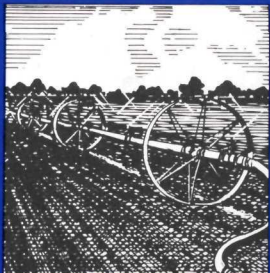
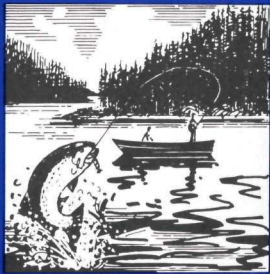
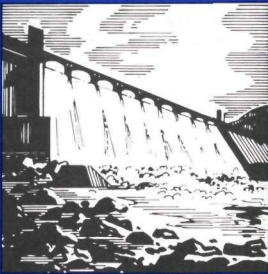


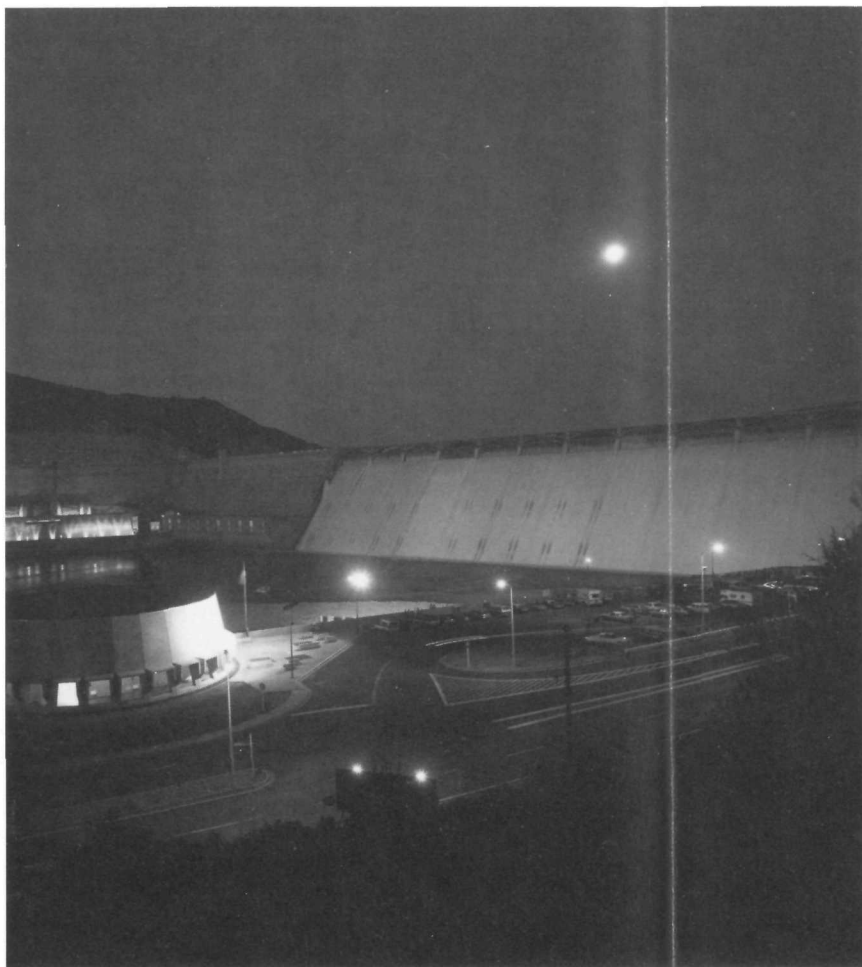
WATER IN ACTION

GRAND COULEE DAM
AND LAKE ROOSEVELT



Lake Roosevelt has steadily gained in popularity as a summer tourist attraction. High reservoir levels most years provide visitors with a rich variety of recreational opportunities. But many people are not aware of the full story behind Grand Coulee Dam and the great lake it created.

This brochure explains the origin of Lake Roosevelt, why it was built and how it serves the people of the Pacific Northwest. It represents a unified effort on the part of the three federal agencies most involved in management and oversight of Lake Roosevelt and Grand Coulee Dam: the U.S. Bureau of Reclamation, the Bonneville Power Administration, and the U.S. National Park Service.



Grand Coulee Dam Visitor Arrival Center by night.

Who's responsible for what?

The U.S. Bureau of Reclamation built and operates the Columbia Basin Project including Grand Coulee Dam. While many parties with diverse needs and interests provide input in the project's operation, Reclamation makes the final decisions. To contact a representative of Reclamation, call (509) 638-1360 or write to Grand Coulee Project Office, Attention: Code 140, Grand Coulee, Washington 99133.

The Bonneville Power Administration markets and distributes power generated at federal dams on the Columbia River and its tributaries. In 1980, a new federal law charged BPA with ensuring that the Northwest has an adequate supply of power, whether from hydroelectric dams or other generating resources. BPA schedules power generation at Grand Coulee Dam within constraints established by Reclamation that provide for the project's multipurpose benefits. For more information on BPA's role at Lake Roosevelt and throughout the region, call the BPA Public Involvement Office toll-free from Washington, Idaho and Montana at 1-800-547-6048, or from Oregon at 1-800-452-8429. Or write to the BPA Public Involvement Office, P.O. Box 3621, Portland, Oregon 97208.

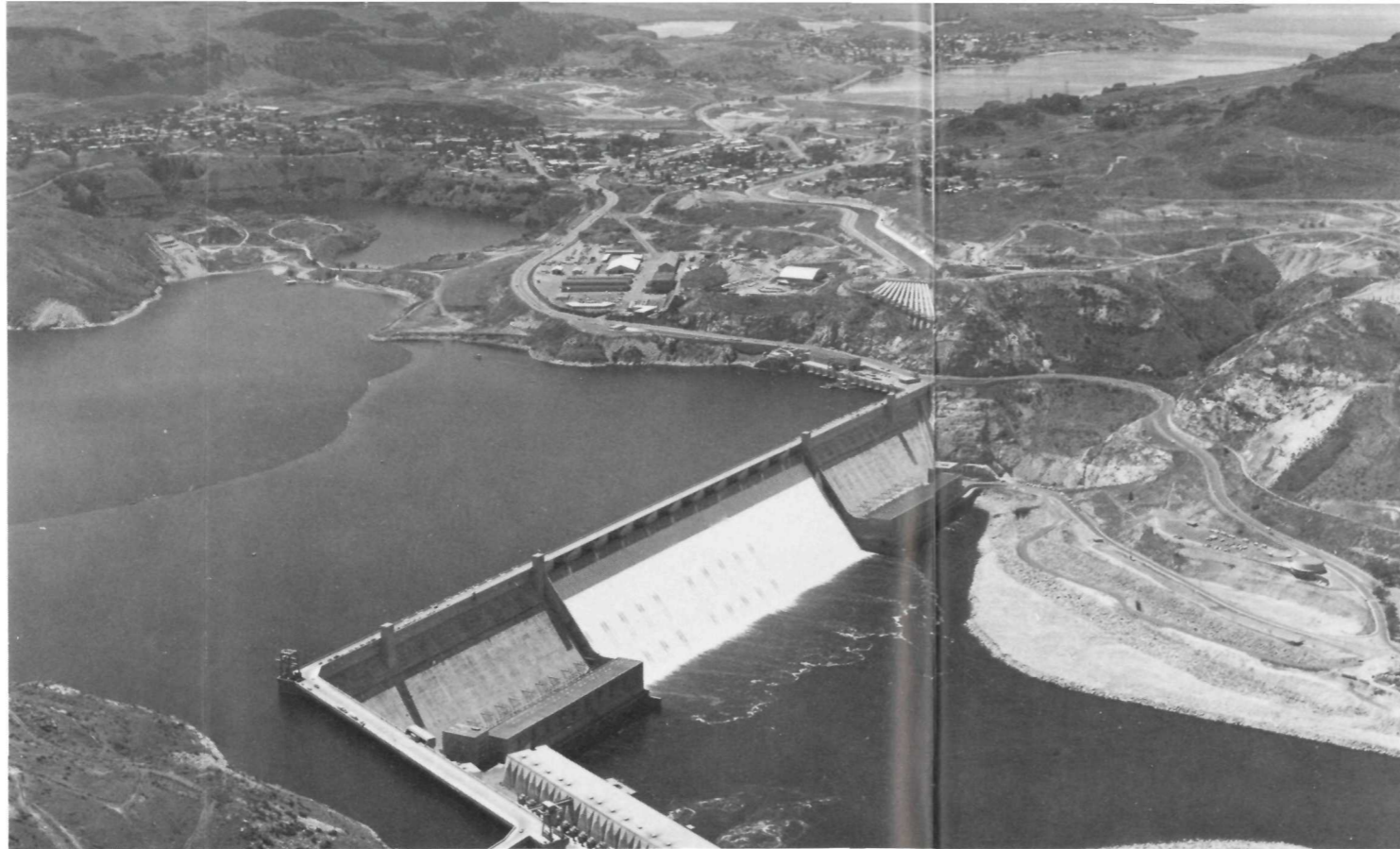
The U.S. National Park Service manages the Coulee Dam National Recreation Area. The Recreation Area includes the portion of Lake Roosevelt and adjacent shoreline that is not within the Colville and Spokane Indian Reservations. Besides recreation, the National Park Service administers a reservoir shoreline special use permit program. Commercial recreation facilities and services are also provided to the public by concessioners operating under contracts administered by the National Park Service. For more information call (509) 633-0881 or write Coulee Dam National Recreation Area, P.O. Box 37, Coulee Dam, Washington 99116.

The U.S. Army Corps of Engineers is responsible for coordinating the operation of the major reservoirs in the Columbia River Basin for flood control. The level of Lake Roosevelt is lowered in the spring to provide space for regulating snowmelt runoff, then is filled gradually during May and June at the direction of the Corps to control downstream flooding. Additional information about the Corps' flood control responsibilities can be obtained by calling the Corps' Reservoir Control Center at (503) 221-3741 or writing: USACE North Pacific Division, Attn: NPDEN-WM-RCC, P. O. Box 2870, Portland, Oregon 97208-2870.

Power and Plenty: An Overview of Grand Coulee Dam and the Columbia Basin Project

The Grand Coulee Dam is a study in superlatives. The key structure of the multipurpose Columbia Basin Project, it stands astride the Columbia River, the fourth largest river in North America.

The dam is one of the largest concrete structures in the world, containing nearly 24 million tons of concrete. It towers 550 feet from bedrock to crest and



Grand Coulee Dam with Banks Lake in background.

tapers from a width of more than 500 feet at its base to 30 feet at the top.

The dam forms a reservoir, Franklin D. Roosevelt Lake, extending 151 miles to the Canadian border, with 600 miles of shoreline, an 82,000-acre surface area, and nearly 10 million acre feet of storage capacity.

One of the dam's most important jobs is the production of electrical energy. Torrents of water rush through generating turbines near the base of the dam. Sophisticated electronic equipment and human expertise are combined in minute-by-minute scheduling and operation of the power-producing facilities.

During World War II, Grand Coulee Dam played an important role in providing power for building ships and planes. In subsequent years, its hydroelectric generators have produced huge



Wheel-line irrigation sprinkler system using Columbia Basin Project water.

amounts of power to help meet the demand for electricity throughout the Northwest and beyond.

Now, Grand Coulee Dam serves as a "peaking plant" as well, producing extra power needed mainly in the morning and at night when people's use of electricity surges upward.

The Columbia River flow ranges from "high" to "low" between summer and winter: power managers must plan dam and reservoir operations to satisfy various needs for the water and so harvest the greatest benefits from the river's tremendous resources.

In winter – the period of lowest river flow – water released for power production exceeds the amount entering the reservoir, resulting in considerable "drawdown." In spring, when the Columbia River begins its annual rise, up to 80 feet of empty storage space in the reservoir forms a safety valve to absorb the forces of spring flooding.

At about the time the river starts its annual spring rise, the irrigation season begins. When the powerful irrigation pumps located in the Grand Coulee Pump Generating Plant are operating, water is channeled to irrigate crops as far as 125 miles away.

A Historical Perspective

Grand Coulee Dam is part of a much larger plan to harness the power of a great river and turn a semi-arid desert into productive cropland. The physical project had its beginnings in 1933, providing employment for thousands of people in the depths of the Great Depression. In subsequent years, the Columbia Basin Project has turned relatively unproductive land into a substantial, diversified farming area, and provided power for homes, businesses and industry throughout the West.

Today an important side benefit of the project – recreation – serves an increasingly important role in the region's economy. At the same time, more traditional and sometimes conflicting needs such as flood control, irrigation and power production are relied upon for the

benefits they produce. The task confronting river planners has become complex – a delicate balancing act among the project's diverse values.

How Lake Roosevelt water is used

Today, virtually all the water in Lake Roosevelt is spoken for. This isn't just running water: it means flourishing crops, renewable energy at the flick of a switch, marine highways, the best flood insurance available, and much more. What follows is an item-by-item description of the project's main purposes – irrigation, flood control, and power production. Fish and wildlife and recreation needs, two other important benefits, are discussed here also.

Irrigation

The need for irrigation led to the creation of Grand Coulee Dam and Lake Roosevelt, and irrigation has been a primary benefit ever since. And for good reason: the Columbia Basin is one of the world's prime croplands. In 1948, the first irrigation benefits were realized.

The Columbia's prehistoric channel, the Grand Coulee, was dammed at both ends, creating Banks Lake. This 27-mile-long reservoir is two miles south and 280 feet above the level of the river at Grand Coulee Dam. Fed by 12 massive pumps from Lake Roosevelt, Banks Lake can irrigate 1.1 million acres of semiarid Columbia Basin Plateau fanning out as far as 125 miles south, to the Oregon border.

Currently, the project irrigates about 540,000 acres, half the acreage authorized by Congress. About two million acre feet of water are diverted annually from Lake Roosevelt for irrigation, mainly between May and September.

All this development has borne more than good fruit. In 1984, for example, about 6,000 Columbia Basin Project farms earned \$340.3 million for their crops – 16.2 percent of the value of

Washington's total harvest. The average crop value of each irrigated acre: \$657. These fertile lands bore everything from potatoes to peppermint – more than 60 crops in all.

Who pays for this bounty? The Columbia Basin Project is designed to pay for itself mainly through power revenues. Part of it is paid for by the water users – the irrigators – who also pay for the operation and maintenance of the irrigation facilities. For every dollar irrigators contribute to pay for these facilities, power produced at Grand Coulee Dam contributes nearly seven dollars. That totaled nearly \$625 million as of late 1985.

Flood Control

Just as the Grand Coulee Dam was shaped by gigantic processes, so was the entire Columbia Basin and Columbia Plateau. And from the dawn of history, the byword has been floods. First it was floods of basaltic lava. Next, unimaginably huge floods of ice and water scoured, sculpted and etched it into one of the most intricately channeled surfaces on the earth.

In recent times, this life-giving river has also ravaged the area with floods. It was partly for this reason – to allow a human-induced pace to the river – that the Grand Coulee Dam was built and Lake Roosevelt levels regulated.

Grand Coulee Dam forms the gateway for 74,000 square miles of river drainage, an area substantially larger than the entire State of Washington. Grand Coulee, one of 11 dams on the Columbia River in the United States, is the system's primary storage dam, designed to store Columbia River runoff for release at more opportune or safer times. Teamed up with several dams on the Columbia in Canada and other U.S. dams on Columbia tributaries, Grand Coulee has virtually eliminated the devastating floods on the lower river.

Lake Roosevelt must be kept somewhat low throughout the first half of each year, to provide room for storing high river flows occurring with spring rains and melting snows.

In 1984, winter and spring "draw-down" for power production and flood

Turbines in the powerplant at Grand Coulee Dam.



Migrating geese feeding on the Columbia Basin Project.

control made a 3.6 million acre foot "space" available in Lake Roosevelt to capture high spring runoff – ultimately preventing some \$2.1 million in flood damage along the lower Columbia River. There is a price to be paid for such prevention: the reservoir sometimes starts summers lower than optimum for power production or recreation. But few, if any, would willingly accept the alternative.

Power Generation

When originally authorized by the Rivers and Harbors Act of 1935, the Columbia Basin Project envisioned power generation simply "as a means of financially aiding and assisting such undertakings" as irrigation and flood control – that is, to pay for the cost of building Grand Coulee Dam and the irrigation facilities. The responsibility for marketing the power fell to the Bonneville Power Administration.

That responsibility has not diminished over the years: it has burgeoned. As of October 1985, Reclamation and the Corps have built Northwest dams and reclamation projects costing nearly \$11 billion. BPA must repay about 86 percent of that investment, plus interest, through power sales and related services from the power these dams produce. And with the passage of the Pacific

Northwest Power Act in 1980, BPA has a new and greater responsibility – to ensure that the region's power needs will be adequately met, now and in the future.

Grand Coulee uses 33 massive turbines to spin gargantuan generators, creating electricity which is drawn out of the dam over 22 transmission lines. Switchyards and substations prepare the energy for transmission along 14,000 miles of lines throughout the Northwest and beyond.

Its massive generators create, on average, about 20 billion kilowatt-hours of clean, renewable electricity per year – at the lowest cost of any powerplant in the federal system. It currently satisfies about 22 percent of BPA's generation requirements.

Two factors make Grand Coulee especially important to the region's power supply. The first is vested in a simple fact of hydroelectric life: hydropower is flexible. Unlike other power plants such as nuclear or coal-fired, a hydro plant can be started up easily and quickly. (In fact, any of Grand Coulee's Third Powerplant penstocks can accelerate from "zero" to capacity in 12 seconds.)

The second factor is that Grand Coulee Dam draws on the largest "fuel tank" or storage reservoir in the U.S. Columbia River System. Most other mainstem dams are "run-of-river," so

called because they have little capacity to seasonally store water. Not only does Lake Roosevelt hold water for its own project uses, but its water releases are coordinated to optimize downstream project operations as well.

BPA's obligation to repay the U.S. Treasury for project-related costs, while keeping Northwest power rates stable, requires a delicate balance among all of the Columbia Basin Project benefits. Power revenues from Grand Coulee Dam and other federal generating facilities in the Pacific Northwest also pay for all BPA transmission facilities and their operation and maintenance costs.

In real terms, this means that BPA must use every opportunity to sell energy to meet its financial responsibilities. If BPA fails to make enough sales, Northwest rates will rise, potentially affecting everyone from homeowners to industries.

Of course, this does not mean that BPA can call for more power-related water releases from Lake Roosevelt when this would violate Reclamation constraints maintained to ensure that other project benefits will be met.

Fish and Wildlife

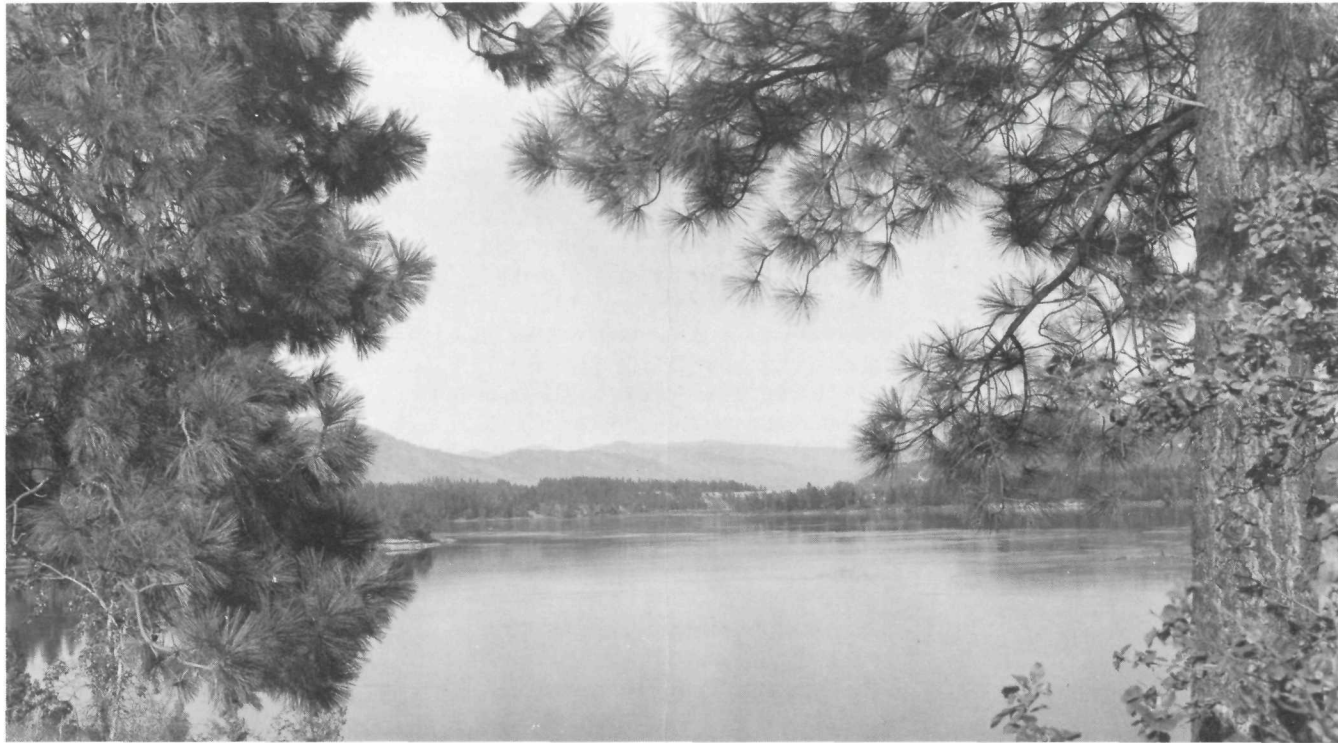
Grand Coulee Dam and the seven other federal dams on the Columbia River have brought great benefits to the Northwest. They have also caused damage to the natural world, particularly migrating salmon and steelhead.

Not that dams were never operated with fish and wildlife in mind. Historically, about 10 percent of all appropriations for project development have paid for fish and wildlife facilities. Thus far, more than \$371 million has been spent for fish passage and mitigation facilities, with operating costs that exceed \$13 million per year. Even so, by 1980 a Columbia River salmon had, at best, one-in-four odds of making it through all the federal dams on the Columbia River.

By the late 1970s, the salmon and steelhead harvest had dropped to 15 percent of the 1920 levels. Overharvesting on the river and in the ocean, as well as forestry and agricultural practices, have contributed to this decline. But the Columbia River dams are now the major

Migrating smolts.





View of Lake Roosevelt through pine trees.

problem facing migrating fish.

A rising chorus of concern found expression in the Pacific Northwest Power Planning and Conservation Act of 1980. The Act assigned BPA certain responsibilities to rebuild fish and wildlife populations in and around the streams and rivers of the federal hydroelectric system. One of the most innovative arrangements is the Water Budget Program.

How does the Water Budget work? From April 15 to June 15 each year, when the downstream spring migration reaches its peak, a predetermined amount of water can be released from upriver storage reservoirs including Lake Roosevelt to help "move" migrating fish downstream. Water Budget managers have at their disposal roughly 3.45 million acre-feet of Columbia River water (as measured downstream at Priest Rapids Dam) from upstream storage and natural flows. The Water Budget uses approximately \$58 million worth of water a year – that's the water's value as hydro fuel.

Recreation

Recreation was not one of the purposes originally authorized for the Columbia Basin Project. But not surprisingly, in such surroundings recreation has flourished. Reclamation, recognizing the importance of recreation, has made it a part of Grand Coulee Dam and Lake Roosevelt operations.

Through an agreement with Reclamation and annual Congressional appropriations, the National Park Service administers the Coulee Dam National Recreation Area. The recreation area encompasses about 75 percent of the reservoir and shoreline, and the remaining area is within the Colville and Spokane Indian Reservations. As tourism has grown over the years, the National Park Service has developed 27 recreation sites within the National Recreation Area, providing for camping, swimming, boating, sightseeing, and other outdoor activities. More than a half-million people visited the area in 1985.



Boating on Lake Roosevelt.

A delicate balance: the annual planning process

It is an old adage that everyone talks about the weather but nobody does anything about it. Among those who plan and regulate the flow of the Columbia River in the United States and Canada, the adage doesn't quite fit: these people are expected to make accurate predictions *despite* the weather.

Over the years, that planning has grown increasingly complex – and critical. Coordination has been essential. Initially, it was among chains of unrelated dam and irrigation project operators. More recently it has been among utilities, industries and others throughout the entire Northwest and Western Canada, linked together by a 14,000-mile network of transmission lines and the desire to coordinate electricity production for the greater good of all.

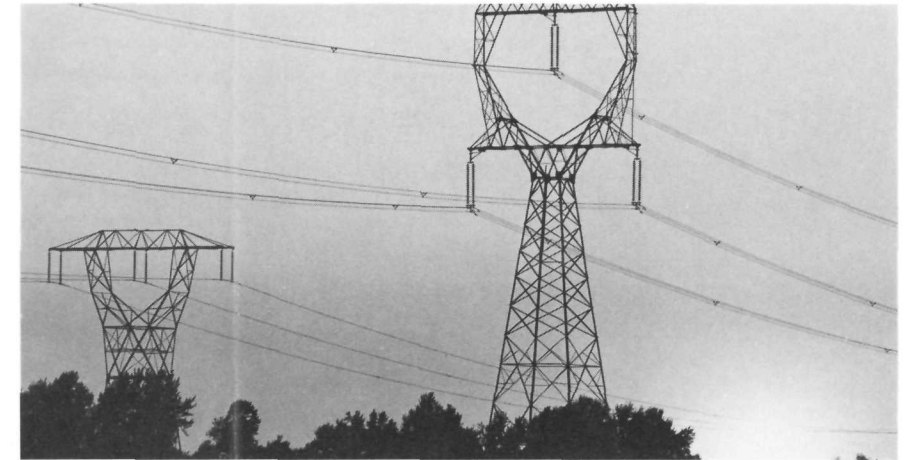
In September 1964, a single document cemented this idea into reality. Called the Pacific Northwest Coordination Agreement, it set forth a planning process that accommodates all the purposes the Federal Columbia River Power System was authorized to serve. The parties to the agreement include BPA, Reclamation, the Corps, nine public utilities and six private utilities from throughout the region.

The agreement begins by calling for annual planning, which yields a delicate balance of priorities each year until the present agreement ends in 2003. The annual process starts each February and results in formal guidelines for the 12 months beginning in July.

All planning for the coming year attempts to accommodate all requests to the extent possible. In February 1986, for instance, Reclamation submitted a requirement that Lake Roosevelt be at 1283 feet (seven feet below full) by July 31, to accommodate recreation. Reclamation also required that by May 31 Lake Roosevelt be at 1240 feet above sea level – the point at which several of the 12



Bumper crop of apples in an irrigated orchard on Royal Slope.



High voltage transmission lines.



Farmlands in the Columbia Basin Project.



Duck hunting on Banks Lake.

massive irrigation pumps carrying water to Banks Lake become efficient.

All the parties involved make trade-offs to meet all the demands on the system. By July, the enormously intricate and complex balancing act is finished for another year.

If the system were entirely within human control the plan would be perfectly accurate. But a hydropower system ultimately depends on the weather. As the year passes, updated estimates of river runoff, actual power demand, and more are periodically added to the models, to ensure that Lake Roosevelt – and the entire Columbia River System – continue to serve the various purposes discussed here.

In the formal annual planning process, Reclamation usually requests that Lake Roosevelt be at the 1285-1290 foot level by July 31 of each year. However, due to good water years and other circumstances favorable to filling the reservoir, a full reservoir has been quite common by July 1. As a result, many of the campgrounds, boat launches and swimming areas have been developed for optimum use when the reservoir is full. But whether or not the reservoir is full by July 1, Lake Roosevelt remains a principal recreational attraction.

Relaxing on the Reservoir: recreation opportunities on Lake Roosevelt

Stretching from as far north as the Canadian border and south to Pasco, Washington, the Columbia Basin Project offers a vast recreation resource encompassing 350,000 acres of land and water. Before the project there were 35 lakes; now there are more than 140 lakes, ponds and reservoirs. The largest is Franklin D. Roosevelt Lake, forming the core of the Coulee Dam National Recreation Area. The 600-mile ribbon of shoreline ranges from 100 feet to 300 feet wide when the reservoir is full – and even wider when water levels are lower.

Lake Roosevelt extends 151 miles to the Canadian border, and is partially located on the Colville and Spokane Indian Reservations. Tribal authorities regulate hunting, fishing, and boating within these zones. Visitors should check with each reservation regarding available recreational opportunities.

Colville Confederated Tribes
Fish and Wildlife Department
Box 150
Nespelem, WA 99155
(509) 634-4013

Spokane Indian Reservation
Box 100
Wellpinit, WA 99046
(509) 258-4581

Under agreement with Reclamation, the remainder of Lake Roosevelt and adjacent lands are administered for recreation by the U.S. National Park Service. Because Lake Roosevelt is not actually a lake but a reservoir, recreation opportunities and practices sometimes are unique here: the lake elevations are subject to change, for instance, and can affect boat access, swimming areas and other water-related activities. Knowing that the reservoir is subject to fluctuations and remembering a few tips before you start out will make your visit more rewarding.

Water Levels. Drawdowns on Lake Roosevelt are limited to 1.5 feet vertically in a 24-hour period. However, depending on the slope of the river bank, a vertical drop of 1.5 feet exposes anywhere from a few feet to hundreds of feet of lake bottom. This should be kept in mind when launching your boat and choosing a mooring site.

Reservoir Hotline. To help you in your planning, call the Reservoir Hotline toll-free at 1-800-824-4916 for an estimate of future reservoir levels, updated daily by the Bureau of Reclamation. Tip: an afternoon call is best, as the hotline is updated most days by 3 p.m. With estimate in hand, boaters can refer to the “launch elevations” information on the attached reservoir map and facilities matrix. Fourteen launch ramps are maintained at a variety of water levels.

Navigation Aids. Lake Roosevelt is equipped with navigation aids to guide and inform boaters. Boat harbors are identified, control and restrictive measures are posted, and night navigation aids are maintained. Federal and state boating regulations are well posted in public places – and enforced. For more information, contact your nearest vehicle licensing office or the Coulee Dam office of the National Park Service.

Fishing on Lake Roosevelt

Lake Roosevelt and the adjacent waters have an abundance of freshwater fish ranging from eight-inch perch to sturgeon larger than a man. One of the biggest attractions for fishermen is the walleye. Rainbow trout are also common in the main part of the reservoir, while small bays and inlets will reward you with yellow perch. Best months: June through September.

Tip: pick up a copy of the Washington State fishing regulations – available wherever fishing licenses are found. Lake Roosevelt has some unique limits and sizes for some species; check Region 1 and special regulation sections.

Wind surfing on Lake Roosevelt.



Young swimmers in Lake Roosevelt.

“All Americans should take pride in their outstanding public lands and historic sites that belong to everyone. . . We must work together for a renewed awareness that these lands are our lands.”

President Ronald Reagan, State of the Union Address, February 6, 1986.

TAKE PRIDE IN AMERICA: THIS LAND IS YOUR LAND





National Park Service Campgrounds and Other Points of Interest

Because Lake Roosevelt extends from the Columbia Basin Plateau to the Okanogan Highlands, the variety of recreational opportunities is notable. The National Park Service maintains 19 recreational-vehicle and tent campgrounds, and eight "boat-in-only" campgrounds, ranging from primitive campsites to more developed facilities with picnic tables, restrooms, grass campsites and fire grills. More than 600 campsites await you. Most have water, but showers and utility hookups are not available. Camping fees are collected at most campgrounds, which have a 14-day limit. Refer to the facilities matrix and map for additional information.

A nice catch on Lake Roosevelt.

Recreation Area Services

	Lower Lake Roosevelt							Spokane River Arm							Upper Lake Roosevelt												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Campground — Tent Sites	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Campground — Trailer Sites	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Campground — Group Sites	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Campground — Boat Access Only	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Picnic Area	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Lifeguarded Swim Beach	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Amphitheater Program	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Drinking Water	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Snack Bar	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Store	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Waste Disposal Station — Trailer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Waste Disposal Station — Boat	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ferry Service	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Boat Dock	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Boat Ramp	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Boat Fuel	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Boat Launch Elevation	1234'	1229'	1282'	1277'	1262'	1247'		1236'	1233'	1249'	1285'		1237'	1281'	1287'	1282'											

