CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DIVISION ENGINEER
NORTH PACIFIC DIVISION
210 Custom House
Portland 9, Oregon

9 June 1956

NOTICE OF PUBLIC HEARINGS
ON
COLUMBIA RIVER AND TRIBUTARIES

Pursuant to resolution adopted 28 July 1955 by the Committee on Public Works of the United States Senate, the Division Engineer has been directed to review the report on Columbia River and tributaries published as House Document No. 531, 81st Congress, 2d Session. For your information the resolution reads as follows:

"Resolved by the Committee on Public Works of the United States Senate That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report on the Columbia River and Tributaries published as House Document Numbered 531, Eighty-first Congress, Second Session, and other reports, with a view to determining the advisability of modifying the existing project in any way at this time particularly with regard to present requirements of flood control including consideration of flood storage in Canada; the present needs of navigation; a restudy of hydroelectric power potentialities as a part of a combined hydro-thermal system; and consideration of all related water uses."

In order that the report may fully cover the matter, Public Hearings will be held by the respective District Engineers as follows:

Date	Time	Location	Hearing to be Conducted by
9 July 1956	9:00 AM	Bitterroot Room Florence Hotel Missoula, Montana	District Engineer, Seattle District
10 July 1956	9:00 AM	Chamber of Commerce Auditorium 1020 West Riverside Spokane, Washington	District Engineer, Seattle District

Date	Time	Location	Hearing to be Conducted by
11 July 1956	9:00 AM	Ball Room Lewis and Clark Hotel Lewiston, Idaho	District Engineer, Walla Walla District
12 July 1956	9:00 AM	Crystal Ball Room Boise Hotel Boise, Idaho	District Engineer, Walla Walla District
13 July 1956	9:00 AM	Auditorium Interior Building 1101 N. E. Lloyd Blvd. Portland, Oregon	District Engineer, Portland District

A description of the existing project for Columbia River and Tributaries, as well as a resume of the water resource problems and potential solutions to these problems are contained in the attached bulletin for your advance information and consideration. Additional information on the various projects under consideration will be presented at the public hearings. Advance information on any specific project or group of projects may be obtained from the appropriate District Engineer.

This series of hearings is being held in the early stages of the review study to permit the Corps of Engineers to obtain suggestions and comments from those interested in resource development in order that full consideration can be given to these views in the formulation of a feasible and acceptable plan of development. It is planned to hold additional hearings in 1957 after specific proposals have been developed. All interested parties are invited to be present or represented at one of the above listed hearings. Full opportunity will be afforded for the expression of views concerning the need for further water resource development in the basin and general plans of improvement desired.

Oral statements will be heard but for accuracy of record all important facts and arguments should be submitted in writing, in quadruplicate. Written statements may be handed to the District Engineer conducting the public hearing or be mailed to him beforehand. Those wishing to present oral testimony should notify the District Engineer in charge preferably in advance of the meeting. In order to permit maximum participation, it is desired that each presentation from the floor not exceed ten minutes. Time will be allowed for answering questions from the floor.

For your information the addresses of the District Engineers are as follows:

District Engineer
Seattle District
Corps of Engineers
4735 East Marginal Way
Seattle 4, Washington

District Engineer
Walla Walla District
Corps of Engineers
Building 602, City-County Airport
Walla Walla, Washington

District Engineer
Portland District
Corps of Engineers
628 Pittock Block
Portland 5, Oregon

Please bring the foregoing to the attention of persons known to you to be interested in the matter.

L. H. FOOTE
Brigadier General, USA
Division Engineer

1 Incl
Bulletin

INFORMATION BULLETIN ON A STUDY OF WATER RESOURCE DEVELOPMENT OF THE COLUMBIA RIVER BASIN

This bulletin outlines the objectives of the restudy being conducted by the Corps of Engineers, U. S. Army, of its 1948 "308 Review Report" on the Columbia River (published as H. D. 531, 81st Congress, 2d Session), and outlines some of the possibilities being considered to achieve a fuller development of the basin's resources.

Detailed project studies and field investigations by the Corps of Engineers are being conducted by the respective District Engineers. The Seattle District Area includes that portion of the Columbia River Basin above the head of the McNary pool near Richland, Washington. The Walla Walla District encompasses the Snake River Basin and that portion of the Columbia between the head of The Dalles pool near the mouth of John Day River to the head of McNary pool. The Portland District has jurisdiction over the balance of the Columbia River Basin, including the Willamette River Basin.

The Corps of Engineers is receiving assistance in this study as follows:

Project investigations in the Clark Fork and Upper Snake River areas and irrigation studies --	Bureau of Reclamation
Power load growth studies --	Federal Power Commission and Bonneville Power Administration
Power transmission studies and transmission costs --	Bonneville Power Administration
Evaluation of effects of water resource development projects on the fish and wildlife resource --	U.S. Fish and Wildlife Service and State Fish and Game Agencies
Evaluation of effects of water resource development projects on forest access and management facilities --	U. S. Forest Service
Appraisal of recreation values --	National Park Service, the Forest Service and fish and wildlife agencies
Requirements of future water supply and sanitation --	Department of Health, Education and Welfare

Advisory committees composed of representatives of five Northwest states, Federal agencies, private and public power concerns and navigation interests have been established to review and advise on the studies as they progress.

A consulting board of four nationally recognized engineers has been formed to assist the Corps of Engineers, principally in the review of power problems.

The principal objectives of this review.

1. Flood Control. - To formulate an acceptable and effective plan for control of main river floods, giving full consideration to control of floods in upper river flood zones in the selection of reservoir projects.

2. Navigation. - To investigate the need for improvement and extension of inland navigation systems.

3. Hydroelectric Power. - To investigate the future power needs of the Northwest area and to analyze major undeveloped hydroelectric resources. To investigate the economics and operating characteristics of hydroelectric developments in a future combined large hydro and thermo electric generating system.

4. Columbia River Basin in Canada. - To study the effects of potential developments in the Canadian portion of basin on developments and needs in the United States and to study the cost and benefit relations as factual groundwork for negotiation between the United States and Canada in the interest of coordinated development of the resources.

5. Related Water Resource Interests. - In analyzing the foregoing main basin problems, to consider the need and possibility of conjunctive development for irrigation, pollution abatement, domestic and industrial water supply needs, fish and wildlife improvement and recreation development.

The "Main Control Plan" of the 1948 Review Report. - The Columbia River 308 report prepared in 1948 presented a comprehensive plan of water resource development to meet the present and immediate future needs of the region and outlined a plan to meet later needs as the region expands. As a first step, the report proposed for immediate development a system of large multiple-purpose dams and reservoirs which when operated as a coordinated system in conjunction with levees along lower Columbia River and other locations in the basin would provide a high degree of flood control for all floods of record. The development of these reservoirs also would improve inland navigation and supply a large

quantity of hydroelectric power to help meet the growing loads of the region. This coordinated system of initial improvements was designated as the Main Control Plan. The major storage reservoirs included in that plan are shown on the attached map, Plate 1.

This Main Control Plan provided 27,000,000 acre-feet* of storage usable for power, flood control, and other uses. Of the total storage provided, approximately 21,000,000 acre-feet would be utilized in controlling a flood like that of 1894, (1,240,000 cubic feet per second) to a flow of 800,000 cubic feet per second at The Dalles and to control lesser floods to even lower discharges. Further storage development could provide additional control and a higher degree of protection.

The status of the major storage projects included in the Main Control Plan is summarized in the following tabulation:

FLOOD CONTROL STORAGE
(usable at site to control the 1894 flood)

	Main Control Plan (acre feet)	Present Outlook For Early Development (acre feet)
Existing		
Hungry Horse	2,100,000	
Grand Coulee	1,200,000	
Palisades	1,200,000 1/	
Payette and Boise Rivers	390,000	
Subtotal	4,890,000	4,890,000
Additional Proposed in H.D. 531		
Grand Coulee (Increase)	3,900,000	3,000,000 3/
Glacier View	1,800,000	- 4/
Libby	3,900,000	- 5/
Priest Rapids	2,100,000	500,000 6/
John Day	1,400,000 2/	500,000 7/
Garden Valley	300,000	- 8/
Hells Canyon	2,600,000	1,500,000 9/
Subtotal	16,000,000	5,500,000
Total	20,890,000	10,390,000

*An acre-foot of water storage is equal to one foot of water standing on one acre of land.

1/ Operable for storage in 1957.
2/ 2,000,000 acre-feet available for use as required.
3/ Full increase in storage to 3,900,000 acre-feet not effective until other major storage above Grand Coulee is developed.
4/ Specific recommendation of this project withheld because of objections to the project by recreation and wildlife interests.
5/ Authorized but construction delayed pending completion of negotiations with Canada.
6/ Two-dam plan of Public Utility District No. 2 of Grant County would provide approximately 500,000 acre-feet in lieu of 2,100,000 acre-feet contemplated in Main Control Plan.
7/ Authorized. Because of objections to surcharge storage feature of the project by local interests, recommendations for a modified project providing 500,000 acre-feet of storage will be submitted to Congress in near future.
8/ Not authorized.
9/ Not authorized. Plans of private power companies for development of Brownlee and Pleasant Valley would provide 1,500,000 acre-feet of storage.

New Investigations relating to Flood Control. - Because the "present outlook" visualizes the early attainment of only 50 percent of the storage development contemplated by the 1948 Main Control Plan, the review study will include an examination of other apparently feasible and economic storage developments in the basin. Table I attached to this bulletin lists the storage projects which have been considered. Those projects which appear to be worthy of more detailed investigation and appraisals are underlined in the tabulation. Two additional projects, the Bruces Eddy and Penny Cliffs projects on the Clearwater River, which would provide 3,730,000 acre-feet of usable storage, already have been studied in detail and have been recommended for construction in a report submitted to Congress on 1 June 1955. Further study of these projects will not be included in this review but the effects of their development will be evaluated in any revised "Main Control Plan" which may be derived from this study. The location of projects selected for further study are shown on Plate II. All of these reservoirs are so situated that they will provide flood control benefits in up-river damage areas as well as along the lower river. No projects are being considered at this time on Salmon River in Idaho because of the importance of that stream to the anadromous fishery resource.

This review study also will include a reexamination of the possibilities of extending and improving the lower river diking system in combination with alternative plans for up-river storage development. However, it is expected that any major extensions of levees or seawalls along developed water front areas will be confronted with practical and economic difficulties.

While not a part of the Main Control Plan for control of major Columbia River floods, the Willamette River Basin project will also be reviewed to determine the feasibility of providing additional protection to critical flocd damage areas along Willamette River and its major tributaries. Projects under study in that basin include Gate Creek Reservoir in the McKenzie River Basin and Wiley Creek and Cascadia Reservoirs in the South Santiam River Basin. Studies also will be made of channel improvements, supplemental levees and the feasibility of increasing the storage capacities of the existing Fern Ridge, Cottage Grove and Dorena Reservoirs.

New Investigations relating to Navigation. - The navigation project for Columbia River provides for a deep draft ship channel from the sea to Portland, Oregon and Vancouver, Washington; a channel of 27-foot depth from Vancouver to The Dalles, Oregon and thence slack water for barge transportation to Pasco, Washington and Lewiston, Idaho. The project also provides for barge transportation on Willamette River and for numerous side channels and turning basins along the lower Columbia River. While the slack water improvement above The Dalles is only partially complete, widespread use has been made of this transportation artery since completion of the Bonneville Lock in 1938. The growth of water-borne transportation since 1938 is illustrated by the following:

Year	Tonnage	
	Bonneville	The Dalles-Celilo Canal
1938	161,920	44,349
1940	707,444	325,900
1945	802,901	598,980
1950	1,143,901	834,303
1954	1,372,725	791,192

The review study will include a forecast of estimated future commerce on the Columbia-Snake slack-water navigation system above Bonneville, determination of the economic feasibility of extending slack-water navigation above Pasco, Washington and Lewiston, Idaho and consideration of the need for improving existing navigation facilities at Bonneville Dam for future barge traffic.

New Investigations relating to Power. - The demand for power in the Pacific Northwest has increased rapidly since 1935 and continued rapid growth is anticipated. Plate III depicts the results of a preliminary study of load growth between now and the year 2000 made by the Federal Power Commission. The prediction is in terms of firm energy requirements. Peak demands would be some 50 to 60 percent greater.

Preliminary estimates of the probable total development of hydroelectric power in the Northwest, based on practical and economic

limitations, are indicated on Plate III and amount to about 14,000,000 KW (firm energy resource) or double the approximately 7,000,000 KW obtainable from projects presently developed, under construction or under license for immediate development. It is apparent from this estimated total, as the chart indicates, that loads of the magnitude forecast for 1975 and beyond cannot be met by hydro resources alone. Eventually and not too far in the future, large amounts of thermal power must be integrated into the system. Accordingly, system power studies and project appraisals in the review study will be predicated on future operation of the hydro projects in a combined hydro-thermal system. Evaluation of the benefits of storage projects operating in a future large hydro-thermal system is an important objective of this review. The effect of nuclear power generation on the study of potential power resources to meet future loads will be considered to the limit that information on costs of future nuclear generation becomes available during the study period. One concept, developed by the Bonneville Power Administration, of the position of nuclear generation in future regional resources is indicated on Plate III.

Run-of-river projects on important tributaries also will be given some further analysis in the current investigation, but to a lesser extent than projects which will provide flood control and hydro power storage. Projects which may be included in this category are:

Name	Tributary
Kootenai Falls*	Kootenai River
Katka*	Kootenai River
Yaak Falls	Yaak River
Yaak Canyon	Yaak River
McNamara	Clark Fork River
Bonner	Clark Fork River
Plateau	Clark Fork River
Quartz*	Clark Fork River
Quinn*	Clark Fork River
Eddy	Clark Fork River
Coram	Flathead River
Clarkston*	Snake River
Asotin*	Snake River
China Gardens	Snake River
6 possible low head projects on	Clearwater River

*These projects are shown on Plate 2.

Development of the storage projects underlined in Table I and Bruces Eddy and Penny Cliffs; the above indicated additional run-of-river projects; and expansion of the existing, under construction and planned

downstream power plants made possible by the resulting upstream control will provide an increase in system firm energy resource in the general magnitude of 5 to 6 million KW. The remainder of the 14 million KW of firm energy resource indicated above as a probable total hydroelectric development for the Pacific Northwest would be obtained as a result of possible Canadian storages, construction of the Libby project and other smaller tributary developments which eventually may be constructed at a cost less than steam.

Studies of other Water Uses. - Storage provided for flood control and power generation can also be used for irrigating new lands or for supplementing the water supply for lands already under irrigation. This phase of the investigation is being closely coordinated with the Bureau of Reclamation which has primary responsibility for matters pertaining to irrigation.

In many instances, storage reservoirs will enhance the recreation potential of a given area. In general, project operation schedules will be such as to provide a full reservoir during all or a large portion of the summer recreation season. The lakes thus formed would offer opportunity for boating, swimming, fishing, camping, migratory waterfowl hunting in some instances, and other related water sports. Close collaboration is being maintained with the National Park Service and the U. S. Forest Service in the planning of recreational and public use facilities to be provided at the reservoir projects.

Regulation afforded by storage reservoirs will increase the low water flow in the streams on which the reservoirs are located and thereby improve the quality and adequacy of water supply for domestic and industrial use, assist in pollution abatement and enhance the streams for fish life. Close collaboration in planning for such benefits is being maintained with the Department of Health, Education, and Welfare, the U. S. Fish and Wildlife Service and the State Fish and Game agencies. Studies also will be made to indicate the provisions or adjustments that may be required in project development in the interest of fish and wildlife culture.

Developments in Canada. - The Canadian Government is currently making studies to determine the best plan of water resource development for that portion of the Columbia River Basin in British Columbia. Until these studies have been completed, little concrete consideration can be given to the effect of Canadian developments on flood control and power production in the United States. The current review investigation is concerned with the plans for development in Canada which could result in benefits to the United States. The opportunity for exchange of basic engineering information and coordination with Canada is available through the work of the Engineering Committee of the International Joint Commission which is conducting international studies of mutual interest to both countries.

It is expected that the Canadian studies will be completed in time to permit a thorough analysis of the effects of proposed developments on projects in the United States in the forthcoming review report. Development of the Libby project with potential storage lying both in the United States and Canada is an important item contingent upon completion of the international studies.

Related Investigations. - Numerous authorities are available to the Corps of Engineers for investigation of flood control and related water use problems in specific local areas throughout the Columbia Basin. Of primary importance among these are the Upper Snake River above Weiser, Idaho and Kootenai River (Kootenai Flats Area), Idaho investigations. The problems in these areas will not be included in this review study but will be covered by separate investigations and reports.

TABLE I

POTENTIAL STORAGE PROJECTS

Project	Location	Usable Storage (Acre-feet)	Remarks
KOOTENAI RIVER BASIN:			
Long Meadows	Mile 30, Yaak R.	450,000	
Meadow Creek	Mile 11, Moyie R.	320,000	Discontinued. Project entirely within U.S. of doubtful economic value.
CLARK FORK RIVER BASIN:			
Atkins	Mile 43, Rock Cr.	140,000	Discontinued because of high cost and interference with valuable sports fishery.
Ovando	Mile 47-52 Blackfoot River	310,000	Discontinued. Ninemile Prairie more beneficial project
Ninemile Prairie	Mile 22, Blackfoot R.	960,000	
Smoky Range	Mile 167, N.F. Flathead River	1,500,000	Further study dependent upon favorable decision by Dept. of Interior.
Spruce Park	Mile 50, M.F. Flathead River	300,000	
Swan River	Mile 2, Swan River	320,000	
Flathead L. Outlet Improvement	Flathead River	500,000	Would provide more effective use of available storage within present levels of lake operation for flood control.

Project	Location	Usable Storage (Acre-feet)	Remarks
Little Bitterroot	Mile 0.6, Little Bitterroot	60,000	Discontinued. Site would be inundated by Buffalo Rapids #4.
Buffalo Rapids #4	Mile 37, Flathead R.	568,000	
Thompson River	Mile 8, Thompson R.	100,000	Little likelihood of developing economic project.
Paradise	Mile 240.6, Clark Fork	4,080,000	No further consideration because of major impact of project on local economy.
SPOKANE RIVER BASIN:			
St. Joe River	St. Joe River	200,000	Discontinued. None of the four projects investigated proved economically feasible.
Enaville	Mile 37.2, Coeur d'Alene River	805,000	
Springston	Mile 3.5, Coeur d'Alene River	2,600,000	Discontinued because of possible major damage to mineral resources developments.
SIMILKAMEEN RIVER BASIN:			
Nighthawk	Mile 14, Similkameen River	30,000	Very limited value for flood control or power.
WENATCHEE RIVER BASIN:			
Chiwawa	Wenatchee-Chiwawa	150,000	Being studied by Chelan County P.U.D. under preliminary permit from Federal Power Commission
SNAKE RIVER BASIN:			
Thousand Springs	Mile 592, Snake R.	500,000	Discontinued in favor of Marsing site.

Project	Location	Usable Storage (Acre-feet)	Remarks
Marsing	Mile 426, Snake River	830,000	Alternative studies in Guffey-Marsing area being conducted jointly with Bureau of Reclamation.
Nez Perce	Mile 186.1, Snake R.	4,800,000	No further consideration because of interference with Salmon River fish resource. Alternative development covered by Mt. Sheep and Pleasant Valley projects for which license application is now before the Federal Power Commission.
Garden Valley	Mile 4, S.F. Payette	1,000,000	
Horseshoe Bend	Mile 47, Payette R.	850,000	Discontinued in favor of Garden Valley where costs and flowage problems would be less.
Rays Ferry	Mile 19, Grande Ronde	970,000	Determined to have the most favorable prospects of five alternative projects on lower Grande Ronde River.
MAIN STEM COLUMBIA:			
Grande Coulee	Columbia River	Additional 4,000,000	Studies in progress by Bureau of Reclamation to determine modifications required to permit use of all outlets and full utilization of total 5,200,000 acre-feet for flood control as well as power.

MAIN CONTROL PLAN

FLOOD CONTROL RESERVOIRS

EXISTING OR UNDER CONSTRUCTION

AUTHORIZED

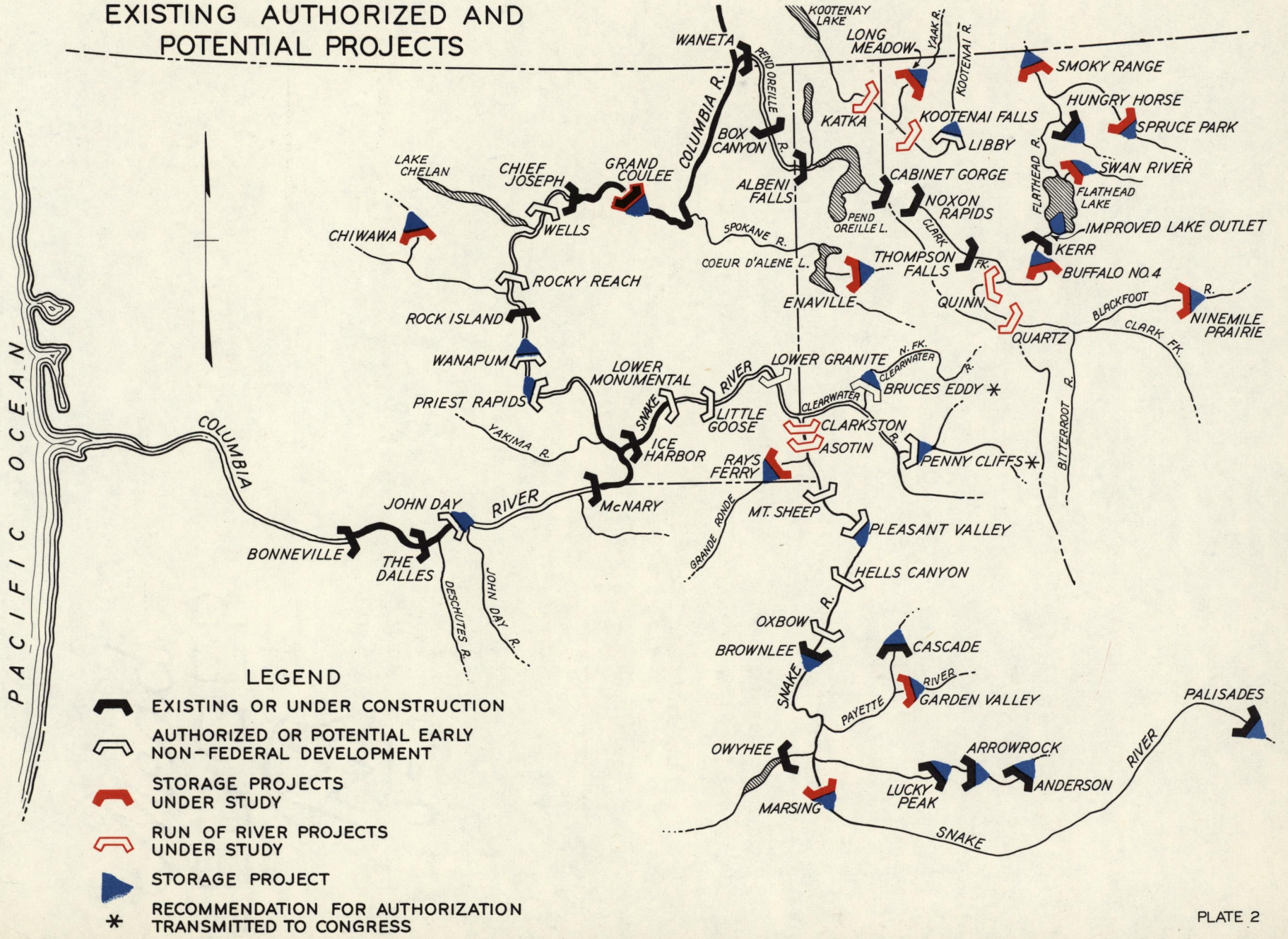
NOT AUTHORIZED

* MODIFIED PROJECT RECOMMENDED

** MODIFICATION OF OUTLETS REQUIRED FOR FLOOD CONTROL

(PROJECTS WHICH ARE NOT PART OF THE MAIN CONTROL PLAN FOR FLOOD CONTROL ARE NOT SHOWN.)

PLATE I


EXISTING AUTHORIZED AND POTENTIAL PROJECTS
PACIFIC OCEAN
COLUMBIA
WANETA
COLUMBIA R.
KOOTENAY LAKE
LONG MEADOW
YAAK R.
KOOTENAI R.
SMOKY RANGE
HUNGRY HORSE
SPRUCE PARK
SWAN RIVER
FLATHEAD R.
FLATHEAD LAKE
IMPROVED LAKE OUTLET
KERR
BUFFALO NO. 4
KOOTENAI FALLS
LIBBY
KATKA
CABINET GORGE
NOXON RAPIDS
CLARK FK.
THOMPSON FALLS
QUINN
BLACKFOOT R.
NINEMILE PRAIRIE
CLARK FK.
QUARTZ
BITTERROOT R.
PEND OREILLE R.
BOX CANYON
ALBENI FALLS
PEND OREILLE L.
SPOKANE R.
COEUR D'ALENE L.
ENAVILLE
LAKE CHELAN
CHIEF JOSEPH
GRAND COULEE
WELLS
CHIWAWA
ROCKY REACH
ROCK ISLAND
WANAPUM
PRIEST RAPIDS
YAKIMA R.
LOWER MONUMENTAL
SNAKE
RIVER
LITTLE GOOSE
ICE HARBOR
LOWER GRANITE
N. FK. CLEARWATER R.
BRUCES EDDY *
CLEARWATER
CLARKSTON
ASOTIN
PENNY CLIFFS *
RAYS FERRY
McNARY
JOHN DAY
RIVER
BONNEVILLE
THE DALLES
DESCHUTES R.
JOHN DAY R.
GRANDE RONDE
MT. SHEEP
PLEASANT VALLEY
HELLS CANYON
OXBOW
BROWNLEE
SNAKE R.
CASCADE
PAYETTE RIVER
GARDEN VALLEY
OWYHEE
MARSING
LUCKY PEAK
ARROWROCK
ANDERSON
SNAKE RIVER
PALISADES
LEGEND
EXISTING OR UNDER CONSTRUCTION
AUTHORIZED OR POTENTIAL EARLY NON-FEDERAL DEVELOPMENT
STORAGE PROJECTS UNDER STUDY
RUN OF RIVER PROJECTS UNDER STUDY
STORAGE PROJECT
* RECOMMENDATION FOR AUTHORIZATION TRANSMITTED TO CONGRESS
PLATE 2

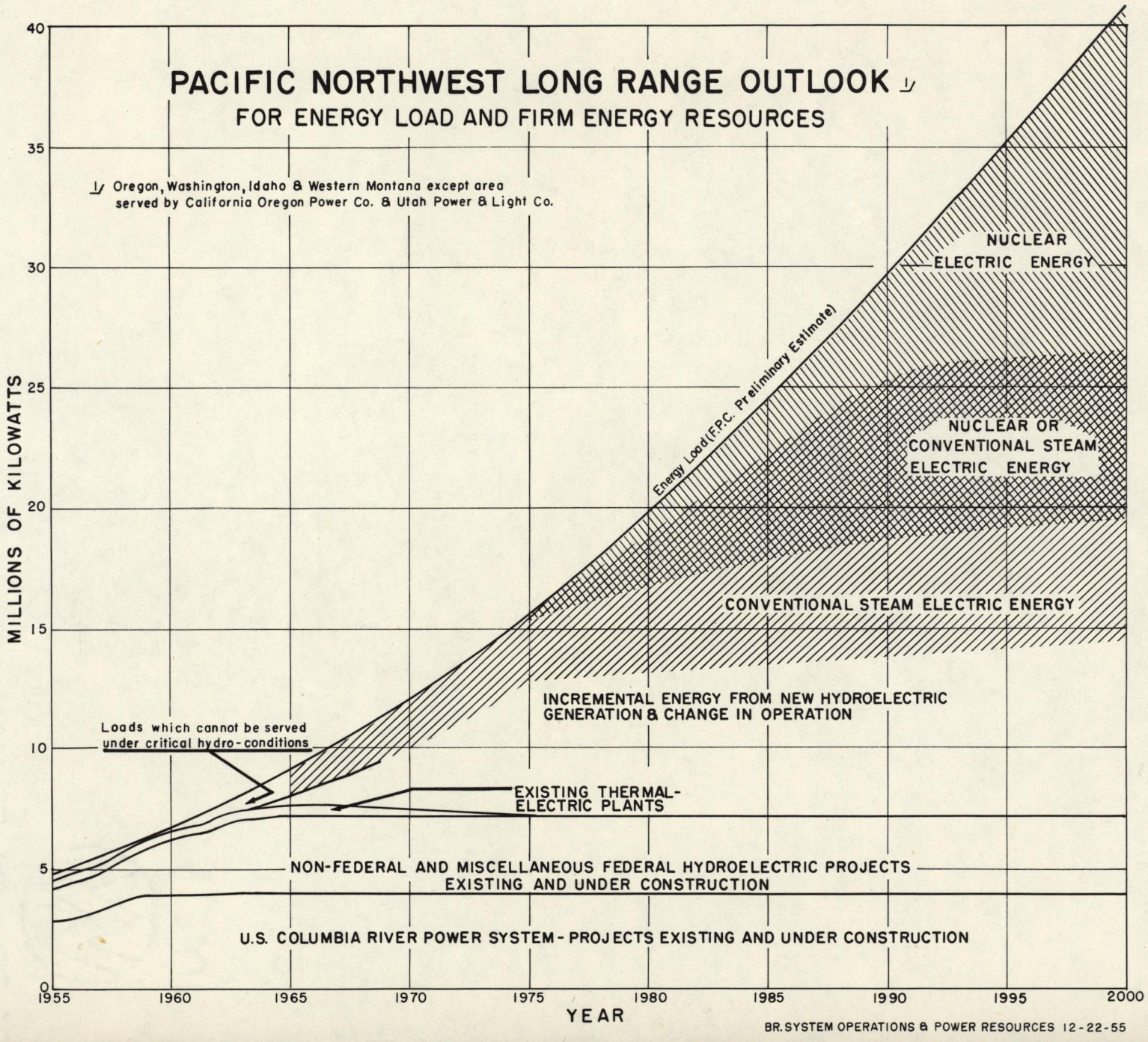

PACIFIC NORTHWEST LONG RANGE OUTLOOK 1/
FOR ENERGY LOAD AND FIRM ENERGY RESOURCES
1/ Oregon, Washington, Idaho & Western Montana except area served by California Oregon Power Co. & Utah Power & Light Co.
MILLIONS OF KILOWATTS
YEAR
0
5
10
15
20
25
30
35
40
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
NUCLEAR ELECTRIC ENERGY
Energy Load (F.P.C. Preliminary Estimate)
NUCLEAR OR CONVENTIONAL STEAM ELECTRIC ENERGY
CONVENTIONAL STEAM ELECTRIC ENERGY
INCREMENTAL ENERGY FROM NEW HYDROELECTRIC GENERATION & CHANGE IN OPERATION
Loads which cannot be served under critical hydro-conditions
EXISTING THERMAL-ELECTRIC PLANTS
NON-FEDERAL AND MISCELLANEOUS FEDERAL HYDROELECTRIC PROJECTS EXISTING AND UNDER CONSTRUCTION
U.S. COLUMBIA RIVER POWER SYSTEM - PROJECTS EXISTING AND UNDER CONSTRUCTION
BR. SYSTEM OPERATIONS & POWER RESOURCES 12-22-55

PLATE 3