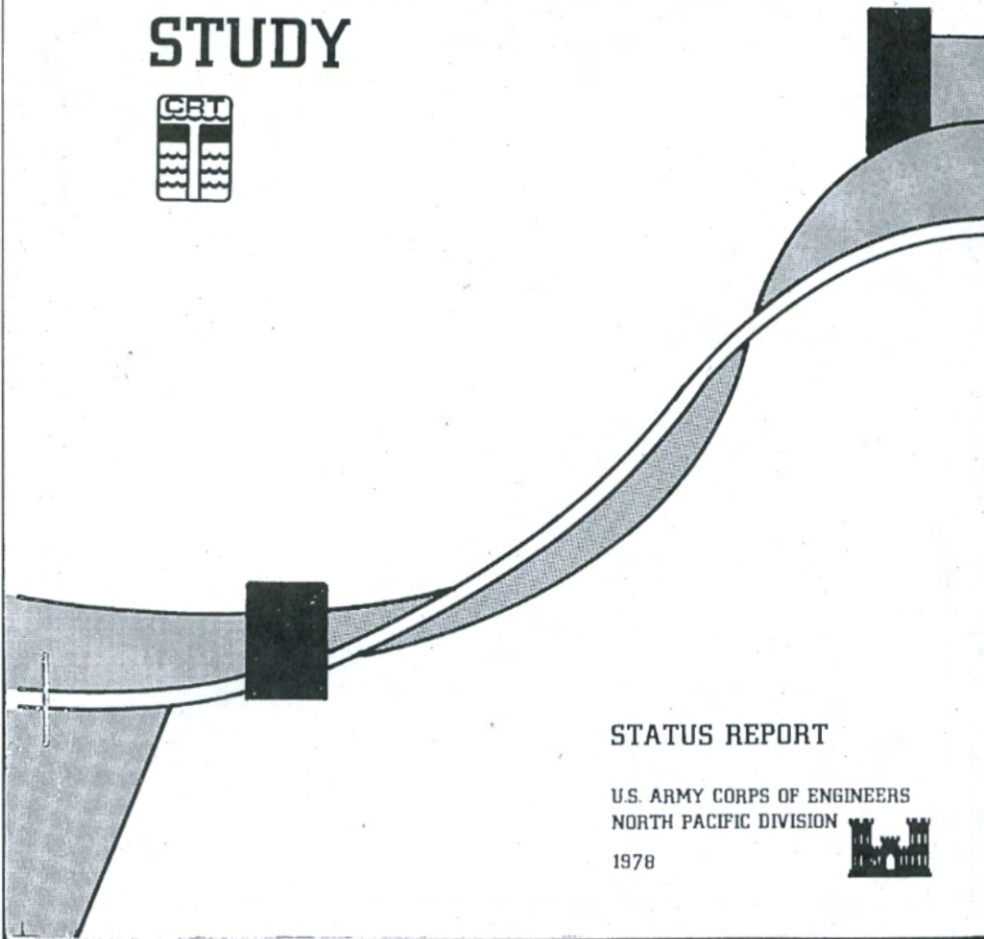


PACIFIC NORTHWEST REGIONAL PUMPED-STORAGE STUDY

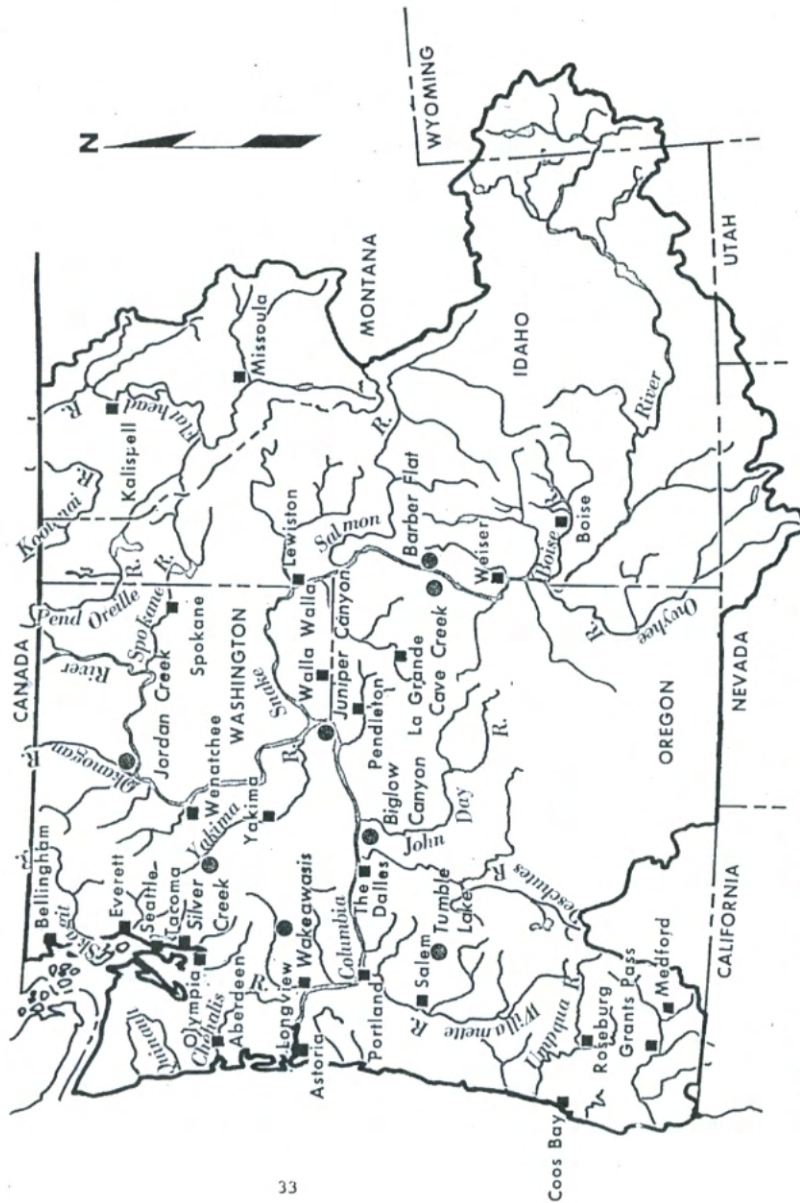


STATUS REPORT

U.S. ARMY CORPS OF ENGINEERS
NORTH PACIFIC DIVISION

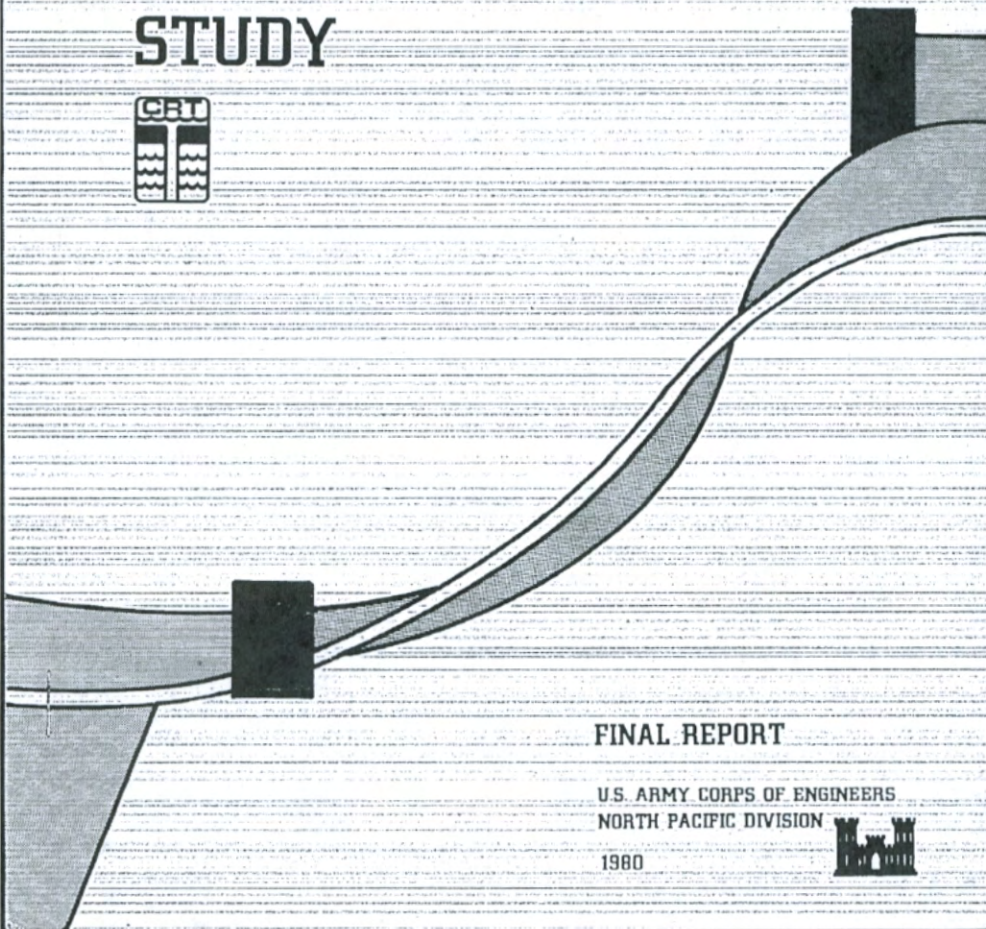
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Map no. 3 - POTENTIAL PUMPED-STORAGE SITES WITH HIGH PRIORITY

PACIFIC NORTHWEST REGIONAL PUMPED-STORAGE STUDY



FINAL REPORT

**U.S. ARMY CORPS OF ENGINEERS
NORTH PACIFIC DIVISION**

1980



V. SEASONAL PUMPED-STORAGE - OMAK LAKE-GOOSE FLATS

From a hydrologic standpoint, a seasonal pumped-storage project would operate similarly to a conventional hydrostorage project. Surplus runoff would be pumped and stored during the freshet season and released when needed. The reservoirs, particularly the upper, would be much larger than those necessary for daily/weekly cycle operated plants, and they would be located adjacent to major streams or existing reservoirs. However, a seasonal pumped-storage site also would have the capability of having a daily/weekly operation superimposed on the seasonal operation. Besides generating peaking power at the project itself, the water released from a seasonal pumped-storage project would be available for downstream uses such as augmenting flows for fish, power production, water quality, and other uses.

A potential seasonal pumped-storage site is located in the Omak Lake-Goose Flats area on the Colville Indian Reservation in north-central Washington. This site would utilize Rufus Woods Lake (Chief Joseph Dam Reservoir) as a lower reservoir.

The Corps of Engineers has done preliminary studies on two alternatives (see Figure 4) for the Omak Lake-Goose Flats area. Alternative A would consist of a 700,000 acre-foot reservoir and Alternative B would consist of a 2,500,000 acre-foot reservoir. Both alternatives would have the same south dam and would be evaluated with a 1,000 MW and 2,000 MW powerhouse.

The Corps is coordinating this study with the Business Council of the Colville Confederated Tribes, who are currently in favor of further investigations.

**OMAK LAKE — GOOSE FLATS
PUMPED STORAGE SITE**

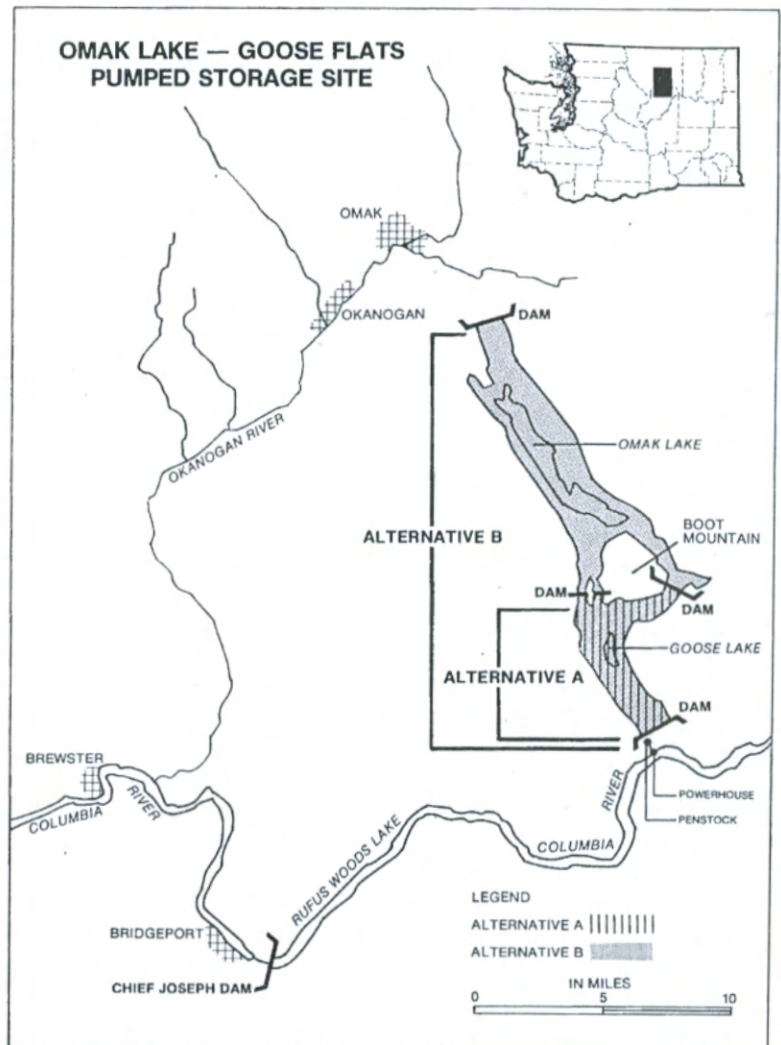


Figure 4

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PACIFIC-NORTHWEST REGIONAL
PUMPED-STORAGE STUDY

REPORT APPENDIX 1

PUMPED-STORAGE SITE DATA SHEETS

<u>SITE</u>	<u>PAGE</u>
<u>Idaho</u>	
Barber Flats	A-1
<u>Oregon</u>	
Biglow Canyon	A-4
Cave Creek	A-7
Juniper Canyon	A-10
Tumble Lake	A-13
<u>Washington</u>	
Jordan Creek	A-17
Silver Creek	A-20
Wakeawasis	A-24

NOTE: Data reflect information available in February 1977.

SITE - BARBER FLAT #170

LOWER RESERVOIR - OXBOW RESERVOIR, SNAKE RIVER

Physical Factors

a. 1,000 MW Plant Size

Head - 2,470 Ft.

Storage - 6,700 Ac. Ft.

Discharge - 5,600 cfs

Drawdown Upper - 30 Ft.

Lower - 6 Ft.

Size Upper - 330 Acres

Lower - 1,150 Acres

Penstock Length - 15,400 Ft.

b. 5,000 MW Plant Size

Head - 2,470 Ft.

Storage - 32,900 Ac. Ft.

Discharge - 27,300 cfs

Drawdown - 75 Ft.

Lower - 30 Ft.

Size Upper - 870 Acres

Lower - 1,150 Acres

Penstock Length - 15,400 Ft.

c. Hydrology. Installation of more than 2,000 MW may cause problems in operation of the Oxbow project.

d. Proximity to Load Center. Site is located 300 airline miles from Portland load center.

e. Access. There is dirt road access to the upper reservoir site, good road access to west bank of Oxbow Reservoir, and a transmission line along the east bank of Oxbow Reservoir.

f. Land Use. The upper reservoir is used as wildlife habitat and domestic grazing on natural rangeland. This area appears to be good deer habitat. There is an existing small reservoir at the site.

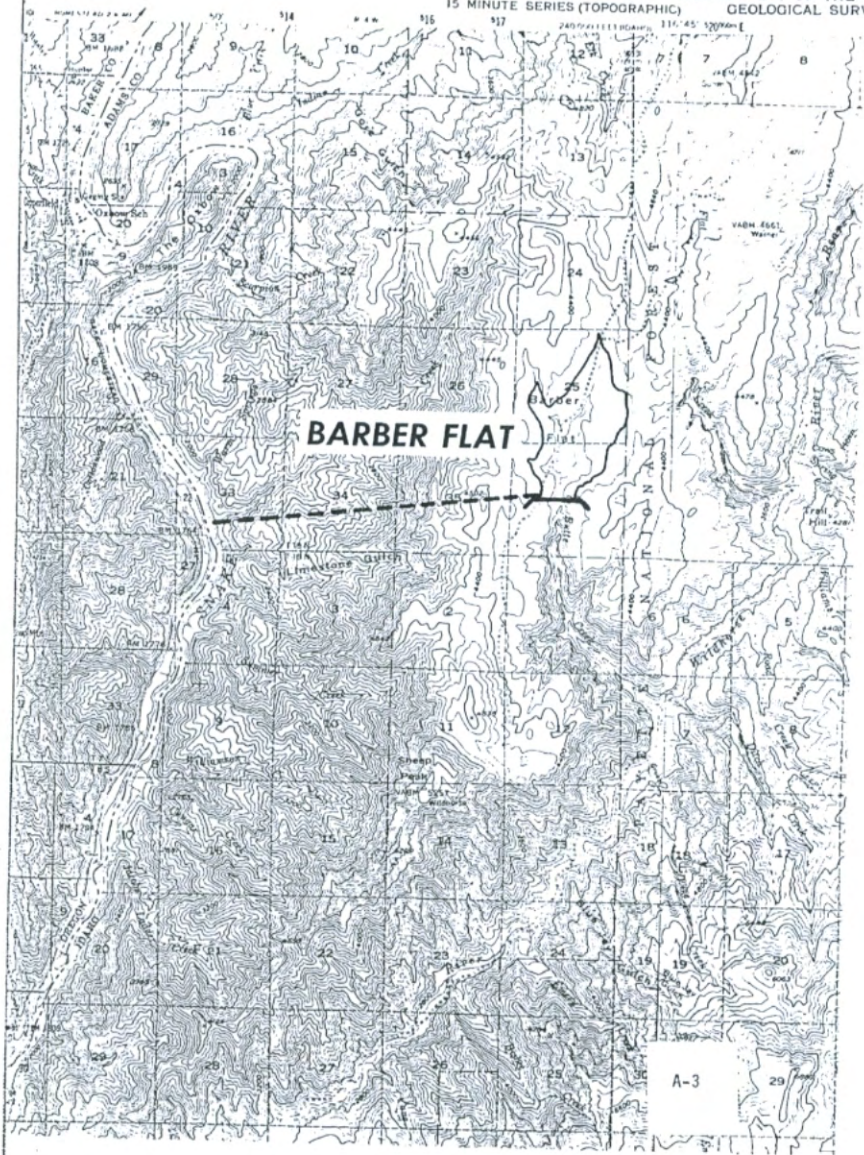
Social Factors

- a. Displacement. There do not appear to be any structures or residences in the area that would be impacted.
- b. Land Ownership. It appears that part of the upper reservoir would be on Forest Service land; however, most of the reservoir would be on private land.
- c. Public Attitudes. Local citizens may oppose the loss of the grazing land; however, the lack of development and the remoteness of the site would tend to reduce the likelihood of opposition to a pumped storage project in this area.
- d. Public Safety. Public access to the upper reservoir and inlet/outlet area of Oxbow Reservoir should be restricted.

Geology. Geology is thin flat-lying basalt flows with granitic-derived interbeds. Possibly some hot spring activity near the Snake River. The existing upper reservoir indicates no leakage problem. Construction materials should be readily available.

Environmental Considerations. The outlet is situated in a non-game bird and shorebird area. The Snake River region still contains enough riparian habitat to be of significant environmental concern. The upper reservoir would reduce the amount of rangeland in the area. This area is big game winter range. The availability of water in this region could increase the populations of upland game birds.

Location Data. The upper reservoir is located 3 miles SE of Oxbow Dam in Sec. 25 and 36 of T19N, R4W. Coordinates are N44-56.5, W116-46.0. Reference USGS quad is Copperfield, Idaho, 1:62,500.



SITE - BIGLOW CANYON #182

LOWER RESERVOIR - JOHN DAY RESERVOIR, COLUMBIA RIVER

Physical Factors

a. 1,000 MW Plant Size

Head - 1,090 ft.

Storage - 15,400 AF

Discharge - 12,800 cfs

Drawdown Upper - 55 ft.

Lower - 1 ft.

Size Upper - 470 acres

Lower - 52,000 acres

Penstock Length - 11,800 feet

b. 2,000 MW Plant Size

Head - 1,090 feet

Storage - 30,300 AF

Discharge - 25,100 cfs

Drawdown - 70 feet

Lower - 1 ft.

Size Upper - 780 acres

Lower - 52,000 acres

Penstock Length - 11,800 feet

- c. Hydrology. Currents in John Day River arm could adversely affect its recreational use. Silting in John Day River is a potential problem.
- d. Proximity to Load Center. Site is located 100 airline miles from Portland load center.
- e. Access. Good access to upper reservoir site. Access to tailrace area on John Day pool would require construction of several miles of road in steep terrain. Main transmission line from John Day Dam to Portland is located .6 miles from site.
- f. Land Use. Upper reservoir is used for dryland wheat farming and grazing under private ownership. Lower reservoir tailrace area is under management of Portland District, Corps of Engineers. Intermediate area is under management of BLM for grazing use.

Social Factors.

- a. Displacement. Development of the upper reservoir would displace most of one farm unit and impact several others.
- b. Land Ownership. Private citizens own all of the land in upper reservoir area outside of county road ways. The Corps of Engineers owns the land adjacent to the lower reservoir. Seven landowners would be involved in the upper reservoir.
- c. Public Attitudes. The farmers in northern Sherman County appear in favor of the site because of its potential use for irrigation. Wildlife agencies will be opposed because of possible adverse effect on the anadromous fishery in John Day River.
- d. Public Safety. Public access to upper reservoir and inlet/outlet area of John Day pool should be restricted.

Geology. The geology of the area consists of a thick series of relatively flat-lying basalt flows with associated flow breccia layers. Most of the reservoir area is mantled with wind-blown silt ranging in depths up to an estimated 20 feet. Bedrock is exposed at several places along the proposed axis of the dam. Surface exposures are closely fractured and highly weathered. No major structural features are apparent. Reservoir leakage is not expected to be a major problem. The presence of numerous springs along the John Day River in the area of the proposed powerhouse siting may indicate an impervious interbed which could cause construction problems. Most embankment materials can be obtained in the immediate area.

Environmental Considerations. The operational impact on the scenic quality of the John Day River and the impact on the remaining anadromous fish runs are the major environmental concerns. The upper reservoir will reduce the amount of dryland wheat acreage; however, the increased availability of water in the upper reservoir area, plus the potential for irrigation development, may actually increase game bird populations in the region.

Location Data. The upper reservoir is located at the head of Biglow Canyon, a tributary to the John Day River arm of John Day pool, about 8 miles northeast of Wasco, Oregon, in Sections 17, 18, 19, 20, 21, and 29 of T 2N, R 18E. Coordinates are N 45-39 W 120-35. Reference USGS quad is Quinton, Oregon, 1:24,000.

SITE - CAVE CREEK #367

LOWER RESERVOIR - BROWNLEE RESERVOIR, SNAKE RIVER

Physical Factors

a. 1,000 MW Plant Size

Head - 1,190 Ft.

Storage - 14,000 Ac. Ft. Discharge - 11,600 cfs

Drawdown Upper - 65 Ft. Lower - 1 Ft.

Size Upper - 290 Acres Lower - 13,000 Acres

Penstock Length - 5,400 Ft.

b. 4,000 MW Plant Size

Head - 1,190 Ft.

Storage - 48,600 Ac. Ft. Discharge - 40,300 cfs

Drawdown - 75 Ft. Lower - 4 Ft.

Size Upper - 740 Acres Lower - 13,000 Acres

Penstock Length - 5,400 Ft.

c. Hydrology. There appears to be no significant problem; however, the effect of drawdown on the operation of Brownlee project should be studied.

d. Proximity to Load Center. Site is located 290 airline miles from Portland load center.

e. Access. Access to the upper reservoir site would require construction of 3 miles of road in flat terrain. The tailrace area would require construction of about 5 miles of access road in steep terrain. An existing transmission line is located 2 miles north of the upper reservoir.

f. Land Use. The upper reservoir is used as wildlife habitat and domestic grazing on natural rangeland. The region is excellent chukar habitat.