CHAPTER 4 - YELLOWSTONE SUBBASIN

SUBBASIN DESCRIPTION

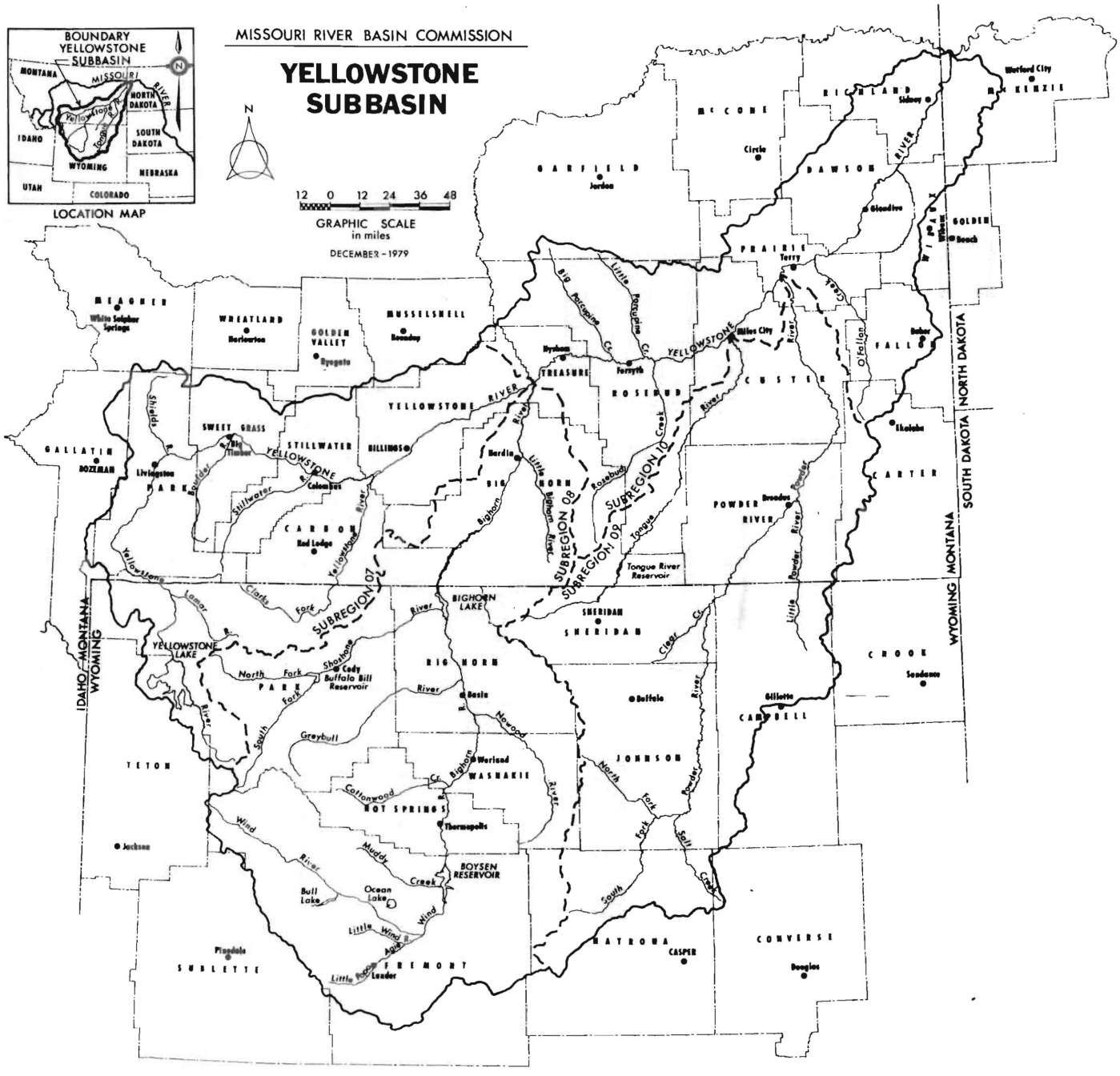
The Yellowstone Subbasin has an area of 45.2 million acres and is located in the west-central portion of the Missouri River Basin. As illustrated in figure 4-1, the subbasin includes parts of Wyoming and Montana drained generally from the southwest to the northeast by the Yellowstone River and its tributaries. A small area of North Dakota lies at the mouth of the Yellowstone Subbasin. The subbasin has a maximum extent of 350 miles in an east-west direction and 300 miles north-south.

Topography is essentially of four types. The most extensive is in the eastern portion, a region of plateaus, plains, basins, and isolated mountain ranges with elevations ranging from 5,000 to 8,000 feet. Parts of the western and central portion of the subbasin are characterized by rugged mountains, broad valleys, and remnants of high plateaus at elevations of 4,000 to 14,000 feet. This region surrounds a highland area of steep slopes with elevations ranging from 2,500 to 6,000 feet. A small area in the extreme northeastern portion of the subbasin is a predominantly smooth plain with elevations ranging from 1,500 to 3,000 feet.

Most ecosystems throughout this subbasin consist of grasslands and deciduous woodlands along streams. Elsewhere, the ecosystems include badlands and agricultural types. The latter occurs as crop-fallow systems on the level uplands or as irrigated lands.

Pronghorn antelope concentrations in the plains areas are unsurpassed in the world. Other significant big game such as elk, mule deer, moose, bighorn sheep, and mountain goat, are also found here. In addition, upland game such as Merriam's turkey, mountain grouse, and prairie grouse are abundant. Several

Figure 4-1-Yellowstone Subbasin



rare animals including the black-footed ferret, Northern Rocky Mountain wolf, grizzly bear, and American peregrine falcon inhabit the subbasin. Other native fauna are the mountain lion, fishers, wolverine, pine marten, Canadian lynx, meadow-jumping mouse, northern swift fox, and certain raptors (prairie falcon, osprey, and burrowing owl). An important exotic upland game bird, the ring-necked pheasant, has been declining for some time due to loss of habitat in agricultural areas.

Abundant cold-water fisheries of excellent quality occur in the upper reaches of streams in this subbasin. Other important aquatic resources include the lakes and streams in the Bighorn Mountains and Beartooth Plateau. Some reservoirs afford excellent mixed cold-water and warm-water fisheries, and in many cases cold-water stream fisheries are maintained downstream through the regulated release of cold waters. High quality waterfowl resources are limited. However, stock pond development on the plains in the past several decades has considerably enhanced the habitat base for waterfowl. Surface-water resources are otherwise sparse.

The subbasin has a rich endowment of natural, scenic, historic, and cultural resources. There are pristine and near pristine riverscapes with free-flowing waters, high alpine plateaus punctuated by clear lakes, deep reservoirs, scenic canyons, rugged peaks including snow fields and glaciers, ice caves, multihued deserts and badlands, prairie-butte landscapes, and undulating to rolling plains landscapes featuring ponderosa pine or native grasslands. Sharply contrasting agricultural patterns of irrigation projects or crop-fallow systems further add to visual variety. Significant native American Indian cultural remains and paleontological sites are present as are sites relating to early exploration and settlement.

The population of the subbasin, estimated at 303,200 in 1975, is expected to reach 514,000 by the year 2000. Projections indicate that the Yellowstone may become the Basin's fastest growing subbasin by 1985. The largest concentration of population in 1975 was in the Billings Standard Metropolitan Statistical Area which contained nearly a third of the population of the subbasin. Native American Indian population in the subbasin is estimated at 12,200 persons. By the year 2000, the total is expected to reach 19,000.

Agricultural employment occupies slightly more than 12 percent of all workers in the subbasin. By the year 2000, agriculture will account for about 5 percent of the total employment. One-third of the cropland is irrigated, producing crops including sugar beets, dry, edible beans, hay, and vegetables. Livestock production is the most important agriculture income source.

Increases in National demand for coal and lignite have transformed the subbasin into an important energy development area. Energy product development is expected to dominate manufacturing employment and income subbasinwide by the year 2000.

Tourism is a significant industry in the subbasin and is expected to continue to contribute to the economy.

Streamflows originate primarily from melting snowpacks in the mountains, with high flows in June and July and very low flows in the winter months. Low flows during August reflect both lower natural streamflow and high rates of diversion for irrigation.

About one-third of the major rivers have some form of multipurpose storage. On many tributaries without storage, extensive use of water is made through instream diversions or pumps.

Some 95 percent of water withdrawals in this subbasin is made for crop irrigation. Surface water quality in the mountainous headwaters tends to be

good but gradually diminishes as it enters the badlands and plains area. Ground water quality varies in the valley-fill alluvial aquifers along the major streams. Better water quality occurs in permeable zones near areas of natural recharge.

Surface water in each of the three subbasin States is considered public property and is regulated by a State agency. All three States allocate water by the prior appropriation system. Beneficial uses as defined in the three States are listed below. Higher priority uses are cited above those of lower priority under each State, except where noted.

MONTANA

Agricultural (including stockwater)
Domestic
Fish and wildlife
Industrial
Irrigation
Mining
Municipal
Power and recreation

(Note: Uses are not prioritized).

NORTH DAKOTA

Domestic
Municipal
Livestock
Irrigation
Industrial
Fish, wildlife and recreation

WYOMING

Drinking water
Municipal
Steam engines for general railway use; culinary, laundering, bathing, refrigerating, and the manufacture of ice; steam and hot water heating plants; and steam power plants and industrial purposes
Irrigation
Hydropower

PROBLEMS AND OPPORTUNITIES

The major problems in the Yellowstone Subbasin are irrigation water shortages, rural flooding, erosion, and point and nonpoint source pollution. Other problems include urban flooding, municipal water supply shortages, lack of access to outdoor recreation along certain rivers, lack of precipitation, and hail damage.

A common problem along the Powder, Tongue, and Clarks Fork Rivers, and Rosebud Creek, is low flows during the critical crop growing season. In addition, many older irrigation systems need extensive rehabilitation to avoid leakage and to improve efficiency. Irrigation diversion facilities are hampered by low flows, flooding, and erosion on the Bighorn and Yellowstone Rivers.

Rural flooding during the spring is common throughout the Yellowstone Subbasin. The use of and development in areas subject to frequent flooding continues along many streams throughout this subbasin. Some areas lack suitable protection from flooding.

Streambank erosion is a problem along the Yellowstone River and tributaries in Montana, Wyoming, and in McKenzie County, North Dakota. Some farming, forest, and range practices contribute to erosion and sediment problems along the Powder River in Wyoming.

Irrigation return flows have contributed to increasing stream salinity in the Yellowstone River near Billings, Montana, the Shoshone River between Lovell and Kane, Wyoming, and generally along the Wind and Bighorn Rivers in Wyoming. Silt and salinity problems affect seasonal recreation uses of streams in the southern portion of the Powder River Basin. Oil, grease, and coliforms affect Yellowstone River water quality from Laurel to Billings, Montana. Suitable waste-water treatment facilities are lacking at Sheridan, Wyoming.

Spring runoff causes urban flooding at many locations, with some of the more severe problems at Billings and Miles City, Montana, on the Yellowstone River and tributaries.

Additional water supplies are needed to meet urban growth in communities such as Lander, Wyoming, and Billings, Montana. Communities in eastern Montana and in Wyoming need improved water systems due to increased population growth and expansion. Many supplies do not meet acceptable standards for water quality.

Additional public access to streams and hunting grounds is necessary throughout the subbasin to meet recreational demands; notably on the Tongue, Bighorn, and Yellowstone Rivers. In the Miles City area there is a demand for additional flat water or lake recreation.

National demands for more power may require assessment of new operating criteria and the possibility of installing additional capacity at hydropower dams throughout this subbasin. Other energy-related water demands are increasing rapidly. Additional storage areas are needed along the Tongue and Powder Rivers in Wyoming to meet coal and uranium industry demands.

PLANNING OBJECTIVES

Comprehensive planning goals of the Yellowstonne Subbasin States vary considerably. Montana has a goal to have a statewide water resources management plan prepared by the end of 1982. North Dakota is in the process of updating its water resources plan which was initially drafted in 1968. Wyoming's planning process provides for an inventory of water resources, identification of current water use and a projection of future needs. The overall goal is to assess intrastate requirements and compare them with regional and river basin plans, with consideration given to multipurpose projects, and to achieving efficient and beneficial use of the water.

All subbasin States stress the need to minimize flood damage. The States specifically support action at the local level for flood plain management supported where necessary by State action.

The preservation of key natural areas and maintenance of fish and wildlife habitat are goals in all subbasin States. The State of Montana allows for the protection of instream flows for fish and wildlife. North Dakota favors preserving wetland areas through temporary leases and easements rather than by the purchase or permanent easements.

It is the objective of all States in the subbasin to develop instate irrigation potential and to provide an adequate supply of water for irrigation. Montana, Wyoming, and North Dakota strongly endorse irrigation water conservation and support rehabilitation and improvement in irrigation systems.

The subbasin States endorse land conservation measures to maintain productivity of soils, to reduce and control erosion, and to reduce sediment. All support State and Federal activities to achieve this goal.

Montana, Wyoming, and North Dakota generally encourage hydropower development. Montana laws prohibit the use of water for coal slurry pipelines. Large water users in Montana are not permitted to change water use from agricultural to industrial purposes. North Dakota carefully reviews water use for thermal generation plants and has not taken a position on coal slurry pipelines. Wyoming evaluates all proposals before taking any action on coal slurry pipelines.

Use and management of water resources for recreation is endorsed by all States in the subbasin. Each State stresses making these areas accessible for public use.

PLAN OVERVIEW

The plan for the Yellowstone Subbasin includes the recommendations presented in this chapter, and the recommended basinwide and statewide programs

for Wyoming, North Dakota, and Montana in chapter 2. The plan for the Yellowstone Subbasin includes the findings of the Yellowstone River Basin and Adjacent Coal Area Level B Study, completed by the Missouri River Basin Commission in 1978.

To address irrigation water shortages, one of the most critical problems in this subbasin, the plan recognizes the importance of completing the Water Management Study Upstream of Gavins Point, now underway by the Water and Power Resources Service. This study will also address a number of municipal water supply and quality problems in the subbasin. In addition, a number of recommended cooperative programs by the Soil Conservation Service address the conservation of irrigation water. Also recommended is continued Bureau of Indian Affairs assistance to the Northern Cheyenne and Wind River Reservations in the developing irrigated lands.

An important ongoing program recommended for completion by the Army Corps of Engineers is examining streambank erosion to determine methods for correcting this problem at three sites along the Yellowstone River. This effort titled "Yellowstone River Bank Protection," is considered a key pilot program for dealing with the streambank erosion problem. A recommended basinwide program, the Rural Clean Water Program, to be administered by the U.S. Department of Agriculture, is expected to be particularly important in the subbasin. When funded, it will help landowners implement conservation practices. With this program, most major erosion and nonpoint source pollution problems will be addressed.

RECOMMENDED PROGRAMS - YELLOWSTONE

NAME, LEAD AGENCY, AND FUNCTIONS ADDRESSED	DESCRIPTION
COMPREHENSIVE PLANNING AND SUPPORT ACTIVITIES	
1-WATER MANAGEMENT STUDY UPSTREAM OF GAVINS POINT DOI/Water and Power Resources Service Comprehensive Also in Upper Missouri & W. & E. Dakotas Subbasins	Ongoing special study of water supply land use in FY 81 the study is scheduled to be completed at a total cost of $871,000;$136,000 of which is programmed to be spent in FY 81.
2-COMPUTERIZED WATER RESOURCES DATA SYSTEM DOI/Bureau of Land Management Comprehensive	Ongoing data collection & research program to develop a data base for the preparation of management framework plans; annual cost $30,000.
3-BIGHORN BASIN RC&D PROJECT, WYOMING USDA/Soil Conservation Service Comprehensive	Ongoing implementation on study that assists local areas in conserving & developing natural resources in Bighorn, Hot Springs, Park, Fremont, & Washakie Co.; total cost $550,000.
4-SNOW SURVEY USDA/Soil Conservation Service Comprehensive Also in Upper Missouri and Platte-Niobrara Subbasins	Ongoing data collection of hydrometeorological snow data to provide advance information on seasonal water supplies for regulation and management of streamflow & storage; FY 81 cost $328,000.
FLOODING	
5-MILES CITY, MONTANA FLOOD CONTROL PROJ., ADV. ENG. & DESIGN Army Corps of Engineers Flooding	Ongoing feasibility study of a 5 mile levee for flood protection for 2,400 families & 300 business; total cost $4.2 million; FY 81 $470,000; FY 82 $3.5 million.

6-BLUE CREEK WATERSHED PROJECT, MONTANA USDA/Soil Conservation Service Flooding	Approved for planning project for flood protection to begin FY 81; total cost $1.5 million.

FISH AND WILDLIFE

IRRIGATION

7-COOPERATIVE IRRIGATION WATER CONSERVATION STUDY, WYOMING USDA/Soil Conservation Service Irrigation Also in Western Dakotas and Platte-Niobrara Subbasins	New start special study of irrigation systems to improve efficiency of distribution and use; total cost $1.1 million programmed through FY 85.
8-REHABILITATION OF EXISTING IRRIG. SYSTEMS COOP SP STUDIES MT USDA/Soil Conservation Service Irrigation, Land Conservation & Management Also in Upper Missouri & W. Dakotas	New start special study to develop inventory of problems and to identify costs and benefits to rehabilitate irrigation systems; FY 81 cost $122,000.
9-CROW RESERVATION IRRIGATION PROJECT DOI/Bureau of Indian Affairs Irrigation	Ongoing implementation of program to improve agricultural development from FY 79 to FY 85; total cost $15.4 million.
10-NORTH CHEYENNE RESERVATION IRRIGATION PROJECT DOI/Bureau of Indian Affairs Irrigation, Flood, F&W, Land Cons. & Mgmt., Water Qual.	Ongoing implementation of program to improve agricultural development from FY 79 to FY 85; total cost $2 million.
11-WIND RIVER RESERVATION IRRIGATION PROJECT DOI/Bureau of Indian Affairs Irrigation, Flood, F&W, Land Cons. & Mgmt., Water Qual.	Ongoing implementation of program to improve agricultural development from FY 79 to FY 85; total cost $28.1 million.

12-GARLAND DIVISION, REHABILITATION & BETTERMENT PROGRAM, WY DOI/Water and Power Resources Service Irrigation	Ongoing program implementation that includes the rehabilitation of an irrigation system; scheduled for completion in FY 82; Shoshone Project, WY; total cost $6 million.
13-WILLWOOD DIVISION, REHABILITATION & BETTERMENT PROGRAM, WY DOI/Water and Power Resources Service Irrigation	New start program implementation that includes the rehabilitation of an existing system; scheduled through FY 81; Shoshone Project, WY; total cost $1.6 million.
14-FRANNIE DIVISION, REHABILITATION & BETTERMENT PROGRAM, WY DOI/Water and Power Resources Service Irrigation	Ongoing special study to determine feasibility of a program to improve an irrigation system; FY 80 funding involves general investigation; FY 81 cost $200,000; Shoshone Project, WY.
15-LOWER YELLOWSTONE, REHABILITATION & BETTERMENT PROGRAM, MT DOI/Water and Power Resources Service Irrigation	New start program implementation that includes the rehabilitation of an existing system; scheduled through FY 81; Lower Yellowstone Project; total cost $12.6 million.
16-HUNTLEY REHABILITATION & BETTERMENT PROGRAM, MT DOI/Water and Power Resources Service Irrigation	New start program implementation that includes the rehabilitation of an existing system; construction start scheduled for FY 80; Huntley Project; total cost $7.8 million.
17-COONEY DAM REHABILITATION, MONTANA DOI/Water and Power Resources Service Irrigation	New start program implementation to improve and enlarge dam for additional water storage for irrigation; total cost $1 million.
18-UPPER SHELL CREEK WATERSHED PROJECT, WYOMING USDA/Soil Conservation Service Irrigation, Land Conservation and Management	Planning authorization requested for irrigation, recreation, and M&I water that includes 1 multipurpose structure and land treatment, to be planned with Lower Shell project.

19-LOWER SHELL CREEK WATERSHED PROJECT, WYOMING USDA/Soil Conservation Service Irrigation, Land Conservation and Management	Planning authorization requested for irrigation, recreation, and M&I water, includes 1 multipurpose structure, canal rehabilitation, and land treatment; total cost $2 million..
20-PRAIRIE DOG WATERSHED PROJECT, WYOMING USDA/Soil Conservation Service Irrigation, Land Conservation and Management	Project recommended for planning to control erosion caused by diversion of irrigation water; facilities include pipeline & land treatment; total cost $1 million

LAND CONSERVATION AND MANAGEMENT

21-YELLOWSTONE RIVER BANK PROTECTION (Sec 32) Army Corps of Engineers Land Conservation and Management	Ongoing implementation of program to demonstrate streambank erosion control at sites in Montana & North Dakota; funding on annual basis; FY 80 cost $450,000.
22-AGRICULTURAL RESOURCES PROGRAM, INDIAN RESERVATIONS DOI/Bureau of Indian Affairs Land Conservation and Management, Water Quality Also in Upper Missouri Subbasin	Ongoing implementation of program providing water and land resources management assistance; funded through FY 85.
23-FOREST MANAGEMENT, INDIAN RESERVATIONS DOI/Bureau of Indian Affairs Land Cons. & Mgmt., Flood, F&W, M&I, Rec., Water Qual. Also in Upper Missouri Subbasin	Ongoing implementation of program providing forest management assistance; funded through FY 85.
24-RANGE STOCK WATER DEVELOPMENT ON INDIAN RESERVATIONS DOI/Bureau of Indian Affairs Land Cons. & Mgmt., Flood, F&W, M&I Rural Supply, Wtr Qual Also in Upper Missouri Subbasin	Ongoing implementation of program to construct range water facilities on Indian lands; cost FY 81 $40,000.
25-MONTANA TIMBER WATER FEDERAL-STATE COOPERATIVE SPECIAL STUDY USDA & Montana Dept. of Natural Resources Land Conservation and Management & Water Quality Also in Upper Missouri & W. Dakotas Subbasins	New start special study with SCS, ESCS, FS, and Montana DNR to determine effects of timber harvest on water yield and sedimentation; cost FY 80 $115,000; FY 81 $120,000; FY 82 $145,000.

MUNICIPAL, INDUSTRIAL, AND RURAL DOMESTIC WATER SUPPLY

26-YELLOWSTONE NATIONAL PARK, WYO., MONT., & IDAHO DOI/National Park Service M&I and Rural Supply, Nat., Hist., & Cult., Water Qual.	Ongoing program implementation to construct an improved water system throughout the park; cost FY 81 $5.5 million.

NATURAL, HISTORIC, AND CULTURAL RESOURCES

27-BIGHORN CANYON NATIONAL RECREATION AREA DOI/National Park Service Nat. Hist. & Cult., F&W, Land Cons. & Mgt., Rec., Trans., Water Qual.	Ongoing program implementation to prepare a detailed environmental statement on a general management plan; cost through FY 83 $202,000.

POWER AND ENERGY

28-OFFSTREAM STORAGE, YELLOWSTONE RIVER DOI/Water and Power Resources Service Power and Energy, Irrigation, M&I Rural Supply	New start special study to determine needs for energy, irrigation, municipal, & recreation, from Buffalo Creek, Cedar Ridge, & Sunny Creek storages; total cost $350,000, FY 81 start.
29-GARLAND CANAL POWER DISTRICT DOI/Water and Power Resources Service Power and Energy, Irrigation	New start program implementation to construct a 2,400 KW powerplant with a parallel penstock; near Corbett Dam on Shoshone River; 10,000,000 KWH will be generated annually; total cost $2.6 million.

WATER-ASSOCIATED OUTDOOR RECREATION

30-PORCUPINE CREEK, SCENIC AND RECREATIONAL RIVER DOI/Bureau of Land Management & USDA/Forest Service Recreation & Legal & Institutional Factors	New start special study to consider management of stream as scenic and recreational river; total cost $274,000.

TRANSPORTATION

WATER QUALITY

LEGAL AND INSTITUTIONAL FACTORS

31-YELLOWSTONE RIVER BASIN, INDIAN RESERVATION WATER RIGHTS DOI/Bureau of Indian Affairs Legal and Institutional Factors	Ongoing data collection program to plan the use and development of reservation lands as provided by law, treaty, or other means; total cost $1,5 million.

INSTREAM FLOWS

WEATHER MODIFICATION

CONCLUSIONS AND ADDITIONAL RECOMMENDATIONS

A. Municipal water supplies for Lander and Basin, Wyoming, are periodically inadequate to meet current and projected near-term future water demands. No programs are underway to consider alternative water supply approaches for these communities. The State of Wyoming, in cooperation with involved Federal agencies, should study water supply options for these and other cities in the subbasin impacted by rapid energy development.

B. An appraisal level study by the Water and Power Resources Service for additional hydroelectric power facilities at Yellowtail Afterbay Dam will be complete in FY 1980. It is recommended that the Service conduct a feasibility level study for this project beginning in FY 1981.

C. Hail storms annually destroy large amounts of grain and feed crops in the Yellowstone Subbasin. Federal agencies with authority or capability in weather modification, in cooperation with the States of Montana and Wyoming, should assess the potential for hail suppression in this subbasin.

D. The Missouri River Basin Commission completed the Yellowstone River Basin and Adjacent Coal Area Level B Study in November 1978. This study provided much information relevant to water resources planning and management and energy development in the Yellowstone Subbasin. To date, few of the study's findings and recommendations have been integrated into State water or energy plans in either Montana or Wyoming. Recommendations from the Yellowstone Level B Study include modifications or additions to Federal laws, policies, or priorities, and State laws and policies. These recommended revisions and changes (summarized below) are intended to suggest courses of action which will facilitate coordination of water resource management.

The recommended revisions in Federal laws, policies, and priorities in Montana include:

- Quantification of Indian reserved water rights
- Adoption of a national energy conservation program
- Development of renewable energy resources program
- Auditing of strip mine reclamation research
- Exchanges of mineral ownership
- Evaluate streambank erosion
- Development of Broadview-Wheat Basin Waterfowl refuges
- Assurance of Federal water planning agencies participation in level B or similar planning efforts

Recommended legal and institutional changes for the State of Montana include:

- Selection and evaluation of off-stream storage sites
- Planning for rural domestic water use in eastern Montana
- Reconsideration of present constraint on slurry lines as nonbeneficial use of water
- Continuation of free-flowing Yellowstone River
- Classification of streams according to fish and wildlife and esthetic value or potential
- Identification and protection of archaeological and historical sites

Suggested revisions in Federal laws, policies, and priorities in Wyoming include:

- Additional funding for land conservation measures
- Adequate funding for land conservation and livestock water improvements on public lands
- Joint survey and study of unique areas
- Uniform methodology for inventory of recreation resources and capabilities
- Amendment of section 7 of the Federal Water Project Recreation Act (79 Stat 213) to encourage greater recreation development at water projects
- Improvement of systems for collection of basic data on nonpoint source pollution
- Increased funding for wastewater construction grants
- Accelerated acquisition of environmental base data
- Development of environmental projections using various asumptions about economic conditions

Recommended legal and institutional changes in the State of Wyoming include:

- Rehabilitation of canals through State aid
- Increased efficiency of irrigation water use

Provision for offsetting social losses resulting from conversion of rangeland to cropland
Provision of minimum practicable daily and seasonal fluctuation in reservoirs
Authorization of State Engineer to license well drillers
Contract for surplus water available in existing Federal Reservoirs
Analysis of adequacy of all municipal water supplies and development of plans
Analysis, with State of South Dakota, of potential use of Keyhole Reservoir
Amendment of Wyoming Industrial Plant Siting Act to give consideration to water resource relationships
Resolution of article X, Yellowstone Compact, dealing with water transfers out of Yellowstone Basin
Establishment of utility corridors to minimize developmental impact on land
Intensified research for rehabilitation of strip mined lands
Establishment of air-monitoring network
Development and implementation of a plan to reduce energy use
Initiation of land use planning
Requirement of permits for stream channel modification
Identification and publicizing of potential flood hazard areas
Provision for instream flow as a beneficial use
Identification and preservation of critical aquatic and wildlife habitats
Establishment of a stream classification system
Designation of Wind River Canyon as a unique archaeologic area
Provision for full disclosure of environmental impacts of actions for other than federally funded developments

E. The Yellowstone Level B Study recommended that the Army Corps of Engineers address flooding problems at Sheridan, Wyoming. The recommendation calls for construction in the near-term future of 2.4 miles of intermittent levees and channel improvements along Goose Creek.

F. Irrigation development can serve the dual role of raising and stabilizing crop productivity and providing an economic stimulus to agriculture throughout the Yellowstone Subbasin. The Yellowstone Level B Study proposed a number of irrigation projects to be undertaken by the Water and Power Resources Service, the Soil Conservation Service, the Montana Department of Natural Resources and Conservation, and the Wyoming Water

Development Comission. Recommendations of the Yellowstone Level B Study are part of this regional plan update, although some of the proposals for irrigation extend beyond the time period of this update. A listing of the programs recommended (by lead agency) is given below:

Water and Power Resources Service

White Horse Bench Unit, appraisal study
Huntley South Unit, appraisal study
Clarks Fork Offstream Storage, appraisal study
Greybull Flat Unit, appraisal study
Badger Basin, appraisal study
Seven Mile-Sitting Bull Unit, feasibility study
Conn's Coulee, feasibility study
Fox Creek South Unit, feasibility study
Seven Sisters Unit, feasibility study
Hardin Unit, feasibility study
Muddy Ridge Area, authorization for construction
Polecat Bench, authorization for construction

Soil Conservation Service

Hidden Valley Project
Taylor Dutch Flats Project
Cody Canal Rehabilitation
Lateral H-103 Improvement
Crow Creek Project
Middle Fork Crazy Woman Project
Flathead Creek Project
Pryor Creek Project
Wyola-Lodge Grass Canal
Long Otter and Gas Field Pumping Unit
Upper Beaver Creek
Nowood River Project
Cyclone Bar Project
Crooked Creek Project
Gooseberry Creek Project
Lower Greybull River Project
Lakeview Canal Rehabilitation
Sage Creek-Pryor Mountain
Sidon Canal Rehabilitation
South Tongue Watershed

Montana Department of Natural Resources and Conservation

Hay Creek Unit
Forsyth Unit
Fallon Bench
Broadview Bench Unit
War Dance Unit

Sand Mesa Project
Kirby Draw Project
Banjo Flats Project
Shoshone Extension Unit
McCollough Section
Sage Section
Westside Irrigation Project
Kaycee Project

G. Accelerated land treatment on public and private lands was recommended throughout the subbasin by the Yellowstone Level B Study, to be carried out by the Soil Conservation Service, the Forest Service, and the Bureau of Land Management. The planning areas and acreages, which may be modified through further planning, include:

Upper Yellowstone--431,000 acres of State and private lands, 13,500 acres of public lands, and 2,400 acres of National Forest System Lands.

Lower Yellowstone--1,551,000 acres of State and private lands, 251,000 acres of public lands, and 700 acres of National Forest System Lands.

Clarks Fort-Bighorn--385,000 acres of State and private lands, and 25,500 acres of public lands.

Tongue and Powder--639,000 acres of State and private lands, 78,000 acres of public lands, and 4,300 acres of National Forest System Lands.

Wind-Bighorn-Clarks Fork--1,432,000 acres of State and private lands, 556,000 acres of public lands, and 5,540 acres of National Forest System Lands.

Northeast Wyoming--5,472,000 acres of State and private lands, 217,000 acres of public lands, and 110,100 acres of National Forest System Lands.

Another land treatment measure recommended is a Soil Conservation Service program, Rehabilitation of the Headwater Basin of the Shields River to alleviate the severe sedimentation problem. To the extent that further planning determines forest lands are involved, the Forest Service will participate in land treatment. The Yellowstone Study further recommended that controls be established limiting commercial development in the Sunlight-Crandall Basin of the Wind-Bighorn-Clarks Fork planning area; these controls would be implemented by the Forest Service to preserve scenic values. Another recommendation, Streambank Greenbelt Program to be carried out on streams throughout the Montana portion of the Yellowstsone subbasin by the Montana Department of Natural Resources and Conservation, is intended to prevent erosion along streambanks while adding to fish and wildlife habitat. All of these Yellowstone Level B Study programs are recommended in the regional plan. Controls in the Sunlight-Crandall Basin will be further explored in current planning for the Shoshone National Forest Land and Resource Management Plan; any controls relating to private lands would be instituted and implemented by State or local authorities.

H. Several programs recommended in the Yellowstone Level B Study to address water supply needs have been adopted as part of this regional plan update. Two Soil Conservation Service programs, the Elbow Creek Project and the Blue Water-Five Mile Creek Project, were proposed to provide water supply and other needs in Carbon County, Montana. The Forest Service will consider alternate multipurpose reservoir sites on the South Tongue River (Shutts Flats) in the process of preparing the Land and Resource Managment Plan for the Bighorn National Forest. The recommended Northeast Wyoming Project to be implemented by the Wyoming Water Development Commission serves several purposes, providing a water supply system for agriculture,

industry, recreation, and fish and wildlife habitat. Also, the Buffalo Bill Reservoir Enlargement to be undertaken by Water and Power Resources Service should be authorized for construction.

I. The Yellowstone Level B Study recommended that several natural and scenic areas be preserved throughout the Yellowstone Basin. The agencies selected to implement or consider actions in their respective areas are listed below. Actions taken since the completion of the level B study are also shown.

Forest Service

Beartooth and Absaroka Primitive Area; classify as a wilderness area in order to maintain the area in a natural state. Montana portions of this area were classified as wilderness in 1978. Management direction for the Wyoming portion will be considered in preparation of the Shoshone National Forest Land and Resource Management Plan.

Clarks Fork River, section from Wyoming border area to Crandell Creek Bridge, 20 river miles; designate as national recreation river. Management direction for this river reach will be considered in preparation of the Shoshone National Forest Land and Resource Management Plan.

Clarks Fork River, section from Crandell Creek Bridge to mouth of Clarks Fork Canyon, 22 miles; designate as national wild and scenic river. The Forest Service has nearly completed the study report as directed by Congress.

High Country Lakes; this would be an extension of the area in Montana to be considered as a wilderness area; all land in Shoshone National Forest. Management direction for this area will be considered in preparation of the Shoshone National Forest Land and Management Plan.

Cloud Peak Primitive Area; classify as wildernness area. The Forest Service has completed the study for this area.

Heritage Conservation and Recreation Service

Yellowstone River; establish National wild and scenic river designation for 225 river miles from Gardiner to Pompey's Pillar.

Beaver River; establish State recreational designations for 58 river miles, from Upside-Down Creek to confluence with Yellowstone River.

Shields River; establish State recreational river designation for 40 river miles from Flathead Creek to confluence with the Yellowstone River.

Stillwater River; establish State recreational river designation for 65 river miles from 20 miles above the U.S. Forest Service Woodbine Campground to confluence with the Yellowstone River.

Yellowstone River; establish National, scenic, and recreational designation for the Lower Yellowstone River for 260 river miles from Pompey's Pillar to the Montana-North Dakota border.

Bighorn River; establish State recreational river designation for the Bighorn River below Bighorn National Recreation Area to Yellowstone River for 50 river miles.

Clarks Fork River; establish State recreational river designation for 75 river miles from the Montana border to Yellowstone River.

Wind River; National designation as a wild, scenic or recreational river from source to Boysen Reservoir.

Montana Department of Fish, Wildlife and Parks

Clarks Fork River, section from mouth of Clarks Fork Canyon to Montana State line, 20 miles; maintain as State recreation river.

All of these programs are recommended in the regional plan update.

J. A number of programs were recommended in the Yellowstone Level B Study to meet rising energy requirements. These recommendations are included in the regional plan update. A project that will add to energy production in this subbasin is the Tongue River Reservoir Modifications to be undertaken by the Montana Department of Natural Resources and Conservation.

K. The Yellowstone Level B Study recommended programs to meet recreation demands throughout the subbasin. These programs are included in the regional plan and are summarized below under the lead agency.

Forest Service

Popo Agie River; 29 miles of North, Middle, and Little Popo Agie above the National forest boundary, designate as national scenic and recreational rivers.

North Fork Shoshone River; section from the north Absaroka Wilderness boundary to the eastern National forest boundary, 20 miles, designate as a scenic and recreational river.

Shell Creek; from source to the Bighorn National Forest boundary, 26 miles, designate as a national scenic or recreational river.

Tensleep Creek; section from Tensleep Lake to Tensleep, Wyoming, 23 miles, designate as a scenic and recreational river.

Tongue River; from source to the National forest boundary, 26 miles, designate as a scenic or recreational river.

South Tongue River Recreation; from source to Tongue River excluding a small reservoir above Shutts Falls, 27 miles, designate as a scenic or recreational river.

These recommendations are being considered by the Forest Service in the preparation of the Shoshone and Bighorn National Forest Land and Resource Management Plans.

Heritage Conservation and Recreation Service

Bighorn River; National designation of section from Boysen Dam to north end of Wind River Canyon for 12 miles, as wild, scenic, or recreational river; designate sections for 98 miles from Bighorn River at the north end of the Wind River Canyon to Bighorn Lake as a State scenic or recreational river.

Wyoming Recreation Commission

North Fork Shoshone River; designate ten-mile section from National forest boundary to Buffalo Bill Reservoir as a recreation river to be preserved and managed by the State of Wyoming.

Tongue River; designate 35 miles from the National forest boundary to the Montana-Wyoming border as a recreational river to be preserved and managed by the State of Wyoming.

L. Minimum flow levels to conserve fish and wildlife in streams throughout the subbasin were recommended in the Yellowstone Level B Study. These recommendations should be implemented by the Fish and Wildlife Service and the State of Wyoming Game and Fish Department and the Montana Department of Fish, Wildlife and Parks.