

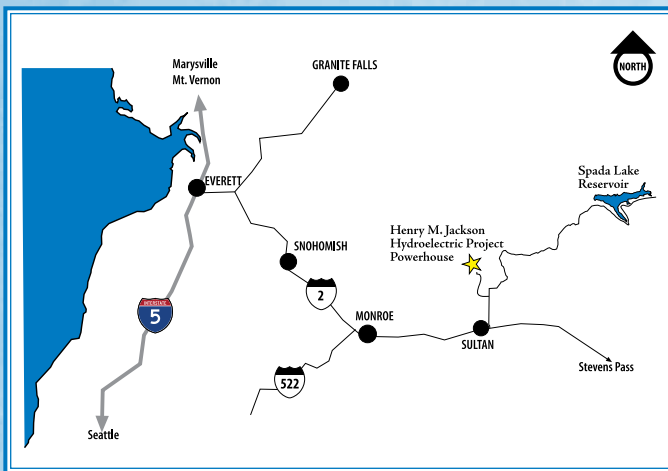
Another Benefit of Hydro Power

JACKSON PROJECT STATISTICS

Generating Capacity.....	111,800 kilowatts
Service Capability.....	approximately 35,800 homes
Spada Lake Reservoir Gross Storage.....	153,260 acre/feet
Spada Lake Reservoir Gross Area.....	1,870 acres
Generator Turbine Types.....	2 Pelton, 2 Francis
Culmback Dam Composition.....	Impervious core, fine filter, gravel, rock fill
Spillway.....	Morning glory, "Ogee Crest"
Tunnel Diameter.....	varies from 10 feet to 14 feet
Tunnel Length.....	3.8 miles
Power Pipeline Diameter.....	10 feet
Power Pipeline Length.....	3.7 miles

FOR MORE INFORMATION

Please visit our website at www.snopud.com/jhp.



JACKSON HYDRO

renewable reliable environmentally responsible
SNOHOMISH COUNTY PUD

HENRY M. JACKSON HYDROELECTRIC PROJECT INFORMATION



Not long after the turn of the century, engineers hiked into the foothills of the Cascade Mountains and, while scanning the Sultan Basin, realized they were looking at an ideal place to store water. Not only did the basin cover an area of about 70 square miles, but the river flowing from it passed through a narrow gorge — the perfect place to build a dam to hold water. Best of all was the amount of rainfall: an incredible 163 inches per year.

About 25 miles east of Everett, the Sultan Basin is now being used for water storage to meet a variety of needs. Snohomish County PUD has built the Henry M. Jackson Hydroelectric Project — a unique multi-purpose facility.

The Jackson Project is unique in two respects: it features a powerhouse that's located nearly eight miles away from the dam and reservoir, and much of the water it uses will eventually find its way into the faucets of about 80 percent of Snohomish County's population. But that's not all.

In addition to generating enough power for about 35,800 homes (using a clean, renewable resource), the Jackson Project also enhances fish and wildlife habitats, provides recreational opportunities, provides an element of flood control, and assures cleaner drinking water.

The Jackson Project was built in two phases. Phase I, completed in 1965, involved the building of Culmback Dam and the creation of Spada Lake Reservoir to increase water supply. Phase II, completed in 1984, involved raising Culmback Dam by 62 feet, which more than doubled the size of Spada Lake Reservoir and quadrupled the water storage capacity.

Spada Lake Reservoir covers an area of about 1,870 acres, with a shoreline of 17.3 miles in length and a normal gross storage capacity of 153,260 acre-feet. A morning glory spillway, which acts like an overflow on a bathroom sink, prevents the water level of the reservoir from overflowing the dam. The water that drains into the spillway is discharged safely into the Sultan River at the base of the dam.

An intake structure at Culmback Dam takes the water through a 3.8-mile tunnel through the base of Blue Mountain and then

through 3.7 miles of pipeline to the powerhouse. Water is conveyed from the powerhouse to Chaplain Reservoir where most is diverted for treatment by the City of Everett to make it suitable for municipal supply. Some water is conveyed back to the Sultan River at the City's Diversion Dam to maintain in-stream flows. The remaining water is returned to the river immediately below the powerhouse.

Meeting the Environmental Challenge

Snohomish County PUD is committed to protecting the environment. When Phase II was completed in 1984, the Washington State Ecological Commission awarded this project its Environmental Excellence Award. This award was presented to the PUD because construction methods were consistent with maintaining water quality, public health, and enhancement of fish and wildlife resources — in addition to the development and implementation of environmental protection plans.

Today, the Jackson Project staff meets the environmental challenges head-on. We have wildlife and fish biologists to ensure that protection and enhancement of the environment is maintained to the highest of standards. Our wildlife habitat management program preserves and enhances valuable habitats, such as old-growth forest

and wetlands. Second-growth forest management includes promoting old-growth characteristics by creating snags (standing dead trees), downed logs and forest gaps (openings) for many creatures, such as birds and small mammals. Nesting structures are provided for waterfowl. Our fish management program provides river flows, conditions water temperatures, monitors water quality and quantity, and provides fish spawning and rearing habitat enhancements.

This program also monitors anadromous fish populations in the lower Sultan River, resident fish populations in Spada Lake Reservoir, and macro invertebrates in the upper Sultan River. In addition, the PUD provides recreational opportunities and protects cultural resources/historical properties as part of its license.

Due to the project's stewardship of the environment, the Jackson Project was certified as a Low Impact Hydropower Facility by the Low Impact Hydropower Institute in 2011.

The Jackson Project was dedicated in 1984 to the memory of Senator Henry M. Jackson, a Snohomish County native, who became one of the most influential senators in U.S. history. At a dedication ceremony in 1982, Senator Jackson cited this project as "an outstanding example of the combination of preservation of our great environmental resource of this area and, at the same time, providing the power and energy we need."



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JACKSON HYDRO

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CULMBACK DAM

Culmback Dam is an earth-and-rock-filled structure with an impervious clay core. The crest of the dam is 262 feet above the foundation and is 640 feet in length. At the dam is an intake structure where water enters the tunnel on its way to the powerhouse. Movable panels on the intake structure make it possible to draw from varying depths, thus controlling the temperatures of the water that enters the system to help fish populations in the Sultan River. Water is also released to the Sultan River to support fisheries resources in the upper reach of the river.

FISH WATER RETURN LINE

The Sultan River is a productive fisheries resource. In order to maintain river flows at sufficient levels during both the salmon and steelhead spawning and rearing periods, water is released at the powerhouse and also routed upstream to the Diversion Dam to maximize the amount of available habitat.

Chaplain Reservoir

CHAPLAIN RESERVOIR PIPELINE

After water has passed through the two Francis turbines, the water is diverted into a 3.5 mile, 6-foot-diameter pipeline to the City of Everett's Chaplain Reservoir for municipal and industrial water supply.

DIVERSION DAM

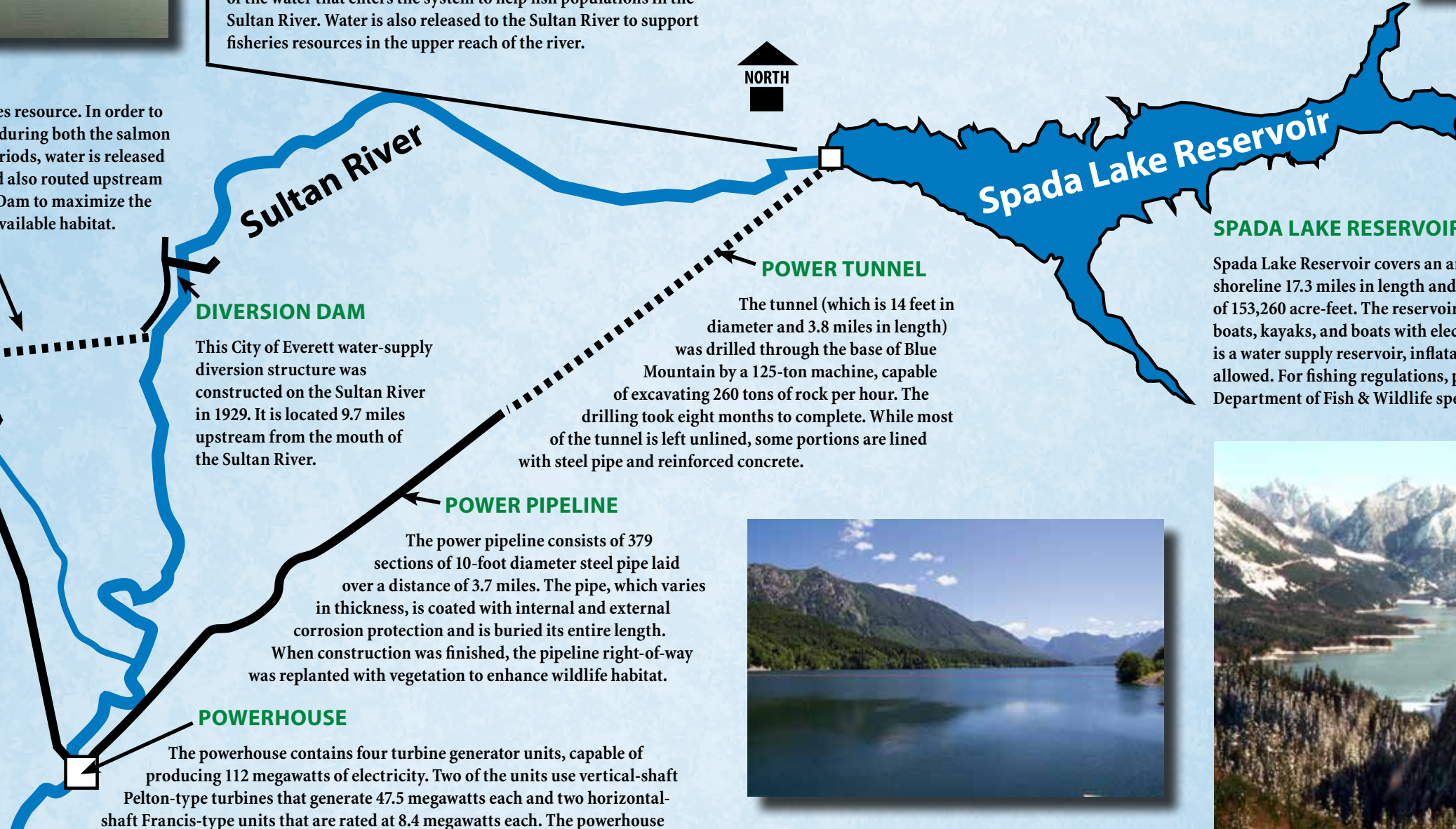
This City of Everett water-supply diversion structure was constructed on the Sultan River in 1929. It is located 9.7 miles upstream from the mouth of the Sultan River.

POWER PIPELINE

The power pipeline consists of 379 sections of 10-foot diameter steel pipe laid over a distance of 3.7 miles. The pipe, which varies in thickness, is coated with internal and external corrosion protection and is buried its entire length. When construction was finished, the pipeline right-of-way was replanted with vegetation to enhance wildlife habitat.

POWERHOUSE

The powerhouse contains four turbine generator units, capable of producing 112 megawatts of electricity. Two of the units use vertical-shaft Pelton-type turbines that generate 47.5 megawatts each and two horizontal-shaft Francis-type units that are rated at 8.4 megawatts each. The powerhouse and Jackson Project facilities can be operated locally by the Jackson Project operators or remotely from Everett.



SPADA LAKE RESERVOIR

Spada Lake Reservoir covers an area of some 1,870 acres, with a shoreline 17.3 miles in length and a normal gross storage capacity of 153,260 acre-feet. The reservoir is available to sail boats, row boats, kayaks, and boats with electric motors only. Because the lake is a water supply reservoir, inflatable boats and float tubes are not allowed. For fishing regulations, please refer to the Washington Department of Fish & Wildlife special fishing regulations.

