERMS

100-year flood: The 100-year flood is a flood event that has a one-in-100 chance of being equaled or exceeded in any year.

Acre-foot: The volume of water that would cover an area equivalent to 1 acre, 1 foot deep, or 43,560 cubic feet (325,851 gallons).

Aggregate: Sand and gravel materials used to make concrete or roller-compacted concrete or used to surface roads.

Aquatic Habitat: The place in which water-dependent plants or animals normally live.

Aquifer: A water-bearing layer of permeable rock, sand, or gravel.

Borrow source: An excavated area where material may be mined/removed for use as fill at another location.

Breach: A break in a dam embankment created by erosion of the embankment materials or by excavation to remove a portion of a dam. A catastrophic breach would be due to dam failure and would release the entire storage content of the reservoir in a brief period. A controlled breach would drain the reservoir to reduce the storage capacity over an extended period.

CFS: Measure of water flow rate in cubic feet per second. One cfs is equal to about 450 gallons per minute.

Chute: The face or channel of a dam's spillway.

Crest: The top face of a dam's spillway or dam itself.

Cubic yard: Volume measurement used in construction equal to a 3-foot cube or 27 cubic feet or 202 gallons.

Cumulative effects: A general estimation of the effects of project impacts in combination with other past, present, and reasonably foreseeable future developments.

Emergency spillway: A spillway structure used to pass infrequent or large flows. Earth-lined emergency spillways may suffer damage from use.

Endangered species: A wildlife species that is listed by the U.S. Fish and Wildlife Service as being in danger of extinction throughout all or a significant portion of its range.

Floodplain: Land that may be submerged by flood waters; a plain built up by stream deposition.

Full pool: Reservoir at spillway crest.

High hazard: A dam whose failure would result in the loss of life; not a statement of condition.

Inflows: Water flowing into a reservoir.

Lithic: Relating to or made of stone.

Long-term impact: Impacts that occur beyond the actual construction timeframes.

Mitigation: Measure taken to lessen an impact.

Outflow: Releases from a project made through the outlet works or spillway.

Prehistoric: Existing in times predating written history.

Primary gate: Gate in the outlet works of a dam used to make normal releases.

Probable maximum flood: The largest possible precipitation event expected in an area based on the most severe combination of hydro-meteorological conditions that are considered reasonably possible for the drainage basin under study.

Roller-compacted concrete (RCC): A concrete mix used to construct gravity dams, placed with conveyors and/or heavy equipment, and compacted with large vibratory rollers.

Secondary gate: Gate in the outlet works of a dam reserved for emergency operation or used during maintenance of the primary gate.

Spillway: Structure used to discharge large quantities of water around the dam without damaging the dam.

Spillway Design Flood: The peak flood flow used to size the maximum discharge capacity of a dam's spillway.

Stilling basin: An open structure or excavation at the foot of a chute or spillway to reduce the energy of the descending stream.

Threatened species: A wildlife species that is federally listed because it is likely to become endangered in the near future.

Total maximum daily load (TMDL): In practice, TMDLs are water quality restoration targets for point and non-point pollution that are contained in water quality restoration plans or in a permit.

Turbidity: Condition of water carrying suspended sediment.

Wetlands: Lands that are generally covered by shallow water or where the ground water table is very close to the surface. Wetlands are generally defined as marshland and riparian habitat.

8.0 REFERENCES

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3. North Fork of the Smith River Dam Rehabilitation Feasibility Study Report, HKM Engineering, March 1995.

4. Cultural Resource Investigations: North Fork of the Smith River Dam, Meagher County, Montana Anthro Research, Livingston Montana (unpublished). Developed for MSE-HKM, Inc. December 1995

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6. A Guide to the Montana Environmental Policy Act – Environmental Quality Council, John Mundinger and Todd Everts, October 2000.

7. Mt Department of Natural Resources and Conservation Historic Cultural Resources Site Form – North Fork Smith River Dam and Reservoir, MT DNRC Trust Lands Division, Patrick Rennie and Jim Domino. March 2002

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11. MT Natural Heritage Program – Data Query on Plant and Animal Species of Special Concern, May 2003.

12. MT Fish, Wildlife and Parks Fisheries Information System, North Fork Smith River and Lake Sutherlin (N. Fork Smith River Reservoir) – Data Query, May 2003

9.0 LIST OF PREPARERS

Jim Domino, DNRC – natural resources, socio-economic issues/impacts, MEPA compliance
Dolores Eustice, DNRC – editorial review, EA distribution
Rob Kingery, DNRC – engineering supervision and review, budgets, project timeframes
Kevin Smith, DNRC - budgets, project timeframes, administrative oversight
Craig Stiles, DNRC – budgets, project timeframes, grants and funding information
Art Taylor, DNRC - engineering review and site evaluation, construction timeframes

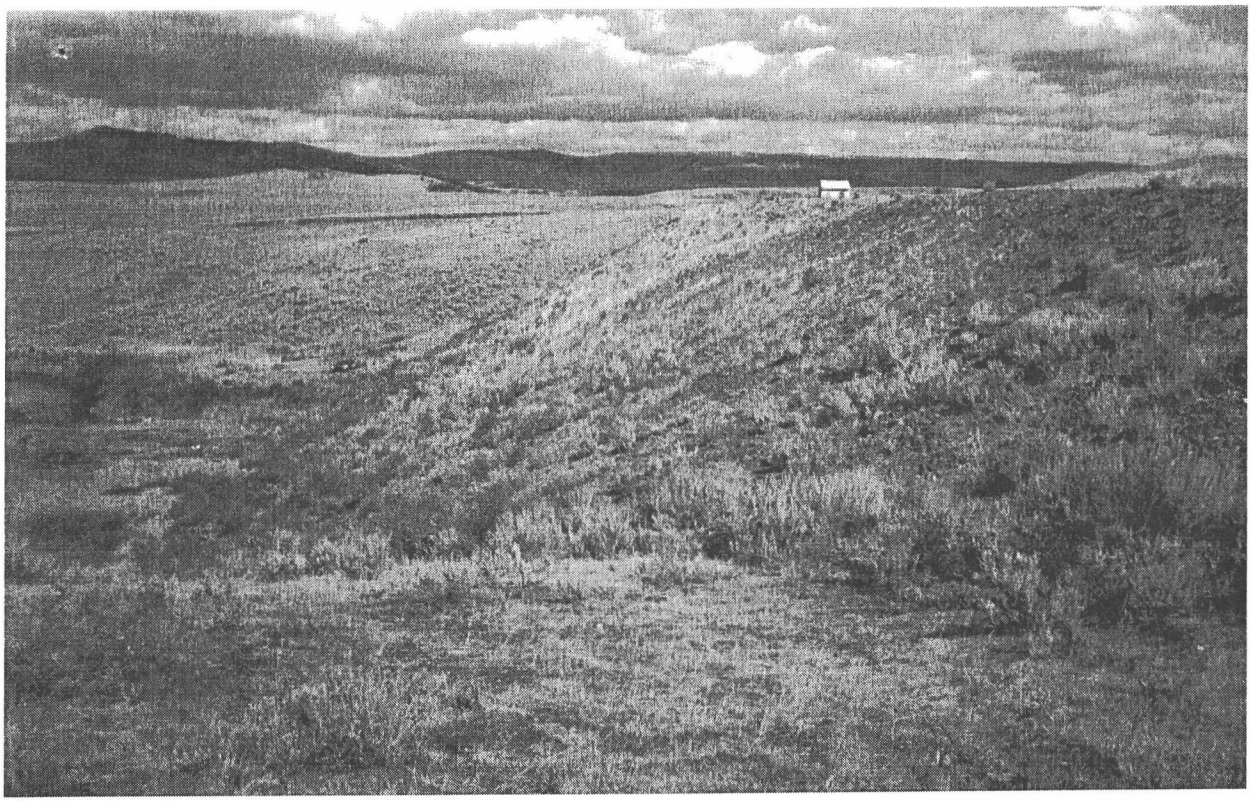
Appendix C Proposed Project Schedule

NORTH FORK OF THE SMITH DAM REHABILITATION PROJECT - Preliminary Schedule

	2003						2004														
TASK	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR
Consultant Selection																					
Final Design																					
Collect Additional Data if Needed																					
Final Design Configuration																					
Design Review																					
Prepare Construction Documents																					
Construction Bidding & Award																					
Construction																					
Reservoir Drawdown																					
Spillway Demolition																					
Spillway Excavation																					
Spillway Construction																					
Drains																					
Reclamation and Restoration																					
RRGL Grant & Loan (HB 6 & 8) Funding																					
Sign Grant/Loan Agreements																					
Request Grant Fund transfer to Org. No.																					
Request Loan Activation																					
CARDD Quarterly Reports																					

7/15/2003

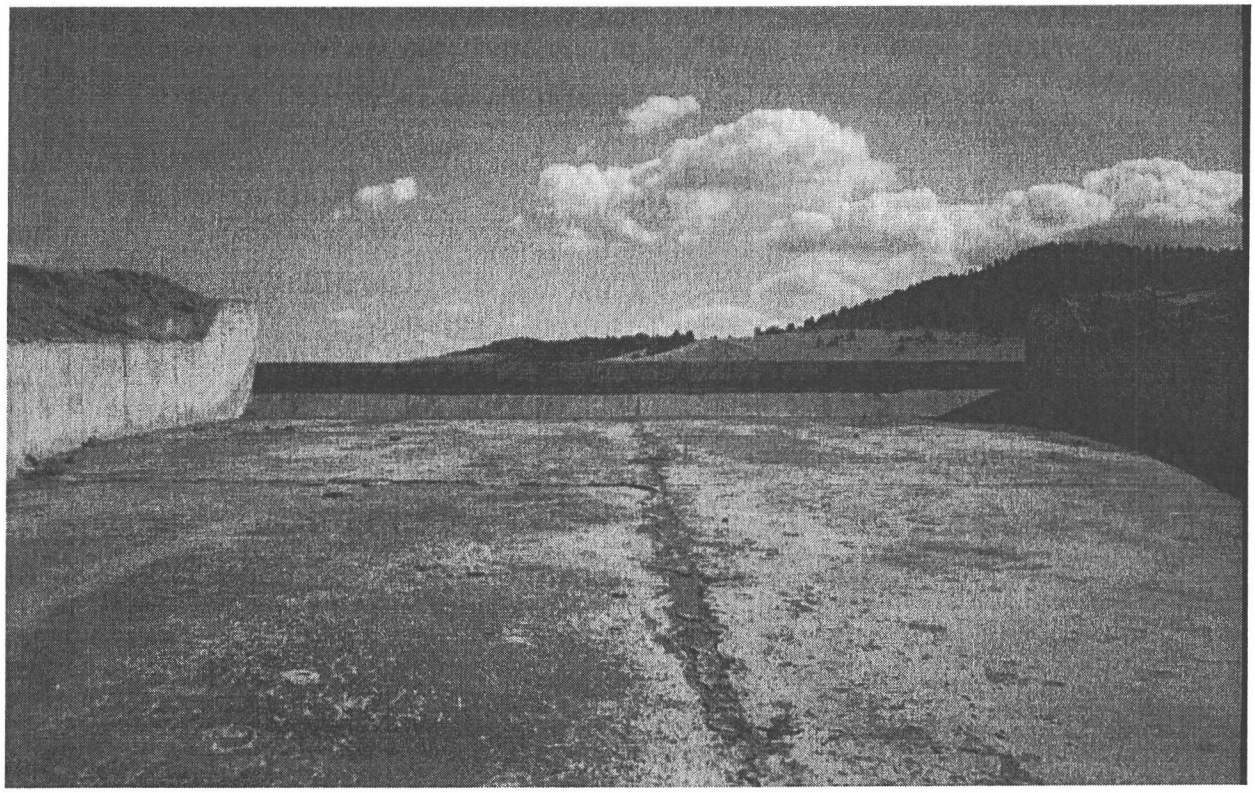
Appendix D Photographs / Fact Sheet



Downstream face of dam, looking north

Upstream face of dam, looking north

Existing outlet structure



Existing spillway

Appendix D

NORTH FORK SMITH RIVER DAM

Fact Sheet

PROJECT DESCRIPTION

- Located on the North Fork of the Smith River in Meagher County
- 10 miles East of White Sulphur Springs
- Owned by DNRC & managed by SWPB
- Operated by Smith River WUA since 1936

- Project consists of:
  - Earthen Embankment Dam, 84 feet high
  - Concrete chute spillway
  - Gated, reinforced concrete outlet conduit

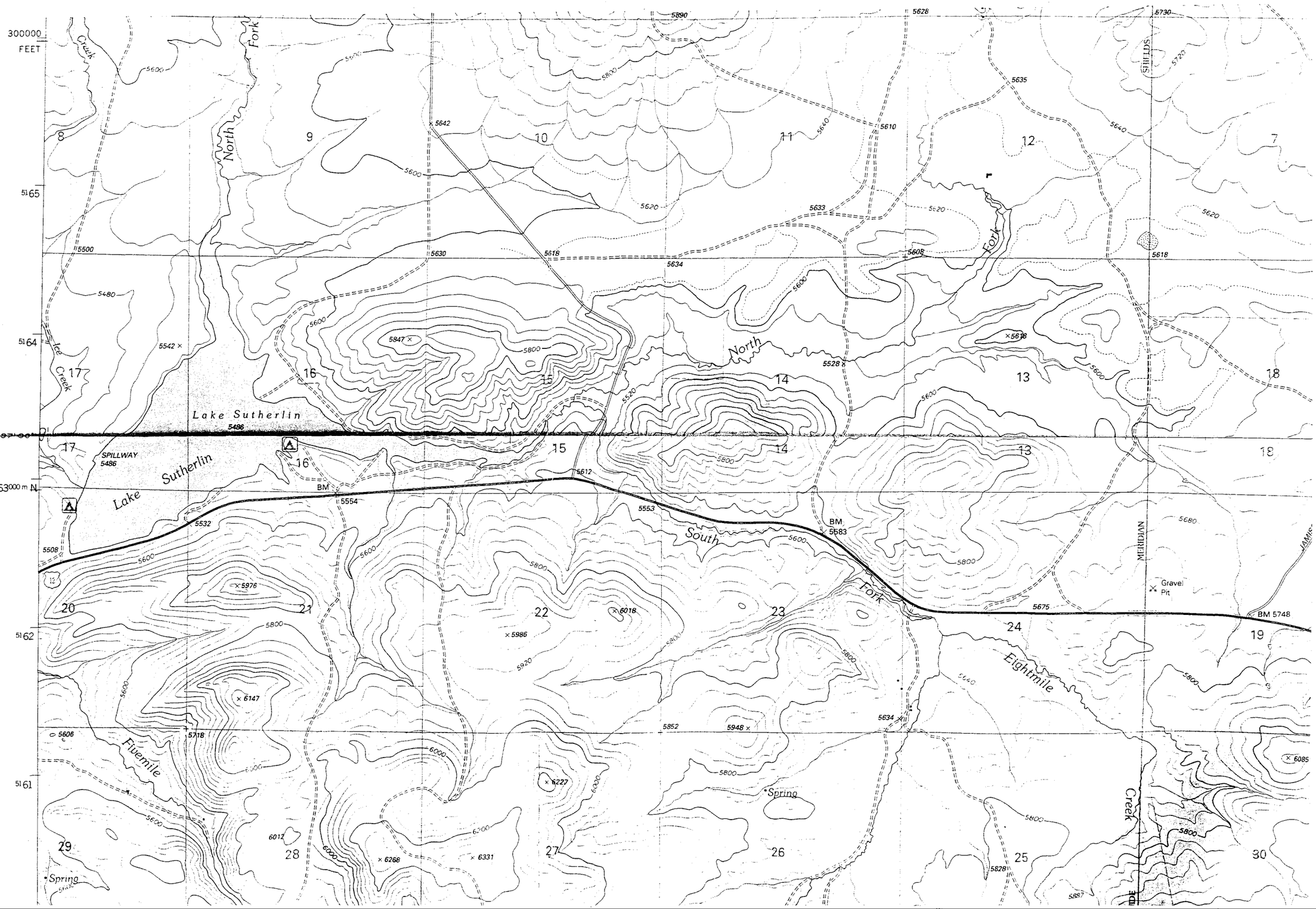
- Original construction completed in 1936
- Normal storage is 11,500 acre-feet
- 29 water users have 40 contracts and irrigate approximately 11,000 acres with one canal (Southside Canal; 13.2 miles long)
- The dam is a "high hazard" structure, which means that its failure could cause loss of life Numerous roads, bridges, and utilities are located in the flood plain. White Sulphur Springs, (pop. 1,018) would begin flooding approximately 3 hours after failure of the dam.

PROJECT DEFICIENCIES

- The North Fork Smith River Dam suffers from several deficiencies and cannot safely route the required inflow design flood for a dam of its size and hazard classification, as required by the MT Dam Safety Act.
- Severe concrete deterioration exists in the spillway floor and walls, and major structural concrete replacement is required to correct the deficiencies.
- Excessive seepage threatens structural integrity

PROPOSED REHABILITATION

- New structural two-cycle labyrinth weir concrete spillway in same location as the old one
- Raising and leveling the dam crest
- Replacing the outlet works terminal structure with a new structure of similar design.
- Add a rock lined auxiliary spillway channel
- Install new drains for seepage control
- Estimated cost: $908,000
- Funding sources include proposed RRGL Grant and Loan, DNRC in-kind contribution, and Water Storage Account revenue.
- The Water Users will increase contract water charges by approximately $3.10 per share to service debt on the new $425,000 loan.


300000
FEET
5165
5164
5163000 m N
5162
5161
Lake Sutherlin
SPILLWAY
5486
Lake Sutherlin
North Fork
Ice Creek
North Fork
South Fork
Eightmile
Fivemile
Creek
MERIDIAN
SHIELDS
Gravel Pit
BM 5748
BM 5554
BM 5583
Spring
Spring
5847
5976
6018
5986
6147
6227
6268
6331
6012
5852
5948
5634
5828
5887
6085
5542
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5718
5606
5675
5553
5612
5532
5508
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5480
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5618
5634
5608
5610
5633
5635
5642
5620
5640
5600
5800
5920
6000
5890
5628
5730
5720
5680

Construction zone boundary

EXISTING SPILLWAY CHUTE

APPROXIMATE EXISTING RIGHT OF WAY BOUNDARY

Construction zone boundary

PROPOSED LABYRINTH SPILLWAY

Sutherlin Ridge site 24 MEAGH

SUTHERLIN RESERVOIR

TP204 TP206 TP207 TP208 TP209 TP210

DH101 DH102 DH103 DH105 DH106 DH107 DH108 DH109 DH110 DH111 DH112 DH114 DH115 DH116 DH120

S=0.020 S=0.025

WALL

scale 100 0 100 200 feet

CONTOUR INTERVAL = 2 FEET

ALTERNATIVE 5 FEATURES

TOP OF DAM ..... ELEV.=5498.0

LABYRINTH SPILLWAY CREST ..... ELEV.=5488.3

CREST WIDTH = 70 FT.

LEGEND OF EXISTING FEATURES

- COORDINATE GRID TICK
- GROUND SURFACE CONTOURS
- EDGE OF ROAD OR TRAIL
- EDGE OF WATER
- TREES OR BUSHES
- CONCRETE STRUCTURES
- DH101 DRILL HOLE LOCATION
- TP204 TEST PIT LOCATION

No.	Revision	By	Date

WARNING: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

Project No. BM087.137 • ALT-4N.DWG • Date APR 1994 • Designed JHT • Drawn GAE • Checked JHT • Approved

NORTH FORK SMITH RIVER DAM REHABILITATION
MEAGHER COUNTY, MONTANA

FINISHED TOPOGRAPHY

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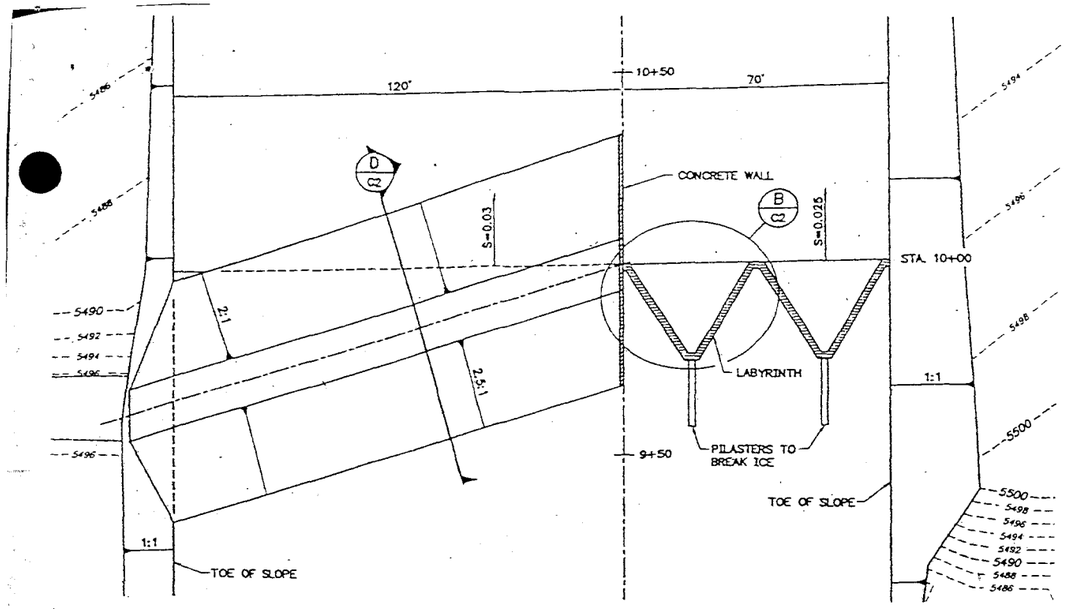
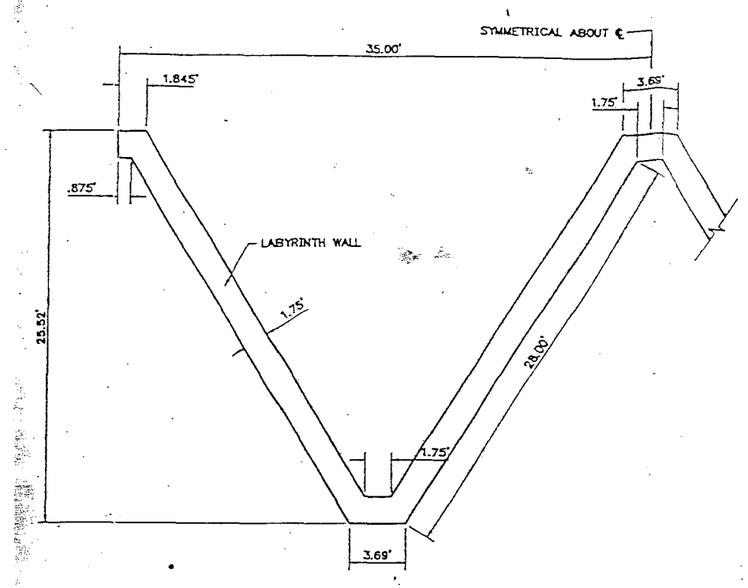
C-1



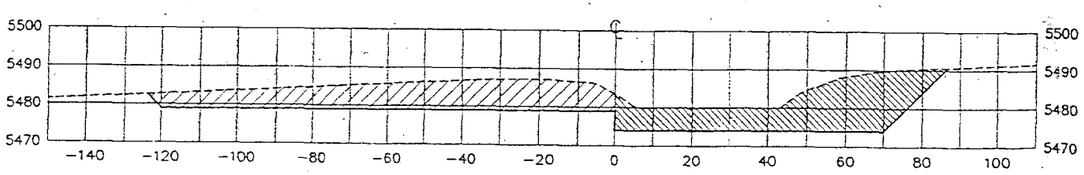
A C2 DETAIL
LABYRINTH SPILLWAY

20 0 20 40
scale feet



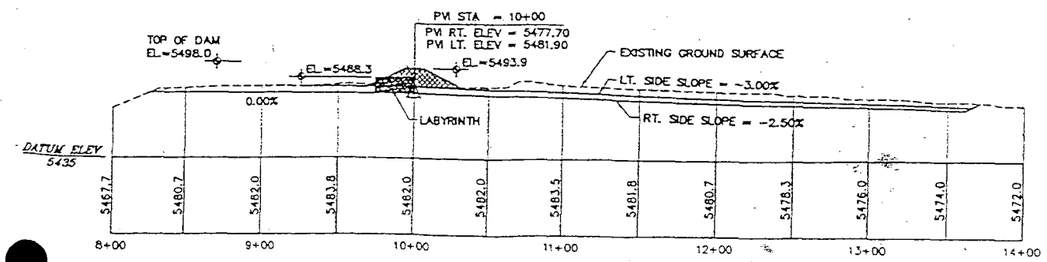
B C2 DETAIL
LABYRINTH DIMENSIONS

5 0 5 10
scale feet



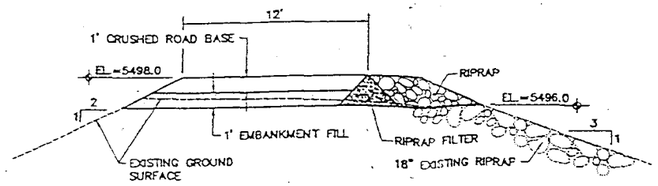
C C2 TYPICAL SECTION
LABYRINTH SPILLWAY

20 0 20 40
scale feet



PROFILE

50 0 50 100
scale feet
HORIZ. & VERT.



E C2 SECTION
EMBANKMENT CREST

5 0 5 10
scale feet

• Project No. BM087.137 • A4-DTL.DWG • Date APR. 1994 • Designed JHT • Drawn GAE • Checked JHT • Approved

No.	Revision	By	Dat

WARNING
0 ½ 1"
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

NORTH FORK SMITH RIVER DAM REHABILITATION
MEAGHER COUNTY, MONTANA

Alternative 5 Sections and Details

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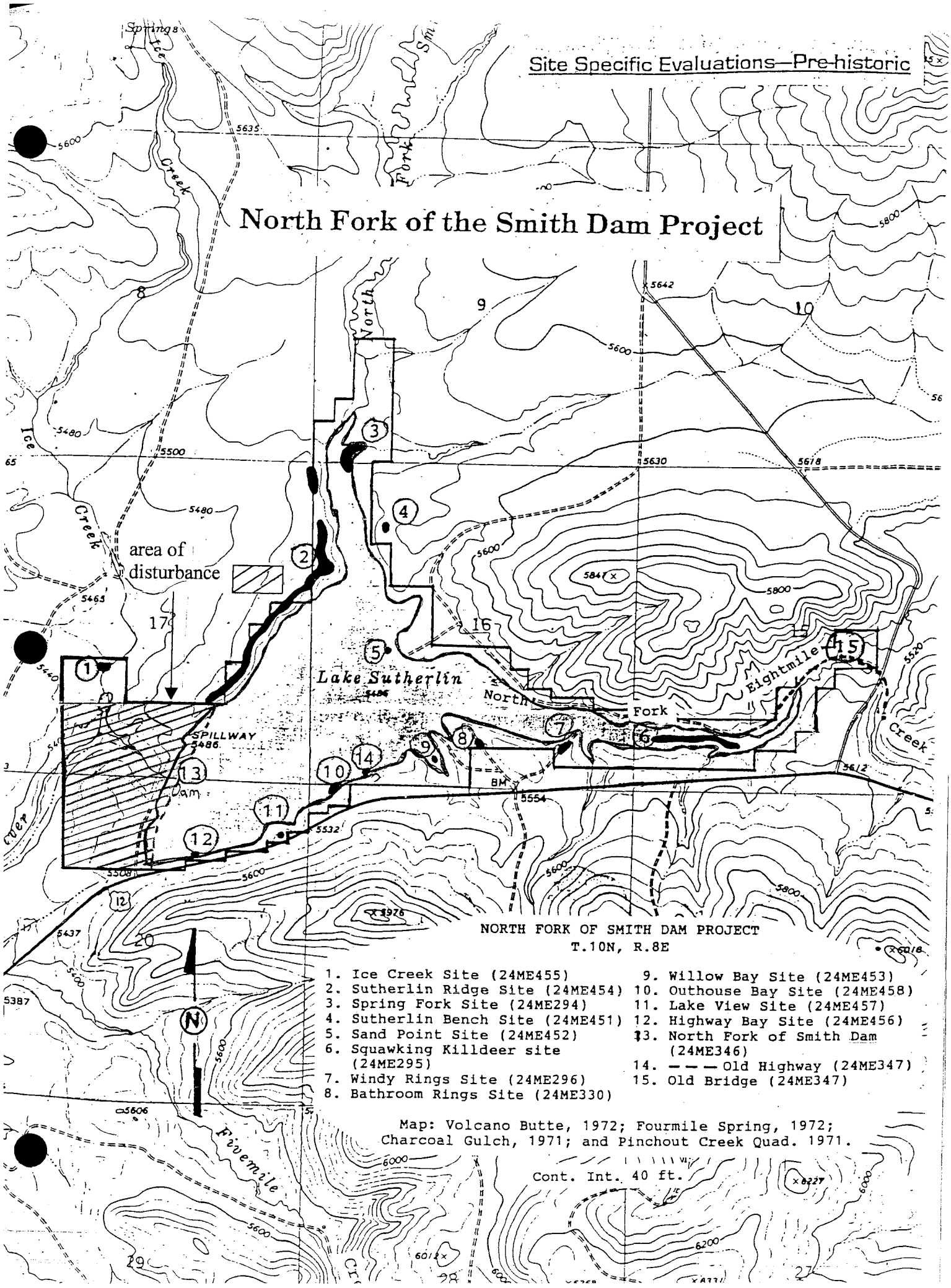
• Bozeman & Miles City, Montana

Sheet No.
C-2
of 10

North Fork of the Smith Dam Project



NORTH FORK OF SMITH DAM PROJECT
T.10N, R.8E

1. Ice Creek Site (24ME455)
2. Sutherlin Ridge Site (24ME454)
3. Spring Fork Site (24ME294)
4. Sutherlin Bench Site (24ME451)
5. Sand Point Site (24ME452)
6. Squawking Killdeer site (24ME295)
7. Windy Rings Site (24ME296)
8. Bathroom Rings Site (24ME330)
9. Willow Bay Site (24ME453)
10. Outhouse Bay Site (24ME458)
11. Lake View Site (24ME457)
12. Highway Bay Site (24ME456)
13. North Fork of Smith Dam (24ME346)
14. — — — Old Highway (24ME347)
15. Old Bridge (24ME347)

Map: Volcano Butte, 1972; Fourmile Spring, 1972; Charcoal Gulch, 1971; and Pinchout Creek Quad. 1971.