UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

APPRAISAL OF WATERPOWER AND RESERVOIR SITES, NESTUCCA RIVER BASIN, OREGON

By Kenneth J. St. Mary

With a section on Geology of selected sites,

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CONVERSION FACTORS

English units are used throughout this report. Factors for converting English units to metric units are shown below.

English unit to convert	Multiply by	Metric unit to obtain
inches (in)	2.540	centimeters (cm)
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
acres	0.004047	square kilometers (km^2)
acres	0.4047	hectares (ha)
square miles (mi^2)	2.590	square kilometers (km^2)
acre-feet (acre-ft)	1234.	cubic meters (m^3)
cubic feet per second (ft^3/s)	0.02832	cubic meters per second (m^3/s)

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INTRODUCTION

This report was prepared to fulfill a basic responsibility of the U. S. Geological Survey (USGS) to identify and protect by classification federally owned lands which have value for water resource development. It reviews the existing waterpower classifications and withdrawals and examines other unclassified potential sites in the Nestucca River basin. Past orders are 3 power site reserves, 1 water power designation, and 2 Federal power projects. The gross acreage reviewed is 9,820 acres in Geological Survey classifications and about 2 acres in Federal Power Commission withdrawals. Of this area, 3,525 acres in Geological Survey classifications and the 2 acres in Federal Power Commission withdrawals are shown to have negligible value for water resource development sites (table 5). Data contained herein are current only through 1976.

Except for a few very small hydroplants which have been abandoned, no powerplants have been developed in the Nestucca basin, nor are any planned for the immediate future. The only storage reservoir developed in the basin, McGuire Reservoir, was constructed by the city of McMinnville in 1969. This small pool stores 3,920 acre-feet of water and is used for transbasin diversion to supplement the municipal water supply.

The potential power of the basin, which theoretically could be developed at 5 sites, is estimated to be 35,600 kilowatts (kW) at 100 percent efficiency, gross head, and average flow. Additionally, a total of 5,000 megawatts (MW) of pumped-storage peaking potential exists at 3 sites in the basin. Should power development occur, it would most likely be used for winter peaking, because coastal streams have their high runoff during the months of October through February, which coincides with the period of low flow from the Columbia basin. This would not be the most desirable operation schedule for fisheries. The summer low-flow months are when additional water is needed for fish. Hydroelectric development in the basin is probably doubtful for the foreseeable future.

Appraisals of the classifications and withdrawals were based upon the status of planning for future water resource development in the basin by all known interested parties and upon examinations of topographic maps, water-supply records, geologic data, and water rights. Decisions relating to Geological Survey classifications are based on tract-by-tract evaluation.

Recommendations relating to Federal Power Commission project withdrawals are based on an evaluation of the purpose of each filing action. A proposed disposition is given for all lands affected by Geological Survey classifications or Federal Power Commission project withdrawals within the basin. Those which appear to be no longer in the public interest will be recommended for revocation.

In this report, "classification" refers to Geological Survey actions and "withdrawal" refers to actions by the Federal Power Commission (FPC). The Federal Power Commission ceased to exist as of October 1, 1977, and its functions were transferred to the Federal Energy Regulatory Commission (FERC).

Geological Survey classifications for water conservation or waterpower purposes are designations of Federal lands possessing value for reservoirs or powersites. These classifications neither commit the Government to construction nor prohibit private use for water resource development; however, they do serve to identify, protect, and forestall encumbrances of potential sites. Classification as a potential water development site does not constitute a "withdrawal" or "reserve" in the usual sense of these terms--the lands remain under the supervision of the agency having control over them at the time of classification. The land may be entered for other purposes after a determination that the proposed use will not injure the power value and with the understanding that water development cannot be precluded by such entry.

Section 24 of the Federal Power Act of June 10, 1920, as amended, provides that any lands of the United States included in any project are reserved from entry, location, or other disposal until otherwise determined by the FERC or by Congress. Withdrawals resulting from these filings under the Federal Power Act are automatic and are effective on the date of filing of an application for preliminary permit or license. However, the revocation of such withdrawals is not automatic when the application expires, is suspended or denied; revocation requires a special FERC action termed a "vacation" of the project withdrawal.

Classifications initiated by the USGS as well as withdrawals effected by the filing of an application under the Federal Power Act are subject to conditional restoration for noninjurious uses under another provision of Section 24 of the Federal Power Act whenever the FERC determines that nonpower use will not be injurious to the value of the lands for power purposes. Public Law 359 of August 11, 1955 (69 Stat. 681), opened all powersite lands, whether so classified by the USGS or withdrawn by an application under the Federal Power Act, "to entry for location and patent of mining claims and for mining, development, beneficiation, removal, and utilization of the mineral resources of such lands under applicable Federal statutes." Excluded from such entry are (1) lands that are in any project operating or being constructed under a license or permit issued under the Federal Power Act or other act of Congress and (2) lands that are being actively examined and surveyed by a prospective licensee. All power rights on the opened lands are retained by the United States.

The review has disclosed that 4,951 acres of unclassified public domain lands lie within potential power or reservoir sites (table 4). The USGS will further analyze the potential of the sites, consult with the land administering agencies and others and, if warranted, classify the lands.

The Federal Wild and Scenic Rivers Act, Public Law 90-542, of October 2, 1968, provided for future identification of segments of rivers for possible later designation as wild, scenic, or recreational. The Columbia-North Pacific Region Framework Report (Pacific Northwest River Basins Commission, 1972, p. 397) recommended that certain streams in the Northwest be studied for preservation in their free-flowing state. Among those to be studied are the Nestucca and Little Nestucca Rivers, from their origins to their mouths; any portions selected for preservation probably would be identified as "recreational," a determination which would preclude any dam construction.

GENERAL DESCRIPTION OF THE NESTUCCA RIVER BASIN

The Nestucca River basin, an area of approximately 317 square miles of north coastal Oregon, is composed mainly of the Nestucca River and the Little Nestucca River drainage areas, both flowing through Nestucca Bay into the Pacific Ocean (fig. 1). The Nestucca River is 53 miles long, falling nearly 2,000 feet from its headwaters in the crest of the heavily forested Coast Range to its mouth on Nestucca Bay. The Little Nestucca River is nearly 20 miles long and falls about 800 feet from headwaters in a high valley of the Coast Range to its mouth on Nestucca Bay. A principal Nestucca River tributary, Three Rivers, falls 1,950 feet in the first 5 miles from its source in North Lake and a total of 2,400 feet in its 13-mile length. Beaver Creek, another major tributary to the Nestucca River, is relatively flat except for the upper end of its West Fork. From river mile 8 to its mouth, Beaver Creek falls only about 200 feet. Altitudes in the Nestucca River basin range from 3,174 feet on Mt. Hebo to sea level.

The basin is bounded on the west by the Pacific Ocean and by the drainage area of Sand Creek. The Tillamook and Trask River basins form the boundary to the north, with the drainage divide altitude rising inland from about 400 feet to more than 2,800 feet. The Coast Range forms the dividing ridge on the east and on part of the south between the Nestucca and Willamette drainages. The divide runs generally southwest from the Nestucca River headwaters at altitudes of 2,800 feet, through Bald Mountain, Bell Mountain, and Springer Mountain to the vicinity of Mt. Hebo, then south for about 13 miles, passing through Little Hebo. The Salmon River and Neskowin Creek drainages form the remainder of the southern basin boundary.

The Nestucca River basin lies on the west slope of the Coast Range, a large broad uplift created by a regional upwarping of the rocks in late Cenozoic time. In early Miocene time, the area was eroded to a surface of gently rolling relief. The upwarping, which resumed in the Pliocene and Pleistocene Epochs and which was accompanied by minor faulting and much gentle folding, elevated the Coast Range to its present level (U.S. Dept. Agriculture (USDA), 1966, p. 4). Pleistocene rise of sea level drowned the present streams and formed Nestucca Bay and wide alluvial flats upstream. Tidewater reaches 7 miles up the Nestucca River to the town of Cloverdale, and 4 miles up the Little Nestucca River to just above Fall Creek.

Most of the Nestucca River basin is in Tillamook County; small parts along the eastern basin boundary are in Yamhill and Polk Counties. The upper basin is heavily forested and generally mountainous, although the extreme

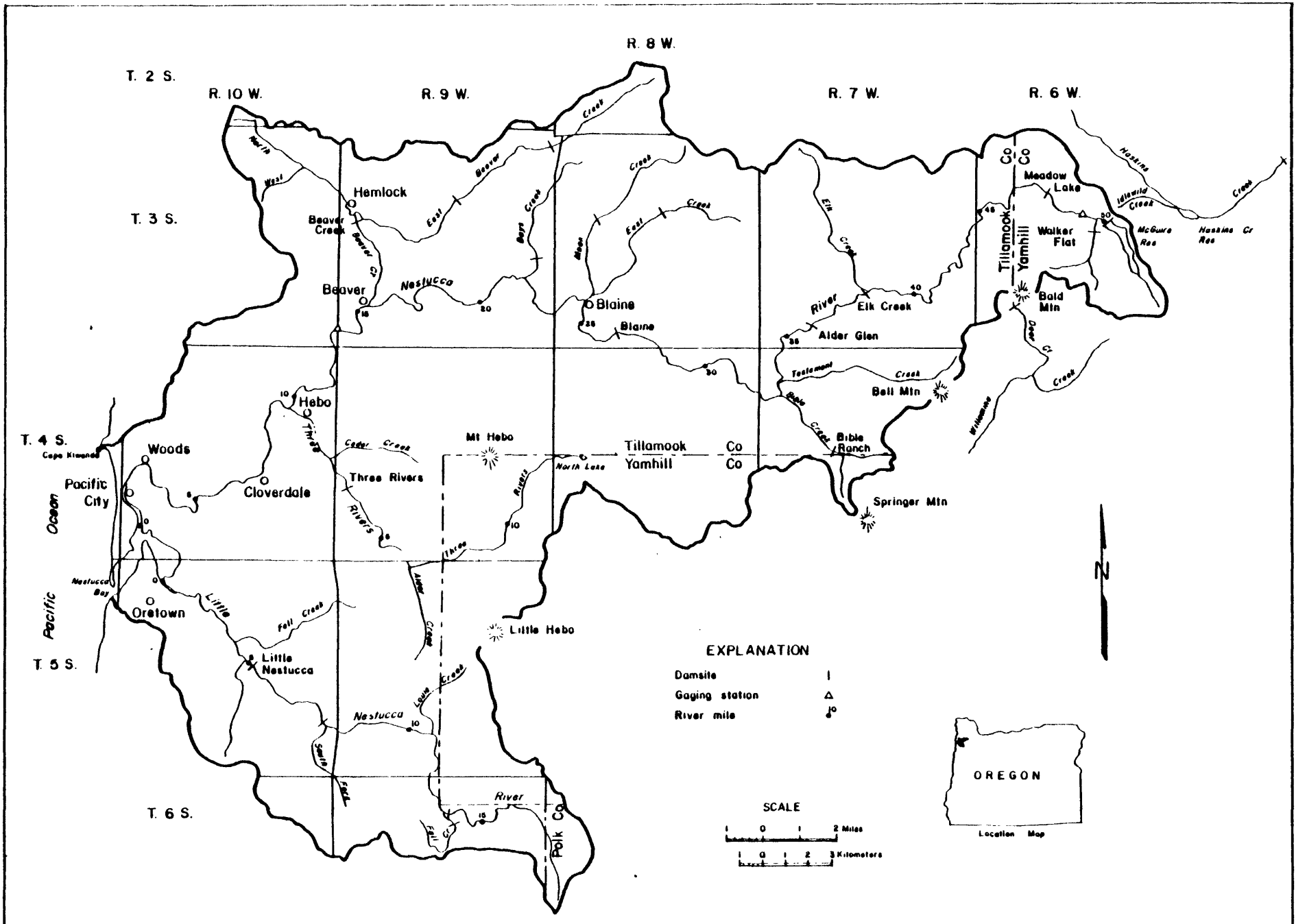


Figure 1. - Nestucca River basin, Oregon.

headwaters of Nestucca River, Little Nestucca River, and Beaver Creek contain fairly large flat areas. The Coast Range consists mainly of marine sedimentary rocks and some volcanic material. The Nestucca River below Blaine and the lower few miles of the Little Nestucca are wide alluvial flats providing good agricultural soils. The coastline, forming the west edge of the basin, is a large sand spit extending south from Cape Kiwanda for about 4 miles.

The estimated population of the basin is about 2,700, according to the Neskowin and Beaver census county divisions as identified in the 1970 U.S. census. These divisions make up nearly the entire basin. The basin's population density of nearly 9 people per square mile compares to the population density of about 22 people per square mile for the State of Oregon. Pacific City, near the mouth of the Nestucca River, is the largest town in the basin, with an estimated population of 350 persons. The towns of Cloverdale, Hebo, and Beaver each have about 200 inhabitants, and Oretown, Woods, Hemlock, and Blaine each have less than 100. None of the communities are incorporated. The population growth rate is now increasing slightly after a general decline in the early and mid 1960's.

Of the total basin area, approximately 70 percent is federally owned, 27 percent is privately owned, and 3 percent is State, county, and municipal land. Forests cover about 93 percent of the basin; western hemlock and Douglas fir predominate. Nearly all Federal land and about two-thirds of the private land within the basin is forested. For the federally owned land, about three-fourths is in the Siuslaw National Forest and the remainder is administered by the Bureau of Land Management (BLM). Approximately 1 percent of the land lies in sand dune areas along the Pacific Coast. Agricultural lands, comprising about 6 percent of the basin, lie mainly along the lower Nestucca and Little Nestucca River valleys, and are used for livestock grazing and crop-raising.

The economy of the Nestucca River basin is based on agriculture and, to some extent, forestry and fisheries. Most of the agricultural income is derived from livestock, primarily in the form of dairy products. Principal crops are hay and pasture for feeding the livestock. Except for one small mill near Hebo which produces wooden spools for paper mills (U.S. Army, Corps of Engineers (USCE), 1971, p. 11), the industrial plants and manufacturers using basin resources for dairy and wood products lie outside the basin. There are no known economic mineral resources within the basin except for some scattered deposits of sand and gravel along streambeds. Mining claims have been filed for gold and platinum along the Nestucca River, but according to the BLM (written commun., 1975), the validity of the claim is questionable.

Recreational opportunities contribute to the economy of the basin. Facilities include national forest campgrounds, State and county parks, public boat landings, and roadside rest areas. The bay area and Kiwanda Beach provide an ample variety of activities for sportsmen and recreationists. The Nestucca River and tributaries support excellent runs of anadromous fish, and upper basin forests are habitat for several big-game species.

The basin is served by one Federal Highway, two State highways, and several secondary improved and unimproved roads. U.S. Highway 101 parallels the lower Nestucca River from the bay area to the town of Beaver, then continues north up Beaver Creek. The graveled BLM Nestucca Access Road follows the

twisting course of the Nestucca River above Beaver to its headwaters, providing access to the upper basin. State Highway 22 enters the southwest part of the basin from the Willamette valley and generally runs north toward Hebo. Most of the Little Nestucca River is also accessible on a good improved road. There is no rail service in the basin; a small landing strip for light planes is maintained at Pacific City.

BASIN HYDROLOGY AND WATER SUPPLY

Precipitation and evapotranspiration

The Nestucca River basin has mild, wet winters and moderate, dry summers. The Pacific Ocean moderates temperatures and the Coast Range intensifies precipitation, most of which falls during late fall and winter.

At present, the only climatological station operated by the U.S. National Weather Service in the entire basin is located in Cloverdale. This station has 33 years of precipitation records. The normal annual precipitation at this location is 85 inches, but is not representative of the entire basin. Rainfall is generally more intense at the coast and upslope areas and increases from about 83 inches at Nestucca Bay to more than 110 inches on high ridges in the central basin, and decreases to 70 inches in the headwater areas. Measurement of an isohyetal map of the North Coast Basin of Oregon indicates that the Nestucca River basin receives an average annual precipitation of about 95 inches (USCE, 1971).

Snowfall is infrequent and is usually very light, particularly at the lower altitudes. In the upper regions of the basin snow may accumulate to a depth of several feet. The snow seldom remains on the ground for an extended period.

No evaporation data are available for the basin, and the only data recorded for the entire Oregon coastal area are from the climatological station in Astoria, about 65 miles north of the Nestucca River basin. However, the difference between mean annual runoff and precipitation provides a rough estimate of total water loss, or evapotranspiration, assuming seepage and diversion losses are small. Because there are no streamflow stations near the Nestucca Bay area, the mean annual runoff for the entire basin was calculated to be 72 inches, using the regression equation for western Oregon streams (Lystrom, 1970, p. A-13). Thus, the resulting estimated annual evapotranspiration in the basin is 25 inches. The annual evaporation at the Astoria station is about 27 inches. Most of the basin water loss occurs between April and October. The ratio of evapotranspiration to precipitation is lower than in the rest of Oregon, because of relatively cool temperatures and fairly high humidity, characteristic of the marine-type climate of a coastal area.

Runoff and floods

The annual streamflow pattern for the Nestucca River basin is similar to the annual precipitation pattern. High flows occur during the winter rainy

season, November-March, and the low flows usually prevail during July-October. The drainage basin is small and rather steep, so streamflow is quickly affected by precipitation. The only storage in the basin is at McGuire Reservoir on the Nestucca River and two very small lakes, North and South Lakes, from which Three Rivers drains. Storage capacities are small and insignificant in holding back runoff.

U.S. Geological Survey measurements of discharge in the basin began in 1928 at a station near the headwaters of the Nestucca River, just downstream from the outlet of the dam that once formed Meadow Lake (p. 12). The station was maintained until 1944. Streamflow was recorded during the 1953 water year in the vicinity of the Blaine damsite. In 1960, a gaging station was established on the Nestucca River near Fairdale, just upstream from the backwater of former Meadow Lake, and is currently in operation. Also in operation is a station established in 1964 on the Nestucca River about 2 miles downstream from the mouth of Beaver Creek. There are no continuous gaging stations on the Little Nestucca River or any of the tributaries in the basin. Table 1 summarizes the available streamflow data.

Table 1.--Summary of streamflow data, Nestucca River

[Data from U.S. Geological Survey records.]

Gaging station	Stream mile	Period of record	Drainage area (sq.mi.)	Streamflow (ft^3/s)			
				Average	Per sq. mi.	Instantaneous Max.	Instantaneous Min.
Near Fairdale	49.3	June 1960 to Sept. 1976	6.2	34	5.5	876	1
Near McMinnville	47.4	Oct. 1928 to Sept. 1944	8.8	44	5.0	1,480	1
Near Blaine	28.9	Oct. 1952 to Sept. 1953	91.0	512	5.6	7,110	21
Near Beaver	13.5	Oct. 1964 to Sept. 1976	180.0	1,182	6.6	29,400	32

Estimated annual runoff at the mouths of the Nestucca and Little Nestucca Rivers is 1,010,000 acre-feet and 232,000 acre-feet, respectively (Oregon State Water Resources Board (SWRB), 1974, p. 11). Beaver Creek drainage contributes approximately 120,000 acre-feet of the Nestucca River runoff. The runoff from the entire 317-square-mile basin averages about 5.8 $ft^3/s/mi^2$ (cubic feet per second per square mile); the Little Nestucca drainage is probably less than that.

The Nestucca River produces relatively little sediment. Accordingly, silting would not be a problem at potential storage reservoirs in the Nestucca River basin (USCE, 1971, p. 18).

Steep stream gradients in the upper regions of the basin allow rapid accumulation of surface water, which then causes flooding in the lower reaches of the Nestucca River below the town of Beaver. Flooding in the Nestucca Bay area occurs almost annually, at any time from October through April. The larger and more frequent floods occur during December, January, and February caused by intense rainfall and high tides; snow contributes little to flooding. Runoff in excess of 100 $ft^3/s/mi^2$ can generally be expected as often as once every 3 years (USCE, 1971, p. 17).

Major floods in recent years in the basin occurred in 1953, 1964, 1972, and 1974. The 1962 washout of Meadow Lake dam caused severe flooding downstream to Nestucca Bay (p. 12). The 1972 flood, which was caused by two consecutive intense rainstorms between January 10 and 23, had a peak instantaneous discharge of 29,400 ft^3/s on January 11 at the USGS's Nestucca River gaging station near Beaver. This is the highest recorded discharge in the history of the station, and had a recurrence interval exceeding 100 years. According to the USCE (1972a, p. 39), damages from the 1972 floods in the Nestucca River basin amounted to nearly $750,000. The floods inundated 3,270 acres in the flood plain below Beaver.

Most of the flood damages could have been prevented by a multiple-purpose storage project at the Blaine site (p. 25). The reservoir site could effectively control a 100-year flood, but upstream storage would not eliminate tidal effects in the lower reaches of the Nestucca River. Additional protective measures such as levees, channel improvements, and flood-plain zoning would be required to prevent all future flood damages. In their studies, the USCE 1971, p. 50) concluded that although flood-prevention measures are needed, no single-purpose works were economically justified, nor would a multiple-purpose storage project at the Blaine site be economically justifiable, either now or in the foreseeable future.

Water rights

In November 1971, surface water rights, about equally divided between consumptive and nonconsumptive uses, totaled 130 ft^3/s in the Nestucca River basin (table 2). Approximately 50 percent of the consumptive rights--33 ft^3/s are used for irrigating about 2,800 acres. Seventy-five percent of the nonconsumptive rights--49 ft^3/s are for the propagation of fish. The only two water rights for hydroelectric power, totaling about 12 ft^3/s, are on small tributaries and are for private residential use. Only about 5 percent of the surface water rights are in the Little Nestucca River basin, amounting to 7 ft^3/s, mainly for irrigation.

Even though the consumptive surface water rights are far less than the average annual yield of the streams in the basin, shortages do occur at some points as a result of low summer flows at times of heaviest use. Legal diversions from Beaver Creek, tributary to the Nestucca River, are nearly equal to natural streamflows during the low-flow season. The conservation of excessive runoff water in reservoirs would be of considerable benefit but so far has been little utilized. Providing storage reservoirs could relieve the shortages and benefit aquatic life by raising minimum streamflows.

Table 2.--Surface water rights allotted by the State of Oregon in the Nestucca River basin

[Expressed in cubic feet per second. Data from Oregon State Water Resources Board (1971)]

Stream	Consumptive rights						Nonconsumptive rights			Total surface rights
	Dom.	Mun.	Ind.	Irrig.	Rec.	Total	Power	Fish	Total	
Nestucca River	0.01	16.29	--	12.14	--	28.44	--	--	--	28.44
Moon and East Creeks and misc	.18	--	--	1.41	--	1.59	--	--	--	1.59
Boulder Creek and misc	.21	--	--	1.52	--	1.73	*3.50	--	3.50	5.23
Foland Creek	--	--	--	.58	--	.58	--	--	--	.58
Foland Creek misc	.30	--	--	.71	--	1.01	--	--	--	1.01
Beaver Creek and misc	.72	.33	0.15	1.94	--	3.14	--	--	--	3.14
Three Rivers	--	.20	--	1.21	--	1.41	--	--	--	1.41
Three Rivers misc	1.04	.07	.92	.26	--	2.29	3.88	46.90	50.78	53.07
Clear Creek	--	--	--	.80	--	.80	--	--	--	.80
Clear Creek misc	.74	--	--	--	--	.74	--	--	--	.74
Nestucca River misc	2.29	7.07	.03	6.71	0.10	16.20	8.50	2.47	10.97	27.17
Little Nestucca River	.01	--	--	1.76	--	1.77	--	--	--	1.77
Little Nestucca River misc	.64	--	1.03	3.30	--	4.97	--	--	--	4.97
Nestucca Bay and misc	.06	--	.02	.44	--	.52	--	--	--	.52
Total	6.20	23.96	2.15	32.78	.10	65.19	15.88	49.37	65.25	130.44

* Not electrical

Minimum flow requirements

An overriding concern in any storage development on the Nestucca and Little Nestucca Rivers and their tributaries is the protection of the anadromous fish runs. The Oregon coastal streams are famous for their excellent runs of salmon and steelhead trout and the Nestucca River is one of the State's most productive streams. The fine fishing is extremely important to the recreational aspect of the area, drawing sportsmen from other States and all parts of Oregon. Although the exact amount is difficult to compute, fishing contributes significantly to the total economy of the basin.

The Oregon State Game Commission's report (1972) recommended to the SWRB minimum flows for the North Coast basin, which would support a reasonable level of fish production. This was to conform to Oregon Revised Statute (ORS) 536.310(7) directing the Board to consider "the maintenance of minimum perennial streamflows sufficient to support aquatic life." Land and water uses in the past have been at the expense of stream productivity. The minimum streamflows are those necessary to accommodate the environmental requirements of salmon and steelhead because these fish receive primary management emphasis in Oregon's coastal streams by fishery agencies. After holding public hearings in 1973, the Board adopted the recommended minimum streamflow program for the North Coast basin. In the Nestucca River basin, minimum streamflow requirements were established for 14 points (table 3). Human and livestock consumption, of course, holds priority over other water uses and the Board cannot restrict appropriation for human and livestock consumption in order to preserve instream flows (T. H. Myers, SWRB, written commun., 1973). In addition, the Board adopted the following measures relative to the water resources of the Nestucca basin:

1. Waters are classified and will be utilized only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife, and fish life uses;

2. No appropriations of water except for human consumption, livestock consumption, and waters legally released from storage shall be made or granted by any State agency or public corporation of the State for the waters of the streams and their tributaries when flows are less than the amounts specified (table 3);

3. No application for appropriation of water to be legally stored on any stream shall be approved by any State agency or public corporation of the State without the prior establishment of a minimum perennial streamflow at the proposed storage site, if deemed necessary, by the Board at the time of request;

4. No out-of-basin appropriation of water shall be made or granted by any State agency or public corporation of the State without the prior approval of, and following a public hearing by, the SWRB;

5. Structures or works for utilization of waters must be planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and must fit the multi-purpose concept.

Table 3.--Minimum perennial streamflows necessary for aquatic life, Nestucca River basin

[In cubic feet per second. Locations listed in downstream order]

Month	October 1-15	October 16-31	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept
Nestucca River													
From Elk Creek (1) to Bible Creek (2)	40	110	110	110	110	110	110	110	100	50	20	20	20
From Bible Creek (2) to Moon Creek (3)	80	150	180	180	180	180	180	180	180	100	60	60	60
Tributary--Moon Creek													
At or near confluence with Nestucca River (3)	20	50	50	50	40	40	40	40	30	20	5	5	5
Nestucca River													
From Moon Creek (3) to Beaver Creek (4)	100	100	230	230	220	220	220	220	210	120	65	65	65
Tributary--East Beaver Creek													
At or near confluence with Beaver Creek (5)	20	20	60	60	50	50	50	50	40	20	8	8	8
Tributary--Beaver Creek													
From East Beaver Creek (5) to Nestucca River (4)	40	40	80	80	75	75	75	75	60	40	15	15	15
Nestucca River													
From Beaver Creek (4) to Three Rivers (6)	140	200	250	250	250	250	250	250	200	150	80	80	80
Tributary--Three Rivers													
From Alder Creek (7) to Cedar Creek (8)	20	50	80	80	60	60	60	60	50	15	10	10	10
From Cedar Creek (8) to Nestucca River (6)	50	90	90	90	90	90	90	90	80	40	20	20	20
Nestucca River													
From Three Rivers (6) to its mouth	190	260	260	260	260	260	260	260	260	150	90	90	90
Tributary--Clear Creek													
At or near confluence with Nestucca River (9)	10	20	20	20	20	20	20	20	15	10	5	5	5
Little Nestucca River													
From Louie Creek (10) to South Fork (11)	30	90	90	90	80	80	80	80	60	10	10	10	10
From South Fork (11) to Fall Creek (12)	40	110	110	110	100	100	100	100	70	40	15	15	15
From Fall Creek (12) to its mouth	60	130	130	130	130	130	130	130	100	60	25	25	25

Key to localities (parenthetical numbers):

1 NW¼ sec. 27, T. 3 S., R. 7 W.
2 NW¼ sec. 7, T. 4 S., R. 7 W.
3 SW¼ sec. 30, T. 3 S., R. 8 W.
4 SE¼ sec. 30, T. 3 S., R. 9 W.
5 NW¼ sec. 18, T. 3 S., R. 9 W.
6 SE¼ sec. 11, T. 4 S., R. 10 W.
7 NW¼ sec. 4, T. 5 S., R. 9 W.
8 NE¼ sec. 24, T. 4 S., R. 10 W.
9 NE¼ sec. 28, T. 4 S., R. 10 W.
10 SE¼ sec. 28, T. 5 S., R. 9 W.
11 SE¼ sec. 25, T. 5 S., R. 10 W.
12 NW¼ sec. 15, T. 5 S., R. 10 W.

These measures obviously put certain restrictions on storage development within the Nestucca basin. Construction of any of several proposed storage facilities for irrigation, power, and other uses for the basin would present serious problems for anadromous fish runs, and fish passage facilities would have to be provided if present runs were to be maintained. The Oregon State Game Commission considered none of the reservoir sites in the Nestucca basin to be compatible with preservation of fishery resources. Furthermore, they concluded that to effectively protect fish life, gravel removal from all streams and triburaries in the basin should be prohibited. And yet, development of storage is the only means to increase low streamflows to the desirable minimums recommended for fish life.

DEVELOPED SITES

The only developed storage site in the basin is McGuire Reservoir, near the headwaters of the Nestucca River. In 1961, Cornell, Howland, Hayes, and Merryfield, (CH_2M), a consulting engineering firm, investigated three reservoir sites for expanding the city of McMinnville's municipal water supply. On the basis of their reports, the McMinnville Water and Light Commission determined that development of the two smaller sites, McGuire and Walker Flat, fitted their planning and finances better than the larger site, Walker Creek.

In 1969, the McMinnville Water and Light Commission constructed McGuire dam (fig. 2) at river mile 50 in sec. 15, T. 3 S., R. 6 W., to form a 148-acre reservoir. The 305-foot-long earth embankment is about 70 feet high and backs water 2 miles up the Nestucca River to an altitude of 1,866 feet. At normal pool the reservoir (fig. 3) stores 3,920 acre-feet from a drainage area of 2.9 square miles. Dead storage is negligible. Under normal operation, the reservoir starts filling in January. During summer months water is diverted from the reservoir through a 30-inch pipe to Idlewild Creek, a tributary draining in to Haskins Creek Reservoir (fig. 4) on the east side of the Coast Range. This transbasin diversion supplies additional water for municipal use by the city of McMinnville. In the fall, the reservoir is drained; no storage is planned for winter months runoff. However, during periods of heavy runoff, inflow may be greater than the capacity of the outlet tunnel and there may be temporary storage.

Power Site Reserve 659 of December 12, 1917, and Water Power Designation 14 of the same date classified lands in SE¼ sec. 15, T. 3 S., R. 6 W., within and adjacent to McGuire Reservoir. These lands should remain in classified status. No new classifications are needed.

About 1897, a low dam was constructed to form a logging pond on the Nestucca River near river mile 48, in sec. 8, T. 3 S., R. 6 W. Several years later, a sports club enlarged the pond for recreation purposes by raising the embankment several feet, thereby creating Meadow Lake. The earth dam was 16 feet high and backed water upstream for 2 miles, storing about 1,200 acre-feet of water. On November 20, 1962, after heavy rainfall, the dam broke. The resulting flood wave damaged downstream improvements, including washing out numerous bridges to the town of Blaine. Meadow Lake was never redeveloped. Development potential of the Meadow Lake site is discussed in the next chapter. Figures 5 and 6 show the site of Meadow Lake before and after the dam washed out.

Figure 2.--Upstream face of McGuire Dam, September 1972.

Figure 3.--McGuire Reservoir, viewed upstream, September 1972.

Figure 4.--Haskins Creek Reservoir, Willamette River drainage, September 1972.

Figure 5.--Meadow Lake viewed upstream from dam; at least one third of lake is out of view, around the bend in the distance, August 1923.

Figure 6.--Site of former Meadow Lake, viewed upstream from washed-out damsite, June 1970.

DEVELOPMENT POSSIBILITIES

Within the Nestucca basin are numerous undeveloped reservoir sites (fig. 7) available to conserve excessive runoff water for power, flood protection, irrigation, industry, domestic and municipal uses, recreation, pollution abatement, and fish life. However, this potential has not been used extensively to date (1980). This section discusses, in downstream order, the development possibilities and affected land classifications and withdrawals. Only a few sites have been considered for power development.

The storage site farthest upstream, the McGuire Reservoir (discussed under "Developed Sites"), is considered by the city of McMinnville to be fully developed.

Walker Flat

A site on Walker Creek, called Walker Flat by the USGS, was investigated by consulting engineers (CH_2M, 1961a) for the city of McMinnville at the same time as the McGuire Reservoir site. A dam 580 feet long in sec. 15, T. 3 S., R. 6 W., would raise the water surface altitude from 1,815 feet to 1,890 feet and provide 6,460 acre-feet of storage for municipal water supply. The 203-acre reservoir would inundate a large, flat, relatively open area on Walker Creek just upstream from its junction with the Nestucca River. The drainage area of 2.9 square miles yields an estimated average annual runoff of about 11,000 acre-feet. The USDA (1966, p. 97) studied the same site for development of a 349-acre reservoir at an altitude of 1,920 feet providing 10,700 acre-feet of storage for irrigation and recreation. The embankment would have a crest length of 850 feet and require approximately 739,000 cubic yards of fill.

The Walker Flat site has also been considered for use as the upper reservoir in a pumped-storage plan studied by the USCE (1972b, p. 33). Approximately 1,200 feet of head exists between Walker Flat and the lower reservoir site on Haskins Creek in T. 3 S., R. 5 W. Haskins Creek is on the east side of the Coast Range divide, and drains into the North Yamhill River, a tributary of the Willamette River. Construction of the Walker Flat reservoir to a pool altitude of 2,000 feet would provide 44,200 acre-feet of storage, sufficient to operate a 3,000-MW plant on a weekly cycle for peaking power. A penstock 20,000 feet long between Walker Flat and Haskins reservoirs would drop water to a lower pool altitude of 800 feet. If Walker Flat reservoir were developed to an altitude of only 1,915 feet, storage capacity would still be enough to operate a 1,000-MW plant, and require development of the lower reservoir to an altitude of only 716 feet. The USCE estimated that in terms of 1971 costs, total investment for development of the Walker Flat pumped-storage site would be $150/kW for a 3,000-MW plant or $180/kW for a 1,000-MW plant.

According to the investigation by CH_2M (1961a) and the USGS (p. 34), the Walker Flat site is geologically favorable and would present few construction problems. The foundation rocks at the site are adequate to support an embankment, and fill material is available within half a mile of the site. The west abutment, valley floor, and most of the reservoir basin are impervious. The east abutment would require grouting to reduce leakage through the deeply weathered basalt. The lower reservoir site on Haskins Creek was not studied geologically.

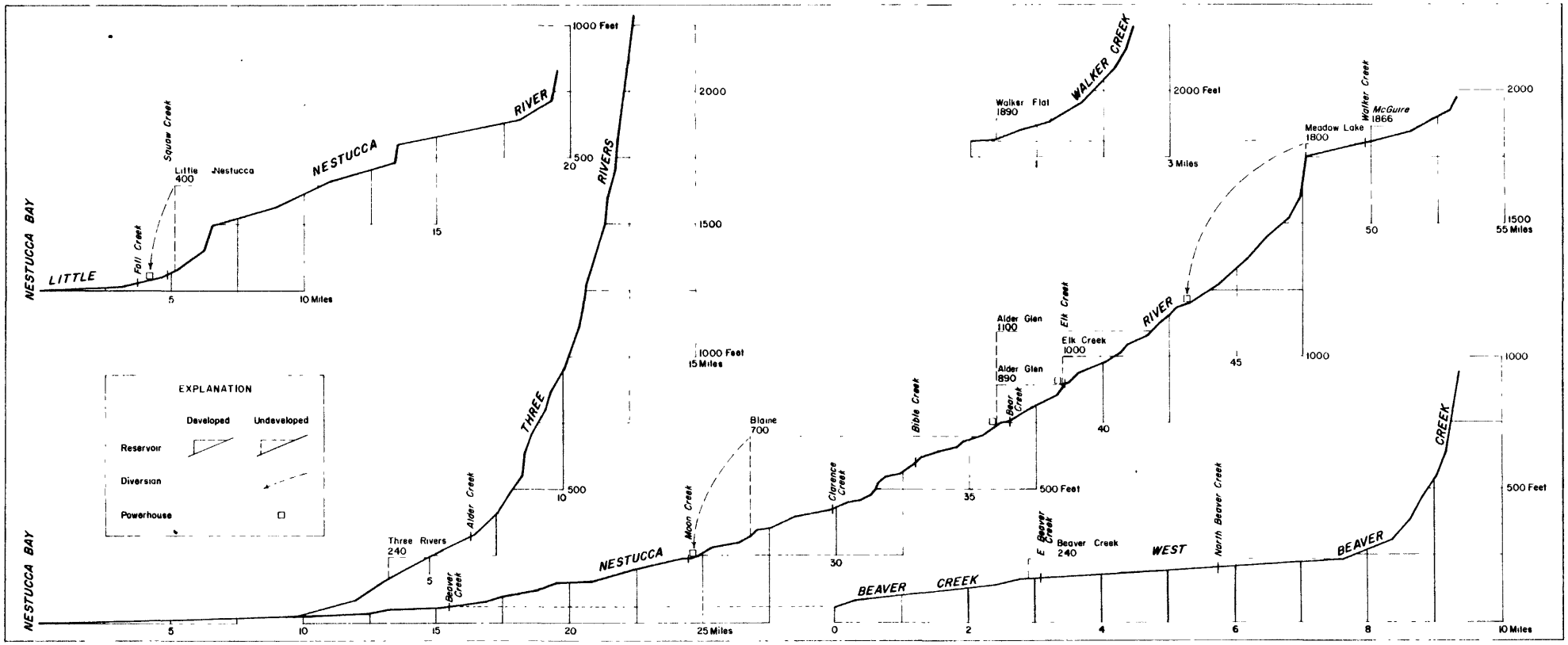


Figure 7 - Stream profiles and selected reservoir sites, Nestucca River basin.

The McMinnville Water and Light Commission (A. H. Jones, general manager, oral commun., 1972) has a preliminary permit from the State of Oregon to build Walker Flat reservoir and renews the permit periodically with the State. The reservoir will probably be developed as the second phase expansion to McMinnville's municipal water supply when the demand and population needs dictate.

Land classified in Power Site Reserve 659 and Water Power Designation 14 protect the Walker Flat damsite area and should remain in that status. About 80 acres of public domain land not now classified for storage purposes in sec. 21, T. 3 S., R. 6 W., would be affected by development of Walker Flat reservoir site above an altitude of 1,920 feet.

Walker Creek

A third site considered by the city of McMinnville for water supply, called Walker Creek herein, is on the Nestucca River, just downstream from the mouth of Walker Creek in SW¼NW¼ sec. 15, T. 3 S., R. 6 W. Storage capacity between the present water surface altitude of 1,780 feet and suggested pool altitude of 1,860 feet is 12,300 acre-feet. USGS streamflow records at the site show the average annual runoff to be 24,200 acre-feet from 6.2 square miles of drainage area. Development above an altitude of 1,820 feet would require a low dike in the saddle dividing Haskins Creek drainage from the Nestucca River. Full development of the Walker Creek site is unlikely because McGuire Reservoir would be inundated.

Although storage at the Walker Creek site is more than the combined capacities of McGuire Reservoir and the Walker Flat site, the two smaller reservoirs were favored by the McMinnville Water and Light Commission because the dual sites allowed flexibility in the development schedule as water needs arose. Additionally, Walker Creek reservoir site would have required more costly land acquisition and relocation of a few miles of the Nestucca River highway.

Meadow Lake

The next downstream site on the Nestucca River, Meadow Lake, was evaluated by the USGS for power development. A 40-foot-high dam raising the water surface to 1,800 feet in sec. 8, T. 3 S., R. 6 W., and approximately 5 miles of conduit diverting water to a powerhouse in sec. 24, T. 3 S., R. 7 W., could develop 600 feet of gross head. The average flow from 8.8 square miles of drainage area is 44 ft^3/s, according to USGS streamflow records at the site from 1928 to 1944. This average flow combined with the gross head would theoretically produce 2,200 kW of power at 100 percent efficiency. Storage capacity at an altitude of 1,800 feet is about 2,000 acre-feet.

Geologic reconnaissance by CH_2M indicates possible instability of the foundation. The fairly long conduit route and small power potential make development of the Meadow Lake site seem unlikely. Power Site Reserves 659 and 662, and Water Power Designation 14, all effective as of December 12, 1917, classified lands in the damsite area and downstream along the conduit route. A 40-acre parcel in sec. 9, T. 3 S., R. 6 W., should remain classified to protect the Meadow Lake damsite area. A net total of about 1,348 acres downstream

from the damsite in Tps. 3 S., Rs. 6 and 7 W., have power value for conduit purposes only and can thus be restored from the three classifications.

Elk Creek

In the 8-mile reach of river below the Meadow Lake powerhouse site, four damsites were studied, two (Elk Creek and Alder Glen) by the USGS and two (unnamed) by the USDA. There is approximately 500 feet of fall between river miles 43 and 35. Development of the upper 4.5 miles could use either of the two farthest upstream sites. Nearly the entire 8-mile reach could be developed by a single high dam or by dams at two of the four sites.

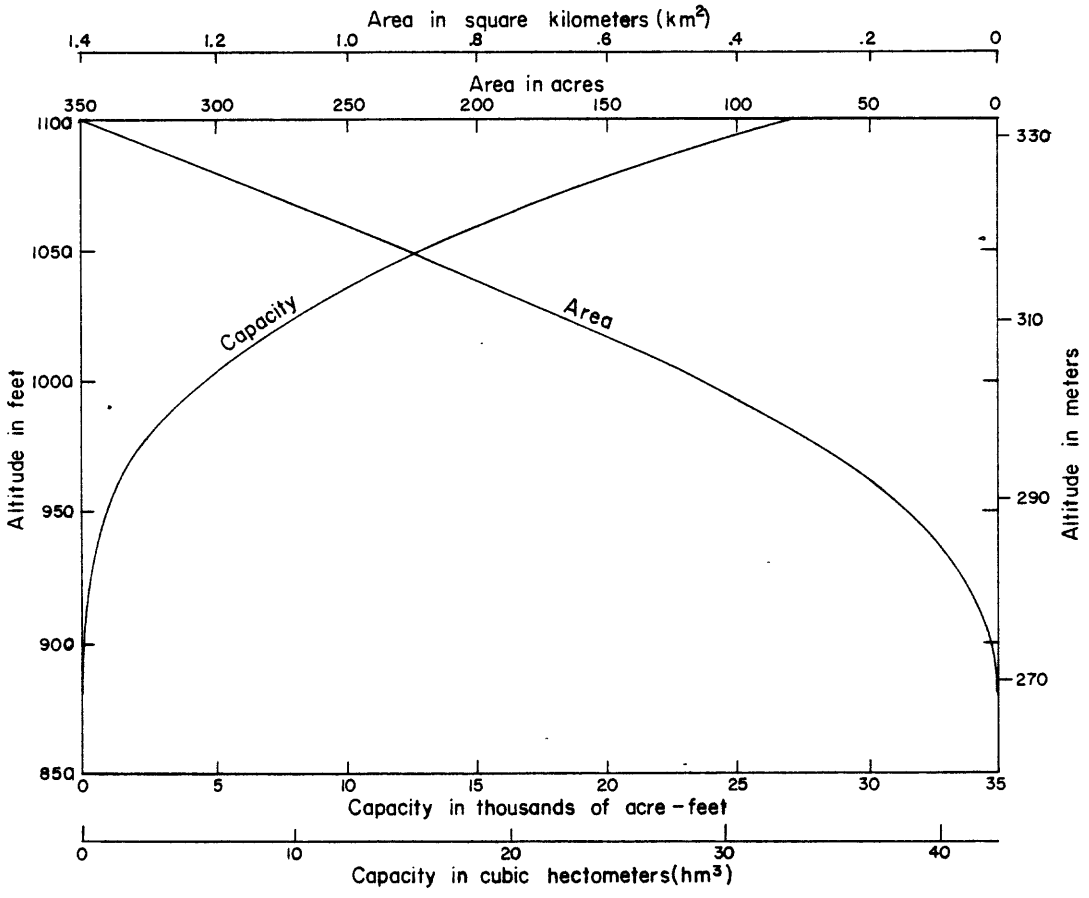
Near river mile 39 on the Nestucca River, a small unnamed site was investigated by the USDA (1966, p. 97) for irrigation and recreation purposes. Suggested was development of a 105-foot-high dam in the SE¼NW¼ sec. 27, T. 3 S., R. 7 W., between altitudes 935 and 1,040 feet, backing water for a little more than 2 miles upstream. According to planimetric measurements of a 1969 USGS river survey map (sheet one), area and capacity of the reservoir would be 103 acres and 4,380 acre-feet, respectively. An alternative to this site is located 3,000 feet downstream on the section line between secs. 27 and 28, T. 3 S., R. 7 W., and is called Elk Creek by the USGS. A 110-foot-high dam raising the water to an altitude of 1,000 feet would store 4,580 acre-feet and form a 118-acre reservoir. If the site were developed to an altitude of 1,100 feet, water would be backed up to within 1 mile of the Meadow Lake powerhouse site. The reservoir could then store 27,000 acre-feet (fig. 8) of water for irrigation, recreation, and flood control. The storage capacity would allow streamflow to be regulated to 100 ft^3/s, nearly 50 percent of the mean annual flow which is estimated to be 205 ft^3/s from 37 square miles of drainage. Power developable at the site using 210 feet of gross head and the mean annual flow amounts to 3,700 kW at 100 percent efficiency.

Alder Glen

The USGS studied and mapped the Alder Glen reservoir site on the Nestucca River. The damsite (fig. 9) is at river mile 36, in sec. 32, T. 3 S., R. 7 W., about 2,000 feet downstream from the mouth of Bear Creek. According to the area-capacity table (fig. 10) a dam 155 feet high raising the water surface altitude from 735 to 890 feet would back water to the Elk Creek site and provide a storage capacity of 13,400 acre-feet. The area-capacity curves of the Alder Glen site were developed to an altitude of 1,100 feet (365-foot-high dam), although development of such a high dam is unlikely. The capacity of 140,000 acre-feet at that altitude would be about three-fourths the mean annual runoff, which is estimated to be 185,000 acre-feet, and could regulate streamflow to 240 ft^3/s. Estimated mean annual flow at the site is 255 ft^3/s from 46 square miles of drainage.

Estimated potential power at the Alder Glen site is 3,400 kW if developed to an altitude of 890 feet, and 7,900 kW if developed to 1,100 feet.

Power Site Reserves 659 and 662 and Water Power Designation 14 classified lands within the Alder Glen and Elk Creek reservoir sites; a net total of about

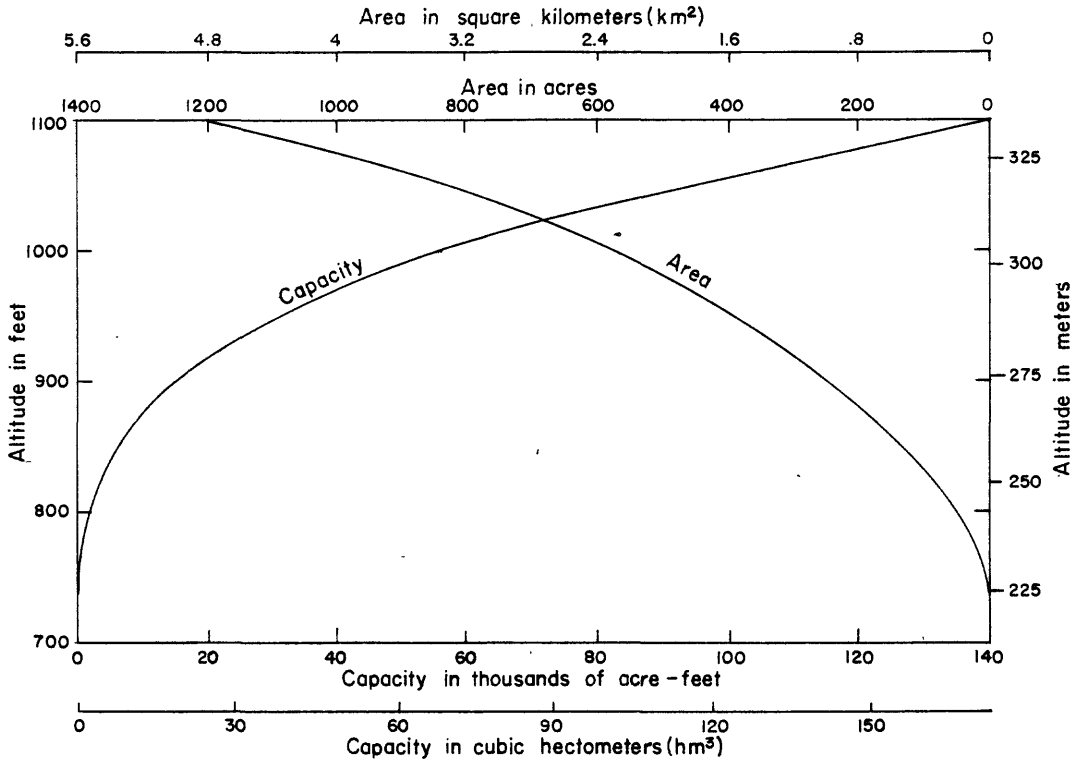


AREA AND CAPACITY

Altitude (feet)	Area (acres)	Capacity (acre-feet)
890	0	0
900	2	9
920	12	140
940	26	520
960	49	1,300
980	82	2,500
1,000	118	4,600
1,020	157	7,300
1,040	199	10,900
1,060	247	15,500
1,080	298	20,900
1,100	350	27,200

Figure 8. --Area-capacity of the Elk Creek reservoir site.

Figure 9.--Alder Glen damsite, downstream view, September 1972.



AREA AND CAPACITY

Altitude (feet)	Area (acres)	Capacity (acre-feet)
735	0	0
740	1	2
760	9	100
780	32	500
800	56	1,400
820	88	2,800
840	119	4,900
860	161	7,700
880	207	11,400
900	252	16,000
920	304	21,500
940	362	28,200
960	428	36,100
980	522	45,600
1,000	590	56,700
1,020	679	69,400
1,040	776	84,000
1,060	884	100,000
1,080	995	119,000
1,100	1,200	140,000

Figure 10.-- Area-capacity of the Alder Glen reservoir site.

1,777 acres remain outstanding. According to the USGS Blaine, Oregon, 15-minute topographic quadrangle map, all the classified lands lie at or below the 1,100-foot contour, except for 240 acres in secs. 21 and 27, T. 3 S., R. 7 W. Those classifications affecting lands lying above an altitude of 1,100 feet should be revoked. The other lands should remain classified. In addition, approximately 1,000 acres of public domain land lie at or below an altitude of 1,100 feet and have value for reservoir storage, but are not classified for this purpose.

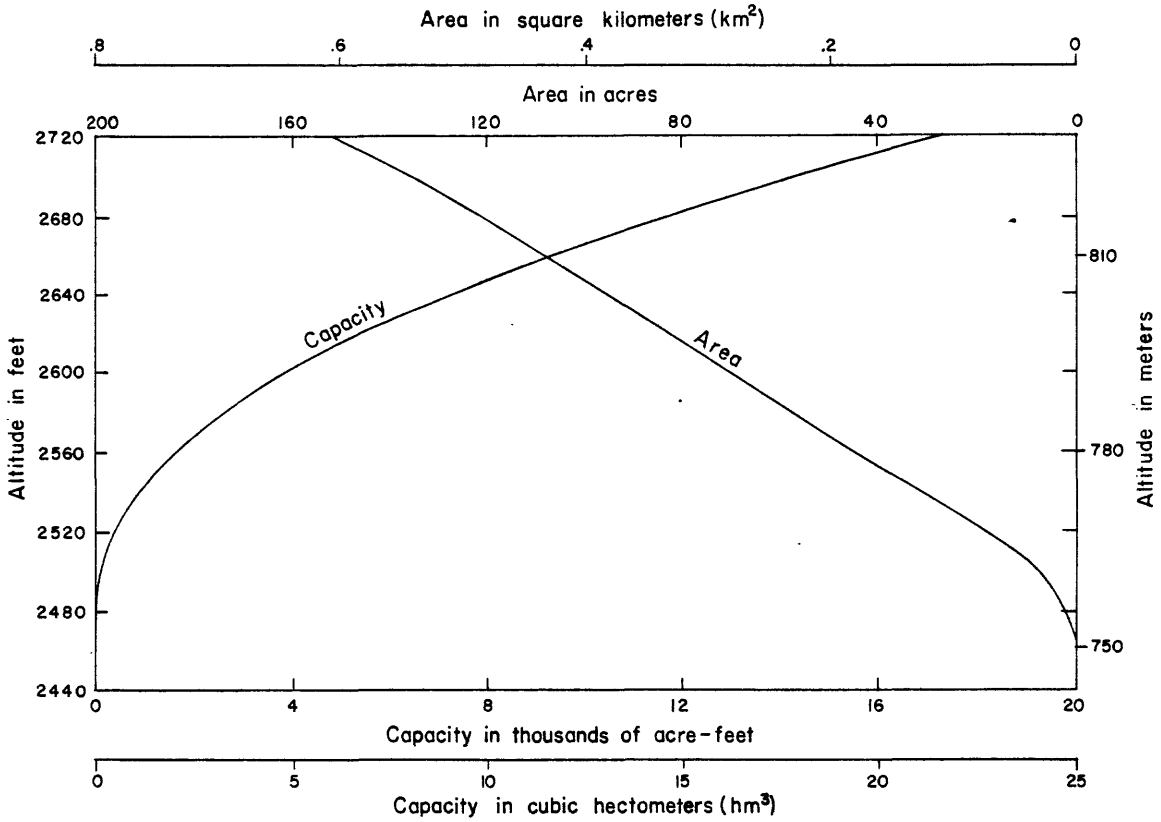
Bald Mountain

Either the Alder Glen or Elk Creek sites, if developed, could be the lower reservoir of the Bald Mountain pumped-storage site studied by the USGS. The upper reservoir would be just outside (south of) the Nestucca drainage boundary in the headwaters of Deer Creek, a Willamette basin tributary. A detailed map (scale 1:4,800) of the upper reservoir site was made in 1969 by the USGS. A 215-foot-high dam constructed in the southeast corner of sec. 30, T. 3 S., R. 6 W., would form a reservoir with a pool altitude of 2,680 feet, and 11,700 acre-feet of total storage capacity (fig. 11). Assuming development of the lower reservoir pool to an altitude of 1,100 feet, approximately 1,580 feet of head would be available with a nearly 2-mile long penstock between the upper reservoir and the Alder Glen or Elk Creek sites. The use of 11,100 acre-feet of storage from the upper reservoir with drawdown between altitudes 2,680 and 2,530 feet would be sufficient to operate a 1,000-MW pumped-storage plant on a weekly cycle (equivalent to 14 hours of continuous generation). Drawdown would be 10 feet in the Alder Glen reservoir site or 37 feet in the Elk Creek reservoir site. Stated in terms of 1971 costs, development would be $150/kW or $127/kW with Alder Glen or Elk Creek, respectively, as the lower reservoir.

Development of the Alder Glen site to only 890 feet would still allow its use as the lower reservoir for the Bald Mountain pumped-storage site. A head of about 1,790 feet would require use of only 9,200 acre-feet of storage to operate a 1,000-MW plant on a weekly cycle. The penstock length would increase to about 21,000 feet because of this lower development and drawdown in the Alder Glen reservoir would increase to about 50 feet. Investment cost would be $148/kW indexed to 1971.

There are 80 acres of public domain land in sec. 31, T. 3 S., R. 6 W., within the upper reservoir damsite area of the Bald Mountain pumped-storage site, but they are not yet classified for powersite purposes.

An alternative to the Alder Glen site is an unnamed site studied by the USDA (1966, p. 97). The damsite is roughly in the center of sec. 6, T. 4 S., R. 7 W., one-half mile upstream from left-bank tributary Testament Creek and 2.3 miles downstream from Alder Glen damsite. A dam raising the water-surface altitude from 640 to 800 feet would create a 317-acre reservoir with a storage capacity of 15,200 acre-feet for irrigation, flood control, and recreation. Estimated volume of fill required for the 1,200-foot-long embankment is nearly 2 million cubic yards. The damsite is within the backwater limits of the USGS's Blaine site.



AREA AND CAPACITY

Altitude (feet)	Area (acres)	Capacity (acre-feet)
2,470	0	0
2,500	7	70
2,520	18	320
2,540	32	820
2,560	45	1,600
2,580	56	2,600
2,600	70	3,900
2,620	85	5,400
2,640	100	7,300
2,660	111	9,400
2,680	122	11,700
2,700	136	14,300
2,720	154	17,200

Figure 11. -- Area-capacity of the Bald Mountain pumped-storage site.

Blaine

The Blaine damsite is in sec. 33, T. 3 S., R. 8 W., on the Nestucca River near mile 27 (fig. 12). According to a study by the USGS, a 375-foot-high dam raising the water surface altitude to 700 feet, and about 2 miles of conduit diverting water to a powerhouse near the town of Blaine in sec. 29, (fig. 13), could develop a gross head of 455 feet. Estimated mean annual flow at the site, as determined from nearby streamflow and precipitation records, is 516 ft^3/s from 94 square miles of drainage area.

The average flow and gross head could theoretically, at 100 percent efficiency, produce about 20 MW of power and an estimated average annual generation of 140,000 MWh. Storage capacity of the reservoir would be 289,000 acre-feet (fig. 14), or approximately three-fourths of the mean annual runoff at the site, sufficient to regulate the flow to very nearly average. Construction of such a high dam on the Nestucca River seems very unlikely.

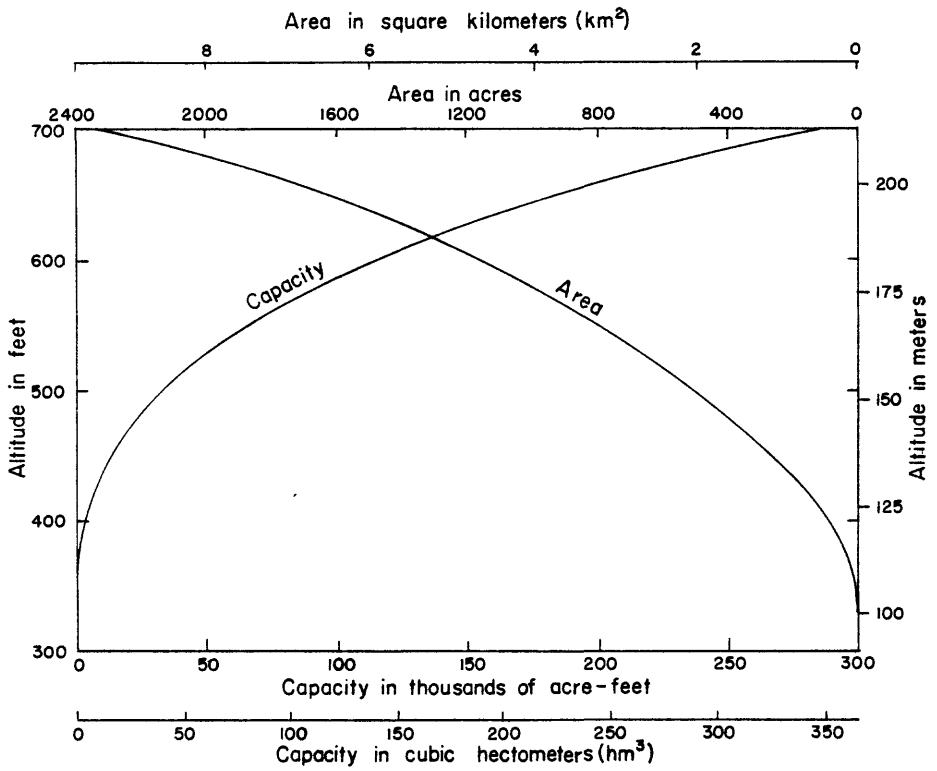
The Blaine site, studied more recently by the USCE (1971, p. 31), was considered to have the best potential for storage development in the basin. The reservoir would control runoff from about 36 percent of the total drainage area of the Nestucca River and would be located where effective flood control would be possible. Control of the 100-year flood, which would have an estimated peak discharge of 19,000 ft^3/s at the site, would require about 115,000 acre-feet of storage space. An embankment-type dam between altitudes 400 and 630 feet would create a reservoir of 130,000 acre-feet allowing 115,000 acre-feet for flood control and 15,000 acre-feet of dead storage. In the narrow valley of Nestucca River upstream from Hebo, the proposed Blaine reservoir would be very effective in preventing flood damages to narrow strips of agricultural lands, roads, and bridges--the type of property that cannot be protected effectively by levees. However, a substantial proportion of the flood damages in the tidal reach of the basin is attributable to high tides and could not be prevented by upstream storage.

The Corps of Engineers' plan considered multiple-purpose use of the Blaine reservoir site. About 1,000 acres of land along the lower reaches of the Nestucca River could be irrigated, using about 5,000 acre-feet of storage during July, August, and September. The Nestucca basin has no significant freshwater lakes, and a reservoir with proper facilities at the Blaine site could provide opportunities for water-based recreation. Withdrawal of irrigation water would not appreciably reduce the pool level during the recreation season. The USCE (1971, p. 32) further determined that if the reservoir were not operated for flood control, runoff available at the site would allow hydroelectric power generation of approximately 20,000 kW during the 4-month period November through February. However, installation of generating facilities would not be economical under those conditions, and operation of the reservoir for power generation in winter would not be compatible with flood-control operations.

Conclusions reached by the Corps of Engineers' investigations were that no upstream storage project for flood control or water conservation could be developed which was economically justifiable at that time. Of course, when need for flood control and water conservation for irrigation or other purposes increases, an upstream storage site should be considered in any framework plan to utilize the water and related land resources in the Nestucca basin.

Figure 12.--Blaine damsite area, downstream view, 1958.

Figure 13.--Vicinity of Blaine powerhouse site, September 1972.



AREA AND CAPACITY		
Altitude (feet)	Area (acres)	Capacity (acre-feet)
325	0	0
400	80	3,000
480	420	23,000
560	880	75,000
640	1,540	172,000
700	2,380	289,000

Figure 14. -- Area-capacity of the Blaine reservoir site.

Despite its apparent favorable potential, a multiple-purpose project at the Blaine site is probably not feasible in the foreseeable future, owing to the adverse effect on the anadromous fishery industry.

About 2,400 acres of land within the Blaine site are now classified by Power Site Reserves 659, 662, and 730 and Water Power Designation 14. Inasmuch as the Blaine site has considerable storage potential, all classifications affecting lands below an altitude of 700 feet will be retained. Classifications should be revoked on nearly 500 acres of land lying outside the area that would be inundated by the reservoir. Approximately 1,520 acres of unclassified public domain land are at or below the flowage altitude of 700 feet.

Bible Ranch

The Blaine site, if developed to an altitude of 610 feet or higher, could also serve as the lower reservoir for a potential pumped-storage site, Bible Ranch, studied by the USGS. The upper reservoir would be formed by a 190-foot-high dam to an altitude of 1,640 feet, near the corner in common with secs. 16, 17, 20, and 21, T. 4 S., R. 7 W., and would store 26,000 acre-feet of water, sufficient to operate a 1,000-MW plant on a weekly cycle. Approximately 1,000 feet of head would be available, using a 12,000-foot-long penstock. Drawdown in the upper and lower reservoirs would be about 60 and 14 feet, respectively. Portions of 200 acres of public domain land in sec. 21, T. 4 S., R. 7 W., would be affected by the dam and reservoir, but classification will be deferred until the site's potential is studied further. In terms of 1971 prices, development of the site would cost about $162/kW.

Downstream from the town of Blaine, the Nestucca River begins to flatten out and the valley widens into fairly level agricultural lands. There are no Geological Survey classifications on lands below mile 23, because there are no potential sites. Several small storage sites (discussed below) on some of the tributaries below the Blaine site were investigated by the USDA (1966, p. 97).

Moon Creek

The Moon Creek site is on Moon Creek, tributary to the Nestucca River near mile 24, and is in sec. 17, T. 3 S., R. 8 W., about 2 miles north of Blaine. A 700-foot-long dam raising the present water surface 115 feet to an altitude of 480 feet would store 3,150 acre-feet of water for irrigation and recreation. The estimated embankment volume of 643,000 cubic yards is rather large (204 yd^3/ac-ft) for the small amount of storage. Annual runoff from the 6.4 square miles of drainage is about 27,000 acre-feet. The entire storage site is on patented lands.

East Creek

Two miles east of the Moon Creek site is a similar small storage site, on East Creek, a tributary to Moon Creek. The East Creek site, in the N½ sec. 15, T. 3 S., R. 8 W., would store 1,940 acre-feet behind a dam 80 feet high and 800 feet long, from a drainage area of 5.4 square miles. Nearly 215 cubic yards of embankment fill would be required per acre-foot of capacity. All of the lands within the reservoir site area are federally owned under BLM jurisdiction, but are not classified for reservoir site purposes.

Bays Creek

The Bays Creek site, on Bays Creek about one-half mile above its mouth on the Nestucca River, is a 2,000 acre-foot reservoir site studied for irrigation, flood control, and recreation. An 80-foot-high dam in sec. 24, T. 3 S., R. 9 W., would create a reservoir occupying about 60 acres. Raising the dam an additional 40 feet to an altitude of 360 feet would triple the capacity and nearly double the surface area of the reservoir, providing considerably more potential for flood control and recreation on Bays Creek. The storage site is on patented lands.

East Beaver Creek

Two unnamed potential storage sites located on East Beaver Creek, tributary to Beaver Creek, several miles northeast of the town of Beaver, would be suitable for irrigation and recreation. The upper damsite is in sec. 1, T. 3 S., R. 9 W., and the lower site is about 3 miles downstream in sec. 15 of the same township. Respective capacities of the upper and lower sites are 2,000 and 1,300 acre-feet using 110- and 70-foot-high dams. Embankment fill required at the upper damsite would be about 426,000 cubic yards, over 210 cubic yards per acre-foot of storage, and nearly twice the fill needed at the smaller downstream site. Both reservoir sites have surface areas of approximately 60 acres. Except for a small area near the backwater limits of the reservoir, the lower site is on patented lands, whereas the entire upper reservoir site affects parcels totaling 270 acres within the Siuslaw National Forest.

Beaver Creek

An excellent storage site on Beaver Creek just below the mouth of East Beaver Creek was investigated for irrigation, recreation, and flood control. The Beaver Creek damsite, in sec. 18, T. 3 S., R. 9 W., would store 26,400 acre-feet between altitudes 165 and 240 feet (fig. 15). The 75-foot-high dam would form a reservoir about 4 miles long with a surface area of nearly 1,200 acres. Less than 14 cubic yards of fill per acre-foot of storage would be required for the embankment. A dam built to an altitude of 295 feet would provide storage capacity equal to the estimated mean annual runoff at the site, 112,000 acre-feet. This is about 15 percent of the mean annual runoff for the Nestucca River at its mouth. However, development of the reservoir site would entail relocation of about 2 miles of U.S. Highway 101, 3 miles of a paved country road, and numerous homes and buildings. Most of the land is heavily forested with some being used for farming and livestock grazing. All lands within the site area are patented.

Three Rivers

The steep-gradient stream, Three Rivers, joins the Nestucca River at mile 10 near the town of Hebo. An unnamed site on Three Rivers, in sec. 30, T. 4 S., R. 9 W., was studied for irrigation and recreation purposes as well as for a potential municipal water supply. The site is in a fairly wide, flat basin about 3 miles above the mouth of Three Rivers (fig. 16). Some houses and mobile

Figure 15.--Beaver Creek damsite, viewed downstream, May 1972.

Figure 16.--Three Rivers reservoir site, upstream view, September 1972.

homes are located in the grassy bottomlands and on the heavily forested side slopes. Raising the water surface 75 feet, to an altitude of 240 feet, would create a 220-acre pool area over 1 mile long to store 5,000 acre-feet. Annual runoff at the site is estimated to be 114,000 acre-feet from about 28 square miles of drainage. Except for a few 40-acre parcels bordering the pool edge, all the lands within the reservoir site area are patented.

Little Nestucca River

The Little Nestucca River, at the extreme southern part of the drainage area discussed herein, contains four potential reservoir sites; of these four, two were considered "suitable" for further evaluation, according to a reservoir-site inventory by the Oregon State Water Resources Board (1975). A "suitable" category indicates that the Board's initial site screening disclosed no obvious site deficiencies (such as adverse impact on the anadromous fishery, inadequate storage capacities, unfavorable geology).

Damsite No. 477, in NW¼NW¼ sec. 10, T. 6 S., R. 9 W., on the Little Nestucca River could store 35,000 acre-feet of water behind a 90-foot-high dam if the water surface were raised to an altitude of about 610 feet. Topographically, the site has potential for much more storage but the annual runoff at the site is probably no more than 35,000 acre-feet. Except for perhaps the backwater limits of the reservoir area, the site is on patented lands.

The Fall Creek site, No. 469, in about the center of sec. 10, T. 6 S., R. 9 W., on Fall Creek was also categorized as "suitable" and could store about 4,000 acre-feet of water at a pool altitude of 725 feet. The dam height would be approximately 70 feet. All the lands within the site area are patented.

Two potential reservoir sites exist on the lower half of the Little Nestucca River. An upper damsite, unnamed by the USDA, in SE¼ sec. 25, T. 5 S., R. 10 W., would store 21,600 acre-feet of water for irrigation, recreation, and flood control between altitudes 260 and 400 feet. The reservoir would back water 3 miles up the main stem and about 1.5 miles up the South Fork, forming two long, narrow arms at about right angles to each other. Surface area would be over 500 acres. An estimated 889,000 cubic yards of fill would be required, or 41 cubic yards per acre-foot of capacity. The lands within the site are almost all privately or State owned except for a few parcels that border the potential pool edge.

The Little Nestucca site on the Little Nestucca River is downstream 2.5 miles in NE¼ sec. 22, T. 5 S., R. 10 W. The USDA's plan is for an 80-foot-high dam to an altitude of 160 feet which would store 2,900 acre-feet of water, primarily for irrigation. The USGS earlier considered the same location for a power site, using a dam 320 feet high to an altitude of 400 feet and approximately 1 mile of conduit to a powerhouse at an altitude of 40 feet, to develop 360 feet of gross head. Estimated mean flow is 205 ft^3/s from 41 square miles of drainage. Only 6,300 kW of power could be theoretically produced at 100 percent efficiency using the gross head and mean flow. Capacity studies indicate that if the site were developed to an altitude of 400 feet, 132,000 acre-feet could be stored. This capacity, 87 percent of the mean annual runoff, would allow flow to be regulated to about 175 ft^3/s. The reservoir at an altitude of 400 feet would have a surface area of 1,310 acres and inundate the upper site

discussed in the previous paragraph. Most of the lands within the reservoir site area are patented. Nearly 1,100 acres of public domain land--within the Siuslaw National Forest in Tps. 5 S., Rs. 9 and 10 W.--lie near or below the maximum pool altitude (400 feet), but only a few acres of the public land lie below the pool altitude of 160 feet suggested by USDA.

Table 4 lists the public lands not now classified for power or reservoir site purposes that would be affected by all the potential developments just discussed.

Table 4.--Public lands potentially valuable for waterpower or reservoir sites, which are not presently classified for those purposes.

Walker Flat site - 80 acres
T. 3 S., R. 6 W., sec. 21, W½SE¼.
Alder Glen site (and alternatives) - 1,000 acres
T. 3 S., R. 7 W., sec. 19, E½E½; sec. 21, SE¼NW¼; sec. 26, SE¼; sec. 27, NE¼ and E½NW¼; sec. 29, NW¼ and SW¼SW¼; sec. 30, E½NE¼ and NE¼SE¼; sec. 32, NW¼NW¼; sec. 33, SE¼NW¼.
Bald Mountain pumped-storage site - 80 acres
T. 3 S., R. 6 W., sec. 31, N½NE¼.
Blaine site - 1,519.94 acres
T. 3 S., R. 8 W., sec. 34, SW¼SE¼.
T. 4 S., R. 8 W., sec. 2, lots 1, 3, 4, and 6, SW¼NW¼, and SE¼SW¼; sec. 3, SE¼SW¼; sec. 4, lot 1, SE¼NE¼, and NW¼SE¼; sec. 8, N½NE¼NE¼; sec. 9, SE¼NE¼, W½NW¼, NE¼SW¼, and NW¼SE¼; sec. 10, NE¼, NW¼NW¼, E½SW¼, and SE¼; sec. 11, NW¼SW¼; sec. 12, N½NW¼; sec. 14, NW¼NW¼ and SE¼SW¼; sec. 15, SW¼NE¼, SE¼NW¼, and E½SE¼; sec. 22, NE¼NE¼; sec. 23, NE¼NW¼.

Table 4.--Public lands potentially valuable for waterpower or reservoir sites, which are not presently classified for those purposes. (continued).

Bible Ranch pumped-storage site - 200 acres
T. 4 S., R. 7 W., sec. 21, W½NW¼, N½SW¼, and SE¼SW¼.
East Creek site - 480 acres
T. 3 S., R. 8 W., sec. 10, S½S½; sec. 11, SW¼SW¼; sec. 14, NW¼NW¼; sec. 15, N½NE¼ and NW¼.
East Beaver Creek site (upper) - 270.25 acres
T. 3 S., R. 8 W., sec. 6, lot 4. T. 3 S., R. 9 W., sec. 1, lots 8 to 11, inclusive, NE¼SW¼, and NW¼SE¼.
East Beaver Creek site (lower) - 120 acres
T. 3 S., R. 9 W., sec. 10, S½NE¼ and NE¼SE¼.
Three Rivers site - 120 acres
T. 4 S., R. 9 W., sec. 30, NE¼NE¼ and SW¼SE¼; sec. 31, NE¼NE¼.
Little Nestucca site - 1,081.05 acres
T. 5 S., R. 9 W., sec. 28, N½SW¼; sec. 29, S½NW¼; sec. 30, SE¼NE¼ sec. 31, lot 1. T. 5 S., R. 10 W., sec. 23, N½NW¼, SE¼NW¼, SW¼SW¼, and NW¼SE¼; sec. 24, NW¼NE¼, E½W½, and W½SW¼; sec. 25, NE¼SW¼; sec. 26, W½NE¼, NW¼, and N½SW¼.
Total public lands - 4,951.24 acres

GEOLOGY OF SELECTED SITES,

by J. L. Renner and D. L. Gaskill

Five sites discussed under "Development Possibilities" were investigated by USGS geologists.

Walker Flat

The Walker Flat damsite (pl. 1) is on Walker Creek about 1,200 feet upstream from its confluence with the Nestucca River (p. 16-18). Warren and others (1945) assigned the rocks in the area to the Tillamook Volcanic Series (Eocene), a sequence of basaltic lavas and tuffs and varying amounts of shale, tuffaceous shale, and siltstone. Wilkinson (1961) reviewed the geology of several potential damsites in the area including the Walker Flat and Walker Creek sites for the McMinnville (Oregon) Water and Light Commission. The rocks exposed at the Walker Flat damsite are similar to those at the Walker Creek site. However, Wilkinson's drill logs enable a more detailed evaluation of the stratigraphy and structure at the Walker Flat site.

Wilkinson (1961) recognized four rock units on the basis of core samples from three test holes drilled at the Walker Flat damsite. The core sample from the east abutment was entirely basalt, which Wilkinson thinks is either in fault contact with the rocks shown in test holes 1 and 2 or is a near-vertical dike. Inspection of the test hole logs of Wilkinson (1961), without benefit of examination of the cores, suggests that the basalt unit shown in TH-3 is probably two basalt flows. The lateral discontinuity between TH-2 and TH-3 can be viewed as a fault because of the strong linear trend of Walker Creek or as the contact between sediments and the edge of a flow, both of which were covered by later flows (fig. 17, pl. 1). The latter explanation is preferred. Whichever the interpretation, an inclined contact between tuffaceous siltstone and basalt is present between TH-2 and TH-3.

Abutments

Test holes 1 and 2 show a carbonaceous, tuffaceous siltstone at about the elevation of Walker Creek overlain successively by basalt, about 50 feet thick, and a tuffaceous siltstone. The upper siltstone and the basalt shown in TH-1 are thought to be the same units which are exposed at the Walker Creek damsite. The west abutment would be constructed on the basalt and tuffaceous siltstone shown in TH-2. Wilkinson (1961) observes that it is "probable that there will be no need for major grouting along this abutment." The east abutment would be entirely on basalt that is altered and jointed to varying degrees. In Wilkinson's (1961) opinion, grouting will be necessary on the east abutment, as well as near the siltstone-basalt contact between TH-2 and TH-3.

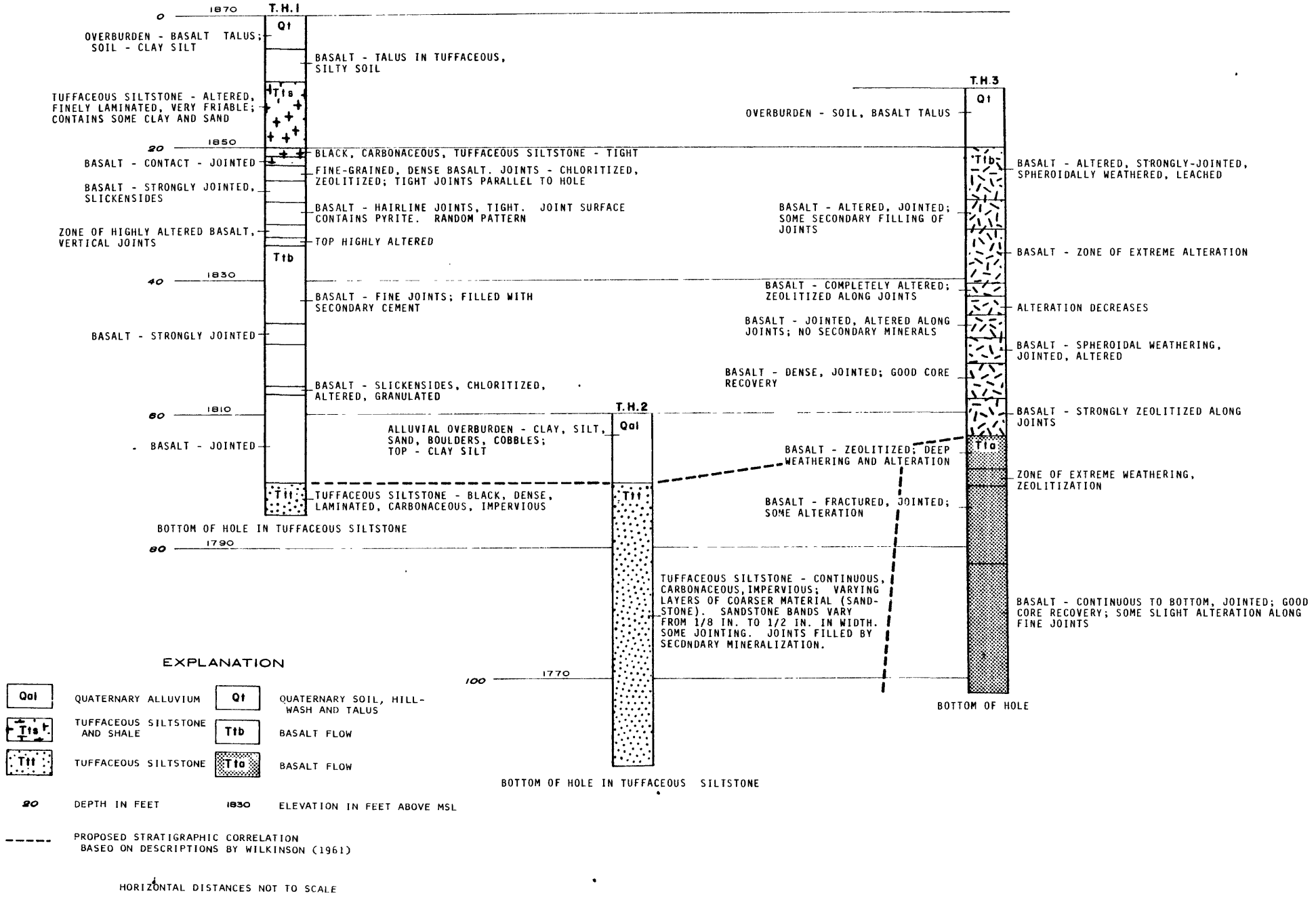


Figure 17. --- Lithologic logs of three test holes drilled in the Walker Flat site. (Modified from Wilkinson, 1961).

Reservoir

The reservoir site is underlain by basalt and tuffaceous siltstone with a covering of deeply altered bedrock and alluvium. The reservoir should be relatively impermeable.

Stability

No evidence of active or inactive landslides was seen in the area of the damsite or reservoir. A fault may extend along Walker Creek and through Walker Flat. If a fault is present, grouting of the fault zone may be necessary at the damsite although the fault should cause no problem in the reservoir. Von Hoke (1976) states that three magnitude VI earthquakes have been reported in the McMinnville area since 1896 and places the Walker Flat area in zone 2 risk; moderate damage can be expected.

Overburden

The geologic work of Wilkinson (1961) suggests a fairly uniform 10 feet of overburden and soil at the damsite and in the reservoir area. The more deeply weathered areas, particularly at the east abutment, may require removal of a greater amount of material.

Construction material

Tuffaceous siltstone and shale are present near both the Walker Flat and Walker Creek damsites, particularly in the ridge to the southwest of the sites. Basalt could be quarried at several locations in Walker Flat or at the quarry opened during construction of the existing McGuire Dam.

Walker Creek

The Walker Creek damsite (pl. 1) is on the Nestucca River about 1,200 feet downstream from its confluence with Walker Creek (p. 18). The area is deeply weathered, thickly mantled by soil, and, in most places, densely vegetated. The geology is inferred from scattered outcrops. The stratigraphically lowest rock of the Tillamook Volcanic Series (Eocene) exposed at the damsite is fine-grained basalt that crops out on the south side of the river. The basalt is moderately jointed, and some grouting would be necessary to prevent dam leakage. Overlying the basalt is tuffaceous siltstone with some interbedded shale. When dried, the shale flakes and is easily eroded.

Abutments

The south abutment would be on fine-grained basalt overlain by shale. The basalt-shale contact appears to dip north toward the river. Grouting of the contact probably will be necessary. The north abutment would be entirely on the shale unit. The suitability of this material as support for a dam needs to be tested.

Reservoir

Rocks in most of the reservoir area resemble rocks exposed near the abutments. That part of the reservoir in the Walker Creek drainage should be relatively impervious. A small outcrop of gabbroic rock is located slightly upstream and north of the potential damsite. This intrusive is mineralogically and texturally similar to the extensive sill in the Bald Mountain area and to widespread gabbroic occurrences north of the damsite. The extent of the rock unit and its degree of jointing are not discernible, owing to poor outcrops.

Stability

No evidence of active or inactive landslides was seen in the area of the damsite or elsewhere in the reservoir. Engineering studies of the shale exposed in the area should be made to determine its stability under load and water-saturated conditions. Von Hoke (1976) places the Walker Creek area in zone 2 risk; moderate damage can be expected.

Overburden

About 3-20 feet of alluvium is present in the area of the river. The abutment areas are probably covered by 3-13 feet of soil and weathered rock. Actual thickness can only be determined by drilling or excavation.

Construction materials

Materials available for construction are described on page 36.

Alder Glen

Warren and others (1945) assigned the rocks in the Alder Glen area to the Tillamook Volcanic Series (Eocene), a sequence of basaltic lavas and tuffs with varying amounts of shale, tuffaceous shale, and siltstone. More recent mapping places the volcanic rocks exposed in the Alder Glen area within the Siletz River Volcanics (Eocene), (Snavely and Wagner, 1964; Snavely and others, 1968). The general structure of the Oregon Coast Range is a northward-plunging anticlinorium with numerous broad elongate anticlines and synclines (Snavely and Wagner, 1964).

The geology of the damsite is shown on plate 2. Owing to dense vegetation and the thick soil cover, the geology must be inferred from scattered outcrops. The stratigraphically lowest rock unit mapped is a sequence of pillow basalts. The chilled borders of the pillows are much altered and, together with the interstitial material, are now clays and zeolites. The pillow basalt is overlain by a thin (2.6 feet) basaltic sandstone which, in outcrop, is poorly cemented and apparently somewhat permeable. Overlying these rocks is a thick (greater than 650 feet) sequence of amygdaloidal basalt. The amygdules and most of the joints in the basalt are filled with calcite and zeolitic material. The rock units appear to dip about 10° SSW (downstream).

Abutments

The abutments for the Alder Glen dam would be placed on the amygdaloidal basalt to at least the 900-foot altitude on both sides of the river. A 98-foot-thick basalt dike intrudes the amygdaloidal basalt in the abutment area. The dike strikes N. 45° W. and dips about 70° S., or downstream. Three prominent joint sets are apparent: one strikes N. 10° W. with a dip of 65° E.; another strikes N. 80° E. with a dip of 55° S.; and a third strikes N. 40° E. with a dip of 30° E. The joints do not appear to be well-cemented.

The downstream dip of the major rock units, and more particularly the dike, could allow subsurface leakage from the reservoir. The amygdaloidal basalt and pillow basalts appear to be relatively impermeable because of extensive filling of joints by alteration products. Grouting would probably be necessary to seal the dike and the basaltic sandstone.

Reservoir

The reservoir area is underlain by rocks similar to those exposed at the damsite. Tuffaceous siltstones and sandstones, present locally, appear to be relatively well-cemented and impervious. Some grouting of the basaltic sandstone will probably be necessary to minimize leakage.

Stability

No active landslides occur at the damsite or elsewhere in the reservoir area. However, extensive landslides are known at other areas of the drainage basin in similar rock types. Several small inactive landslides may be present on the east side of the river about one-quarter mile upstream from the damsite. The heavy vegetation makes positive identification very difficult. The Alder Glen area has been placed in zone 2 risk; moderate damage can be expected (Von Hoke, 1976).

Overburden

Rocks are deeply weathered. Approximately 3-10 feet of soil and weathered rock will have to be removed to provide an adequate foundation for the abutments. The river has less than 6 feet of alluvial material underlying its bed in the area of the damsite. A major obstacle will be the relocation of the existing highway.

Construction materials

Rock and riprap material well suited for construction is available immediately downstream in outcrops of the amygdaloidal basalt. Sandstone and shale, and tuffaceous shale are located to the northwest of the confluence of Bear Creek and the Nestucca River, within 0.6 mile of the damsite.

Bald Mountain

The Bald Mountain site occupies a bowl-shaped valley at the headwaters of Deer Creek between the drainage areas of the Nestucca River and Deer Creek (p. 23-24). Warren and others (1945) assigned the rocks of the Bald Mountain area to the Tillamook Volcanic Series (Eocene), a sequence of basaltic lavas and tuffs and varying amounts of shale, tuffaceous shale, and siltstone. More detailed mapping about 1.5 miles to the south (Baldwin and others, 1955) shows the Siletz River Volcanics (Eocene) cropping out along Deer Creek and overlain by the Nestucca Formation (Eocene).

Detailed mapping in the Bald Mountain area is complicated by the deeply weathered bedrock, thick soil cover, and dense vegetation. As a result, the geology (pl. 2) has been interpreted from scattered outcrops, mainly in road-cuts. Although attitude of bedding is difficult to determine, the interlayered tuffaceous sediments and flows of the Nestucca Formation appear to dip gently to the southwest, like the dips of 5-20° SW just south of the Bald Mountain area (Baldwin and others, 1955). The valley of Deer Creek in the vicinity of the damsite is underlain by dense, resistant amygdaloidal basalt thought to be the uppermost Siletz River Volcanics in this area. The basalt's relative resistance to erosion may be the cause of the extremely low stream gradient upstream from the outcrop.

Abutments

The abutments of the dam would be on tuffaceous shale with some minor interlayered basalt flows. The shale contains enough clayey material to produce a high degree of imperviousness, but, when water-saturated and under stress, may yield to plastic deformation.

Reservoir

The reservoir site is underlain by interbedded shale, tuffaceous shale and siltstone, and several basalt flows. The gently rounded knobs on the ridge surrounding the reservoir site are capped by remnants of an extensive gabbroic sill. The reservoir should have good water retention.

Stability

Topographically, the Bald Mountain reservoir site is a distinct embayment into the ridge running southwestward from Sheridan Peak and Bald Mountain. Erosional processes are more rapid at that part of the ridge. Erosion was probably assisted by various types of mass wasting, including landslides. At several areas within the reservoir site, there is strong topographic evidence for landslides. Although no evidence for recent movement of any of the slide areas was noted, development of a reservoir, particularly one used for pumped storage, could reactivate old slides or trigger new ones. Rapid withdrawal of water from the reservoir could decrease slope stability during each withdrawal cycle. Von Hoke (1976) places the Bald Mountain area in zone 2 risk; moderate damage can be expected.

Overburden

Dam construction would entail removal of 10-33 feet of weathered rock and soil from the abutment area. A paved highway now crosses each abutment area and would have to be relocated.

Construction materials

Basaltic rocks are available in limited quantities within the reservoir site and in substantial amounts at a developed quarry on Sheridan Peak about 1.2 miles from the damsite. Sufficient quantities of shale for construction are available from the reservoir area. Small amounts of gravel are present along Deer Creek.

Blaine

The Blaine damsite area is situated on the Nestucca River in secs. 32 and 33, T. 3 S., R. 8 W. The area is accessible by surfaced road 2.5 miles southeast of Blaine, Oregon.

Bedrock in the damsite area comprises basalt flows and intercalated beds of pyroclastic and sedimentary rocks locally intruded by basalt dikes and thin to massive gabbroic and dioritic sills. Bedrock exposures are mostly confined to road excavations and the channel of the Nestucca River. Adjacent forested slopes and abutments along lines of cross sections A-A' and B-B' (pl. 3) are generally covered with slope debris.

Bedrock attitudes are variable in the damsite area, but generally dip upstream at low angles. Slickensides are conspicuous along some bedding planes. The bedrock is locally broken by small faults, shear zones, and closely spaced joint sets. A pattern of topographic lineaments discernible on aerial photographs may reflect unfavorable bedrock structures in the area. The igneous and interbedded clastic rocks are equivalent to a sequence of volcanic, sedimentary, and intrusive rocks of Eocene and Miocene age described by Warren, Norbisrath, and Grivetti (1945), Snavely and Vokes (1949), and Baldwin and Roberts (1952).

Section A-A'

Mudstone exposed in the river channel at section A-A' is overlain by a basalt flow (or sill?). The mudstone is well indurated and exhibits many slickensides along bedding planes. A thin bed of limestone crops out between beds of mudstone about 100 feet upstream from the line of section A-A'. Also exposed upstream from section A-A' are thin-bedded tuff, sandy tuffaceous siltstone, and underlying basalt. These foundation rocks appear to have been moderately warped and locally exhibit several joint sets spaced one or more feet apart. Basalt dikes near section A-A' are 2-7 feet wide and strike uniformly northwest. Prominent joint fractures and minor shear zones in basalt also trend northwest in the vicinity of locality 1 (pl. 3). Most of these rock fractures are vertical or dip steeply upstream. Section A-A' appears to coincide

roughly with the axis of a minor flexure at river level. The foundation rocks at section A-A' appear to be slightly downthrown relative to beds west of the dikes. Topographic lineations shown on plate 3 may represent concealed fracture zones or faults. Scattered outcrops elsewhere in the damsite area also include locally zeolitized flow breccias, tuffaceous and fine-grained, locally glauconitic sandstone, tuffaceous claystone, and thick beds of shale. No outcrops were observed on the abutment slopes along section A-A', but massive ledges of basalt between beds of shale and sandstone crop out about 350 feet above the river east of section A-A' (locality 2, pl. 3).

The topography at section A-A' is well adapted to a high, broad-based dam structure, although relatively weak clastic rocks constitute part of the bedrock in both the foundation and abutments. These clastic rocks appear to be well compacted and are locally indurated, but they are generally thin-bedded and variable in composition and bearing power. The bulk of these clastic beds contain abundant fine, partly altered, tuffaceous material. Such rocks have little or no intergranular cementation, may undergo extensive disaggregation if exposed to water after drying, and when saturated may become plastic and deform under load (Meade, 1937). Argillaceous rocks in general, and hydrated or kaolinized volcanic tuff in particular, may also tend to disaggregate (Meade, 1937). Such interstratified beds will vary in bonding and permeability between bedding planes, with consequent lowered resistance to sliding between beds. Thin calcareous beds interstratified with mudstone indicate possible zones of solution, but are perhaps more objectionable as potential planes of slippage. The mudstone exposed at river level is probably impervious, but may fail and slide along bedding planes. The basaltic rocks themselves seem to be relatively impervious and competent foundation and abutment material, although their competency is reduced relative to the extent, frequency, and competency of the intercalated clastic strata, and in perhaps lesser degree by little-known structural conditions. Joints and shear planes appear tight and generally dip upstream, although some joints trend downstream and might provide zones of minor leakage. The basaltic dikes are nearly parallel to section A-A', and should form impervious or semi-impervious, subvertical plates in the foundation and abutment rocks. Bedding planes may dip as much as 20° toward the river on the north abutment, suggesting relatively weak bedrock and susceptibility to landsliding. No landslides were noted in the area shown on plate 3, but an extensive, deep-seated landslide is present just west of the damsite area about one-half mile southwest of section A-A' on the south side of the Nestucca River valley.

Section B-B'

An alternative damsite at section B-B' may be geologically superior to one at section A-A'. No intercalated clastic beds were observed in the foundation or abutment rocks there. Massive sills (?) of dark phaneritic gabbro or diorite with a fine- to medium-grained diabasic texture are exposed in the riverbed and on the north abutment up to the 450-foot contour, or higher. Some of the sill rock exhibits irregular columnar jointing, and is locally sheared and hydrothermally altered, but, in general, seems to be relatively impervious and competent rock on which to anchor a dam structure. There appears to be a discordant relationship between the rock sequence west of the quarry at locality 3 and the rocks in the area of section B-B'. Igneous intrusion and high-angle

normal faulting near locality 3 may have downthrown the rocks at section B-B' relative to those at section A-A'. Assuming a dam height to an altitude of 630 feet (p. 25), the crestline of a dam at site B-B' would be substantially shorter than at section A-A'. Less stripping and grouting might also be required at section B-B'.

Construction materials

Rock fill and riprap materials could be quarried in the damsite area. Alluvial soil horizons are developed along narrow valley bottoms a short distance above and below the damsite area. Larger areas of farmland have been developed on river terraces below Blaine. These terraces have 2 feet or more of topsoil and clayey subsoil overlying thick deposits of porous, unconsolidated sands, pebbles, cobbles, and boulders.

CLASSIFICATION AND WITHDRAWAL ORDERS, SUBSEQUENT ACTIONS, AND CONCLUSIONS

Geological Survey classifications in the Nestucca River basin are (1) power site reserves under the Act of June 25, 1910 (36 Stat. 847 as amended 37 Stat. 497), and (2) water power designations under the Act of June 9, 1916 (39 Stat. 218). Classifications by the Geological Survey to protect the water resource value of the land in the Nestucca basin began in 1917. The first of these were Power Site Reserves 659 and 662, and Water Power Designation 14, all approved on December 12, 1917. They were followed by Power Site Reserve 730 of February 19, 1920.

Under the Federal Power Act of June 10, 1920, as amended, Federal lands in a proposed project are automatically withdrawn when an application for a preliminary permit or license is filed. In the Nestucca River basin only two project withdrawals have been made: FPC Projects 1541 and 1690, of February 2, 1939, and May 20, 1940, respectively. Both withdrawals were for minor hydroelectric projects before electricity was generally available in the area.

Geological Survey classifications and Federal Power Commission withdrawals in the Nestucca basin are listed in this chapter. The land affected by such classification or withdrawal is identified, subsequent actions are summarized, and conclusions are given pertaining to the disposition of the land. Classifications affecting land which has potential for future water resource development will be retained and classifications affecting land now considered to have negligible value for future water resource development will be recommended for revocation. Fig. 18 shows the outstanding unduplicated Geological Survey classifications. Table 5 summarizes the status and recommended disposition of the classified and withdrawn lands in the Nestucca River basin.

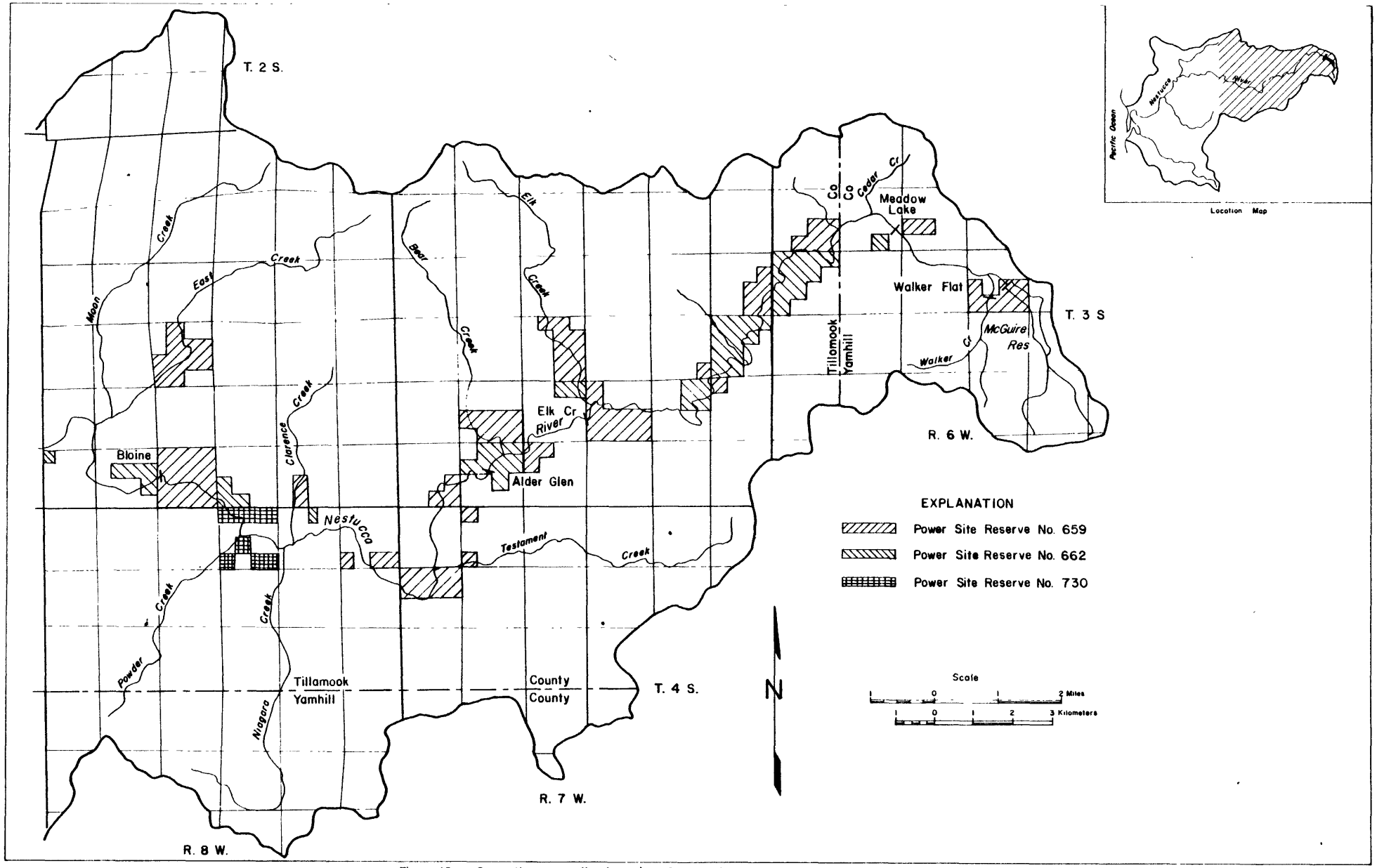


Figure 18 — Currently outstanding (1980) U.S. Geological Survey waterpower classifications.

Table 5.--Status and recommended disposition of classified and withdrawn lands, Nestucca River basin

Order No.[1]	ACRES				
	Originally classified or withdrawn	Subsequent revocations	Currently outstanding	To be retained	Recommended for revocation
Power Site Reserve 659	4,855.54	1,120.00	3,735.54	2,455.54	1,280.00
Power Site Reserve 662	3,082.85	1,294.63	1,788.22	823.32	964.90
Power Site Reserve 730	320.16	--	320.16	320.16	--
Water Power Designation 14[2]	5,175.70	1,200.00	3,975.70	2,695.70	1,280.00
U.S. Geological Survey totals			9,819.62	6,294.72	3,524.90
FPC Project 1541	0.19	--	0.19	--	0.19
FPC Project 1690	1.50	--	1.50	--	1.50
Federal Power Commission totals			1.69	--	1.69

1/ Pertains to only the acreage classified or withdrawn in the Nestucca River basin.

2/ Overlaps identical areas originally classified in Power Site Reserves 659 or 730.

Power Site Reserve 659

The following described lands, among others along western Oregon coast streams, were classified in Power Site Reserve 659, approved December 12, 1917. The public lands considered to be valuable for waterpower sites at that time lie along the main stem Nestucca River from its headwaters down to the vicinity of the town of Blaine and also up several tributaries within that reach. All of the land was also classified in Water Power Designation 14, approved the same date.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 6 W.,	sec. 7, SE¼SW¼ and SE¼;	200.00
	sec. 9, N½SW¼;	80.00
	sec. 15, W½SW¼, SE¼SW¼, and SE¼.	280.00
T. 3 S., R. 7 W.,	sec. 13, SE¼NE¼ and SE¼;	200.00
	sec. 19, E½E½;	160.00
	sec. 21, lots 2, 3, and 4, W½E½, and NE¼NW¼;	333.89
	sec. 23, SE¼SE¼;	40.00
	sec. 25, NW¼NW¼;	40.00
	sec. 27, W½NW¼ and S½;	400.00
	sec. 29, SW¼NE¼, NW¼, N½SW¼, SE¼SW¼, and SE¼;	480.00
	sec. 31, NE¼SE¼ and S½SE¼;	120.00
	sec. 33, N½NW¼ and SW¼NW¼.	120.00
T. 4 S., R. 7 W.,	sec. 5, lot 4 and SW¼SW¼;	80.49
	sec. 7, lots 1 and 2, NE¼, N½NW¼, and E½SE¼;	401.16
	sec. 17, N½NW¼.	80.00
T. 3 S., R. 8 W.,	sec. 9, N½N½, S½NW¼, N½SW¼, and SW¼SW¼;	360.00
	sec. 11, SW¼;	160.00
	sec. 21, S½NE¼, W½, and N½SE¼;	480.00
	sec. 33;	640.00
	sec. 35, E½SW¼.	80.00
T. 4 S., R. 8 W.,	sec. 1, SW¼SW¼ and S½SE¼.	120.00
	Total	4,855.54

Subsequent actions

Power Site Restoration, approved August 22, 1925, revoked Power Site Reserve 659 to the extent that it affected the following described lands having no value for powersite purposes and lying along several tributaries to the Nestucca River above Blaine.

Power Site Reserve 659 (continued)

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 7 W.,	sec. 19, E½E½;	160.00
	sec. 29, SW¼NE¼ and NW¼.	200.00
T. 4 S., R. 7 W.,	sec. 7, E½SE¼;	80.00
	sec. 17, N½NW¼.	80.00
T. 3 S., R. 8 W.,	sec. 9, N½N½, S½NW¼, N½SW¼, and SW¼SW¼;	360.00
	sec. 11, SW¼;	160.00
	sec. 21, W½NW¼.	80.00
	Total	1,120.00

The Federal Power Commission determined in DA-62-Oregon of January 28, 1926, that the waterpower value of the following described lands, among others, would not be injured or destroyed by location, entry, or selection under the provisions of the Federal Power Act. The determination arose from a request that said lands be opened to homestead entry.

Willamette Meridian, Oregon

T. 3 S., R. 6 W., sec. 7, SE¼SW¼, NW¼SE¼, and S½SE¼;
sec. 15, NW¼SW¼, S½SW¼, and SE¼.

T. 3 S., R. 7 W., sec. 13, SE¼NE¼ and SE¼;
sec. 21, lots 2, 3, and 4, W½NE¼, NE¼NW¼, and W½SE¼;
sec. 23, SE¼SE¼;
sec. 25, NW¼NW¼;
sec. 27, W½NW¼ and S½;
sec. 29, N½SW¼, SE¼SW¼, and SE¼;
sec. 31, NE¼SE¼ and S½SE¼;
sec. 33, N½NW¼ and SW¼NW¼.

T. 4 S., R. 7 W., sec. 5, lot 4 and SW¼SW¼;
sec. 7, lots 1 and 2, NE¼, and N½NW¼.

T. 3 S., R. 8 W., sec. 21, S½NE¼, E½NW¼, SW¼, and N½SE¼;
sec. 33;
sec. 35, E½SW¼.

T. 4 S., R. 8 W., sec. 1, SW¼SW¼ and S½SE¼.

In DA-319-Oregon of February 20, 1940, the Federal Power Commission determined that the waterpower value of the following described parcel would not be injured or destroyed if the land was restored to entry subject to the provisions

of Section 24 of the Federal Power Act. Accordingly, a formal order, Restoration 1047, was issued on March 29, 1940, opening the land to entry subject to Section 24 of the Federal Power Act.

Willamette Meridian, Oregon

T. 3 S., R. 6 W., sec. 9, NW¼SW¼.

Conclusions

The following described lands lie along Walker Creek and the upper Nestucca River. They protect the developed McGuire Reservoir and portions of the Walker Flat and Meadows Lake damsites and will be retained in their present status.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 6 W., sec. 9, NW¼SW¼;	40.00
sec. 15, W½SW¼, SE¼SW¼, and SE¼.	280.00
Total	320.00

The following described lands lie along the Nestucca River below Meadow Lake damsite in a narrow reach suitable for development only by conduit and diversion methods and offer no potential storage sites. Power Site Reserve 659 will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 6 W., sec. 7, SE¼SW¼ and SE¼;	200.00
sec. 9, NE¼SW¼.	40.00
T. 3 S., R. 7 W., sec. 13, SE¼NE¼ and SE¼.	200.00
Total	440.00

The following described lands lie along the Nestucca River and several tributaries between the potential Meadow Lake powerhouse site and Alder Glen damsite. This reach offers storage possibilities at the Elk Creek and Alder Glen reservoir sites and the lands will therefore be retained in their present status.

Power Site Reserve 659 (continued)

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 7 W., sec. 21, lots 2, 3, and 4, SW¼NE¼, and NW¼SE¼;	213.89
sec. 23, SE¼SE¼;	40.00
sec. 25, NW¼NW¼;	40.00
sec. 27, W½NW¼, N½S½, and SW¼SW¼;	280.00
sec. 29, N½SW¼, SE¼SW¼, and SE¼;	280.00
sec. 33, N½NW¼ and SW¼NW¼.	120.00
Total	973.89

The following described lands lie along the Nestucca River within the potential Blaine reservoir site, and will be retained in their present status to protect the water resource value of the land.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 7 W., sec. 31, NE¼SE¼ and S½SE¼.	120.00
T. 4 S., R. 7 W., sec. 5, lot 4 and SW¼SW¼;	80.49
sec. 7, lots 1 and 2, NE¼, and N½NW¼.	321.16
T. 3 S., R. 8 W., sec. 33, S½N½ and S½;	480.00
sec. 35, E½SW¼.	80.00
T. 4 S., R. 8 W., sec. 1, SW¼SW¼ and SW¼SE¼.	80.00
Total	1,161.65

The following described lands lie above potential altitudes of storage sites on the reaches of the Nestucca River between the Meadow Lake powerhouse site and Blaine damsite. As the water resource value of the land is negligible, Power Site Reserve 659 will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 7 W., sec. 21, NW¼NE¼, NE¼NW¼, and SW¼SE¼;	120.00
sec. 27, SE¼SW¼ and S½SE¼.	120.00
T. 3 S., R. 8 W., sec. 33, N½N½.	160.00
T. 4 S., R. 8 W., sec. 1, SE¼SE¼.	40.00
Total	440.00

Power Site Reserve 659 (continued)

The following described land lies along East Creek, 1 to 2 miles northeast of the town of Blaine. Inasmuch as the land has negligible value for water resource development, the classification will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

	Acres
T. 3 S.. R. 8 W., sec. 21, $S\frac{1}{2}NE\frac{1}{4}$, $E\frac{1}{2}NW\frac{1}{4}$, $N\frac{1}{2}S\frac{1}{2}$, and $S\frac{1}{2}SW\frac{1}{4}$.	400.00
Total	400.00

Power Site Reserve 662

The following described lands, among others along western Oregon coast streams, were classified in Power Site Reserve 662, approved December 12, 1917. At that time, the public lands were considered valuable for potential waterpower sites. They generally lie along the main stem Nestucca River from Meadow Lake damsite downstream to the vicinity of the town of Blaine.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 6 W.,	sec. 8, $SW\frac{1}{4}SE\frac{1}{4}$;	40.00
	sec. 18, lots 1 to 4, inclusive, $N\frac{1}{2}NE\frac{1}{4}$, $SW\frac{1}{4}NE\frac{1}{4}$, $E\frac{1}{2}NW\frac{1}{4}$, and $NE\frac{1}{4}SW\frac{1}{4}$.	427.88
T. 3 S., R. 7 W.,	sec. 18, $NE\frac{1}{4}SW\frac{1}{4}$;	40.00
	sec. 20, $W\frac{1}{2}W\frac{1}{2}$;	160.00
	sec. 24, $N\frac{1}{2}NE\frac{1}{4}$, $SW\frac{1}{4}NE\frac{1}{4}$, and $W\frac{1}{2}$;	440.00
	sec. 26, $NE\frac{1}{4}$, $NE\frac{1}{4}NW\frac{1}{4}$, $S\frac{1}{2}NW\frac{1}{4}$, $N\frac{1}{2}SW\frac{1}{4}$, and $SW\frac{1}{4}SW\frac{1}{4}$;	400.00
	sec. 28, lots 1 to 4, inclusive, $NW\frac{1}{4}NE\frac{1}{4}$, and $SW\frac{1}{4}SE\frac{1}{4}$;	248.00
	sec. 30, $NE\frac{1}{4}NE\frac{1}{4}$;	40.00
	sec. 32, $NE\frac{1}{4}$, $NE\frac{1}{4}NW\frac{1}{4}$, $S\frac{1}{2}NW\frac{1}{4}$, $N\frac{1}{2}SW\frac{1}{4}$, $SW\frac{1}{4}SW\frac{1}{4}$, and $NW\frac{1}{4}SE\frac{1}{4}$.	440.00
T. 4 S., R. 7 W.,	sec. 6, $SE\frac{1}{4}SW\frac{1}{4}$ and $E\frac{1}{2}SE\frac{1}{4}$;	120.00
	sec. 8, $SW\frac{1}{4}SW\frac{1}{4}$;	40.00
	sec. 18, $SE\frac{1}{4}NE\frac{1}{4}$.	40.00
T. 3 S., R. 8 W.,	sec. 8, $NE\frac{1}{4}SE\frac{1}{4}$;	40.00
	sec. 14, $N\frac{1}{2}NW\frac{1}{4}$;	80.00
	sec. 29, $SW\frac{1}{4}SW\frac{1}{4}$;	40.00
	sec. 31, lot 1;	17.02
	sec. 32, $S\frac{1}{2}NE\frac{1}{4}$, $NW\frac{1}{4}NW\frac{1}{4}$, $SE\frac{1}{4}NW\frac{1}{4}$, and $NE\frac{1}{4}SE\frac{1}{4}$;	200.00
	sec. 34, $W\frac{1}{2}SW\frac{1}{4}$ and $SE\frac{1}{4}SW\frac{1}{4}$.	120.00

		Acres
T. 4 S., R. 8 W., sec. 2,	lots 1 and 5, SE¼NW¼, N½N½NE¼SW¼, NE¼NW¼SE¼, N½NW¼NW¼SE¼, N½NE¼SE¼, and N½SE¼NE¼SE¼.	149.95
	Total	3,082.85

Subsequent actions

Power Site Restoration 400, approved August 22, 1925, revoked Power Site Reserve 662 to the extent that it affected the following described lands lying along the Nestucca River and its tributaries above the town of Blaine. These lands were considered to be no longer valuable for powersite purposes or had passed to patent making the classification invalid.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 7 W.,	sec. 18, NE¼SW¼;	40.00
	sec. 20, W½W½;	160.00
	sec. 26, NE¼NW¼ and S½NW¼;	120.00
	sec. 30, NE¼NE¼;	40.00
	sec. 32, N½SW¼ and SW¼SW¼.	120.00
T. 4 S., R. 7 W.,	sec. 6, SE¼SW¼ and E½SE¼;	120.00
	sec. 8, SW¼SW¼;	40.00
	sec. 18, SE¼NE¼.	40.00
T. 3 S., R. 8 W.,	sec. 8, NE¼SE¼;	40.00
	sec. 14, N½NW¼;	80.00
	sec. 29, SW¼SW¼;	40.00
	sec. 32, NW¼NW¼.	40.00
T. 4 S., R. 8 W.,	sec. 2, lot 1, SE¼NW¼, N½N½NE¼SW¼, NE¼NW¼SE¼, N½NW¼NW¼SE¼, N½NE¼SE¼, and N½SE¼NE¼SE¼.	129.98
	Total	1,009.98

Power Site Restoration 439, approved June 20, 1930, revoked Power Site Reserve 662 to the extent that it affected the following described lands lying along the upper Nestucca River, a few miles downstream from the potential Meadow Lake powerhouse site. These lands had passed to patent, being embraced in claims initiated prior to classification or pursuant to express provisions of law.

Power Site Reserve 662 (continued)

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 7 W.,	sec. 26, N½SW¼ and SW¼SW¼;	120.00
	sec. 28, lots 2, 3, and 4, and SW¼SE¼.	164.65
	Total	284.65

In DA-229-Oregon of March 28, 1932, the Federal Power Commission determined that the value of the following described land would not be injured or destroyed for purposes of power development by location, entry, or selection under the provisions of the Federal Power Act. A formal order, Restoration 629, issued on April 19, 1932, opened the land to entry subject to Section 24 of the Federal Power Act.

Willamette Meridian, Oregon

T. 3 S., R. 7 W., sec. 32, NE¼.

Conclusions

The following described lands lie generally along the Nestucca River downstream from the potential Meadow Lake damsite in a narrow reach not suitable for storage or power development, except by conduit and diversion methods. Power Site Reserve 662 will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 6 W.,	sec. 8, SW¼SE¼;	40.00
	sec. 18, lots 1 to 4, inclusive, N½NE¼, SW¼NE¼, E½NW¼, and NE¼SW¼.	427.88
T. 3 S., R. 7 W.,	sec. 24, N½NE¼, SW¼NE¼, and W½.	440.00
	Total	907.88

The following described lands lie near or adjacent to the Nestucca River and downstream from the potential Meadow Lake powerhouse site in a reach which offers storage at the Elk Creek and Alder Glen reservoir sites. For this reason, the lands will be retained in their present atatus.

Power Site Reserve 662 (continued)

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 7 W.,	sec. 26, NE¼;	160.00
	sec. 28, lot 1 and NW¼NE¼;	83.35
	sec. 32, NE¼, NE¼NW¼, S½NW¼, and NW¼SE¼.	320.00
	Total	563.35

The following described lands lie along the Nestucca River within the potential Blaine reservoir site, and will be retained in their present status to protect the water resource value of the land.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 8 W.,	sec. 32, S½NE¼ and NE¼SE¼;	120.00
	sec. 34, W½SW¼ and SE¼SW¼.	120.00
T. 4 S., R. 8 W.,	sec. 2, lot 5.	19.97
	Total	259.97

The following described lands lie along the Nestucca River downstream from the potential Blaine damsite. As the water resource value of the land is negligible, Power Site Reserve 662 will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 8 W.,	sec. 31, lot 1;	17.02
	sec. 32, SE¼NW¼.	40.00
	Total	57.02

Power Site Reserve 730

Power Site Reserve 730, approved February 19, 1920, affected lands with powersite value along many streams of western Oregon. The following described lands included in Power Site Reserve 730 lie near or adjacent to the Nestucca River 1 to 2 miles upstream from the potential Blaine damsite. All of the land was also classified in Water Power Designation 14, approved the same date.

Power Site Reserve 730 (continued)

Willamette Meridian, Oregon

	Acres
T. 4 S., R. 8 W., sec. 3, lots 1 to 4, inclusive, NE¼SW¼, SW¼SW¼, and S½SE¼.	320.16
Total	320.16

Subsequent actions

The Federal Power Commission determined in DA-62-Oregon of January 28, 1926, that the waterpower value of the following described lands, among others, would not be injured or destroyed by location, entry, or selection under the provisions of the Federal Power Act. The determination arose from a request that said lands be opened to homestead entry.

Willamette Meridian, Oregon

T. 4 S., R. 8 W., sec. 3, lots 1 to 4, inclusive, NE¼SW¼, SW¼SW¼, and S½SE¼.

Conclusions

All the Nestucca River basin lands classified by Power Site Reserve 730 lie within the potential Blaine reservoir site on the Nestucca River. They will be retained in their present status to protect the water resource value of the land and are described as follows:

Willamette Meridian, Oregon

	Acres
T. 4 S., R. 8 W., sec. 3, lots 1 to 4, inclusive, NE¼SW¼, SW¼SW¼, and S½SE¼.	320.16
Total	320.16

Water Power Designation 14

The following described lands, among others along western Oregon streams, were classified in Water Power Designation 14, approved December 12, 1917. These public lands were revested Oregon and California Railroad Grant lands and were considered to be valuable for waterpower sites at that time. They lie along the main stem Nestucca River from its headwaters down to the vicinity of the town of Blaine and also up several tributaries within that reach. The lands are also classified in Power Site Reserves 659 or 730, described previously.

Water Power Designation 14 (continued)

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 6 W.,	sec. 7, SE¼SW¼ and SE¼;	200.00
	sec. 9, N½SW¼;	80.00
	sec. 15, W½SW¼, SE¼SW¼, and SE¼.	280.00
T. 3 S., R. 7 W.,	sec. 13, SE¼NE¼ and SE¼;	200.00
	sec. 19, E½E½;	160.00
	sec. 21, lots 2, 3, and 4, W½E½, and NE¼NW¼;	333.89
	sec. 23, SE¼SE¼;	40.00
	sec. 25, NW¼NW¼;	40.00
	sec. 27, W½NW¼ and S½;	400.00
	sec. 29, SW¼NE¼, NW¼, N½SW¼, SE¼SW¼, and SE¼;	480.00
	sec. 31, NE¼SE¼ and S½SE¼;	120.00
	sec. 33, N½NW¼ and SW¼NW¼.	120.00
T. 4 S., R. 7 W.,	sec. 5, lot 4 and SW¼SW¼;	80.49
	sec. 7, lots 1 and 2, NE¼, N½NW¼, and E½SE¼;	401.16
	sec. 17, N½NW¼.	80.00
T. 3 S., R. 8 W.,	sec. 9, N½N½, S½NW¼, N½SW¼, and SW¼SW¼;	360.00
	sec. 11, SW¼;	160.00
	sec. 21, S½NE¼, W½, and N½SE¼;	480.00
	sec. 33;	640.00
	sec. 35, E½SW¼.	80.00
T. 4 S., R. 8 W.,	sec. 1, SW¼SW¼ and S½SE¼;	120.00
	sec. 3, lots 1 to 4, inclusive, NE¼SW¼, SW¼SW¼, and S½SE¼.	320.16
	Total	5,175.70

Subsequent actions

Power Site Cancellation 9, approved October 3, 1925, revoked Water Power Designation 14 to the extent that it affected the following described lands lying along several tributaries to the Nestucca River above Blaine that were not valuable for powersite purposes.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 7 W.,	sec. 19, E½E½;	160.00
	sec. 29, SW¼NE¼ and NW¼.	200.00

Water Power Designation 14 (continued)

Willamette Meridian, Oregon

		Acres
T. 4 S., R. 7 W.,	sec. 7, E½SE¼;	80.00
	sec. 17, N½NW¼.	80.00
T. 3 S., R. 8 W.,	sec. 9, N½N½, S½NW¼, N½SW¼, and SW¼SW¼;	360.00
	sec. 11, SW¼;	160.00
	sec. 21, W½NW¼;	80.00
	sec. 35, E½SW¼.	80.00
	Total	1,200.00

The Federal Power Commission determined in DA-62-Oregon of January 28, 1926, that the waterpower value of the following described lands, among others, would not be injured or destroyed by location, entry, or selection under the provisions of the Federal Power Act. The determination arose from a request that said lands be opened to homestead entry.

Willamette Meridian, Oregon

T. 3 S., R. 6 W., sec. 7, SE¼SW¼, NW¼SE¼, and S½SE¼;
sec. 15, NW¼SW¼, S½SW¼, and SE¼.

T. 3 S., R. 7 W., sec. 13, SE¼NE¼ and SE¼;
sec. 21, lots 2, 3, and 4, W½NE¼, NE¼NW¼, and W½SE¼;
sec. 23, SE¼SE¼;
sec. 25, NW¼NW¼;
sec. 27, W½NW¼ and S½;
sec. 29, N½SW¼, SE¼SW¼, and SE¼;
sec. 31, NE¼SE¼ and S½SE¼;
sec. 33, N½NW¼ and SW¼NW¼.

T. 4 S., R. 7 W., sec. 5, lot 4 and SW¼SW¼;
sec. 7, lots 1 and 2, NE¼, and N½NW¼.

T. 3 S., R. 8 W., sec. 21, S½NE¼, E½NW¼, SW¼, and N½SE¼;
sec. 33.

T. 4 S., R. 8 W., sec. 1, SW¼SW¼ and S½SE¼;
sec. 3, lots 1 to 4, inclusive, NE¼SW¼, SW¼SW¼, and S½SE¼.

In DA-319-Oregon of February 20, 1940, the Federal Power Commission determined that the waterpower value of the following described parcel would not be injured or destroyed if the land was restored to entry subject to the provisions of Section 24 of the Federal Power Act. Accordingly, a formal order, Restoration 1047, was issued on March 29, 1940, opening the land to entry subject to Section 24 of the Federal Power Act.

Water Power Designation 14 (continued)

Willamette Meridian, Oregon

T. 3 S., R. 6 W., sec. 9, NW¼SW¼.

Conclusions

The following described lands lie along Walker Creek and the upper Nestucca River. They protect the developed McGuire Reservoir and portions of the Walker Flat and Meadow Lake damsites and will be retained in their present status.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 6 W.,	sec. 9, NW¼SW¼;	40.00
	sec. 15, W½SW¼, SE¼SW¼, and SE¼.	280.00
	Total	320.00

The following described lands lie along the Nestucca River below Meadow Lake damsite in a narrow reach suitable for development only by conduit and diversion methods and offer no potential storage sites. Water Power Designation 14 will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 6 W.,	sec. 7, SE¼SW¼ and SE¼;	200.00
	sec. 9, NE¼SW¼.	40.00
T. 3 S., R. 7 W.,	sec. 13, SE¼NE¼ and SE¼.	200.00
	Total	440.00

The following described lands lie along the Nestucca River and several tributaries between the potential Meadow Lake powerhouse site and Alder Glen damsite. This reach offers storage possibilities at the Elk Creek and Alder Glen reservoir sites and the lands will therefore be retained in their present status.

Willamette Meridian, Oregon

		Acres
T. 3 S., R. 7 W.,	sec. 21, lots 2, 3, and 4, SW¼NE¼, and NW¼SE¼;	213.89
	sec. 23, SE¼SE¼;	40.00
	sec. 25, NW¼NW¼;	40.00
	sec. 27, W½NW¼, N½S½, and SW¼SW¼;	280.00
	sec. 29, N½SW¼, SE¼SW¼, and SE¼;	280.00
	sec. 33, N½NW¼ and SW¼NW¼.	120.00
	Total	973.89

Water Power Designation 14 (continued)

The following described lands lie along the Nestucca River within the potential Blaine reservoir site, and will be retained in their present status to protect the water resource value of the land.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 7 W., sec. 31, NE¼SE¼ and S½SE¼.	120.00
T. 4 S., R. 7 W., sec. 5, lot 4 and SW¼SW¼;	80.49
sec. 7, lots 1 and 2, NE¼, and N½NW¼.	321.16
T. 3 S., R. 8 W., sec. 33, S½N½ and S½.	480.00
T. 4 S., R. 8 W., sec. 1, SW¼SW¼ and SW¼SE¼;	80.00
sec. 3, lots 1 to 4, inclusive, NE¼SW¼, SW¼SW¼, and S½SE¼.	320.16
Total	1,401.81

The following described lands lie above potential development altitudes of storage sites on the reaches of the Nestucca River between the Meadow Lake powerhouse site and Blaine damsite. As the water resource value of the land is negligible, Water Power Designation 14 will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 7 W., sec. 21, NW¼NE¼, NE¼NW¼, and SW¼SE¼;	120.00
sec. 27, SE¼SW¼ and S½SE¼.	120.00
T. 3 S., R. 8 W., sec. 33, N½N½.	160.00
T. 4 S., R. 8 W., sec. 1, SE¼SE¼.	40.00
Total	440.00

The following described land lies along East Creek, 1 to 2 miles northeast of the town of Blaine. Inasmuch as the land has negligible value for water resource development, the classification will be revoked to the extent that it affects this land.

Willamette Meridian, Oregon

	Acres
T. 3 S., R. 8 W., sec. 21, S½NE¼, E½NW¼, N½S½, and S½SW¼.	400.00
Total	400.00

Federal Power Commission Project 1541

On February 2, 1939, a completed application was filed by Mrs. Ernestine Aufdermauer, Hebo, Oregon, with the Federal Power Commission for a license to operate a minor hydroelectric project affecting lands of the United States in the Siuslaw National Forest on Buck Creek, a small tributary in the Three Rivers drainage.

The project consisted of a low diversion dam on Buck Creek in SW¼SW¼SE¼ sec. 9, T. 5 S., R. 9 W., and a wooden flume and steel penstock leading to a powerhouse in NW¼SE¼SW¼ of the same section. The small amount of power generated was used to light the Aufdermauer ranch, before public utilities supplied electricity to the area.

The area reserved by the filing of the application is described as follows:

Willamette Meridian, Oregon

All portions of the following described subdivision lying within 10 feet of the centerline of the proposed wood flume and dam locations as shown on a map designated "Exhibit F" and entitled "Hydroelectric Power Project of Mrs. E. Aufdermauer, Hebo, Ore.", and filed in the office of the Federal Power Commission on January 30, 1939;

	Acres
T. 5 S., R. 9 W., sec. 9, SW¼SE¼.	0.19
Total	0.19

Subsequent actions

The project license expired on September 30, 1947, and no renewal was applied for.

Conclusions

The project area was inspected by the USGS in late September 1972. The current resident stated that only portions of the wooden flume remained and the project was unusable.

Power has been supplied to the area for many years by the Tillamook Peoples Utility District. Inasmuch as the project is no longer used nor needed, it is recommended that FPC Project 1541 be vacated in its entirety.

Federal Power Commission Project 1690

An application was filed with the Federal Power Commission on May 20, 1940, by William W. Hamilton, Castle Rock Lodge, Hebo, Oregon, for a hydroelectric power project on Three Rivers, in the Siuslaw National Forest.

Federal Power Commission Project 1690 (continued)

The pruject was to be used for domestic purposes and consisted of (1) a low wood dam 130 feet long on Three Rivers in the NE¼SW¼, sec. 32, T. 4 S., R. 9 W., forming a pond with a surface area of about 1.25 acres; (2) a flume 384 feet long and 20 feet wide from the dam to a waterwheel in the NW¼SW¼, sec. 32, T. 4 S., R. 9 W.; and (3) a transmission line 428 feet long from the waterwheel to Castle Rock tourist camp store.

The area reserved by the filed application is described as follows.

Willamette Meridian, Oregon

All portions of the following described subdivisions lying (1) parallel to and 10 feet distant on either side of the centerline of the flume and transmission line locations, and extending 10 feet beyond the waterwheel center; (2) parallel to and 10 feet distant from the dam centerline; and (3) parallel to and 5 feet distant from the maximum flow line of the pond, all as shown on revised map designated "Exhibit F" and entitled "Hydroelectric Power Project of W. W. Hamilton - Castle Rock Camp, Ore.", and filed in the office of the Federal Power Commission on May 20, 1940:

	Acres
T. 4 S., R. 9 W., sec. 32, N½SW¼.	1.50
Total	1.50

Subsequent actions

On December 11, 1947, the Federal Power Commission accepted the requests of William W. Hamilton (past owner) and Mrs. Bessie N. Davis (owner at that time) for the surrender of the license for FPC Project 1690.

Conclusions

When the USGS inspected the project site during September 1972, no visible signs of the project structures remained. Inasmuch as the license has been surrendered and power is available in the area from Tillamook Peoples Utility District, it is recommended that FPC Project 1690 be vacated in its entirety.

MAP COVERAGE OF THE NESTUCCA RIVER BASIN

Numerous maps covering all or part of the Nestucca River basin in various scales have been prepared by various agencies. Copies of those listed below may be inspected at the USGS, Conservation Division office in Portland.

A State of Oregon, Water Resources Department planimetric map of the North Coast drainage basin, File No. 1.6, 1972, is available from that agency. A planimetric map of the Siuslaw National Forest may be obtained from the Forest Service, U.S. Department of Agriculture. The Portland sheet of the sectional aeronautical chart series, scale 1:500,000 and contour interval of 1,000 feet, may be purchased from the National Ocean Survey, U.S. Department of Commerce.

Five USGS topographic 15-minute quadrangle maps, scale 1:62,500, together cover the basin: Tillamook, Blaine, Fairdale, Hebo, and Grand Ronde; all are 1955 editions and have 80-foot contour intervals.

Several special damsite and river survey sheets mapped and published by the USGS cover the Nestucca River above the town of Hebo: (1) 1955 plan and profile survey (scale 1:24,000) of the Nestucca River and tributaries for 23 miles above Hebo, from about river miles 12 to 35, (The Blaine reservoir site (p. 25) is included in this reach and the damsite itself is shown mapped at a 1:4,800 scale.); (2) 1969 plan map of the Nestucca River upstream for another 8 miles at a scale of 1:12,000 and including the Alder Glen reservoir site (p. 19) to an altitude of 1,200 feet, (Sheet 2 shows the map (scale 1:4,800) of Alder Glen damsite and the Bald Mountain pumped storage upper reservoir site (p. 23)); and (3) the 1970 map (scale 1:2,400) of Walker Creek damsite (p. 18) on the Nestucca River below Walker Creek.

Several USGS small-scale maps show the basin: (1) Vancouver 1^{o} by 2^{o} quadrangle, scale 1:250,000, contour interval 200 feet; (2) base map of Oregon, scale 1:500,000, contour interval 500 feet; and (3) Cascade Range sheet (NL-10) of the International Map of the World series, scale 1:1,000,000, contour interval 100 meters.

The above-mentioned USGS maps may be purchased from the Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225.

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