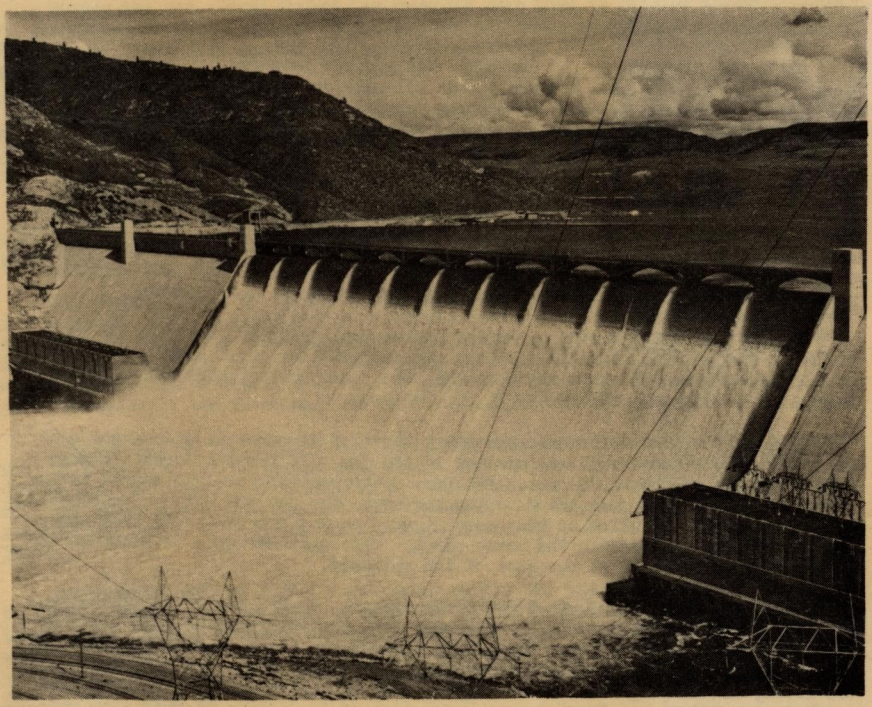

THE COLUMBIA BASIN PROJECT

LOCATIONS OF THE DAM AND PROJECT LANDS - The Grand Coulee Dam, largest concrete dam in the world, is 92 miles west and north of Spokane, Washington, over U.S.10-A, and about 240 miles east of Seattle. It is accessible by hard-surfaced highways connecting with cross-state routes at Wilbur, Coulee City, Soap Lake, and Burke Junction, east of Vantage. A visit to the dam adds only about 30 miles to a cross-state automobile tour.

The dam is situated in the deep Columbia River Canyon, near the head of the Grand Coulee, a geological phenomenon. Fifty-two miles long and one and one-half to five miles wide, with perpendicular walls rising nearly 1,000 feet, the Grand Coulee was cut southward through a lava plateau by the Columbia's mighty Ice-Age ancestor when its channel was blocked by a glacier, where the Grand Coulee Dam now stands. The Grand Coulee, home of famed Steamboat Rock and spectacular Dry Falls, ends at Soap Lake. There the irrigable lands in the Columbia Basin Project fan out approximately 80 miles south and 60 miles east and west. They are bounded on the west by the Columbia River.

PURPOSES OF THE COLUMBIA BASIN RECLAMATION PROJECT - The Grand Coulee Dam is the principal engineering feature of the Columbia Basin Project, a combination irrigation and power project. By releasing stored water in the low-water season, the dam improves winter navigation conditions in the lower Columbia, and will increase the firm-power capacities of all downstream power plants. With other dams on the river, the Grand Coulee Dam will be of value in flood control.

Receipts from the sale of power generated at the Grand Coulee Dam will pay approximately three-fourths of the cost of building an irrigation system for the reclamation of more than 1,000,000 acres of semiarid land in the Big Bend region

of south central Washington.

PRINCIPAL FEATURES OF THE PROJECT - The project includes, at present, (1) the Grand Coulee Dam; (2) Lake Roosevelt, the 151-mile storage reservoir behind the dam; (3) a powerhouse on each side of the central spillway at the dam; and (4) the world's largest hydro-electric generating units, with transformers and control equipment.

The irrigation system will include: (1) the main pumping plant, now being built at Grand Coulee Dam, (2) a 27-mile Equalizing Reservoir in the Upper Grand Coulee, (3) four earth-and-rock dams, two of which will form the Equalizing Reservoir, (4) a small pumping plant to serve 5,400 acres near Pasco, and (5) siphons, tunnels, and other works, including more than 4,000 miles of main and secondary canals. Several parts of the irrigation system are under construction.

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Spillway. Water not needed for the generation of power is discharged over the 1,650-foot central spillway section of the dam. It forms a waterfall more than twice the height of Niagara. Millions of horsepower formerly wasted in the river's 151-mile flow from the Canadian border to the dam are now concentrated at the dam. Great quantities of that concentrated energy are recovered from water passing through turbines in the power plant. The remainder goes to waste in the turbulent surplus water at the foot of the spillway.

Drum Gates. As the flow of the river changes, drum gates at the top of the spillway are raised or lowered to discharge from the reservoir as much water as flows into it, minus the water that flows through the power plant turbines. The purpose is to prevent the reservoir surface from rising more than 1290 feet above sea level, and backing water into Canada. Each drum gate is 135 feet long, and weighs about 500 tons. There is one under each of the eleven highway arch bridges.

LAKE ROOSEVELT - Water impounded by the Grand Coulee Dam forms Lake Roosevelt, which extends 151 miles from the dam to the Canadian border, and makes the Columbia navigable for 350 miles, to Revelstoke, British Columbia. Lake Roosevelt has 600 miles of attractive shore line, and averages 4,000 feet in width. Easily accessible by good highways, Lake Roosevelt is less than a day's drive from other major tourist attractions in the Pacific Northwest. Unlike most storage reservoirs, Lake Roosevelt will not be drawn down and made unsightly in the summer.

For protective purposes, the Government owns a strip of land along the shore. Recreational activities along Lake Roosevelt are managed by the National Park Service, which maintains offices at Coulee Dam.

POWER FROM THE COLUMBIA - The Columbia River is the Nation's foremost power stream. The Corps of Engineers has recommended the development of the river by means of 10 dams. The first to be built on the Columbia was at Rock Island, near Wenatchee, by the Puget Sound Power & Light Company. The second, Bonneville Dam, was built by the Corps of Engineers, 146 miles from the mouth of the river. The third was Grand Coulee Dam, built and operated by the Bureau of Reclamation. It is 450 miles above Bonneville, or 596 miles from the mouth of the Columbia.

POWER PLANT AT GRAND COULEE DAM - Although still incomplete, the power plant at the Grand Coulee Dam is the mightiest in the world. It consists of two powerhouses, capable of serving a total of 18 large generating units. The West Powerhouse also has capacity for three smaller station-service units, to meet local power demands. The West Powerhouse has nine large units in operation now. They are rated at 108,000 kilowatts each and are driven by 150,000 horsepower turbines. The East Powerhouse, across the river, has two of its total of nine equally large units completed. Units in both powerhouses are the most powerful generators and turbines ever built. Being the first of their size, they were conservatively designed, and have been found capable of carrying loads approaching 130,000 kilowatts, or far higher than their "nameplate" ratings.

During the war, Grand Coulee Dam provided more than 15 billion kilowatt-hours of electrical energy to help build ships, planes, tanks, and the atomic bomb. The dam's power production for war was equal to the labor of 1,000,000 men working 8 hours a day for 78 years.

THE PUMPING PLANT - The dam is not needed to store water for irrigation. The Columbia has the unique characteristic of having its high-water season in summer. Consequently, both the water required for irrigation and the power needed for pumping it will be provided by the surplus floodwaters of summer.

Irrigation water will be raised about 280 feet from Lake Roosevelt to an Equalizing Reservoir in the Grand Coulee. From this reservoir it will flow to the lands to be irrigated.

The pumping plant is behind a "wing dam" on the upstream side of the dam, at its west end. This smaller dam is about 600 feet long. Ultimately, twelve pumps will be installed there to force water uphill through tunnels, into a canal leading to the Equalizing Reservoir. Each pump will be driven by a 65,000-hp. motor, and each will have a capacity of 12,000 gallons of water per second--enough to meet the needs of the seven million residents of greater New York City.

THE EQUALIZING RESERVOIR - The Equalizing Reservoir in the Upper Grand Coulee will be formed by two earth-and-rock dams. One will be 1½ miles from the Grand Coulee Dam, the other near Coulee City. The reservoir will be 27 miles long, but will not cover the entire floor of the Coulee. However, the Government-owned railroad in the Coulee will be abandoned, and the highway will be relocated at a higher level.

WATER DISTRIBUTING SYSTEM - The water supply for the land to be irrigated will be carried south from the Equalizing Reservoir, through a rugged area east of the Lower Grand Coulee, by means of canals, siphons, tunnels, and prehistoric water courses. About 2½ miles north of Adrian, the water supply will be divided between the 80-mile West Canal, which will irrigate the western part of the project, and the 130-mile East Low Canal, which will irrigate the greater part of the eastern and southern sections. Some time in the future, the extreme eastern part of the project area, now devoted to dry-land farming, will be irrigated from the East High Canal.

The 3½-mile O'Sullivan Dam, south of Moses Lake, will form a reservoir which, in effect, will be an extension of Moses Lake. It will impound run-off water from irrigated land in the northerly part of the project for re-use on lands to the south. The dam is the fourth longest in the United States.

THE LAND TO BE IRRIGATED - The irrigation system is designed to serve more than 1,000,000 acres of land which lie within a 2,500,000-acre expanse. Ninety percent of the irrigable land is privately owned. No Government land is open to homestead entry. Settlers will buy land from current owners, or from such non-profit agency as may be formed by the Government to purchase, lay out, and resell the land, in family-size units.

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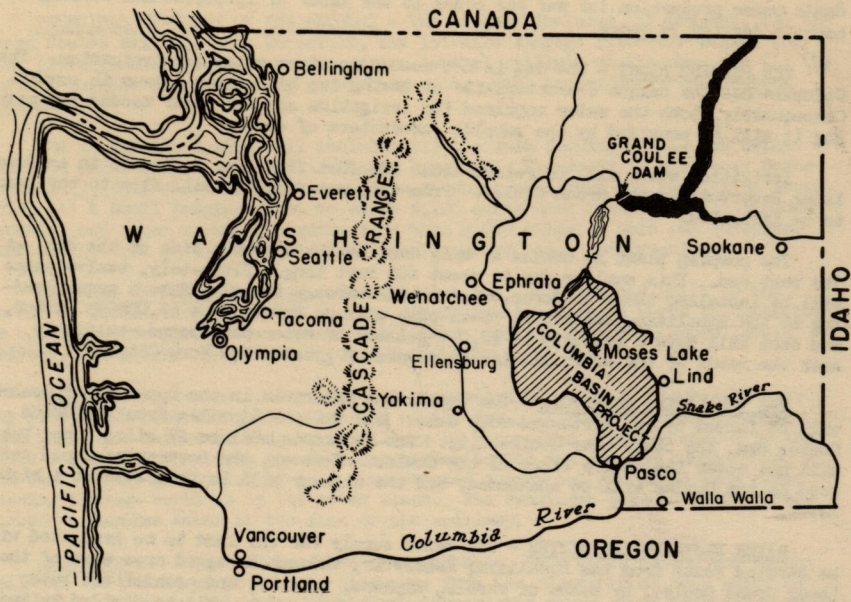
In 1948, a pumping system for 5,400 acres of land began operating near Pasco. The 1,200-acre Burbank Pumping Unit, farther south, will receive its first water in 1950. The time at which water will be available in the northerly part of the project and the speed at which the project will be developed will depend upon the rate at which Congress appropriates money for construction and upon demand for irrigated land.

A landowner will be allowed to retain only one family-size farm unit. All irrigable excess land eligible to be served by the irrigation system will be purchased by the Government, divided into family-size units, and sold to settlers. The land a person owns now or may purchase later will not necessarily be that for which he will receive water, because land retained by owners must conform to the Government's family-size farm pattern. Farm units will be laid out on a basis of land quality and contour, not on the basis of existing property lines.



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United States - Department of the Interior - Bureau of Reclamation - 1949

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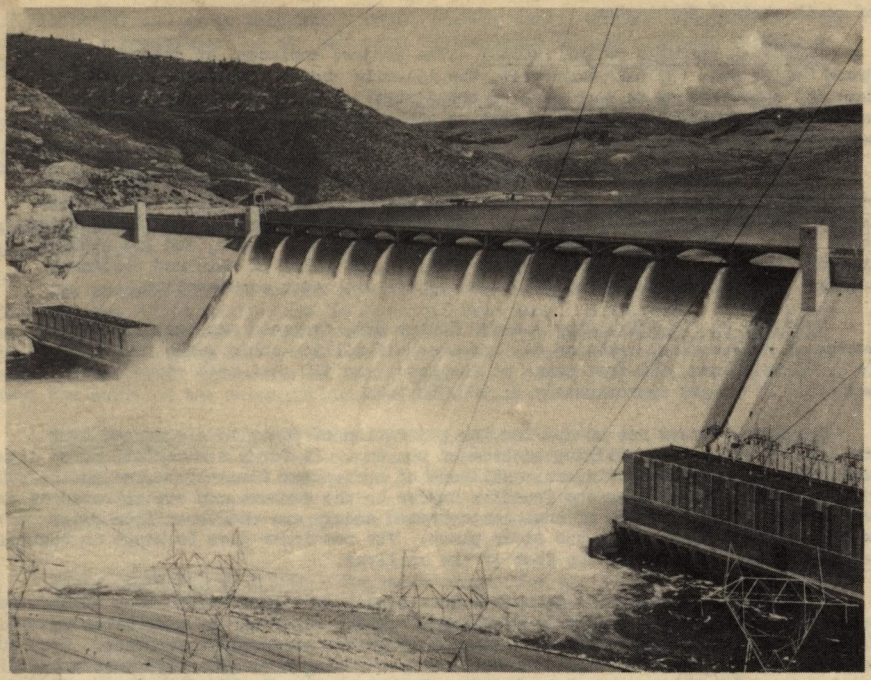

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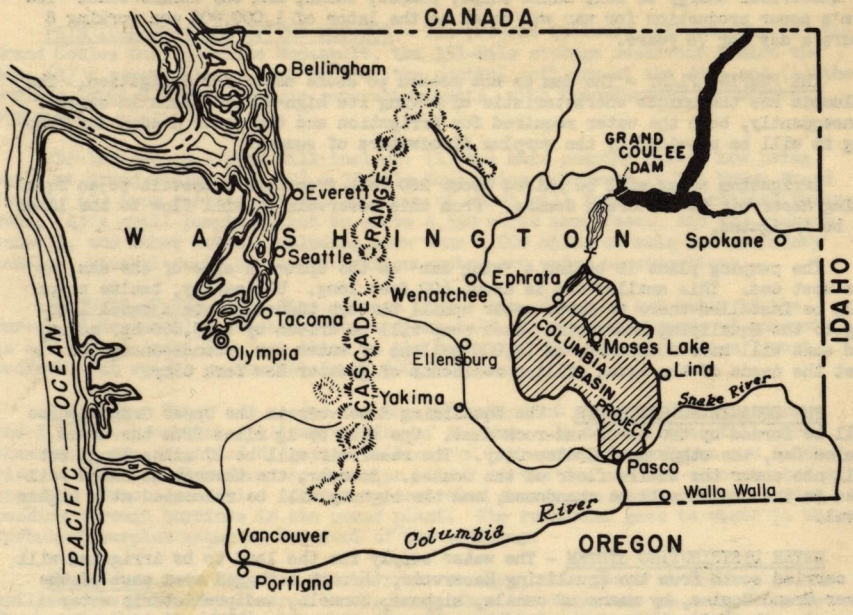

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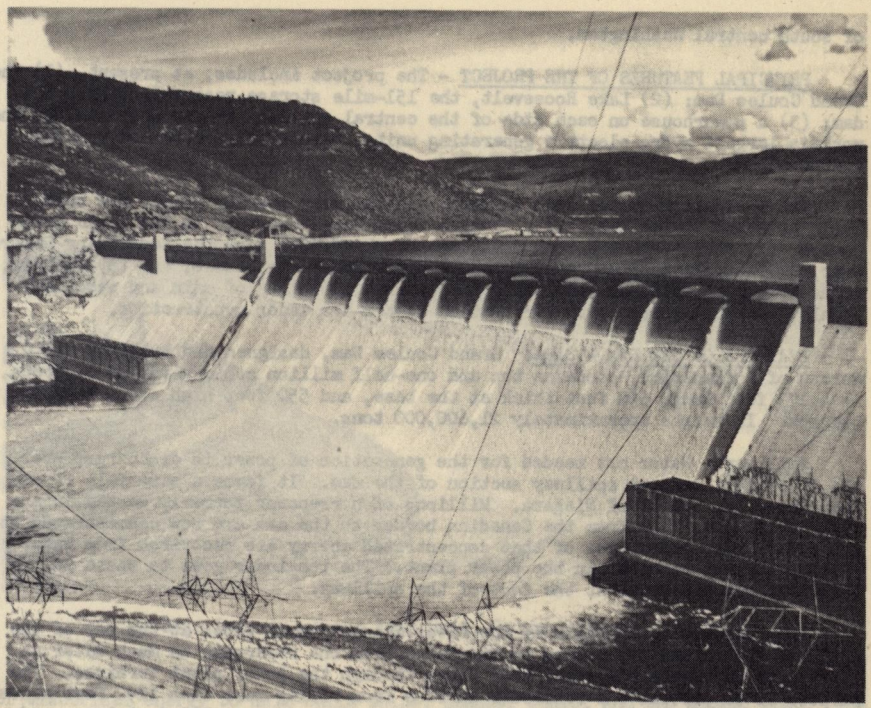

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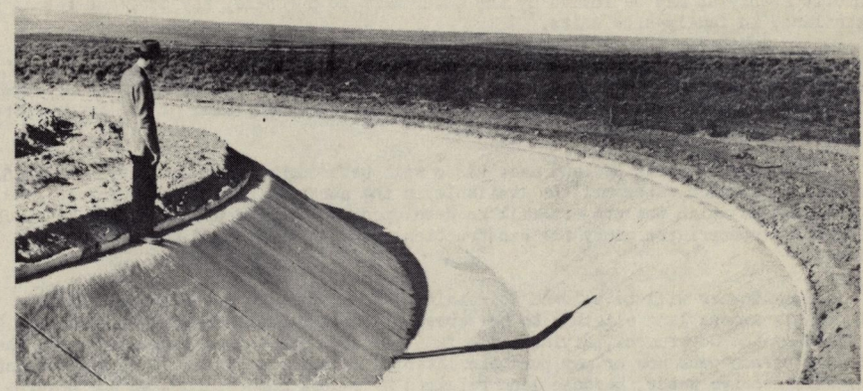

Main Lateral, Pasco Pump Unit, Columbia Basin Project.

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WATER DISTRIBUTING SYSTEM - The water supply for the land to be irrigated will be carried south from the Equalizing Reservoir, through a rugged area east of the Lower Grand Coulee, by means of canals, siphons, tunnels, and prehistoric water courses. About 2½ miles north of Adrian, the water supply will be divided between the 80-mile West Canal, which will irrigate the western part of the project, and the 130-mile East Low Canal, which will irrigate the greater part of the eastern and southern sections. Some time in the future, the extreme eastern part of the project area, now devoted to dry-land farming, will be irrigated from the East High Canal.

The Potholes Dam, now under construction south of Moses Lake, will form a reservoir which, in effect, will be an extension of Moses Lake. It will impound run-off water from irrigated land in the northern part of the project for reuse on lands to the south.

THE LAND TO BE IRRIGATED - The irrigation system is designed to serve more than 1,000,000 acres of land which lie within a 2,500,000-acre expanse. Ninety percent of the irrigable land is privately owned. No Government land is open to homestead entry. Settlers will buy land from current owners, or from such non-profit agency as may be formed by the Government to purchase, lay out, and resell the land, in family-size units.

Before purchasing any parcel of land in the project area, prospective buyers should obtain free, from the Bureau of Reclamation at Coulee Dam, Washington, complete and reliable information regarding the character and value of the land. There is no advantage in buying land now.

About 5,400 acres of land near Pasco will be brought under irrigation in 1948. The time at which water will be available in the northern part of the project, and the speed at which the project will be developed will depend upon the rate at which Congress appropriates money for construction and upon the demand for irrigated land.

A landowner will be allowed to retain only one family-size farm unit. All irrigable excess land eligible to be served by the irrigation system will be purchased by the Government, divided into family-size units, and sold to settlers. The land a person owns now or may purchase later will not necessarily be that for which he will receive water, because land retained by owners must conform to the Government's family-size farm pattern. Farm units will be laid out on a basis of land quality and contour, not on the basis of existing property lines.

THE ANTI-SPECULATION ACT - All project land eligible to receive water is covered by definite anti-speculation restrictions. All irrigable land has been surveyed, examined, classified, and appraised. The appraisal is based on dry-land values. The fact that the land will be irrigated is not considered in making the appraisals. Do not pay more than the appraised, dry-land value for eligible property. Consult the Bureau of Reclamation at Coulee Dam or Ephrata, Washington, before making a purchase.

NEED FOR MORE FARM LAND - One-third of the population is ill-fed, ill-clothed, and ill-housed. Soil erosion and bad farming practices are destroying farm land at an alarming rate.

Population is increasing approximately a million a year, and nearly 4 acres of land are needed to support each person at our present living levels. It now takes 530,000,000 acres of crop land to support our population of 140,000,000. Even under full development, the Columbia Basin Project will add less than one-fifth of one percent to the crop land of the country.

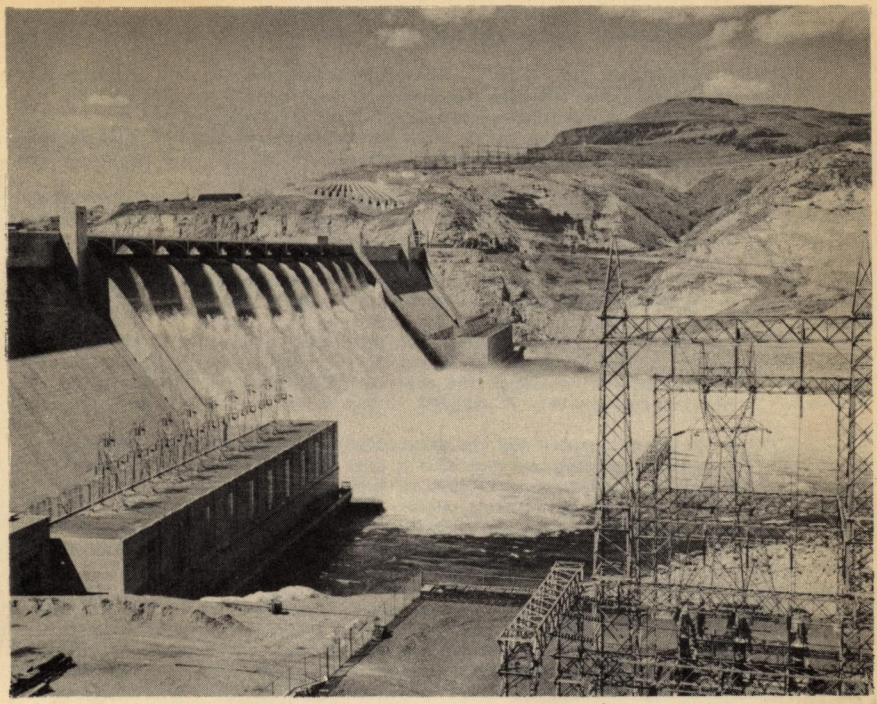
Reclamation of land and development of incidental power projects to serve those lands, and surrounding areas, are special fields of the Bureau of Reclamation. This agency of the Department of the Interior deals with the most precious of western natural resources—water, the basis of western agriculture. The Bureau's projects create new wealth, and their costs are repaid to the Government.

INFORMATION SERVICE - Inquiries regarding the general activities of the Bureau of Reclamation should be addressed to the Commissioner, Bureau of Reclamation, Washington 25, D.C.

Specific inquiries regarding the Columbia Basin Project should be addressed to the Bureau of Reclamation at Coulee Dam, Washington, or Ephrata, Washington.

United States - Department of the Interior - Bureau of Reclamation - 1947

[Removed from The Grand Coulee by J. Harlen Bretz]



THE COLUMBIA BASIN PROJECT

LOCATIONS OF THE DAM AND PROJECT LANDS - The Grand Coulee Dam, largest concrete dam in the world, is 92 miles west and north of Spokane, Washington, over U.S. 2, and about 240 miles east of Seattle. It is accessible by hard-surfaced highways connecting with cross-state routes at Wilbur, Coulee City, Soap Lake, and Burke Junction, east of Vantage. A visit to the dam adds only about 30 miles to a cross-state automobile tour.

The dam is situated in the wide, deep canyon of the Columbia River, near the head of the Grand Coulee, ice-age diversion channel of the prehistoric Columbia, formed when the southward advance of the Cordilleran Ice Cap closed the river canyon for thousands of years. The Grand Coulee is a spectacular geological phenomenon, of great interest to tourists.

The lands to be irrigated lie in the Big Bend of the Columbia, beginning near Ephrata, sixty miles southwest of the dam, and extending to Pasco, about eighty miles further south. Out of an area of about two and a half million acres of land, 1,029,000 acres are suited to irrigation farming.

PURPOSES OF THE COLUMBIA BASIN RECLAMATION PROJECT - The Grand Coulee Dam is the principal engineering feature of the Columbia Basin Project, a combination irrigation and power project. By releasing stored water in the low-water season, the dam improves winter navigation conditions in the lower Columbia, and will increase the firm-power capacities of all downstream power plants. With other dams on the river, the Grand Coulee Dam will be of value in flood control.

Receipts from the sale of power will pay for the dam, and the powerhouse and other power facilities, and for about three quarters of the cost of the irrigation system. Settlers on the land will pay a part of construction costs and all oper-

ation and maintenance costs on the irrigation system.

PRINCIPAL FEATURES OF THE PROJECT - The project includes (1) the Grand Coulee Dam; (2) Lake Roosevelt, the 151-mile storage reservoir behind the dam; (3) a powerhouse on each side of the central spillway at the dam; and (4) the world's largest hydro-electric generating units, with transformers and control equipment, a partially equipped pumping plant and canal system.

The irrigation system will include when completed: (1) the main pumping plant at Grand Coulee Dam, (2) a 27-mile Equalizing Reservoir in the Upper Grand Coulee, (3) four earth-and-rock dams, two of which form the Equalizing Reservoir, (4) a small pumping plant serving 5,400 acres near Pasco, and (5) siphons, tunnels, and other works, including more than 4,000 miles of main and secondary canals. Several parts of the irrigation system are still under construction.

FEATURES OF THE DAM - Size. Grand Coulee Dam, designed and built by the Bureau of Reclamation, contains ten and one-half million cubic yards of concrete, is 4,173 feet long, 500 feet thick at the base, and 550 feet high above lowest bedrock. It weighs approximately 21,600,000 tons.

Spillway. Water not needed for the generation of power is discharged over the 1,650-foot central spillway section of the dam. It forms a waterfall more than twice the height of Niagara. Millions of horsepower formerly wasted in the river's 151-mile flow from the Canadian border to the dam are now concentrated at the dam. Great quantities of that concentrated energy are recovered from water passing through turbines in the power plant. The remainder goes to waste in the turbulent surplus water at the foot of the spillway.

Drum Gates. As the flow of the river changes, drum gates at the top of the spillway are raised or lowered to discharge from the reservoir as much water as flows into it, minus the water that flows through the power plant turbines. The purpose is to prevent the reservoir surface from rising more than 1290 feet above sea level, and backing water into Canada. Each drum gate is 135 feet long, and weighs about 500 tons. There is one under each of the eleven highway arch bridges.

LAKE ROOSEVELT - Water impounded by the Grand Coulee Dam forms Lake Roosevelt, which extends 151 miles from the dam to the Canadian border, and makes the Columbia navigable for 350 miles, to Revelstoke, British Columbia. Lake Roosevelt has 600 miles of attractive shore line, and averages 4,000 feet in width. Easily accessible by good highways, Lake Roosevelt is less than a day's drive from other major tourist attractions in the Pacific Northwest. Unlike most storage reservoirs, Lake Roosevelt will not be drawn down and made unsightly in the summer.

For protective purposes, the Government owns a strip of land along the shore. Recreational activities along Lake Roosevelt are managed by the National Park Service, which maintains offices at Coulee Dam.

POWER FROM THE COLUMBIA - The Columbia River is the Nation's foremost power stream. The Corps of Engineers has recommended the development of the river by means of 10 dams. The first to be built on the Columbia was at Rock Island, near Wenatchee, by the Puget Sound Power & Light Company. The second, Bonneville Dam, was built by the Corps of Engineers, at tidewater, 146 miles from the mouth of the river. The third was Grand Coulee Dam, built and operated by the Bureau of Reclamation. It is 450 miles above Bonneville, or 596 miles from the mouth of the Columbia.

POWER PLANT AT GRAND COULEE DAM - The power plant at the Grand Coulee Dam is the mightiest in the world. It consists of two powerhouses, each containing 9 large generating units. The West Powerhouse also has three smaller station-service units, to meet local power demands. Units in both powerhouses are the most powerful generators and turbines ever built. Being the first of their size, they were conservatively designed, and have been found capable of carrying loads approaching 130,000 kilowatts, or far higher than their "nameplate" ratings of 108,000 kilowatts.

During the war, Grand Coulee Dam provided more than 15 billion kilowatt-hours of electrical energy to help build ships, planes, tanks, and the atomic bomb. The dam's power production for war was equal to the labor of 1,000,000 men working 8 hours a day for 78 years.

THE PUMPING PLANT - The dam is not needed to store water for irrigation. The Columbia has the unique characteristic of having its high-water season in summer. Consequently, both the water required for irrigation and the power needed for pumping it will be provided by the surplus floodwaters of summer.

Irrigation water will be raised about 280 feet from Lake Roosevelt to an Equalizing Reservoir in the Grand Coulee. From this reservoir it will flow to the lands to be irrigated.

The pumping plant is behind a "wing dam" on the upstream side of the dam, at its west end. This smaller dam is about 600 feet long. Ultimately, twelve pumps will be installed there to force water uphill through tunnels, into a canal leading to the Equalizing Reservoir. Each pump will be driven by a 65,000-hp. motor, and each will have a capacity of 12,000 gallons of water per second--enough to meet the needs of the seven million residents of greater New York City. The first two pumps were started in the summer of 1951.

THE EQUALIZING RESERVOIR - The Equalizing Reservoir in the Upper Grand Coulee was formed by two earth-and-rock dams. One is 2 miles from the Grand Coulee Dam, the other near Coulee City. The reservoir is 27 miles long, but does not cover the entire floor of the Coulee. However, the Government-owned railroad in the Coulee was abandoned, and the highway was relocated at a higher level along the east wall of the Coulee.

WATER DISTRIBUTING SYSTEM - The water supply for the land to be irrigated will be carried south from the Equalizing Reservoir, through a rugged area east of the Lower Grand Coulee, by means of canals, siphons, tunnels, and prehistoric water courses. About 2½ miles north of Adrian, the water supply will be divided between the 80-mile West Canal, which will irrigate the western part of the project, and the 130-mile East Low Canal, which will irrigate the greater part of the eastern and southern sections. Some time in the future, the extreme eastern part of the project area, now devoted to dry-land farming, will be irrigated from the East High Canal.

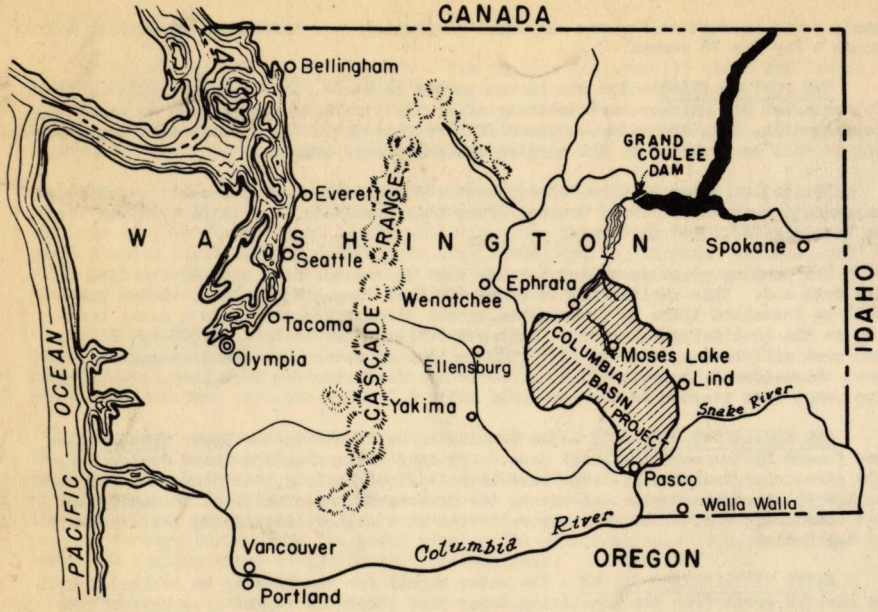
The 3½-mile O'Sullivan Dam, south of Moses Lake, will form a reservoir which, in effect, will be an extension of Moses Lake. It will impound runoff water from irrigated land in the northerly part of the project for re-use on lands to the south. The dam is the fourth longest in the United States.

THE LAND TO BE IRRIGATED - The irrigation system is designed to serve more than 1,000,000 acres of land which lies within a 2,500,000-acre expanse. Ninety percent of the irrigable land is privately owned. No Government land is open to homestead entry. Settlers will buy land from current owners. The Government will lay out the land in family-size units.

Before purchasing any parcel of land in the project area, prospective buyers should obtain free, from the Bureau of Reclamation at Ephrata, Washington, complete and reliable information regarding the character and value of the land. There is no advantage in buying land in any area long before water is to be available there.

In 1948, a pumping system for 5,400 acres of land began operating near Pasco. The 1,200-acre Burbank Pumping Unit, farther south, received its first water in 1950. The speed at which the project will be developed will depend upon the rate at which Congress appropriates money for construction and upon demand for irrigated land. Water will be available for 87,000 acres of land in 1952.

A landowner will be allowed to retain only one family-size farm unit. Available excess land eligible to be served by the irrigation system will be purchased by the Government, divided into family-size units, and sold to settlers. The land a person owns now or may purchase later will not necessarily be that for which he will receive water, because land retained by owners must conform to the Government's family-size farm pattern. Farm units will be laid out on a basis of land quality and contour, not on the basis of existing property lines.



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Specific inquiries regarding power should be addressed to the Bureau of Reclamation at Coulee Dam, Washington. Inquiries about land and irrigation should be addressed to Ephrata, Washington.

United States - Department of the Interior - Bureau of Reclamation - 1951

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