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BASS LAKE DAM RECONSTRUCTION
FINAL ENVIRONMENTAL IMPACT STATEMENT

Bitterroot National Forest
Stevensville Ranger District

September 1995

United State Department of Agriculture
Forest Service

1

SUMMARY

Final Environmental Impact Statement

Bass Lake Dam Reconstruction

Bitterroot National Forest
Stevensville Ranger District
Ravalli County, Montana

September, 1995

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ABSTRACT and SUMMARY

The Bass Lake Dam is in a steep canyon in the Bitterroot Mountains at an elevation of 6,770 feet. It is owned by the Bass Lake Reservoir Company. It was built to it's present size of 43 feet high and 300 feet long in 1952 with bulldozers and dump trucks. It impounds Bass Lake, 100 surface acres and 3,600 acre feet of irrigation water. The lake is located 11 miles northwest of Stevensville, Montana, on the Bitterroot National Forest. A primitive road, 8 miles long, was built to the dam in 1952. The road is now managed as a non-motorized hiking and horse trail.

With the passage of the Wilderness Act in 1964 the area became the Selway-Bitterroot Wilderness. Since 1964, access to the dam and maintenance have been completed primarily with non-motorized equipment. Compliance with federal dam safety laws now requires the dam to have repairs. This will require the use of heavy motorized equipment to add rip-rap to the face of the dam, widen the spillway, fill low spots on the crest of the dam, and replace the outlet pipe and the inlet structure.

The downstream hazard potential is rated high by the Forest Service because failure of the dam would threaten life and property. The Bitterroot Forest Plan, Selway-Bitterroot Wilderness General Managment Direction recognizes the need to use mechanized equipment for the dam to meet federal safety standards.

Eight alternatives for the reconstruction and repair work were developed to respond to the environmental issues. The issues are: preserving wilderness values, protecting watershed and aquatic ecosystems; access to the dam site; work areas and base camp; effects to vegetation; use of motorized and mechanized equipment; dam safety standards, and economics.

Four of the eight alternatives were considered but not studied in detail because they would not meet the purpose and need for action. Four alternatives were studied in detail. All alternatives studied in detail use the minimum tool principal, as prescribed in the Bitterroot Forest Plan.

Alternative 1 is the no action alternative. Without action the dam would remain in noncompliance with safety standards and would continue to threaten downstream lives and property. Catastrophic failure would also adversely affect watershed, fisheries, wildlife, wilderness, and recreation values. **Alternative 2** is the repair of the dam with the use of heavy construction equipment that is walked in on the Bass Creek trail, which would be restored upon project completion. All other equipment, supplies, and personnel would be flown to the site with helicopters. Duration of the project would be 25 days at an estimated cost of $140,000. **Alternative 3** is the repair of the dam using lighter construction equipment that is flown to the site with a heavy-lift helicopter. All access to the site would be with helicopters, and the use of more primitive tools would be required. Duration of the project would be 50 days at an estimated cost of $206,000. **Alternative 4** is the repair of the dam using lighter construction equipment that is walked in on the Bass Creek Trail, which would be restored upon project completion. Duration of the project would be 35 days at an estimated cost of $188,000.

Alternatives 3 and 4 use a lighter excavator that is not capable of excavating and installing the concrete housing for the inlet pipe. A concrete maintenance program would extend the life of the housing for 20-25 years. The concrete maintenance would require the use of helicopter and other motorized equipment in the wilderness every 3-5 years. In 20-25 years, the concrete structure and the inlet pipe would need to be replaced, requiring the heavier excavator used in Alternative 2.

Alternatives 2 and 4 would implement a trail rehabilitation plan for the Bass Creek trail that would correct pre-exisiting drainage problems, and would bring the trail closer to Forest Plan standards. Alternative 2 would create more visual impacts along the trail than Alternatives 3 and 4. The environmental consequences of the alternatives are disclosed in Chapter 4.

The selected alternative is Alternative 2. This alternative utilizes minimum tools for completing all the reconstruction work in one operating season, while protecting wilderness and other resources. Rationale for the selection of this alternative is included in the Record of Decision. Work on the dam is expected to begin in September, 1996.

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CHAPTER 1

Purpose and Need

CHAPTER 1

PURPOSE AND NEED FOR ACTION

I. INTRODUCTION

Bass Lake Dam is owned and operated by the Bass Lake Reservoir Company. The 43-foot high earthen dam impounds the headwaters of Bass Creek, creating Bass Lake, which covers approximately 100 acres and holds 3,600 acre feet of water when full. The facility is authorized with an easement under the acts of 1866 and 1891, and it is located within the Selway-Bitterroot Wilderness on the Bitterroot National Forest. The Wilderness was established by Congress with the Wilderness Act in 1964. The first dam was a log crib structure built between 1897 and 1903, which enlarged an existing lake. The dam was later enlarged from 1911 to 1914. The Forest Service condemned the dam in 1949, and it was constructed to it's present standard in 1952. A low standard road, approximately 8 miles long, was built to the dam at that time for heavy equipment access. This road is managed as Bass Creek Trail #4 and has been administered for non-motorized access since the establishment of the Selway-Bitterroot Wilderness in 1964.

A 15-minute videotape that provides an overview of the Bass Lake project, the affected environment, and the purpose and need for action, is available for public viewing at the Stevensville Ranger Station.

II. PURPOSE AND NEED FOR ACTION

The reconstruction of the Bass Lake Dam is needed to bring the dam to a safe condition that will protect life and property, comply with Federal dam safety standards, and provide and maintain irrigation water to dependent ranchers and agricultural lands. The reconstruction and repair is needed to meet the requirements of the Federal Dam Inspection Act of 1972 (P.L. 62-367), and the Federal Guidelines for Dam Safety of 1979. The dam is currently in an unsafe condition because a Probable Maximum Flood (PMF) has the potential to exceed the capacity of the spillway and overtop the dam. This could cause the dam to erode away. Other repair work is needed to ensure that the dam face, spillway, and the outlet works do not corrode any further. Specific reconstruction needs have been requested by the Forest Service.

The National Dam Inspection Act of August 8, 1972, Public Law 92-367, authorizes the Secretary of the Army, through the Corps of Engineers, to conduct safety inspections of non-federal dams throughout the United States. Inspections are conducted using the Recommended Guidelines for Safety Inspection of Dams.

Under the authority of the National Dam Inspection Act, the Corps of Engineers (COE), and the United States Forest Service (USFS) have classified Bass Lake Dam as a "high hazard" dam. High hazard dams are required to pass the PMF without overtopping the dam. PMF is defined as; "The flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the region and is derived

from probable maximum precipitation." The hazard potential is based on "the loss of life or property that could occur if the structure failed." The failure of Bass Lake Dam would affect the Charles Waters Memorial Campground, at least two residences, several private and County roads and bridges, and several hundred acres of agricultural and ranch lands. The Forest Service requires all dam structures authorized by permit to be maintained to standards ensuring safe and satisfactory performance. Permitted dams are inspected for operation and maintenance deficiencies at frequencies related to their size and storage capacity. High hazard dams are inspected annually. According to Montana House Bill 382, passed in 1991, dams on federal lands are exempt from the Montana Dam Safety Act of 1985. They are regulated by the Federal Guidelines for Dam Safety.

Inspection reports describing the condition of the dam and outlining the need for the proposed actions are included in the project file at the Stevensville Ranger Station. These were prepared by CH2M Hill for the Seattle District Corps of Engineers, Montana Department of Natural Resources and Conservation, and the Forest Service, (April, 1980); Charles L. Walter, P.E. (August, 1989); and Druyvestein, Johnson, and Anderson (October, 1992). In addition, annual inspection reports completed by the Forest Service are filed at the Stevensville Ranger Station.

III. LOCATION

The project is located approximately eight miles west of the Bass Creek Trailhead and the Charles Waters Memorial Campground, within the Bitterroot National Forest, Ravalli County, Montana. The dam is five miles within the Selway-Bitterroot Wilderness. The Bass Creek Trail, (Forest Service Trail #4) leads to the dam and beyond from the trailhead for a distance of about eight miles. The dam is located in the S.E. 1/4, Sec. 30, T. 10 N., R. 21 W. This is approximately 11 air miles northwest of Stevensville, Montana (refer to three maps, end of this chapter). The immediate area affected at the dam site is approximately five acres.

IV. PROPOSED ACTION

The scope of the proposed action is limited to the Bass Creek drainage, Bitterroot National Forest. Connected actions which are also described are: transportation of the equipment, materials, supplies, and personnel; clearing, using, and rehabilitating the Bass Creek Trail, storage of the materials and supplies; and the occupation and supplying of the camp site for the personnel.

This is the proposal as submitted by the permittee for reconstructing and repairing the dam. It meets all engineering and technical compliance standards. The work listed below is required to meet federal compliance standards, and is expected to place the dam in a condition that will not need major repair work for 50 years. Detailed technical specifications and plans have been prepared and submitted by Druyvestein, Johnson, and Anderson, Consulting Engineers. These are available for review in the project file. The proposed reconstruction will not make any changes in water storage capacity,

lake surface level, or historic water flows. (Refer to the photos 1-8 at the end of this chapter).

The condition of the concrete structure that encases the openings of the twin inlet pipes, the headgates, and the trash rack is such that a concrete maintenance program involving patching, grouting, and sealing of the concrete every 3-5 years will extend the life of this structure for 20-25 years. It will then need to be replaced. The proposed action would replace it concurrently with the other repair work needed, completing all work in one season of operation.

1. Description of Work

- Renovate the water transmission pipe that goes through the dam. Currently the pipe includes 220 feet of 30" corrugated metal pipe (CMP) that "wyes" at the inlet into two 24" CMP's. The inlet wye is 14 feet long. The existing pipe is rusted and eroded with some small holes showing. Renovation includes:

a. Excavating the inlet area and replacing the current inlet pipes with 20-foot smooth steel pipe, wyed and encased in concrete. Replacing the concrete inlet structure that holds the twin inlet pipes. The concrete would be mixed off-site and flown to the area of use.

b. The remainder of the transmission pipe would be repaired using a 24" polyethylene (PE) pipe inserted within the existing 30" CMP. Each 20 foot section would weigh 600 pounds. Sections would be heat welded together and pulled from the outlet end by a winch or similar device placed at the inlet. It would be coupled to the steel wye at the inlet and grouted to the CMP both there and at the outlet end. The middle portion of the PE pipe would be centered and spaced within the old pipe using sand obtained at the site.

c. The splash apron at the outlet would be repaired by installing 12 cubic yards of rip-rap (in a 10'x 20' area), using 2 foot minus native material which would be obtained from a borrow area located on talus, north of the dam. The current apron is concrete.

- Fill and shape three areas on the upstream dam face and crest which have eroded. Once the spillway is widened, the present dam crest will be sufficient to meet the Probable Maximum Flood (PMF) as currently calculated; however, fill is needed to bring the entire dam to grade prior to the placement of rip-rap. The fill material would be pit-run, obtained from the talus area just north of the dam. Each 8" lift of material would be applied and compacted until approximately 165 cubic yards are in place. Compaction would be obtained by a small vibratory compactor weighing 200-300 pounds.

- Strengthen, widen, and extend the existing spillway. This is needed to pass the PMF. The spillway must be 27 feet wide at the crest (for a length of approximately 50 feet) and widen to 30 feet thereafter to the distal end (for an additional 120 feet) where it re-enters the stream below the dam. Plans require removal of the masonry stone wall, adding compacted fill as needed, widening as necessary along the entire length, and installing rip-rap on the final 120 feet. Five hundred cubic yards of 2 foot minus material would be

used as rip-rap. Both fill and rip-rap material would come from the borrow area north of the dam.

- Place 1700 cubic yards of 2 foot minus rip-rap on upstream dam face to prevent erosion from wave action. The talus slope to the north of the dam would be used for the borrow area.

- Renovate the log boom to protect the spillway from filling with floating debris. This includes installing a new log boom, 140 feet long, composed of 13 logs (western larch, 5 feet long by 12"-18" in diameter) connected by 3/4" steel cable and attached to the logs using eye bolts. The boom would be secured to the shore using eyebolts anchored in rock at least 2'x2'x6', buried to expose only the top.

2. Equipment Proposed

- Caterpillar D6D tracked loader- 40,000 lbs, 9'4" wide, 15'10"long.
  For the excavation and placement of rip-rap and fill.

- Caterpillar 225B excavator/backhoe- 60,000 lbs, 10'6" wide, 32'3" long.
  For the excavation and sorting of the rip-rap; and at the inlet area, for the excavation and shaping of the fill material, for the widening of the spillway, and for the insertion of the transmission pipe.

- John Deere 4-wheel drive farm tractor- 5800 lbs, 6'7" wide.
  To pull the PE pipe welder, mounted on a trailer, 4600 lbs, 6'0" wide.

- Bell 204 helicopter (or similar)
  To transport all other equipment and supplies, including the sections of pipe, and diesel fuel in 250 gallon containers.

- Hughes 500 helicopter(or similar)
  To transport personnel and smaller supplies.

Other motorized equipment proposed: compactor device, rock drill, chainsaw, generator(s), welder, grout pump.

3. Access to Site

The old road, constructed in 1952 to access the dam site, would be used to walk in the tracked loader, the excavator, the farm tractor and trailer, and back to the trailhead upon completion of the project. The road, which coincides with and serves as the Bass Lake Trail for 6.0 miles, is 7.4 miles in total length. The road would need to be cleared of rock along a 200 foot section that has been filled in by rock slides. The road crosses Bass Creek in two locations and low water fords are present for walking equipment across the creek. Clearing of vegetation would be needed along the remainder of the route. This would include moving some rocks and removing small trees that have grown up in the road. In some places, vegetation could be driven over and removed only if severely damaged.

The excavator requires approximately a 10.5 foot wide cleared area for travel while the loader and tractor need somewhat less. Clearing and rock removal

would be limited to that amount that is needed for safe passage of the equipment. The last 1/4 mile of trail, just east of the reservoir, is steep with a grade of 20%-25%. The backhoe would pull itself up with the arm and bucket, then pull the other equipment up with the arm. On the way out the excavator would come last and rehabilitate and naturalize the road by narrowing the tread with rocks and dead logs, replacing rocks and vegetation, filling in root holes, and scattering broken limbs and stems. Drainage dips would be installed, existing waterbars would be improved, and stream crossings would be improved to prevent water from running down the trail. A trail rehabilitation plan is part of the proposed action and the alternatives that propose using the trail for access. (Appendix)

All other access to the site, including the transportation of all workers, equipment, fuel, and other supplies, would be done with the two helicopters. Helicopter flights would be minimized and kept within a specified corridor to protect wilderness values and wildlife.

4. Camp and Storage Area

A camp for the reconstruction crew would be located west of the dam and on the north side of Bass Lake. A previously disturbed site, above and south of the dam, would also be used as a helicopter landing area and for storing and staging equipment and supplies. This site would be used for the storage of up to 500 gallons of diesel fuel, in 2- 250 gallon tanks. A staging and heliport area would be located on private land near the mouth of Bass Creek Canyon. A camp management plan and a plan for air operations, safety, materials handling, and storage is part of the proposed action. (Project File)

5. Duration

Work would begin around September 1, or possibly earlier, depending on the water level in the reservoir. The project would take an estimated 25 days. The camp at the dam site would be occupied by a maximum of six persons for approximately 30 days while work is underway. The pipe repair would take 3-4 days; the rock and fill work may take 10 days; the log boom would require 2-3 days; and the remainder of the time would be used for camp set-up and breakdown, equipment preparation, maintenance, and work site preparation. Bad weather may increase this timeframe.

6. Permits

The following permits have been received for the work activities:

Bitterroot Conservation District, 310 Permit for the two stream crossings.

The following agencies have been contacted, and consultation in underway to determine if the following permits are needed:

US Army Corps of Engineers; 404 Dredge and Fill Permit for the cofferdam installation.

Montana Department of Natural Resources and Conservation, Water Quality Division; Water Quality Standards Turbidity Exemption (3(a)authorization), and Construction Stormwater Permit.

V. ORGANIZATION OF THE DOCUMENT

This project-level EIS is tiered to the Bitterroot National Forest Plan and Final EIS (September, 1987), the Region One Wilderness Dam Policy (June, 1993), and the Selway-Bitterroot Wilderness General Management Direction (1992 Update). These documents provide overall guidance for land management activities on the Bitterroot National Forest. This decision will be guided by the direction provided by the National Dam Inspection Act, Federal Guidelines for Dam Safety, Wilderness Act, and Forest Service policy.

Chapter 2 describes a range of alternatives. One of these will be the "no action" alternative in which none of the proposed activities would be implemented. The three "action" alternatives will examine varying methods for achieving the purpose and need for action that are responsive to the environmental issues. Also discussed are four alternatives that were considered but not given detailed study.

Chapter 3 describes the affected environment of the project area and the condition of specific resources.

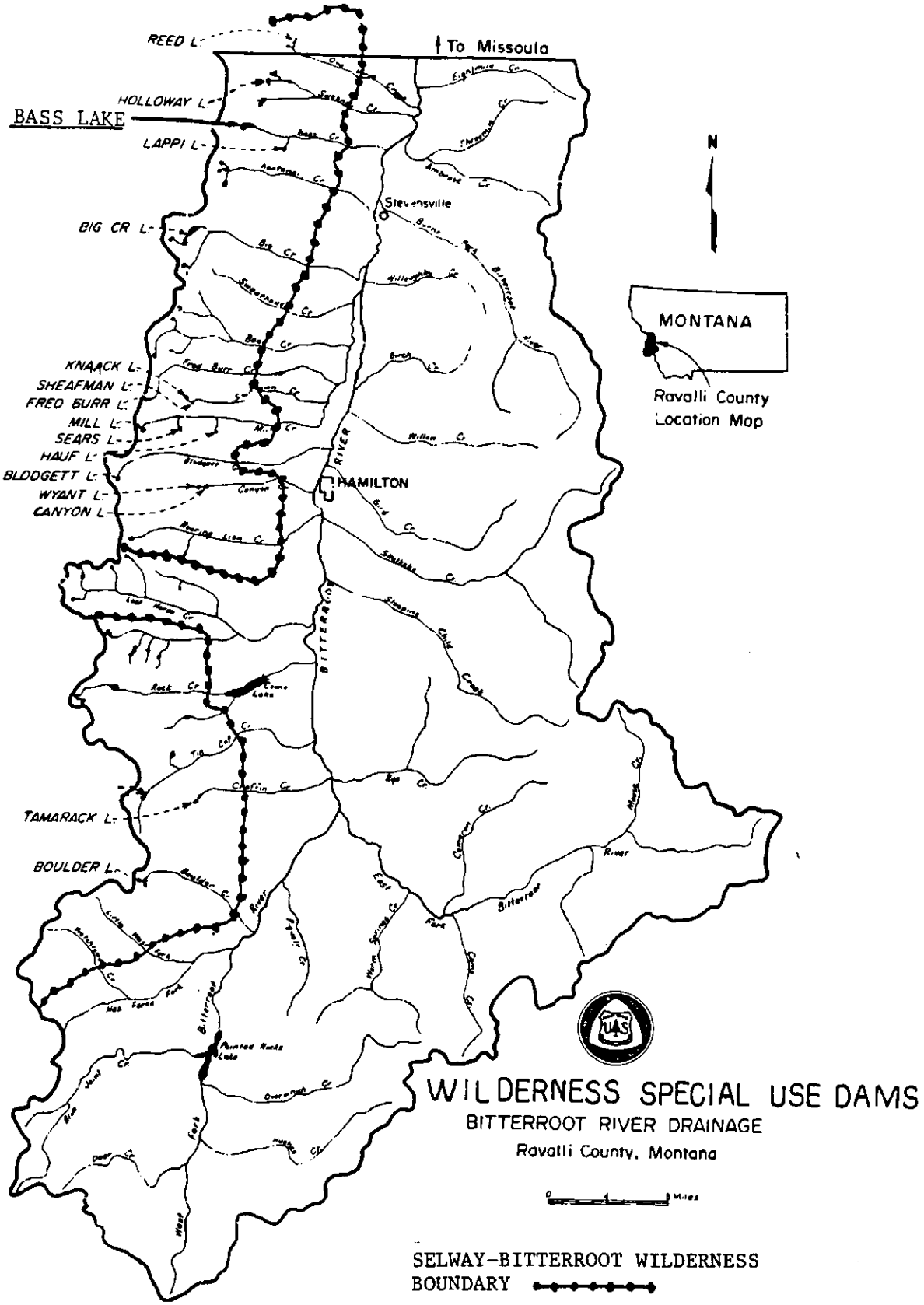
Chapter 4 discloses the expected environmental effects on the various resources for each of the alternative actions if implemented. Direct, indirect, and cumulative effects are predicted for each resource. Potential conflicts with plans and policies of this or other agencies are identified, in addition to other required disclosures.

Chapter 5 contains the list of public and other government agency participants, comments received on the Draft EIS, and responses to these comments.

A List of Preparers identifies who was involved in the preparation of this document.

The Appendices and Project File contain analytical reports and key-supporting information, including interaction with the public and comments received during project development. All project files for the Bass Lake Dam Reconstruction Environmental Impact Statement are available for public review at the Stevensville Ranger Station.

Public participation is an important part of the analysis, commencing with the initial scoping process (40 CFR 1501.7), which was initiated in May 1992, and continuing through the preparation of the Final EIS.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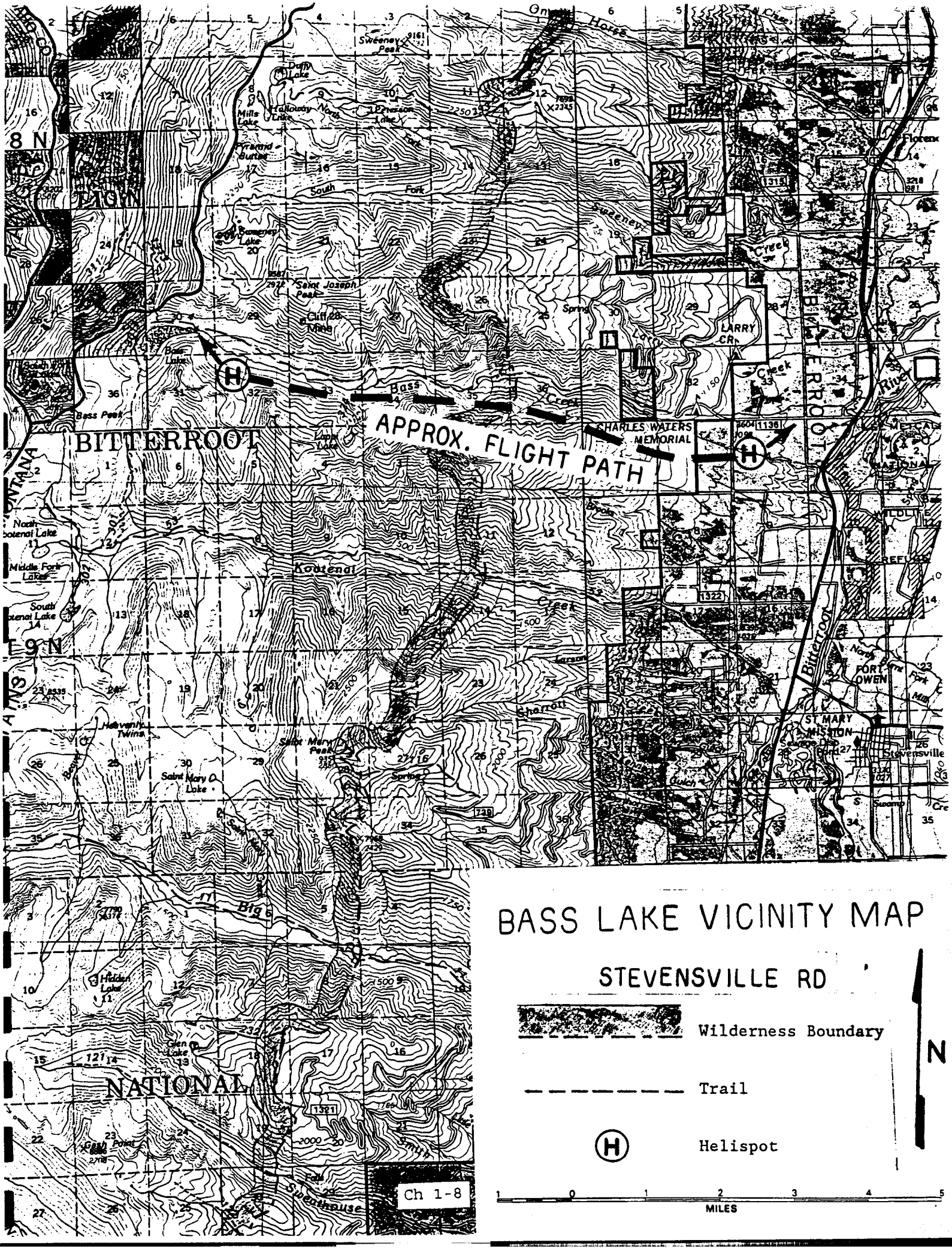
To Missoula
HOLLOWAY L.
BASS LAKE
LAPPI L.
BIG CR L.
KNAACK L.
SHEAFMAN L.
FRED BURR L.
MILL L.
SEARS L.
HAUF L.
BLODGETT L.
WYANT L.
CANYON L.
TAMARACK L.
BOULDER L.
Stevensville
HAMILTON
BITTERROOT RIVER
N
MONTANA
Ravalli County
Location Map
WILDERNESS SPECIAL USE DAMS
BITTERROOT RIVER DRAINAGE
Ravalli County, Montana
Miles
SELWAY-BITTERROOT WILDERNESS
BOUNDARY


BASS LAKE VICINITY MAP
STEVENSVILLE RD
Wilderness Boundary
Trail
Helispot
N
MILES
APPROX. FLIGHT PATH
BITTERROOT
NATIONAL
CHARLES WATERS MEMORIAL
LARRY CR.
FORT OWEN
ST MARY MISSION
Stevensville
Bass Creek
Kootenai Creek
Sweeney Creek
Bitterroot River
Sweeney Peak
Saint Joseph Peak
Bass Peak
Saint Mary Peak
Saint Mary Lake
Heavenly Twins
Middle Fork Lakes
North Kootenai Lake
South Kootenai Lake
Hidden Lake
Glen Lake
Gash Point
Sweathouse
Ch 1-8

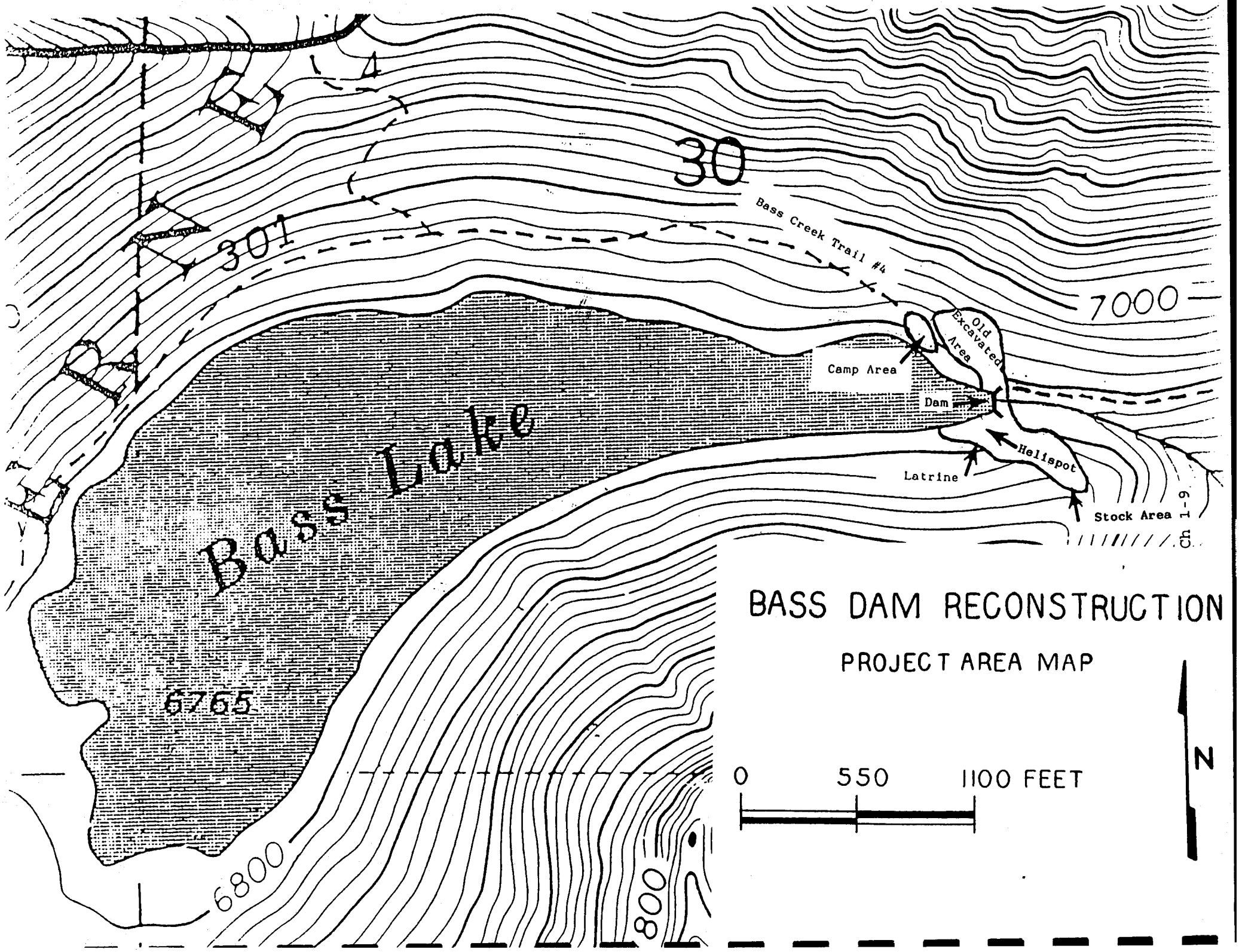

BASS DAM RECONSTRUCTION
PROJECT AREA MAP
0
550
1100 FEET
N
Bass Lake
6765
6800
800
30
301
Bass Creek Trail #4
7000
Old Excavated Area
Camp Area
Dam
Helispot
Latrine
Stock Area

PHOTO • 1

This existing outlet structure will be grouted and sealed Riprap will be installed within the wingwalls and for a distance of 20 downstream

PHOTO • 2

The existing spillway will be reconstructed to more uniform dimensions and to provide a smooth riprapped surface. The old log boom lies in the background

PHOTO # 3

Riprap will be removed from the talus slide to the right of the grassy slope The upper face of the dam will be riprapped to prevent further erosion

PHOTO # 4

This shows more evidence of slope erosion on the dam The inlet trash rack is just under water at the waters edge The lake level will be lowered more and a cofferdam installed to allow construction of the inlet structure and to pull the plastic pipe from the outlet side The arrow indicates the location of the crew camping area

PHOTO • 5

Looking from the existing log boom, one can see the slight depressions in the dam crest The old disturbed area in the upper left corner of the photo will be used as a borrow source to fill the depressions This area will also be used as a staging area for equipment and supplies

PHOTO • 6

This site below the dam and just to the left of photo #5 could be used as an additional camping and storage area

PHOTO # 7

Typical section of trail/old road through a forested section of the upper trail

PHOTO # 8

This shows the trail/old road through the large rock talus slopes just below the dam