

# Lowlands

U.S. Department of the Interior  
Rogers C. B. Morton, Secretary,  
Bureau of Reclamation,  
Gilbert G. Stamm, Commissioner



At the base of the dam a powerplant occupies nearly the entire width of the riverbed. The plant houses four 62,500-kilowatt generating units, driven by four 87,500-horsepower turbines producing an average of about 1 billion kilowatt-hours of energy annually. Water power is supplied to each unit by separate 12-foot-diameter penstocks through the dam.

On the east rim of the canyon, high above the dam, is the switchyard through which electrical power and energy is delivered to the Bureau of Reclamation's Missouri River Basin power system. Power is transmitted from the plant to the switchyard by insulated cables enclosed in two 1,800-foot-long underground, oil-filled, high-pressure pipes.

Power delivery from the switchyards can be made to the western area systems with the Bureau's 115 kilovolt lines to Wyoming and by a 230 kilovolt interconnection to the systems of the Pacific Power and Light Co., and

the Montana Power Co. Power can also be delivered to the Bureau's eastern system by the 230 kilovolt line to the Dawson County substation near Glendive, Mont. Production at the 250,000-kilowatt plant is fully integrated with the more than 2,490,000 kilowatts of hydropower capacity at other Federal developments in the Missouri River Basin. More than 10,600 miles of Federal transmission lines carry this power to major wholesale load centers for further distribution by local suppliers to the farms, homes, and cities of the basin.

Bighorn Lake will provide a high-level diversion for the future irrigation of the 43,550-acre Hardin Unit and river-level diversion for smaller units further downstream. The potentially irrigable Hardin Unit area—now primarily dryfarmed for wheat or native pasture—lies largely in a strip of land 2 to 3 miles wide, commencing about 1 1/2 miles below the dam and extending 40 miles downstream along the west side of the Bighorn River.

Future irrigation will permit diversified agricultural production including such crops as

sugar beets, beans, alfalfa, and irrigated pasture. During construction of the dam, provisions were made for irrigation service by incorporating into the structure the beginning of a system that will allow delivery of water to lands which lie on two benches above the river. A 9 1/2-foot tunnel inlet structure takes off about 365 feet above the bottom of the dam and runs 250 feet into the canyon wall.

When irrigation is developed, the tunnel will be extended for nearly 1 1/2 miles to connect with a pumping plant. Hydraulic turbines powered by water released from the reservoir will drive the pumps. About one-third of the water will be lifted to higher benchlands, and the remainder will flow by gravity through a canal system to irrigate lower benchlands.

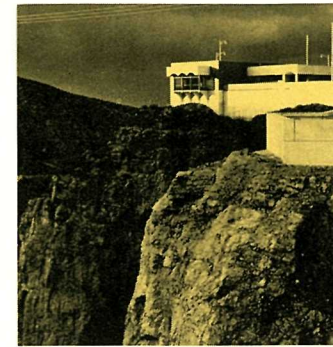
Storage and regulation of water provided by Yellowstone is the key to future irrigation development of the lower Bighorn Basin.

### Municipal and Industrial Water

Expanding requirements for all types of energy are focusing attention upon the vast coal deposits in the Northern Great Plains. About 40 percent of the Nation's coal resources are located in the area, with huge reserves of mineable coal. This low-sulfur coal is suitable for thermal-electric power generation and for conversion to synthetic pipeline gas or liquid fuels. Water is essential to the conversion of coal, and a substantial volume can probably be made available from Bighorn Lake each year for industrial purposes.

Major oil companies are examining the potential of this tremendous energy reserve. Since 1967, options have been let on water service contracts covering 623,000 acre-feet of water annually. This includes 110,000 acre-feet of water that have been reserved for development of coal resources located on Crow Indian Reservation lands.

Use of water impounded in Bighorn Lake is subject to terms of the Yellowstone River Compact and provisions of the National Environmental Policy Act of 1969. The magnitude of the Nation's energy needs and the large potential for creating energy-producing systems within the region magnify the need for orderly development. Close



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coordination between Federal, State, and local interests will be necessary to balance environmental, social, economic, and energy needs.

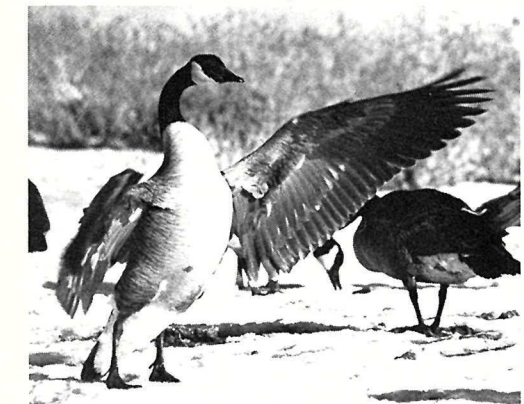
### Flood Control

Regulation of the erratic and widely fluctuating flows of the Bighorn River to alleviate flood damage is an important function of the Yellowstone Unit. The spring runoff from snowmelt in the mountains and flash storms sometimes reaches flood proportions, and it is estimated that Yellowstone Dam will reduce average annual flood damages by \$323,000. During the flood of 1967, storage in Bighorn Lake prevented flood damages of more than \$1.4 million, and by 1973 the reservoir had prevented more than \$3.6 million in flood damages.

Brown and rainbow trout and walleye pike are the most popular sport fish in Bighorn Lake. Trout predominate in the Afterbay Reservoir and in the Bighorn River for several miles downstream. Fishing is outstanding on a year-round basis in the river below the Afterbay Dam. Big game in the area include whitetail and mule deer, antelope, and elk. The Pryor Mountain wild horse range adjoins the area on the west near the Montana-Wyoming border.

Outdoor recreationists will find that Yellowtail provides natural habitat, food sources, and nesting and resting areas for a large and varied population of upland game birds and waterfowl. Photographers and amateur and professional bird watchers alike will find a variety of waterfowl, songbirds, and shore birds on the unit, which includes a special wildlife area located along the Shoshone River and managed by the Wyoming Game and Fish Commission.

Bighorn Lake area has a tremendous potential for waterfowl and upland game-bird hunting and is considered the top upland game-bird area in Wyoming. Pheasant, chukar and Hungarian partridge, sage grouse, sharptail grouse, and wild turkey are available. Waterfowl include Canada geese and mallards, plus blue-wing and green-wing teal, and many shore birds. You are welcome to fish, hunt, observe, photograph, and enjoy the wildlife and fishery at Yellowtail.



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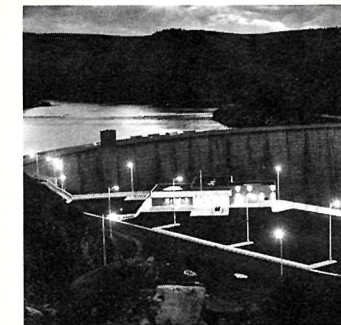
1. Interior of the 250,000-kW powerplant.
2. Visitor center near dam.
3. Scenic Bighorn Canyon about 15 miles upstream from dam.
4. New visitor center located 500 feet above the Bighorn River.
5. Wildlife in the Bighorn Lake area.



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# Power

# Irrigation

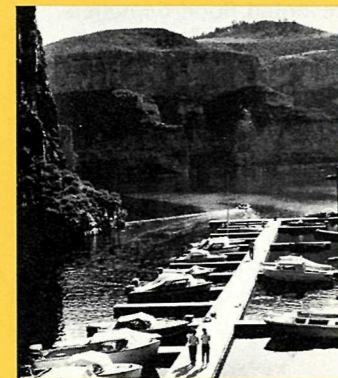
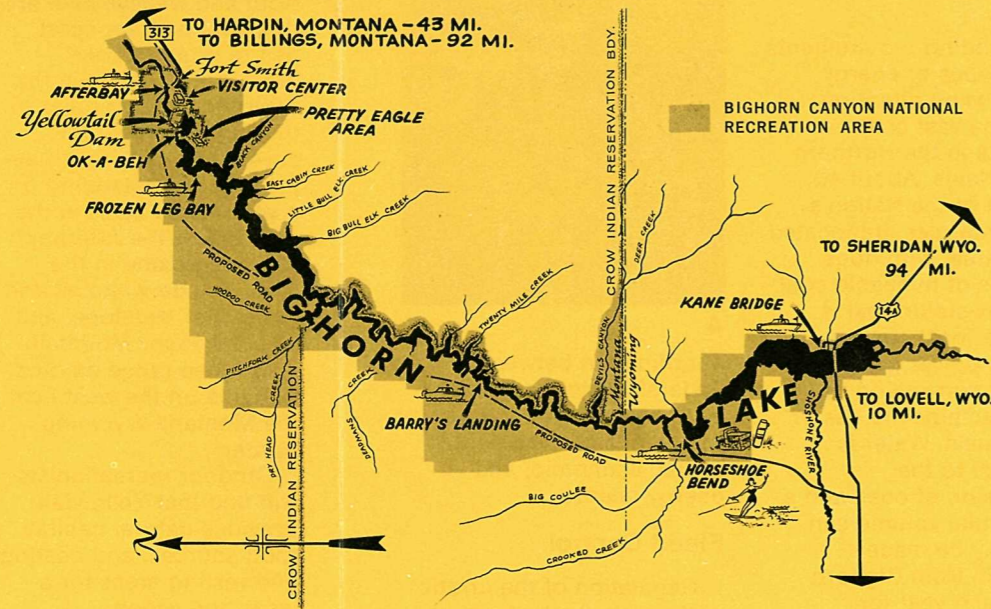
# Water

# Fish & Wild Life

The dam, reservoir, and surrounding area create a playground paradise providing great opportunity for public use and enjoyment. A myriad of activities associated with the outdoors is available throughout a rugged and colorful area. The reservoir is a deep 71-mile-long blue-water lake having a magnificent and exciting 195-mile shoreline. Surrounding the reservoir are uplifted mountains—the Bighorns to the east and Pryors to the west—with upland prairie between them. Through this beautiful grassland the Bighorn River has carved a narrow and precipitous gorge, dropping in some cases 2,200 feet from prairie to river level. The lake covers portions of Montana and Wyoming, and the lower 47 miles are within the spectacular Bighorn Canyon. A visitor is rewarded with magnificent scenery around every turn of a vari-colored canyon that serves as a beautiful backdrop for the reservoir waters. The area is rich in Indian history, and part of the lake is located in the Crow Indian Reservation. Buffalo jumps, medicine wheels, siege sites, and vision quest locations—all of which have played important parts in the history of the Crow Indian

# Recreation

people—are to be seen in several areas of this outdoor playground. The use of the reservoir and surrounding lands is unusually diversified. Water-related activities constitute the basic attraction, and there are outstanding opportunities for boating trips and cruising parties. Fishing is excellent, whether along the river, below the dam, on the reservoir, or in the various trout streams that feed into the manmade lake. Other activities on the surrounding terrain include camping, picnicking, hiking, riding, scenic drives, points of historical and archaeological interest, the dam itself, bird and wildlife watching, hunting, and geological interests



including nearby caves. A visitor center near the dam provides parking areas, rest facilities, a public information center including dioramic exhibits related to the construction of the dam, historical displays, and audiovisual presentations of areas of interest. Some 63,300 acres in this wonderland have been established as the

Bighorn Canyon National Recreation Area, administered by the National Park Service. Boat-launching ramps, camping and picnicking facilities, comfort stations, and parking areas are available at the Afterbay Dam, Ok-a-beh, Barry's Landing, Horseshoe Bend, and Kane Bridge. A beach, fish-cleaning facility, and a modern winterized comfort station are located at Horseshoe Bend. (See map above.) For further information on recreational opportunities, contact the Superintendent, Bighorn Canyon National Recreation Area, P.O. Box 458, Fort Smith, Mont. 59035.

# Yellowtail

## A Pick-Sloan Missouri Basin Program Unit

The Yellowtail Unit is located on the Bighorn River in southcentral Montana, about 43 air miles southeast of Billings. Construction has been carried out as part of the Pick-Sloan Missouri Basin Program—an overall plan to utilize the waters of the Missouri River Basin. Key feature of the unit is Yellowtail Dam, which rises 525 feet between the rugged Bighorn Canyon walls. The dam, a tall, variable-thickness arch type, is the highest in the Missouri River Basin and creates one of the largest reservoirs in capacity—1,375,000 acre-feet—on the tributary system of the Missouri River.

The reservoir, named Bighorn Lake, is utilized for the generation of power, irrigation, recreation, enhancement of fish and wildlife, sediment retention, municipal and industrial water, and flood control. In April 1961, the prime contract for construction was awarded. The last bucket of mass concrete was put into place in the dam during October 1965. Yellowtail Dam and the Bighorn Canyon National Recreation Area were dedicated on October 31, 1968.



## Dam:

Type	Concrete arch
Height above foundation (feet)	525
Crest length (feet)	1,480
Crest width (feet)	22
Crest elevation (feet)	3,660
Base thickness at center of arch (feet)	About 145
Volume (cubic yards)	1,546,000
Spillway: 32-foot-diameter tunnel in left abutment, controlled by two radial gates 25 feet wide by 64.4 feet high. Discharge capacity at water surface elevation 3,660 (cubic feet per second)	92,000
Outlet works: River outlets—Two 84-inch-diameter conduits through dam, controlled by 84-inch-diameter ring-follower gates. Discharge capacity (cubic feet per second)	5,000
Power outlets—Four 12-foot-diameter penstocks through dam.	

## Reservoir (Bighorn Lake):

Capacity (acre-feet at elevation 3,657)	1,375,000
Area (acres at elevation 3,657)	17,300
Length (river miles at elevation 3,657)	71
Water surface elevation (joint-use storage)	3,614 to 3,640
Water surface elevation (flood-control storage)	3,640 to 3,657

## Powerplant:

Indoor-type, housed in structural-steel framework building faced with brick. Vertical-shaft generators direct-connected to Francis-type turbines.

Total nameplate capacity (kilowatts)	250,000
Number of units	4
Capacity each generator (kilowatts)	62,500
Capacity each turbine (horsepower)	87,500

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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# Physical Data

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