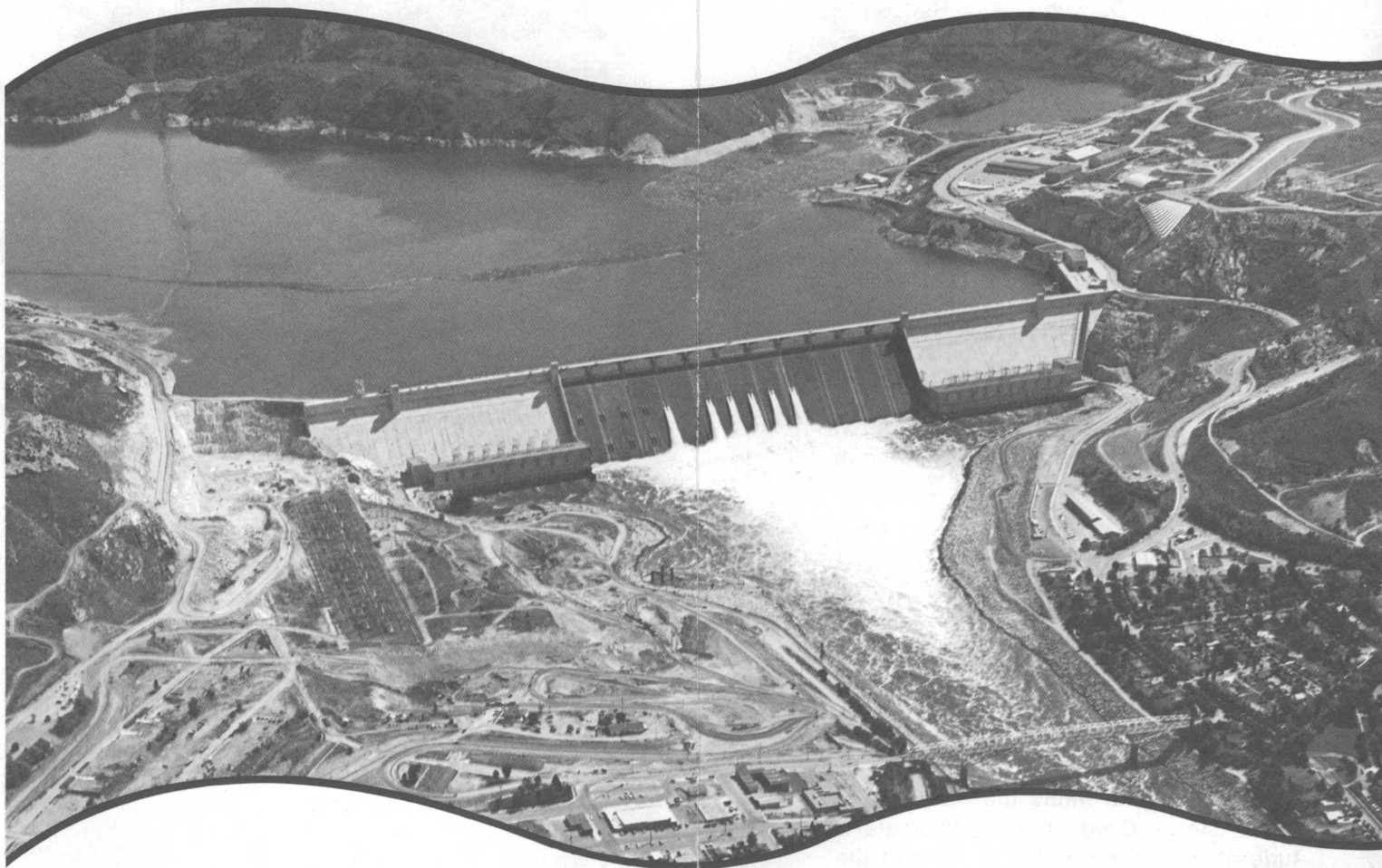


As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental 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.



## River Basins of the United States:

# The Columbia



U.S. Department of the Interior/Geological Survey

## River Basins of the United States: The Columbia

This leaflet, one of a series on the river basins of the United States, contains information on the Columbia River Basin, including a brief early history, a description of the physical characteristics, and other statistical data. At present, other river basins included in the series are The Colorado, The Delaware, The Hudson, The Potomac, and The Wabash.

### Early Exploration and Settlement

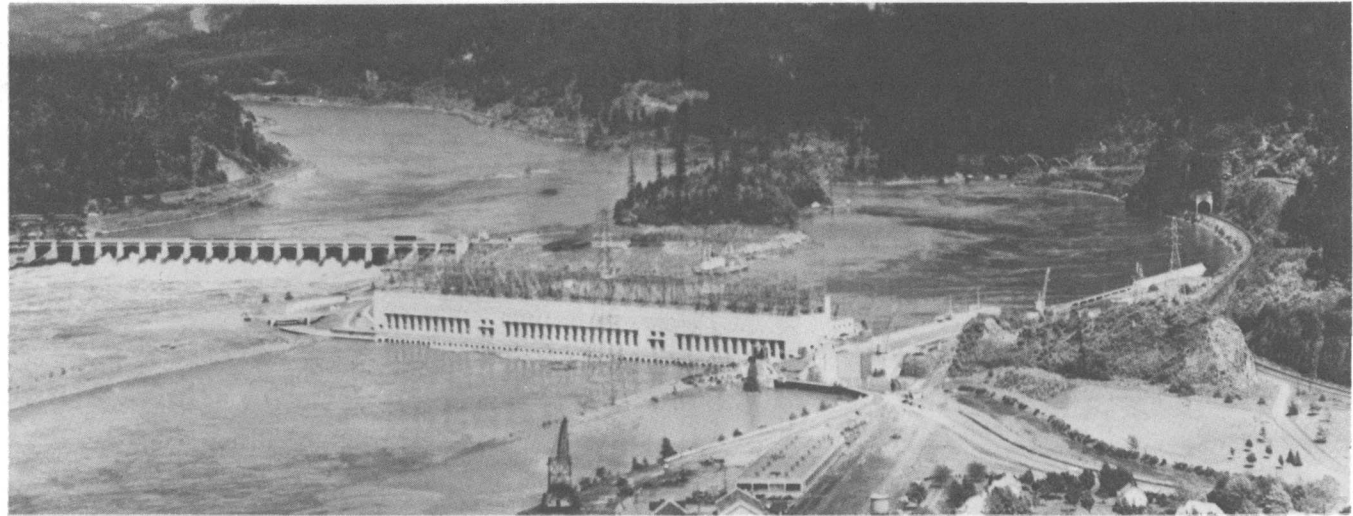
The Columbia was discovered in 1792 by Captain Robert Gray, a Boston trader who named the river after his boat. Lewis and Clark reached the river overland in 1805. The basin was originally inhabited by many Indian tribes, among them the Yakima Indians west of the river in what is now Washington and the Clatsop Indians on the banks of the Columbia River near present-day Astoria, where, in 1805, Lewis and Clark established Fort Clatsop. In 1811, Astoria was established by John Jacob Astor's fur trading company.

### Headwaters

The headwaters of the Columbia River is in Columbia Lake in British Columbia, between the Canadian Rockies and the Selkirk Mountains, 2,650 feet above sea level.

### Mouth

The Columbia enters the Pacific Ocean near Astoria, Oreg.; the approximate latitude at the mouth is 46°15' N., and the approximate longitude is 124°05' W.



### Major Tributaries

The Kootenai, Pend Oreille, Spokane, Okanogan, Wenatchee, Yakima, Snake, Lewis, Cowlitz, John Day, Deschutes, and Willamette Rivers are major tributaries of the Columbia.

### Course

The river flows northwest 218 miles; then south for 280 miles; it crosses the United States-Canadian border into northeastern Washington; and flows south, then west, and again south across central Washington in a sweeping curve called Big Bend. A series of coulees or dry canyons have been cut by the river; the biggest one is the Grand Coulee. Just below the mouth of the Snake River, the Columbia turns west for 210 miles and cuts across the Cascade Range through the scenic Columbia River Gorge, forming the boundary between Washington and Oregon. At Vancouver, Wash., it turns briefly north for 50 miles, then west for the final 55 miles to the Pacific Ocean.

### Length

The Columbia River is approximately 1,243 miles long from its headwaters to its

mouth at the Pacific Ocean. It is the largest North American river flowing into the Pacific Ocean. It ranks 7th among 135 U.S. rivers that are more than 100 miles long.

### Width

From 1½ miles below Cascade Range, the river widens to a maximum of 6 miles near its mouth, and it discharges into the ocean between jetties 2 miles apart.

### Depth

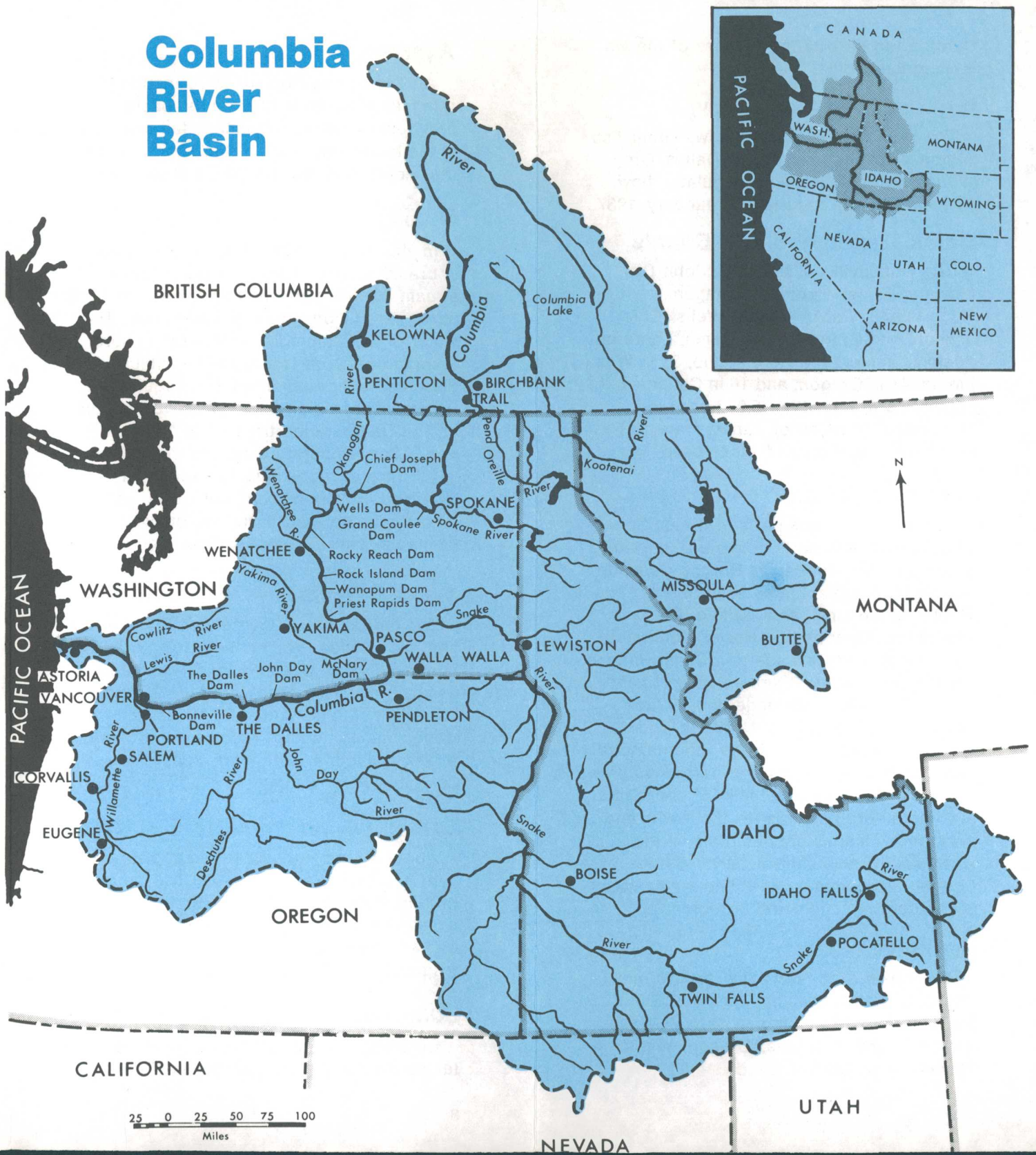
The navigable channel depth is kept at 40 feet as far as Portland and at 27 feet between Portland and Bonneville Locks. Depths to 300 feet have been measured near The Dalles, Oreg., and to 200 feet in lower river and estuary.

### Rate of Flow

Near Birchbank, British Columbia, the river's rate of flow is 32 million gallons per minute (gpm); at The Dalles Dam, it is 88 million gpm; and at the mouth, the rate of flow is 123 million gpm. Ocean tides affect the flow as far upstream as Bonneville Dam—145 miles above the mouth. Unusual problems in gaging the river flow above Bonneville Dam are caused in part by variable backwater effect from the



# Columbia River Basin



Dam and in part by the flatness of the water surface profile.

### Highest and Lowest Flow

The highest unregulated flow, about 555 million gpm, occurred at The Dalles, Oreg., in June 1894; the lowest unregulated flow, 16 million gpm, occurred in January 1937.

### Dams, Reservoirs, and Canals

The Bonneville, The Dalles, John Day, McNary, Priest Rapids, Wanapum, Rock Island, Rocky Reach, Wells, Chief Joseph, and Grand Coulee Dams. There are 20 dams in Montana, 48 in Idaho, 33 in Washington, 45 in Oregon, and 16 in Canada with capacities greater than 5,000 acre-feet. Thousands of miles of canals transport water for irrigation and other uses.

### Geologic Setting

The basin includes parts of British Columbia, Canada, and parts of five U.S. physiographic provinces: Pacific Border, Cascade Range, Columbia Plateau, Northern Rocky Mountains, and Middle Rocky Mountains. Bounded by Rocky Mountains on the east and Cascade and Coast Ranges on the west, 100,000 square miles of the Columbia Plateau are underlain by lava flows and are semiarid. Northern and western sections are rugged mountainous areas with steep ridges and narrow valleys. The basin is made up chiefly of sedimentary and metamorphic rocks in the north and east, and volcanic igneous rocks in the west, south, and central parts. Stands of Douglas fir, hemlock, and pine cover about 80 percent of mountainous regions.

### Drainage Area

The basin area is 259,000 square miles: 39,500 in British Columbia and 219,500 in the United States, including parts of Washington, Idaho, Montana, Oregon, Wyoming, Nevada, and Utah.

### Average Rainfall

An average of from 10 to 20 inches of rain falls annually in most of the basin, and between 40 to 140 inches fall annually at the lower elevations of the basin between the mouth and the Columbia River Gorge.

### Quality

In the estuary near Astoria, the water is brackish. The sediment load is low for a stream of this size, ranging from 3 to 2,660 parts per million (ppm) at Vancouver. The water of the Columbia is moderately hard (averaging 70 parts per million of undissolved solids per liter) and requires treatment for some uses. Dissolved solids at The Dalles range from 57 to 163 ppm and water temperature ranges from 32° to 81° F. It is of good quality except for localized pollution from industrial and municipal wastes. Ground water, where available, can be used without treatment.

### Major Cities

Spokane, Yakima, Vancouver, Walla Walla, and Wenatchee, Wash.; Portland, Astoria, Eugene, Salem, Corvallis, and Pendleton, Oreg.; Boise, Pocatello, Idaho Falls, and Twin Falls, Idaho; Butte and Missoula, Mont.; and Penticton, Kelowna, and Trail, British Columbia, are major cities of the Columbia River Basin.

### Municipal and Industrial Water Use

About 3½ million people use approximately 3 billion gallons of surface and ground water daily. During irrigation season nearly 54 billion gallons of water are withdrawn or diverted each day to irrigate 5½ million acres of land.

### Commercial Water Use

Shipping on the Columbia River as far as Pasco, Wash., and on the Snake

River to Lewiston, Idaho; salmon fishing; and nuclear and hydroelectric power generation are some of the ways in which water from the basin is used commercially.

### Agriculture

Agricultural products which come from the basin are: fruits (the basin is the largest apple producing area in the United States), berries, nuts, vegetables, general farming, wheat and small grains, dairy farming, cattle, and forests.

### Industry

Industry in the basin includes: aluminum, chemicals, lumber and wood products, pulp and paper, fabricated metals, machinery, food processing, fishing, tourist and resorts, and transportation.

### Minerals

Minerals found in the basin are: sand and gravel, silver, gold, copper, zinc, lead, and coal.

### Water Data

The Hydrologic Data Network, maintained by the U.S. Geological Survey in cooperation with the individual States, is the chief source of basic data on water in this country. In cooperation with other agencies, the U.S. Geological Survey maintains 16,500 gaging stations that measure high and low flow of rivers, lakes, and streams; 27,500 observation wells that collect data on levels and pumpage of ground water; and 8,200 stations that measure water quality.

This publication is one of a series of general interest publications prepared by the U.S. Geological Survey to provide information about the earth sciences, natural resources, and the environment. To obtain a catalog of additional titles in the series "Popular Publications of the U.S. Geological Survey," write:

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