REDACTED

USACE WATER CONTROL MANUAL

FOR

PALISADES RESERVOIR AND JACKSON LAKE

These projects are considered authority of Section 7 for the U.S. Army Corps of Engineers. Palisades Reservoir and Jackson Lake dam are operated and owned by the U.S. Bureau of Reclamation.

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U.S. ARMY CORPS OF ENGINEERS, WALLA WALLA DISTRICT NOVEMBER 1958

JANUARY 1994

WATER CONTROL MANUAL REVISIONS
FOR PALISADES RESERVOIR

The following revisions are provided for the updating of this Water Control Manual. This Manual will be reviewed annually and updated if necessary. Major revisions pertaining to format and content in accordance with references EC 1110-2-278 and
ER 1110-2-240 will be accomplished as time and manpower become available.

JANUARY 1994 revisions include:

[redacted]

3. SECTION VII - WATER CONTROL MANAGEMENT (pages 7-4, 7-5, & 7-6)

[redacted]

NOVEMBER & DECEMBER 1987 revisions include:

1. Special Notice on Jackson Lake Reservoir Operations (Green Page i-a) 2. [redacted]
3. Table of Contents (Yellow sheets, pages a & b)
4. Pertinent Data:
   (1) Palisades Dam (page A)
   (2) Jackson Lake Dam (page B)
5. SECTION VII - WATER CONTROL MANAGEMENT
   (1) Text (page 7-1)
   (2) [redacted]
   (3)
6. TABLE 3 - PALISADES RESERVOIR - ACTIVE STORAGE CAPACITY

MARCH 1987 revisions include:

1. Notice To Users Of This Manual (page i)
2. [redacted]
3. Table of Contents (Yellow sheets. pages a to c)
4. SECTION VII - WATER CONTROL MANAGEMENT
   (1) Text (pages 7-1 to 7-3)
   [redacted]
5. TABLE 6 - Snake R. nr Heise, Id. (2 pages)
6. TABLE 7 - Snake R. nr Moran, Wy. (3 pages)
7. TABLE 7A - Snake R. below Flat Cr. nr Jackson, Wy.(3 pages)
8. TABLE 8 - Snake R. nr Shelley, Id. (4 pages)
9. TABLE 9 - Henrys Fork nr Rexburg. Id. (3 pages)

NOTICE TO USERS OF THIS MANUAL

Regulations specify that this Water Control Manual be published in loose-leaf form, and only those sections, or parts thereof; requiring changes will be revised and printed. Therefore, this copy should be preserved in good condition so that inserts can be made to keep this manual current.

As a continuing program it will be, necessary to revise portions of this manual annually in order to keep it up to date. Revisions to this manual will be made by the Walla Walla District's Planning Division (Hydrology Branch). Changes in the plan of operation will be made for the purpose of improving regulation technique and project developments may occur which require revision of the information presented in this Manual. Whenever revisions are required, new pages containing the revised material will be printed with the date of revision and issued to each person having a copy of the manual so that substitution may be made.

ADDED AUG. 1984

PALISADES DAM

REVISED FEB. 1987

Source: Bureau of Reclamation, SOP, Palisades Dam

Revision no. 2
April 22, 1981

PALISADES RESERVOIR PERTINENT DATA

RESERVOIR

Active Capacity (El. 5497.9 - El. 5620)..... 1,200,000 ac. ft.
Inactive Storage (El. 5452.43 - 5497.9) ..... 157,000 ac. ft.
Dead storage (streambed - 5452.43)..... 44,000 ac. ft.
Total Capacity at normal water surface El. 5620 ..... 1,401,000 ac. ft.
Surcharge storage (El. 5620 - 5621) ..... 16,000 ac. ft.
Surface area at normal water surface El. 5620..... 16,150 acres
Minimum power pool elevation..... 5,497.5 msl.
Size.....Approximately 21 by 2 1/2 to 3 miles.

Remarks. Partial storage began in October 1955; full storage began in November 1956

DAM

Located on Snake River 7 miles upstream from Irwin, Idaho
Type.....rolled earth fill
Volume 13,571,000
Maximum structural height .....270 feet
Hydraulic height .....250 feet
Top width .....40 feet
Crest elevation ..... .5,630 msl.
Crest length .....2,100 feet

Spillway

Spillway crest elevation..... 5,570 msl.
Spillway capacity: at El. 5621 ..... 48,400 cfs
at El. 5620 ..... 47,000 cfs.

Outlet Works

Total Outlet discharge at El. 5620 ..... .33,000 cfs.
By-pass power discharge at El. 5620 ..... 14,000 cfs.

POWER PLANT

Powerhouse..... 132 ft wide x 298 feet long x 113 feet high
Total installed capacity (4 units at 28,500 KW)..... 114,000 KW
Power tunnel capacity at minimum power head ..... 10,000 cfs.
Operating head ....122 to 244 feet
Transmission, 6 - 115 KV lines totaling 230 miles and forming a network with the American Falls and Minidoka Projects.

HYDROLOGY

Drainage area above Heise, Idaho..... ...5,752 sq. mi.
Drainage is upstream from Palisades Dam... ..... 5,208 sq. mi.
Average annual runoff at Heise (WY 1911-1985)..... 5,083,000 ac. ft. [1/]
Peak discharge record at Heise (June 15 - 16, 19]8) ..... 51,600 cfs. [2/]
Extreme outside period of record (June 1894) ..... .65,000 cfs.
Maximum discharge since filling Palisades Reservoir
(June 26, 29, 1974) ..... 26,200 cfs.
Minimum discharge (Nov. 10, 12, 1956..... ...460 cfs.
Inflow design flood, volume 30 days..... ...3,320,000 ac. ft.

Inflow design flood, peak discharge ..... .105,000 cfs.

1/ Runoff at Heise is 1-1/4 percent higher than at Palisades dam.
2/ Peak discharge of 60,000 cfs. occurred May 19, 1927 as the result of washing out of landslide on Gros Ventre River.

PALISADES AND JACKSON LAKE DAMS.....REVISED NOV. 1987

JACKSON LAKE RESERVOIR PERTINENT DATA

RESERVOIR

Location	On Snake River, about 25 miles north of Jackson, Wyoming, and 1 mile west of Moran, Wyoming.
Normal pool elevation	6,769 msl.
Active Capacity at pool El. 6769	847,000 ac. ft.
Surface area at pool El. 6769	Approx. 25,500 acres

DAM

Type	Concrete gravity, embankment wings.
Structural height	70 feet
Hydraulic height	41 feet
Base width	61 feet
Crest width	21 feet
Elevation of crest	6,776.8 msl.
Volume of fill	491,700 cu. yds.
Spillway type	Overflow weir with 19 radial gates, each 8 feet by 6 feet
Spillway capacity	13,000 cfs

OUTLET WORKS

Type	20 slide gates, each 8 by 6.5 feet.
Capacity	15, 000 cfs

HYDROLOGY

Drainage area above Moran, Wyoming	807 sq.mi.
Average annual runoff at Moran, (WY 1904-1985)	1,051,000 ac.ft.
Peak discharge of record (June 12, 1918)	15,100 cfs.

Remarks: Flood during June 1894 was considerably higher than that of June 12 1918.

PALISADES RESERVOIR - WATER CONTROL MANUAL

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SECTION I - INTRODUCTION

1.01 Authority. - This manual is prepared under authority contained in Section 7 of the Flood Control Act of 1944 (58 Stat. 890) which reads in part as follows:

'Hereafter, it shall be the duty of the Secretary of War to prescribe regulations for the use of storage allocated for flood control or navigation at all reservoirs constructed wholly or in part with Federal funds provided on the basis of such purposes, and the operation of any such project shall be in accordance with such regulations:"

General instructions regarding the preparation of the manual are contained in Part CXXXVI, Reservoir Regulation, Engineering Manual, Civil works Construction, August 1951.

1.02 Purpose and scope. Purpose of this manual is to present information for reference pertinent to system operation for flood control of Palisades Reservoir in conjunction with Jackson Lake Reservoir including details of facilities and regulation criteria. It contains a general description of the drainage basin and development. It describes the plan of operation, including regulation schedules for flood control, special regulation for unusual conditions and exceptionally large floods, and regulation examples. Comprehensive pertinent data are presented, including basin and reservoir maps, outlet and spillway discharge, curves, and tables, storage allocations, discharge rating tables for key stations, climatological data, and hydrographs of stream flow at key stations for the period of record. The organization and responsibilities of those concerned with proper operation of the projects are also included. The Bureau of Reclamation and Corps of Engineers in cooperation with other Federal and State agencies and private organizations, made extensive studies of water supply, bank protection, and multiple-purpose water usage in the development of the operation plan. The degree of flood protection provided was determined from an analysis of flood records and historical data, with consideration given to present and future needs of irrigation and additional flood control storage facilities.

1.03 Revisions to this manual. - As a continuing program, it will be necessary to revise portions of this manual to keep it up to date. Pertinent discharge rating tables must be revised when changes become evident in the stage-discharge relation; likewise, changes in the plan of operation will be made for the purpose of improving regulation technique, and project developments may occur which require revision of the information presented in the manual. Whenever revisions are necessitated, new pages containing the revised material will be printed and issued to each person having a copy of the manual so that substitution may be made. Revised pages will show the date of revision.

SECTION II - DESCRIPTION OF DRAINAGE AREA

2.01 Topography and streams. - The drainage area above Palisades Dam is 5,110 square miles and is located in northwestern Wyoming and southeastern Idaho. The main stem of the Snake rises in the Rocky Mountains of Yellowstone National Park, Wyoming, from where it flows westerly in deep canyons or narrow valleys for approximately 35 miles to the junction of Lewis River, thence southerly into Jackson Lake Reservoir. From Jackson Lake the river flows southerly for about 50 miles through a flat valley known as Jackson Hole. At the lower end of Jackson Hole the river enters a canyon and gradually bends until it is flowing northwesterly as it crosses the Wyoming-Idaho border and into the upper end of Palisades Reservoir. Below Palisades Reservoir the Snake River continues to flow northwesterly through a narrow valley, emerging into Snake River plain over an alluvial fan and thence flowing southwesterly through highly developed irrigated areas and into American Falls reservoir. Regulation by Palisades affects most of its local flood benefits in the area between Palisades and American Falls. Tributaries to the Snake River above American Falls are generally mountain streams with steep slopes. The largest of the tributaries is Henrys Fork which has a drainage area of 3,280 square miles and enters the Snake about 30 miles below Palisades. Pertinent data regarding the tributaries are given in the following table:

		Discharge in cfs		
Name	Drainage Area	Average Annual	Max. Year	Max. Peak
	3,280	1,914	2,820	9,490
Henrys Fork	1,295	159	294	868
Blackfoot	1,000	259	141	2,000+
Portneuf				

A general plan of the area is shown on Plate 1.

2.02 Economy. - The principal natural resource of the Upper Snake River area is the fertile agricultural land. Because of the shortness of the growing season in the valleys above Palisades Dam, the economy is based upon raising of cattle for beef and dairy farming on Salt River in Star Valley. In this area ranches engage in raising hay on all available valley floor lands for winter use to supplement upland summer range. The Snake River plains below Palisades has developed into one of the most productive irrigated areas in the nation. At least 85 percent of the employment in the area is provided directly or indirectly by irrigated farms. Manufacturing is characterized by a preponderance of food processing plants, including sugar beet refineries, creameries, canneries, and meat packing establishments. Production of phosphate fertilizer and elemental phosphorus is of recent but increasing importance. Forestry, mining, and recreation are other industries of the area. The leading exports of the area are livestock, potatoes, sugar, beans, wool, grain, onions, and dairy products.

2.03 Irrigation. - Because of the short growing season in the area above Palisades, irrigation of lands is not extensive being mostly confined to irrigation of pasture and hay lands. However, in the Snake River plain below Palisades, irrigation has reached a high degree of development. In this area the entire natural flows of all streams for many years have been diverted for irrigation use during July, August, and September. During flood periods the diversion of flow for irrigation makes a substantial reduction in the magnitude of floods. Since 1920, expansion of storage facilities has been the chief irrigation development.

The following table shows average irrigation diversions from Snake River

during the 10-year period 1944-53.

Irrigation diversions in 1,000 acre-feet

Month	Palisades to Shelley	Shelley to Blackfoot	Total	CFS
May	267.1	147.5	414.6	6,731
June	400.6	170.1	570.7	9,574
July	538.5	219.5	758.0	12,306
August	452.2	177.7	629.9	10,226
September	327.7	125.3	453.0	7,598

2.04 Population. The population of the area above Palisades Reservoir is 2,593 based on the 1950 census. The town of Jackson with a population of about 1,200 is the largest community. In the area downstream of palisades to American Falls there is a population of about 60,000. The principal towns with 1950 populations are as follows:

Pocatello	26,004
Idaho Falls	18,855
Rexburg	4,253
Blackfoot	5,178
American Falls	1, 874

SECTION III - HYDROLOGY

3.01 Climate. - Because of its geographic location, diversified, topography, and wide range in elevation, the upper Snake River area has a variable climate ranging from semi-arid on the plains area below Palisades Dam to moderately wet on the west slopes of the Teton Mountains. Annual precipitation varies from less than ten inches in the plains area to a maximum of about 60 inches in the Teton Mountains. Characteristic of seasonal distribution is a May-June maximum occurring at lower elevations and a January maximum at higher elevations. July and August are uniformly the months of minimum precipitation. Much of the winter precipitation falls as snow. Mean monthly minimum and maximum temperatures in valley areas vary from 10.3 degrees to 86.0 degrees at Idaho Falls, Idaho, to minus 6.2 degrees and 76.4 degrees at Moran, Wyoming. Extreme temperatures vary from 104 at Idaho Falls to minus 63 degrees at Moran, Wyoming. Representative climatological data for the area are shown in Table 1.

3.02 Stream-flow characteristics. - Snake River and its tributaries in the area have rather regular patterns of natural stream flow with high flows during the months of May through July, receding stream flow in August and September and low flows in the months of October through April. High flows in the late spring and early summer result from the melting of the winter-accumulated snow pack, sometimes augmented by runoff from rain storms. Maximum annual discharges usually occur as .a result of above normal temperatures existing for a period of several days in succession. Daily discharge hydrographs for Snake River at Moran are shown on Plate 6. Plates 7, 8, and 9 show daily discharge hydrographs for Snake River at Heise.

3.03 Past floods. - The largest flood of historical record in upper Snake River area was that of 1894. No actual observations of discharge during this flood were made in the area, but estimates based on high-water marks and concurrent records in adjacent watersheds indicate a peak flow of approximately 65,000 cfs for the Snake River at Heise. The highest recorded discharge occurred in May 1927 and was the result of the failure of a landslide dam on Gros Ventre River. Approximately 50,000 acre-feet of water were released in a period of about three hours, resulting in a peak discharge of 60,000 cfs at Heise. Other large floods since 1902 were those of 1904, 1909, 1917 and 1918, with maximum discharges of 50,800, 44,000, 38,900 cfs and 52,000 cfs respectively. A tabulation of annual peak discharges and May-July volumes for the Snake River at Heise are given in Table 2. Tables 10 and 11 show the natural monthly volumes of runoff for period of record through 1950 at Moran and Heise.

3.04 Snake River channel capacity. - The channel of the Snake River through Jackson Hole is generally inadequate to carry discharges of 8,000 cfs without appreciable damage from overflow and bank erosion. Below Palisades Dam the safe channel capacity varies from 15,000 cfs to 35,000 cfs. At 15,000 cfs, small areas, usually covered with natural pasture grass and which are annually subject to main river overflow, are inundated. For flows up to 20,000 cfs only pasture inundation occurs; however, some appreciable damage results from bank cutting. At the present time, levees constructed mainly by the Federal Government protect areas lying along the Snake River from Heise to Henrys Fork for flows up to 30,000 cfs. Below Henrys Fork to American Falls, emergency works constructed by the Federal Government and local interests give a measure of protection to several critical locations.

3.05 Flood frequencies. Frequency curves of maximum annual flood peak discharges for Snake River at Heise have been determined for actual conditions where flood control was incidental to regulation of Jackson Lake Reservoir for irrigation interests; for natural conditions approximating flows that would have occurred without regulation of Jackson Lake; and for conditions reflecting regulation of Palisades Reservoir and 200.000 acre-feet of storage space

at Jackson Lake for flood control. Peak discharge data are available for Snake River at Heise for years 1903 to date. Frequency statistics for flood peak discharges were compiled and adjusted to the 97-year period of stream-flow records of Columbia River near The Dales by methods described in Civil Works Engineer Bulletin 51-1 and subsequent publications by ONCE on the subject of flood frequencies. Plate 2 depicts peak discharge frequency curves for Snake River at Heise, Idaho. The following tabulation briefly summarizes natural peak discharge magnitudes for various recurrence intervals.

Average recurrence interval	Maximum annual flood peak discharge	
Years	Natural	Regulated
	cfs.	cfs.
2	32,500	20,000
5	42,300	21,000
10	48,700	21,900
20	54,500	23,000
50	62,000	25,800
100	68,000	29,800

3.06 Flood damages. Flood damages in the region are mostly to agricultural lands and produce. Without the advantage of flood-control storage facilities the average annual damages along the Snake River from Palisades Dam to American Falls are estimated at $2,700,000. Operation of Palisades Reservoir and Jackson Lake as outlined in this manual is expected to reduce average annual damages by about $1,350,000. Plate 3 shows the average relationship of flood damages to peak discharges. The use of space in Jackson Lake in conjunction with Palisades space for flood control purposes also provides a reduction of flood damages in the Jackson Hole area between Jackson Lake and Palisades Dams. In addition to the reduction of flood damages in the upper reaches of the Snake River, regulation by palisades will be effective in reducing damages along the lower reaches of the Snake and' along the lower Columbia River. The main control plan for control of floods on the lower Columbia River includes palisades in the system of flood control reservoirs.

SECTION IV - PROJECT DESCRIPTIONS

4.01 Palisades Dam. Located on Snake River seven miles upstream from Irwin, Idaho, was authorized for construction by the Secretary of Interior on 9 December 1941 under provisions of Section 9 of the Reclamation Project Act of 1939. Reauthorization was made by Public Law 864, 81st Congress, 2nd Session; approved 30 September 1950. The total storage capacity of the reservoir at normal water surface is 1,401,600 acre-feet. Of the total storage, 1,200,000 acre-feet are allocated for joint use of irrigation, flood control, and production of power; 155,500 acre-feet are inactive storage for power head and for preservation and propagation of fish and wildlife; and 44,100 acre-feet are dead storage. Construction of Palisades Dam was started in 1951 and completed in 1957. The general plan and sections of the dam are shown on Plate 4. Table 3 shows capacity of the reservoir at one foot elevation increments. The spillway is a tunnel, located in the left abutment and designed to discharge 47,000 cfs at normal water surface elevation. Control of the spillway is affected by two radial regulating gates, 20 by 50 feet each. The tunnel is 1,890 feet long and, except for inlet and outlet ends, lined with unreinforced concrete. The outlet works consist of a trashrack structure, two circular tunnels with steel liners downstream from the dam axis, manifold section, valve house, and stilling basin. The two tunnels, one power and one outlet with diameters of 26 feet, have a total capacity of 32,500 cfs at minimum power pool elevation of 5,497.5 feet msl.; 10,000 cfs through the power tunnel and 22,500 cfs through the outlet tunnel at minimum power head. The outlet tunnel has six discharge tubes for control of irrigation and flood water. The power tunnel has two bypass tubes for routing floods and four penstocks for generation of power. There are four regulating gates, four emergency gates, two 96-inch hollow jet valves and two 96-inch ring follower gates for control of the outlet tunnel discharge, and two regulating and two emergency gates for control of the power tunnel bypasses. The regulating gates are hydraulically operated 7 foot-6 inch by 9 foot-O inch rectangular gates. Spillway and outlet discharge curves are shown on Plate 4. Pertinent data are summarized in the table at the forepart of this manual.

4.02 Jackson Lake Dam. Jackson Lake Dam is located on Snake River in the State of Wyoming and controls the outflow from Jackson Lake. Originally, in 1907, the reservoir was formed by a temporary log crib dam creating a usable capacity of 300,000 acre-feet. This dam washed out in July 1910 and was replaced by an earth dam, forming a reservoir with a usable capacity of 380,000 acre-feet. The earth dam was raised in 1916, increasing the usable capacity to 780,000 acre-feet. In 1919, the capacity was further increased to 847,000 acre-feet between elevations 6,730 and 6,769 msl. by dredging the outlet. The reservoir covers an area of about 25,540 acres. Table 4 is a storage capacity table for Jackson Lake. The spillway dam is a concrete gravity type with embankment wings having a structural height of 70 feet and hydraulic height of 41 feet. The spillway is an overflow weir controlled by 19 radial gates, 8 feet by 6 feet each with a total capacity of 13,000 cfs. The outlet works consist of 20 slide gates, 8 feet by 6.5 feet each, having a total capacity of 15,000 cfs. The general plan and sections of the dam are shown on Plate 5. Pertinent data are summarized in a table at the forepart of this manual.

SECTION V - PLAN OF OPERATION

5.01 History of plan of operation. A draft of the plan of operation for Palisades Reservoir was prepared by the Bureau of Reclamation in cooperation with the Portland District, Corps of Engineers, and submitted to the Chief of Engineers in January 1948, along with a report on the derivation of the operation plan showing estimates of flood control benefits. The Office, Chief of Engineers concurred with estimates of flood control benefits expected to accrue from proposed plan of operation, and informed the Commissioner, Bureau of Reclamation by letter dated 28 January 1948 that, upon completion of the structure, recommendations of the Chief of Engineers to the Secretary of the Army for regulation under Section 7 of the 1944 Flood Control Act would be in accordance with the allocation for flood control as contained in the adopted plan of operation. Copies of the operation plan as prepared in 1948 were attached to contract with water user organizations for use of palisades water. It was included as an appendix to the Bureau of Reclamation supplemental report on Palisades Dam and Reservoir Report, dated June 1949, which was basic to final authorization of that project. Also it was contained in the Definite Plan Report for Palisades Reservoir prepared by the Bureau of Reclamation and dated November 1951. Appendix A is a copy of this operating plan. Recent studies have indicated some improvement and interpretations to the plan. The following items have been agreed to by exchange of letters between the Corps of Engineers and the Bureau of Reclamation:

a. That the best available forecasts be adopted, regardless of the basis upon which they were made.

b. That the wording of the Original Operating Plan is interpreted to provide for the development and maintenance of an adequate hydrologic reporting network.

c. That numbered paragraph 2 of the Original Operating Plan is broad enough to accommodate the power plant operations relative to and consistent with the flood-control evacuation program.

In accordance with Federal law the regulations were summarized for publication in the Federal Register. This summary of regulations which includes the revisions mentioned above is included as Appendix B to this manual.

5.02 Essential features of plan of operation. The operation plan provides for the optimum feasible use of the storage space in Palisades Reservoir for flood control in coordination with its uses for irrigation, power, and recreation, and in coordination with use of storage in Jackson Lake. Salient features of the plan are summarized as follows:

a. Storage space up to 1,400,000 acre-feet in Palisades and Jackson Lake will be made available for flood control on a forecast basis by the Bureau of Reclamation in accordance with Flood Control Storage Reservation Diagram shown on Plate 10. However, not less than 7S percent of total storage space required at any time will be made available in Palisades Reservoir.

b. Forecasts of runoff volume from forecast date until 31 July for operation of reservoir will be made periodically beginning 1 February by Bureau of Reclamation, Region I after consultation with U. S. Army Engineer District, Walla Walla, and Idaho State Watermaster District 36.

c. Reservoir releases will be scheduled to evacuate and refill reservoir space in

accordance with Flood Control Storage Reservation Diagram without exceeding 20,000 cfs at the Heise gaging station insofar as practicable.

d. For extraordinarily large floods which require more than 1,400,000 acre-feet in Palisades and Jackson Lake to regulate flow to 20,000 cfs at Heise, releases in excess of 20,000 cfs will be planned as given in paragraph 5.05.

e. When the forecasted runoff for the period 1 June through 31 July exceeds 2,500,000 acre-feet, and when, after 1 June, the available space is not within 10,000 acre-feet of the space required by the Flood Control Storage Reservation Diagram, the releases from the reservoir may be increased so that the flow at Heise will exceed 20,000 cfs up to a limit of 30,000 cfs to the extent of 1,000 cfs for each 5,000 acre-feet of deficient storage space, except that the release shall not be greater than natural inflow. The change in discharge will be made in such manner as to minimize the adverse downstream effects.

f. A hydrologic reporting network sufficient to provide the necessary basic data for determination of required flood control reservation shall be developed and maintained by the Bureau of Reclamation.

g. Current information on forecasts, reservoir releases, reservoir storage, and such other operating criteria which affect the schedule of operation shall be furnished the District Engineer, Corps of Engineers and Watermaster, Water District No. 36, by the Bureau of Reclamation.

5.03 Runoff forecasts. - Satisfactory results from the operating plan depend to a great extent on the adequacy of the runoff forecasts. Because runoff above Palisades Dam is primarily from melting of the accumulated winter and spring snow pack, forecasts of runoff volume can be made with a reasonable degree of accuracy. In accordance with the operating plan, the Bureau of Reclamation will make forecasts of seasonal volume runoff for operation of reservoirs periodically commencing with 1 February of each year after consultation with Corps of Engineers and State Watermaster District 36. The forecasting equations developed by the Bureau are included as Appendix C to this manual. They consist of statistically derived relationships of past occurrences of runoff and snow fall, precipitation, and temperature. Results of the forecasts as would have occurred in past years are also shown on Table C-1 of Appendix C. Plate C-1 shows probability levels for various magnitudes of forecast errors.

5.04 Derivation of storage reservation diagram. The allocation of flood control storage space in the reservoirs is based on a storage reservation diagram shown on Plate 10. This diagram was developed by enveloping points relating the volumes of flood season runoff with coordinates of time and storage reservation required for control of the floods. Analysis of past floods provide the points from which the curves were drawn. Flood season runoff for each year of record was analyzed for the amount of storage reservation that would be required to control the runoff to the allowable discharge in Snake River channel at the , Heise gaging station. This value is defined as bankfull capacity in the main channel below Palisades Dam (20,000 cfs). The values of storage reservation required were plotted on the date the storage would. be required and, adjacent to each plotted point) the runoff from that date to 31 July was noted. Curves were sketched as enveloping lines which encompassed the maximum required storage reservation on any date for any of the floods studied. In addition to enveloping the points of maximum storage requirements, the curves were shifted so as to provide increasing amounts for an additional safety factor in the early part of the season, prior to 1 June. Curves as originally developed are shown on Plate A-I of Appendix A. Subsequent studies indicated a

need for modifying the curves as applicable to low runoff years to insure refilling of the reservoir. Accordingly) the curves were modified to provide greater assurance of filling and still provide required flood control space by construction of two sets of curves; one set to be used until natural inflow to Palisades first exceeds 20,000 cfs and the other set to be used after that time. The curves are shown on Plate 10, and Plate B-1 of Appendix B.

5.05 Regulation of extraordinary large floods. Although most floods can be regulated to bankfull by use of the storage reservation diagram, Snake River is occasionally subjected to floods much larger which cannot be so regulated. With present downstream channel capacity) there is insufficient reservoir capacity to regulate the standard project flood and maximum historical floods to bankfull. Also, heavy precipitation and consequent snow accumulation may develop late in the season, leaving insufficient time to evacuate the reservoir to obtain required space for regulation to bankfull. For these floods, operation of the reservoir to permit releases above bankfull will materially reduce the magnitude of the peak discharge downstream. These extraordinarily large floods are expected to occur very rarely. The rate of releases from Palisades and Jackson Lake Dams for such floods will be determined in accordance with the following rule curve showing the relationship of required discharge to the 1 May - 31 July forecast of runoff volume:

1 May - 31 July Forecasted Volume (acre-feet)		Required Discharge [1/] (cfs)
Less than	4,100,000	20,000
	4,100,000	23,000
	4,300,000	24,000
	4,600,000	25,000
	4,900,000	26,000
	5,300,000	21,000
	5,600,000	28,000
	6,000,000	29,000
	6,300,000 or larger	30,000

[1/] Applicable only when exceeded by natural inflow to Palisades Reservoir.

Releases of the above amounts begun in May will be modified after 1 June in accordance with the procedure set forth in 5.02e. Regulation of the Standard Project Flood as would occur by this plan is shown on Plate 11. Regulation of the 1953 flood is shown on Plate 12.

5.06 Regulation for power production. As an integral part of the Palisades Project, a power plant has been constructed with an installed capacity in four units totaling 114,000 kilowatts. The power plant is designed to operate through a range of head varying from a minimum of 122 feet to a maximum of full 'reservoir of approximately 245 feet. Use of water for power production will be limited to water released for irrigation or flood control purposes including release of water to fill the prior storage right of American Falls Reservoir. The normal production of hydroelectric power at Palisades Dam will be incidental to the operation of the reservoir for irrigation and flood control. There are no power-generating facilities in operation at Jackson Lake Dam.

5.07 Continuing and additional operation studies. In the interest of obtaining maximum benefits from the operation of the reservoir, a program of continuous study of each current flood for possible improvements in the regulation schedules will be necessary at all times. Some of

the continuing and additional studies are enumerated as follows:

a. Review runoff forecasting techniques with a view toward gaining greater accuracy.

b. Analysis of recent and current data to determine what additional data are required for improvement in forecasting.

c. Studies to determine a reliable method of forecasting short-term stream flows.

d. Review of Storage Reservation Diagram.

e. Review of basis for releases in excess of 20,000 cfs when required for control of extraordinary large floods.

f. Studies to provide for better integration of Palisades Reservoir into the entire Upper Snake water control system, including all irrigation and storage features above American Falls Dam.

SECTION VI - DATA COLLECTION AND COMMUNICATION NETWORKS

6-01. Data Collection. The Bureau of Reclamation and the Corps of Engineers have cooperative agreements with other agencies to collect and publish specific hydrologic data necessary for reservoir regulation. Under the terms of these agreements, the Bureau and Corps pay the Geological Survey, Soil Conservation Service, and the National Weather Service for their data collection services. The Geological Survey collects streamflow data and annually publishes recorded data in their publication. Water Resources Data for Idaho. The Soil Conservation Service collects manual snow course measurement data and publishes the data in their monthly publication. Water Supply Outlook for Idaho. In addition, SNOTEL stations provide real-time snow water content data on a daily basis via the SCS's Data General System. The National Weather Service collects climatic data and publishes it annually in their Climatological Data for Idaho publication.

For real-time reservoir regulation data are readily available, once collected, from the Soil Conservation Service and the National Weather Service. The Bureau of Reclamation and the Soil Conservation Service have established automated hydromet systems for the Palisades and Jackson Lake Dams which provide real-time data as listed in paragraph 6-03.

6-02. REPORTING AND EXCHANGING BASIC DATA.

b. Frequency of Exchange. The frequency of exchange of basic data pertinent to efficient operation of the dam and regulation of floods will be on a daily basis during the work week except during unusual or rare conditions of weather or reservoir inflow when the frequency will be as requested or needed. Data is automatically sent to the Corps of Engineers CROHMS system on an hourly basis 7 days per week from the Bureau of Reclamation Hydromet System located in Boise.

6-03. Automated Hydromet Systems.

a. Bureau Hydromet System. The Pacific Northwest Regional Office of the Bureau of Reclamation has a hydromet system for the Boise Basin as part of an extensive automated hydrometeorological data collection system throughout the upper and middle Snake River Basin. This system is composed of (1) a Direct Readout Ground Station (DRGS) located in Boise for the Geostationary Operational Environmental Satellite (GOES), (2) a computerized network controller, referred to as the Central Computer Facility (CCF), and (3) remote stations.

The system is unique in that the Data Collection Platform (DCP) at each remote site is microprocessor-controlled and has the capability to transmit through two channels on the GOES system. One channel handles only self-timed transmissions, whereas the second channel is dedicated to only adaptive random transmissions. Operation in the self-timed mode is as follows. The DCP interrogates all sensor outputs at 15-minute intervals and stores the values in

its memory. At a preassigned time interval, every 4 hours, the DCP transmits all stored values from each sensor to the Central Computer Facility through the Direct Readout Ground Station in Boise. This produces a very complete detailed data base.

Transmissions in the adaptive random reporting (R/R) mode are completely unscheduled with the decision to transmit being made by the DCP. This is accomplished by programming threshold values in the micro-processor which the DCP uses to compare with sensor outputs. If the threshold values are exceeded, the DCP computes a random transmission rate and begins to transmit randomly. The microprocessor also computes rates of change between sensor readings: if the rate of change exceeds the preprogrammed threshold values, this also causes the DCP to compute a random transmission rate and begin transmitting. Each time a DCP transmits randomly, it only sends three values - the most current value and the two preceding values. Also, once the DCP goes into random mode it will send at least three transmissions randomly before shutting down. However, if the threshold values are continually exceeded and/or the rates of change increase, the DCP will continue in the random mode until the situation returns to normal. It is important to note that as the rate of change of the sensor value increases, the random transmission interval is shortened, thereby transmitting more frequently as the event becomes more serious.

All data received by the Central Computer Facility (CCF) are immediately processed and stored in the Dayfiles. At 5:00 a.m. each morning, the CCF compiles data from the previous day's Dayfiles database file readings to be put into the Archives database. The Archives database is composed of such things as midnight reservoir elevation and contents, maximum and minimum temperatures, and mean daily flows, etc. Both Dayfiles and Archives databases are available to users through time-share terminals.

Figure 6-1 on page 6-6 shows a schematic for the Palisades and Jackson Lake basin hydromet system. The following tabulation summarizes real-time data which are available from the Bureau's hydromet system.

Station	Parameters	
Dam and Reservoir	Archives	Dayfiles
1. Jackson Lake Reservoir (JCK)	AF,FB,QU	AF,FB
2. Palisades Reservoir (PAL)	AF,FB,ID	AF,FB
Stream Gages		
1. Snake River at Flagg Ranch (FLGY)	GD,HJ,QD	GH, HJ, Q
2. Snake River near Moran(JCK)	GD,HJ,MM,MN,MX,PC, PP,PU,PUX,PX,QD,SP	GH.HJ.PC,Q, OB, SP
3. Pacific Creek (PCKY)	GD,HJ,QD	GH, HJ, Q
4. Buffalo Fork (BFKY)	GD,HJ,QD	GH, HJ, Q
5. Gros Ventre River (GROY)	GD,HJ,QD	GH, HJ, Q
6. Snake River below Fat Creek (JKSY)	GD,HJ,QD	GH, HJ, Q
7. Snake River near Alpine (ALPY)	GD,HJ,OD	GH, HJ, Q
8. Greys River (GREY)	GD,HJ,OD	GH, HJ, Q
9. Salt River (SALY)	GD,HJ,OD	GH, HJ, Q
10. Snake River near Irwin (PALI)	GD, HJ, MM, MN ,MX , PC, PP,QD,QU	GH, HJ, PC, Q. OB
11. Snake River near Heise (HEll)	GD,HJ,OD,OU	GH, HJ, Q

AF -	Reservoir content	PU -	Cumulative precipitation, inches (water year)
FB -	Reservoir forebay elevation	PUX -	Cumulative precipitation inches (water year) manually observed
GO -	Mean daily gage height	PX -	Precipitation, inches (manually observed)
GH -	Observed gage height	Q -	Computed discharge
HJ -	Gage height rating shift	QD -	Daily average discharge
ID -	Daily average reservoir inflow	QU -	Daily computed unregulated flow
MM -	Average daily temperature	SP -	Snow water content
MN -	Minimum daily temperature		
MX -	Maximum daily temperature		
OB -	Observed air temperature		
PC -	Cumulative Precipitation		
PP -	Daily precipitation		

b. SCS SNOTEL System. The Soil Conservation Service owns and operates a hydromet system for the Boise River and adjacent river basins as part of its western states Snow Telemetry (SNOTEL) program. This system uses (1) two master polling stations located at Boise. Idaho, and Ogden, Utah, (2) meteor-burst radio communications, and (3) remote stations. The system collects remote data once per day during a nominal polling period (5:00 a.m. to 8:00 a.m. Pacific time) and has the capability of additional interrogations (ad hoc polls) as needed. A total of three parameters can be retrieved from each remote data site, with ultimate plans for retrieving a total of 16 parameters. The following tabulation summarizes real-time data which are available from the SNOTEL system.

	Station Name (No.)	Elevation (ft. ms 1)	Basin	Location Latitude Deg.	Min.	Longitude Deg.	Min.
1.	Base Camp (10F02S)	7.030	Snake R.	43	56	110	26
2.	Coulter Creek (10E10S)	7,020	Snake R.	44	10	110	34
3.	East Rim Divide (10F17S)	7,930	Green R.	43'	08	110	12
4.	Grassy Lake (10E15S)	7,265	Henrys Fk.	44	08	110	50
5.	Lewis Lake Div. (10E09S)	7,850	Snake R.	44	12	110	40
6.	Salt River Smt. (10G08S)	7,700	Snake R.	42	31	110	55
7.	Snake River Sta. (10E12S)	6,920	Snake R.	44	08	110	40
8.	Thumb Divide (10E07S)	7,980	Snake R.	44	22	110	34
9.	Togwotee Pass (10F09S)	9,580	Snake R.	43	45	110	03
10.	Two Ocean Plt. (10E17S)	9.360	Snake R.	44	09	110	13

Parameters reported by these SNOTEL stations include:

1. PILL - Snow water content from snow pillow
2. PREC - Cumulative precipitation
3. TMAX - Maximum daily air temperature
4. TMIN - Minimum daily air temperature
5. TAVE - Average daily air temperature

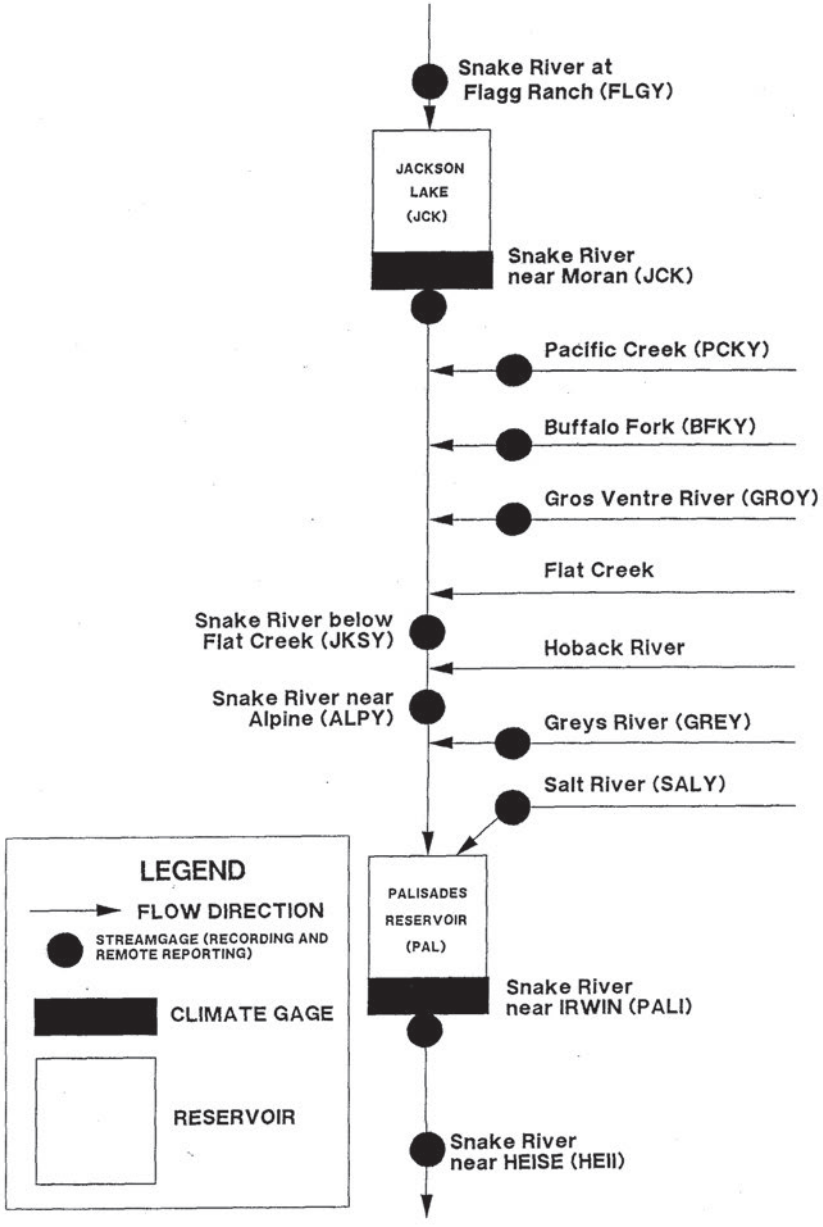
Note: SNOTEL stations provide real-time snow water content data on a daily basis via the SCS's Data General System.

6-04. CORPS OF ENGINEERS - CROHMS SYSTEM The Columbia River Operational Hydromet and Management system (CROHMS) is a real-time water resources data management system. A computer system is used for data reduction, system modeling, forecasting, and data base support functions. The data acquisition for these three functions is supported through the CROHMS Automated Front End (CAFE). Figure 6-2 on page 6-7 shows the CROHMS network diagram.

The CAFE is a centralized computer facility consisting of a primary computer and a backup, communications interface, storage for data, and software capabilities. It functions as a central point of raw data collection for CROHMS, a source of raw data files, and a distribution center for reports processed by the CROHMS computer.

6-05. Use of Real-Time Data. The real-time data are used for volume forecasting and in the Streamflow Synthesis and Reservoir Regulation (SSARR) model and thus form the basis for decisions and resultant reservoir regulation. All of the regulating agencies plan continued support for the existing data collection programs.

FIGURE 6-1
UPPER SNAKE RIVER GAGING FACILITIES



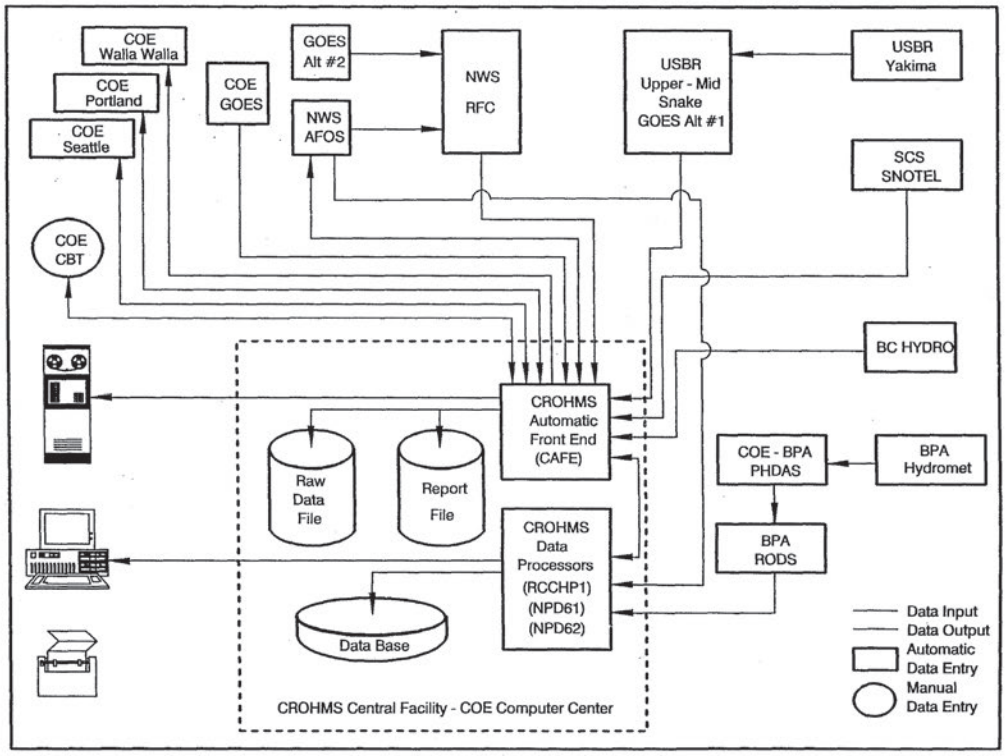


FIGURE 6-2 CROHMS Data Collection System

SECTION VII - WATER CONTROL MANAGEMENT

7-01. General. The various interests affected by regulation of Palisades and Jackson Lake Reservoirs require close cooperation among the Corps of Engineers, the Bureau of Reclamation, and the State of Idaho Department of Water Resources.

7-6. The organization and responsibility of these agencies, as they relate to the operation of Palisades and Jackson Lake, are given in the following paragraphs.

7-02. Bureau of Reclamation. The Regional Office, Region 1, Bureau of Reclamation in Boise, Idaho, is directly responsible for the operation of Palisades and coordination of Palisades' operations with that of Jackson Lake to accomplish the flood control objectives. These objectives will at all times be in accordance with regulations set forth in Section V Plan Of Operation, Appendix A, and Appendix B of this manual. The Water Resources and Operations Branch, Chief is responsible for the coordination of flood control and refill regulation for all Bureau reservoirs in Region 1. The Minidoka Project Superintendent and his staff are responsible for the day-to-day operation and maintenance of Palisades and Jackson Lake Dams. [redacted]

Responsibilities of the Bureau of Reclamation include:

1. Maintenance of adequate hydrologic reporting network.

2. Collection and dissemination of hydrologic and reservoir data.

3. Preparation of periodic forecasts of runoff for the period January through July and consultation with the Corps of Engineers and District Watermaster to coordinate forecasts and establish details of the flood control evacuation and refill schedules.

4. Execution of releases at Palisades and Jackson Lake as required to conform with the Flood Control Storage Reservation Diagram or as these may be modified by agreement between the Corps of Engineers and Bureau of Reclamation.

5. Performance of studies for refinement of forecasting and regulation techniques.

6. Issuing public news releases, if necessary when there is a planned departure from normal operations or unusual developments.

7-03. Corps of Engineers. The Walla Walla District of the Corps of Engineers has the responsibility of prescribing flood control regulations in accordance with Section 7 of the Flood Control Act of 1944 as referred to in paragraph 1.01. Within the District, the Planning Division's Hydrology Branch, Reservoir Regulation Section is responsible for coordinating and developing operational regulation plans in cooperation with the Bureau of Reclamation. [redacted]

The Hydrology Branch is responsible for monitoring the Palisades - Jackson Lake reservoir system operation to assure conformance with flood control criteria and procedures in this Manual. By collection of hydrologic and reservoir data, the Reservoir Regulation Section will keep informed on the hydrological and meteorological situation in the Upper Snake drainage area and on the operation of Palisades and Jackson Lake Reservoirs. The Reservoir Regulation Section will make periodic forecasts of runoff which will be coordinated with the Bureau of Reclamation to provide an operating forecast. The Reservoir Regulation Section will also make studies in coordination with the Bureau of Reclamation to refine regulation technique.

7-04. State of Idaho. Department of Water Resources. As a State agency, the Department of Water Resources is responsible for ensuring that Idaho water is regulated, stored, conserved, distributed, and used in an effective manner consistent with State of Idaho laws and policies. Maintaining these interests for the State of Idaho is the responsibility of the Director and specific personnel within his staff. [redacted]

For the Palisades and Jackson Lake projects, the Department of Water Resources responsibilities include (1) reviewing (with the Bureau and/or' Corps) criteria and regulation procedures in this Manual, (2) overseeing the duties of the Upper Snake River Watermaster. As a result, the Department of Water Resources is able to protect the water control management interests of the State of Idaho which pertain to the Upper Snake River Basin.

7.05. STATE OF IDAHO - WATER DISTRICT #01.

The State of Idaho - Water District #01 is an organization created under provisions of Idaho laws. This entity is responsible for annually electing the Upper Snake River Watermaster, :setting his budget, and levying costs against its membership to pay for budget expenses. Membership of the State of Idaho - Water District #01 is composed of any organizations or persons which have decreed water rights, licenses, and permits for water within Water District #01. Water District #01 includes the area of the Snake River Basin and tributaries above Milner, but excludes the Blackfoot and Portneuf River Basins.

In general, the Upper Snake River Watermaster is responsible for the accounting and distribution of water within Water District #01 according to all decreed, licensed, and permitted rights. As part of his duties, the Watermaster is responsible for (1) maintaining current discharge rating tables for pertinent stream gages, (2) monitoring the storage and distribution of water in the Palisades and Jackson Lake reservoir system in accordance with Idaho laws and (3) working closely with staff level personnel from the Bureau and the Idaho Department of Water Resources to accomplish his duties.

7-06. Other Agencies. While not involved with project regulation, the National Weather Service, Soil Conservation Service, and the Geological Survey collect support data (precipitation and temperature, snow survey measurements, and streamflows) under contract with the regulating agencies. This data is essential for the regulation and these data collection programs must be supported and continued.

7-07. Public Information. The regulating agencies have an obligation to provide pertinent regulation information to the Idaho Department of Water Resources so that they can routinely monitor the regulation and evaluate the effectiveness of regulation. When significant regulation and release changes are necessary, the regulating agencies have an obligation to provide public information news releases.

TABLE 1

CLIMATOLOGICAL DATA

(Snake River Basin above Idaho Falls, Idaho)

Station	Watershed	Elev. m.s.l.	Period of Record	Temperature-Degree Fahrenheit				Annual Precipitation in Inches				Snowfall-Inches	
				Years of Record	Mean Annual	Highest of Record	Lowest of Record	Years of Record	Average	Maximum	Minimum	Years of Record	Average Annual
Afton, Wyoming	Salt River	6,225	1904-1946	34	38.0	98	-55	32	17.63	26.41	12.35	37	90.1
Alta, Wyoming	Henrys Fk.	6,500	1910-1954	43	39.1	97	-46	44	18.23	28.02	9.47	38	100.0
Bechler River, Wyoming	Snake River	6,300	1931-1944	10	38.7	96	-47	13	36.90	48.89	10.06	12	297.7
Bedford, Wyoming	Salt River	6,221	1902-1954	46	38.5	100	-46	42	19.46	29.71	10.78	47	107.1
Jackson, Wyoming	Snake River	6,244	1905-1954	32	37.7	96	-52	30	15.94	21.47	10.93	25	82.3
Moose, Wyoming	Snake River	6,627	1936-1954	18	36.2	92	-44	19	26.89	32.94	17.70	12	177.6
Moran, Wyoming	Snake River	6,740	1911-1954	42	34.2	92	-63	42	21.36	29.32	13.51	35	134.9
Snake Riv.Sta.,Wyoming	Snake River	6,800	1906-1954	35	34.7	97	-56	32	30.13	50.10	21.32	35	208.3
Ashton, Idaho	Henrys Fk.	5,100	1897-1954	56	41.3	100	-37	53	16.37	24.18	8.97	47	72.5
Idaho Falls, Idaho	Snake River	4,744	1880-1954	50	44.6	104	-37	63	11.31	21.31	5.93	49	44.2
Irwin, Idaho	Snake River	5,200	1898-1954	51	41.8	102	-45	57	14.85	24.33	4.75	43	63.2
Island Park, Idaho	Henrys Fork	6,300	1942-1954	12	36.7	91	-60	12	30.27	37.43	24.15	5	179.0
Lake, Idaho	Henrys Fork	6,700	1890-1945	2	38.8	92	-39	22	17.65	22.35	11.93	15	132.2
Sugar, Idaho	Henrys Fork	4,892	1907-1954	35	41.6	104	-44	46	11.02	19.24	6.52	33	46.9
Grover, Wyoming	Salt River	6,115	1904-1952	45	37.7	96	-55	49	18.04	26.41	12.35	38	88.6

TABLE 2

RUNOFF AND DISCHARGE DATA

SNAKE RIVER NEAR HEISE, IDAHO

Year	Annual Oct.-Sept. Runoff 1,000 A.F.	Actual 1/ peak Discharge 1,000 cfs	Natural Peak Discharge 1,000 cfs	Natural May-July Volume 1,000 A.F.
1903		23.0	32.0	
04	6,573	49.5	52.2	4,275
1905	2,983	13.5	18.3	1,756
06	4,095	19.0	27.0	2,753
07	5,922	23.5	32.4	4,290
08	5,061	18.5	26.5	2,645
09	6,911	44.0	48.7	4,600
1910	5,599	22.0	30.9	2,862
11	5,758	32.6	40.6	3,633
12	5,949	39.3	45.6	3,806
13	6,442	30.5	38.9	3,787
14	5,809	26.0	35.0	3,384
1915	3,940	17.1	19.5	1,742
16	5,761	28.1	36.8	3,477
17	6,448	38.9	39.5	3,140
18	6,620	52.0	54.2	4,014
19	3,869	17.9	24.1	1,635
1920	5,082	26.0	35.0	3,348
21	5,690	34.0	40.5	3,545
22	5,129	26.3	33.9	3,196
23	5,144	24.5	33.1	3,007
24	3,766	15.4	20.6	1,831
1925	5,530	25.1	35.7	3,542
26	4,296	19.0	20.4	1,722
27	5,782	36.0	41.5	4,079
28	6,195	36.1	44.0	3,793
29	4,506	24.3	29.6	2,355
1930	4,419	20.5	24.1	2,143
31	3,231	12.6	14.8	1,264
32	4,325	21.3	30.5	2,942
33	4,323	25.6	31.5	2,358
34	2,980	13.6	15.1	1,173
1935	4,004	21.6	31.8	2,605
36	5,103	29.3	38.7	3,425
37	3,941	17.9	23.5	2,192
38	4,994	23.1	32.9	3,145
39	4,406	19.4	21.1	2,175
1940	3,566	13.9	20.8	1,769
41	3,635	14.5	20.5	1,961
42	4,219	19.5	27.6	2,320
43	6,183	36.0	36.4	3,909
44	4,321	20.0	20.2	2,085
1945	4,422	22.5	27.7	2,781
46	5,466	26.2	26.2	2,742
47	5,226	25.9	27.1	3,082
48	5,015	30.5	32.7	2,864
49	4,841	21.0	28.9	2,832
1950	5,760	28.5	35.7	3,730
51	6,284	30.4	36.3	3,607
52	6,036	26.8	31.5	3,286
53	4,633	26.0	31.1	2,631
54	4,993	29.7	30.2	3,076
1955	4,091	18.5	22.0	2,222
1956	6,523	33.1	43.0	4,246
Avg.	5,015			2,920

1/ Reflect regulation by Jackson Lake.

SNAKE RIVER AT MORAN, WYO.

Year	Natural Peak Discharge 1,000 cfs	Natural May-July Volume 1,000 A.F.	Annual Oct.-Sept. Runoff 1,000 A.F.
1904	8.2	885	1,302.0
05	5.0	467	780.0
06	6.0	591	899.0
07	7.6	894	1,270.0
08	6.4	560	1,124.0
09	14.2	814	1,461.0
1910	10.1	881	1,238.0
11	13.3	981	1,346.0
12	12.2	808	1,214.0
13	14.7	968	1,436.0
14	12.5	749	1,149.0
1915	6.9	408	769.8
16	13.5	874	1,223.0
17	13.0	880	1,238.0
18	17.0	921	1,249.0
19	7.2	417	685.2
1920	9.2	693	992.6
21	10.0	756	1,068.0
22	10.0	716	1,007.0
23	9.0	677	944.5
24	5.9	430	648.2
1925	12.9	924	1,328.0
26	9.5	465	763.4
27	14.2	1,038	1,416.0
28	15.2	984	1,331.0
29	9.0	578	866.1
1930	6.4	493	794.0
31	4.6	344	575.8
32	9.6	718	992.1
33	10.3	620	878.1
34	6.5	346	628.4
1935	10.9	654	933.7
36	11.4	759	1,069.0
37	7.9	558	779.4
38	10.8	816	1,146.0
39	8.8	576	892.9
1940	7.4	543	794.5
41	6.3	495	780.0
42	8.3	570	886.8
43	13.3	993	1,417.0
44	7.4	538	810.0
1945	9.5	625	896.4
46	9.5	668	1,059.0
47	10.2	809	1,129.0
48	9.9	736	1,026.0
49	8.6	775	1,107.0
1950	10.3	830	1,168.0
51	12.0	783	1,219.0
52	11.9	809	1,222.0
53	11.1	661	969.4
54	11.6	838	1,182.0
1955	7.5	619	898.2
56	14.1	1,054	1,484.0
Avg.		709	1,046.9

TABLE 3
PALISADES RESERVOIR ACTIVE STORAGE CAPACITY

GAGE HEIGHT (FEET)	CONTENT IN ACRE-FEET 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	AREA (ACRES)
5497.00										0.	
5498.00	499	1000	1501	2002	2503	3004	3505	4006	4507	5003	4972
5499.00	5509.	6017.	6525.	7034.	7542.	8050.	8559.	9067.	9575.	10084	5046
5500.00	10592	11108	11624	12140	12656	13172	13688	14203	14719	15235	5121
5501.00	15751	16275.	16798.	17322.	17846.	18369.	18893	19416.	19940	20464	5197
5502.00	20987	21519	22050	22582	23113	23645	24176	24708	25239	25771	5275
5503.00	26302	26841	27381	27920	28460	28999	29538	30078	30617	31157	5354
5504.00	31696	32243	32791	33338	33886	34433	34980	35528	36075	36622	5434
5505.00	37170	37725	38280	38836	39391	39946	40502	41057	41612	42167	5514
5506.00	42723	43286	43849	44412	44975	45538	46101	46664	47227	47791	5592
5507.00	48354	48924	49495	50066	50637	51207	51778	52349	52920	53490	5670
5508.00	54061	54639	55217	55795	56374	56952	57530	58108	58686	59264	5745
5509.00	59842	60428	61013	61598	62183	62769	63354	63939	64524	65110	5818
5510.00	65695	66287	66879	67471	68063	68654	69246	69838	70430	71022	5887
5511.00	71614	72212	72811	73409	74007	74605	75203	75801	76400	76998	5952
5512.00	77596	78200	78804	79408	80012	80616	81220	81824	82428	83032	6012
5513.00	83636	84245	84855	85465	86074	86684	87293	87903	88512	89112	6068
5514.00	89732	90346	90961	91576	92191	92860	94421	94036	94651	95266	6123
5515.00	95881	96501	97122	97742	93362	98982	99603	100223	100843	101464	6176
5516.00	102084	102710	103335	103961	104587	105212	105838	106464	107789	107715	6230
5517.00	108341	108972	109603	110235	110866	111497	112129	112760	113391	114023	6284
5518.00	114654	115291	115928	116566	117203	117840	118477	119115	119752	129389	6342
5519.00	121026	121670	122314	122957	123601	124244	124888	125532	126175	126819	6403
5520.00	127462	128113	128763	129414	130064	130715	131365	132016	132666	133316	6469
5521.00	133967	134625	135282	135940	136598	137256	137914	138571	139229	139887	6540
5522.00	140545	141210	141876	142541	143206	143872	144537	145203	145868	146534	6615
5523.00	147199	147873	148546	149219	149893	150566	151240	151913	152586	153260	6694
5524.00	153933	154615	155296	155978	156659	157341	158023	158704	159386	160067	6774
5525.00	160749	161439	162128	162818	163508	164198	164888	165578	166267	166957	6857
5526.00	167647	168345	169043	169742	170440	171138	171836	172534	173232	173931	6940
5527.00	174629	175335	176042	176748	177455	178161	178867	179574	180280	180987	7023
5528.00	181693	182408	183122	183837	184552	185266	185981	186695	187410	188125	7106
5529.00	188839	189562	190284	191007	191730	192452	193175	193897	194620	195342	7187

SOURCE: BUREAU OF RECLAMATION; SOP, PALISADES DAM, DATE: MARCH 1967
PALISADES DAM
PAGE! OF 4 ADDED DEC. 1967

TABLE 3
PALISADES RESERVOIR ACTIVE STORAGE CAPACITY

GAGE HEIGHT (FEET)	CONTENT IN ACRE-FEET 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	AREA (ACRES)
5530.00	196065	196795	197526	198256	198986	199717	200447	201177	201908	202638	7265
5531.00	203368	204106	204844	205582	206320	207058	207796	208534	209272	210010	7342
5532.00	210748	211493	212239	212984	213730	214475	215221	215967	216712	217458	7418
5533.00	218203	218956	219709	220462	221215	221968	222721	223474	224227	224980	7493
5534.00	225733	226494	227254	228015	228775	229536	230296	231057	231817	232577	7568
5535.00	233338	234106	234874	235642	236410	237177	237945	238713	239481	240249	7642
5536.00	241017	241792	242567	243343	244118	244893	245668	246444	247219	247994	7716
5537.00	248769	249552	250335	251117	251900	252683	253465	254248	255030	255813	7790
5538.00	256596	257386	258176	258966	259756	260546	261336	262126	262916	263706	7863
5539.00	264496	265293	266090	266887	267685	268482	269279	270077	270874	271671	7936
5540.00	272469	273273	274078	274883	275687	276492	277297	278101	278906	279711	8010
5541.00	280515	281327	282139	282951	283763	284575	285387	286199	287011	287822	8083
5542.00	288634	289454	290273	291092	291911	292730	293549	294368	295187	296007	8155
5543.00	296826	297652	298478	299304	300131	300957	301783	302610	303436	304262	8227
5544.00	305089	305922	306755	307589	308422	309256	310089	310923	311756	312589	8299
5545.00	313423	314263	315104	315945	316785	317626	318466	319307	320148	320988	8370
5546.00	321829	322677	323524	324372	325220	326068	326916	327763	328611	329459	8442
5547.00	330307	331162	332017	332872	333727	334582	335437	336292	337147	338002	8514
5548.00	338857	339720	340582	341444	342307	343169	344031	344894	345756	346619	8587
5549.00	347481	348351	349221	350091	350960	351830	352700	353570	354440	355310	8661
5550.00	356179	357057	357934	358812	359689	360566	361444	362321	363199	364076	8736
5551.00	364954	365839	366724	367609	368494	369379	370265	371150	372035	372920	8813
5552.00	373805	374698	375591	376484	377377	378270	379163	380056	380949	381842	8891
5553.00	382735	383636	384537	385438	386339	387240	388141	389042	389942	390843	8969
5554.00	391744	392653	393562	394471	395380	396289	397198	398107	399016	399925	9049
5555.00	400833	401750	402667	403584	404501	405418	406335	407252	408169	409086	9129
5556.00	410003	410928	411853	412778	413703	414628	415553	416478	417403	418327	9210
5557.00	419252	420285	421118	422051	422984	423917	424850	425783	426716	427649	9290
5558.00	428582	429523	430464	431405	432346	433287	434228	435169	436109	437050	9370
5559.00	437991	438940	439889	440838	441786	442735	443684	444633	445582	446530	9449
5560.00	447479	448436	449392	450349	451305	452262	453219	454175	455132	456008	9527
5561.00	457045	458009	458973	459937	460902	461866	462830	463794	464759	465723	9604
5562.00	466687	467659	648631	469603	470575	471546	472518	473490	474462	475434	9681
5563.00	476406	477385	478365	479344	480324	481303	482282	483262	484241	485221	9757
5564.00	486200	487187	488174	489161	490148	491135	492122	493109	494096	495083	9832

SOURCE: BUREAU OF RECLAMATION; SOP, PALISADES DAM, DATE: MARCH 1967

TABLE 3
PALISADES RESERVOIR ACTIVE STORAGE CAPACITY

GAGE HEIGHT (FEET)	CONTENT IN ACRE-FEET										AREA (ACRES)
	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	
5565.00	496070	497065	498059	499054	500048	501043	502037	503032	504026	505021	9908
5566.00	506015	507017	508019	509021	510024	511026	512028	513030	514032	515034	9983
5567.00	516036	517046	518055	519065	520075	521084	522094	523104	524113	525123	10059
5568.00	526133	527150	528167	529185	530202	531219	532237	533254	534271	535288	10135
5569.00	536306	537331	538356	539381	540406	541431	542456	543481	544506	545531	10211
5570.00	543556	547589	548621	549654	550687	551720	552752	553785	554818	555815	10289
5571.00	556883	557924	558964	560004	561045	562085	563125	564166	565206	566246	10366
5572.00	567287	568334	569382	570430	571478	572525	573573	574621	575669	576717	10441
5573.00	577765	578820	579875	580930	581985	583041	584096	585151	586206	587262	10515
5574.00	588317	589379	590442	591505	592568	593630	594693	595756	596818	597881	10589
5575.00	598944	600014	601084	602155	603225	604295	605366	606436	607506	608577	10665
5576.00	609647	610725	611803	612881	613960	615038	616116	617194	618272	619350	10742
5577.00	620429	621515	622601	623688	624774	625860	626947	628033	629119	630206	10822
5578.00	631292	632387	633482	634577	635672	636767	637862	638956	640051	641146	10905
5579.00	642241	643345	644449	645553	646657	647761	648865	649969	651073	652177	10993
5580.00	653281	654395	655509	656622	657736	658849	659963	661077	662190	663304	11087
. 5581.00	664417	665541	666665	667788	668912	670035	671159	672282	673406	674529	11185
5582.00	675653	676787	677921	679055	680188	681322	682456	683590	684724	685858	11286
5583.00	686991	688136	689280	690425	691569	692714	693858	695002	696147	697291	11391
5584.00	698436	699591	700747	701902	703057	704213	705368	706523	707679	708834	11498
5585.00	709990	711156	712323	713489	714656	715823	716989	718156	719323	720489	11609
5586.00	721656	722834	724013	725191	726369	727548	728726	729904	731083	732261	11724
5587.00	733439	734630	735820	737011	738201	739391	740582	741772	742962	744153	11843
5588.00	745343	746546	747749	748952	750154	751357	752560	753763	754966	756168	11965
5589.00	757371	758537	759803	761018	762234	763450	764665	765881	767097	768312	12091
5590.00	769528	770757	771986	773215	774444	775673	776902	778131	779360	780589	12222
5591. 00	781819	783062	784305	785548	786791	788034	789278	790521	791764	793007	12359
5592.00	794250	795508	796766	798024	799232	800540	801798	803056	804314	805699	12504
5593.00	806830	808104	809377	810650	811924	813197	814470	815744	817017	813290	12656
5594.00	819564	820853	822142	823431	824720	826009	827898	828587	829876	831165	12811
5595.00	832454	833759	385064	836369	837674	838979	840248	841589	842894	844199	12970
5596.00	845504	846824	848145	849466	850787	852108	853429	854749	856070	857391	13129
5597.00	858712	860049	861385	862722	864058	865395	866731	868068	869405	870741	13288
5598.00	872078	873430	874782	876134	877486	878838	880190	881542	882894	884246	13444
5599.00	885598.	886965	888331	889698	891065	892432	893799	895116	896533	897900	13596

SOURCE: BUREAU OF RECLAMATION; SOP, PALISADES DAM, DATE: MARCH 1967

TABLE 3
PALISADES RESERVOIR ACTIVE STORAGE CAPACITY

GAGE HEIGHT (FEET)	CONTENT IN ACRE-FEET 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	AREA (ACRES)
5600.00	899267	900648	902029	903410	904792	906173	907554	908936	910317	911698	13742
5601.00	913079	914475	915870	917266	918661	920056	921452	922847	924243	925638	13884
5602.00	927034	928443	929852	931262	932671	934080	935490	936899	938309	939718	14024
5603.00	941127	942550	943974	945397	946820	948243	949666	951089	952655	953936	14163
5604.00	955359	956796	958232	959669	961106	962543	963979	965416	966853	968290	14300
5605.00	969727	971177	972627	974077	975527	976977	978427	979878	981328	982778	14435
5606.00	984228	985691	987155	988618	990081	991545	993008	994471	995935	997398	14568
5607.00	998861	1000337	1001814	1003290	1004766	1006242	1007718	1009195	1010671	1012147	14698
5608.00	1013623	1015112	1016601	1018090	1019579	1021067	1022556	1024045	1025534	1027023	14826
5609.00	1028512	1030013	1031514	1033015	1034517	1036018	1037519	1039020	1040521	1042023	14951
5610.00	1043524	1045037	1046550	1048064	1049577	1051091	1052604	1054117	1055631	1057144	15073
5611.00	1058657	1060183	1061708	1063234	1064759	1066284	1067810	1069335	1070861	1072386	15194
5612.00	1073912	1075449	1076986	1078524	1080061	1081599	1083136	1084674	1086211	1087749	15315
5613.00	1089286	1090836	1092385	1093934	1095484	1097033	1098582	1100132	1101681	1103230	15435
5614.00	1104780	1106341	11 07902	1109463	1111024	1112585	1114146	1115707	1117268	1118829	15553
5615.00	1120390	1121962	1123534	1125106	1126678	1128250	1129823	1131395	1132967	1134539	15667
561600	1136112	1137694	1139277	1140860	1142443	1144026	1145609	1147192	1148775	1150358	15777
5617.00	1151941	1153534	1155127	1156720	1158313	1159906	1161499	1163092	1164685	1166278	15882
5618.00	1167871	1169474	1171076	1172679	1174281	1175883	1177486	1179088	1180691	1182293	15979
5619.00	1183896	1185506	1187117	1188728	1190339	1191950	1193561	1195172	1196783	1198394	16069
5620.00 *	1200000	1201626	1203248	1204869	1206491	1208112	1209734	1211355	1212976	1214598	16150
5621.00	1216219										

* Top of Joint Use.

SOURCE: BUREAU OF RECLAMATION; SOP, PALISADES DAM, DATE: MARCH 1967
PALISADES DAM

ADDED DEC. 1987

TABLE 4
JACKSON LAKE RESERVOIR
USABLE STORAGE CAPACITY

ELEV. FEET	STORAGE CONTENT	STOR DIFF	ELEV. FEET	STORAGE CONTENT	STOR DIFF	ELEV. FEET	STORAGE CONTENT	STOR DIFF	ELEV. FEET	STORAGE CONTENT	STOR DIFF	ELEV. FEET	STORAGE CONTENT	STOR DIFF	ELEV. FEET	STORAGE CONTENT	STOR DIFF	ELEV. FEET	STORAGE CONTENT	STOR DIFF
6730.0	0	1720	6735.0	88,070	1840	6740.0	182,520	1990	6745.0	284,450	2120	6750.0	392,900	2240	6755.0	506,550	2320	6760.0	624,360	2400	6765.0	746,260	2500
30.1	1,720	1720	35.1	89,910	1830	40.1	184,510	1980	45.1	286,570	2120	50.1	395,140	2230	55.1	508,870	2330	60.1	626,760	2400	65.1	748,760	2500
30.2	3,440	1720	35.2	91,730	1830	40.2	186,494	1984	45.2	288,690	2120	50.2	397,370	2240	55.2	511,200	2330	60.2	629,160	2410	65.2	751,260	2500
30.3	5,160	1720	35.3	93,570	1830	40.3	188,476	1984	45.3	290,810	2120	50.3	399,610	2230	55.3	513,520	2320	60.3	631,570	2410	65.3	753,760	2500
30.4	6,880	1720	35.4	95,400	1830	40.4	190,456	1984	45.4	292,930	2120	50.4	401,840	2240	55.4	515,850	2330	60.4	633,980	2410	65.4	756,260	2500
30.5	8,600	1720	35.5	97,230	1840	40.5	192,430	1980	45.5	295,050	2130	50.5	404,080	2240	55.5	518,170	2320	60.5	636,380	2400	65.5	758,760	2500
30.6	10,320	1720	35.6	99,070	1830	40.6	194,410	1980	45.6	297,180	2120	50.6	406,320	2230	55.6	520,490	2320	60.6	638,780	2410	65.6	761,220	2500
30.7	12,040	1720	35.7	100,900	1830	40.7	196,396	1980	45.7	299,300	2120	50.7	408,550	2240	55.7	522,820	2330	60.7	641,190	2410	65.7	763,720	2480
30.8	13,760	1720	35.8	102,730	1830	40.8	198,370	1980	45.8	301,420	2120	50.8	410,790	2230	55.8	525,140	2320	60.8	643,600	2400	65.8	766,200	2500
30.9	15,480	1720	35.9	104,560	1830	40.9	200,350	1980	45.9	303,540	2120	50.9	413,020	2240	55.9	527,470	2320	60.9	646,000	2400	65.9	768,700	2480
6731.0	17,190	1740	6736.0	106,390	1860	6741.0	202,330	2010	6746.0	305,660	2150	6751.0	415,260	2260	6756.0	529,790	2340	6761.0	648,400	2430	6766.0	771,180	2510
31.1	18,930	1740	36.1	108,250	1860	41.1	204,340	2010	46.1	307,810	2140	51.1	417,520	2260	56.1	532,130	2340	61.1	650,830	2420	66.1	773,690	2510
31.2	20,670	1740	36.2	110,110	1860	41.2	206,350	2010	46.2	309,950	2150	51.2	419,770	2250	56.2	534,470	2340	61.2	653,250	2420	66.2	776,200	2510
31.3	22,410	1740	36.3	111,970	1860	41.3	208,360	2010	46.3	312,100	2150	51.3	422,030	2260	56.3	536,810	2340	61.3	655,670	2420	66.3	778,710	2510
31.4	24,150	1740	36.4	113,830	1860	41.4	210,370	2010	46.4	314,240	2140	51.4	424,280	2250	56.4	539,150	2340	61.4	658,090	2420	66.4	781,220	2510
31.5	25,890	1740	36.5	115,690	1860	41.5	212,380	2010	46.5	316,390	2150	51.5	426,540	2250	56.5	541,490	2340	61.5	660,510	2420	66.5	783,720	2500
31.6	27,630	1740	36.6	117,550	1860	41.6	214,390	2010	46.6	318,540	2140	51.6	428,790	2260	56.6	543,830	2340	61.6	662,950	2420	66.6	786,230	2510
31.7	29,370	1740	36.7	119,410	1860	41.7	216,400	2010	46.7	320,680	2150	51.7	431,050	2260	56.7	546,170	2340	61.7	665,390	2420	66.7	788,740	2510
31.8	31,110	1740	36.8	121,270	1860	41.8	218,410	2010	46.8	322,830	2140	51.8	433,300	2260	56.8	548,510	2340	61.8	667,780	2420	66.8	791,250	2510
31.9	32,850	1730	36.9	123,130	1850	41.9	220,420	2010	46.9	324,970	2150	51.9	435,560	2250	56.9	550,850	2340	61.9	670,200	2420	66.9	793,760	2500
6732.0	34,580	1760	6737.0	124,980	1890	6742.0	222,430	2040	6747.0	327,120	2170	6752.0	437,810	2280	6757.0	553,190	2360	6762.0	672,620	2440	6767.0	796,260	2530
32.1	36,340	1760	37.1	126,870	1890	42.1	224,470	2040	47.1	329,290	2170	52.1	440,090	2280	57.1	555,550	2360	62.1	675,060	2440	67.1	798,790	2530
32.2	38,100	1760	37.2	128,766	1890	42.2	226,510	2040	47.2	331,460	2170	52.2	442,360	2270	57.2	557,900	2360	62.2	677,580	2440	67.2	801,320	2520
32.3	39,860	1760	37.3	130,656	1880	42.3	228,550	2040	47.3	333,630	2170	52.3	444,640	2280	57.3	560,260	2360	62.3	679,940	2430	67.3	803,840	2520
32.4	41,610	1740	37.4	132,536	1890	42.4	230,590	2040	47.4	335,800	2170	52.4	446,910	2270	57.4	562,610	2360	62.4	682,370	2430	67.4	806,379	2530
32.5	43,330	1740	37.5	134,426	1891	42.5	232,630	2040	47.5	337,970	2170	52.5	449,180	2270	57.5	564,970	2360	62.5	684,810	2440	67.5	808,909	2530
32.6	45,140	1740	37.6	136,316	1891	42.6	234,670	2040	47.6	340,140	2170	52.6	451,460	2270	57.6	567,330	2360	62.6	687,250	2440	67.6	811,428	2530
32.7	46,990	1760	37.7	138,206	1888	42.7	236,710	2040	47.7	342,310	2170	52.7	453,730	2270	57.7	569,680	2360	62.7	689,690	2440	67.7	813,959	2530
32.8	48,660	1760	37.8	140,080	1889	42.8	238,750	2040	47.8	344,480	2170	52.8	456,010	2270	57.8	572,040	2350	62.8	692,130	2440	67.8	816,479	2520
32.9	50,420	1760	37.9	141,974	1894	42.9	240,790	2040	47.9	346,650	2170	52.9	458,280	2270	57.9	574,390	2360	62.9	694,570	2430	67.9	819,009	2520
6733.0	52,180	1790	6738.0	143,866	1920	6743.0	242,830	2070	6748.0	348,820	2190	6753.0	460,550	2300	6758.0	576,750	2370	6763.0	697,000	2460	6768.0	821,520	2550
33.1	53,970	1780	38.1	145,780	1910	43.1	244,900	2060	48.1	351,010	2200	53.1	462,850	2290	58.1	579,120	2370	63.1	699,440	2460	68.1	824,070	2540
33.2	55,750	1780	38.2	147,690	1920	43.2	246,960	2070	48.2	353,210	2190	53.2	465,140	2290	58.2	581,490	2370	63.2	701,920	2450	68.2	826,610	2540
33.3	57,530	1780	38.3	149,610	1920	43.3	249,030	2070	48.3	355,400	2190	53.3	467,430	2290	58.3	583,870	2370	63.3	704,370	2460	68.3	829,160	2540
33.4	59,310	1790	38.4	151,530	1920	43.4	251,100	2070	48.4	357,590	2190	53.4	469,720	2290	58.4	586,240	2370	63.4	706,830	2450	68.4	831,706	2540
33.5	61,140	1780	38.5	153,450	1914	43.5	253,170	2060	48.5	359,780	2200	53.5	472,010	2290	58.5	588,610	2370	63.5	709,280	2460	68.5	834,294	2540
33.6	62,880	1780	38.6	155,360	1920	43.6	255,230	2070	48.6	361,980	2190	53.6	474,300	2290	58.6	590,980	2370	63.6	711,740	2450	68.6	836,796	2540
33.7	64,660	1780	38.7	157,280	1920	43.7	257,300	2070	48.7	364,170	2190	53.7	476,600	2300	58.7	593,350	2380	63.7	714,190	2460	68.7	839,340	2550
33.8	66,440	1780	38.8	159,200	1920	43.8	259,370	2070	48.8	366,360	2190	53.8	478,890	2290	58.8	595,730	2370	63.8	716,650	2450	68.8	841,886	2540
33.9	68,230	1790	38.9	161,120	1910	43.9	261,440	2060	48.9	368,560	2200	53.9	481,180	2290	58.9	598,100	2370	63.9	719,100	2460	68.9	844,420	2580
6734.0	70,010	1810	6739.0	163,030	1950	6744.0	263,500	2100	6749.0	370,750	2210	6754.0	483,470	2310	6759.0	600,470	2390	6764.0	721,560	2470	6769.0	847,000	2530
34.1	71,820	1800	39.1	164,980	1950	44.1	265,600	2090	49.1	372,960	2220	54.1	485,780	2310	59.1	602,860	2390	64.1	724,030	2470	69.1	849,530	2570
34.2	73,620	1810	39.2	166,930	1950	44.2	267,690	2100	49.2	375,180	2220	54.2	488,090	2300	59.2	605,250	2390	64.2	726,500	2480	69.2	852,100	2560
34.3	75,430	1810	39.3	168,880	1950	44.3	269,790	2090	49.3	377,400	2210	54.3	490,390	2310	59.3	607,640	2380	64.3	728,980	2470	69.3	854,660	2560
34.4	77,240	1800	39.4	170,830	1950	44.4	271,880	2100	49.4	379,610	2210	54.4	492,700	2310	59.4	610,020	2390	64.4	731,450	2470	69.4	857,220	2570
34.5	79,040	1810	39.5	172,780	1950	44.5	273,980	2090	49.5	381,820	2220	54.5	495,010	2310	59.5	612,410	2390	64.5	733,920	2480	69.5	859,796	2560
34.6	80,850	1810	39.6	174,730	1950	44.6	276,070	2100	49.6	384,040	2220	54.6	497,320	2310	59.6	614,800	2390	64.6	736,400	2480	69.6	862,350	2560
34.7	82,660	1800	39.7	176,680	1950	44.7	278,170	2090	49.7	386,260	2210	54.7	499,630	2300	59.7	617,190	2390	64.7	738,870	2470	69.7	864,910	2570
34.8	84,460	1810	39.8	178,630	1950	44.8	280,260	2100	49.8	388,470	2210	54.8	501,930	2310	59.8	619,580	2390	64.8	741,390	2470	69.8	867,480	2570
34.9	86,270	1800	39.9	180,580	1940	44.9	282,360	2090	49.9	390,680	2220	54.9	504,240	2310	59.9	621,970	2390	64.9	743,810	2479	69.9	870,040	2560
																					6770.0	872,600	

TABLE 4

TABLE 5
REPRESENTATIVE SNOW COURSE DATA

Snow Course	Map No.	Elevation m.s.l.	Years of Record and Average Water Equivalent - Inches																	
			January 1st		January 15th		February 1st		February 15th		March 1st		March 15th		April 1st		April 15th		May 1st		June 1st	
			Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.
Afton R.S.	1	6,200	19	2.2	-	-	21	3.8	-	-	21	4.7	-	-	21	8.1	1	0.0	4	0.0	-	-
Aster Creek	2	7,700	5	14.4	31	14.5	6	25.0	32	22.1	6	32.1	32	27.2	8	39.6	32	29.8	1	45.0	1	15.0
Blackrock	3	8,600	-	-	-	-	33	12.6	-	-	7	20.6	-	-	20	22.9	-	-	3	25.3	-	-
CCC Camp	4	7,500	19	4.5	-	-	21	7.7	-	-	21	10.1	-	-	21	11.9	1	15.0	7	4.4	-	-
Cottonwood Lake	5	7,500	2	7.4	-	-	1	11.2	-	-	3	14.1	-	-	18	17.5	-	-	1	10.6	-	-
Coulter Creek	6	7,600	5	9.1	30	11.0	6	17.1	32	16.7	6	22.2	32	20.3	8	26.4	30	21.0	-	-	-	-
Deadman Ranch	7	6,534	10	4.1	-	-	12	6.5	-	-	20	9.9	-	-	19	16.7	-	-	5	1.2	-	-
East Rim Divide	8	7,950	6	3.8	-	-	2	7.1	-	-	17	10.2	1	12.4	21	12.1	1	13.1	10	10.8	-	-
Four-Mile Meadows	9	7,770	-	-	-	-	33	8.3	-	-	7	12.3	-	-	21	13.4	-	-	-	-	-	-
Glade Creek	10	7,200	6	9.5	31	11.6	6	16.7	32	17.4	6	21.7	32	21.4	8	26.0	32	22.8	1	32.1	1	7.0
Grover Park Divide	11	7,500	19	4.4	-	-	20	7.5	-	-	21	10.1	-	-	21	11.6	1	14.7	7	4.4	-	-
Huckleberry Divide	12	7,300	6	8.4	31	9.7	6	14.8	32	14.9	6	19.0	32	18.0	7	22.8	32	18.8	1	17.5	-	-
Lewis Lake Divide	13	7,900	6	19.8	31	20.7	6	33.1	32	30.7	6	42.9	32	37.9	8	51.3	32	42.0	5	47.9	1	34.7
Togwotee Pass	14	9,600	-	-	-	-	33	18.9	-	-	7	27.6	-	-	21	29.6	-	-	7	35.5	1	37.0
Turpin Meadows	15	6,930	-	-	-	-	33	6.9	-	-	7	10.6	-	-	21	10.9	-	-	-	-	-	-
Yellowjacket	16	7,675	4	1.9	-	-	9	4.3	1	5.2	15	5.8	1	5.7	20	6.7	1	5.6	7	0.3	-	-

TABLE 6

DISCHARGE RATING TABLE - SNAKE RIVER NEAR HEISE, IDAHO
(USGS STATION NO. 13037500)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.10	1030	1041	1052	1063	1074	1085	1096	1107	1118	1129
1.20	1140	1152	1164	1176	1188	1200	1212	1224	1236	1248
1.30	1260	1273	1286	1299	1312	1325	1338	1351	1364	1377
1.40	1390	1404	1418	1432	1446	1460	1474	1488	1502	1516
1.50	1530	1545	1560	1575	1590	1605	1620	1635	1650	1665
1.60	1680	1696	1712	1728	1744	1760	1776	1792	1808	1824
1.70	1840	1856	1872	1888	1904	1920	1936	1952	1968	1984
1.80	2000	2016	2032	2048	2064	2080	2096	2112	2128	2144
1.90	2160	2177	2194	2211	2228	2245	2262	2279	2296	2313
2.00	2330	2349	2368	2387	2406	2425	2444	2463	2482	2501
2.10	2520	2540	2560	2580	2600	2620	2640	2660	2680	2700
2.20	2720	2741	2762	2783	2804	2825	2846	2867	2888	2909
2.30	2930	2951	2972	2993	3014	3035	3056	3077	3098	3119
2.40	3140	3161	3182	3203	3224	3245	3266	3287	3308	3329
2.50	3350	3371	3392	3413	3434	3455	3476	3497	3518	3539
2.60	3560	3582	3604	3626	3648	3670	3692	3714	3736	3758
2.70	3780	3803	3826	3849	3872	3895	3918	3941	3964	3987
2.80	4010	4034	4058	4082	4106	4130	4154	4178	4202	4226
2.90	4250	4275	-4300	4325	4350	4375	4400	4425	4450	4475
3.00	4500	4526	4552	4578	4604	4630	4656	4682	4708	4734
3.10	4760	4787	4814	4841	4868	4895	4922	4949	4976	5003
3.20	5030	5058	5086	5114	5142	5170	5198	5226	5254	5282
3.30	5310	5338	5366	5394	5422	5450	5478	5506	5534	5562
3.40	5590	5618	5646	5674	5702	5730	5758	5786	5814	5842
3.50	5870	5898	5926	5954	5982	6010	6038	6066	6094	6122
3.60	6150	6178	6206	6234	6262	6290	6318	6346	6374	6402
3.70	6430	6460	6490	6520	6550	6580	6610	6640	6670	6700
3.80	6730	6762	6794	6826	6858	6890	6922	6954	6986	7018
3.90	7050	7084	7118	7152	7186	7220	7254	7288	7322	7356
4.00	7390	7424	7458	7492	7526	7560	7594	7628	7662	7696
4.10	7730	7764	7798	7832	7866	7900	7934	7968	8002	8036
4.20	8070	8104	8138	8172	8206	8240	8274	8308	8342	8376
4.30	8410	8444	8478	8512	8546	8580	8614	8648	8682	8716
4.40	8750	8784	8818	8852	8886	8920	8954	8988	9022	9056
4.50	9090	9124	9158	9192	9226	9260	9294	9328	9362	9396
4.60	9430	9466	9502	9538	9574	9610	9646	9682	9718	9754
4.70	9790	9826	9862	9898	9934	9970	10006	10042	10078	10114
4.80	10150	10186	10222	10258	10294	10330	10366	10402	10438	10474
4.90	10510	10546	10582	10618	10654	10690	10726	10762	10798	10834
5.00	10870	10908	10946	10984	11022	11060	11098	11136	11174	11212

TABLE 6

DISCHARGE RATING TABLE - SNAKE RIVER NEAR HEISE, IDAHO

(USGS STATION NO. 13037500)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
5.10	11250	11290	11330	11370	11410	11450	11490	11530	11570	11610
5.20	11650	11692	11734	11776	11818	11860	11902	11944	11986	12026
5.30	12070	12112	12154	12196	12238	12280	12322	12364	12406	12448
5.40	12490	12532	12574	12616	12658'	12700	12742	12784	12826	12868
5.50	12910	12952	12994	13036	13078	13120	13162	13204	13246	13288
5.60	13330	13372	13414	13456	13498	13540	13582	13624	13666	13708
5.70	13750	13794	13838	13882	13926	13970	14014	14058	14102	1414E
5.80	14190	14234	14278	14322	14366	14410	14454	14498	14542	14586
5.90	14630	14674	14718	14762	14806	14850	14894	14938	14982	15026
6.00	15070	15116	15162	15208	15254	15300	15346	15392	15438	15484
6.10	15530	15576	15622	15668	15714	15760	15806	15852	15898	15944
6.20	15990	16036	16082	16128	16174	16220	16266	16312	16358	16404
6.30	16450	16496	16542	16588	16634	16680	16726	16772	16818	16864
6.40	16910	16956	17002	17048	17094	17140	17186	17232	17278	17324
6.50	17370	17416	17462	17508	17554	17600	17646	17692	17738	17784
6.60	17830	17876	17922	17968	18014	18060	18106	18152	18198	18244
6.70	18290	18336	18382	18428	18474	18520	18566	18612	18658	18704
6.80	18750	18796	18842	18888	18934	18980	19026	19072	19118	19164
6.90	19210	19256	19302	19348	19394	19440	19486	19532	19578	19624
7.00	19670	19716	19762	19808	19854	19900	19946	19992	20038	20084
7.10	20130	20176	20222	20268	20314	20360	20406	20452	20498	20544
7.20	20590	20638	20686	20734	20782	20830	20878	20926	20974	21022
7.30	21070	21118	21166	21214	21262	21310	21358	21406	21454	21502
7.40	21550	21598	21646	21694	21742	21790	21838	21886	21934	21982
7.50	22030	22078	22126	22174	22222	22270	22318	22366	22414	22462
7.60	22510	22559	22608	22657	22706	22755	22804	22853	22902	22951
7.70	23000	23050	23100	23150	23200	23250	23300	23350	23400	23450
7.80	23500	23550	23600	23650	23700	23750	23800	23850	23900	23950
7.90	24000	24050	24100	24150	24200	24250	24300	24350	24400	24450
8.00	24500	24550	24600	24650	24700	24750	24800	24850	24900	24950
8.10	25000	25050	25100	25150	25200	25250	25300	25350	25400	25450
8.20	25500	25550	25600	25650	25700	25750	25800	25850	25900	25950
8.30	26000	26050	26100	26150	26200	26250	26300	26350	26400	26450
8.40	26500	26555	26610	26665	26720	26775	26830	26885	26940	26995
8.50	27050	27105	27160	27215	27270	27325	27380	27435	27490	27545
8.60	27600	27655	27710	27765	27820	27875	27930	27985	28040	28095
8.70	28150	28205	28260	28315	28370	28425	28480	28535	28590	28645
8.80	28700	28755	28810	28865	28920	28975	29030	29085	29140	29195
8.90	29250	29305	29360	29415	29470	29525	29580	29635	29690	29745
9.00	29800									

2 MAR 1987

TABLE 7

DISCHARGE RATING TABLE - SNAKE RIVER NEAR MORAN, WYOMING

(USGS STATION NO. 13011000)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.20	18	19	20	21	22	23	24	25	26	27
1.30	28	29	30	32	33	34	35	36	38	39
1.40	40	41	43	44	46	47	48	50	51	53
1.50	54	56	57	59	60	62	64	65	67	68
1.60	70	72	74	76	78	81	83	85	87	89
1.70	91	93	96	98	100	103	105	107	109	112
1.80	114	117	119	122	124	127	130	132	135	137
1.90	140	143	146	148	151	154	157	160	162	165
2.00	168	171	174	177	180	183	186	189	192	195
2.10	198	201	205	208	211	215	218	221	224	228
2.20	231	235	238	242	245	249	252	256	259	263
2.30	266	270	274	278	282	286	289	293	297	301
2.40	305	309	313	317	321	326	330	334	338	342
2.50	346	350	355	359	363	368	372	376	380	385
2.60	389	394	398	403	407	412	416	421	425	430
2.70	434	439	443	448	453	458	462	467	472	476
2.80	481	486	491	496	501	506	510	515	520	525
2.90	530	535	540	545	550	556	561	566	571	576
3.00	581	586	592	597	602	608	613	618	623	629
3.10	634	640	645	651	656	662	667	673	678	684
3.20	689	695	700	706	712	718	723	729	735	740
3.30	746	752	758	764	770	777	783	789	795	801
3.40	807	813	820	826	832	839	845	851	857	864
3.50	870	877	883	890	896	903	909	916	922	929
3.60	935	942	948	955	961	968	974	981	987	994
3.70	1000	1007	1014	1021	1028	1035	1042	1049	1056	1063
3.80	1070	1077	1084	1091	1098	1105	1112	1119	1126	1133
3.90	1140	1148	1156	1164	1172	1180	1188	1196	1204	1212
4.00	1170	1174	1178	1182	1186	1190	1194	1198	1202	1206
4.10	1210	1214	1218	1222	1226	1230	1234	1238	1242	1246
4.20	1380	1388	1396	1404	1412	1420	1428	1436	1444	1452
4.30	1460	1468	1476	1484	1492	1500	1508	1516	1524	1532
4.40	1540	1549	1558	1567	1576	1585	1594	1603	1612	1621
4.50	1630	1639	1648	1657	1666	1675	1684	1693	1702	1711
4.60	1720	1729	1738	1747	1756	1765	1774	1783	1792	1801
4.70	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900
4.80	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
4.90	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
5.00	2110	2120	2130	2140	2150	2160	2170	2180	2190	2200

TABLE 7

DISCHARGE RATING TABLE - SNAKE RIVER NEAR MORAN, WYOMING

(USGS STATION NO. 13011000)

GAGE HEIGHT	DISCHARGE IN CFS									
FEET	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
5.10	2210	2221	2232	2243	2254	2265	2276	2287	2298	2309
5.20	2320	2331	2342	2353	2364	2375	2386	2397	2408	2419
5.30	2430	2441	2452	2463	2474	2485	2496	2507	2518	2529
5.40	2540	2551	2562	2573	2584	2595	2606	2617	2628	2639
5.50	2650	2661	2672	2683	2694	2705	2716	2727	2738	2749
5.60	2760	2772	2784	2796	2808	2820	2832	2844	2856	2868
5.70	2880	2892	2904	2916	2928	2940	2952	2964	2976	2988
5.80	3000	3013	3026	3039	3052	3065	3078	3091	3104	3117
5.90	3130	3143	3156	316!=!	3182	3195	3208	3221	3234	3247
6.00	3260	3273	3286	3299	3312	3325	3338	3351	3364	3377
6.10	3390	3403	3416	3429	3442	3455	3468	3481	3494	3507
6.20	3520	3533	3546	3559	3572	3585	3598	3611	3624	3637
6.30	3650	3664	3678	3692	3706	3720	3734	3748	3762	3776
6.40	3790	3804	3818	3832	3846	3860	3874	3888	3902	3916
6.50	3930	3944	3958	3972	3986	4000	4014	4028	4042	4056
6.60	4070	4084	4098	4112	4126	4140	4154	4168	4182	4196
6.70	4210	4225	4240	4255	4270	4285	4300	4315	4330	4345
6.80	4360	4375	4390	4405	4420	4435	4450	4465	4480	4495
6.90	4510	4525	4540	4555	4570	4585	4600	4615	4630	4645
7.00	6179	6213	6247	6281	6315	6349	6383	6417	6451	6485
7.10	6519	6554	6589	6624	6659	6695	6730	6765	6800	6835
7.20	4970	4986	5002	5018	5034	5050	5066	5082	5098	5114
7.30	5130	5146	5162	5178	5194	5210	5226	5242	5258	5274
7.40	5290	5306	5322	5338	5354	5370	5386	5402	5418	5434
7.50	5450	5466	5482	5498	5514	5530	5546	5562	5578	5594
7.60	5610	5627	5644	5661	5678	5695	5712	5729	5746	5763
7.70	5780	5797	5814	5831	5848	5865	5882	5899	5916	5933
7.80	5950	5967	5984	6001	6018	6035	6052	6069	6086	6103
7.90	6120	6137	6154	6171	6188	6205	6222	6239	6256	6273
8.00	6290	6307	6324	6341	6358	6375	6392	6409	6426	6443
8.10	6460	6477	6494	6511	6528	6545	6562	6579	6596	6613
8.20	6630	6647	6664	6681	6698	6715	6732	6749	6766	6783
8.30	6800	6817	6834	6851	6868	6885	6902	6919	6936	6953
8.40	6970	6987	7004	7021	7038	7055	7072	7089	7106	7123
8.50	7140	7157	7174	7191	7208	7225	7242	7259	7276	7293
8.60	7310	7327	7344	7361	7378	7395	7412	7429	7446	7463
8.70	7480	7498	7516	7534	7552	7570	7588	7606	7624	7642
8.80	7660	7678	7696	7714	7732	7750	7768	7786	7804	7822
8.90	7840	7858	7876	7894	7912	7930	7948	7966	7984	8002
9.00	8020	8039	8058	8077	8096	8115	8134	8153	8172	8191

TABLE 7

DISCHARGE RATING TABLE - SNAKE RIVER NEAR MORAN, WYOMING
(USGS STATION NO. 13011000)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
9.10	8210	8229	8248	8267	8286	8305	8324	8343	8362	8381
9.20	8400	8419	8438	8457	8476	8495	8514	8533	8552	8571
9.30	8590	8609	8628	8647	8666	8685	8704	8723	8742	8761
9.40	8780	8799	8818	8837	8856	8875	8894	8913	8932	8951
9.50	8970	8989	9008	9027	9046	9065	9084	9103	9122	9141
9.60	9160	9179	9198	9217	9236	9255	9274	9293	9312	9331
9.70	9350	9369	9388	9407	9426	9445	9464	9483	9502	9521
9.80	9540	9559	9578	9597	9616	9635	9654	9673	9692	9711
9.90	9730	9749	9768	9787	9806	9825	9844	9863	9882	9901
10.00	16945	16983	17021	17059	17097	17135	17172	17210	17248	17286
10.10	17324	17362	17400	17438	17476	17515	17553	17591	17629	17667
10.20	10300	10320	10340	10360	10380	10400	10420	10440	10460	10480
10.30	10500	10520	10540	10560	10580	10600	10620	10640	10660	10680
10.40	10700	10720	10740	10760	10780	10800	10820	10840	10860	10880
10.50	10900	10920	10940	10960	10980	11000	11020	11040	11060	11080
10.60	11100	11120	11140	11160	11180	11200	11220	11240	11260	11280
10.70	11300	11320	11340	11360	11380	11400	11420	11440	11460	11480
10.80	11500	11520	11540	11560	11580	11600	11620	11640	11660	11680
10.90	11700	11720	11740	11760	11780	11800	11820	11840	11860	11880
11.00	11900									

28 JAN 1980

TABLE 7A

DISCHARGE RATING TABLE - SNAKE RIVER BELOW FLAT CREEK NEAR JACKSON, WYO.
(USGS STATION NO. 13018750)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.40	660	673	686	699	712	725	738	751	764	777
1.50	790	803	816	829	842	8-55	868	881	894	907
1.60	920	933	946	959	972	985	998	1011	1024	1037
1.70	1050	1063	1076	1089	1102	1115	1128	1141	1154	1167
1.80	1180	1193	1206	1219	1232	1245	1258	1271	1284	1297
1.90	1310	1323	1336	1349	1362	1375	1388	1401	1414	1427
2.00	1440	1453	1466	1479	1492	1505	1518	1531	1544	1557
2.10	1570	1583	1596	1609	1622	1635	1648	1661	1674	1687
2.20	1700	1714	1728	1742	1756	1770	1784	1798	1812	1827
2.30	1840	1854	1868	1882	1896	1910	1924	1938	1952	1967
2.40	1980	1994	2008	2022	2036	2050	2064	2078	2092	2106
2.50	2120	2136	2152	2168	2184	2200	2216	2232	2248	2264
2.60	2280	2296	2312	2328	2344	2360	2376	2392	2408	2424
2.70	2440	2456	2472	2488	2504	2520	2536	2552	2568	2584
2.80	2600	2616	2632	2648	2664	2680	2696	2712	2728	2744
2.90	2760	2778	2796	2814	2832	2850	2868	2886	2904	2922
3.00	2940	2958	2976	2994	3012	3030	3048	3066	3084	3102
3.10	3120	3138	3156	3174	3192	3210	3228	3246	3264	3282
3.20	3300	3318	3336	3354	3372	3390	3408	3426	3444	3462
3.30	3480	3498	3516	3534	3552	3570	3588	3606	3624	3642
3.40	3660	3678	3696	3714	3732	3750	3768	3786	3804	3822
3.50	3840	3858	3876	3894	3912	3930	3948	3966	3984	4002
3.60	4020	4040	4060	4080	4100	4120	4140	4160	4180	4200
3.70	4220	4240	4260	4280	4300	4320	4340	4360	4380	4400
3.80	4420	4440	4460	4480	4500	4520	4540	4560	4580	4600
3.90	4620	4642	4664	4686	4708	4730	4752	4774	4796	4818
4.00	4840	4862	4884	4906	4928	4950	4972	4994	5016	5038
4.10	5060	5082	5104	5126	5148	5170	5192	5214	5236	5258
4.20	5280	5302	5324	5346	5368	5390	5412	5434	5456	5478
4.30	5500	5522	5544	5566	5588	5610	5632	5654	5676	5698
4.40	5720	5742	5764	5786	5808	5830	5852	5874	5896	5918
4.50	5940	5962	5984	6006	6028	6050	6072	6094	6116	6138
4.60	6160	6182	6204	6226	6248	6270	6292	6314	6336	6358
4.70	6380	6404	6428	6452	6476	6500	6524	6548	6572	6596
4.80	6620	6644	6668	6692	6716	6740	6764	6788	6812	6836
4.90	6860	6884	6908	6932	6956	6980	7004	7028	7052	7076
5.00	7100	7126	7152	7178	7204	7230	7256	7282	7308	7334
5.10	7360	7386	7412	7438	7464	7490	7516	7542	7568	7594
5.20	7620	7646	7672	7698	7724	7750	7776	7802	7828	7854
5.30	7880	7908	7936	7964	7992	8020	8048	8076	8104	8132
5.40	8160	8188	8216	8244	8272	8300	8328	8356	8384	8412
5.50	8440	8468	8496	8524	8552	8580	8608	8636	8664	8692

TABLE 7A

DISCHARGE RATING TABLE - SNAKE RIVER BELOW FLAT CREEK NEAR JACKSON, WYO.
(USGS STATION NO. 13018750)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
5.60	8720	8748	8776	8804	8832	8860	8888	8916	8944	8972
5.70	9000	9028	9056	9084	9112	9140	9168	9196	9224	9252
5.80	9280	9308	9336	9364	9392	9420	9448	9476	9504	9532
5.90	9560	9588	9616	9644	9672	9700	9728	9756	9784	9812
6.00	9840	9868	9896	9924	9952	9980	10008	10036	10064	10092
6.10	10120	10148	10176	10204	10232	10260	10288	10316	10344	10372
6.20	10400	10430	10460	10490	10520	10550	10580	10610	10640	10670
6.30	10700	10730	10760	10790	10820	10850	10880	10910	10940	10970
6.40	11000	110W	11060	11090	11120	11150	11180	11210	11240	11270
6.50	11300	11330	11360	11390	11420	11450	11480	11510	11540	11570
6.60	11600	11632	11664	11696	11728	11760	11792	11824	11856	11888
6.70	11920	11952	11984	12016	12048	12080	12112	12144	12176	12208
6.80	12240	12274	12308	12342	12376	12410	12444	12478	12512	12546
6.90	12580	12614	12648	12682	12716	12750	12784	12818	12852	12886
7.00	12920	12954	12988	13022	13056	13090	13124	13158	13192	13226
7.10	13260	13294	13328	13362	13396	13430	13464	13498	13532	13566
7.20	13600	13634	13668	13702	13736	13770	13804	13838	13872	13906
7.30	13940	13974	14008	14042	14076	14110	14144	14178	14212	14246
7.40	14280	14316	14352	14388	14424	14460	14496	14532	14568	14604
7.50	14640	14676	14712	14748	14784	14820	14856	14892	14928	14964
7.60	15000	15036	15072	15108	15144	15180	15216	15252	15288	15324
7.70	15360	15396	15432	15468	15504	15540	15576	15612	15648	15684
7.80	15720	15756	15792	15828	15864	15900	15936	15972	16008	16044
7.90	16080	16116	16152	16188	16224	16260	16296	16332	16368	16404
8.00	16440	16476	16512	16548	16584	16620	16656	16692	16728	16764
8.10	16800	16836	16872	16908	16944	16980	17016	17052	17088	17124
8.20	17160	17196	17232	17268	17304	17340	17376	17412	17448	17484
.8.30	17520	17556	17592	17628	17664	17700	17736	17772	17808	17844
8.40	17880	17916	17952	17988	18024	18060	18096	18132	18168	18204
8.50	18240	18276	18312	18348	18384	18420	18456	18492	18528	18564
8.60	18600	18638	18676	18714	18752	18790	18828	18866	18904	18942
8.70	18980	19018	19056	19094	19132	19170	19208	19246	19284	19322
8.80	19360	19400	19440	19480	19520	19560	19600	19640	19680	19720
8.90	19760	19800	19840	19880	19920	19960	20000	20040	20080	20120
9.00	20160	20200	20240'	20280	20320	20360	20400	20440	20480	20520
9.10	20560	20600	20640	20680	20720	20760	20800	20840	20880	20920
9.20	20960	21000	21040	21080	21120	21160	21200	21240	21280	21320
9.30	21360	21400	21440	21480	21520	21560	21600	21640	21680	21720
9.40	21760	21804	21848	21892	21936	21980	22024	22068	22112	22156
9.50	22200	22244	22288	22332	22376	22420	22464	22508	22552	22596

TABLE 7A

DISCHARGE RATING TABLE - SNAKE RIVER BELOW FLAT CREEK NEAR JACKSON, WYO.
(USGS STATION NO. 13018750)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
9.60	22640	22684	22728	22772	22816	22860	22904	22948	22992	23036
9.70	23080	23124	23168	23212	23256	23300	23344	23388	23432	23476
9.80	23520	23564	23608	23652	23696	23740	23784	23828	23872	23916
9.90	23960	24004	24048	24092	24136	24180	24224	24268	24312	24356
10.00	24400	24444	24488	24532	24576	24620	24664	24708	24752	24796
10.10	24840	24884	24928	24972	25016	25060	25104	25148	25192	25236
10.20	25280	25324	25368	25412	25456	25500	25544	25588	25632	25676
10.30	25720	25764	25808	25852	25896	25940	25984	26028	26072	26116
10.40	26160	26204	26248	26292	26336	26380	26424	26468	26512	26556
10.50	26600	26644	26688	26732	26776	26820	26864	26908	26952	26996
10.60	27040	27084	27128	27172	27216	27260	27304	27348	27392	27436
10.70	27480	27524	27568	27612	27656	27700	27744	27788	27832	27876
10.80	27920	27964	28008	28052	28096	28140	28184	28228	28272	28316
10.90	28360	28404	28448	28492	28536	28580	28624	28668	28712	28756
11.00	28800									

4 MAR. 1987

TABLE 8

DISCHARGE RATING TABLE - SNAKE RIVER NEAR SHELLEY, IDAHO
(USGS STATION NO. 13060000)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
4.00	1170	1174	1178	1182	1186	1190	1194	1198	1202	1206
4.10	1210	1214	1218	1222	1226	1230	1234	1238	1242	1246
4.20	1250	1255	1260	1265	1270	1275	1280	1285	1290	1295
4.30	1300	1306	1311	1317	1322	1328	1334	1339	1345	1350
4.40	1356	1362	1369	1375	1381	1388	1394	1400	1406	1413
4.50	1419	1426	1433	1440	1447	1454	1460	1467	1474	1481
4.60	1488	1496	1503	1511	1518	1526	1534	1541	1549	1556
4.70	1564	1572	1580	1589	1597	1605	1613	1621	1630	1638
4.80	1646	1655	1664	1672	1681	1690	1699	1708	1716	1725
4.90	1734	1744	1753	1763	1772	1782	1791	1801	1810	1820
5.00	1829	1839	1849	1859	1869	1880	1890	1900	1910	1920
5.10	1930	1940	1951	1961	1972	1982	1992	2003	2013	2024
5.20	2034	2046	2058	2069	2081	2093	2105	2117	2128	2140
5.30	2152	2165	2178	2191	2204	2218	2231	2244	2257	2270
5.40	2283	2298	2312	2327	2341	2356	2370	2385	2399	2414
5.50	2428	2444	2460	2475	2491	2507	2523	2539	2554	2570
5.60	2586	2603	2620	2637	2654	2672	2689	2706	2723	2740
5.70	2757	2775	2794	2812	2831	2849	2867	2886	2904	2923
5.80	2941	2961	2981	3000	3020	3040	3060	3080	3099	3119
5.90	3139	3160	3181	3202	3223	3245	3266	3287	3308	3329
6.00	3350	3371	3392	3413	3434	3456	3477	3498	3519	3540
6.10	3561	3584	3607	3630	3653	3676	3698	3721	3744	3767
6.20	3790	3815	3840	3865	3890	3915	3939	3964	3989	4014
6.30	4039	4066	4092	4119	4146	4173	4199	4226	4253	4279
6.40	4306	4335	4363	4392	4420	4449	4478	4506	4535	4563
6.50	4592	4623	4653	4684	4714	4745	4775	4806	4836	4867
6.60	4897	4929	4962	4994	5026	5059	5091	5123	5155	5188
6.70	5220	5251	5282	5313	5344	5375	5405	5436	5467	5498
6.80	5529	5561	5593	5625	5657	5689	5720	5752	5784	5816
6.90	5848	5881	5914	5947	5980	6014	6047	6080	6113	6146
7.00	6179	6213	6247	6281	631'5	6349	6383	6417	6451	6485
7.10	6519	6554	6589	6624	6659	6695	6730	6765	6800	6835
7.20	6870	6906	6942	6979	7015.	7051	7087	7123	7160	7196
7.30	7232	7269	7307	7344	7381	7419	7456	7493	7530	7568
7.40	7605	7643	7682	7720	7758:	7797	7835	7873	7911	7950
7.50	7988	8027	8067	8106	8145	8185	8224	8263	8302	8342
7.60	8381	8421	8462	8502	8543	8583	8623	8664	8704	8745
7.70	8785	8827	8868	8910	8951	8993	9034	9076	9117	9159
7.80	9200	9238	9275	9313	9350	9388	9425	9463	9500	9538
7.90	9575	9613	9650	9688	9725	9763	9800	9838	9875	9913

TABLE 8

DISCHARGE RATING TABLE - SNAKE RIVER NEAR SHELLEY, IDAHO
(USGS STATION NO. 13060000)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
8.00	9950	9988	10025	10063	10100	10138	10175	10213	10250	10288
8.10	10325	10363	10400	10438	10475	10513	10550	10588	10625	10663
8.20	10700	10726	10752	10779	10805	10831	10857	10883	10910	10936
8.30	10962	10991	11020	11048	11077	11106	11135	11164	11192	11221
8.40	11250	11281	11312	11344	11375	11406	11437	11468	11500	11531
8.50	11562	11596	11630	11663	11697	11731	11765	11799	11832	11866
8.60	11900	11936	11972	12009	12045	12081	12117	12153	12190	12226
8.70	12262	12301	12340	12378	12417	12456	12495	12534	12572	12611
8.80	12650	12691	12732	12774	12815	12856	12897	12938	12980	13021
8.90	13062	13106	13150	13193	13237	13281	13325	13369	13412	13456
9.00	13500	13530	13560	13590	13620	13650	13680	13710	13740	13770
9.10	13800	13830	13860	13890	13920	13950	13980	14010	14040	14070
9.20	14100	14130	14160	14190	14220	14250	14280	14310	14340	14370
9.30	14400	14430	14460	14490	14520	14550	14580	14610	14640	14670
9.40	14700	14737	14774	14811	14848	14885	14922	14959	14996	15033
9.50	15070	15107	15144	15182	15219	15256	15293	15330	15368	15405
9.60	15442	15479	15517	15554	15591	15629	15666	15703	15740	15778
9.70	15815	15853	15890	15928	15965	16003	16040	16078	16115	16153
9.80	16190	16228	16265	16303	16341	16379	16416	16454	16492	16529
9.90	16567	16605	16643	16680	16718	16756	16794	16832	16869	16907
10.00	16945	16983	17021	17059	17097	17135	17172	17210	17248	17286
10.10	17324	17362	17400	17438	17476	17515	17553	17591	17629	17667
10.20	17705	17743	17781	17820	L7858	17896	17934	17972	18011	18049
10.30	18087	18125	18164	18202	18241	18279	18317	18356	18394	18433
10.40	18471	18510	18548	18587	18625	18664	18703	18741	18780	18818
10.50	18857	18896	18934	18973	19012	19051	19089	19128	19167	19205
10.60	19244	19283	19322	19360	19399	19438	19477	19516	19554	19593
10.70	19632	19671	19710	19749	19788	19827	19866	19905	19944	19983
10.80	20022	20061	20100	20140	20179	20218	20257	20296	20336	20375
10.90	20414	20453	20493	20532	20571	20611	20650	20689	20728	20768
11.00	20807	20846	20886	20925	20965	21004	21043	21083	21122	21162
11.10	21201	21241	21280	21320	21359	21399	21439	21478	21518	21557
11.20	21597	21637	21677	21716	21756	21796	21836	21876	21915	21955
11.30	21995	22035	22075	22115	22155	22195	22234	22274	22314	22354
11.40	22394	22434	22474	22514	22554	22594	22634	22674	22714	22754
11.50	22794	22834	22874	22915	22955	22995	23035	23075	23116	23156
11.60	23196	23236	23277	23317	23358	23398	23438	23479	23519	23560
11.70	23600	23649	23697	23746	23795	23844	23892	23941	23990	24038
11.80	24087	24136	24185	24233	24282	24331	24380	24429	24477	24526
11.90	24575	24624	24673	24722	24771	24820	24868	24917	24966	25015

TABLE 8

DISCHARGE RATING TABLE - SNAKE RIVER NEAR SHELLEY, IDAHO
(USGS STATION NO. 13060000)

GAGE HEIGHT FEET	DISCHARGE IN CFS .00	.01	.02	.03	.04	.05	.06	.07	.08	.09
12.00	25064	25113	25162	25211	25260	25309	25358	25407	25456	25505
12.10	25554	25603	25652	25701	25750	25799	25848	25897	25946	25995
12.20	26044	26093	26142	26191	26240	26290	26339	26388	26437	26486
12.30	26535	26584	26633	26683	26732	26781	26830	26879	26929	26978
12.40	27027	27076	27126	27175	27224	27274	27323	27372	27421	27471
12.50	27520	27569	27619	27668	27717	27767	27816	27865	27914	27964
12.60	28013	28062	28112	28161	28211	28260	28309	28359	28408	28458
12.70	28507	28557	28606	28656	28705	28755	28804	28854	28903	28953
12.80	29002	29052	29101	29151	29200	29250	29300	29349	29399	29448
12.90	29498	29548	29597	29647	29696	29746	29796	29845	29895	29944
13.00	29994	30044	30093	30143	30193	30243	30292	30342	30392	30441
13.10	30491	30541	30591	30640	30690	30740	30790	30840	30889	30939
13.20	30989	31039	31089	31139	31189	31239	31288	31338	31388	31438
13.30	31488	31538	31588	31638	31688	31738	31788	31838	31888	31938
13.40	31988	32038	32088	32138	32188	32238	32288	32338	32388	32438
13.50	32488	32538	32588	32638	32688	32739	32789	32839	32889	32939
13.60	32989	33039	33089	33139	33189	33240	33290	33340	33390	33440
13.70	33490	33540	33591	33641	33691	33742	33792	33842	33892	33943
13.80	33993	34043	34094	34144	34194	34245	34295	34345	34395	34446
13.90	34496	34546	34597	34647	34698	34748	34798	34849	34899	34950
14.00	35000	35056	35111	35167	35222	35278	35334	35389	35445	35500
14.10	35556	35612	35668	35724	35780	35836	35891	35947	36003	36059
14.20	36115	36171	36227	36284	36340	36396	36452	36508	36565	36621
14.30	36677	36734	36790	36847	36903	36960	37017	37073	37130	37186
14.40	37243	37300	37357	37414	37471	37528	37584	37641	37698	37755
14.50	37812	37869	37926	37984	38041	38098	38155	38212	38270	38327
14.60	38384	38442	38499	38557	38614	38672	38730	38787	38845	38902
14.70	38960	39018	39076	39134	39192	39250	39307	39365	39423	39481
14.80	39539	39597	39656	39714	39772	39831	39889	39947	40005	40064
14.90	40122	40181	40239	40298	40356	40415	40474	40532	40591	40649
15.00	40708	40767	40826	40885	40944	41003	41061	41120	41179	41238
15.10	41297	41356	41416	41475	41534	41594	41653	41712	41771	41831
15.20	41890	41950	42009	42069	42128	42188	42248	42307	42367	42426
15.30	42486	42546	42606	42666	42726	42786	42845	42905	42965	43025
15.40	43085	43145	43206	43266	43326	43387	43447	43507	43567	43628
15.50	43688	43749	43809	43870	43930	43991	44052	44112	44173	44233
15.60	44294	44355	44416	44477	44538	44599	44659	44720	44781	44842
15.70	44903	44964	45026	45087	45148	45210	45271	45332	45393	45455
15.80	45516	45578	45639	45701	45762	45824	45886	45947	46009	46070
15.90	46132	46194	46256	46318	46380	46442	46504	46566	46628	46690

TABLE 8

DISCHARGE RATING TABLE - SNAKE RIVER NEAR SHELLEY, IDAHO
(USGS STATION NO. 13060000)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
16.00	46752	46814	46877	46939	47001	47064	47126	47188	47250	47313
16.10	47375	47438	47500	47563	47625	47688	47751	47813	47876	47938
16.20	48001	48064	48127	48190	48253	48316	48379	48442	48505	48568
16.30	48631	48694	48758	48821	48884	48948	49011	49074	49137	49201
16.40	49264	49328	49391	49455	49518	49582	49646	49709	49773	49836
16.50	49900	49964	50028	50092	50156	50220	50284	50348	50412	50476
16.60	50540	50604	50669	50733	50797	50862	50926	50990	51054	51119
16.70	51183	51248	51312	51377	51441	51506	51571	51635	51700	51764
16.80	51829	51894	51959	52024	52089	52154	52219	52284	52349	52414
16.90	52479	52544	52610	52675	52740	52806	52871	52936	53001	53067
17.00	53132	53198	53263	53329	53394	53460	53526	53591	53657	53722
17.10	53788	53854	53920	53986	54052	54118	54184	54250	54316	54382
17.20	54448	54514	54581	54647	54713	54780	54846	54912	54978	55045
17.30	55111	55178	55244	55311	55378	55445	55511	55578	55645	55711
17.40	55778	55845	55912	55979	56046	56113	56180	56247	56314	56381
17.50	56448	56515	56583	56650	56717	56785	56852	56919	56986	57054
17.60	57121	57189	57256	57324	57392	57460	57527	57595	57663	57730
17.70	57798	57866	57934	58002	58070	58138	58206	58274	58342	58410
17.80	58478	58546	58615	58683	58751	58820	58888	58956	59024	59093
17.90	59161	59230	59298	59367	59436	59505	59573	59642	59711	59779
18.00	59848	59917	59986	60055	60124	60193	60262	60331	60400	60469
18.10	60538	60607	60677	60746	60815	60885	60954	61023	61092	61162
18.20	61231	61301	61370	61440	61510	61580	61649	61719	61789	61858
18.30	61928	61998	62068	62138	62208	62278	62348	62418	62488	62558
18.40	62628	62698	62769	62839	62910	62980	63050	63121	63191	63262
18.50	63332	63403	63473	63544	63615	63686	63756	63827	63898	63968
18.60	64039	64110	64181	64252	64323	64394	64465	64536	64607	64678
18.70	64749	64820	64892	64963	65035	65106	65177	65249	65320	65392
18.80	65463	65535	65606	65678	65750	65822	65893	65965	66037	66108
18.90	66180	66252	66324	66396	66468	66540	66612	66684	66756	66828
19.00	66900									

TABLE 9

DISCHARGE RATING TABLE - HENRYS FORK NEAR REXBURG, IDAHO
(USGS STATION NO. 13056500)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
2.50	382	385	388	391	394	397	400	403	406	409
2.60	412	415	419	422	426	429	432	436	439	443
2.70	446	450	454	457	461	465	469	473	476	480
2.80	484	488	493	497	502	506	510	515	519	524
2.90	528	533	538	542	547	552	557	562	566	571
3.00	576	581	586	592	597	602	607	612	618	623
3.10	628	633	638	644	649	654	659	664	670	675
3.20	680	685	690	696	701	706	711	716	722	727
3.30	732	737	743	748	754	759	764	770	775	781
3.40	786	792	797	803	808	814	820	825	831	836
3.50	842	848	854	859	865	87]	877	883	888	894
3.60	900	906	912	918	924	930	936	942	948	954
3.70	960	966	972	978	984	990	996	1002	1008	1014
3.80	1020	1026	1032	1038	1044	1050	1056	1062	1068	1074
3.90	1080	1086	1092	1098	1104	1110	1116	1122	1128	1134
4.00	1140	1146	1152	1158	1164	1170	1176	1182	1188	1194
4.10	1200	1206	1212	1218	1224	1230	1236	1242	1248	1254
4.20	1260	1266	1272	1278	1284	1290	1296	1302	1308	1314
4.30	1320	1327	1334	1341	1348	1355	1362	1369	1376	1383
4.40	1390	1397	1404	1411	1418	1425	1432	1439	1446	1453
4.50	1460	1467	1474	1481	1488	1495	1502	1509	1516	1523
4.60	1530	1537	1544	1551	1558	1565	1572	1579	1586	1593
4.70	1600	1607	1614	1621	1628	1635	1642	1649	1656	1663
4.80	1670	1678	1686	1694	1702	1710	1718	1726	1734	1742
4.90	1750	1758	1766	1774	1782	1790	1798	1806	1814	1822
5.00	1830	1838	1846	1854	1862	1870	1878	1886	1894	1902
5.10	1910	1918	1926	1934	1942	1950	1958	1966	1974	1982
5.20	1990	1998	2006	2014	2022	2030	2038	2046	2054	2062
5.30	2070	2079	2088	2097	2106	2115	2124	2133	2142	2151
5.40	2160	2169	2178	2187	2196	2205	2214	2223	2232	2241
5.50	2250	2259	2268	2277	2286	2295	2304	2313	2322	2331
5.60	2340	2349	2358	2367	2376	2385.	2394	2403	2412	2421
5.70	2430	2440	2450	2460	2470	2480	2490	2500	2510	2520
5.80	2530	2540	2550	2560	2570	2580	2590	2600	2610	2620
5.90	2630	2640	2650	2660	2670	2680	2690	2700	2710	2720
6.00	2730	2740	2750	2760	2770	2780	2790	2800	2810	2820
6.10	2830	2841	2852	2863	2874	2885	2896	2907	2918	2929
6.20	2940	2951	2962	2973	2984	2995	3006	3017	3028	3039
6.30	3050	3061	3072	3083	3094	3105	3116	3127	3138	3149
6.40	3160	3172	3184	3196	3208	3220	3232	3244	3256	3268

TABLE 9

DISCHARGE RATING TABLE - HENRYS FORK NEAR REXBURG, IDAHO
(USGS STATION NO. 13056500)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
6.50	3280	3292	3304	3316	3328	3340	3352	3364	3376	3388
6.60	3400	3412	3424	3436	3448	3460	3472	3484	3496	3508
6.70	3520	3532	3544	3556	3568	3580	3592	3604	3616	3628
6.80	3640	3652	3664	3676	3688'	3700	3712	3724	3736	3748
6.90	3760	3773	. 3786	3799	3812	3825	3838	3851	3864	3877
7.00	3890	3903	3916	3929	3942	3955	3968	3981	3994	4007
7.10	4020	4033	4046	4059	4072	4085	4098	4111	4124	4137
7.20	4150	4164	4178	4192	4206	4220	4234	4248	4262	4276
7.30	4290	4304	4318	4332	4346	4360	4374	4388	4402	4416
7.40	4430	4445	4460	4475	4490	4505	4520	4535	4550	4565
7.50	4580	4595	4610	4625	4640	4655	4670	4685	4700	4715
7.60	4730	4746	4762	4778	4794	4810	4826	4842	4858	4874
7.70	4890	4906	4922	4938	4954	4970	4986	5002	5018	5034
7.80	5050	5066	5082	5098	5114	5130	5146	5162	5178	5194
7.90	5210	5226	5242	5258	5274	5290	5306	5322	5338	5354
8.00	5370	5388	5406	5424	5442	5460	5478	5496	5514	5532
8.10	5550	5568	5586	5604	5622	5640	5658	5676	5694	5712
8.20	5730	5748	5766	5784	5802	5820	5838	5856	5874	5892
8.30	5910	5928	5946	5964	5982	6000	6018	6036	6054	6072
8.40	6090	6108	6126	6144	6162	6180	6198	6216	6234	6252
8.50	6270	6288	6306	6324	6342	6360	6378	6396	6414	6432
8.60	6450	6468	6486	6504	6522	6540	6558	6576	6594	6612
8.70	6630	6648	6666	6684	6702	6720	6738	6756	6774	6792
8.80	6810	6829	6848	6867	6886	6905	6924	6943	6962	6981
8.90	7000	7020	7040	7060	7080	7100	7120	7140	7160	7180
9.00	7200	7222	7244	7266	7288	7310	7332	7354	7376	7398
9.10	7420	7443	7466	7489	7512	7535	7558	7581	7604	7627
9.20	7650	7673	7696	7719	7742	7765	7788	7811	7834	7857
9.30	7880	7903	7926	7949	7972	7995	8018	8041	8064	8087
9.40	8110	8133	8156	8179	8202	8225	8248	8271	8294	8317
9.50	8340	8363	8386	8409	8432	8455	8478	8501	8524	8547
9.60	8570	8593	8616	8639	8662	8685	8708	8731	8754	8777
9.70	8800	8823	8846	8869	8892	8915	8938	8961	8984	9007
9.80	9030	9053	9076	9099	9122	9145	9168	9191	9214	9237
9.90	9260	9284	9308	9332	9356	9380	9404	9428	9452	9476
10.00	9500	9525	9550	9575	9600	9625	9650	9675	9700	9725
10.10	9750	9775	9800	9825	9850	9875	9900	9925	9950	9975
10.20	10000	10030	10060	10090	10120	10150	10180	10210	10240	10270
10.30	10300	10330	10360	10390	10420	10450	10480	10510	10540	10570
10.40	10600	10630	10660	10690	10720	10750	10780	10810	10840	10870

TABLE 9

DISCHARGE RATING TABLE - HENRYS FORK NEAR REXBURG, IDAHO
(USGS STATION NO. 13056500)

GAGE HEIGHT FEET	DISCHARGE IN CFS									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
10.50	10900	10930	10960	10990	11020	11050	11080	11110	11140	11170
10.60	11200	11230	11260	11290	11320	11350	11380	11410	11440	11470
10.70	11500	11530	11560	11590	11620	11650	11680	11710	11740	11770
10.80	11800	11830	11860	11890	11920	11950	11980	12010	12040	12070
10.90	12100	12135	12170	12205	12240	12275	12310	12345	12380	12415
11.00	12450	12485	12520	12555	12590	12625	12660	12695	12730	12765
11.10	12800	12835	12870	12905	12940	12975	13010	13045	13080	13115
11.20	13150	13185	13220	13255	13290	13325	13360	13395	13430	13465
11.30	13500	13535	13570	13605	13640	13675	13710	13745	13780	13815
11.40	13850	13885	13920	13955	13990	14025	14060	14095	14130	14165
11.50	14200	14240	14280	14320	14360	14400	14440	14480	14520	14560
11.60	14600	14640	14680	14720	14760	14800	14840	14880	14920	14960
11.70	15000	15040	15080	15120	15160	15200	15240	15280	15320	15360
11.80	15400	15440	15480	15520	15560	15600	15640	15680	15720	15760
11.90	15800	15840	15880	15920	15960	16000	16040	16080	16120	16160
12.00	16200									

TABLE 10

SNAKE RIVER AT MORAN, WYOMING
Natural Flow In 1,000 Acre-feet

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1911	30.8	25.1			37.1	31.0	38.4	206.4	539.5	249.5	67.0	36.4
1912	41.2	43.1	22.2	29.4	35.9	32.0	36.1	133.6	479.9	205.8	103.6	51.3
1913	58.2	39.8	39.2	45.8	33.9	35.7	62.0	308.9	457.7	203.2	107.6	44.0
1914	48.1	45.9	32.7	42.9	39.3	32.7	57.2	298.9	330.3	238.0	43.1	57.3
1915	60.1	49.1	31.4	24.3	17.0	27.4	96.7	139.2	181.8	82.7	30.8	30.8
1916.	23.9	29.0	28.1	37.4	33.6	37.9	47.0	174.9	421.5	279.0	74.0	36.0
1917	35.2	27.3	39.5	27.5	31.4	33.8	30.0	141.3	435.9	303.0	92.2	40.8
1918	25.7	24.0	44.6	33.3	30.0	28.4	35.2	166.2	601.2	150.7	73.3	35.6
1919	46.2	29.1	22.3	23.7	28.7	31.9	42.5	234.5	139.7	39.3	26.6	20.7
1920	26.2	29.8	30.0	28.0	23.1	28.6	30.0	173.3	360.0	162.1	67.8	39.2
1921	40.9	32.0	33.3	33.1	23.6	24.5	35.3	285.9	342.3	129.0	54.9	33.2
1922	25.7	33.6	34.0	29.2	26.8	25.1	24.8	179.4	393.6	142.0	59.3	34.1
1923	20.3	21.5	29.2	31.8	22.6	27.9	31.7	197.0	321.9	159.7	50.1	30.9
1924	30.1	24.3	27.4	27.8	23.2	19.5	30.4	216.2	141.8	67.3	20.0	20.0
1925	42.0	30.3	28.0	31.8	31. 8	26.5	74.2	357.2	369.1	202.8	83.2	47.7
1926	45.3	31.6	26.5	23.1	26.0	22.6	78.6	244.5	148.1	67.4	37.5	21.2
1927	28.6	35.2	35.2	35.4	36.7	23.0	37.4	189.8	597.5	258.2	82.7	55.3
1928	40.5	61.0	49.5	39.9	26.4	32.5	48.6	478.9	293.1	171.7	58.5	32.5
1929	31.4	23.9	33.6	29.5	27.3	27.2	35.0	149.6	314.4	115.7	47.6	31.3
1930	22.7	14.4	27.5	18.5	26.4	22.6	67.3	185.8	207.4	98.8	64.1	31.5
1931	43.2	24.1	20.0	20.2	16.5	23.1	37.7	148.7	148.4	47.4	29.2	17.2
1932	21.7	19.6	24.8	26.4	26.7	29.6	35.4	228.3	358.5	135.9	61. 5	24.8
1933	20.0	20.1	22.1	31.3	27.5	19.3	25.3	118.5	390.4	112.1	53.2	33.0
1934	21.0	19.4	19.9	28.4	20.8	28.7	111.5	208.7	86.2	48.9	20.7	38.4
1935	27.8	28.2	27.6	30.3	22.9	26.1	45.2	167.9	353.7	135.0	51.3	19.6
1936	21.9	23.4	19.6	40.1	38.0	27.7	66.0	382.5	283.5	91.3	51.6	23.3
1937	17.5	13.0	21.4	24.4	27.3	21.2	28.5	230.2	232.1	100.0	107.0	19.1
1938	24.5	22.6	32.1	29.2	26.6	36.1	50.9	223.2	438.2	157.8	64.1	41.3
1939	31.2	27.9	30.5	28.5	28.3	26.1	66.1	307.6	191.4	106.8	51.5	26.4
1940	23.0	14.0	19.0	26.7	29.4	27.6	48.7	264.5	205.4	73.3	38.4	24.5
1941	26.1	24.5	22.9	26.9	22.1	18.4	31.7	225.4	186.0	84.6	62.8	47.2
1942	40.4	31. 7	40.4	27.9	24.8	20.4	59.2	160.0	278.8	133.3	55.1	23.0
1943	16.5	35.2	35.9	43.9	29.5	32.7	98.7	240.3	481.4	275.7	87.0	42.1
1944	33.6	29.8	23.1	19.8	22.7	25.6	29.0	168.6	242.6	126.0	66.6	22.2
1945	19.3	25.5	19.9	23.9	28.4	23.0	23.6	171.4	287.0	175.2	66.5	32.6
1946	29.1	31.4	34.9	33.0	35.8	35.6	105.2	271.3	268.0	121.2	50.6	36.5
1947	27.4	29.1	33.0	30.4	21. 6	28.3	33.6	337.8	323.8	147.7	66.1	43.3
1948	28.8	29.6	26.8	29.6	26.4	26.1	41.3	247.7	368.0	119.9	52.3	29.4
1949	25.2	29.9	33.3	29.3	28.3	30.6	67.7	338.6	314.5	121.6	55.7	32.9
1950	32.0	27.0	23.9	35.5	34.2	33.9	40.5	160.6	442.4	217.3	70.2	40.6
Avg.	30.8	28.9	29.4	30.2	28.0	27.8	49.6	226.6	323.9	146.4	60.1	33.7

TABLE 11

SNAKE RIVER AT HEISE, WYOMING
Natural Flow In 1,000 Acre-feet

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1911	211.2	201.6			186.7	203.8	320.7	968.4	1875.5	876.5	795.0	300.9
1912	247.7	226.6	178.1	176.8	169.5	181.5	246.1	911.9	1908.9	984.4	439.6	336.3
1913	343.6	245.1	215.3	216.8	186.2	193.7	518.9	1347.5	1583.7	857.2	434.6	298.0
1914	285.6	249.2	204.8	200.7	168.3	187.8	509.5	1349.8	1370.3	663.9	352.1	312.4
1915	320.8	243.9	204.3	192.2	159.4	176.6	428.3	596.1	687.8	457.5	262.8	233.9
1916	219.4	178.0	172.9	16.9	177.1	240.5	529.8	963.5	1484.5	1029.0	455.0	289.0
1917	272.0	213.0	201.8	171.7	167.0	184.0	256.2	1077.1	180J.9	1326.0	480.2	339.9
1918	287.2	277.9	300.5	252.1	216.5	259.5	381.8	961.4	2259.2	793.7	392.3	283.6
1919	315.7	259.6	235.8	219.2	210.3	252.4	411.6	896.4	498.7	244.7	196.9	179.3
1920	201.0	180.0	146.2	156.0	143.2	156.5	230.0	1142.8	1472.4	733.1	355.8	274.6
1921	261.2	239.3	235.6	229.4	200.9	238.5	358.6	1343.0	1604.3	598.0	364.9	284.7
1922	230.5	228.5	235.9	182.1	164.9	186.8	231.5	1092.0	1529.7	574.0	379.3	284.1
1923	209.9	193.3	194.3	202.9	165.9	198.8	285.7	1078.9	1217.1	711.0	357.9	244.9
1924	231.6	194.4	176.2	167.6	183.0	174.1	290.1	871.7	622.8	335.3	198.0	180.4
1925	232.8	184.7	156.3	177.4	165.2	188.7	515.5	1421.9	1276.4	843.8	422.7	332.2
1926	274.5	225.9	200.9	169.5	161.6	213.8	489.8	849.5	558.1	314.4	253.5	195.9
1927	213.8	206.4	198.6	195.8	170.1	163.3	300.1	1095.0	1952.5	1031.2	428.7	344.3
1928	297.2	298.4	255.8	243.2	180.6	219.6	359.4	1871.9	1149.1	771.7	361.5	257.5
1929	249.5	207.5	187.6	179.3	171.7	172.5	226.4	738.7	1072.4	543.7	294.6	267.3
1930	221.6	177.4	184.4	156.5	149.9	178.2	456.5	758.8	907.4	476.8	354.1	247.6
1931	288.5	202.3	176.4	153.7	143.3	165.6	254.7	503.2	548.4	212.4	150.8	160.2
1932	171.2	198.9	182.3	143.9	133.2	154.1	271.7	1025.0	1271.4	645.1	337.5	236.8
1933	214.1	193.6	175.0	184.2	150.6	157.2	237.5	588.1	1330.4	439.1	268.2	213.0
1934	186.1	169.0	253.7	157.3	130.8	176.0	357.4	632.7	335.2	204.4	150.7	127.6
1935	157.6	146.6	139.1	137.6	118.4	137.1	308.4	722.2	1231.0	551. 3	274.2	198.4
1936	180.8	166.3	146.4	158.6	146.4	143.6	426.9	1655.2	1279.8	490.3	315.4	241.9
1937	206.3	173.3	168.8	142.8	135.4	146.9	218.4	988.7	805.2	397.9	219.8	189.7
1938	191.3	172.4	179.4	159.3	139.4	170.8	421.4	1052.1	1408.7	683.9	328.0	253.8
1939	236.6	206.3	192.9	181.1	152.8	194.9	489.3	982.6	734.9	457.3	274.6	217.5
1940	197.6	157.6	153.7	154.2	150.4	171.9	288.6	877.1	665.3	276.2	191.1	184.9
1941	181.6	163.3	149.4	147.3	127.7	154.6	248.2	822.8	761.7	376.3	305.6	256.4
1942	234.5	195.1	199.6	157.8	140.4	147.5	459.5	731.1	1039.3	549.4	254.8	204.8
1943	188.4	193.0	186.2	183.9	152.3	166.1	773.5	1166.4	1612.8	1140.1	460.3	289.2
1944	262.0	228.4	197.2	173.3	163.9	163.6	239.1	594.7	958.1	532.5	257.4	200.8
1945	190.2	187.1	167.1	156.9	150.4	155.6	207.4	837.0	1120.9	823.0	391.7	303.0
1946	251.0	223.6	205.3	179.2	162.6	205.8	760.0	1135.5	1068.1	538.7	308.3	262.5
1947	253.4	212.4	212.2	168.1	156.4	198.2	328.1	1254.1	1145.2	683.0	404.7	271.5
1948	233.9	207.6	187.2	177.9	156.2	159.0	299.8	1079.4	1319.9	464.4	281.0	223.2
1949	210.2	197.6	185.8	159.7	152.3	176.5	454.8	1239.0	1101.3	491.5	281.2	230.3
1950	226.0	208.6	181.4	178.1	167.5	188.1	425.9	976.6	1682.0	1071.1	422.7	311.3
Avg.	234.7	205.8	192.9	177.3	160.7	177.7	370.4	1005.0	1206.3	629.9	336.4	251.6

CORPS OF ENGINEERS

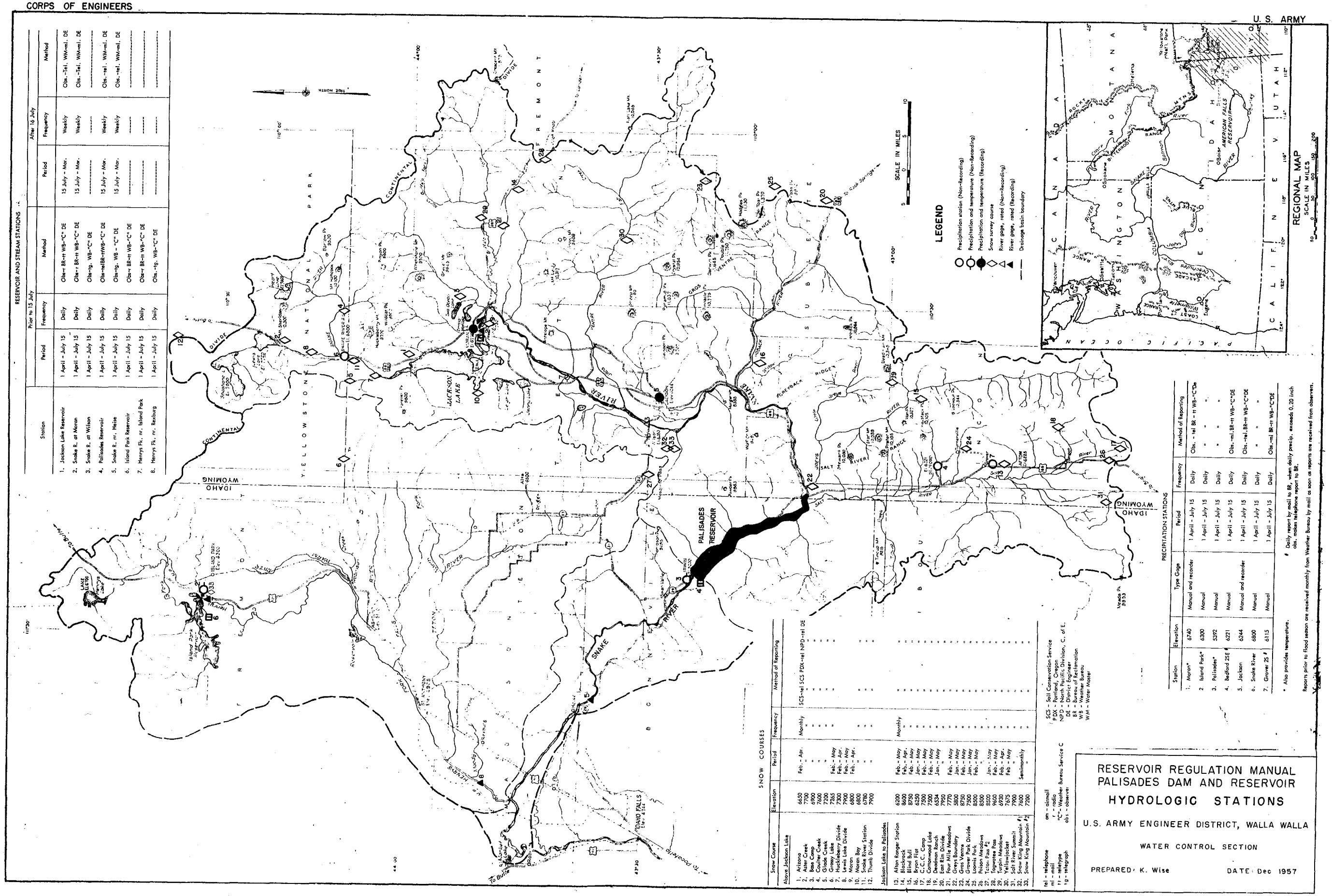
U. S. ARMY

RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR
HYDROLOGIC STATIONS

U.S. ARMY ENGINEER DISTRICT, WALLA WALLA

WATER CONTROL SECTION

PREPARED: K. Wise DATE: Dec 1957



Station	Elevation	Type Gage	Period	Frequency	Method of Reporting
1. Moran*	6740	Manual and recorder	1 April - July 15	Daily	Obs. - tel BR-rt WB-"C"DE
2. Island Park*	6300	Manual	1 April - July 15	Daily	" " " "
3. Palisades*	5392	Manual	1 April - July 15	Daily	" " " "
4. Bedford 23E	6221	Manual	1 April - July 15	Daily	Obs.-tel.BR-rt WB-"C"DE
5. Jackson	6244	Manual and recorder	1 April - July 15	Daily	Obs.-tel.BR-rt WB-"C"DE
6. Snake River	6800	Manual	1 April - July 15	Daily	" " " "
7. Grover 25 E	6115	Manual	1 April - July 15	Daily	Obs.-tel BR-rt WB-"C"DE

* Also provides temperature.

Daily report by mail to BR, when daily precip. exceeds 0.20 inch obs. makes telephone report to BR.

Reports prior to flood season are received monthly from Weather Bureau by mail as soon as reports are received from observers.

Snow Course	Elevation	Period	Frequency	Method of Reporting
Above Jackson Lake				
1. Arizona	6650	Feb. - Apr.	Monthly	SCS-tel SCS PDX-tel NPD-tel DE
2. Aster Creek	7700	" "	"	" " " " " "
3. Beaver Creek	7400	" "	"	" " " " " "
4. Coulter Creek	7600	" "	"	" " " " " "
5. Glade Creek	7200	" "	"	" " " " " "
6. Grassy Lake	7265	Feb. - May	"	" " " " " "
7. Headwaters Divide	7900	Feb. - Apr.	"	" " " " " "
8. Lewis Lake Divide	7900	Feb. - May	"	" " " " " "
9. Moran	6800	Feb. - Apr.	"	" " " " " "
10. Moran Bay	6850	" "	"	" " " " " "
11. Snake Station	7700	" "	"	" " " " " "
12. Thumb Divide	7900	" "	"	" " " " " "
Jackson Lake to Palisades				
13. Afton Ranger Station	6200	Feb. - May	Monthly	" " " " " "
14. Blackrock	8600	Feb. - Apr.	"	" " " " " "
15. Blind Bull	8750	Feb. - May	"	" " " " " "
16. Box C Ck.	6650	Jan. - May	"	" " " " " "
17. Camp Creek Camp	7200	Feb. - May	"	" " " " " "
18. Cottonwood Lake	7500	Feb. - May	"	" " " " " "
19. Deadman Ranch	6534	Jan. - May	"	" " " " " "
20. Fall Rim Divide	7950	Feb. - May	"	" " " " " "
21. Fossil Meadows	7770	Feb. - May	"	" " " " " "
22. Grays Boundary	5800	Jan. - May	"	" " " " " "
23. Gros Ventre	8750	Feb. - May	"	" " " " " "
24. Grover Park Divide	7500	Jan. - May	"	" " " " " "
25. Lander Peak	8650	Feb. - May	"	" " " " " "
26. Poison Meadows	8500	" "	"	" " " " " "
27. Teton Pass #2	8500	Jan. - May	"	" " " " " "
28. Togwotee Pass	9600	Feb. - May	"	" " " " " "
29. Turpin Meadows	9000	Feb. - Apr.	"	" " " " " "
30. Yellowjacket	7675	Feb. - May	"	" " " " " "
31. Salt River Summit	7900	" "	"	" " " " " "
32. Snow King Mountain #1	7600	" "	Semimonthly	" " " " " "
33. Snow King Mountain #2	7200	" "	"	" " " " " "

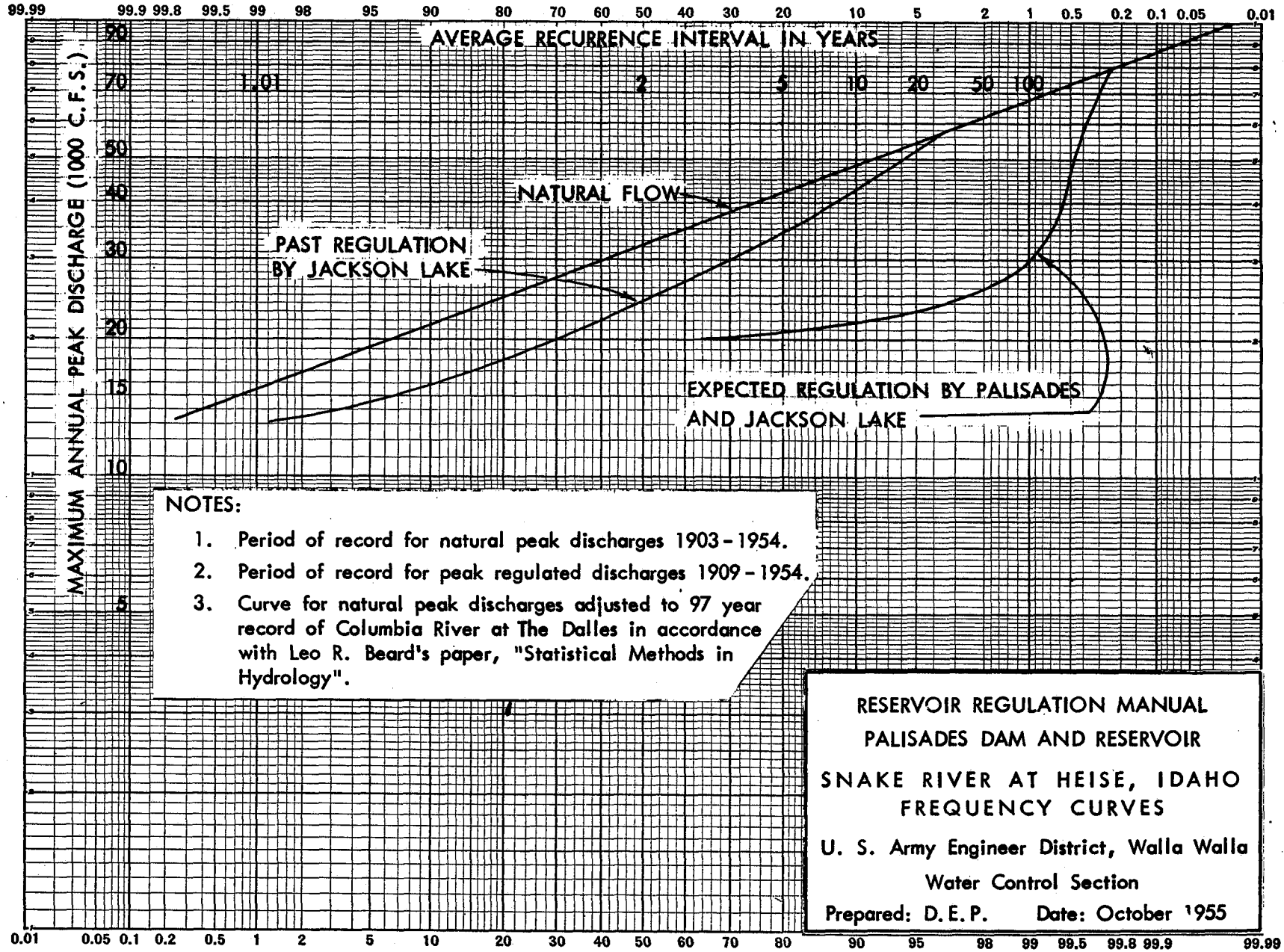
SNOW COURSES

SCS - Soil Conservation Service
PDX - Portland, Oregon
NPD - North Pacific Division, C. of E.
DE - District Engineer
BR - Bureau of Reclamation
WB - Weather Bureau
WM - Water Master

tel - telephone
rt - radio teletype
tg - telegraph

om - airmail
WB - Weather Bureau Service C
"C" - climatological station
obs - observer

PLATE I



NOTES:

1. Period of record for natural peak discharges 1903 - 1954.
2. Period of record for peak regulated discharges 1909 - 1954.
3. Curve for natural peak discharges adjusted to 97 year record of Columbia River at The Dalles in accordance with Leo R. Beard's paper, "Statistical Methods in Hydrology".

RESERVOIR REGULATION MANUAL

PALISADES DAM AND RESERVOIR

SNAKE RIVER AT HEISE, IDAHO

FREQUENCY CURVES

U. S. Army Engineer District, Walla Walla

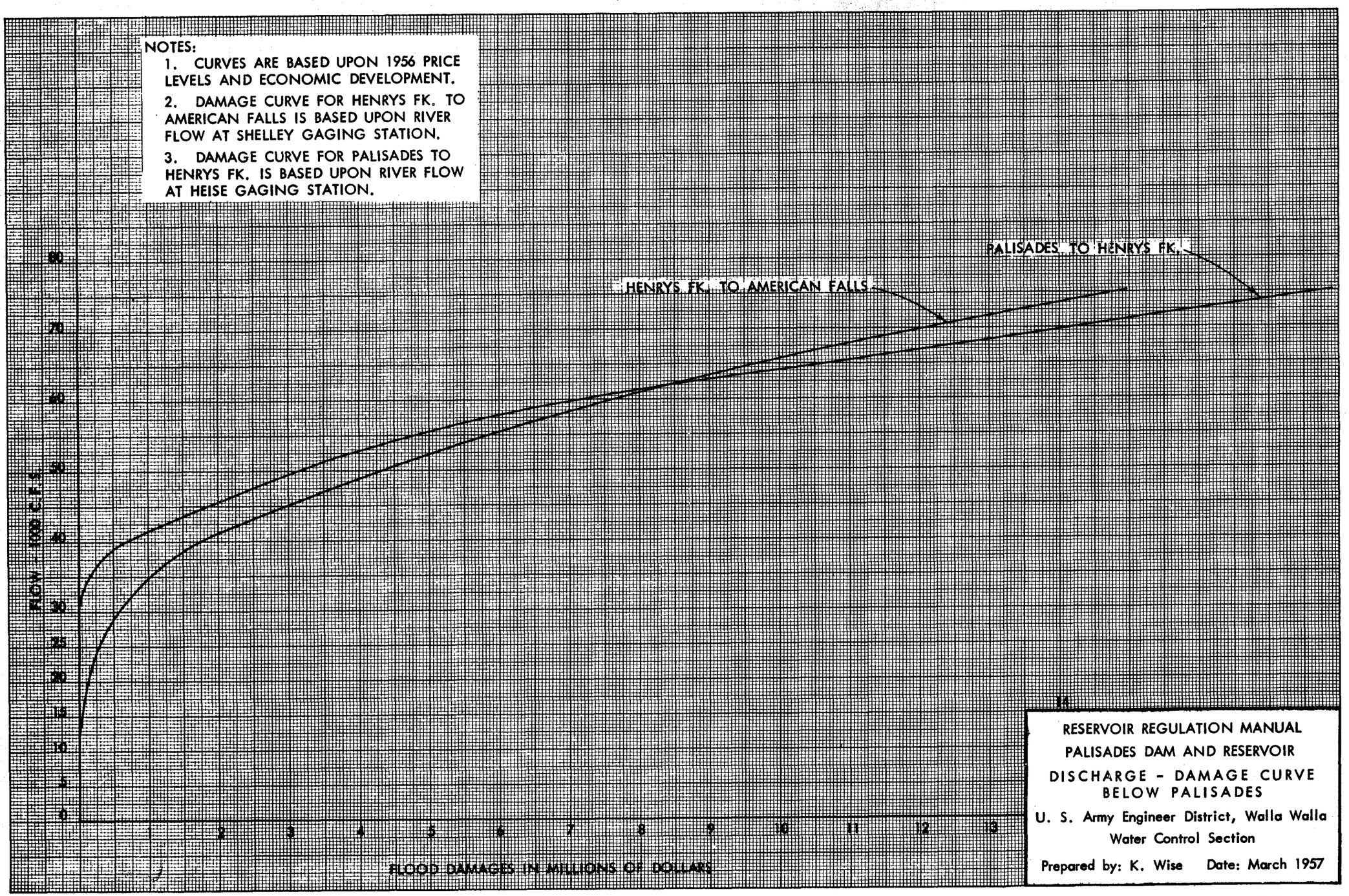
Water Control Section

Prepared: D. E. P. Date: October 1955

PLATE 2

NOTES:

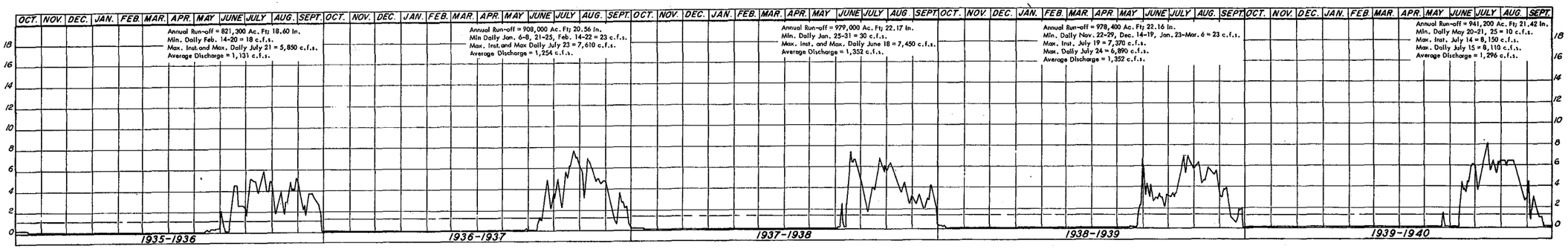
1. CURVES ARE BASED UPON 1956 PRICE LEVELS AND ECONOMIC DEVELOPMENT.
2. DAMAGE CURVE FOR HENRYS FK. TO AMERICAN FALLS IS BASED UPON RIVER FLOW AT SHELLEY GAGING STATION.
3. DAMAGE CURVE FOR PALISADES TO HENRYS FK. IS BASED UPON RIVER FLOW AT HEISE GAGING STATION.

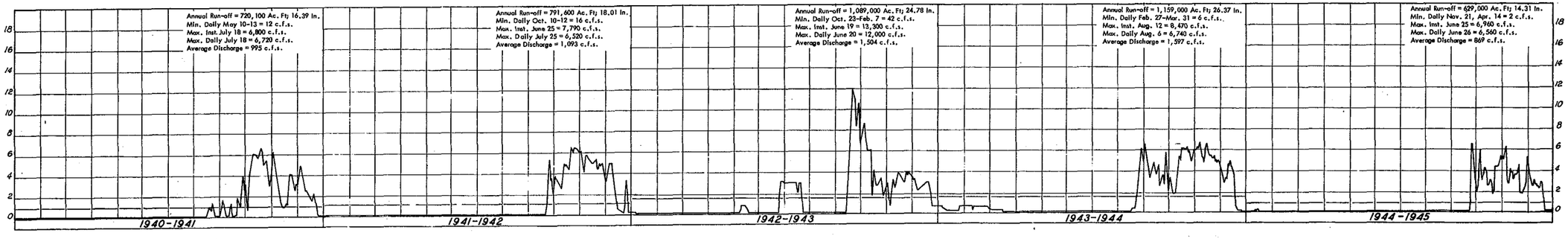


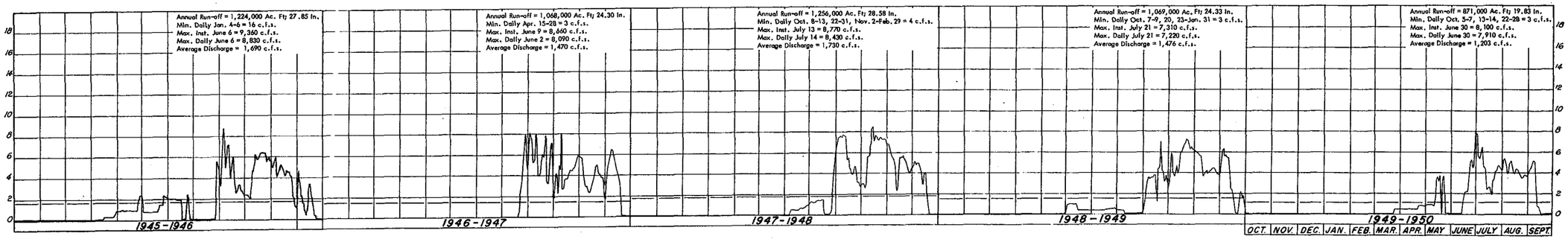
RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR
DISCHARGE - DAMAGE CURVE BELOW PALISADES
U. S. Army Engineer District, Walla Walla
Water Control Section
Prepared by: K. Wise Date: March 1957

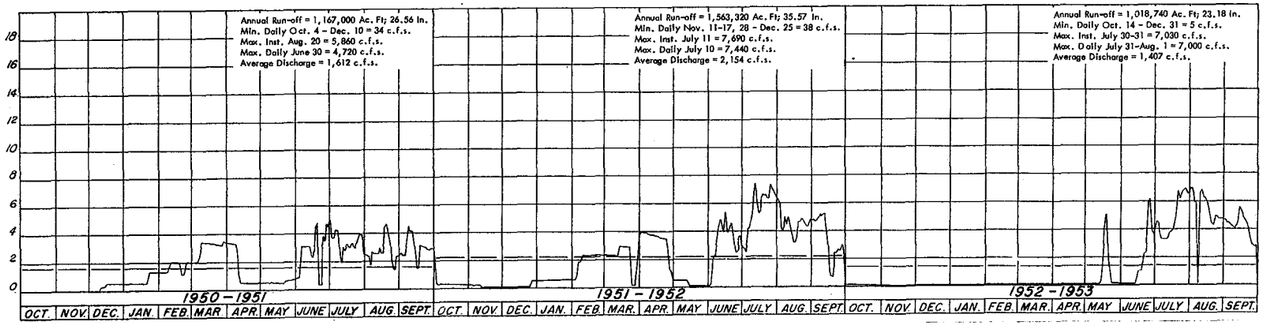
PLATE 3

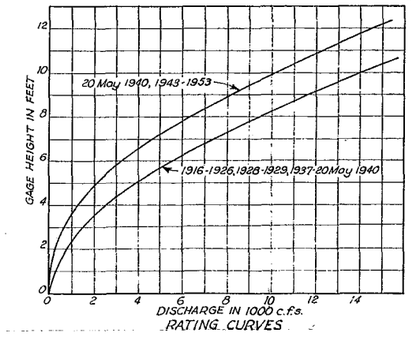
DISCHARGE IN 1000 C.F.S.











STATION DESCRIPTION

Station	Dr. Area Sq. Mi.	Records Available	Records Character	Type of Gage	Location	Datum (M.S.L.)
nr. Moran, Wyoming	828	14 June 1917 to 19 May 1940	Continuous	Staff	Sec.17, T.45N., R.114W. 6th prin. mer. 1½ mi. below Moran P.O. & Jackson L. Outlet 3½ mi. U.S. from Pacific Cr.	
At Moran, Wyoming	824	20 May 1940 to 30 Sept. 1953	Continuous	Recorder	Sec.18, T.45N., R.114W. 1000 Ft. D.S. from Jackson L. Dam	6725.61

RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR

DAILY DISCHARGE HYDROGRAPH

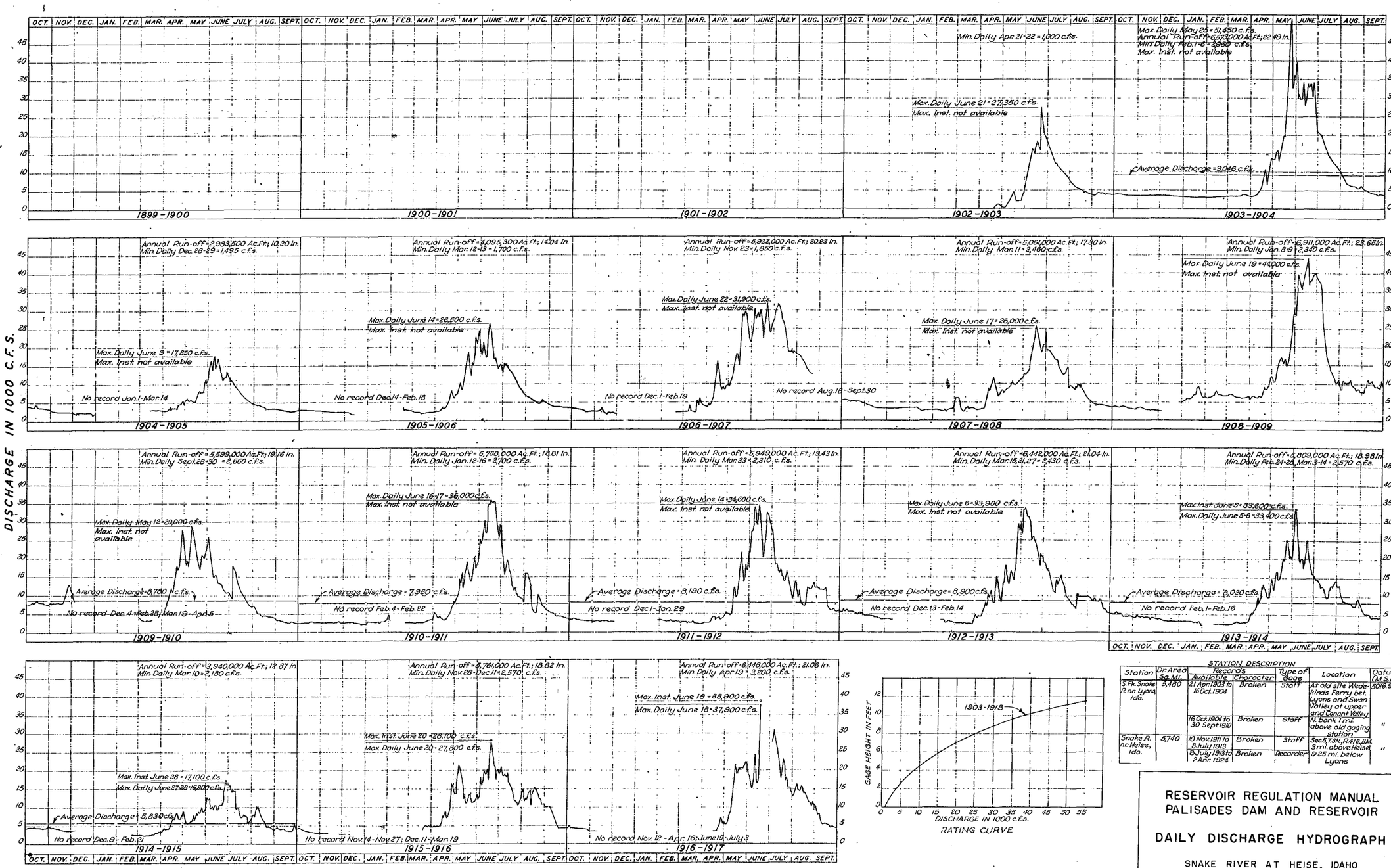
SNAKE RIVER AT MORAN, WYOMING

U.S. ARMY ENGINEER DISTRICT, WALLA WALLA
WATER CONTROL SECTION
PREPARED K. Wise DATE: Dec 1957

PLATE 6

CORPS OF ENGINEERS — U.S. ARMY

DISCHARGE IN 1000 C.F.S.



RATING CURVE

STATION DESCRIPTION

Station	Dr. Area Sq. Mi.	Records Available	Records Character	Type of Gage	Location	Datum (M.S.L.)
S. Fk. Snake R. nr. Lyons, Ida.	5,480	21 Apr. 1903 to 16 Oct. 1904	Broken	Staff	At old site Wade-kinds Ferry bet. Lyons and Swan Valley at upper end of Canon Valley	5016.90
		16 Oct. 1904 to 30 Sept. 1910	Broken	Staff	N. bank 1 mi. above old gaging station	"
Snake R. nr. Heise, Ida.	5,740	10 Nov. 1911 to 8 July 1913	Broken	Staff	Sec. 5, T3N, R41E, BM. 3 mi. above Heise	"
		8 July 1913 to 2 Apr. 1924	Broken	Recorder	6.25 mi. below Lyons	

RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR

DAILY DISCHARGE HYDROGRAPH

SNAKE RIVER AT HEISE, IDAHO

U.S. ARMY ENGINEER DISTRICT, WALLA WALLA

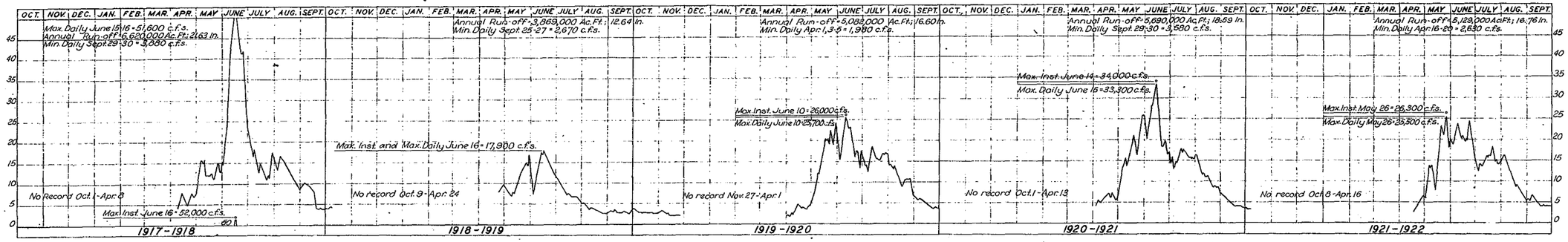
WATER CONTROL SECTION

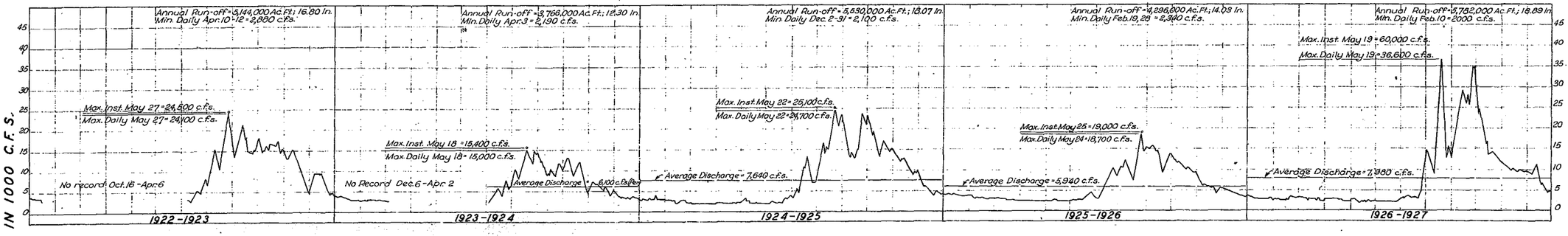
PREPARED: K. Wise — DATE: Dec 1957

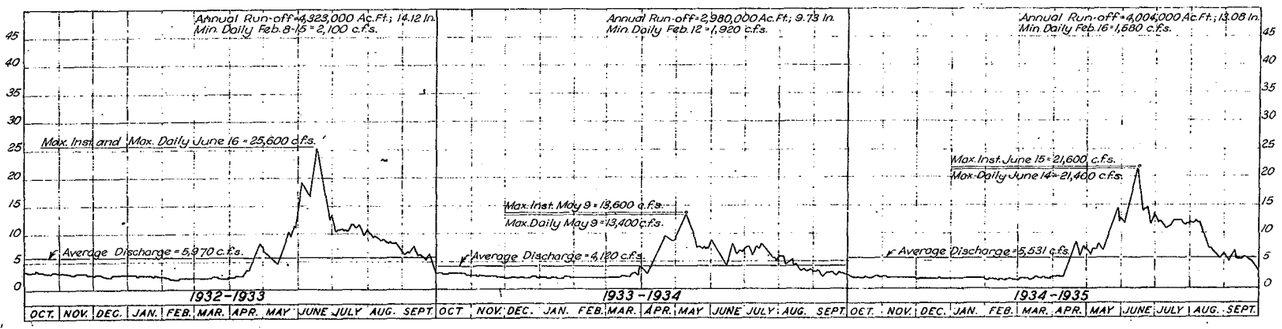
PLATE 7

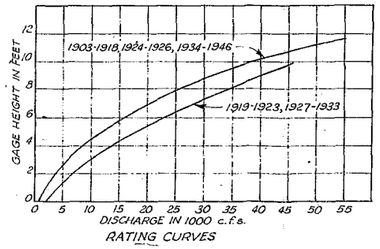
CORPS OF ENGINEERS U.S. ARMY

DISCHARGE IN 1000 C.F.S.









RATING CURVES

STATION DESCRIPTION

Station	Dr. Area Sq. Mi.	Records Available	Records Character	Type of Gage	Location	Datum (M.S.L.)
Snake R. nr. Heise, Ida.	5,740	8 July 1919 to 2 Apr. 1924	Broken	Recorder	Sec. 5, T3N, R41E, BM 3 mi. above Heise & 25 mi. below Lyons.	5,016.90
		2 Apr. 1924 to 30 Sept. 1946	Continuous			Lowered 2 Ft. 1 Oct. 1933 5,014.90

RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR

DAILY DISCHARGE HYDROGRAPH

SNAKE RIVER AT HEISE, IDAHO

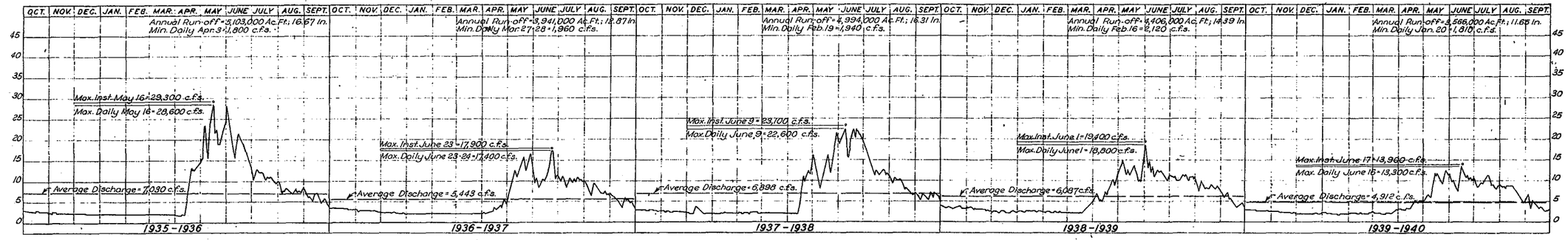
U.S. ARMY ENGINEER DISTRICT, WALLA WALLA

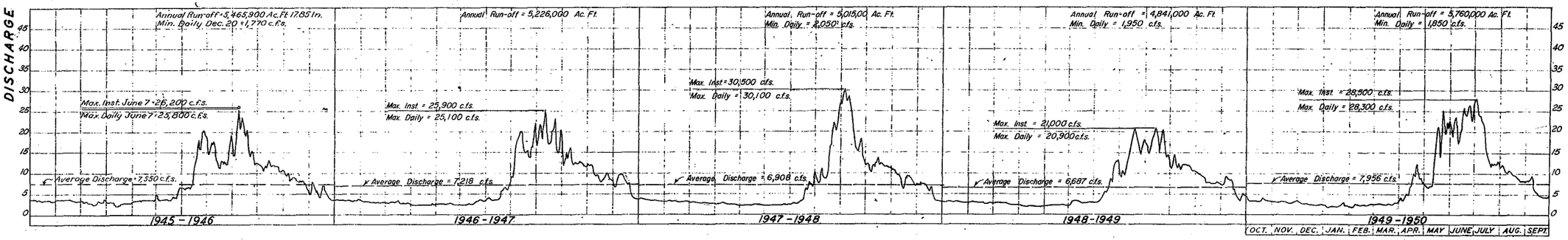
WATER CONTROL SECTION

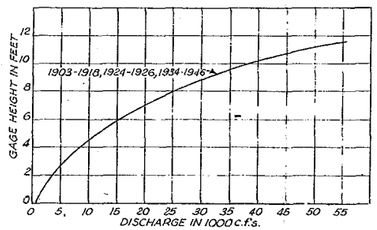
PREPARED: K. Wise DATE: Dec 1957

PLATE 8

DISCHARGE IN 1000 C.F.S.







RATING CURVE

STATION DESCRIPTION

Station	Dr. Area Sq. Mi.	Records Available	Records Character	Type of Gage	Location	Datum (M.S.L.)
Snake R. nr. Heise Ida.	5,740	2 Apr. 1924 to 30 Sept. 1946	Continuous	Recorder	Sec. 5, T. 3 N., R. 41 E. B.M. 3 mi. above Heise & 25 mi. below Lyons	5,014.90

RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR

DAILY DISCHARGE HYDROGRAPH

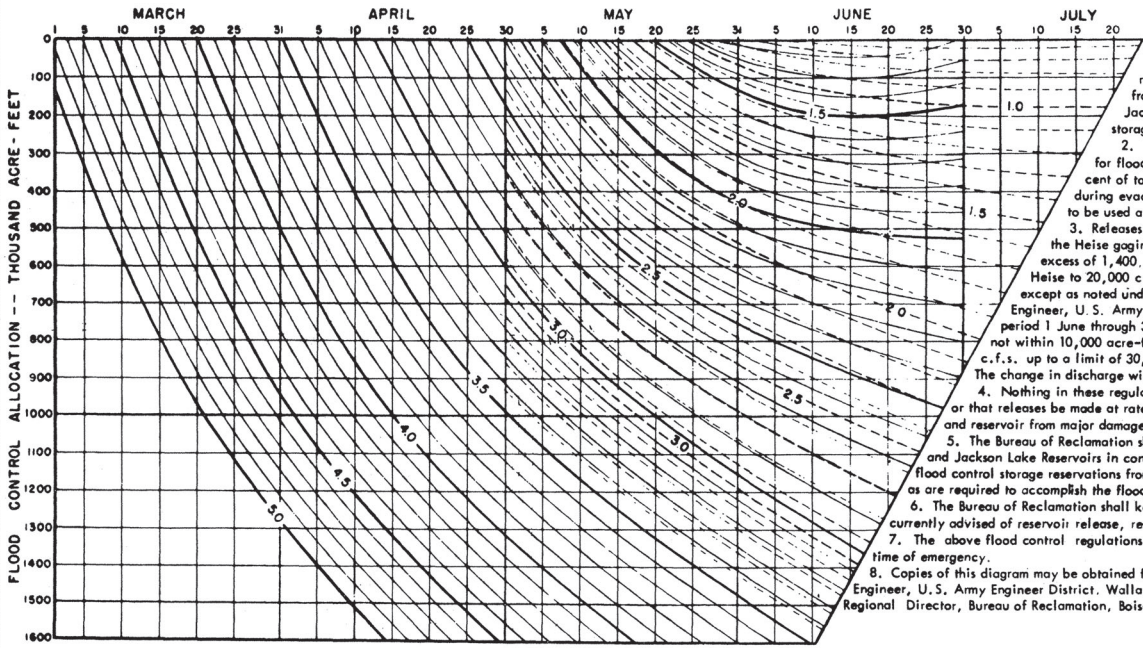
SNAKE RIVER AT HEISE, IDAHO

U.S. ARMY ENGINEER DISTRICT, WALLA WALLA

WATER CONTROL SECTION

PREPARED: K. Wise DATE: Dec 1957

PLATE 9



NOTES

1. The minimum flood control storage reservation required on any day of the flood season is as indicated by the diagram. Parameter values are forecasted natural flood run-off of Snake River at Heise in millions of acre-feet for the remainder of the season from any given date to 31 July. A minimum of 200,000 acre-feet of storage space in Jackson Lake will be held vacant until 1 May every year unless the forecast indicates that storage should begin earlier to insure filling that space.

2. Storage space in Palisades Reservoir and Jackson Lake combined shall be kept available for flood control purposes in accordance with this diagram. However, not less than 75 per cent of total storage space will be made available in Palisades Reservoir. Solid lines to be used during evacuation and until natural inflow to Palisades first exceeds 20,000 c.f.s. Dashed lines to be used after natural inflow exceeds 20,000 c.f.s.

3. Releases from Palisades Reservoir shall be restricted to 20,000 c.f.s. or less as measured at the Heise gaging station except: (A) when the forecasted run-off indicates that storage capacity in excess of 1,400,000 acre-feet in Palisades and Jackson Lake combined is required to control flows at Heise to 20,000 c.f.s., releases in excess of 20,000 c.f.s. will be made but not to exceed 30,000 c.f.s. except as noted under item 7 or as may be agreed upon by the Bureau of Reclamation and the District Engineer, U.S. Army Engineer District, during extremely large floods and; (B) when the forecasted run-off for the period 1 June through 31 July exceeds 2,500,000 acre-feet, and, when after 1 June the available space is not within 10,000 acre-feet of the space required by this diagram, the release may be increased above 20,000 c.f.s. up to a limit of 30,000 c.f.s. to the extent of 1,000 c.f.s. for each 5,000 acre-feet of deficient storage. The change in discharge will be made in such manner as to minimize the adverse downstream effects.

4. Nothing in these regulations shall be construed to require dangerously rapid changes in magnitudes of releases, or that releases be made at rates or in a manner that would be inconsistent with requirements for protecting the dam and reservoir from major damage.

5. The Bureau of Reclamation shall procure current basic hydrologic data necessary for forecasting inflows to Palisades and Jackson Lake Reservoirs in conformance with procedures mutually agreed to, make current determinations of required flood control storage reservations from the diagram and make current calculations of permissible releases from the reservoirs as are required to accomplish the flood control objectives.

6. The Bureau of Reclamation shall keep the District Engineer, U.S. Army Engineer District, in charge of the locality currently advised of reservoir release, reservoir storage and such other operating data as the District Engineer may request.

7. The above flood control regulations are subject to temporary modification by the District Engineer, if found necessary in time of emergency.

8. Copies of this diagram may be obtained from the offices of the District Engineer, U.S. Army Engineer District. Walla Walla, Washington, and the Regional Director, Bureau of Reclamation, Boise, Idaho.

PALISADES DAM AND RESERVOIR

Snake River, Idaho

FLOOD CONTROL STORAGE RESERVATION DIAGRAM

Prepared Pursuant to Flood control Regulations for Palisades Dam and Reservoir (33 CFR 208.)

APPROVED: H A Dexheimer
Commissioner of Reclamation

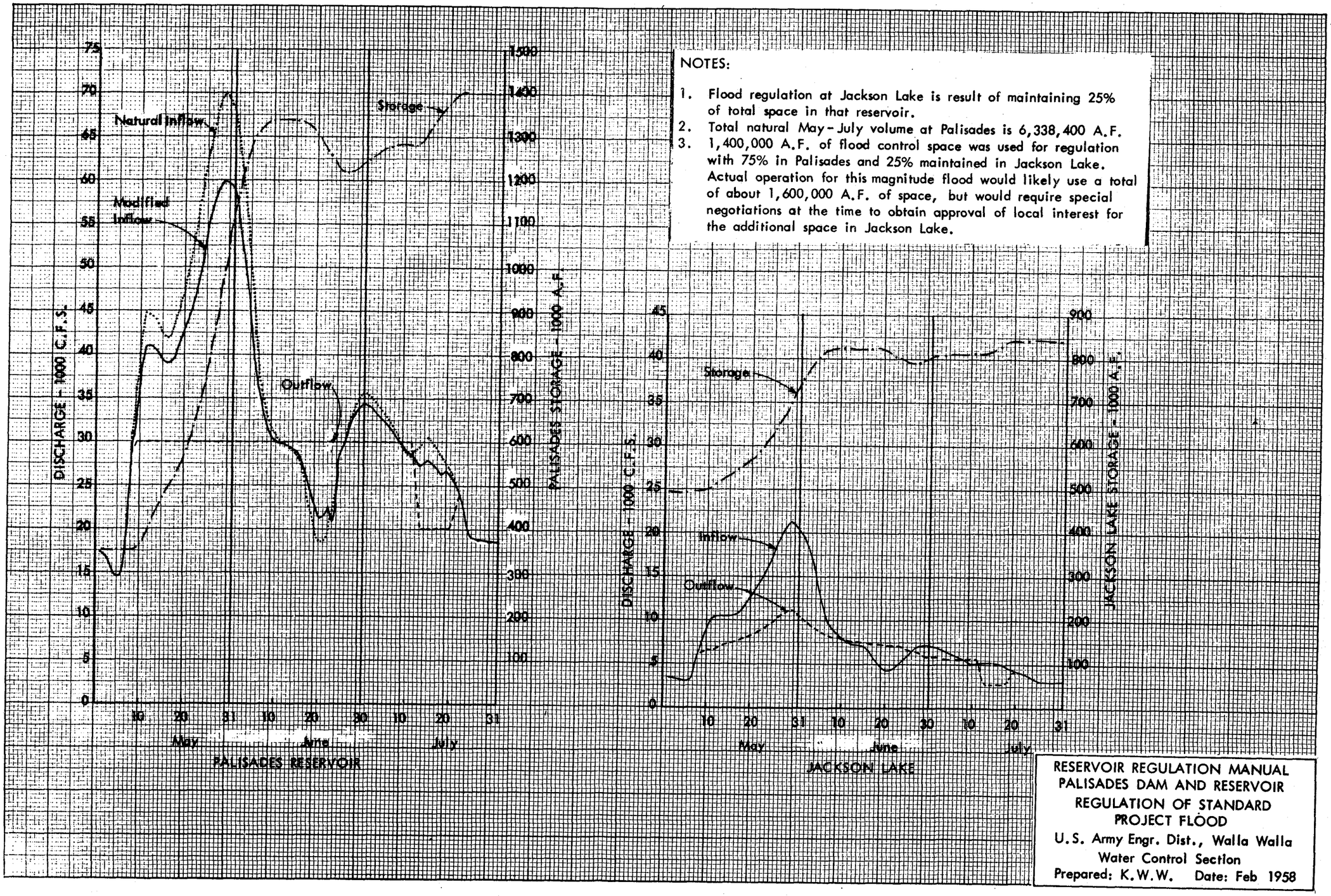
APPROVED: Ed. Fisher
Major General, Chief of Engineers

Effective Date: May 12, 1958 File No. SN-902-1/1

PLATE B-1 PLATE 10

NOTES:

1. Flood regulation at Jackson Lake is result of maintaining 25% of total space in that reservoir.
2. Total natural May - July volume at Palisades is 6,338,400 A.F.
3. 1,400,000 A.F. of flood control space was used for regulation with 75% in Palisades and 25% maintained in Jackson Lake. Actual operation for this magnitude flood would likely use a total of about 1,600,000 A.F. of space, but would require special negotiations at the time to obtain approval of local interest for the additional space in Jackson Lake.

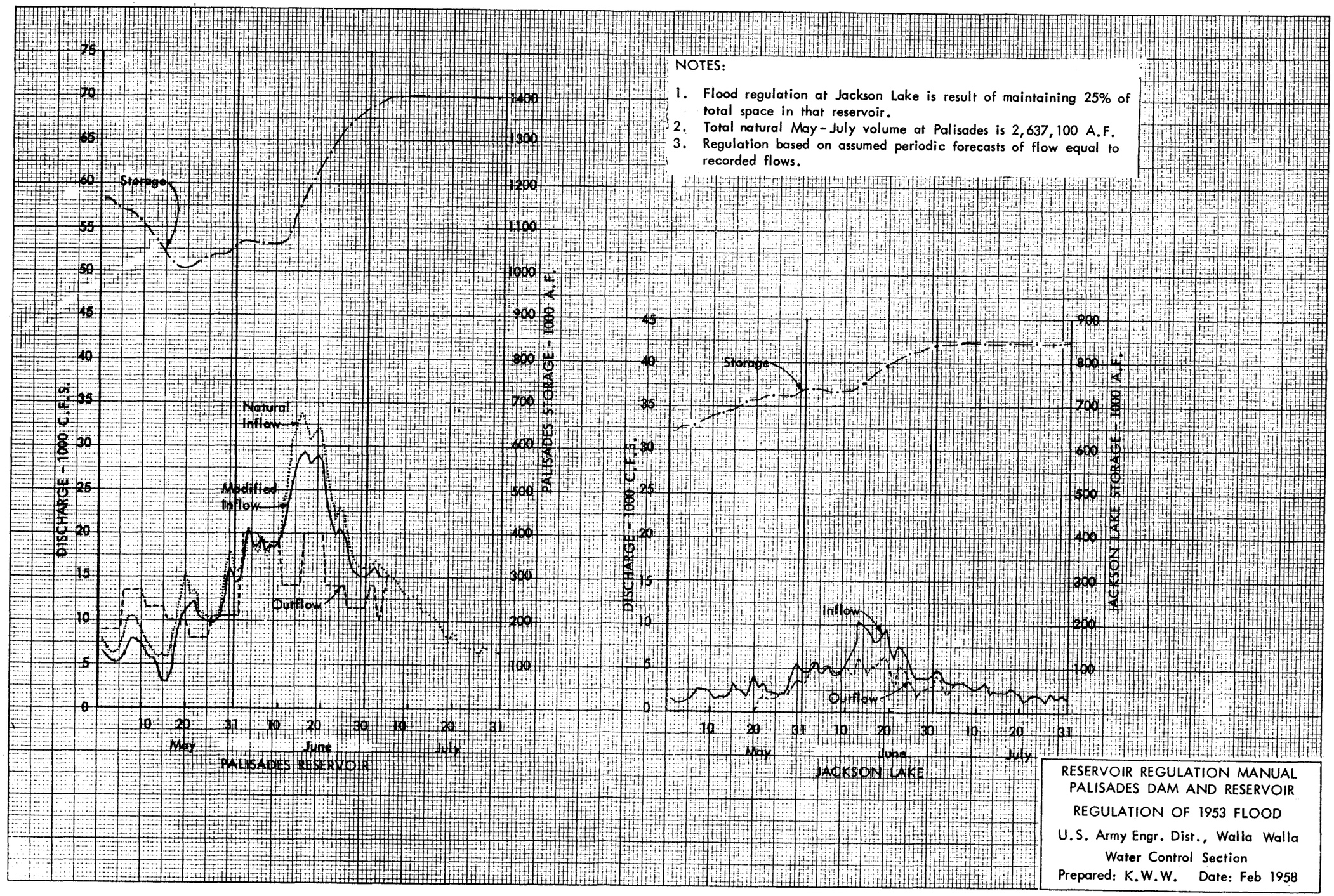


RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR
REGULATION OF STANDARD PROJECT FLOOD
U.S. Army Engr. Dist., Walla Walla
Water Control Section
Prepared: K.W.W. Date: Feb 1958

PLATE 11

NOTES:

1. Flood regulation at Jackson Lake is result of maintaining 25% of total space in that reservoir.
2. Total natural May - July volume at Palisades is 2,637,100 A.F.
3. Regulation based on assumed periodic forecasts of flow equal to recorded flows.



RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR
REGULATION OF 1953 FLOOD
U.S. Army Engr. Dist., Walla Walla
Water Control Section
Prepared: K.W.W. Date: Feb 1958

PLATE 12

APPENDIX A

ORIGINAL OPERATING PLAN - 1948

Palisades Project

The Bureau of Reclamation plans to construct and operate Palisades Reservoir for the optimum multiple-purpose use of the entire storage of 1,400,000 acre-feet. To attain this objective, the storage below elevation 5,497 feet mean sea level, approximating 200,000 acre-feet, will be reserved for dead storage and allocated exclusively to the production of hydroelectric power and the maintenance of a permanent pool for the preservation and propagation of fish and wildlife. The remainder of the storage capacity in the amount of 1,200,000 acre-feet will be operated in the joint interests of irrigation and flood control governed by the best available runoff forecasts.

The Bureau of Reclamation will forecast from time to time during the period from 1 February to 31 July of each year, on the basis of precipitation, temperature, snow survey and runoff data, the volume of run-off that may be expected in the drainage area tributary to the Snake River above Heise, Idaho. To the extent that such services can be arranged for by cooperative agreements, the Bureau of Reclamation will make the forecasts hereunder after consultation with the Reclamation Engineer of the State of Idaho or his authorized representative, and the Chief of Engineers or his authorized representative. To facilitate the forecasting of runoff the Bureau of Reclamation will expand the existing hydrologic network and will establish and operate continuously a system for the efficient assembling and analyzing of the basic data. Until such time as a better method of forecasting be devised, the forecasts will be based upon estimates of area-elevation weighted snow water content as determined from periodic snow surveys on or about 1 February, 1 March, 1 April, and 1 May, and upon precipitation for September of the preceding year. A sample curve of the correlation between weighted snow water content on 1 April of a given year plus precipitation of the preceding September and the resultant runoff from 1 April to 31 July, inclusive, of the year in question, is shown on Plate II.

To the end of accomplishing the optimum multiple-use of the reservoir, the Bureau of Reclamation, beginning with the first year the reservoir is put into operation, will operate the reservoir on "the basis of the forecasted .runoff as nearly as practicable in accordance with the following plan:

1. For the purpose of rules and regulations to be prescribed by the Secretary of the Army under Section 7 of the Flood Control Act of 1944 (58 Stat. 887, 890) the storage space allocated to - flood control is defined as follows:

> It is the reservoir space which, using the governing forecast of flood runoff for the year, according to the curves shown on Plate I is required to the end of controlling the forecasted flood volume from the time in that year that reservoir inflow first exceeds 20,000 second-feet through the succeeding 31 July

releases from the reservoir during that period such that the flow at the Heise gage will not exceed 20,000 second-feet, insofar as this control can be accomplished with a reservoir capacity not exceeding 1,200,000 acre-feet. The governing forecast of flood volume for each year is the forecast made as of the day when reservoir inflow in that year first exceeds 20,000 second-feet.

The parameters shown on Plate I, empirically derived from floods of record, are enveloping curves of the storage requirements for various volumes of total forecast runoff from any given date to 31 July. The reservoir capacity required to control the flood to a discharge of 20,000 second-feet (or less) below the dam is indicated by the ordinate of the parameter corresponding to the forecasted runoff on the date when the inflow to the reservoir exceeds 20,000 second-feet.

2. During the period of each year from the date of the first forecast about 1 February to the date of making the governing forecast for that year (approximately the middle of May) herein designated as the evacuation period, the reservoir will be operated in such a manner that the required reservoir level as determined by the parameters on Plate I at the time inflow to the reservoir exceeds 20,000 second-feet can be attained with minimum practicable rates and fluctuations of discharge. The rate of discharge during the evacuation period would be determined as follows: The reservoir level required on or about 15 May (the date on which inflows normally may be expected to exceed 20,000 second-feet) would be estimated by use of the parameters on Plate I and a 15 May forecast would be derived by deducting probable minimum inflows for the intervening period from the date of periodic forecasts beginning on 1 February. The reservoir levels thus estimated would comprise tentative allocations of flood control space at which to aim the evacuation procedure. The rate of discharge then would be selected as that required to release the probable maximum inflow for the period between date of forecast and 15 May plus the evacuation necessary to attain the required reservoir level indicated by the latest tentative allocation.

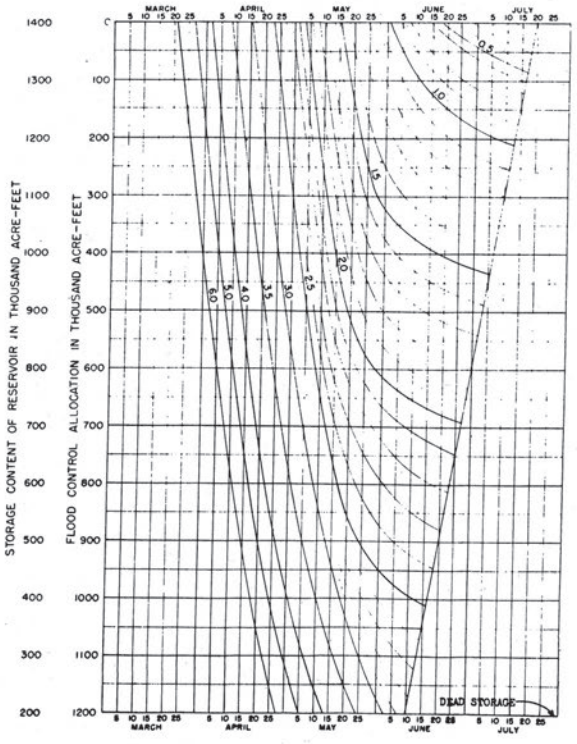
3. From the date of the governing forecast each year through 31 July of that year herein designated the filling period, the reservoir shall be operated in such a manner that the reservoir content shown on the chart (Plate I) will be maintained but not be exceeded except when storage above those levels is required to limit the flows to 20,000 second-feet at Heise. When the forecasted runoff indicates a required storage capacity in excess of the total active storage capacity of the reservoir, releases in excess of 20,000 second-feet will be made as required but at rates not to exceed 30,000 second-feet, except as indicated in paragraph 4 below.

4. Whenever the pool shall have risen above elevation 5,620, the full reservoir level, due to an extraordinary excess of inflow over the maximum releases permitted under. paragraph I or is expected to rise above that level within the next 48 hours, releases may be increased temporarily above those previously specified, so as to minimize the peak rate of release and to draw the reservoir down to the full reservoir level as rapidly as possible. However, the maximum rate of such extraordinary release shall not exceed the estimated maximum mean daily rate of inflow to the reservoir

during the period when the reservoir level is above elevation 5,620.

5. All reservoir releases made as herein provided are subject to the condition that no releases shall be made at rates or in a manner that would be inconsistent with whatever operating rules and regulations are laid down by the Chief Engineer of the Bureau of Reclamation for the purpose of protecting the dam and reservoir from damage.

If operating experience indicates the desirability therefore, the Secretary of the Interior may, after consultation with the Secretary of the Army, modify from time to time the operating plan herein described with respect to the amount of space allocated to flood control each year on the basis of advance forecasts as to runoff, but no modification which would result in a substantial change in the control of floods herein stated to be the objective of the original operating plan shall be made without the concurrence of the Secretary of the Army Revisions of the rules and regulations prescribed under the Flood Control Act of 1944 will be made by the Secretary of the Army if, in his judgment, these are requisite because of such modifications in flood control space allocations. Modifications in the operating plan not requiring the concurrence of the Secretary of the Army shall not be the occasion for a revision of the conclusions originally reached as to the flood control benefits to be realized from the original operating plan or of the formula adopted for the allocation of construction costs to flood control purposes.



NOTES:

1. Parameters are anticipated flood run-off of Snake River at Heise in millions of acre-feet for the remainder of the season from any given date to July 31. The anticipated run-off is the forecasted flow at Heise less the storage capacity available in Jackson Lake. A minimum of two hundred thousand acre-feet of storage space in Jackson Lake will be held vacant until May 1 of every year unless the forecast indicates that storage should begin earlier to insure filling that space.
2. Storage reservation based upon a release which would give a maximum regulated flow at Heise of twenty thousand second-feet.

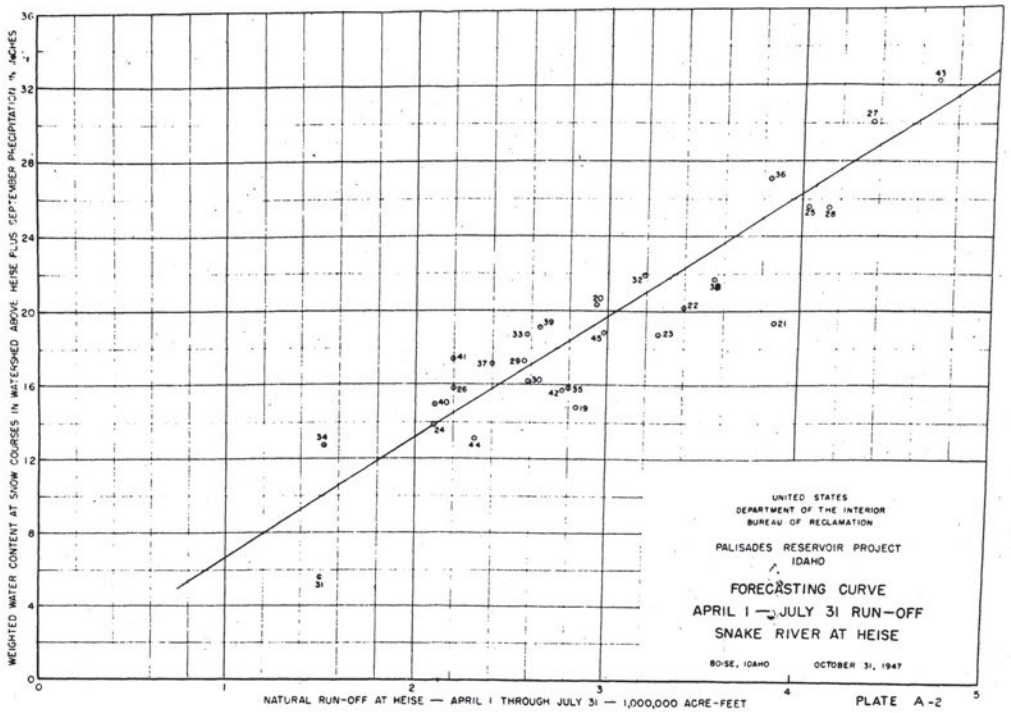
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

PALISADES RESERVOIR PROJECT
IDAHO

ALLOCATION OF FLOOD CONTROL SPACE

BOISE, IDAHO OCTOBER 31, 1947

PLATE A-1



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

PALISADES RESERVOIR PROJECT
IDAHO

FORECASTING CURVE
APRIL 1 — JULY 31 RUN-OFF
SNAKE RIVER AT HEISE

BOISE, IDAHO OCTOBER 31, 1947

PLATE A-2

APPENDIX B

TITLE 33--NAVIGATION AND NAVIGABLE WATERS

Chapter II--Corps of Engineers
Department of the Army

PART 208--FLOOD CONTROL REGULATIONS

PALISADES DAM AND RESERVOIR, SNAKE RIVER, IDAHO

Pursuant to the provisions of section 7 of the Act of Congress approved December 22, 1944 (58 Stat. 890; 33 U. S. C. 709), the following #208.91 is hereby prescribed to govern the use and operation of Palisades Dam and Reservoir on Snake River, Idaho, for flood control purposes.

#208.91 Palisades Dam and Reservoir, Snake River, Idaho. The Bureau of Reclamation shall operate Palisades Dam and Reservoir in the interests of flood control as follows:

(a) Storage space in Palisades Reservoir and Jackson Lake combined shall be kept available for flood control purposes in accordance with the Flood Control Storage Reservation Diagram currently in force. Not less than 75 percent of the total flood control space shall be made available in Palisades Reservoir.

(b) Releases from Palisades Reservoir shall be restricted to quantities which will not cause downstream flows at the Heise gaging station to exceed 20,000 cubic feet per second, insofar as this control can be accomplished with combined reservoir capacity not exceeding 1,400,000 acre-feet in palisades Reservoir and Jackson Lake.

(c) When the total active capacity of the reservoir has been evacuated and when the forecasted runoff indicates that storage capacity in excess of 1,400,000 acre-feet may be required for Palisades Reservoir and Jackson Lake combined to control the flows at Heise gaging station to 20,000 cubic feet per second, releases in excess of 20,000 cubic feet per second prior to June 1 will be planned on the basis of the following rule curve:

May 1-July 31 forecasted volume (acre-feet):	Required discharge [1/] (cfs)
Less than 4,100,000	20,000
4,100,000	23,000
4,300,000	24,000
4,600,000	25,000
4,900,000	26,000
5,300,000	27,000

5,600,000	28,000
6,000,000	29,000
6,300,000 or larger	30,000

[1/]Applicable only when exceeded by natural inflow.

(d) When the forecasted runoff for the period June 1 through July 31 exceeds 2,500,000 acre-feet, and when, after June 1, the available space is not within 10,000 acre-feet of the space required by the Flood Control Storage Reservation Diagram currently in force, the releases from the reservoir may be increased so that the flow at Heise gaging station will exceed 20,000 cfs up to a limit of 30,000 cfs to the extent of 1,000 cfs for each 5,000 acre-feet of .deficient storage space, except that the release shall not be greater than the natural inflow. The change in discharge will be made in such manner as to minimize the adverse downstream effects.

(e) In no case will releases be made which will cause the flow of Snake River at Heise gaging station to exceed 30,000 cfs except as may be agreed upon by the Corps of Engineers and Bureau of Reclamation in the case of exceedingly large floods or as provided in paragraph (f) or (h) of this section.

(f) The flood control regulations of the section are subject to temporary modification by the District Engineers, Corps of Engineers, if found necessary in time of emergency. Requests for and action on such modification maybe made by any available means of communication, and the action taken by the District Engineer shall be confirmed in writing under date of the same day to the Office of the Regional Director of the Bureau of Reclamation in charge of the locality.

(g) The Flood Control Storage Reservation Diagram currently in force as of the promulgation of this section is that dated May 12, 1958, File No. SN-902-l/1, and is on file in the Office of the Chief of Engineers, Department of the Army, Washington, D. C., and in the Office of the Commissioner, Bureau of Reclamation, Washington, D. C. Revisions of the Flood Control Storage Reservation Diagram may be developed from time to time as necessary by the Corps of Engineers and the Bureau of Reclamation. Each such revision shall be effective upon the date specified in the approval thereof by the Chief of Engineers and the Commissioner of Reclamation, and, from that date until replaced, shall be the Flood Control Storage Reservation Diagram currently in force for purposes of this section. Copies of the Flood Control Storage Reservation Diagram currently in force shall be kept on file in and may be obtained from the office of the District Engineer, Corps of Engineers, and the Regional Director, Bureau of Reclamation, in charge of the locality.

(h) In the event that the reservoir level rises above elevation 5620 at the dam (top of spillway gates), care shall be taken that the maximum subsequent release from the reservoir does not exceed the corresponding rate of reservoir inflow.

(i) Nothing in the regulations in this section shall be construed to require dangerously rapid changes in magnitude of releases, or that releases be made at rates

or in a manner that would be inconsistent with requirements for protecting the dam and the reservoir from major damage.

(j) The Bureau of Reclamation shall currently procure basic hydrologic data, make determinations of required flood control reservation from the Flood Control Storage Reservation Diagram currently in force, and make calculations of permissible releases from the reservoir as are required to accomplish the flood control objectives prescribed in this section.

(k) The Bureau of Reclamation shall keep the District Engineer, Corps of Engineers, Department of the Army, in charge of the locality, currently advised of hydrologic data and other operating criteria which affect the schedule of operation. Also, the Bureau of Reclamation shall keep the Watermaster, Water District No. 36, acting for the Department of Reclamation, State of Idaho, currently advised of reservoir releases.

(Regs., May 12, 1958, ENGWE) (Sec. 7, 58 Stat. 890; 33 U. S. C. 709)

(SEAL)

HERBERT M. JONES
Major General, U. S. Army,
The Adjutant General

(F. R. Doc. 58-4387; Filed, June 10, 1958; 8:45 a.m.)

Copies from Federal Register dated 11 June 1958

Plate B-1 goes here

APPENDIX C

FORECASTS OF RUNOFF - SNAKE RIVER AT HEISE

1955 Forecast Study - Upper Snake River

Revised

January through July forecasts of "Inflow to Jackson Lake" and the "Inflow Between Moran and Heise" are determined from two groups of equations: (1) An early set, with precipitation as the primary forecasting parameter to be used before snow data become available for forecasts on January I, February 1, and March 1, [1/] and (2) a later set of equations with the snow variable as the primary forecasting parameter to be used for April 1, May 1, June 1, and July 1 forecasts.

It should be noted that each forecast equation was derived from information available on the latest date shown in the subtitle. Forecasts for the earlier dates are obtained by substituting long-term average values for unavailable information.

The forecast of the Snake River at Heise is the sum of forecasts of inflow to Jackson Lake and the inflow between Moran and Heise.

Forecast of Inflow to Jackson Lake

January and February Forecast Equation (F55-2)

$$Y = 26.36X_1 + 66.43X_2 - 15.21X_3 + 205.99$$

X_1 = Accumulated precipitation for September and October in inches, taken as average of measurements at Moran and Snake River.

[1/] The inflow to Jackson Lake forecast on March 1 is an exception, since the April equation is used on March 1 by converting March 1 snow measurements to April 1 snow and substituting additional long-term averages where necessary.

X_2 = Accumulated precipitation for November, December and January in inches, taken as average of measurements at Moran and Snake River.

X_3 = The average variation of daily maximum temperatures above 350 at Moran for the preceding month of December measured in average degree days.

Y = Forecast of inflow to Jackson Lake in 1,000 acre-feet for January 1 - July 31. February 1 - July 31 inflow forecast obtained by deducting recorded January inflow.

March, April. May, June, July Forecast Equation (A55-1)
(Inflow to Jackson Lake)

$Y = 21.51 X_1 + 13.40 X_2 + 34.90 X_3 - 1.20X_4 - 66.84$

X_1 = Snow water content on April 1 in inches taken as the average measured at Aster Creek, Coulter Creek, Glade Creek. Huckleberry Divide and Lewis Lake Divide. (On March 1 use March I snow water content plus 3.75 inches)

X_2= Accumulated precipitation at Snake River for period September through December, minus October through March inflow to Jackson Lake measured in inches. (Note: 1" over watershed = 43,520 acre-feet.) On March 1 use long-term average inflow for March.

X_3 = The average of precipitation stations Moran and Snake River for April + 2/3 May + 1/3 June measured in inches. Use long-term average figures when current data not available. On March 1 and April 1 use 4.01 inches. (April = 1. 93" 2/3 May = 1.38" and 1/3 June = 0.70")

degree days. On March 1 use long-term average for March of 4.34.

Y = Forecast of inflow to Jackson Lake in 1,000 acre-feet for April 1-July 31. Add average flow for March to obtain March I-July 31 forecast of volume.

Forecast of Inflow Between Moran and Heise

<u>January. February. and March Forecast Equation (M55-2)</u>

$Y = 246.96 X_1 + 198.88X2 - 12l.96 X_3 + 1017.40$

TABLE C-1
FORECAST RESULTS

Snake R. Near Heise, Idaho

Date	May - July Volumes *		
	Forecast	Actual	Forecast Error
1928	3645	3793	-148
29	2473	2355	+118
1930	1844	2143	-299
31	1282	1264	+ 18
32	2746	2942	-196
33	2546	2358	+188
34	1271	1173	+ 98
1935	2613	2605	+8
36	3468	3425	+ 43
37	2447	2192	+255
38	2997	3145	-148
39	2287	2175	+112
1940	1740	1769	- 29
41	2292	1961	+331
42	2125	2320	-195
43	4087	3909	+178
44	2042	2085	- 43
1945	2651	2781	-130
46	2446	2742	-296
47	3024	3082	- 58
48	2717	2864	-147
49	3249	2832	+417
1950	3582	3730	-148
51	3586	3607	- 21
52	3352	3286	+ 66
53	2658	2631	+ 27
54	3175	3076	+ 99

Snake R. at Moran, Wyoming

Date	May - July Volumes *		
	Forecast	Actual	Forecast Error
1928	855	984	- 129
29	569	578	- 9
1930	538	493	+ 45
31	361	344	+ 17
32	791	718	+ 73
33	716	620	+ 96
34	355	346	+9
1935	738	654	+ 84
36	890	759	+131
37	720	558	+162
38	846	816	+ 30
39	698	576	+ 122
1940	619	543	+ 76
41	569	495	+ 74
42	574	570	+ 4
43	991	993	- 2
44	457	538	- 81
1945	644	625	+ 19
46	636	668	+ 69
47	846	609	+ 37
48	710	736	- 26
49	903	775	+128
1950	811	830	- 19
51	830	783	+ 47
52	736	809	- 73
53	716	661	+ 55
54	872	838	+ 34

* All values in 1000 A.F.

X_1 = Accumulated precipitation for October, November and December in inches, taken as the average of measurements at Bedford, Jackson, Moran and Snake River, minus the runoff between Moran and Heise for October through December, measured in inches. 1" over the watershed - 262,613 acre-feet.

X_2 = Accumulated precipitation for January and February in inches, taken as the average of measurements at Bedford, Jackson, Moran, and Snake River. Use 2.45 as average of 4 stations for January and 2.25 for February.

X_3 = Average variation of daily maximum temperatures above 350 at Moran for the preceding December in average degree days.

Y = Forecast of inflow between Moran and Heise in 1,000 acre-feet for the period January I-July 31, inclusive. (Forecasts of inflow for any date after January 1 estimated by subtracting actual flows.)

<u>April, May, June, July Forecast Equation (ASS-I) (Between Moran and Heise)</u>

Y = 115.54X1 + 15.04X2 + 50.35X3 + 19.43X4 - 25.92X5 + 321.3

X_1 = Snow water content on April 1 in inches taken as average measured at Togwotee Pass, Turpin Meadows, Yellowjacket, East Rim Divide, Blackrock, and Four Mile Meadows.

X_2 = Snow water content on April 1 in inches taken as average measured at Afton Ranger Station, CCC Camp, Cottonwood Lake, Deadman Ranch and Grover Park Divide.

X_3 = Accumulated precipitation for October, November, and December taken as the average of measurements for Grover 25, Bedford, Jackson, and Moran, minus 1/5 (November through March runoff between Moran and Heise) measured in inches. (1" over the watershed = 262,613 acre-feet.)

X_4 = April + 2/3 May + 1/3 June precipitation in inches taken as the average of measurements at Bedford, Jackson and Moran. On April 1 use 3.39 inches. (April = 1.46, 2/3 May = 1. 25" , 1/3 June = .69")

X_5 = The average variation of daily maximum temperatures above 350 at Moran for the preceding December and March measured in average degree days.

Y = Forecast of inflow between Moran and Heise in 1,000 acre-feet
for the period April 1-July 31, inclusive.

SNAKE RIVER AT HEISE UNREGULATED FLOW
VOLUME FORECAST PROCEDURE
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION

THE BUREAU OF RECLAMATION FORECAST PROCEDURE CONSISTS OF A MULTIPLE REGRESSION EQUATION OF THE FOLLOWING FORM:

$$Y = K + C1(X1) + C2(X2) + C3(X3) + C4(X4)$$

WHERE,

Y = FORECASTED RUNOFF VOLUME FOR THE PERIOD 1 OCTOBER THROUGH 31 JULY IN 1000'S OF ACRE FEET (KAF).

X_1 = INDEX OF OBSERVED RUNOFF VOLUME FOR THE PERIOD 1 OCTOBER THROUGH 30 NOVEMBER IN KAF.

X_2 = INDEX OF OBSERVED/EXPECTED TOTAL MONTHLY PRECIPITATION IN INCHES FOR THE 1 OCTOBER THROUGH 31 MARCH TIME PERIOD.

X_3 = INDEX OF OBSERVED/EXPECTED 1 APRIL SNOW WATER CONTENT IN INCHES.

X_4 = INDEX OF OBSERVED/EXPECTED TOTAL MONTHLY PRECIPITATION FOR THE PERIOD 1 APRIL THROUGH 30 JUNE IN INCHES.

C1, C2, C3, C4, K = COEFFICIENTS OF REGRESSION. .

THE REGRESSION EQUATION IS FOR THE 1 OCTOBER THROUGH 31 JULY FORECAST PERIOD ONLY. TO FORECAST OTHER TIME PERIODS, SUBTRACT OBSERVED RUNOFF, 1 OCTOBER THROUGH DATE, FROM THE EQUATION RESULT. THE VARIABLES XI THROUGH X4 ARE COMPUTED USING PROCEDURES ON PAGE C-1 SHEETS 2 AND 3.

1985 SNAKE RIVER AT HEISE UNREGULATED INFLOW VOLUME FORECAST PROCEDURE

X1 = TOTAL OCT.-NOV. ANTECEDENT RUNOFF (KAF):

OCT	NOV		
		X1	TOTAL OCT.-NOV. R.O. - _ _ _ _ (KAF) (ENTER X1 ON PAGE C-1, SHEET 5)

X2 = OCT.-MARCH PRECIPITATION (INCHES) (1):

STATION	WEIGHT	OCT	NOV	DEC	JAN	FEB	MAR
AFTON (AFTY)	1.00						
BONDURANT (BONY)	1.00						
JACKSON (JKNY)	1.00						
MORAN (JCKY)	2.00						
PALISADES (PAL)	1.00						
SNAKE R. STA. (SKRY)	1.00						
(A)=TOTALS		-----	-----	-----	-----	-----	-----
(B)=WEIGHT (WGHT)		1. 00	1.00	1.00	1.00	1. 00	1.00
.(A*B)=WGHT TOTALS		-----	-----	-----	-----	-----	-----

X2 = TOTAL WGHT OCT. - MAR.PRECIPITATION =INCHES
(ENTER X2 ON PAGE C-1, SHEET 5)

(1) REFER TO TABLE 2, PAGE C-1, SHEET 4

X3 = APR. 1 SNOW (INCHES):

STATION	OBSERVED WATER CONTENT (INCHES) WGHT (A)	NORMAL SNOW WATER ACCUM. (2) DATE-1. APR (B)	(C)	EXPECTED 1 APRIL TOTAL WATER CONTENT (D)= (B) * (C)	WGHT 1 APRIL WATER CONTENT (INCHES) (D) * (A)
EAST RIM DIV (ERDY)	1.00				
HUCKLEBERRY DIV (HKBY)	1.00				
LEWIS LAKE DIV (LWSY)	1.00				
POISON MEADOWS (PSMY)	2.00				
SALT RIVER SUM (SLTY)	2 00				
THUMB DIVIDE (THMY)	1.00				
TOGWOTEE PASS (TOGY)	1.00				

X3 = TOTAL WGHT 1 APR. WATER CONTENT =_ _ _ _ _ _ INCHES
(ENTER X3 ON PAGE C-1, SHEET 5)

(2) REFER TO TABLE 1, PAGE C-1, SHEET 4

1985 SNAKE RIVER AT HEISE UNREGULATED INFLOW VOLUME FORECAST PROCEDURE

X4 = APR.-JUNE PRECIPITATION (INCHES) (3)

STATION	WGHT	APR	MAY	JUNE
AFTON (AFTY)	1.00			
BONDURANT (BONY)	1.00			
JACKSON (JKNY)	1.00			
MORAN (JCKY)	2.00			
PALISADES (PAL)	1.00			
SNAKE R. STA. (SKRY)	1.00			
(A)=TOTALS		_____	_____	____
(B)=WGHT		1.00	1.00	0.67
(A)*(B}=WGHT TOTALS				

X4 = TOTAL WGHT APR.-JUNE PRECIPITATION = INCHES
(ENTER X4 ON PAGE C-1, SHEET 4)

(3) REFER TO TABLE 2, PAGE C-1, SHEET 4

OBSERVED RUNOFF
1 OCT.-DATE

MONTH	RUNOFF	SUM	R.O. (4)
OCT			
NOV			
DEC			
JAN			
APR			
MAY			

(4) ENTER SUM R.O. 1 OCT-DATE FROM PAGE C-1, SHEET 5

1985 SNAKE RIVER AT HEISE UNREGULATED INFLOW VOLUME FORECAST PROCEDURE

TABLE 1

NORMAL SNOW WATER ACCUMULATION
(DATE-1 APRIL) (INCHES)

STATION	1 JAN	1 FEB	1 MAR
EAST RIM DIVIDE (ERDY)	5.9	3.7	1.5
HUCKLEBERRY DIVIDE (HKBY)	11.9	6.7	2.5
LEWIS LAKE DIVIDE (LWSY)	25.9	15.6	7.0
POISON MEADOWS (PSMY)	16.0	8.9	4.9
SALT RIVER SUMMIT (SLTY)	9.6	5.6	2.2
THUMB DIVIDE (THMY)	13.6	7.9	3.8
TOGWOTEE PASS (TOGY)	18.0	11.3	5.1

TABLE 2

STATION	EXPECTED MONTHLY PRECIPITATION (INCHES)					
	JAN	FEB	MAR	APR	MAY	JUNE
AFTON (AFTY)	1.68	1. 38	1. 41	1.70	2.07	1.97
BONDURANT (BONY)	2.98	2.05	2.22	1.32	1.60	1.68
JACKSON (JKNY)	1.52	1. 11	1.08	1.07	1.69	1.72
MORAN (JCKY)	2.93	2.19	1.98	1.78	1.99	1.79
PALISADES (PAL)	1.88	1.65	1.50	1.54	2.19	2.29
SNAKE R. STA. (SKRY)	4.12	3.35	3.03	2.31	2.65	2.74

FORECAST PERIOD _____ FORECAST DATE_____

1985 SNAKE RIVER AT HEISE UNREGULATED INFLOW VOLUME FORECAST PROCEDURE

1 OCTOBER THROUGH 31 JULY VOLUME FORECAST.

Y1 = (-2046.52) + (4.3730)X1 + (14. 1565)X2 + (11.1188)X3 + (28. 3688)X4

Y1 = (-2046.52) + (4.3730)_____+ (14.1565)_____+ (11.1188)____ + (28.3688)

Y1 =_____KAF

NOTE: XI, X2, X3, AND X4 VALUES FOR INSERTION INTO THE ABOVE EQUATION ARE COMPUTED ON SHEETS 2 AND 3.

FORECAST DATE THROUGH 31 JULY VOLUME FORECAST

Y (DATE-31 JULY) = Y1 (1 OCT. - 31 JULY) - OBSERVED RUNOFF IN KAF (1 OCT. - DATE)

Y (DATE-31 JULY) =_____ - _____

Y (DATE-31 JULY) =_____ KAF

U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT

UPPER SNAKE RIVER VOLUME FORECAST
(TOTAL UNREGULATED HEISE DISCHARGE)

FORECAST DATE:_____
DATE:_____
BY:_____

1. SNOW WATER CONTENT (WC) FORECAST. (USE FOR 1 Jan-15 May FORECASTS ONLY)

SNOW COURSE	A0 (TABLE 1) (SHEET 8)	A1 (TABLE 2) (SHEET 8)	X1 MEASURED WATER CONTENT (INCHES)	FORECASTED RUNOFF Y= A0 + A1 X1 (INCHES)
ARIZONA				
BASE CAMP				
BLACKROCK				
COULTER CREEK				
FOUR MILE MEADOWS				
GLADE CREEK				
GRASSY LAKE				
LEWIS LAKE DIVIDE				
SALT RIVER SUMMIT				
SNAKE RIVER STATION				
TOGWOTEE				

SUM =_____

YWC =AVERAGE FORECAST =_____

FORECASTED RUNOFF VOLUME - YWC (INCHES) = _____
(DATE - 31 July) YWC (ACRE-FEET) = (306773) (YWC INCHES)
YWC (ACRE-FEET) = _____

NOTE: FOR 1 JUNE FORECAST PROCEDURE - SEE SHEET 4 & 5

2. PRECIPITATION FORECAST. (USE FOR 1 JAN-15 MAY FORECASTS ONLY)

PRECIPITATION STATION	B0 (TABLE 3) (SHEET 9)	B1 (TABLE 4) (SHEET 9)	X1 ACCUMULATED PRECIPITATION OCT THRU DATE (INCHES)	FORECASTED RUNOFF Y= B0 + B1 X1 (INCHES)
BONDURANT				
ISLAND PARK DAM				
JACKSON				
LAKE YELLOWSTONE				
MOOSE				
MORAN SWNW				
PALISADES DAM				
SNAKE RIVER STATION				

SUM =_____

YPRECIP =AVERAGE FORECAST =_____

FORECASTED RUNOFF VOLUME - YPRECIP (INCHES) = _____
(DATE - 31 July) YPRECIP (ACRE-FEET) = (306773)
(YPRECIP INCHES)
YPRECIP (ACRE-FEET) = _____
(1 JAN - 31 JUL)

FORECASTED RUNOFF VOLUME-YPRECIP (AF)=YPRECIP (AF)=OBSERVED TOTAL RUNOFF (AF)
(DATE-31 JUL) (DATE-31 JUL) (1 JAN-31 JUL) (1 JAN-DATE)

YPRECIP (AF) = _____
(DATE-31 JUL)

NOTE: FOR 1 JUNE FORECAST PROCEDURE - SEE SHEET 4 & 5
FOR 1 JULY FORECAST PROCEDURE - SEE SHEET 6

3. COMBINED RUNOFF VOLUME FORECAST (USE FOR 1 JAN - 15 MAY FORECASTS ONLY)
(DATE - 31 JULY)

YWC (PAGE 1) = _____ ACRE-FEET

YPRECIP (PAGE 2) = _____ ACRE-FEET
SUM = _____ ACRE-FEET

YCOMB = AVERAGE = _____ ACRE-FEET

NOTE: FOR 1 JUNE FORECAST PROCEDURE - SEE SHEET 4 & 5
FOR 1 JULY FORECAST PROCEDURE - SEE SHEET 6

UPPER SNAKE RIVER VOLUME FORECAST
(TOTAL UNREGULATED HEISE DISCHARGE)

FORECAST DATE: 1 JUNE

DATE:_____
BY:_____

4. FORECAST ADJUSTMENT PROCEDURE

TEMPERATURE STATIONS	OBSERVED MAY AVERAGE MAXIMUM TEMPERATURES (DEGREES)
AFTON	
ALTA	
BONDURANT	
DARWIN	
JACKSON	
MOOSE	
MORAN	
SNAKE RIVER STATION	

TOTAL = _____

ATEMP = AVERAGE = _____

5. JUNE FORECAST

SNOW COURSE	A0 (TABLE 1) (SHEET 9)	A1 (TABLE 2) (SHEET 9)	X1 MEASURED WATER CONTENT (INCHES)	FORECASTED RUNOFF Y= A0 + A1 X1 (INCHES)	C1 FORECAST ADJUSTMENT (SEE PAGE 4) (INCHES	ADJUSTED FORECAST (Y+C1) (INCHES)
ARIZONA						
BASE CAMP						
BLACKROCK						
COULTER CREEK						
FOUR MILE MEADOWS						
GLADE CREEK						
GRASSY LAKE						
LEWIS LAKE DIVIDE						
SALT RIVER SUMMIT						
SNAKE RIVER STATION						
TOGWOTEE						

SUM =_____

YWC =AVERAGE FORECAST =_____

FORECASTED RUNOFF VOLUME - YWC (INCHES) = _____

(DATE - 31 July) YWC (ACRE-FEET) = (306773) (YWC INCHES)

YWC (ACRE-FEET) = _____

UPPER SNAKE RIVER VOLUME FORECAST FORECAST DATE: 1 JULY
(TOTAL UNREGULATED HEISE DISCHARGE)
1.0 BASIN INCH= 306773 AC.-FT FOR 5752 SQ. MILES

6.0 FORECAST ADJUSTMENT PROCEDURE

TEMPERATURE STATIONS	ELEVATION (FT. MSL)	OBSERVED TEMPERATURES (MAY)	AVERAGE (JUNE)	MAXIMUM (DEGREES FAHRENHEIT) (MAY-JUNE)/2
ALTA	6430			
BONDURANT	6620			
JACKSON	6230			
MOOSE	6470			
MORAN	6789			
			TOTAL=	
			ATEMP=AVERAGE=	

ADJUSTMENT PROCEDURE CRITERIA (BASED ON AVG. MAY-JUNE MAX. TEMPERATURE)

1. IF ATEMP IS LESS THAN 65, C1= 1 JULY FORECAST ADJUSTMENT = 0.5 BASIN INCHES

2. IF ATEMP=65-67 OR IF OBSERVED JUNE RUNOFF IS LESS THAN OR EQUAL TO 4.15 BASIN INCHES, THEN C1= 1 JULY ADJUSTMENT = 0.0 BASIN INCHES

3. IF ATEMP IS GREATER THAN 67, C1= 1 JULY FORECAST ADJUSTMENT- 0.5 BASIN INCHES

1-31 JULY ADJUSTED RUNOFF FORECAST= Y1 = Y + C1

WHERE: Y=31 JULY FORECASTED RUNOFF=0.084 + 0.496X
X=OBSERVED UNREGULATED RUNOFF AT HEISE
C1=1 JULY FORECAST ADJUSTMENT IN BASIN INCHES (BASED ON AVG. MAY-JUNE MAX. TEMPERATURE)

Y1 (INCHES) = 0.084 + 0.496X + C1
Y1 (INCHES) =
Y1 (ACRE-FEET) = Y1 (INCHES) (306773)
Y1 (ACRE-FEET) =

TABLE 3. REGRESSION EQUATION INTERCEPT B0 (INCHES)

UPPER SNAKE RIVER - TOTAL UNREGULATED HEISE INFLOW

FORECAST PERIOD	1 APRIL - 31 JULY RUNOFF FORECAST (ACRE-FEET)	STANDARD ERROR (ACRE-FEET)
1 JAN - 31 JULY	Y = -379192 + 0.962 X	43764
15 JAN - 31 JULY	Y = -318766 + 0.970 X	37905
1 FEB - 31 JULY	Y = -258339 + 0.977 X	32045
15 FEB - 31 JULY	Y = -193129 + 0.961 X	26940
1 MAR - 31 JULY	Y = -127919 + 0.985 X	21834
15 MAR - 31 JULY	Y = -63960 + 0.993 X	10917

NOTE: X = VOLUME FORECAST IN ACRE-FEET FOR FORECAST PERIOD INDICATED.
Y = EXPECTED APRIL - JULY RUNOFF IN ACRE-FEET.

TABLE 1. REGRESSION EQUATION INTERCEPT A0 (INCHES)

SNOW COURSE	1 JAN	15 JAN	1 FEB	15 FEB	1 MAR	15 MAR	1 APR	15 APR	1 MAY	15 MAY	1 JUN
ARIZONA	7.32	6.37	5.41	4.20	2.99	2.25	1.51				
BASE CAMP	7.92	6.52	5.11	3.85	2.58	2.08	1.58				
BLACKROCK			3.62	2.37	1.12	0.53	-0.06				
COULTER CREEK	7.29	6.45	5.61	4.23	2.84	1.87	0.89				
FOUR MILE MEADOWS			3.06	1.73	0.39	-0.29	-0.97				
GLADE CREEK	7.08	5.91	4.73	3.52	2.30	1.65	0.99				
GRASSY LAKE	6.24	4.86	3.48	2.40	1.32	0.47	-0.38	-0.01	.36	2.42	4.48
LEWIS LAKE DIVIDE	7.16	6.07	4.97	3.99	3.01	2.09	1.16	0.88	0.59	1.37	2.14
SALT RIVER SUMMIT	8.10	6.45	4.79	4.08	3.36	1.98	0.60				
SNAKE RIVER STATION	7.11	5.83	4.55	3.41	2.27	1.45	0.63				
TOGWOTEE PASS	6.30	4.70	3.10	1.72	0.34	-0.10	-0.53	-1.16	-1.79	0.24	2.260.

TABLE 2. REGRESSION EQUATION COEFFICIENT A1

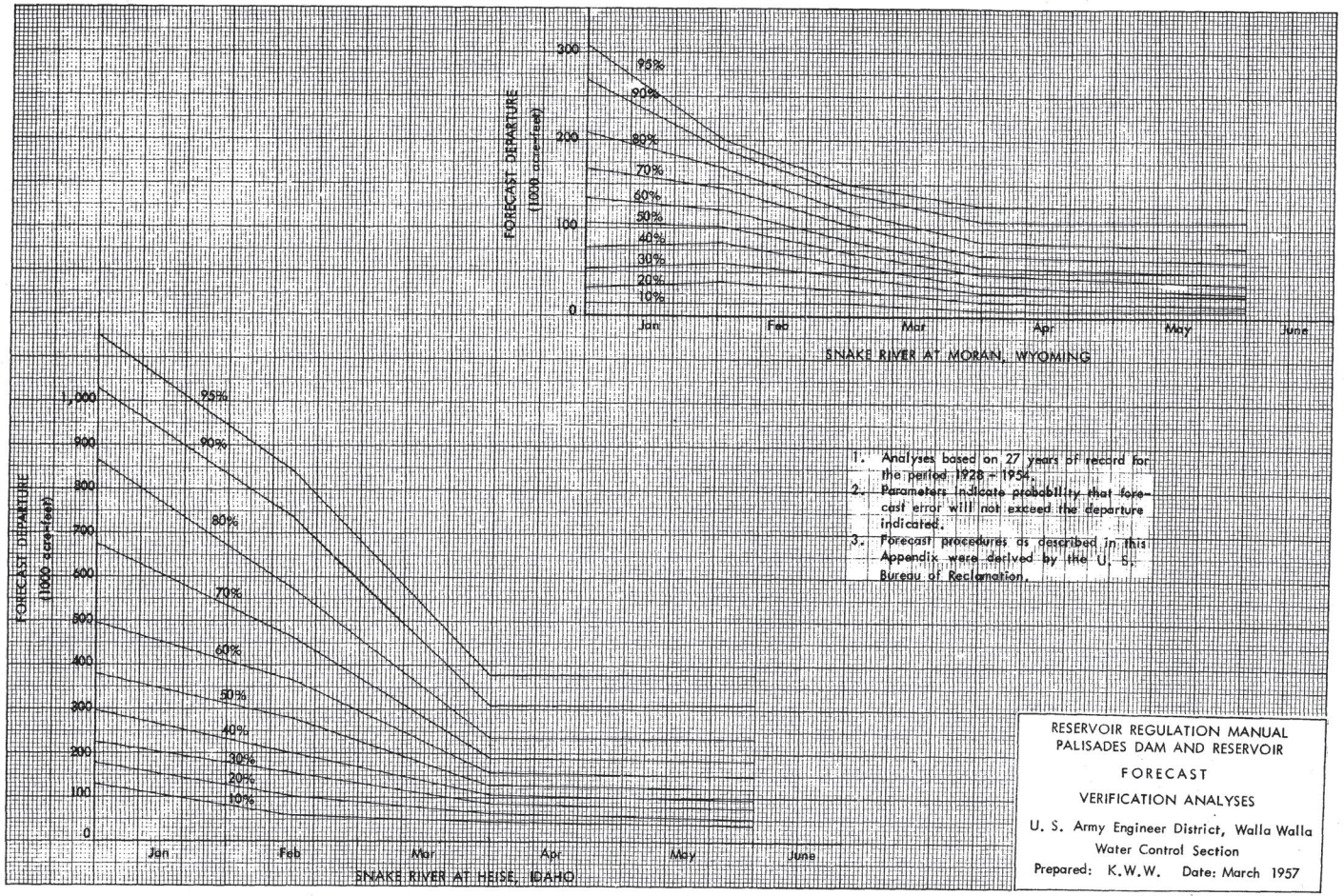
SNOW COURSE	1 JAN	15 JAN	1 FEB	15 FEB	1 MAR	15 MAR	1 APR	15 APR	1 MAY	15 MAY	1 JUN
ARIZONA	0.738	0.637	0.535	0.526	0.516	0.504	0.492				
BASE CAMP	0.590	0.553	0.515	0.513	0.511	0.492	0.473				
BLACKROCK			0.578	0.571	0.563	0.526	0.489				
COULTER CREEK	0.607	0.515	0.423	0.425	0.426	0.429	0.432				
FOUR MILE MEADOWS			0.984	0.984	0.984	0.929	0.873				
GLADE CREEK	0.646	0.567	0.487	0.476	0.465	0.446	0.426				
GRASSY LAKE	0.443	.406	0.369	0.353	.337	0.328	0.318	0.297	0.276	0.234	0.192
LEWIS LAKE DIVIDE	0.329	0.291	0.253	0.244	0.234	0.230	0.225	0.221	0.216	0.194	0.171
SALT RIVER SUMMIT	0.775	0.738	0.701	0.651	0.601	0.620	0.639				
SNAKE RIVER STATION	0.689	0.617	0.544	0.526	0.508	0.499	0.489				
TOGWOTEE PASS	0.578	0.518	0.458	0.453	0.447	0.413	0.379	0.364	0.348	0.267	0.186

TABLE 3. REGRESSION EQUATION INTERCEPT B0 (INCHES)

PRECIPITATION STATION	1 JAN	15 JAN	1 FEB	15 FEB	1 MAR	15 MAR	1 APR	15 APR	1 MAY	15 MAY
BONDURANT	8.86	8.21	7.56	7.34	7.12	7.14	7.15	7.01	6.86	6.45
ISLAND PARK DAM	5.98	5.59	5.19	4.34	3.48	3.02	2.56	1.97	1.38	0.24
JACKSON	8.54	7.93	7.32	6.80	6.27	5.61	4.94	4.27	4.14	4.00
3.31	7.44	6.96	6.47	6.04	5.61	4.94	4.27	4.14	4.00	3.31
MOOSE	7.59	6.09	4.58	4.40	4.21	3.48	2.75	2.50	2.25	2.00
MORAN SWNW	6.93	5.98	5.02	4.55	4.08	3.36	2.63	2.49	2.34	1.45
PALISADES DAM	6.92	6.12	5.32	4.69	4.05	3.52	2.99	2.67	2.35	2.30
SNAKE RIVER STATION	6.57	5.28	3.99	3.47	2.95	2.27	1.58	1.32	1.05	0.04

TABLE 4. REGRESSION EQUATION COEFFICIENT B1

PRECIPITATION STATION	1 JAN	15 JAN	1 FEB	15 FEB	1 MAR	15 MAR	1 APR	15 APR	1 MAY	15 MAY
BONDURANT	0.629	0.593	0.557	0.524	0.490	0.448	0.406	0.397	0.388	0.394
ISLAND PARK DAM	0.778	0.663	0.587	0.581	0.574	0.555	0.535	0.537	0.539	0.559
JACKSON	1.060	1.021	0.982	0.976	0.970	0.982	0.993	0.983	0.973	1.012
LAKE YELLOWSTONE	1.070	0.986	0.901	0.872	0.842	0.839	0.835	0.794	0.753	0.757
MOOSE	0.910	0.943	0.976	0.902	0.828	0.830	0.831	0.802	0.772	0.747
MORAN SWNW	0.877	0.842	0.806	0.771	0.735	0.737	0.738	0.705	0.671	0.685
PALISADES DAM	1.185	1.128	1.071	1.040	1.008	0.982	0.956	0.918	0.880	0.822
SNAKE RIVER STATION	0.645	0.637	0.629	0.597	0.564	0.553	0.541	0.525	0.508	0.522



1. Analyses based on 27 years of record for the period 1928 - 1954.
2. Parameters indicate probability that forecast error will not exceed the departure indicated.
3. Forecast procedures as described in this Appendix were derived by the U. S. Bureau of Reclamation.

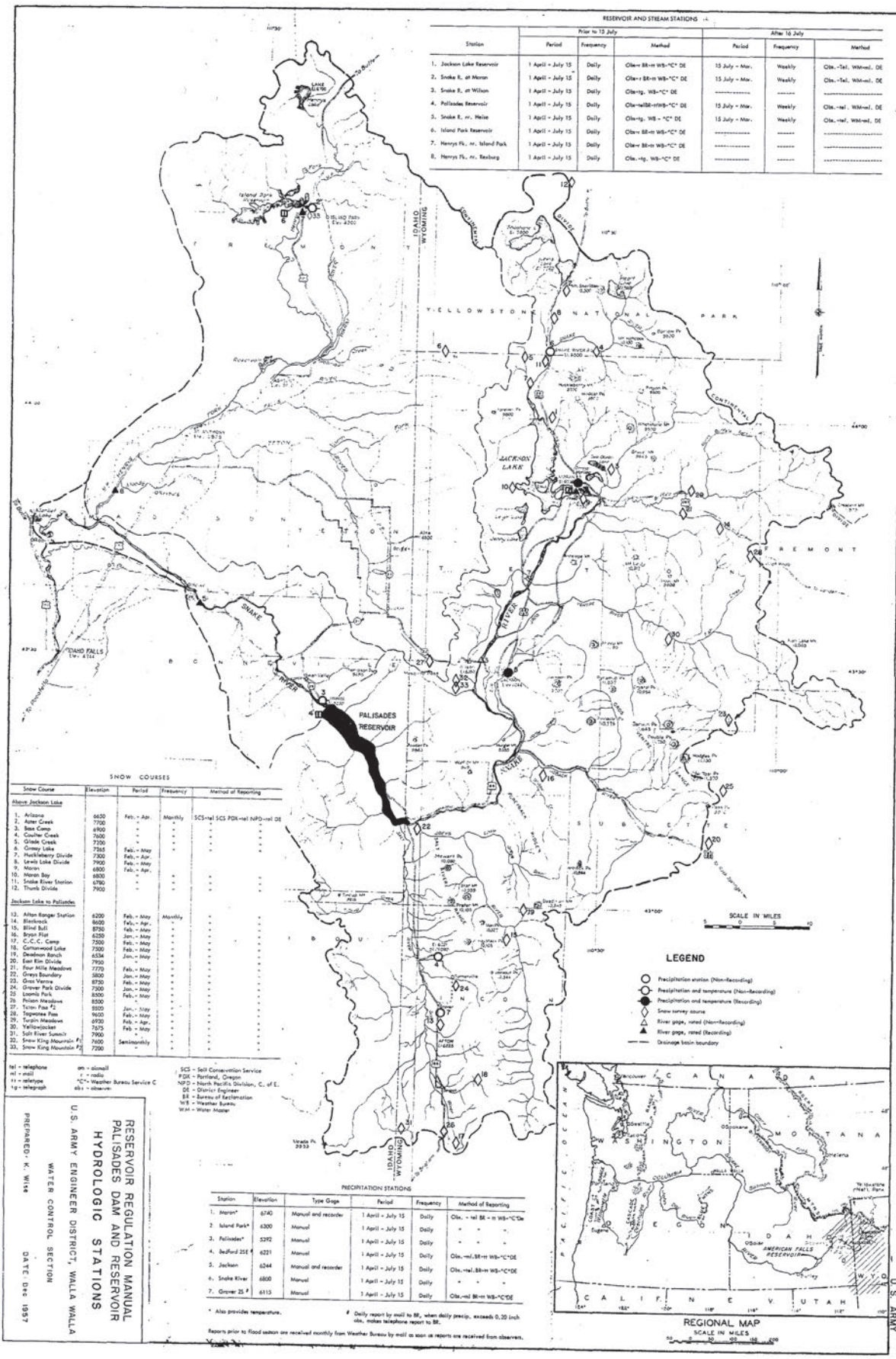
RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR

FORECAST

VERIFICATION ANALYSES

U. S. Army Engineer District, Walla Walla
Water Control Section
Prepared: K.W.W. Date: March 1957

PLATE C-1



RESERVOIR AND STREAM STATIONS

Station	Prior to 15 July			After 16 July		
	Period	Frequency	Method	Period	Frequency	Method
1. Jackson Lake Reservoir	1 April - July 15	Daily	Obs-r BR-tt WB-"C" DE	15 July - Mar.	Weekly	Obs.-Tel. WM-mail. DE
2. Snake R. at Moran	1 April - July 15	Daily	Obs-r BR-tt WB-"C" DE	15 July - Mar.	Weekly	Obs.-Tel. WM-mail. DE
3. Snake R. at Wilson	1 April - July 15	Daily	Obs-rg. WB-"C" DE	----------	------	----------
4. Palisades Reservoir	1 April - July 15	Daily	Obs-rel BR-rtWB-"C" DE	15 July - Mar.	Weekly	Obs.-rel. WM-mail. DE
5. Snake R. nr. Heise	1 April - July 15	Daily	Obs-rg. WB - "C" DE	15 July - Mar.	Weekly	Obs.-rel. WM-mail. DE
6. Island Park Reservoir	1 April - July 15	Daily	Obs-r BR-tt WB-"C" DE	----------	------	----------
7. Henrys Fk. nr. Island Park	1 April - July 15	Daily	Obs-r BR-tt WB-"C" DE	----------	------	----------
8. Henrys Fk. nr. Rexburg	1 April - July 15	Daily	Obs.-rg. WB-"C" DE	----------	------	----------

SNOW COURSES

Snow Course	Elevation	Period	Frequency	Method of Reporting
Above Jackson Lake				
1. Arizona	6650	Feb. - Apr.	Monthly	SCS-tel SCS POR-tel NPD-tel DE
2. Aster Creek	7700	"	"	" " "
3. Base Camp	6900	"	"	" " "
4. Coulter Creek	7600	"	"	" " "
5. Glade Creek	7200	"	"	" " "
6. Grassy Lake	7365	Feb. - May	"	" " "
7. Huckleberry Divide	7300	Feb. - Apr.	"	" " "
8. Lewis Lake Divide	7900	Feb. - May	"	" " "
9. Moran	6800	Feb. - Apr.	"	" " "
10. Moran Bay	6800	"	"	" " "
11. Snake River Station	6780	"	"	" " "
12. Thumb Divide	7900	"	"	" " "
Jackson Lake to Palisades				
13. Alton Ranger Station	6200	Feb. - May	Monthly	" " "
14. Blankrock	8600	Feb. - Apr.	"	" " "
15. Blind Bull	8750	Feb. - May	"	" " "
16. Bryan Flat	6250	Jan. - May	"	" " "
17. C.C.C. Camp	7500	Feb. - May	"	" " "
18. Cottonwood Lake	7500	Feb. - May	"	" " "
19. Deadman Ranch	6534	Jan. - May	"	" " "
20. East Rim Divide	7900	"	"	" " "
21. Four Mile Meadows	7770	Feb. - May	"	" " "
22. Greys Boundary	5800	Jan. - May	"	" " "
23. Gros Ventre	8750	Feb. - May	"	" " "
24. Grover Park Divide	7500	Jan. - May	"	" " "
25. Loomis Park	8500	Feb. - May	"	" " "
26. Prison Meadows	8500	"	"	" " "
27. Teton Pass #2	9500	Jan. - May	"	" " "
28. Togwotee Pass	9600	Feb. - May	"	" " "
29. Turpin Meadows	6930	Feb. - Apr.	"	" " "
30. Yellowjacket	7675	Feb. - May	"	" " "
31. Salt River Summit	7900	"	"	" " "
32. Snow King Mountain #1	7600	Semimonthly	"	" " "
33. Snow King Mountain #2	7200	"	"	" " "

tel - telephone
rel - mail
tt - teletype
tg - telegraph
am - aircall
r - radio
"C" - Weather Bureau Service C
obs - observer

SCS - Soil Conservation Service
POR - Portland, Oregon
NPD - North Pacific Division, C. of E.
DE - District Engineer
BR - Bureau of Reclamation
WB - Weather Bureau
WM - Water Master

PRECIPITATION STATIONS

Station	Elevation	Type Gage	Period	Frequency	Method of Reporting
1. Moran*	6740	Manual and recorder	1 April - July 15	Daily	Obs. - tel BR - tt WB-"C"DE
2. Island Park*	6300	Manual	1 April - July 15	Daily	" " " "
3. Palisades*	5592	Manual	1 April - July 15	Daily	" " " "
4. Bedford 25E #	6221	Manual	1 April - July 15	Daily	Obs.-rel.BR-tt WB-"C"DE
5. Jackson	6244	Manual and recorder	1 April - July 15	Daily	Obs.-tel.BR-tt WB-"C"DE
6. Snake River	6800	Manual	1 April - July 15	Daily	" " " "
7. Grover 25 #	6115	Manual	1 April - July 15	Daily	Obs.-rel BR-tt WB-"C"DE

* Also provides temperature.

Daily report by mail to BR, when daily precip. exceeds 0.20 inch obs. makes telephone report to BR.

Reports prior to flood season are received monthly from Weather Bureau by mail as soon as reports are received from observers.

RESERVOIR REGULATION MANUAL
PALISADES DAM AND RESERVOIR
HYDROLOGIC STATIONS

U.S. ARMY ENGINEER DISTRICT, WALLA WALLA
WATER CONTROL SECTION

PREPARED: K. Wise
DATE: Dec 1957

PLATE I

CORPS OF ENGINEERS - U.S. ARMY

TABLE 5

REPRESENTATIVE SNOW COURSE DATA

Snow Course	Map No.	Elevation m.s.l.	Years of Record and Average Water Equivalent - Inches																			
			January 1st		January 15th		February 1st		February 15th		March 1st		March 15th		April 1st		April 15th		May 1st		June 1st	
			Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.	Years	W.E.
Afton R.S.	1	6,200	19	2.2	-	-	21	3.8	-	-	21	4.7	-	-	21	2.1	1	0.0	4	0.0	-	-
Aster Creek	2	7,700	5	14.4	31	14.5	6	25.0	32	22.1	6	32.1	32	27.2	8	39.6	32	29.8	1	45.0	1	15.0
Blackrock	3	8,600	-	-	-	-	33	12.6	-	-	7	20.6	-	-	20	22.9	-	-	3	25.3	-	-
CCC Camp	4	7,500	19	4.5	-	-	21	7.7	-	-	21	10.1	-	-	21	11.9	1	15.0	7	4.4	-	-
Cottonwood Lake	5	7,500	2	7.4	-	-	1	11.2	-	-	3	14.1	-	-	18	17.5	-	-	1	10.6	-	-
Coulter Creek	6	7,600	5	9.1	30	11.0	6	17.1	32	16.7	6	22.2	32	20.3	8	26.4	30	21.0	-	-	-	-
Deadman Ranch	7	6,534	10	4.1	-	-	12	6.5	-	-	20	9.9	-	-	19	10.7	-	-	5	1.2	-	-
East Rim Divide	8	7,950	6	3.8	-	-	2	7.1	-	-	17	10.2	1	12.4	21	12.1	1	13.1	10	10.8	-	-
Four-Mile Meadows	9	7,770	-	-	-	-	33	8.3	-	-	7	12.3	-	-	21	13.4	-	-	-	-	-	-
Glade Creek	10	7,200	6	9.5	31	11.6	6	16.7	32	17.4	6	21.7	32	21.4	8	26.0	32	22.8	1	32.1	1	7.0
Grover Park Divide	11	7,500	19	4.4	-	-	20	7.5	-	-	21	10.1	-	-	21	11.6	1	14.7	7	4.4	-	-
Huckleberry Divide	12	7,300	6	8.4	31	9.7	6	14.8	32	14.9	6	19.0	32	18.0	7	22.8	32	18.8	1	17.5	-	-
Lewis Lake Divide	13	7,900	6	19.8	31	20.7	6	33.1	32	30.7	6	42.9	32	37.9	8	51.3	32	42.0	5	47.9	1	34.7
Togwotee Pass	14	9,600	-	-	-	-	33	18.9	-	-	7	27.6	-	-	21	29.6	-	-	7	35.5	1	37.0
Turpin Meadows	15	6,930	-	-	-	-	33	6.9	-	-	7	10.6	-	-	21	10.9	-	-	-	-	-	-
Yellowjacket	16	7,675	4	1.9	-	-	9	4.3	1	5.2	15	5.8	1	5.7	20	6.7	1	5.6	7	0.3	-	-