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A PROPOSED STREAMFLOW-DATA PROGRAM FOR IDAHO

By

C. A. Thomas and W. A. Harenberg

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ABSTRACT

A streamflow information system is proposed for Idaho. This proposal resulted from a study in which the basic steps were (1) definition of long-term program goals, (2) examination and evaluation of available data to determine which goals have been achieved, and (3) consideration of alternate programs and techniques for meeting the remaining goals.

The following conclusions are drawn from the study. Goals have been achieved on many of the principal unregulated streams; operation of 11 new or reactivated gages on principal streams are needed to satisfy needs. However, the goals cannot be met on unregulated minor streams with present data and analytical techniques. Few of the goals can be achieved with the available data for major or minor streams which are regulated, which are fed by springs or receive significant return flows, or which are affected by extensive channel losses. These streams will require river-systems studies which necessitate collection of complete records of diversions, return flows, upstream storage, and information relative to exchange between surface flow and ground water. Noteworthy inadequacies include data to define floods at long recurrence intervals, such as 100-year floods, and to define the low-flow characteristics, especially in small streams and in channels affected by springs, return flows, seepage, regulation, or diversions.

The proposed program consists of both data collection and analyses to efficiently provide the streamflow information required for (1) current water use and management, (2) planning and design, (3) determination of long-term trends, and (4) assessment of stream environment.

INTRODUCTION

Water is essential for life and for the economic well-being and enjoyment of the people. Expected future growth of the economy and the population will make unprecedented demands on the available water supply of the State.

The streamflow measurement program provides information which is basic for the inventory and management of the water resources of the State as well as for planning better utilization of the available supply. The streamflow data collection program in Idaho has evolved through the years as Federal and State interests in surface-water resources have increased and as funds have become available for operating stream-gaging stations.

Systematic collection of streamflow information began in 1889 when gaging stations were started on Bear River near Preston, Snake River at Idaho Falls, and Big Wood River at Hailey. Information needs for flood control, irrigation, hydroelectric power, fish studies, recreational appraisal, navigation, and waste disposal have resulted in operation of gaging stations at a great many sites for various lengths of time.

One notable program enlargement occurred about 1910 after enactment of the Carey Act, which was passed by Congress to encourage reclamation of the public domain by private enterprise. Many gaging stations were added after World War I, as the serious shortage of manpower was alleviated, and additional gages were added during the drought of the 1930's to investigate new water supplies. In 1943, an expanded stream-gaging program in the Bear River basin resulted from a need to formulate and administer a tri-state compact between Idaho, Utah, and Wyoming.

During the early 1960's, the program enlarged in a different way when crest-stage gages were installed on several small streams. In contrast to the earlier gages, which produced a continuous record of water-surface stage (elevation) and discharge, the crest-stage gages provide data only on the maximum stage and discharge of floods.

The U.S. Geological Survey streamflow data program in Idaho as of 1969 was publishing daily records for streams, reservoirs, and major diversions at 252 continuous record sites and publishing annual flood-peak data at 80 crest-stage gage sites.

Table A-1 in the appendix lists sites in Idaho and adjacent areas along with the period of records for both continuous and crest-stage gages that have been published by the Geological Survey. Locations of these gages is shown in figure 1. In addition, more than 10,000 discharge measurements at miscellaneous sites have been made and published (Decker and others, 1970).

The existing network of stream gages and the wealth of available data have resulted more from a need for information at specific sites than from a planned, all-purpose, data collection system. At present, because of the increased gage operation costs, the restraint on funds and manpower, and the need for a greater variety of hydrologic data, it is imperative that the streamflow program be evaluated for the purpose of designing an optimum system to produce the types of hydrologic information required by State, Federal, and private interests.

The concepts and procedures used in this study have been presented in detail by Carter and Benson (1970) and are summarized only briefly in this report. The basic steps are (1) definition of the long-term objectives of the streamflow-data program in quantitative form, (2) examination and analysis of all available data to determine which objectives have already been met, (3) consideration of alternate means of meeting the remaining objectives, and (4) preparation of a proposed program of data collection and analysis.

CONCEPTS AND PROCEDURES USED IN THIS STUDY

The principal concept of this study is that streamflow information may be needed at any point on any stream in Idaho, and that the program must be designed to accommodate this need. This information can be provided by a combination of data collection and hydrologic studies that generalize the information obtained at gaging sites.

Another important concept is that the goals of the program, including accuracy goals, should be identified in quantitative form. In the initial phase of the study, program goals were established. This led to a comparison of existing data with the goals and to consideration of the elements that should be included in the future program to meet the goals not yet attained.

The procedures used in this study are presented with reference to the general framework shown by table 1. Streamflow data are classified into four types: (1) Data for current use, (2) data for planning and design, (3) data to define long-term trends, and (4) data on the stream environment. For the second type of data, streams are classified as natural or regulated, and each of these classifications is further subdivided into principal or minor, with the separation of the two occurring at a drainage area of 500 square miles.

The need for each type of data, and the methods of obtaining the data, are discussed in subsequent sections.

Data for Current Use

Current information on streamflow is needed at many sites for day-to-day decisions on water management, for assessment of current water availability, for the management of water quality, for forecast of water hazards, and for surveillance necessary to comply with legal requirements. Gaging stations in this classification are operated to fill needs for information on the actual flow at any moment, or during any specific day, month, or year. These data are used currently for a particular purpose, and the interest is in flows as they occur as well as in the historic records.

Data for current use are obtained by operating gaging stations to obtain the data specifically required for water-management systems. Current-purpose data stations are identified separately in this study because (1) justification can be related to specific needs, (2) the data may have little or no transfer value in a hydrologic sense, and (3) the locations of the stations, the accuracy requirements, and the period of operation are specified by the user of the data who usually provides the financing.

Table 1. Framework for design of data collection program.

Program element	Type of data						
	Current use	Planning and Design				Long-term trends	Stream environment
		Natural Flow		Regulated Flow			
		Minor streams	Principal streams	Minor streams	Principal streams		
Program goals	To provide current data on streamflow needed for day-by-day decisions on water management as required.	To provide information on statistical characteristics of flow at any site on any stream to the specified accuracy.				To provide a long-term data base of homogeneous records on natural-flow streams.	To describe the hydrologic environment of stream channels and drainage basins.
Drainage area limits	Full range	Less than 500* sq mi.	Greater than 500* sq mi.	Less than 500* sq mi.	Greater than 500* sq mi.	Full range	Full range
Accuracy goal	As required	Equivalent to 10 years of record.	Equivalent to 25 years of record.	Equivalent to 10 years of record.	Equivalent to 25 years of record.	Highest obtainable	As required
Approach	Operate gaging stations as required to provide specific information needed.	Relate flow characteristics to drainage basin characteristics using data for gaged basins.	Operate gaging stations to obtain 25 years of record (or the equivalent by correlation) at a network of points on principal streams; interpolate between points.	Develop generalized relations that account for the effect of storage, diversion or regulation on natural flow characteristics.	Utilize analytical model of stream system with observed data as input to compute homogeneous records for both natural flow conditions and present conditions of development.	Operate a number of carefully selected gaging stations indefinitely.	Observe and publish information on stream environment.
Evaluate available data	Identify stations where data is used currently and code the specific use of data.	Develop relationship for each flow characteristic and compare standard error with accuracy goal. Evaluate sample.	Lay out network of points on principal streams and compare data available at these points with goal.	Appraise type of regulation, data available, and areas where relationships are needed.	Identify stream systems that should be studied using model approach and determine data requirements.	Select two stations in each WRC subregion to operate indefinitely for this purpose.	Evalualte information available in relation to goals.
Design future program		Identify goals that have not been attained. Consider alternate means of attaining goals. Identify elements of future program.					

*May be varied with terrain and hydrologic conditions.

This part of the program is not subject to design, but changes in response to the needs for data in water management.

Data for Planning and Design

Streamflow records form the principal basis for the planning and design of water-related facilities. Past hydrologic experience, however, is never precisely duplicated in the future; the exact sequence of wet and dry years probably will not occur again. For this reason, designers and planners commonly utilize statistical characteristics of streamflow rather than the records of flow at specific times. It is assumed that the probability of occurrence of a flow of a given magnitude or other statistical parameter in the future can be approximated from the frequency of such occurrence in the past. Typical statistical characteristics are the mean flow, the flood of 50-year recurrence interval, and the standard deviation of annual mean flows.

A long record of streamflow at the specific site is desirable for defining statistical characteristics of streamflow at that site. Although it is not feasible to collect a long continuous streamflow record at every site where it may be needed, a number of such stations are required to provide information that can be transferred to ungaged sites or to sites where little streamflow information is available.

Natural-Flow Streams

The transfer of information on natural-flow streams is done by relating flow characteristics to basin characteristics such as drainage area, topography and climate; by relating a short record to a longer one; or by interpolating between gaged points on a stream channel.

To evaluate the statistical characteristics of streamflow, the streams in Idaho were identified as having either natural or regulated flow conditions. For the purpose of this study, streams were also defined under each of the above categories as being minor streams (drainage area less than 500 square miles), or principal streams (drainage area greater than 500 square miles). The principal-stream network was defined by first identifying sites with drainage areas of about 500 square miles on the upstream segments of all streams, and then identifying the next and following sites on each stream from that upstream site to the mouth at points where the drainage area has doubled, or more than doubled, due to large tributaries entering.

Regulated-Flow Streams

The natural flow regimen of many streams in Idaho is altered by diversion for irrigation and by storage in reservoirs. These alterations increase the amount of data collection and analysis that is required to define the flow characteristics.

To be useful in statistical predictions, streamflow data must be homogeneous in time. Frequently, however, it is not possible to obtain a long record under one condition of development before additional changes occur.

Definition of the flow characteristics at any point on any stream is also much more difficult under conditions of regulation. The procedures used for natural streams such as regression, correlation, and interpolation cannot be applied.

For regulated streams, a systems approach seems to be the most efficient way of providing meaningful information on the statistical characteristics of flow. This approach requires some sort of analytical model of the stream system. Such models are simple in concept and generally consist of water-budget equations and flow-storage equations. In many instances, the use of the digital computer is required to facilitate the handling of the large volumes of data or for complex computations. Generally, computer programs tailored to the individual system can be prepared.

Development of such a model requires information on stage-capacity curves of reservoirs, records of outflow at the outlets, operating-rule curves for the release of water, reservoir losses due to evaporation and seepage, records of diversions, consumptive use, and return flow. Information on streamflow at strategic locations is also necessary. Streamflow for previously ungaged subbasins in the system may be required to complete the input to the model. Fortunately, many of the stations operated to obtain current data are on regulated streams, and the records provide a base for a systems study. Frequently, aquifer characteristics and ground-water pumpage must be considered.

The model and the associated data can be used to derive homogeneous data for both the natural and the regulated conditions. All historical streamflow records for both natural and regulated flows can be used as input to the model.

Accuracy Goals

In using past hydrologic experience to appraise the probability of future occurrences, some error must be tolerated. Natural streamflow is not truly random, but the great variation in time and space makes the assumption that natural streamflow is random a reasonable one. Therefore, many characteristics of natural streamflow can be interpreted in terms of statistical distributions. Estimates of the magnitude and frequency of occurrence of events of interest to the planner can then be studied, and the probable accuracy of the estimates can be appraised.

The principal measure of the accuracy with which a particular streamflow characteristic can be estimated is the "standard error of estimate," expressed in this report as "standard error," a percentage of the average value of the characteristic. The standard error is the estimated limit, above and below the average, within which about 67 percent (that is, two in three) of future values of the characteristic are expected to fall, if all assumptions as to normality and randomness are sound. Conversely, there is one chance in three that any given future value of a characteristic will differ from the estimated value by more than one standard error.

In general, the longer the record the more reliable are the estimates of probable future occurrences. However, even with a long record, say 50 to 100 years or more, it is not possible to determine with great precision the probability of certain flow characteristics such as floods of a given magnitude, for example. The standard error of various streamflow parameters decreases with the years of available record, but at a decreasing rate. Examples typical of records in Idaho are shown by the two curves in figure 2. The incremental economic value of the additional years of record beyond a reasonable limit in the planning and design of projects is under continuing study, but no usable guidelines are available now. It can be seen from the two curves of figure 2 that a relatively small improvement in accuracy results from extending records beyond about 25 years.

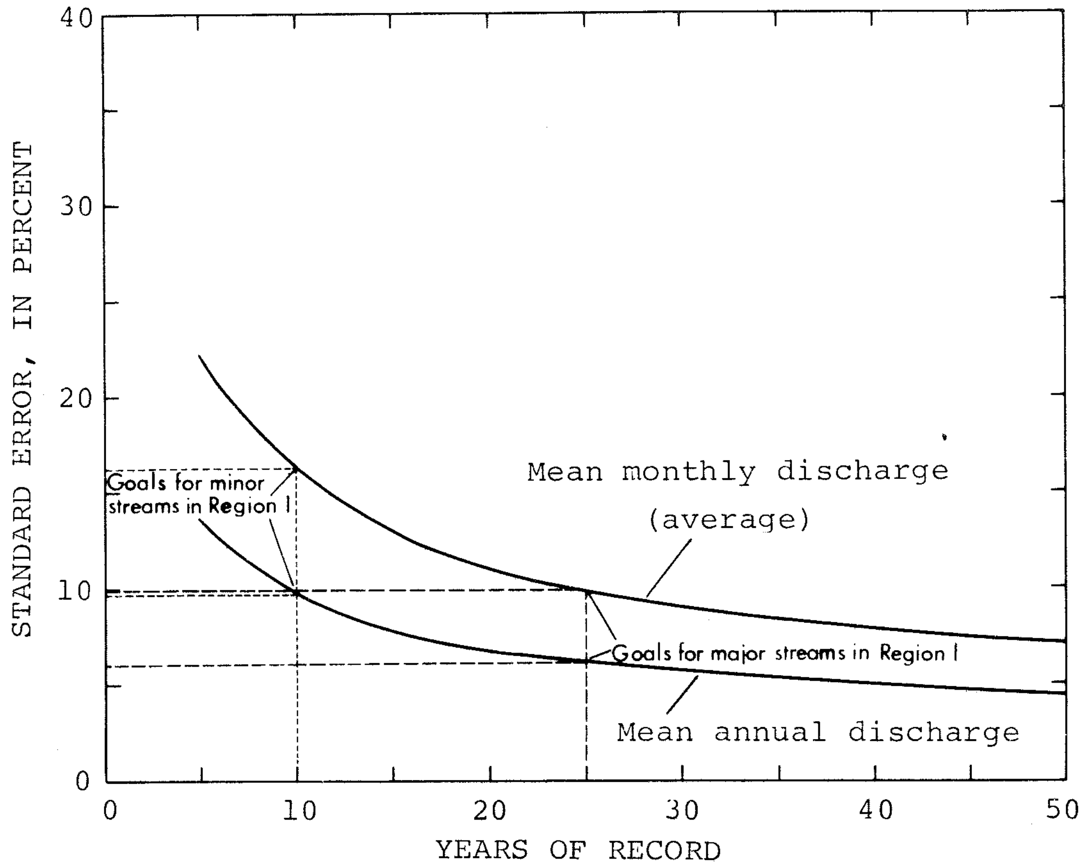

FIGURE 2.-- Curve showing relation of standard error to years of record for streams in Region 1 in Idaho.

Accuracy goals for streamflow characteristics are expressed as the accuracy equivalent to that obtained from an arbitrary number of years of record. These goals are the same for natural and regulated flows; that is, accuracy equivalent to that which would be obtained from 10 years of record at the site for minor streams (drainage area less than 500 square miles), and accuracy equivalent to that which would be obtained from 25 years of record for principal streams (drainage area more than 500 square miles).

At sites on natural-flow streams where streamflow records are not available, the desired streamflow characteristics may be defined by means of the relation between the streamflow parameter and the characteristics of the drainage basin. This definition is accomplished by multiple regression analysis, a statistical method of handling sample data that can relate streamflow characteristics to the topographic and climatic characteristics that affect streamflow. This analysis produces regression equations that can be used to compute the flow characteristics at any point on natural streams in Idaho. The standard error of a regression equation provides a measure of the accuracy of an estimate made from it at an ungaged site. That error may be compared with the error associated with the same characteristic defined from a given number of years of record to determine whether the accuracy objective has been achieved. This comparison provides a basis for planning the future surface-water data program.

Data to Define Long-Term Trends

A long continuing series of consistent observations of natural streamflow is needed for two purposes: (1) To define changes in characteristics of natural flow with time and (2) as a reference or comparative base for noting changes in the regime of streams whose basins or flows are developed for use. Characteristics of streamflow defined from gaging-station records are used to estimate future flow characteristics, on the assumption that the observed record is a representative sample of the population of flows. To affirm this assumption, or to define better the ways in which the characteristics of flows change with time, selected gaging stations on natural streams should be operated indefinitely. The network of long term trend stations should gage streamflow from basins which are representative of the wide ranges of topography, climate, and other characteristics encountered in the State. The accuracy of gaging at these sites should be the highest that the state of the art permits.

Data on Stream Environment

Stream discharge and water use are intimately related to the environment in which the water occurs. Environmental data include a variety of water-related information in addition to stream discharge. These data are useful in hydrologic studies, in planning, designing, and operating systems for controlling water, in using water for irrigation, recreation and waste disposal, and for the preservation of the esthetic character of the water and of the water-related features. For example, data on the geometry of stream channels may be useful in appraising the use of a stream for recreation or in determining its capacity to reaerate or to assimilate wastes, and data on stream profiles may be used to determine areas inundated by floods. Information regarding the characteristics of adjacent aquifers is valuable in low flow studies and in planning the conjunctive use of surface and ground water. Basin and climatic characteristics may determine the discharge characteristics as well as the most appropriate use of the water.

GOALS OF THE IDAHO STREAMFLOW-DATA PROGRAM

The objective of the Idaho streamflow-data program is to provide information on flow at any point on any stream. Within this general objective, specific goals are set for each of the four types of data that represent the particular information that is needed. Acceptable accuracy levels govern the techniques used in providing the information and also provide a measure of specific goals.

Data for Current Use

The program goal for this type of data is to provide the particular information needed at specific sites for current use. Accuracy goals at a given site, as specified by the data user, can be met by intensive observation, or by more sophisticated instrumentation as needed.

Data for Planning and Design

The goal for this type of data is to define, within the given accuracy, the statistical characteristics of streamflow. This definition applies not only to all streams with natural flow, but also to those streams that are affected by regulation and diversion. The accuracy goals used in this report are equivalent to 10 years of record for minor streams and 25 years of record for principal streams. The standard errors were calculated from a theoretical relation of standard error to the index of variability and the number of years of record for streams in each of the four Idaho Regions (see fig. 1). Specific goals for two flow characteristics for Region 1 are shown in figure 2, and others are presented by regions in table 2.

In addition to these goals, definition of flood peaks for recurrence intervals as long as 100 years is needed for proposed flood insurance programs and for design of some water-related projects. Records of peak flows 50 years in length at selected sites are recommended for adequate definition of these floods.

Data to Define Long-Term Trends

The goal for this type of data is to operate indefinitely a small network of gaging stations on streams that are expected to be relatively free from manmade changes. One or two stations should be located in each major drainage area in the State, and stations should be located on streams that differ in physical characteristics.

Data on Stream Environment

Environmental data describe the flow and the stream channel in terms that will be valuable in planning the use of the stream for any purpose such as recreation, fish and wild life enhancement, irrigation, hydroelectric power, waste disposal, conjunctive surface water-ground water supply, and guarding against water hazards. The long-range goals are to provide information related to the hydrologic environment of the basin and stream channel. Examples of specific projects are given below.

Table 2. Comparison of regression equation with accuracy goals for principal and minor streams with natural flow.

Streamflow characteristics	Standard error (percent)		
	Accuracy goals		Regression equation
	10-year record	25-year record	
Region 1			
Mean annual flow	9.6	6.1	35
Standard deviation of annual flow	22	14	43
Mean monthly flow (average)	16	9.9	38
Standard deviation of monthly flow	22	14	61
50-year peak flow	22	14	35
25-year 7-day high flow	19	12	48
2-year 7-day low flow	10	6.4	50
20-year 7-day low flow	16	10	84
Region 2			
Mean annual flow	8.3	5.3	23
Standard deviation of annual flow	22	14	37
Mean monthly flow (average)	13	8.1	47
Standard deviation of monthly flow	22	14	68
50-year peak flow	23	15	51
25-year 7-day high flow	19	12	33
2-year 7-day low flow	7.4	4.7	39
20-year 7-day low flow	11	7.1	43

Table 2. Comparison of regression equation with accuracy goals for principal and minor streams with natural flow--Continued.

Streamflow characteristics	Standard error (percent) Accuracy goals 10-year record	Standard error (percent) Accuracy goals 25-year record	Standard error (percent) Regression equation
Region 3			
Mean annual flow	6.2	3.9	39
Standard deviation of annual flow	22	14	69
Mean monthly flow (average)	8.0	5.1	146
Standard deviation of monthly flow	22	14	109
50-year peak flow	20	13	35
25-year 7-day high flow	16	9.9	131
2-year 7-day low flow	5.9	3.6	68
20-year 7-day low flow	8.8	5.4	69
Region 4			
Mean annual flow	13	8.4	48
Standard deviation of annual flow	22	14	22
Mean monthly flow (average)	14	8.9	72
Standard deviation of monthly flow	22	14	111
50-year peak flow	36	23	43
25-year 7-day high flow	32	20	62
2-year 7-day low flow	14	10	207
20-year 7-day low flow	25	16	-

1. Hydrometric surveys of stream-aquifer systems.

   a. Locations of springs, seeps and return flows, and gaining reaches.

   b. Identification of channel reaches with decreasing discharge.

2. Surveys of time of travel of solutes and flood waves in stream channels.

3. Definition of flood profiles along stream channels.

4. Identification of flood plains of streams for floods of selected frequencies.

5. Reconnaissance of streamflow and stream channel parameters that are related to the use of the stream for recreation and fish and wildlife propagation, such as velocities, depths, bank vegetation, bed material, water temperature, water quality, and accessibility.

6. Research studies of the effects of manmade changes in the environment on the quantity and quality of streamflow.

7. Evaporation from water surfaces at various latitudes and altitudes.

8. Characteristics of drainage basins including vegetal cover, land and channel slopes, geology, topography, and retention properties of soils.

9. Climatic characteristics.

10. Channel geometry and its relation to streamflow characteristics.

11. Relations between stream environment and water quality.

EVALUATION OF EXISTING DATA IN IDAHO

In this evaluation, all data are considered and analyzed in relation to program objectives. A separate evaluation is made for each of the four types of data following the framework of table 1.

Data for Current Use

About 85 percent of the gaging stations in Idaho are operated to provide data for current use. It is assumed that the need for this type of data is being met, and that this part of the program can be modified as requirements change. A summary of the 214 gaging stations needed to provide data for specific uses is shown below (many stations provide data for more than one use).

Use of data	Number of stations
1. Current accounting of water availability	13
2. Operation of water-related projects	161
3. Forecasting water supply and hazards	90
4. Monitoring of effects of waste disposal	4
5. Management of water quality	51
6. Compact or legal	39
7. Research or special study	29

Gaging stations that are operated to satisfy the need for current-purpose data are listed and coded according to the specific use of data in table 3. The brackets around C in this table indicate that a continuous record of discharge is no longer needed to supply current-purpose information. For example, flood forecasting may require only a record of stage and a current relation between stage and discharge. For some water-quality stations, only the discharge at the time the sample is taken is sufficient.

Data for Planning and Design

The statistical characteristics of streamflow can be defined by sample gaging, analytical methods of regionalization, systems studies, or any combination of the three. The following discussion of the evaluation of this type of data follows the framework shown in table 1.

Table 3. Gaging stations in operation and proposed for the network.

Column 1: B, bench mark or long-term-trend station on unregulated stream.

Column 2: C, current-purpose station; [], station is no longer needed for the purpose indicated.

Columns 3-5: Purposes for which current-purpose station is operated: 1, accounting; 2, operation; 3, forecasting; 4, disposal; 5, water quality; 6, compact or legal; 7, research or special study.

Column 6: P, principal stream station; H, hydrologic station except when classified as P; R, regulated stream; [] station is no longer needed for purpose indicated.

Column 7: Effect of regulation on low flow and monthly flow: blank, no appreciable effect; 1, no appreciable effect on daily flow (diurnal fluctuation only); 2, no appreciable effect on weekly flow; 3, monthly flow not affected by more than 10 percent of natural conditions; 4, monthly flow affected but published data available to adjust to natural conditions with an error of less than 10 percent; 5, effect of regulation has not been evaluated; 6, effect on daily flow is appreciable (more than 10 percent); 7, effect on weekly low flow is appreciable (more than 10 percent); 8, monthly flow is affected by more than 10 percent and data not available to adjust to natural conditions with an error less than 10 percent; 9, effect varies by month or season.

Column 8: Effect of regulation on peak flow: blank, no appreciable effect; 1, annual peak flow affected by less than 10 percent; 2, annual peak affected by more than 10 percent; 3, annual peak affected by undetermined amount.

Column 9: Financing of station: 1, U.S. Geological Survey; 2, cooperative program with Idaho Department of Water Administration or Idaho Department of Highways; 3, other Federal agency; 4, combination of 1 and 2; 5, combination of 1 and 3; 6, combination of 2 and 3; 7, combination of 1, 2, and 3; 8, paid by or furnished by private companies under F.P.C. licensing; 9, new proposed station.

Station number	Station name	1	2	3	4	5	6	7	8	9
10-										
0395.	Bear River at Border, Wyo.	-	C	6	5	2	H	8	2	2
0410.	Thomas Fork near Wyoming-Idaho State line	-	C	6	5	2	R	-	-	2
0435.	Diversions from Bear River between Border and Harer gaging stations	-	C	6	2	-	R	4	2	8
0440.	Bear River at Harer	-	C	6	3	2	R	8	2	8
0455.	Diversion from Bear River between Harer and Stewart Dam gaging stations	-	C	6	2	-	R	4	2	8
0460.	Rainbow inlet canal near Dingle	-	C	6	5	2	R	4	2	8
0465.	Bear River below Stewart Dam, near Montpelier	-	C	6	1	2	R	8	2	8
0475.	Montpelier Creek at irrigators weir, near Montpelier	-	C	3	-	-	-	-	-	2
0555.	Bear Lake at Lifton, near St. Charles	-	C	2	6	3	R	-	-	8
0586.	Bloomington Creek at Bloomington	-	-	-	-	-	H	-	-	2
0595.	Bear Lake outlet canal near Paris	-	C	5	2	6	R	4	2	8
0685.	Bear River at Pescadero	-	C	6	7	-	-	8	2	2
0728.	Eightmile Creek near Soda Springs	-	-	-	-	-	H	-	-	2
0750.	Bear River at Soda Springs	-	C	6	2	-	R	8	2	8
0764.	Soda Creek at Fivemile Meadows, near Soda Springs	-	-	-	-	-	H	-	-	2
0785.	Diversions from Bear River between Pescadero and Alexander gaging stations	-	C	6	2	-	R	4	2	8
0790.	Soda Reservoir at Alexander	-	-	-	-	-	R	-	-	8
0795.	Bear River at Alexander	-	C	6	5	2	-	8	2	8
0845.	Cottonwood Creek near Cleveland	-	-	-	-	-	[H]	-	-	2
0855.	Diversions from Bear River between Alexander and Oneida gaging stations	-	C	6	2	-	R	4	2	8
0860.	Oneida Reservoir at Oneida	-	-	-	-	-	R	-	-	8
0865.	Bear River below Utah Power and Light Co.'s tailrace at Oneida	-	C	2	6	-	R	8	2	8
0900.	Diversions from Bear River between Oneida and Preston gaging stations	-	C	6	2	-	R	4	2	8
0905.	Bear River near Preston	-	C	6	5	2	H	4	2	8
0912.	Deep Creek near Clifton	-	C	7	-	-	R	8	2	2
0930.	Cub River near Preston	B	C	3	-	-	-	-	-	2
1255.	Malad River at Woodruff	-	C	5	1	-	H	8	2	2
12-										
3050.	Kootenai River at Leonia	-	C	2	3	5	[P]	-	-	1
3055.	Boulder Creek near Leonia	-	-	-	-	-	[H]	-	-	3
3065.	Moyie River at Eastport	B	C	6	-	-	[P]	-	-	3
3075.	Moyie River at Eileen	-	C	3	-	-	[P]	-	-	3
3095.	Kootenai River at Bonners Ferry	-	C	3	-	-	-	-	-	3
3110.	Deep Creek near Moravia	-	-	-	-	-	[H]	-	-	3
3140.	Kootenai River at Klockmann Ranch, near Bonners Ferry	-	C	6	3	-	-	-	-	3
3168.	Mission Creek near Copeland	-	C	6	3	-	-	-	-	3
3185.	Kootenai River near Copeland	-	C	6	5	3	-	-	-	3
3215.	Boundary Creek near Porthill	-	C	6	7	-	-	-	-	3
3220.	Kootenai River at Porthill	-	C	6	5	1	-	-	-	3
3920.	Clark Fork at Whitehorse Rapids, near Cabinet	-	C	2	6	3	H	8	2	8
3923.	Pack River near Colburn	B	-	-	-	-	H	-	-	2
3925.	Pend Oreille Lake at Hope	-	C	2	3	6	R	-	-	1
3930.	Priest Lake at outlet, near Coolin	-	C	6	2	3	R	-	-	3

Table 3. Gaging stations in operation and proposed for the network--Continued.

Station number	Station name	1	2	3	4	5	6	7	8	9
12-										
3940.	Priest River near Coolin	-	C	2	3	-	R	9	1	3
3950.	Priest River near Priest River	-	C	2	3	-	R	9	1	1
3955.	Pend Oreille River at Newport, Wash.	-	C	2	3	-	H	8	2	3
4110.	Coeur d'Alene River above Shoshone Creek, near Prichard	-	-	-	-	-	[H]	-	-	1
4130.	Coeur d'Alene River at Enaville	-	C	3	2	1	-	-	-	3
4131.4	Placer Creek at Wallace	-	C	7	-	-	H	-	-	3
4131.5	South Fork Coeur d'Alene River at Silverton	-	C	7	-	-	H	-	-	3
4133.	South Fork Coeur d'Alene River at Smelterville	-	C	7	3	4	H	-	-	2
4134.	West Fork Pine Creek near Pinehurst	-	C	7	-	-	H	-	-	3
4135.	Coeur d'Alene River near Cataldo	-	C	3	2	-	-	-	-	8
4137.	Latour Creek near Cataldo	-	C	7	-	-	H	-	-	3
4140.	St. Joe River at Avery	-	-	-	-	-	P	-	-	9
4145.	St. Joe River at Calder	-	C	3	2	-	[H]	-	-	2
4149.	St. Maries River near Santa	-	C	2	-	-	H	-	-	2
4155.	Coeur d'Alene Lake at Coeur d'Alene	-	C	6	3	2	R	-	-	8
4160.	Hayden Creek below North Fork, near Hayden Lake	B	C	5	-	-	H	-	-	1
4170.	Hayden Lake at Hayden Lake	-	C	2	6	-	-	-	-	2
4180.	Rathdrum Prairie Canal at Huetter	-	C	2	-	-	-	4	2	8
4190.	Spokane River near Post Falls	-	C	2	3	1	[H]	4	1	8
13-										
0105.	Jackson Lake at Moran, Wyo.	-	C	2	3	-	R	-	-	2
0110.	Snake River at Moran, Wyo.	-	C	2	3	-	R	4	2	2
0115.	Pacific Creek near Moran, Wyo.	B	-	-	-	-	[H]	-	-	1
0119.	Buffalo Fork above Lava Creek, near Moran, Wyo.	-	-	-	-	-	H	-	-	3
0225.	Snake River above reservoir, near Alpine, Wyo.	-	C	6	2	5	H	4	2	3
0230.	Greys River above reservoir, near Alpine, Wyo.	-	C	6	2	-	H	-	-	3
0275.	Salt River above reservoir, near Etna, Wyo.	-	C	6	2	5	R	8	2	3
0320.	Bear Creek above reservoir, near Irwin	-	C	2	-	-	[H]	-	-	2
0324.5	Palisades Reservoir near Irwin	-	C	2	3	-	R	-	-	6
0325.	Snake River near Irwin	-	C	2	3	-	R	4	2	3
0375.	Snake River near Heise	-	C	1	2	3	H	4	2	1
0390.	Henrys Lake near Lake	-	C	2	-	-	R	-	-	2
0395.	Henrys Fork near Lake	-	C	2	-	-	R	-	-	2
0420.	Island Park Reservoir near Island Park	-	C	2	-	-	R	-	-	5
0425.	Henrys Fork near Island Park	-	C	2	-	-	R	4	2	6
0460.	Henrys Fork near Ashton	-	C	2	3	-	H	4	2	2
0465.	Grassy Lake near Moran, Wyo.	-	C	2	-	-	R	-	-	6
0470.	Diversions from Falls River above gaging station near Squirrel	-	C	2	-	-	R	4	2	2
0475.	Falls River near Squirrel	-	C	2	3	-	[H]	4	2	2
0490.	Diversions from Falls River between Squirrel and Chester gaging stations	-	C	2	-	-	R	4	2	2
0495.	Falls River near Chester	-	C	2	-	-	R	8	2	2
0500.	Diversions from Henrys Fork between Ashton and St. Anthony gaging stations	-	C	2	-	-	R	4	2	2
0505.	Henrys Fork at St. Anthony	-	C	2	3	-	H	8	2	6
0522.	Teton River above South Leigh Creek, near Driggs	-	-	-	-	-	H	8	2	3
0550.	Teton River near St. Anthony	-	C	2	3	5	H	8	2	2
0555.	Diversions from Teton River between St. Anthony gaging station and mouth	-	C	2	-	-	R	4	2	2
0560.	Diversions from Henrys Fork between St. Anthony and Rexburg gaging stations	-	C	2	-	-	R	4	2	2
0565.	Henrys Fork near Rexburg	-	C	2	3	5	R	8	2	2
0573.	Grays Lake Diversion near Wayan	-	C	2	7	-	R	4	2	3
0574.	Grays Lake near Wayan	-	C	7	-	-	-	-	-	3
0575.	Grays Lake Outlet near Herman	-	C	7	5	-	R	8	2	3
0580.	Willow Creek near Ririe	-	C	7	5	-	R	8	2	3
0595.	Diversions from Snake River between Heise and Shelley gaging stations	-	C	2	-	-	R	4	2	2
0600.	Snake River near Shelley	-	C	2	3	-	R	8	2	2
0630.	Blackfoot River above reservoir, near Henry	B	C	5	-	-	H	3	1	2
0650.	Blackfoot River Reservoir near Henry	-	C	2	-	-	R	-	-	6
0685.	Blackfoot River near Blackfoot	-	C	2	3	5	R	8	2	2
0690.	Diversions from Snake River between Shelley and Blackfoot gaging stations	-	C	2	-	-	R	4	2	2
0695.	Snake River near Blackfoot	-	C	2	3	-	H	8	2	2
0720.	Portneuf River near Pebble	-	C	7	-	-	R	8	2	2
0730.	Portneuf River at Topaz	-	C	2	3	5	R	8	2	2
0750.	Marsh Creek near McCammon	-	C	7	5	-	R	8	2	3
0755.	Portneuf River at Pocatello	-	C	2	3	5	R	8	2	2
0759.	Fort Hall Michaud Canal near Pocatello	-	C	2	-	-	R	4	2	2
	Bannock Creek near mouth, near Pocatello	-	-	-	-	-	H	8	2	9

Table 3. Gaging stations in operation and proposed for the network--Continued.

Station number	Station name	1	2	3	4	5	6	7	8	9
13-										
0764.	Michaud Canal at American Falls	-	C	2	-	-	R	4	2	2
0765.	American Falls Reservoir at American Falls	-	C	2	3	-	R	-	-	6
0770.	Snake River at Neeley	-	C	2	3	5	H	8	2	2
	Rock Creek at mouth, near American Falls	-	-	-	-	-	H	8	2	9
0777.	George Creek near Yost, Utah	-	-	-	-	-	[H]	-	-	*
0780.	Raft River at Peterson Ranch, near Bridge	-	C	5	-	-	H	8	2	3
0790.	Clear Creek near Naf	-	-	-	-	-	[H]	-	-	*
0791.	Cassia Creek above Stinson Creek, near Elba	-	-	-	-	-	H	-	-	2
0800.	North Side Minidoka Canal near Minidoka	-	C	2	-	-	R	4	2	2
0805.	South Side Minidoka Canal near Minidoka	-	C	2	-	-	R	4	2	6
0810.	Lake Walcott near Minidoka	-	C	2	-	-	R	-	-	6
0815.	Snake River near Minidoka	-	C	2	-	-	R	8	2	2
0823.	Marsh Creek near Albion	-	C	7	-	-	R	9	3	2
0825.	Goose Creek above Trapper Creek, near Oakley	-	C	3	2	5	R	8	2	2
0830.	Trapper Creek near Oakley	-	C	3	2	5	-	8	3	3
0835.	Oakley Reservoir near Oakley	-	C	2	3	-	-	-	-	3
0855.	Minidoka North Side Pump Canal near Burley	-	C	2	-	-	R	4	2	2
0858.	P. A. lateral near Milner	-	C	2	-	-	R	4	2	2
0860.	Milner low lift canal near Milner	-	C	2	-	-	R	4	2	2
0865.	Gooding Canal at Milner	-	C	2	-	-	R	4	2	2
0870.	North Side Twin Falls Canal at Milner	-	C	2	-	-	R	4	2	2
0875.	South Side Twin Falls Canal at Milner	-	C	2	-	-	R	4	2	2
0880.	Snake River at Milner	-	C	2	3	-	H	8	2	2
0900.	Snake River near Kimberly	-	C	6	2	5	H	8	2	8
0910.	Blue Lakes Spring near Twin Falls	-	C	5	-	-	H	-	-	2
0920.	Rock Creek near Rock Creek	B	-	-	-	-	H	3	1	2
0930.	Rock Creek near Twin Falls	-	-	-	-	-	R	8	2	9
0937.	Niagara Springs near Buhl	-	C	1	-	-	H	-	-	2
0940.	Snake River near Buhl	-	C	1	-	-	R	8	-	3
0955.	Box Canyon Springs near Wendell	-	C	5	-	-	H	-	-	2
1040.	Shoshone Creek near San Jacinto, Nev.	-	-	-	-	-	H	-	-	9
1050.	Salmon Falls Creek near San Jacinto, Nev.	-	C	2	3	-	R	8	2	2
1060.	Salmon River Canal Co. canal near Rogerson	-	C	2	-	-	R	4	2	2
1065.	Salmon River Canal Co. reservoir near Rogerson	-	C	2	-	-	-	-	-	2
1081.5	Salmon Falls Creek near Hagerman	-	C	7	5	2	R	8	2	2
1085.	Camas Creek at Eighteenmile shearing corral near Kilgore	-	C	7	-	-	H	8	1	2
1120.	Camas Creek at Camas	-	C	2	5	-	R	8	2	2
1130.	Beaver Creek at Spencer	-	C	7	-	-	H	2	1	2
1135.	Beaver Creek at Dubois	-	C	2	-	-	[H]	8	2	2
1140.	Beaver Creek at Camas	-	C	2	-	-	[H]	8	2	2
1150.	Mud Lake near Terreton	-	C	2	5	-	-	-	-	2
1170.2	Birch Creek at Blue Dome Inn, near Reno	-	C	7	-	-	R	8	2	6
1170.3	Birch Creek at Eight-Mile Canyon Road, near Reno	-	C	7	-	-	R	8	2	6
1173.	Sawmill Creek near Goldburg	-	-	-	-	-	H	-	-	2
1187.	Little Lost River below Wet Creek, near Howe	-	C	2	-	-	R	8	2	2
1190.	Little Lost River near Howe	-	C	2	3	5	R	8	2	2
1195.	Blaine County Investment Co.'s canal near Howe	-	C	2	-	-	-	4	2	2
1200.	North Fork Big Lost River at Wild Horse, near Chilly	B	C	2	-	-	[H]	-	-	2
1205.	Big Lost River at Howell Ranch, near Chilly	-	C	2	3	-	P	-	-	2
1260.	Mackay Reservoir near Mackay	-	C	2	3	-	R	-	-	2
1270.	Big Lost River below Mackay Reservoir, near Mackay	-	C	2	3	5	R	8	2	2
1289.	Lower Cedar Creek above diversions, near Mackay	-	C	7	-	-	H	-	-	2
1309.	Antelope Creek above Willow Creek, near Darlington	-	C	2	-	-	H	2	1	2
1325.	Big Lost River near Arco	-	C	2	4	5	R	8	2	2
1350.	Snake River below Lower Salmon Falls, near Hagerman	-	C	6	2	-	H	8	2	2
1355.	Big Wood River near Ketchum	-	-	-	-	-	[H]	-	-	2
1395.1	Big Wood River and Big Wood Slough combined discharge at Hailey	-	C	2	3	-	R	8	2	2
1410.	Big Wood River near Bellevue	-	C	2	5	-	R	8	2	2
1415.	Camas Creek near Blaine	-	C	2	5	-	R	8	2	2
1420.	Magic Reservoir near Richfield	-	C	2	3	-	R	-	-	2
1425.	Big Wood River below Magic Dam, near Richfield	-	C	2	3	-	R	8	2	2
1479.	Little Wood River above High Five Creek, near Carey	-	C	2	3	-	R	4	2	2
1482.	Little Wood Reservoir near Carey	-	C	2	3	-	R	-	-	2
1485.	Little Wood River near Carey	-	C	2	3	-	R	4	2	2
1510.	Little Wood River near Richfield	-	C	2	-	-	R	8	2	2
1525.	Big Wood River near Gooding	-	C	2	5	-	R	8	2	2
1530.	King Hill Canal near Hagerman	-	C	2	6	-	R	4	2	2
1545.	Snake River at King Hill	-	C	1	2	5	H	8	2	8
1553.	Little Canyon Creek at Stout Crossing, near Glenns Ferry	-	C	7	3	-	H	-	-	2
1625.	East Fork Jarbidge River near Three Creek	-	-	-	-	-	[H]	-	-	2

Table 3. Gaging stations in operation and proposed for the network--Continued.

Station number	Station name	1	2	3	4	5	6	7	8	9
13-										
	Sheep Creek at mouth, near Grasmere	-	-	-	-	-	H	-	-	9
	Bruneau River above East Fork, near Grasmere	-	-	-	-	-	H	-	-	9
1675.	East Fork Bruneau River near Hot Spring	-	-	-	-	-	R	8	2	3
1685.	Bruneau River near Hot Spring	-	C	2	3	5	R	8	1	2
1695.	Big Jacks Creek near Bruneau	B	C	5	-	-	[H]	-	-	1
1725.	Snake River near Murphy	-	C	1	2	3	R	8	2	8
1760.	Owyhee River above China diversion dam, near Owyhee, Nev.	-	C	2	-	-	R	8	2	*
	Deep Creek near Riddle	-	-	-	-	-	H	3	1	9
	Owyhee River at Crutcher's crossing, near Riddle	-	-	-	-	-	H	8	2	9
	South Fork Owyhee River at mouth, near Riddle	-	-	-	-	-	H	8	2	9
1780.	Jordan Creek above Lone Tree Creek, near Jordan Valley, Oreg.	-	C	3	-	-	P	8	1	3
1845.	Middle Fork Boise River near Twin Springs	-	-	-	-	-	H	-	-	9
1850.	Boise River near Twin Springs	-	C	2	3	-	P	-	-	2
1860.	South Fork Boise River near Featherville	-	C	2	3	-	P	-	-	2
1890.	Little Camas Canal at heading, near Bennett	-	C	2	-	-	R	4	2	2
1900.	Anderson Ranch Reservoir at Anderson Ranch Dam	-	C	2	3	-	R	-	-	3
1905.	South Fork Boise River at Anderson Ranch Dam	-	C	2	3	-	R	4	2	3
1940.	Arrowrock Reservoir at Arrowrock	-	C	2	3	-	R	-	-	6
1965.	Bannock Creek near Idaho City	-	-	-	-	-	[H]	-	-	1
2000.	Mores Creek above Robie Creek, near Arrowrock Dam	-	[C]	2	-	-	[H]	-	-	3
2005.	Robie Creek near Arrowrock Dam	-	-	-	-	-	[H]	-	-	3
2015.	Lucky Peak Reservoir near Boise	-	C	2	3	-	R	-	-	3
2020.	Boise River near Boise	-	C	2	3	5	R	8	2	3
2035.	Lake Lowell near Caldwell	-	C	2	-	-	-	-	-	2
2045.	Diversions from Boise River between near Boise and at Boise gaging stations	-	C	2	-	-	R	4	2	2
2055.	Boise River at Boise	-	C	3	2	4	R	8	2	3
2070.	Spring Valley Creek near Eagle	-	-	-	-	-	H	8	2	2
2120.	Diversions from Boise River between at Boise and Notus gaging stations	-	C	2	-	-	R	4	2	2
2125.	Boise River at Notus	-	C	1	3	5	H	8	2	2
	Snake River at Nyssa, Oreg.	-	-	-	-	-	R	8	2	9
2350.	South Fork Payette River at Lowman	B	-	-	-	-	P	-	-	2
2360.	Deadwood Reservoir near Lowman	-	C	2	3	-	R	-	-	3
2365.	Deadwood River below Deadwood Reservoir, near Lowman	-	C	2	3	-	R	4	2	6
2380.	Payette River near Banks	-	C	2	3	-	R	4	2	2
2385.	Payette Lake at McCall	-	C	2	6	-	R	-	-	2
2390.	North Fork Payette River at McCall	-	C	2	4	-	R	8	1	2
2400.	Lake Fork Payette River above Jumbo Creek, near McCall	-	C	2	3	-	[H]	-	-	2
2410.	Lake Fork Reservoir near McCall	-	C	2	-	-	R	-	-	2
2420.	Lake Irrigation District Canal near McCall	-	C	2	-	-	R	4	2	2
2425.	Lake Fork Payette River below Lake Irrigation District Canal	-	C	2	-	-	R	8	2	2
2435.	Gold Fork River near Roseberry	-	C	7	-	-	H	4	-	3
2445.	Cascade Reservoir at Cascade	-	C	2	3	-	R	-	-	3
2450.	North Fork Payette River at Cascade	-	C	2	3	-	R	8	2	3
2460.	North Fork Payette River near Banks	-	[C]	2	-	-	R	8	2	3
2475.	Payette River near Horseshoe Bend	-	C	2	3	-	R	8	2	2
2495.	Payette River near Emmett	-	C	2	3	-	R	8	2	2
2506.	Big Willow Creek near Emmett	B	-	-	-	-	H	-	-	2
2510.	Payette River near Payette	-	C	2	5	-	R	8	2	2
2513.	West Branch Weiser River near Tamarack	-	C	7	5	-	[H]	-	-	6
2515.	Weiser River at Tamarack	-	-	-	-	-	[H]	-	-	2
2585.	Weiser River near Cambridge	-	C	3	-	-	P	-	-	2
2610.	Little Weiser River near Indian Valley	-	-	-	-	-	[H]	-	-	2
2655.	Crane Creek at mouth, near Weiser	-	C	2	-	-	R	8	3	2
2660.	Weiser River near Weiser	-	C	2	3	5	R	8	1	2
2670.5	Mann Creek below Mann Creek Dam, near Weiser	-	[C]	2	-	-	[H]	-	-	2
2690.	Snake River at Weiser	-	C	2	3	5	R	8	2	1
2897.	Brownlee Reservoir at Brownlee Dam, Idaho-Oregon State line	-	C	2	6	-	R	-	-	8
2900.	Snake River at Oxbow, Oreg.	-	C	1	2	6	R	8	2	8
2904.5	Snake River at Hells Canyon Dam, Idaho-Oregon State line	-	C	2	6	-	R	8	2	8
2905.	Snake River near Joseph	-	C	2	6	-	R	8	2	8
2950.	Valley Creek at Stanley	-	-	-	-	-	[H]	-	-	2
2965.	Salmon River below Yankee Fork, near Clayton	-	-	-	-	-	[H]	-	-	2
2980.	East Fork Salmon River near Clayton	-	-	-	-	-	P	3	1	9
2985.	Salmon River near Challis	-	C	3	-	-	[H]	3	1	2
2992.	Challis Creek below Jeffs Creek, near Challis	-	[C]	7	-	-	[H]	-	-	6
	Pahsimeroi River above Patterson Creek, near May	-	-	-	-	-	R	8	2	9

Station name	Station name	1	2	3	4	5	6	7	8	9
13-										
3020.	Pahsimeroi River near May	-	-	-	-	-	R	8	2	9
3025.	Salmon River at Salmon	-	C	5	3	-	R	9	1	2
3050.	Lemhi River near Lemhi	-	C	2	-	-	R	8	2	2
3055.	Lemhi River at Salmon	-	-	-	-	-	R	8	2	9
3065.	Panther Creek near Shoup	-	-	-	-	-	[H]	-	-	3
3070.	Salmon River near Shoup	-	-	-	-	-	R	9	1	3
3085.	Middle Fork Salmon River near Cape Horn	-	-	-	-	-	[H]	-	-	2
	Middle Fork Salmon River below Marble Creek, near Landmark ranger station	-	-	-	-	-	P	-	-	9
	Middle Fork Salmon River near Shoup	-	-	-	-	-	P	-	-	9
3107.	South Fork Salmon River near Krassel Ranger station	-	C	7	-	-	H	-	-	3
3130.	Johnson Creek at Yellow Pine	B	-	-	-	-	[H]	-	-	2
	South Fork Salmon River at mouth, near Warren	-	-	-	-	-	P	-	-	9
3165.	Little Salmon River at Riggins	-	C	3	-	-	P	9	1	3
3168.	North Fork Skookumchuck Creek near White Bird	-	-	-	-	-	H	4	1	2
3170.	Salmon River at White Bird	-	C	1	2	3	[P]	3	1	2
3343.	Snake River near Anatone, Wash.	-	C	2	3	5	R	8	2	3
	Selway River below White Cap Creek, near McGruder ranger station	-	-	-	-	-	P	-	-	9
	Selway River above Moose Creek, at Moose Creek ranger station	-	-	-	-	-	P	-	-	9
	Moose Creek at Moose Creek ranger station	-	-	-	-	-	P	-	-	9
3361.	Meadow Creek near Lowell	-	C	7	5	-	H	-	-	3
3365.	Selway River near Lowell	-	C	2	3	-	[P]	-	-	2
	Lochsa River below Warm Springs Creek, near Lowell	-	-	-	-	-	P	-	-	[illegible]
3370.	Lochsa River near Lowell	-	C	2	3	-	[P]	-	-	2
3375.	South Fork Clearwater River near Elk City	B	-	-	-	-	[H]	-	-	3
3385.	South Fork Clearwater River at Stites	-	C	3	-	-	P	-	-	3
3388.	Lawyer Creek near Nez Perce	-	C	7	-	-	H	-	-	2
3400.	Clearwater River at Orofino	-	C	2	3	-	P	-	-	2
	North Fork Clearwater River below Kelly Creek, near Bungalow ranger station	-	-	-	-	-	P	-	-	9
3406.	North Fork Clearwater River at Canyon ranger station	-	C	2	3	5	P	-	-	3
3410.5	Clearwater River near Peck	-	C	2	3	5	P	-	-	3
3413.	Bloom Creek near Bovill	-	-	-	-	-	H	-	-	2
3414.	East Fork Potlatch River near Bovill	-	-	-	-	-	[H]	-	-	2
3425.	Clearwater River at Spalding	-	C	2	3	5	P	-	-	8
3450.	Palouse River near Potlatch	-	C	7	-	-	H	-	-	2

* Operated and financed outside of the district.

Evaluation of the Natural-Flow System

The purpose of the evaluation is to determine how accurately the statistical characteristics that are listed as goals can be defined by regionalization of the data now available.

The most effective way now known for defining statistical streamflow characteristics on a broad scale is to relate the streamflow characteristics to basin characteristics in equations developed by use of multiple-regression techniques applied to past data.

Once the equations and their constants are defined, streamflow characteristics for a specific site in a given basin can be computed by substituting the appropriate values of the hydrologic variables in the formulas.

The total of 150 streamflow records used in the regression analysis are those with 10 or more years of unregulated flow or flow that can be adjusted to natural conditions. Both minor and principal streams are included. Records were not adjusted to a base period. Because of regulation, not all flow characteristics were defined for each gaging station. Only monthly and annual mean flows were used at some stations, and at a few stations, only monthly flows during the snowmelt season were used.

The following 37 streamflow characteristics are those that may be needed for planning and design. They were computed for each gaging station with natural or virtually natural adjusted flow and were used as dependent variables in the regression analysis.

Mean annual flow (Q_a), in cubic feet per second, is the average of the annual flows.

Standard deviation of annual flow (SD_a), in cubic feet per second, is the square root of the sum of the squares of the deviations from the average annual flow divided by the number of annual flows.

Average monthly flow (q_n), in cubic feet per second, is the average flow for each of the 12 months, where the subscript, "n," refers to the numerical order of the month beginning with q_1 for January.

Standard deviation of monthly flow (SD_n), in cubic feet per second, is the standard deviation of the average monthly flow for each of the 12 months. Subscript is as for q above.

Peak flow for n-year recurrence interval (Q_n), in cubic feet per second, is the peak flow that would be exceeded, on the average, once in n years. Peaks were computed for 2, 5, 10, 25, and 50 year recurrence intervals.

Minimum 7-day flow for n-year recurrence interval ($M_{7,n}$), in cubic feet per second, is the minimum average flow for 7 consecutive days below which the minimum average flow for 7 consecutive days would recede, on the average, once in n years. Minimum 7-day low flows were computed for 2, 10, and 20-year recurrence intervals.

High flow volume ($V_{m,n}$), in cubic feet per second, is the highest average flow for m consecutive days that would be exceeded, on the average, once in n years. High-flow 7-day volumes were computed for 2, 10, and 25 year recurrence intervals.

The following 22 physical and climatic characteristics of the drainage basins were determined for each gaging station for which records were used in the regression analysis.

Drainage area (A), in square miles, as shown in the latest Geological Survey streamflow reports.

Main channel length (L_c), in miles, from the gaging station to the basin divide, as measured at intervals of a quarter of a mile with dividers using 1:250,000 Army Map Service maps or maps of larger scale where practicable.

Main channel slope (S), in feet per mile, determined from elevations at points 10 percent and 85 percent of the distance along the channel from the gaging station to the divide. This index was described by Benson (1962, 1964).

Area of lakes and ponds (L_a), expressed as the percentage of the drainage area covered by water plus 1 percent, determined by the grid method.

Mean basin elevation (E), in thousands of feet above mean sea level, measured on 1:250,000 Army Map Service maps by laying a grid over the map, determining the elevation at each grid intersection, and averaging those elevations. The grid spacing was designed to give at least 40 intersections within the basin boundary.

Forest cover (F), expressed as the percentage of the drainage area covered by forests as shown on the topographic maps plus 1 percent, determined by the grid method.

Aspect (D) is the resultant direction of downstream slope, or, in other words, the general direction in which the watershed area faces. Aspects were reckoned in degrees clockwise from south.

Soils index (S_i) represents values of potential maximum infiltration, in inches, during an annual flood, under average soil moisture conditions. Values of the soils index were computed for each basin from data provided by the Soil Conservation Service.

Latitude (N), of the centroid of the basin as located by inspection on 1:250,000 Army Map Service maps, in degrees minus 40.

Longitude (W), of the centroid of the basin as located by inspection on 1:250,000 Army Map Service maps, in degrees minus 110.

Mean monthly temperature for January (T_1), in degrees fahrenheit, adjusted to the mean elevation of the basin on the basis of weather records and lapse rates from nearby weather stations.

Mean monthly temperature for July (T_7), in degrees fahrenheit, determined as for January.

Azimuth (Z) is the horizontal direction of the corridor into the basin reckoned in degrees clockwise from south. The corridor is defined as the route between the moisture source and the basin over which moisture-laden air can enter the basin with the least vertical rise. The corridor is arbitrarily of constant width and spans the extremities of the drainage basin. The principal source of moisture is the Pacific Ocean via the lowlands of the Walla Walla Plateau, the Payette Section of the Columbia Plateau, and the Snake River Plain (Fenneman, 1931). Therefore, only corridors with westerly components were used so that the azimuths were all between zero and 180 degrees. The corridors were defined from the 1:250,000 Army Map Service plastic relief maps.

Corridor width (M) is the width of the corridor as described in the preceding item measured in miles at right angles to the direction of flow.

The following three elevation parameters were computed by determining a weighted mean elevation of the highest ridges that collectively span the corridor at the appropriate points along the axis of the corridor.

Barrier elevation (E_b) is determined at the highest ridge or series of ridges between a point 8 miles upwind from the basin and the lowland source of moisture, and is measured in thousands of feet.

Entry elevation (E_r), in thousands of feet, is measured along the upwind basin boundary.

Exit elevation (E_x) is measured along the downwind basin boundary and is reported in thousands of feet.

Approach (U), in thousands of feet, is an index of whether air masses are rising or falling in the corridor as they approach the basin. It is determined by subtracting the barrier elevation (E_b) from the entry elevation (E_r) and adding 5,000 feet to avoid negative numbers.

Entry (R), in thousands of feet, is an index of whether air masses rise or fall as they enter the basin and is computed by subtracting the entry elevation (E_r) from the mean elevation (E) and adding 5,000 feet.

Exit (X), in thousands of feet, is an index of whether air masses rise or fall as they leave the basin. It is determined by subtracting the mean elevation (E) from the exit elevation (E_x) and adding 5,000 feet.

Across (G) is an index of whether air masses rise or fall while crossing the entire length of the basin. It is measured in thousands of feet and is computed by subtracting the entry elevation (E_r) from the exit elevation (E_x) and adding 5,000 feet.

Spillover (V) is an index of the percentage of the basin which is in a spillover area or area of increased precipitation on the lee side as the incoming air masses enter the basin over a ridge. The index was determined in percent of the basin by multiplying the corridor width in miles by 4 miles, dividing by the basin area, and multiplying the quotient by 100. A spillover effect was assumed and computed only when the topography was such that there was a rise between the barrier elevation and the entry elevation and a drop between the entry elevation and the mean elevation.

Five physical characteristics, channel length, elevation of barrier, entry, exit, and corridor width were computed and are listed in tables 8, 9, 10, and 11, but were not used in the multiple regression, because these five indices were very highly correlated with other basin indices. Channel length and corridor width were found to be highly correlated with drainage area, and barrier elevation, entry elevation, and exit elevation were highly correlated with mean elevation.

The next step was to relate each of the streamflow characteristics to basin and climatic characteristics in equations developed by using multiple regression techniques. A digital computer program performed the voluminous calculations for the step-backwards regression analysis. This program assumes that the form of the relation between a flow characteristic (Y) and the basin characteristics (A, S, F, etc.) is

$$Y = a\ A^{b1}\ S^{b2}\ F^{b3}\ \ldots$$

where a, b_1, b_2 ... are constants determined by the analysis. As a first step, the program uses a single flow characteristic and the 17 selected basin characteristics to compute a regression equation, the standard error of estimate, and the significance of each basin characteristic. Automatically then the program omits the least significant basin characteristic and repeats the calculations. This process continues sequentially until a relation containing only one basin characteristic is computed.

After a set of 17 equations was computed for a selected flow characteristic, a new flow characteristic was used and the entire computation process repeated.

In applying the step-backwards regression analysis to the Idaho data, flow characteristics and basin characteristics for all 150 gages with more than 10 years of natural or adjusted-to-natural record were used. Study of the results of this statewide analysis showed that the errors from these relations had geographic groupings and indicated a need to divide the State into four regions as outlined in figure 1. The data for each of these four regions were then analyzed separately.

Results of the regression analyses are summarized in tables 4, 5, 6, and 7. For each flow characteristic in each of the four regions, 17 relations were defined. The tables show, however, only the one relation in which the basin characteristics are all significant at the five percent level.

Table 4. Summary of regression equations, Region 1.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable	Regression constant	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
Y	a	A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	
Q	0.912	1.034	-	-	-	0.562	-	-	-	-	-	-	-	-	-	-	-	-	35
SD_a	.0224	1.081	*0.221	-	-	0.270	-	-	-	-	*-0.0923	-	-	-	-	-	-	-	43
q_1	.0155	1.159	.239	*0.186	-1.066	.448	-	-	-	-	-.0990	*0.157	-	-	-	-	-	-	36
q_2	2.62	1.078	-	-	-1.501	.289	-	-	-	-	-.112	-	-	-	-	-	-	-	38
q_3	.213	1.181	.192	-	-2.054	*.193	-	-	-0.729	1.558	-.0811	*.0677	-	-	-	-	-	-	28
q_4	$5.13x10^{-11}$	1.062		-	-	.502	-	5.376	.730	-	-	-	-	-	-	-	-	-	38
q_5	.790	1.018	-	-	-	.832	-	-	-	-	-	-	-	-	-	-	-	-	42
q_6	$1.59x10^{-13}$	.931	-	-	5.556	.377	-	-	2.890	3.190	-	-	-	*0.996	-	3.502	-	-	37
q_7	$3.02x10^{-9}$	.901	-	-	4.552	.691	-	-	2.508	-	-	-	-	-	-	2.778	-	-	42
q_8	$1.82x10^{-11}$	.948	-	-	4.613	.685	*1.439	-	1.811	-	-	-	-	-	-	4.106	*-1.482	-	45
q_9	$3.32x10^{-10}$	.976	-	*-.280	4.206	.566	*1.381	-	1.955	-	-	-	-	-	-	3.456	*-1.277	-	44
q_{10}	$9.93x10^{-8}$	.981	-	-	3.785	.452	1.190	-	2.252	-	-	-	-	-	-	*1.133	-	-	36
q_{11}	$1.94x10^{-5}$	.990	-	-	1.388	.493	-	-	1.611	-	*-.0757	-	-	-	-	*1.350	-	-	38
q_{12}	.0163	1.162	*.196	-	-.839	.589	-	-	-	-	*-.891	-	-	-	-	-	-	-	37
SD_1	$1.67x10^3$	1.165	-	-	-2.961	-	-	-	-	-	-	-	-	-2.743	-	-	-	-	93
SD_2	$1.82x10^3$	1.169	-	-	3.824	-	-	-	-	-	-	-	-	*-1.854	-	-	-	-	97
SD_3	1.67	1.061	*.197	-	-3.712	-	-	-	-	-	-	-	-	-	2.108	-	-	0.167	40
SD_4	$6.79x10^{-7}$	1.052	-	-		-	-	3.303	1.224	-	-	-	-	-	-	-	-	-	62

Table 4. Summary of regression equations, Region 1--Continued.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable Y	Regression constant a	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
		A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	
SD_5	$1.9x10^{-28}$	1.014	-	0.364	5.428	*0.227	-	11.341	3.747	-	-	-	-	-	-	-	-	*0.0950	42
SD_6	$2.24x10^{-11}$	.921	-	-	4.894	-	-	-	2.741	2.998	-	-	*0.683	-	-	2.853	-	-	40
SD_7	$2.29x10^{-17}$	.861	-	-	7.960	-	-	-	4.015	4.560	-	-	-	-	-	5.130	-	-	65
SD_8	$2.50x10^{-9}$	.922	-	-	4.061	.457	-	-	2.158	-	-	-	-	-	-	2.827	-	-	55
SD_9	$6.84x10^{-8}$	.900	-	-	4.009	-	-	-	3.707	-	-	-	-	-	-	*1.726	-	-	51
SD_{10}	$5.97x10^{-7}$	1.023	-	-	2.670	.427	-	-	3.227	-	-	-	-	-	1.349	-	-	-	48
SD_{11}	$2.73x10^{-5}$	1.214	0.531	*.375	-	-	-	-	1.782	-	-0.199	-	1.803	-	-	-	-	-	61
SD_{12}	$2.88x10^{20}$	1.244	-	-	-1.684	.436	-	-	-	-	-	-	-	-2.559	-20.573	-34.641	-29.030	-	77
Q_2	0.197	1.006	.293	-	-	-	-	-	1.265	-	-.147	-	-	-	-	-	-	.0980	41
Q_5	1.49	.981	.254	-	-	-	-	-	1.065	-	-.159	-	-	-	-	-	-	.0845	37
Q_{10}	2.39	.967	.247	-	-	-	-	-	.982	-	-.165	-	-	-	-	-	-	.0785	34
Q_{25}	3.89	.950	.241	-	-	-	-	-	.906	-	-.173	-	-	-	-	-	-	*.0724	34
Q_{50}	4.99	.947	.248	-	-	-	-	-	.837	-	-.171	-	-	-	-	-	-	*.0678	35
$M_{7,2}$	$6.44x10^{-7}$	1.093	-	-	2.058	1.380	-	-	-	-	-	-	-	-	-	2.304	-	-	50
$M_{7,10}$	$2.86x10^{-7}$	1.077	-	-	2.557	1.533	-	-	-	-	-	-	-	-	*-3.238	-	3.697	-	71
$M_{7,20}$	$1.24x10^{-7}$	1.292	-	-	2.537	1.380	-	-	-	-	-	-	-	-	-	-	-	-	84
$V_{7,2}$	$3.58x10^{-4}$	1.100	.253	.378	1.370	-	-	-	1.492	2.122	-	-	-	-	-	-	-	-	38
$V_{7,10}$	.0762	1.038	*.186	.316	*.848	-	-	-	1.062	*1.431	-	-	-	-	-	-	-	-	33
$V_{7,25}$	.00242	.806	-	-	1.188	-	-	-	1.258	-	*-.123	-	-	-	-	-	-	-	48

* Significant at .05 level; all others are significant at .01 level.

Table 5. Summary of regression equations, Region 2.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable Y	Regression constant a	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
		A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	
Q_a	5.81	1.026	-	-	-	0.375	-	-2.219	-	1.515	-	-	-	1.714	-	-	-	-	23
SD_a	1.56×10^{5}	1.080	-	-	-	-	-	-5.400	-	2.672	-	-	-	2.046	-	-	-	-	37
q_1	1.22	1.040	-	-	-0.866	-	-	-	-	-	-	-	-	-	-	-	-	-	42
q_2	3.12	1.038	-	-	-1.325	-	-	-	-	-	-	-	-	-	-	-	-	-	43
q_3	2.06	1.048	-	-	-1.697	.304	-	-	-	-	-	-	*-1.398	*1.390	-	-	-	-	34
q_4	3.11×10^{4}	.812	*-.464	-	-1.611	.802	-	-3.660	-	-	-	-	-	2.637	1.869	-	-	-	29
q_5	5.34×10^{-8}	-	-	-	-	.966	-	-	-	-	-	-	-	-	-	11.027	-	-	174
q_6	1.62×10^{-9}	.990	-	-	2.456	.752	-	-	-	2.138	-	-	-	2.512	-	*2.390	-	-	33
q_7	1.31×10^{-9}	1.058	-	-	3.210	.509	-	-	-	2.024	-	-	-	2.025	-	1.803	-	-	23
q_8	6.53×10^{-5}	1.097	-	-	3.043	.394	-	-	-	1.301	-	-	-	-	-	-	-	-	35
q_9	2.66×10^{-5}	1.091	-	-	2.642	.407	-	-	-	1.088	-	-	-	-	-	-	-	-	37
q_{10}	2.53	.993	*-.424	-	-	.920	-1.149	-	-	-	0.221	-	-1.346	-	-	-	-	-	32
q_{11}	.263	1.169	-	-	-	.604	-.624	-	-	-	-	-	*-1.241	-	-	-	-	-	37
q_{12}	.163	1.115	-	-	-	.340	-	-	-	-	-	-	-1.637	-	-	-	-	-	38
SD_1	3.08×10^{4}	-	-1.781	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207
SD_2	18.6	1.054	-	-	-3.178	-	-	-	-	-	-	-	-	-	-	-	-	-	60
SD_3	.0145	.944	-	-	-2.716	.560	-	-	-	-	-	-	-1.678	2.165	1.901	-	-	-	39
SD_4	6.31×10^{13}	.877	-	-	-3.559	.707	-	-8.404	-	-	-	-	-	3.401	-	-	-	-	47

Table 5. Summary of regression equations, Region 2--Continued.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable Y	Regression constant a	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
		A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	
SD_5	0.0525	0.949	-	-	-	0.921	-	-	-	-	-	-	-	-	-	-	-	-	120
SD_6	6.92×10^{26}	1.384	1.031	-	-	*.452	2.563	-15.023	-	-	-	-	-	3.886	-	-	-	-	56
SD_7	2.57×10^{19}	1.583	1.134	-	-	-	1.948	-16.484	-	-	-	-	-	4.350	-	-	-	-	44
SD_8	5.3×10^{-9}	1.347	.604	-	2.468	-	-	-	-	2.067	-	-	-	3.180	-	-	-	-	33
SD_9	3.08×10^{5}	1.085	-	-	-	.352	-	-4.512	-	-	-	-	-	1.910	-	-	-	-	40
SD_{10}	3.06×10^{-3}	1.116	-	-	-	.610	-	-	-	-	-	-	-	-	-	-	-	-	63
SD_{11}	5.21×10^{5}	1.124	-	-	-2.654	.614	-	-4.655	-	-	-	-	-	2.839	-	-	-	-	55
SD_{12}	.0355	1.007	-	-	-2.448	.644	-	-	-	-	-	-	*-1.860	3.951	-	-	-	*0.188	47
Q_2	3.16×10^{20}	1.116	.627	-	-2.586	-	1.991	-13.467	-	-	-	-	-	2.984	-	-	-	-	43
Q_5	2.57×10^{21}	1.085	.623	-	-2.712	-	2.031	-13.836	-	-	-	-	-	3.034	-	-	-	-	47
Q_{10}	3.9×10^{21}	1.071	*.627	-	-2.818	-	1.988	-13.799	-	-	-	-	-	3.034	-	-	-	-	49
Q_{25}	4.37×10^{21}	1.062	*.650	-	-2.901	-	2.018	-13.806	-	-	-	-	-	3.126	-	-	-	-	51
Q_{50}	4.9×10^{21}	1.067	*.672	-	-2.941	-	2.073	-13.859	-	-	-	-	-	3.183	-	-	-	-	51
$M_{7,2}$	.894	1.175	-	-	-	-	1.076	-	-	-2.707	-	0.483	-	-1.928	-	-	-	-	39
$M_{7,10}$	.678	1.176	-	-	-	-	1.196	-	-	-3.259	-	.498	-	-2.168	-	-	-	-	42
$M_{7,20}$	.521	1.174	-	-	-	-	1.232	-	-	-3.412	-	.498	-	-2.250	-	-	-	-	43
$V_{7,2}$	6.53×10^{2}	1.013	-	-	-	-	.321	-	-2.927	-	3.364	-	-	-	-	-	-	-	20
$V_{7,10}$	9.08×10^{2}	1.230	.462	-	-	-	-	-	-3.655	-	3.981	-	-	-	-	-	-	.0982	29
$V_{7,25}$	1.83×10^{4}	1.185	.453	-	-	-	-	-	-4.126	-	3.724	-	-	-	-	-	-	-	33

* Significant at .05 level; all others are significant at .01 level.

Table 6. Summary of regression equations, Region 3.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable	Regression constant	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
Y	a	A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	
Q_a	0.0455	1.073	-	-	-	0.826	-	-	-	-	-	-	-	-	-	-	-	-	39
SD_a	1.72×10^7	.828	-	-	-	-	-	-	-6.089	1.563	-	-	-	2.979	-	-	-	-	69
q_1	.0275	1.378	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	334
q_2	1.50×10^4	1.642	-	-	-	-	-	-	-	-	-	-	-	-	-	*-8.117	-	-	281
q_3	2.57×10^4	1.634	-	-	-	-	-	--	-	-	-	-	-	-	-	*-8.356	-	-	276
q_4	.0103	1.024	-	-	-	.529	-	-	-	-	-	-	-	-	-	-	-	-	58
q_5	4.89×10^{-7}	.800	-	-	-	-	-	-	-	-	-	0.376	4.778	*1.512	-	-	1.610	-	36
q_6	1.26×10^{-8}	.990	-	-	2.993	-	-	-	-	-	-	-	3.847	-	-	2.406	-	-	37
q_7	65.0	.978	-	-	-	-	-	*-3.535	-	-	-	-	3.306	-	-	*2.456	-	-	45
q_8	1.18×10^{-3}	1.127	-	-	-	.884	-	-	-	-	-	-	-	-	-	-	-	-	68
q_9	.0940	1.120	-	-	-	.790	-	-	-	-	-	-	-	-	-	-	-	-	81
q_{10}	.0702	1.121	-	-	-	*.701	-	-	-	-	-	-	-	-	-	-	-	-	86
q_{11}	.634	1.170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	126
q_{12}	.0225	1.347	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	322
SD_1	.0532	1.183	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	239
SD_2	9.93×10^{-3}	1.148	-	-	-	-	-	-	-	-	-	*.733	-	-	-	-	-	-	211
SD_3	127	1.366	-	-	-	-	-	-	-	-	-	*.650	-	-	-	*-7.076	-	-	181
SD_4	1.04×10^{-4}	.982	-	-	-	-	-	-	-	-	-	*.257	2.746	-	-	-	-	-	48

Table 6. Summary of regression equations, Region 3--Continued.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable	Regression constant	Regression coefficients of indicated independent variables																	Standard error of
Y	a	A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	estimate (percent)
SD_5	$1.31x10^{-3}$	1.035	-	-	-	-	-	-	-	-	-	-	2.390	-	-	-	-	-	68
SD_6	$2.34x10^{-6}$	1.015	-	-	3.384	-	-	-	-	-	-	-	2.903	-	-	-	-	-	53
SD_7	$3.44x10^{6}$	.902	-	-	-	-	-	-6.391	-	-	-	-	2.810	-	-	*3.002	-	-	50
SD_8	$1.08x10^{9}$	.971	-	-	-	-	-	-5.831	*0.910	-	-	-	-	-	-	-	-	-	39
SD_9	$3.45x10^{3}$	.983	-	-	-	-	-	*-3.035	1.626	-	-	-	-	-	-	-	-	-	52
SD_{10}	$3.12x10^{6}$	.937	-	-	-	-	-	*-4.189	-	-	-	-	-	-	-	-	-	-	64
SD_{11}	.0182	1.048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82
SD_{12}	$2.86x10^{3}$	1.594	-	-	-	-	-	-	-	-	-	-	-	-	-	*-7.879	-	-	215
Q_2	1.86	.792	-	*0.329	-	0.466	-	-	-	-0.612	-	-	-	-	-	-	-	-	39
Q_5	$5.14x10^{-3}$	.866	-	-	3.590	-	-	-	1.354	-	-	-	-	-	-	-	-	-	44
Q_{10}	5.73	.775	-	*.311	-	*.330	-	-	-	-.520	-	-	-	-	-	-	-	-	37
Q_{25}	30.1	.748	-	*.321	-	-	-	-	-	-.544	-	-	-	-	-	-	-	-	38
Q_{50}	.0159	.891	-	-	-	-	-	-	-	-	-	0.243	2.582	-	-	-	-	-	35
$M_{7,2}$	6.88	.849	-	-	-	-	-	-	-	-	-	-	*-.470	-	-	-	-	-	68
$M_{7,10}$	5.84	.842	-	-	-	-	-	-	-	-	-	-	*-.478	-	-	-	-	-	68
$M_{7,20}$	5.41	.843	-	-	-	-	-	-	-	-	-	-	*-.478	-	-	-	-	-	69
$V_{7,2}$	$1.43x10^{-5}$	.982	-	-	-	-	-	-	-	-	-	-	.350	5.228	-	-	-	-	38
$V_{7,10}$	$1.84x10^{-4}$	.974	-	-	-	-	-	-	-	-	-	-	.328	4.374	-	-	-	-	37
$V_{7,25}$	3.67	1.028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	131

* Significant at .05 level; all others are significant at .01 level.

Table 7. Summary of regression equations, Region 4.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_1^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable Y	Regression constant a	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
		A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_1	U	R	X	G	V	
Q_a	2.72×10^{8}	1.075	-	-	-	0.807	-	-5.675	-	-	-	-	-	-	-	-	-	-	48
SD_a	5.68×10^{-6}	1.018	-	-	2.852	.700	-	-	-	1.714	-	-	-	*0.528	-	-	-	-	22
q_1	1.64×10^{-3}	1.099	-	-	-	.864	-	-	-	-	-	-	-	-	-	-	-	-	41
q_2	0.0872	1.110	-	-	-	.746	-	-	-	-	-	-	-	-	-	-	-	-	36
q_3	.0743	1.144	-	-	-	.731	-	-	-	-	-	-	-	-	-	-	-	-	36
q_4	.0676	1.149	-	-	-	.953	-	-	-	-	-	-	-	-	-	-	-	-	44
q_5	3.8×10^{10}	1.150	-	0.579	-	1.241	-	-7.140	-2.149	-	-	-	-	-	*1.674	-	-	-	45
q_6	2.51×10^{21}	1.169	-	.813	-	1.230	-	-13.263	-3.098	-	-	-	-	-	2.290	-	-	-	47
q_7	8.12×10^{23}	1.213	-	*.514	-	1.434	-	-15.096	-3.539	-	-	-	-	-	*2.325	-	-	-	59
q_8	2.24×10^{21}	1.288	-	-	-	1.707	-	-13.300	-3.799	-	-	-	-	-	-	-	-	-	86
q_9	1.07×10^{14}	1.327	-	-	-	2.227	-	*-9.608	-4.403	-	-	-	-	-	-	-	-	-	119
q_{10}	6.45×10^{-4}	1.308	-	-	-	2.494	-	-	-3.474	-	-	-	-	-	-	-	-	-	128
q_{11}	1.12×10^{-5}	1.366	-	-	-	2.681	-	-	-3.747	-	-	-	-	-	-	-	-	-	127
q_{12}	3.78×10^{-4}	1.314	-	-	-	2.203	-	-	-2.695	-	-	-	-	-	-	-	-	-	100
SD_1	1.24×10^{-4}	1.002	-	-	-	.345	-	-	-	3.259	-	*-4.310	-	-	-	-	-	-	44
SD_2	$1. \times 10^{-12}$	1.081	-	-	-	.530	-	*4.402	-	1.744	-	-	-	-	-	-	-	-	45
SD_3	1.68×10^{-10}	1.134	-	-	-	.460	-	3.721	-	-	-	-	1.182	-	-	-	-	-	32
SD_4	.0647	1.190	-	-	-	.686	-	-	-	-	-	-	-	-	-	-	-	-	70

Table /. Summary of regression equations, Region 4--Continued.

$$Y = aA^{b1} S^{b2} L_a^{b3} E^{b4} F^{b5} T_1^{b6} T_7^{b7} N^{b8} W^{b9} D^{b10} Z^{b11} S_i^{b12} U^{b13} R^{b14} X^{b15} G^{b16} V^{b17}$$

Dependent variable	Regression constant	Regression coefficients of indicated independent variables																	Standard error of estimate (percent)
Y	a	A	S	L_a	E	F	T_1	T_7	N	W	D	Z	S_i	U	R	X	G	V	
SD_5	$2.47x10^{-5}$	1.227	-	-	3.166	0.765	-	-	-	-	-	-	-	-	-	-	-	-	52
SD_6	$4.8x10^{17}$	1.098	-	0.719	-	.982	-	-11.149	-2.621	-	-	-	-	-	2.260	-	-	-	41
SD_7	22.0	1.144	-	*.276	5.624	.941	-	-5.276	-	-	-	-	-	-	1.694	-	-	-	35
SD_8	$3.20x10^{-9}$	.949	-	-	4.744	1.163	-	-	-	*-1.383	-	-	-	-	-	3.526	-	-	42
SD_9	$2.24x10^{-4}$	1.174	-	*.593	-	1.949	-	-	-	-	-	-	-2.554	-	-	-	-	-	88
SD_{10}	$3.12x10^{-4}$	1.178	-	.910	-	1.854	-	-	-	-	-	-	-2.016	-	-	-	-	-	94
SD_{11}	$1.50x10^{-5}$	1.303	-	*1.001	-	2.364	-	-	-3.540	-	-	-	-	-	-	-	-	-	76
SD_{12}	$2.66x10^{-6}$	1.589	-	-	-	3.367	-	-	-4.765	-	-	-	-	-	-	-	-	-	715
Q_2	$5.37x10^{-7}$	.948	-	-	4.849	-	-	-	3.340	2.221	-	-	-1.204	1.410	-	-	-	-	26
Q_5	$1.42x10^{-6}$	.918	-	-	3.480	-	-	-	2.830	2.189	-	-	-1.154	1.446	-	-	-	-	23
Q_{10}	$1.60x10^{-5}$	.898	-	-	2.810	-	-	-	2.536	2.097	-	-	-1.149	1.379	-	-	-	-	26
Q_{25}	.600	.880	-	-	-	-	-	-	1.576	-	-	-	-	1.604	-	-	-	-	42
Q_{50}	.154	.852	-	-	-	-	-	-	1.276	-	-	-	-	1.266	-	-	-	-	43
$M_{7,2}$	.0149	.955	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207
$M_{7,10}$	.0308	*.931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	532
$M_{7,20}$	(a)																		
$V_{7,2}$	$3.4x10^{11}$	1.094	-	-	-	-	0.695	-	*-6.922	-	-	-	-	-	-	-	-	-	68
$V_{7,10}$	.316	1.033	-	-	-	-	.705	-	-	-	-	-	-	-	-	-	-	-	67
$V_{7,25}$	.174	.995	-	-	-	-	.652	-	-	-	-	-	-	-	-	-	-	-	62

* Significant at .05 level; all others are significant at .01 level.
a No equation with coefficients of at least .05 significance.

The standard errors of these relations may be compared with the accuracy goals to determine the adequacy of the relations for estimating planning and design characteristics (see table 2).

Adequacy of regression relations.--Comparison of the standard errors of estimate for the relations shown in tables 4, 5, 6, and 7 with the accuracy goals (table 2) indicates that the relations are of inadequate accuracy to meet the goals for planning and design data. To meet the goals, there is therefore a need either for additional streamflow data, or for an improved technique of estimating flow characteristics, or for both additional data and improved techniques.

Regression relations were defined in this analysis on the assumption that the relation between flow and basin characteristics is linear if all characteristics are transformed to logarithms. Alternate transformations or model forms may be more useful and may provide more reliable estimates. Also, this regression study used as independent variables only those basin characteristics that could be obtained readily from maps or available data. A precipitation variable could be expected to improve significantly the accuracy of regression relations. To date, however, no reliable method is available for estimating precipitation on most ungaged basins, especially on small basins, and studies are needed to define this variable. Additional or alternate basin characteristics, including those which require a field measurement, such as channel size, channel shape, or soils characteristics might improve the estimating relations. Obviously, more detailed analysis offers promise of improved regression relations.

Another consideration in the improvement of regression relations is the adequacy of the sample of flow records used in the analysis. Ideally, the sample will include long-term records (about 20 years or more) on areally distributed basins that sample the range of basin characteristics existing in Idaho. Inspection of tables 8, 9, 10, and 11 indicates that there are only a few records on basins of less than about 60 square miles, especially in Regions 2 and 3. About 10 records on small basins in each region should be available for a meaningful analysis. Records of 2- to 10-year length are available for 93 minor stream sites. Basin characteristics for these sites should be evaluated to determine a representative sample of small streams where additional years of record should be obtained for future regression analyses.

Table 8. Selected physical and climatic characteristics of drainage basins for gaging stations used in regression analyses of Region 1.

Station number	A	S	L_c	L_a	E_m	F	T_1	T_7	N	W	D	Z	M	E_b	E_r	E_x	S_i	U	R	X	G	V
12-																						
3045	766	23	71.0	1.04	5.05	96	17	56	8.83	5.70	29	40	25	4.6	5.7	5.6	7.5	6.1	4.35	5.55	4.9	14
3050	11,740	6	309.0	1.0	4.90	96	16	55	9.47	5.45	356	35	180	5.9	6.6	7.6	7.2	5.7	3.30	7.70	6.0	7
3055	53	152	13.0	1.0	4.98	101	15	55	8.57	6.17	235	30	9	3.1	5.5	4.5	6.7	7.4	4.48	4.52	4.0	69
3065	570	41	55.0	2.0	4.87	101	16	55	9.25	6.00	26	20	22	4.6	7.0	5.1	6.0	7.4	2.87	5.23	3.1	16
3075	755	21	76.0	2.0	4.71	101	16	55	9.08	6.00	16	20	22	4.6	6.4	5.3	6.0	6.8	3.31	5.59	3.9	13
3205	29	109	14.0	1.0	5.26	101	15	53	8.88	6.62	211	25	4	6.8	6.4	4.5	6.7	4.6	3.86	4.24	3.1	1
3210	70	156	18.0	1.0	5.10	101	15	54	8.92	6.67	241	25	10	4.6	5.9	5.2	6.7	6.3	4.20	5.10	4.3	58
3215	97	164	18.8	1.0	4.65	101	16	56	9.02	5.75	261	25	15	5.6	6.5	5.8	6.7	5.9	3.15	6.15	4.3	63
3220	13,700	6	375.0	1.0	4.71	96	16	55	9.48	5.58	1	35	180	5.8	6.0	7.6	6.0	5.2	3.71	7.89	6.6	6
3907	182	101	22.0	1.0	4.35	101	19	56	7.53	5.53	241	90	12	5.0	6.1	5.7	7.2	6.1	3.25	6.35	4.6	27
3923	124	132	23.0	1.0	4.21	101	20	57	8.52	6.58	311	40	18	3.8	6.3	4.4	6.7	7.5	2.91	5.19	3.1	59
3935	572	50	47.0	7.5	4.23	96	20	57	8.82	6.92	351	20	29	4.3	4.2	6.3	6.2	4.9	5.03	7.07	7.1	1
3950	902	12	87.0	5.5	3.82	96	21	59	8.65	6.87	351	30	37	4.1	4.5	6.2	6.3	5.4	4.32	7.38	6.7	17
3960	68.3	12	13.3	1.0	3.65	101	24	59	8.27	7.43	266	35	12	3.1	4.8	3.9	6.2	6.7	3.85	5.25	4.1	71
4110	335	37	42.0	1.0	4.12	91	22	62	7.90	6.10	311	60	30	4.3	4.9	5.0	6.7	5.6	4.22	5.88	5.1	37
4130	895	24	73.0	1.0	3.61	96	24	64	7.70	5.98	1	60	43	3.8	4.5	5.5	6.5	5.7	4.11	6.89	6.0	20
4135	1,220	22	78.0	1.0	3.90	91	23	62	7.67	6.15	21	60	50	3.9	4.7	5.6	6.6	5.8	4.20	6.70	5.9	17
4145	1,030	64	53.0	1.0	4.21	96	22	61	7.23	5.70	101	90	34	4.5	4.7	6.5	6.7	5.2	4.51	7.29	6.8	14
4190	3,840	6	141.0	3.0	3.67	86	23	63	7.41	6.17	95	70	88	3.5	4.0	6.0	6.2	5.5	4.67	7.33	7.0	10
13-																						
1200	114	83	20.0	1.0	8.54	41	8	52	3.92	4.25	246	15	16	7.9	10.5	9.4	5.0	7.6	3.04	5.86	3.9	57
1205	450	48	36.8	1.0	8.59	26	8	52	3.87	4.00	181	25	34	8.1	10.0	9.1	4.8	6.9	3.59	5.51	4.1	31
1415	648	12	50.0	2.5	5.60	6	14	63	3.33	4.83	276	30	36	4.1	6.0	7.1	3.9	6.9	4.60	6.50	6.1	23
1479	248	141	20.3	1.0	7.22	11	16	61	3.58	4.00	356	35	21	5.8	6.5	9.7	4.4	5.7	5.72	7.48	8.2	1
1480	267	115	22.5	1.0	7.16	11	16	61	3.58	4.00	356	35	21	5.8	6.8	9.7	4.4	6.0	5.36	7.54	7.9	1
1485	312	86	28.5	1.0	6.85	11	17	62	3.57	4.00	356	35	22	5.8	6.9	9.5	4.3	6.1	4.95	7.65	7.6	29
1540	140	105	27.5	1.0	4.70	1	23	69	3.13	4.93	1	50	16	3.7	4.5	5.6	1.9	5.8	5.20	5.90	6.1	1
1860	635	52	51.8	1.0	6.84	21	18	63	3.67	5.00	56	45	35	6.2	6.3	9.0	6.4	5.1	5.54	7.16	7.7	1
1865	131	133	21.2	1.0	6.14	26	19	66	3.45	5.13	46	60	12	5.8	6.0	8.3	3.0	5.2	5.14	7.16	7.3	1
1870	55.3	192	15.0	1.0	6.07	91	19	65	3.52	5.42	346	95	13	5.4	7.1	7.0	5.9	6.7	3.97	5.93	4.9	95
1910	1,090	35	89.6	1.0	6.27	26	19	65	3.58	5.08	56	65	32	4.7	6.2	9.1	5.6	6.5	5.07	7.83	7.9	1
2365	112	34	19.8	5.0	6.63	96	15	54	4.42	5.72	11	45	12	6.0	7.6	7.7	6.3	6.6	4.03	6.07	5.1	44
2390	144	54	26.0	6.5	6.52	91	14	57	5.08	6.00	11	40	15	6.3	6.5	7.8	6.3	5.2	5.02	6.28	6.3	1
2400	48.9	139	12.0	2.0	6.95	101	13	55	4.95	5.92	11	60	12	6.9	7.0	8.0	6.7	5.1	4.95	6.05	6.0	99
2405	54.6	135	12.8	2.0	6.95	101	13	55	4.95	5.92	11	60	12	6.9	7.0	8.0	6.7	5.1	4.95	6.05	6.0	89

Table 8. Selected physical and climatic characteristics of drainage basins for gaging stations used in regression analyses of Region 1--Continued.

Station number	A	S	L_c	L_a	E_m	F	T_1	T_7	N	W	D	Z	M	E_b	E_r	E_x	S_i	U	R	X	G	V
13-																						
2513	3.96	366	4.3	1.0	4.94	96	19	65	5.03	6.45	351	10	2	5.5	5.6	5.1	6.7	5.1	4.34	5.16	4.5	203
2515	36.5	56	14.7	1.0	4.69	86	20	65	5.03	6.42	356	10	7	3.5	5.0	5.0	6.7	6.5	4.69	5.31	5.0	78
2525	2	391	3	1.0	6.90	56	14	58	4.75	6.27	201	35	1.5	3.7	7.7	6.5	6.7	9.0	4.20	4.60	3.8	301
2535	106	48	29	1.0	5.01	86	19	65	4.93	6.38	11	20	17	4.2	5.3	5.5	6.4	6.1	4.71	5.49	5.2	65
2560	390	34	45	1.0	4.68	61	20	65	4.83	6.42	6	15	25	3.7	5.2	5.7	5.8	6.5	4.48	6.02	5.5	27
2570	86.5	151	22.5	1.0	5.43	71	18	63	4.67	6.23	76	50	10	3.6	5.9	6.9	6.2	7.3	4.53	6.47	6.0	47
2585	605	32	59	1.0	4.65	56	20	66	4.75	6.47	26	20	30	4.0	4.8	5.8	5.8	5.8	4.85	6.15	6.0	21
2600	54	14	13.9	1.0	4.73	26	17	66	4.65	6.82	326	110	13	4.2	5.6	5.6	4.6	6.4	4.13	5.87	5.0	97
2610	81.9	215	18.8	1.0	5.30	51	15	64	4.55	6.23	61	60	12	3.7	4.7	6.8	5.5	6.0	5.60	6.50	7.1	1
2635	1,160	22	92.0	1.0	4.28	36	21	68	4.65	6.55	26	30	38	3.6	4.4	6.0	4.9	5.8	4.88	6.72	6.6	14
2670	56	174	18.2	1.0	4.86	41	20	65	4.50	6.97	341	135	11	3.7	5.9	4.8	4.4	7.2	3.96	4.94	3.9	80
2925	94.7	60	14.2	1.0	8.14	51	11	52	3.92	4.75	166	35	10	8.6	9.3	8.8	6.2	5.7	3.84	5.66	4.5	43
2930	35.7	130	11.9	7.0	8.11	76	11	52	3.92	4.95	231	75	8	7.4	9.4	8.8	5.9	7.0	3.71	5.69	4.4	91
2950	147	60	22.2	2.0	7.40	76	13	55	4.27	5.03	316	80	18	7.9	8.6	7.7	5.1	5.7	3.80	5.30	4.1	50
2955	501	40	36.4	2.5	7.80	61	12	53	4.08	4.75	201	80	44	8.3	9.1	8.9	4.9	5.8	3.70	6.10	4.8	36
3085	138	95	16.8	1.1	7.37	96	13	54	4.42	5.08	96	85	15	7.9	8.1	8.3	4.6	5.2	4.27	5.93	5.2	44
3090	180	33	22.0	1.0	7.04	91	14	55	4.40	5.40	251	85	20	7.6	7.8	7.9	6.6	5.2	4.24	5.86	5.1	45
3105	92	92	15.6	1.7	6.63	91	14	57	4.58	5.70	191	45	12	6.2	7.2	6.9	6.7	6.0	4.43	5.27	4.7	53
3130	213	71	34.5	1.3	7.17	101	13	55	4.75	5.50	181	35	19	7.4	8.0	7.9	5.6	5.6	4.17	5.73	4.9	37
3140	1,160	69	62.6	1.1	6.71	71	14	57	4.95	5.63	176	50	59	6.9	7.7	8.0	5.9	5.8	4.01	6.29	5.3	21
3155	15.8	130	10.3	1.0	4.66	91	20	66	5.08	6.47	346	15	5	5.2	4.8	5.0	6.7	4.6	4.86	5.34	5.2	1
3165	576	61	48.2	1.2	5.43	81	25	60	5.17	6.33	176	45	41	5.4	6.4	6.6	6.4	6.0	4.03	6.17	5.2	29
3365	1,910	39	92	1.0	5.64	96	18	56	6.00	4.85	101	115	58	5.8	6.6	7.9	6.0	5.8	4.04	7.26	6.3	13
3369	89.2	134	18.6	1.0	4.47	101	21	60	6.37	5.45	276	110	10	4.2	5.4	4.8	6.7	6.2	4.07	5.33	4.4	46
3370	1,180	44	98	1.0	5.25	101	17	55	6.47	5.00	66	95	48	4.9	6.0	7.8	6.0	6.1	4.25	7.55	6.8	17
3405	996	40	50	1.0	4.93	101	19	59	6.75	5.23	81	85	42	4.6	5.8	6.7	6.5	6.2	4.13	6.77	5.9	18
3410	2,440	23	133	1.0	4.22	96	22	61	6.87	5.75	71	90	50	3.4	4.6	6.6	6.6	6.2	4.62	7.38	7.0	9

Table 9. Selected physical and climatic characteristics of drainage basins for gaging stations used in regression analyses of Region 2.

Station number	A	S	L_c	L_a	E_m	F	T_1	T_7	N	W	D	Z	M	E_b	E_r	E_x	S_i	U	R	X	G	V
12-																						
3110	133	19	14.0	1.0	3.40	96	20	59	8.57	6.42	201	15	16	3.2	3.9	4.1	6.0	5.7	4.50	5.70	5.2	49
3168	23	288	7.5	1.0	4.80	96	16	55	9.00	6.35	341	2	5	3.2	4.8	4.9	6.7	6.6	5.00	5.10	5.1	1
4150	437	19	42.0	1.0	3.56	96	24	63	7.12	6.40	126	90	25	3.7	4.0	4.8	5.7	5.3	4.56	6.24	5.8	24
13-																						
1085	210	96	24.2	1.0	6.97	56	14	64	4.45	1.90	331	25	25	5.6	7.3	8.1	5.6	6.7	4.67	6.13	5.8	49
1130	120	85	22.8	1.0	7.11	26	13	63	4.47	2.23	341	20	13	5.3	7.7	7.6	5.4	7.4	4.41	5.49	4.9	44
1160	165	86	24.2	1.0	7.52	21	12	62	4.40	2.67	321	10	15	7.5	8.7	8.8	4.8	6.2	3.82	6.28	5.1	37
1170	320	30	24.8	1.0	7.58	21	12	61	4.33	3.05	326	140	19	8.5	8.7	8.6	5.0	5.2	3.88	6.02	4.9	25
1355	137	76	19.0	1.0	8.12	51	8	49	3.78	4.58	281	20	16	7.9	9.1	9.4	5.8	6.2	4.02	6.28	5.3	48
1365	96	87	19.0	1.0	7.56	56	8	53	3.65	4.53	251	35	11	8.1	8.6	8.4	6.3	5.5	3.96	5.84	4.8	47
1395.1	640	54	40.3	1.0	7.62	36	8	53	3.70	4.42	316	20	34	6.8	8.0	10.1	5.6	6.2	4.62	7.48	7.1	22
2960	195	91	26.2	1.0	7.98	91	11	53	4.40	4.70	16	90	19	8.8	8.9	9.0	4.8	5.1	4.08	6.02	5.1	40
2965	802	37	47.2	2.0	7.79	71	12	53	4.17	4.83	216	80	51	8.4	9.2	9.2	4.9	5.8	3.59	6.41	5.0	26
2980	497	63	35	1.1	8.10	31	11	52	4.22	4.62	211	140	38	9.5	8.9	9.8	5.7	4.4	4.2	6.70	5.9	1
2985	1,800	28	80.5	1.5	7.82	56	12	53	4.25	4.58	216	80	51	8.4	9.2	9.0	5.2	5.8	3.62	6.18	4.8	12
2990	85	219	15.0	1.1	7.83	71	12	58	4.58	4.42	271	105	16	8.8	9.3	7.6	6.1	5.5	3.53	4.77	3.3	76
3025	3,760	22	150	1.3	7.38	41	13	58	4.48	4.03	196	90	100	8.7	9.0	9.1	5.3	5.3	3.38	6.72	5.1	12
3030	73	138	17.4	1.0	7.70	36	8	54	4.48	3.30	171	140	8	8.8	8.1	7.9	4.8	4.3	4.60	5.20	4.8	1
3060	214	84	22.5	1.0	6.22	91	12	59	5.53	3.95	6	100	20	7.8	7.9	7.6	5.9	5.1	3.32	6.38	4.7	38
3065	529	99	42.2	1.0	7.03	96	15	56	5.12	4.27	166	145	29	8.4	7.5	8.7	6.4	4.1	4.53	6.67	6.2	1
3070	6,270	20	198	1.2	7.14	41	15	56	4.58	4.07	181	90	134	8.6	8.5	8.9	5.4	4.9	3.64	6.76	5.4	1
3100	470	41	34.4	1.0	7.00	86	15	54	5.12	5.15	241	160	33	7.6	8.0	7.9	5.4	5.4	4.00	5.90	4.9	29
3110	19.5	312	4.9	1.0	7.78	91	11	53	4.88	5.32	176	50	5	8.0	8.4	8.3	4.0	5.4	4.38	5.52	4.9	104
3115	42.5	238	7.2	1.0	7.64	96	12	53	4.92	5.30	141	40	6	7.7	7.6	8.6	4.0	4.9	5.04	5.96	6.0	1
3120	104	184	14.7	1.0	7.42	91	12	54	4.95	5.35	116	40	15	8.0	8.0	8.5	4.0	5.0	4.42	6.08	5.5	1
3170	13,550	16	346	1.2	6.72	61	15	57	4.92	4.78	161	90	144	7.2	7.6	8.7	5.5	5.4	4.12	6.98	6.1	5
3375	261	34	30	1.0	5.15	101	23	61	5.78	5.38	96	145	21	5.5	6.0	6.3	6.3	5.5	4.15	6.15	5.3	33
3380	865	47	66	1.0	5.16	101	23	61	5.82	5.65	91	145	42	4.0	5.1	7.0	6.1	6.1	5.06	6.84	6.9	1
3390	4,850	26	130	1.0	5.01	96	20	58	6.08	5.50	91	115	98	4.5	5.4	7.7	5.7	5.9	4.61	7.69	7.3	9
3415	425	50	43	1.0	2.98	76	26	66	6.77	6.47	11	90	28	2.9	3.2	3.8	4.2	5.3	4.78	5.82	5.6	27
3425	9,640	17	185	1.0	4.36	71	22	61	6.13	5.75	91	115	108	3.6	4.1	7.5	5.5	5.5	5.26	8.14	8.4	1
3480	132	31	22.5	1.0	2.73	6	29	67	6.72	6.97	71	90	14	2.6	2.6	3.2	3.5	5.0	5.13	5.47	5.6	1
3485	27.1	30	13.5	1.0	2.67	1	29	67	6.77	7.10	61	90	5	2.5	2.6	2.8	3.5	5.1	5.07	5.13	5.2	1

Table 10. Selected physical and climatic characteristics of drainage basins for gaging stations used in regression analyses of Region 3.

Station number	A	S	L_c	L_a	E_m	F	T_1	T_7	N	W	D	Z	M	E_b	E_r	E_x	S_i	U	R	X	G	V
13-																						
0100	485	53	36.0	5.0	8.22	81	7	52	4.68	0.52	86	90	32	7.9	8.4	8.7	8.1	5.5	4.82	5.48	5.3	27
0110	824	25	65.2	8.0	8.04	71	7	53	4.08	.57	36	90	48	7.1	8.8	8.4	7.1	6.7	4.24	5.36	4.6	24
0115	160	69	31.0	3.0	8.16	81	7	53	4.00	.32	56	130	26	9.0	8.6	8.7	7.4	4.6	4.56	5.54	5.1	1
0120	378	58	45.0	1.0	8.85	61	5	50	3.90	.13	81	130	28	9.2	8.9	9.8	6.7	4.7	4.95	5.95	5.9	1
0145	622	50	53.8	1.0	8.85	61	5	50	3.53	.22	101	70	33	9.8	10.0	9.9	6.6	5.2	3.85	6.05	4.9	22
0195	564	59	43.8	1.0	8.00	66	7	53	3.20	.47	121	90	35	9.1	9.2	9.6	6.7	5.1	3.80	6.60	5.4	26
0225	3,465	13	138	3.5	8.15	66	7	53	3.58	.42	26	90	106	7.9	9.1	9.5	6.1	6.2	4.05	6.35	5.4	13
0230	448	46	55.2	1.0	8.08	76	7	53	2.88	.72	171	100	44	8.3	9.8	10.0	6.7	6.5	3.28	6.92	5.2	40
0235	3,940	13	146	3.0	8.08	66	7	53	2.50	.42	31	90	136	7.9	9.3	9.7	6.2	6.4	3.78	6.62	5.4	15
0255	115	76	20.9	1.0	7.42	36	15	59	2.60	1.13	211	150	16	7.8	8.3	7.9	5.5	5.5	4.12	5.48	4.6	57
0275	829	38	56.2	1.0	8.47	51	6	51	2.83	1.00	171	115	44	7.6	8.1	9.4	5.2	5.5	5.37	5.93	6.3	1
0295	108	64	17.5	1.0	6.96	66	15	60	3.17	1.25	271	120	11	7.0	7.5	7.2	6.1	5.5	4.46	5.24	4.7	42
0300	36.8	336	9.8	1.0	7.79	66	13	57	3.37	1.00	86	85	7	7.7	7.5	9.5	6.3	4.8	5.29	6.71	7.0	1
0305	59.2	149	12.5	1.0	7.67	71	13	57	3.37	1.02	51	85	9	7.9	8.6	8.5	6.2	5.7	4.07	5.83	4.9	62
0320	77.1	106	15.2	1.0	7.13	71	14	59	3.27	1.32	256	110	9	6.7	7.5	7.8	5.6	5.8	4.63	5.67	5.3	48
0375	5,752	12	201	2.5	7.77	61	11	56	3.42	.62	36	90	140	7.1	8.3	9.6	6.0	6.2	4.47	6.83	6.3	11
0395	99.3	179	16.0	9.5	7.47	46	11	56	4.65	1.39	331	30	14	7.2	7.9	8.3	5.3	5.7	4.57	5.82	5.4	57
0425	481	27	39.5	5.0	7.08	66	12	58	4.52	1.40	301	45	34	6.3	7.1	8.2	6.0	5.8	4.98	6.12	6.1	29
0440	656	25	72.8	4.0	6.86	86	12	58	4.43	1.42	321	45	37	4.9	6.9	8.1	6.2	7.0	4.96	6.24	6.2	24
0445	178	90	29.2	1.0	6.83	76	12	58	4.25	1.25	1	45	14	6.1	6.2	7.2	6.7	5.1	5.63	5.37	6.0	1
0455	129	102	25.5	1.0	6.45	96	13	60	4.17	1.12	61	45	12	5.7	6.2	7.0	6.7	5.5	5.25	5.55	5.8	1
0460	1,040	20	83.0	3.0	6.71	81	12	59	4.43	1.37	251	45	47	5.7	6.5	7.9	6.3	5.8	5.21	6.19	6.4	1
0475	351	80	41.2	2.0	7.52	81	10	56	4.22	.92	46	55	26	6.0	7.0	8.5	6.7	6.0	5.52	5.98	6.5	1
0550	890	27	64.0	1.0	6.90	46	14	60	3.80	1.13	126	115	35	5.2	6.1	10.0	4.5	5.9	5.80	8.10	8.9	1
0580	627	22	73.8	7.0	6.39	16	15	63	3.25	1.63	156	140	24	5.0	6.2	7.0	5.2	6.2	5.19	5.61	5.8	1
0630	360	24	37.8	1.0	6.94	46	12	59	2.75	1.32	96	150	23	6.8	7.0	7.9	5.5	5.2	4.94	5.96	5.9	27
0635	38.8	58	10.5	1.0	6.60	11	13	60	2.97	1.47	86	160	9	7.0	6.8	7.0	4.8	4.8	4.80	5.40	5.2	1
0730	570	17	48.0	1.0	6.08	16	19	65	2.77	2.47	16	110	41	6.2	7.2	6.6	4.7	6.0	3.88	5.52	4.4	30
0740	6.56	424	4.5	1.0	7.24	91	19	61	2.35	2.30	251	140	4	6.7	7.8	7.4	6.2	6.1	4.44	5.16	4.6	245
0750	355	21	37.5	1.0	5.63	16	22	66	2.50	2.18	156	140	21	6.2	6.8	6.5	4.2	5.6	3.83	5.87	4.7	25

Table 11. Selected physical and climatic characteristics of drainage basins for gaging stations used in regression analyses of Region 4.

Station number	A	S	L_c	L_a	E_m	F	T_1	T_7	N	W	D	Z	M	E_b	E_r	E_x	S_i	U	R	X	G	V
13-																						
0777	7.84	464	4.8	1.0	8.57	26	15	58	1.92	3.45	91	15	5	4.2	9.1	8.6	2.1	9.9	4.47	5.03	4.5	256
0790	20.2	409	3.8	1.0	7.87	36	16	60	1.93	3.33	241	25	6	4.2	9.6	7.3	1.9	10.4	3.27	4.43	2.7	120
0792	84	120	12.8	1.0	6.56	36	19	64	2.25	3.60	261	120	10	4.3	7.8	7.1	3.1	8.5	3.76	5.54	4.3	49
0825	633	34	50.8	1.0	6.03	11	24	66	1.93	4.07	216	140	37	6.5	6.7	7.2	3.3	5.2	4.33	6.17	5.5	24
0830	53.7	168	13.0	1.0	6.36	16	23	65	2.15	4.10	256	115	10	7.3	7.4	6.4	3.0	5.1	3.96	5.04	4.0	75
0920	80	160	17.8	1.0	6.33	21	22	65	2.25	4.25	156	125	11	3.8	6.3	7.0	3.2	7.5	5.03	5.67	5.7	1
0960	461	27	32.5	1.0	6.76	6	21	63	1.80	5.02	286	150	35	5.1	8.4	7.1	3.3	8.3	3.36	5.34	3.7	31
1625	84.6	131	22.1	1.0	7.60	26	19	61	1.90	5.32	176	155	9	3.8	7.4	9.4	3.2	8.6	5.20	6.80	7.0	1
1685	2,630	32	121	1.0	5.60	6	25	69	2.22	5.57	181	160	53	4.2	4.6	7.8	4.1	5.4	6.00	7.20	8.2	1
1695	253	77	44.2	1.0	5.15	1	26	70	2.53	6.07	191	160	21	4.6	5.1	5.4	4.9	5.5	5.05	5.25	5.3	1
1700	100	117	31.4	1.0	5.02	1	26	71	2.65	6.13	236	160	21	4.2	4.8	5.1	3.7	5.6	5.22	5.08	5.3	1
1780	440	33	40.6	1.0	5.78	31	24	68	2.85	6.75	96	105	28	5.2	5.9	6.3	4.3	5.7	4.88	5.52	5.4	26
1850	830	62	54.8	1.0	6.35	76	19	58	3.90	5.87	56	70	31	5.8	6.6	9.0	5.9	5.8	4.75	7.65	7.4	16
1965	5.75	96	4.5	1.0	5.20	71	20	62	3.78	5.75	156	50	4	5.6	5.6	5.6	6.7	5.0	4.60	5.40	5.0	1
2000	399	92	45.0	1.0	4.96	86	20	63	3.83	5.92	26	50	24	2.8	5.8	6.6	6.4	8.0	4.16	6.64	5.8	25
2005	15.8	356	8.1	1.0	4.96	81	24	67	3.67	6.50	321	60	7	2.8	5.6	5.4	6.3	7.8	4.36	5.44	4.8	178
2020	2,680	29	119	1.4	5.91	51	18	61	3.75	5.25	50	60	63	3.5	5.6	8.6	5.7	7.1	5.31	7.69	8.0	1
2070	20.9	221	9.5	1.0	3.99	6	26	71	3.78	6.23	61	55	6	2.6	3.9	5.1	3.0	6.3	5.09	6.11	6.2	1
2075	59.4	177	15.3	1.0	4.05	11	26	71	3.73	6.20	91	60	11	2.6	3.6	5.5	3.4	6.0	5.45	6.45	6.9	1
2345	59.6	174	19.2	1.0	6.34	101	15	55	4.18	5.85	36	70	9	5.6	6.6	7.1	6.7	6.0	4.74	5.76	5.5	61
2350	456	79	45.9	1.0	6.78	91	14	54	4.17	5.00	86	50	33	7.5	7.6	9.0	4.4	5.1	4.18	7.22	6.4	30
2370	230	52	38.8	3.0	6.25	96	16	56	4.33	5.72	6	45	20	6.0	7.4	7.7	6.5	6.4	3.85	6.45	5.3	36
2375	779	54	63.9	1.5	6.40	91	15	55	4.17	5.50	81	50	50	6.9	7.5	8.5	5.4	5.6	3.90	7.10	6.0	27
2380	1,200	41	76.7	1.0	6.02	91	16	56	4.25	5.58	76	50	60	6.2	7.2	8.3	5.8	6.0	3.82	7.28	6.1	21
2450	626	12	66.2	8.0	5.96	76	16	59	4.83	6.00	1	40	34	4.7	7.0	7.9	6.2	7.3	3.96	6.94	5.9	23
2460	933	11	100	5.5	5.80	81	16	60	4.67	6.00	1	40	50	4.6	6.7	7.6	6.4	7.1	4.10	6.80	5.9	22
2475	2,230	38	90.2	3.0	5.85	86	16	59	4.33	5.75	41	65	102	5.5	6.8	8.2	6.1	6.3	4.05	7.35	6.4	19

As an alternative to regression analyses, other methods should be considered for estimating planning and design data. Most alternate methods will require collection of some information at the design point. For example, Riggs (1969) proposed a method for defining mean annual flows from mid-month discharge measurements over a period of time. Moore (1968) suggested methods of estimating mean flows from runoff-altitude relations, or from channel width and depth measurements. The flow information needed to define these estimating relations is the same as required for regression analyses.

Another alternative to regression relation estimates is to estimate planning and design data by interpolation between adequately gaged points. An interpolation scheme is particularly adapted to principal streams, those draining more than 500 square miles, because there are only a limited number of sites, the information on larger streams is needed for many purposes in addition to planning and design, and many records currently exist on larger streams. Adequate basic information on natural-flow, principal streams is considered to be 25 years of record at all sites of about 500 square miles and at each downstream site where the drainage area about doubles; that is at 1,000 square miles, 2,000 square miles, and so forth. The available information on principal streams in Idaho only partially meets this goal. Although several sites have records exceeding 25 years, 9 sites have less than 25 years record and no record is available for 10 sites.

Evaluation of the Regulated Flow Data

The planning and design goals for regulated streams are more difficult to obtain because the techniques of regionalization by regression does not apply, the flow characteristics are not necessarily stationary in time, and a meaningful correlation between two sites seldom exists if one site is regulated. A systems approach, which requires a mathematical basin model, may be used to define flow characteristics for different patterns of regulation or for natural conditions. System or model studies of all regulated flow systems in Idaho will require a major effort. Therefore, the present evaluation is limited to identifying the regulated stream systems that should be studied and the amount of data available.

Table 12 lists the Idaho stream systems materially affected by regulation. Of these streams, Bear River, Pend Oreille River, Spokane River, Snake River, Bruneau River, and Owyhee River are major interstate streams and the systems should be modeled to include more than the Idaho reach.

Streamflow records are available for sites in each of the regulated flow systems and daily records of reservoir contents and major diversions are also available. It is emphasized, however, that in most regulated basins there are available, at most, only scanty records of some of the diversions, return flows, and storage records. Collection of sufficient water-use information in regulated systems to construct basin models will require considerable future effort.

Evaluation of Long-Term Trend Data

At present, two stations are designated as long-term trend stations and are to be operated indefinitely. The variable climatic and topographic conditions of Idaho will require that additional records be obtained to define long-term trends. Several existing gages that have a long period of accurate record on natural streamflow from basins that are expected to remain in a natural condition in the future would qualify for selection as long-term trend stations.

Evaluation of Stream Environmental Data

Many environmental factors were determined for the drainage basins used in the regression study, specifically those variables listed in tables 8, 9, 10, and 11. Additional information on stream environment is available from a number of ground-water reports such as Crosthwaite and others (1970), Mundorff and others (1963), Stearns and others (1938), Walker and others (1970), and Thomas (1969). In general, however, data are inadequate to define the hydrologic environment of stream channels and drainage basins in Idaho.

Table 12. River segments for systems studies of regulated flow.

	Region
1. Bear River from Wyoming to Utah line	3
2. Malad River from headwaters to Utah line	3
3. Pend Oreille River from Montana to Washington line	1,2
4. Priest River from Priest Lake to Pend Oreille River	1
5. Spokane River below Coeur d'Alene Lake	2
6. Snake River from Jackson Lake to Washington line including Snake Plain aquifer	3,4
7. Henrys Fork from Henrys Lake to mouth	3,4
8. Falls River from Squirrel to mouth	3,4
9. Teton River from headwaters to mouth	3,4
10. Blackfoot River from Blackfoot Reservoir to mouth	3,4
11. Portneuf River from Portneuf-Marsh Valley Reservoir to mouth	3,4
12. Raft River from headwaters to mouth	4
13. Goose Creek from headwaters to Oakley Reservoir	4
14. Salmon Falls Creek from headwaters to mouth	4
15. Mud Lake basin	2,4
16. Little Lost River from headwaters to Snake Plain	2,4
17. Big Lost River from Howell Ranch to Snake Plain	2,4
18. Big Wood River from Ketchum to mouth	1,2
19. Little Wood River from Carey Reservoir to mouth	1
20. Bruneau River from Nevada line to mouth	4

Table 12. River segments for systems studies of regulated flow--Continued.

	Region
21. Owyhee River from Nevada to Oregon line including Jordan Creek	4
22. Boise River from Anderson Ranch Reservoir to mouth	1,4
23. Payette River below Deadwood Reservoir	1,4
24. Weiser River below Council	1,4
25. Salmon River from headwaters to mouth	1,2
26. Pahsimeroi River from headwater to mouth	2
27. Lemhi River from headwaters to mouth	2
28. Little Salmon River from headwaters to mouth	1

THE PROPOSED PROGRAM

The information developed in different segments of this study has been merged to plan a program that will eventually attain as many of the remaining goals as possible within the limits of available funds. For the optimum program, a balance must be maintained between data collection and data analysis. Continuous interaction between the two is needed, not only to gain a better understanding of the hydrologic system, but also to guide future evaluation of the program in meeting ever-changing needs and in adapting to changing technology.

Data Collection

Data for Current Use

The operation of the 214 stations identified as meeting the requirements for current-purpose data in table 3 will be continued as long as specific needs dictate. The changing needs will be assessed continuously, cooperators will be consulted, and the data collection network will be modified by adding or discontinuing stations as required. The data requirements for each site will be examined to determine whether a continuous record of discharge is needed or whether measurement of specific flow characteristics such as peak flow or instantaneous flow will suffice.

Data for Planning and Design

The objective of providing the desired information on any stream in Idaho has been only partially attained. This evaluation has indicated the need for continued operation of certain stations to obtain continuous-record and partial-record data. The need for some additional gaging stations is also apparent.

Although the regression analyses include only the 50-year flood for both minor and principal streams, it is desirable to collect 50 years of flood-peak data at selected sites to define the 100-year flood. When a continuous-record station is to be discontinued, consideration will be given to continuing the collection of peak-discharge data. Thus, by operating a partial-record station, needed data can be obtained at a low cost.

Low-flow studies should be instituted and low-flow measurements made beginning in streams where low flows are most critical because of problems related to quality control, passage or maintenance of fish, irrigation or municipal uses, or others. Low-flow data, especially in drought years, are useful in planning and design in major and minor streams, whether regulated or unregulated. Sites where measurements should be made have not been evaluated for this report.

Other requirements needed in the future data-collection program to achieve as many of the remaining goals as practicable are proposed in the following sections.

Minor streams with natural flow.--Some method of regionalization or of estimating discharge characteristics at ungaged sites is required to define streamflow characteristics for minor streams since it is impractical to gage all of them. To provide an adequate basis for these determinations, the data collection program must sample data from streams representing the full range of characteristics that affect streamflow. More records are needed on streams below about 60 square miles especially in Regions 2 and 3. A total of 93 sites on minor streams have been gaged for periods between 2 and 10 years. It is proposed that physical and climatic characteristics be determined for all of these basins. After these characteristics are available, representative gaging sites can be chosen, possibly many of them from this group, and operated at least 10 years to extend the geographical coverage on small streams. A minimum of 10 gaging stations in each of the four regions at sites on streams draining less than 60 square miles operating for at least 10 years is recommended. These gages would also be useful as index stations for low-flow studies in Idaho.

Records of crest-stage gages will be analyzed in a study scheduled for 1972 fiscal year, at which time more than 80 crest-stage gages will have been operated at least 10 years. More definite recommendations for peak-flow data from small basins will be deferred until after this analysis is made. Operation of all crest-stage gages should continue until at least 10 and preferably 15 years of record are available, and operation of selected gages should continue until 25 years or more of record are available. Locations of crest gages are shown in figure 1.

For the purposes of defining 100-year recurrence interval flood peaks on minor streams, the following stations should be operated as partial-record stations to collect peak flows.

Station number	Station name	Previous record (annual peaks)
12-3110	Deep Creek at Moravia	43
12-4110	Coeur d'Alene River above Shoshone Creek, near Prichard	21
13-1355	Big Wood River near Ketchum	23
13-1870	Fall Creek near Anderson Ranch Dam	13
13-2000	Moore Creek above Robie Creek, near Arrowrock Dam	20
13-2515	Weiser River at Tamarack	34
13-2610	Little Weiser River near Indian Valley	38
13-2950	Valley Creek at Stanley	49
13-3085	Middle Fork Salmon River near Cape Horn	42
13-3369	Fish Creek near Lochsa ranger station	10
13-3414	East Fork Potlatch near Bovill	11
13-3415	Potlatch River at Kendrick	25

Principal streams with natural flow.--The objectives for principal streams are to be attained by sampling progressively doubled increments of drainage area beginning with the upstream 500 square miles. The objective of 25 years of record has already been achieved at a number of principal streams stations. However, most of these stations now in operation are required for the collection of current-purpose data. Additional stations required at natural flow sites to meet the objectives are listed in table 3 and are as follows:

Station number	Station name	Drainage area (approx.)	Previous record (full yrs.)	Region
12-4140	St. Joe River at Avery	594	2	1
13-1845	Middle Fork Boise River near Twin Springs	382	4	4
13-2980	East Fork Salmon River near Clayton	497	11	2
	Middle Fork Salmon River below Marble Creek, near Landmark R.S.	1,050	-	1
	Middle Fork Salmon River near Shoup	2,850	-	2
	South Fork Salmon River at mouth, near Warren	1,315	-	1
	Selway River below White Cap Creek, near McGruder R.S.	520	-	1
	Selway River above Moose Creek, at Moose Creek R.S.	976	-	1
	Moose Creek at Moose Creek R.S.	371	-	1
	Lochsa River below Warm Spring Creek, near Lowell	588	-	1
	North Fork Clearwater	578	-	1

Big Creek near Big Creek (13-3100) has been operated 14 years and discontinued. It is accessible only by airplane and is not recommended for reactivation at this time.

For the purpose of defining 100-year-recurrence flood peaks on principal streams, the following stations should be operated as partial-record stations to collect peak flows:

Station number	Station name	Previous record (annual peaks)
13-2375	South Fork Payette River at Garden Valley	37
13-2965	Salmon River below Yankee Fork, near Clayton	49
13-3065	Panther Creek near Shoup	26
13-3405	North Fork Clearwater River at Bungalow ranger station	25

<u>Regulated streams</u>.--It is beyond the scope of this report to propose specific analyses needed to meet goals on regulated streams. However, gaging stations on regulated streams proposed in order that minimal streamflow data will be available when system studies are made are as follows:

Station number	Name	Region
	Bannock Creek at mouth, near Pocatello	4
	Rock Creek at mouth, near American Falls	4
	Rock Creek at mouth, near Twin Falls	4
13-1040	Shoshone Creek near San Jacinto, Nev.	4
	Sheep Creek at mouth, near Grasmere	4
	Deep Creek near Riddle	4
	Owyhee River at Crutchers Crossing, near Riddle	4
	South Fork Owyhee River at Crutchers Crossing, near Riddle	4
	Pahsimeroi River below Patterson Creek, near May	2
13-3020	Pahsimeroi River near May	2
	Lemhi River at Salmon	2

Locations of these sites are shown in figure 1.

Systems studies on regulated streams will vary in complexity, and will involve both surface water and ground water. Changes caused by regulation and diversion in some systems are far reaching, and some of the models required for the analyses will be complex.

Adjustments to natural flow conditions or to the present or some future development condition will require considerable data for adjusting the recorded flows for effects of regulation and diversion. The future data program should include provisions to continue the collection of records of inflow, outflow, reservoir contents, and other pertinent data at major reservoirs in the regulated streams system. The relation between lake and reservoir evaporation and pan evaporation has not been defined for the physical and climatic conditions existing in Idaho and should be investigated. Diversions, return flows, and changes in irrigated acreages should be assessed. More data on diversions are needed in some basins. Effects of ground-water pumpage on streamflow should be evaluated. Because of the continual, significant increases in development of the regulated-stream systems, it is recommended that gaging stations defining regulated as well as unregulated streamflow be continued until no further changes in regulation are expected. Irrigated acreages should be inventoried often in order to evaluate their impact on streamflow characteristics. Contents of some sizable reservoirs including Deadwood and Crane Creek Reservoirs have not been published because of inadequate capacity tables. Others are of questionable accuracy because of sediment. These should be resurveyed or checked.

Data to Define Long-Term Trends

The two gaging stations that have been previously designated as bench-mark stations, Hayden Creek below North Fork, near Hayden Lake (12-4160) and Big Jacks Creek (formerly Wickahoney Creek) near Bruneau (13-1695), should be continued in operation indefinitely. As a part of this study, 11 additional stations, one of them in Wyoming, have been designated from the present network as long-term trend stations and should be operated indefinitely to meet the need for this type of station. The additional stations were selected to provide a long-term sample reflecting areal coverage of the State and a variety of climatic and physiographic characteristics. Not all of the various climatic and physiographic regimes are defined by these gages, but other stations in the network serve this need in addition to other needs. Before any of these other gages are discontinued, their value for long-term definitions should be assessed. The 13 stations designated for indefinite operation are coded with a "B" in column 1 of table 3. The 11 newly proposed long-term trend stations are listed below:

Station number	Station name
10-0930	Cub River near Preston
12-3065	Moyie River at Eastport
12-3923	Pack River near Colburn
13-0115	Pacific Creek near Moran, Wyo.
13-0630	Blackfoot River above reservoir, near Henry
13-0920	Rock Creek near Rock Creek
13-1200	North Fork Big Lost River at Wild Horse, near Chilly
13-2350	South Fork Payette River at Lowman
13-2506	Big Willow Creek near Emmett
13-3130	Johnson Creek at Yellow Pine
13-3375	South Fork Clearwater River near Elk City

Data on Stream Environment

Environmental data should be included in future programming to satisfy the needs for such data in research, planning, design, and operation of water-related facilities. Effects of man's activities on environment and effects of environmental changes on the quality and quantity of streamflow are pressing problems of the age. All of the proposed environmental projects listed on page 15 have value and the required data should be collected in future programs.

Summary

Table 3 summarizes the proposed program for collection of daily discharge records. The table includes all streamflow stations currently operating and those proposed for future operation. Each station is identified as to type of data that it provides and recommendations are indicated as to whether the station should be continued in the future program or whether it has already provided the data needed to meet the program goals and could be discontinued. Location of each listed gaging station is shown in figure 1.

Data Analysis

The proposed program of data analyses of Idaho streams may be classed in two phases--those based on streamflow data collected to date and those for which additional or specialized data are required.

The streamflow-data network operated through the years supplies the basic data for analysis to provide information needed by designers of water projects and for water management. Analytical studies based on available streamflow data should begin when sufficient data become available and should be updated periodically to include recent streamflow data. The analysis by regression techniques presented in this report will provide a basis for designing future generalization studies. Limitations of time and manpower limited the variables used in this regression. Other alternatives should be investigated, and other forms of regression equations should also be explored. Data analyses and appropriate reports should be scheduled in future programs as finances permit. These include the following:

1. Magnitude and frequency of peak flows--an update of the reports "Magnitude and frequency of floods", published in U.S. Geological Survey water-supply papers for the major basin designations for the United States. Water-Supply Paper 1688 for part 13 was published in 1963 and was based on data collected through 1957. A new study of floods from small basins in Idaho is scheduled for 1972 fiscal year, when the records from the crest-stage gage program will average about 10 years in length.

2. Flood-volume frequency analysis of annual maximum average flows for selected periods of time.

3. Statistics of mean annual and mean monthly flows.

4. Short-term records should be extended by correlation with long-term records. Multiple regressions should be run which include data from these short-term records because of the increased coverage they would provide. Further analyses to determine the value of short-term records at a greater number of sites as compared with longer records at fewer sites is justified.

5. Continuing studies of new or revised methods of regionalization or generalization to estimate discharge at ungaged sites.

The second type of data analysis needed is for studies that require the collection of specialized data in addition to that provided by the stream-gaging network. The following studies are proposed:

1. Investigation of methods for extension of short-term records and for use of miscellaneous measurements to compute flow characteristics.

2. Low-flow characteristics of Idaho streams. A continuing program of base-flow measurements to define low-flow characteristics should be started in a concentrated area. After a report is assembled for each specific study area, available funds and manpower can be applied to an adjacent area.

3. Time of travel of peak flows and time of travel and dispersion of solutes in streams, giving priority to streams subject to industrial pollution or hazards from radioactive wastes, and to streams that furnish water for municipal uses.

4. Definition of flood profiles for floods of different frequencies to provide guidelines for flood-plain zoning of lands under Federal jurisdiction or to meet local requirements.

5. Systems analyses to develop flow characteristics of regulated streams.

6. Hydraulic geometry of streams.

7. Relation of flow characteristics including mean annual flow and peak flows to channel geometry.

8. Hydrometric surveys of stream-aquifer systems.

   a. Locations of springs, seeps, and return flows.

   b. Identification of channel reaches with decreasing discharge.

   c. Impact of development on surface and ground water systems.

9. Reconnaissance of streamflow and stream channel parameters that are related to the use of the stream for recreation and fish and wildlife propagation, such as velocities, depths, bank configuration and vegetation, bed material, water temperature, water quality, and accessibility.

10. Precipitation data at high and intermediate elevations supplemented with analyses to define variability of precipitation in mountainous areas.

11. Extension of present knowledge of the effect of geology and soil types on streamflow characteristics.

These are only a few of the data analysis and hydrologic studies that should be made. Changing needs for streamflow and related information as well as changes in technology must be evaluated frequently.

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APPENDIX

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
10-				
0395	Bear River at Border, Wyo.	a 2,490	1937-	
0400	Thomas Fork near Geneva, Idaho	45.3	1939-51.	
0405	Salt Creek near Geneva, Idaho	37.6	1939-51.	
0410	Thomas Fork near Wyoming-Idaho State line, Idaho	113	1949-	
0415	Thomas Fork above diversions, near Geneva, Idaho	-	1944-46b.	
0420	Preuss Creek near Geneva, Idaho	3.3	1943-44.	
0425	Thomas Fork near Raymond, Idaho	202	1942-52.	
0430	Diversions from Thomas Fork, Idaho	-	1944-45b.	
0433	Sheep Creek tributary near Border, Wyo.	.12	....	1961-64.
0433.5	Sheep Creek tributary No. 2 near Border, Wyo.	.34	....	1965-
0435	Diversions from Bear River between Border and Harer gaging stations, Idaho	-	1931-44c; 1944-56b; 1957b; 1958-d.	
0440	Bear River at Harer, Idaho	a2,780	1913-	
0445	Bear River at Dingle, Idaho	a2,810	1903-14.	
0450	Bear (Mud) Lake inlet canal near Dingle, Idaho	-	1911-13.	
0455	Diversion from Bear River between Harer and Stewart Dam gaging stations, Idaho	-	1925-c; 1944-56b; 1957c; 1958-d.	
0460	Rainbow inlet canal near Dingle, Idaho	-	1922-	
0465	Bear River below Stewart Dam, near Montpelier, Idaho	a2,820	1922-	
0470	Montpelier Creek near Montpelier, Idaho	28.2	1939-44.	
0475	Montpelier Creek at irrigators weir, near Montpelier, Idaho	50.9	1942-	
0480	Diversions from Montpelier Creek, Idaho	-	1944-45b.	
0485	Montpelier Creek below diversions at Montpelier, Idaho	-	1944-47b.	
0535	Fish Haven Creek above diversions, near Fish Haven, Idaho	-	1944-45b.	
0540	Diversions from Fish Haven Creek, Idaho	-	1944-45b.	
0545	Fish Haven Creek below diversions, at Fish Haven, Idaho	-	1944-45b.	
0546	St. Charles Creek above diversions, near St. Charles, Idaho	17.4	1944-45b; 1961-66...........	1967-
0547	Diversions from St. Charles Creek, Idaho	-	1944-45b.	
0548	St. Charles Creek below diversions, near St. Charles, Idaho	-	1944-45b.	
0549	Spring Creek Canal near St. Charles, Idaho	-	1944-45b.	
0549.1	Spring Creek below Spring Creek Canal, near St. Charles, Idaho	-	1944-45b.	
0550	Little Creek at St. Charles, Idaho	-	1944-45b.	
0555	Bear Lake at Lifton, near St. Charles (at Fish Haven), Idaho	a435	1903-6*; 1921-	
0585	Bloomington Creek near Bloomington, Idaho	22.1	1942-47.	
0586	Bloomington Creek at Bloomington, Idaho	24.4	1960-	
0590	Diversions from Bloomington Creek, Idaho	-	1944-45b.	
0595	Bear Lake outlet canal near Paris, Idaho	-	1922-	
0600	Paris power canal near Paris, Idaho	-	1943-47.	
0605	Paris Creek near Paris, Idaho	18.6	1943-47.	
0610	Diversions from Paris Creek, Idaho	-	1944-45b.	
0615	Paris Creek below diversions, near Paris, Idaho	-	1944-45b.	
0620	Slight Canyon Creek near Paris, Idaho	6.81	1943-45.	
0625	Mill Creek above West Fork, near Liberty, Idaho	18.4	1944-47.	
0630	Mill Creek near Liberty, Idaho	27.2	1943-47.	
0635	Diversions from Mill Creek, Idaho	-	1944-45b.	
0640	Mill Creek at Liberty Bridge, near Liberty, Idaho	-	1945b.	
0645	North Creek near Liberty, Idaho	10.9	1943-44.	
0647	Emigration Creek near Liberty, Idaho	9.18	1943-44.	
0649	Diversions from Emigration Creek, Idaho	-	1944-45b.	
0650	North Creek below Emigration Creek, near Liberty, Idaho	26.5	1946-47.	
0655	Diversions from North Creek, Idaho	-	1944-45b.	
0660	North Creek at Liberty Bridge, near Liberty, Idaho	-	1945b.	
0675	Mill Creek (Old Bear Lake Outlet) at Bern Road, near Bern, Idaho	-	1944-45b.	
0680	Bennington Creek near Bennington, Idaho	-	1944-45b.	

Table A-1. Current and discontinued gaging stations in Idaho and adjacent areas.--Continued

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
10-				
0685	Bear River at Pescadero, Idaho	a3,680	1921-54.	
0690	Georgetown Creek near Georgetown, Idaho	22.2	1911-14; 1939-56.	
0695	West Fork near Georgetown, Idaho	-	1944-45b.	
0700	Diverions from Georgetown Creek, Idaho	-	1944-45b.	
0705	Georgetown Creek below diversions, at Georgetown, Idaho	-	1944-47b.	
0710	Co-Op Creek near Nounan, Idaho	-	1944-45b.	
0715	Skinner Creek at Nounan, Idaho	5.41	1939-45.	
0720	Stauffer Creek near Nounan, Idaho	-	1939-44.	
0725	Stauffer Creek at mouth, near Georgetown, Idaho	-	1946-47b.	
0728	Eightmile Creek near Soda Springs, Idaho	23.2	1960-	
0730	Diversions from Eightmile Creek, Idaho	-	1944-45b.	
0735	Eightmile Creek below diversions, near Soda Springs, Idaho	-	1944-47b.	
0740	Diversions from Bailey Creek, Idaho	-	1944-45b.	
0745	Bailey Creek below diversions, near Soda Springs, Idaho	-	1945b.	
0750	Bear River at Soda Springs, Idaho	a3,970	1896; 1898; 1925-44c; 1944-49; 1951-53b; 1953-	
0755	Ledger Creek near Soda Springs, Idaho	-	1944-45b.	
0760	Diversions from Formation Springs, near Soda Springs, Idaho	-	1944-45b.	
0764	Soda Creek at Fivemile Meadow, near Soda Springs, Idaho	a49	1964-	
0765	Soda Creek at Lau Ranch, near Soda Springs, Idaho	a49	1923-26.	
0770	Soda Creek near Soda Springs, Idaho	a52	1913-26; 1928-29.	
0775	Diversions from Soda Creek, Idaho	-	1944-45b.	
0780	Soda Creek below diversions, at Soda Springs, Idaho	-	1945-47b.	
0785	Diversions from Bear River between Pescadero and Alexander gaging stations, Idaho	-	1925-44c; 1944-b.	
0790	Soda Reservoir at Alexander, Idaho	-	1944-b.	
0795	Bear River at Alexander, Idaho	a4,050	1911-	
0800	Bear River below Grace Dam, near Grace, Idaho	-	1944-50b; 1945-46.	
0805	Diversions from Whiskey Creek, Idaho	-	1944-45b.	
0810	Diverions from Trout Creek, Idaho	-	1944-45b.	
0815	Trout Creek at falls, near Thatcher, Idaho	-	1945b.	
0820	Diversions from Warm Creek, Idaho	-	1944-45b.	
0825	Diversions from Williams Creek, Idaho	-	1944-45b.	
0830	Williams Creek below diversions, near Cleveland, Idaho	-	1945b.	
0835	Treasureton Canal near Swan Lake, Idaho	-	1939-46.	
0840	Cottonwood Creek near Swan Lake, Idaho	42.6	1939-46.	
0845	Cottonwood Creek near Cleveland, Idaho	61.7	1938-	
0850	Cleveland Irrigation Co. Canal near Cleveland, Idaho	-	1944-45b.	
0855	Diversions from Bear River between Alexander and Oneida gaging stations, Idaho	-	1925-44c; 1944-b.	
0860	Oneida Reservoir at Oneida, Idaho	-	1944-b.	
0865	Bear River below Utah Power & Light Co's tailrace, at Oneida, Idaho	a4,400	1921-	
0870	Mink Creek Canal near Mink Creek, Idaho	-	1949-52.	
0875	Mink Creek below Dry Fork, near Mink Creek, Idaho	19.3	1947-52; 1955-62.	
0880	Twin Lakes Canal near Mink Creek, Idaho	-	1943-52.	
0885	Preston-Riverdale & Mink Creek Canal near Mink Creek, Idaho	-	1943-52.	
0890	Diversions from Mink Creek, Idaho	-	1944-45b.	
0895	Mink Creek near Mink Creek, Idaho	58.7	1943-52.	
0900	Diversions from Bear River between Oneida and Preston gaging stations, Idaho	-	1925-44c; 1944-b.	
0905	Bear River near Preston (at Battlecreek), Idaho	a4,500	1889-1916; 1917*; 1944-	
0908	Battle Creek tributary near Treasureton, Idaho	a4.5	....	1961-
0910	Battle Creek near Treasureton, Idaho	23.1	1943-44.	
0912	Deep Creek near Clifton, Idaho	a119	1966-	
0915	Bear River near Weston, Idaho	-	1919-44.	
0920	Weston Creek at Weston, Idaho	a63	1942-44.	
0925	Cub River Irrigation Co.'s pump canal (Cub River Pumps) near Weston, Idaho	-	1934-44c; 1944-b.	
0930	Cub River near Preston, Idaho	19.4	1940-52; 1955-	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
10-				
0935	Cub River-Worm Creek Canal at head, near Preston, Idaho	-	1944-45b.	
0940	Cub River-Worm Creek Canal near Preston, Idaho	-	1943-52.	
0945	Mapleton Canal near Preston, Idaho	-	1944-45b.	
0950	Preston-Whitney Canal near Preston, Idaho	-	1944-45 b; 1946-52.	
0955	Cub River Canal near Preston, Idaho	-	1944-45b; 1946-52.	
0956	Cub River Canal above sugar factory, near Preston, Idaho	-	1962-63.	
0957	Cub River Canal below Worm Creek, near Preston, Idaho	-	1962-63.	
0958	West Branch Cub River Canal near Fairview, Idaho	-	1962-63.	
0959	East Branch Cub River Canal near Lewiston, Utah	-	1962-63.	
0960	Cub River above Maple Creek, near Franklin, Idaho	53.7	1940-52.	
0965	Maple Creek near Franklin, Idaho	21.2	1946-52.	
0970	Diversions from Maple Creek, Idaho	-	1944-45 b.	
0975	Maple Creek below diversions, near Franklin, Idaho	-	1944-45 b.	
0980	Cub River at Franklin, Idaho	47.1	1900.	
0985	Worm Creek near Preston, Idaho	11.0	1943-46.	
0986	Worm Creek above treatment plant, near Preston, Idaho	a24	1962-63.	
0987	Worm Creek below sugar factory, near Preston, Idaho	a24	1962-63.	
0988	Worm Creek near Fairview, Idaho	a46	1962-63.	
0990	High Creek near Richmond, Utah	16.2	1944-52.	
1182	Malad River below springs, near Malad City, Idaho	a3.3	1931-32; 1940-47; 1947-61*.	
1183	Warm Springs Canal near Samaria, Idaho	-	1940-45.	
1184	Malad River near Samaria, Idaho	a31	1941-45.	
1185	Wright Creek near Daniels, Idaho	a73	1931-32.	
1190	Little Malad River above Elkhorn Reservoir, near Malad City, Idaho	a120	1911-13; 1931-32; 1940-	
1195	Elkhorn Reservoir near Malad City, Idaho	153	1940-53.	
1200	Little Malad River below Elkhorn Reservoir, near Malad City, Idaho	153	1940-53.	
1205	Little Malad River below Sand Ridge Dam site, near Malad City, Idaho	223	1945-51.	
1225	Devil Creek above Campbell Creek, near Malad City, Idaho	a13	1938-61.	
1230	Devil Creek above Evans dividers, near Malad City, Idaho	a36	1940-43; 1946-53.	
1235	Devil Creek near Malad City, Idaho	a39	1931-40.	
1240	Deep Creek above Third Creek, near Malad City, Idaho	a3.9	1931-32.	
1245	Third Creek near Malad City, Idaho	a13	1931-32.	
1250	Deep Creek below First Creek, near Malad City, Idaho	a32	1931-48.	
1255	Malad River at Woodruff, Idaho	a485	1938-	
1729.7	Rock Creek near Holbrook, Idaho	a42	....	1962-
12-				
3045	Yaak River near Troy, Mont.	766	1910-16; 1956-	
3050	Kootenai River at Leonia, Idaho	a11,740	1928-	
3055	Boulder Creek near Leonia, Idaho	a53	1928-	
3060	Kootenai River at Katka, Idaho	a11,860	1928-33.	
3065	Moyie River at Eastport, Idaho (at Kingsgate, British Columbia)	a570	1915-16e; (1914; 1917)*e;1929-	
3070	Moyie River at Snyder, Idaho	656	1911-16; 1919-23.	
3075	Moyie River at Eileen, Idaho	755	1925-	
3080	Kootenai River at Crossport, Idaho	-	1904*	
3085	Kootenai River at Boom Camp, near Bonners Ferry, Idaho	a12,950	1925-27*e; 1927-60*.	
3090	Cow Creek near Bonners Ferry, Idaho	14.7	1928-34.	
3095	Kootenai River at (near) Bonners Ferry, Idaho	a13,000	1904*; 1905-27*f; 1928-60; 1961-*	
3100	Kootenai River near Bonners Ferry, Idaho	a13,000	1928-*	
3105	Kootenai River at Deep Creek, near Bonners Ferry, Idaho	-	1928-30*.	
3108	Trail Creek at Naples, Idaho	a16	....	1961-
3110	Deep Creek at Moravia, Idaho	133	1928-	
3115	Snow Creek near Moravia, Idaho	19.5	1928-34.	
3120	Caribou Creek near Moravia, Idaho	14.0	1928-34.	
3125	Kootenai River at Myrtle Creek, near Bonners Ferry, Idaho	-	1929-30*.	
3130	Mrytle Creek near Bonners Ferry, Idaho	a37	1928-34.	
3135	Ball Creek near Bonners Ferry, Idaho	a27	1928-34.	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
12-				
3140	Kootenai River at Klockman Ranch, near Bonners Ferry, Idaho	a13,300	1928-*	
3150	Kootenai River at Spurling Ranch, near Copeland, Idaho	-	1928-30*.	
3152	Rock Creek near Copeland, Idaho	14.3	1928-34.	
3154	Trout Creek near Copeland, Idaho	a20	1928-34.	
3155	Kootenai River at Des Voigne Ranch, near Copeland, Idaho	-	1929*.	
3160	Kootenai River at Krause Ranch, near Copeland, Idaho	-	1929-30*.	
3165	Kootenai River at Ashby Ranch, near Copeland, Idaho	-	1929*.	
3168	Mission Creek near Copeland, Idaho	a23	1958-	
3170	Mission Creek at Copeland, Idaho	a31	1928-34.	
3175	Brush Creek near Copeland, Idaho	a7.2	1928-34.	
3185	Kootenai River near (at) Copeland, Idaho	a13,400	1925-27*e;1927-28*;1929-	
3190	Kootenai River at Jerome Slough, near Copeland, Idaho	-	1929-30*.	
3195	Parker Creek near Copeland, Idaho	16.5	1928-34.	
3200	Kootenai River at Lucas Creek, near Porthill, Idaho	-	(1928-30;1932-35;1937-39)*	
3205	Long Canyon Creek near Porthill, Idaho	a29	1928-59.	
3210	Smith Creek near Porthill, Idaho	a70	1928-60.	1962-
3215	Boundary Creek near Porthill, Idaho	a97	1928-	
3220	Kootenai River at (near) Porthill, Idaho	a13,700	1904*;1924-27*e;1927-28*; 1928-	
3225	Kootenay Lake at Kuskonook, British Columbia	-	1936-*	
3920	Clark Fork at Whitehorse Rapids, near Cabinet, Idaho (near Heron, Mont.).	22,067	1928-	
3921	Trapper Creek near Clark Fork, Idaho	1.12	....	1962-
3923	Pack River near Colburn, Idaho	124	1958-	
3924	Rapid Lightning Creek near Samuels, Idaho	45.0	1963-68.	
3925	Pend Oreille Lake at Hope (Sandpoint), Idaho	a22,900	1914-	
3928	Dover Creek near Dover, Idaho	a2.2	....	1961-
3930	Priest Lake at outlet, near Coolin, Idaho	572	(1911-19;1928-49)*;1950-	
3935	Priest River at outlet of Priest Lake, near Coolin, Idaho	572	1911*;1912-48.	
3936	Binarch Creek near Coolin, Idaho	10.4	....	1962-
3940	Priest River near Coolin, Idaho	611	1948-	
3945	Priest River at Falk's ranch, near Priest River	792	1911-12.	
3950	Priest River near (at) Priest River, Idaho	902	1903-5;1910-11;1923;1929-	
3955	Pend Oreille River (Clark Fork) at Newport, Wash.	a24,200	1903-41;1952-	
4110	Coeur d'Alene River (head of Spokane River) above Shoshone Creek, near Prichard, Idaho	335	1950-	
4115	Coeur d'Alene (North Fork Coeur d'Alene) River at Prichard, Idaho	441	1911-14.	
4120	Coeur d'Alene River near Prichard, Idaho	583	1944-53.	
4125	North Fork Coeur d'Alene (Little North Fork Coeur d'Alene) River near Enaville, Idaho	a170	1911-12.	
4130	Coeur d'Alene (North Fork Coeur d'Alene) River at Enaville, Idaho	895	1911-13;1939-	
4131	Boulder Creek at Mullan, Idaho	3.13	....	1961-
4131.4	Placer Creek at Wallace, Idaho	14.9	1968-	
4131.5	South Fork Coeur d'Alene River at Silverton, Idaho	103	1968-	
4132	Montgomery Creek near Kellogg, Idaho	4.53	....	1962-
4133	South Fork Coeur d'Alene River near Smelterville	202	1966-	
4134	West Fork Pine Creek near Pinehurst, Idaho	10.8	1966-	
4135	Coeur d'Alene River near Cataldo, Idaho	a1,220	1911-12;1920-	
4137	Latour Creek near Cataldo, Idaho	24.8	1966-	
4140	St. Joe River at Avery, Idaho	594	1911-17.	
4145	St. Joe River at (near) Calder, Idaho	a1,030	1911-12;1920-	
4149	St. Maries River near Santa, Idaho	275	1965-	
4150	St. Maries River at Lotus, Idaho	437	1911-12;1920-66.	
4151	Cherry Creek near St. Maries, Idaho	7.07	....	1961-
4152	Plummer Creek tributary at Plummer, Idaho	2.10	....	1961-
4155	Coeur d'Alene Lake at Coeur d'Alene, Idaho	a 3,700	1903-	
4160	Hayden Creek below North Fork, near Hayden Lake	22.0	1948-53;1958-59;1965-	1962-65.
4165	Hayden Creek near Hayden Lake, Idaho	26.0	1946-48.	
4170	Hayden Lake at Hayden Lake, Idaho	62.3	1920-*	
4175	Hayden Lake Irrigation District diversion near Hayden Lake, Idaho	-	1945-53.	
4180	Rathdrum Prairie Canal at Huetter, Idaho	-	1945-	
4185	Spokane Valley Farms Co.'s canal (Spokane Valley Land and Water Co.'s canal) at Post Falls, Idaho	-	1911-17; 1919-66.	
4190	Spokane River near (at) Post Falls, Idaho	g 3,840	1912-	
4192	Twin Lakes near Rathdrum, Idaho	41.2	1958-68.	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
0100	Snake River at south boundary of Yellowstone National Park	485	1913-25.	
0105	Jackson Lake at Moran, Wyo.	824	1908-	
0110	(South Fork) Snake River at Moran, Wyo.	824	1903-	
0115	Pacific Creek near Moran, Wyo.	160	1906*; 1917-18; 1944-	
0120	Buffalo Fork near Moran, Wyo.	378	1906*; 1917-18; 1944-60.	
0145	Gros Ventre River at Kelly, Wyo.	622	1918; 1944-58.	
0195	Hoback River near Jackson, Wyo.	564	1917-18; 1944-58.	
0225	Snake River above reservoir, near Alpine, Wyo.	3,465	1937-39; 1953-	
0230	Greys River above reservoir, near Alpine, Wyo.	448	1917-18; 1937-39; 1953-	
0235	Snake River below Greys River, at Alpine, Idaho	3,940	1944-54.	
0255	Crow Creek near Fairview, Wyo.	a115	1946-49; 1961-67.	
0272	Bear Canyon near Freedom, Wyo.	a3.3	....	1961-
0275	Salt River above reservoir, near Etna, Wyo	829	1953-	
0280	Salt River near Alpine, Idaho	878	1917-18.	
0285	Salt River at Wyoming-Idaho State line	890	1933-55.	
0290	Snake River near (at) Alpine, Wyo (Idaho)	4,841	1916-18;1934.	
0295	McCoy Creek above reservoir, near Alpine, Idaho (near Alpine, Wyo)	108	1917-18;1934;1953-61........	1962-
0300	Indian Creek above reservoir, near Alpine (near Blowout), Idaho	36.8	1917-18;1953-61.............	1962-
0305	(Big) Elk Creek above reservoir, near Irwin (Blowout), Idaho	59.2	1917-18;1934;1953-61........	1962-
0310	Little Elk Creek near Blowout, Idaho	11.4	1917.	
0315	Snake River at Calamity Point, near Irwin, Idaho	5,124	1934-36;1939-41.	
0320	Bear Creek above reservoir, near Irwin, Idaho	77.1	1917-18;1934-36;1953-	
0324.5	Palisades Reservoir near Irwin, Idaho	5,208	1955-	
0325	Snake River near Irwin, Idaho	5,225	1935-36;1949-	
0330	Palisades Canal near Irwin, Idaho	-	1935-36.	
0335	Palisades Creek near Irwin, Idaho	60.8	1917-18;1934-36.	
0340	Fall Creek near Swan Valley, Idaho	77.6	1917-18;1934-36.	
0345	Rainy Creek near (at) Swan Valley, Idaho	56.3	1917-18;1934-36.	
0350	(South Fork) Snake River near Swan Valley (Lyon), Idaho	5,488	1903-11;1934.	
0355	Pine Creek near Swan Valley, Idaho	63.2	1917-18;1934-36.	
0360	Snake River at Dry Canyon, near Swan Valley, Idaho	5,616	1934-36.	
0365	Burns Creek near Chokecherry (Heise), Idaho	21.1	1917;1934-36.	
0370	Snake River below Burns Creek, near Chokecherry, Idaho	5,659	1935.	
0375	(South Fork) Snake River near Heise, Idaho	5,752	1910-	
0380	Great Feeder Canal near Ririe, Idaho	-	1923-27.	
0385	Snake River at Lorenzo, Idaho	5,810	1924-27.	
0389	Targhee Creek near Macks Inn, Idaho	a20	....	1963-
0390	Henrys Lake near Lake, Idaho	99.3	1923-	
0395	Henrys Fork near Lake, Idaho	99.3	1920-	
0400	Henrys Fork near Big Springs, Idaho	166	1932.	
0405	Big Springs Creek at Big Springs, Idaho	-	1924-25.	
0410	Henrys Fork at Coffee Pot Rapids, near Island Park, Idaho	261	1935-40.	
0415	Sheridan Creek near Island Park, Idaho	82.1	1935-40.	
0420	Island Park Reservoir near Island Park, Idaho	481	1938-	
0425	Henrys Fork near Island Park, Idaho	481	1933-	
0430	Buffalo River near Island Park, Idaho	36.7	1935-41.	
0435	Henrys Fork at De Winers Ranch, near Island Park, Idaho	523	1935-40.	
0440	Henrys Fork (North Fork Snake River) at Warm River, Idaho	656	1910-15;1918-52.	
0445	Warm River at Warm River, Idaho	178	1912-15;1918-32.	
0450	Wyoming Creek near Squirrel, Idaho	4.7	1931-32.	
0455	Robinson Creek at Warm River, Idaho	129	1912-15;1918-32.	
0460	Henrys Fork (in canyon, above Fall River) (North Fork Snake River) near Ashton (Ora), Idaho	1,040	1890-91;1902-9;1920-	
0465	Grassy Lake near Moran, Wyo.	10.4	1939-	
0470	Diversions from Falls River above gaging station, near Squirrel, Idaho	-	1919-	
0475	Falls (Fall) River near Squirrel (at Wilson's Mill, near Marysville) (near Marysville) (at Fremont), Idaho	351	1902-3*;1904-9;1918-	
0478	North Fork Squirrel Creek near Squirrel, Idaho	2.40	1961-67.	
0480	Squirrel Creek near Squirrel, Idaho	a17	1932.	
0485	Falls (Fall) River in Canyon, Idaho	510	1890-91.	
0490	Diversions from Falls River between Squirrel, Idaho and Chester gaging stations, Idaho	-	1919-	

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13-				
0495	Falls (Fall) River near Chester, Idaho	a 520	1920-	
0500	Diversions from Henrys Fork between Ashton and St. Anthony gaging stations, Idaho	-	1919-	
0505	Henrys Fork at St. Anthony, Idaho	a1,770	1919-	
0507	Mail Cabin Creek near Victor, Idaho	3.27	....	1962-
0508	Moose Creek near Victor, Idaho	21.4	....	1962-
0510	Teton River near Victor, Idaho	47.6	1946-52.	
0515	Teton Creek near Driggs, Idaho	33.8	1946-52.	
0520	Teton River near Driggs, Idaho	303	1935-40.	
0522	Teton River above South Leigh Creek, near Driggs, Idaho	a 335	1961-	
0525	Horseshoe Creek near Driggs, Idaho	11.7	1946-52 .	
0530	Packsaddle Creek near Tetonia, Idaho	a 5.7	1946-50.	
0535	Spring Creek near Tetonia, Idaho	-	1946-50.	
0540	Teton River near Tetonia, Idaho	471	1929-32;1934-37;1940-57.	
0544	Milk Creek near Tetonia, Idaho	14.1	....	1962-
0545	Canyon Creek near Newdale, Idaho	a 68	1920-25;1938-39.	
0550	Teton River near St. Anthony (Wilford) (at Chases Ranch), Idaho	a 890	1890-93;1903-9;1920-	
0555	Diversions from Teton River between St. Anthony, Idaho gaging station and mouth, Idaho	-	1919-	
0560	Diversions from Henrys Fork between St. Anthony, Idaho and Rexburg gaging stations, Idaho	-	1919-	
0565	Henrys Fork (North Fork Snake River) near Rexburg , Idaho	a 2,920	1909-	
0570	Snake River near Menan, Idaho	8,820	1923.	
0573	Grays Lake Diversion to Blackfoot River Basin, near Wayan, Idaho	-	1927-43;1945;1947;1949-50;1966-	
0574	Grays Lake near Wayan, Idaho	137	1966-	
0575	Grays Lake Outlet near Herman, Idaho	137	1916-25;1966-	
0576	Homer Creek near Herman, Idaho	24.6	....	1963-
0580	Willow Creek near Ririe (Prospect), Idaho	627	1903-4;1916-25;1928;1962-	
0585	Willow Creek near Iona, Idaho	-	1916-25.	
0590	Snake River at Idaho Falls, Idaho	9,760	1889-94.	
0595	Diversions from Snake River between Heise and Shelley gaging stations, Idaho	-	1919-	
0600	Snake River near Shelley, Idaho	a 9,790	1915-	
0605	Idaho (Government) Canal near Shelley, Idaho	-	1912-18.	
0610	Idaho (Government) Canal near Firth, Idaho	-	1914-18.	
0611	Snake River tributary near Osgood, Idaho	7.64	....	1961-
0615	SnakeRiver at Firth, Idaho	a 9,890	1914-15.	
0620	Snake River at Porterville Bridge, near Blackfoot, Idaho	a 9,940	1916;1918-23.	
0625	Snake River below Blackfoot Bridge, near Blackfoot, Idaho	9,950	1924-32.	
0627	Angus Creek near Henry, Idaho	13.9	....	1963-
0630	Blackfoot River above reservoir, near Henry, Idaho	a346	1914-25;1967-	
0635	Little Blackfoot River at Henry, Idaho	38.8	1914-25.	
0645	Meadow Creek near Henry, Idaho	75.2	1914-25.	
0650	Blackfoot River (Marsh) Reservoir near Henry, Idaho	581	1912-25;1929-	
0655	Blackfoot River near Henry (Rossford), Idaho	583	1908-25.	
0660	Blackfoot River near Shelley, Idaho	909	1909-45;1947-50.	
0665	Blackfoot River near Presto, Idaho	926	1903-9.	
0670	Sand Creek near Firth, Idaho	-	1917-24.	
0675	Fort Hall Upper Canal near Blackfoot, Idaho	-	1912-50.	
0680	Fort Hall Lower Canal near Blackfoot, Idaho	-	1912-50.	
0685	Blackfoot River near Blackfoot, Idaho	1,295	1913-	
0690	Diversions from Snake River between Shelley and Blackfoot (Bridge) (Porterville) (Clough Ranch) gaging stations	-	1919-	
0695	Snake River (at Clough Ranch) near Blackfoot, Idaho	a11,310	1910-	
0700	Portneuf River above reservoir, near Chesterfield, Idaho	a68	1912-14.	
0705	Portneuf diversion channel near Chesterfield, Idaho	-	1914.	
0710	Portneuf River below reservoir, near Chesterfield, Idaho	a92	1912-15.	
0715	Topons Creek near Chesterfield, Idaho	45.7	1912-14.	
0720	Portneuf River near Peeble, Idaho	261	1910-13; 1968-	
0725	Pebble Creek near Pebble, Idaho	27.2	1911-14.	
0730	Portneuf River at Topaz, Idaho	h570	1913-15;1919-	

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13-				
0735	Portneuf River at McCammon, Idaho	a595	1896.	
0737	Robbers Roost Creek near McCammon, Idaho	a5.7	....	1961-
0740	Birch Creek near Downey, Idaho	6.56	1911-14;1937-49.	
0745	Birch Creek powerplant tailrace near Malad City, Idaho	-	1928.	
0750	Marsh Creek near McCammon, Idaho	355	1954-	
0753	East Fork Mink Creek near Pocatello, Idaho	14.7	....	1963-
0755	Portneuf River at Pocatello, Idaho	1,250	1897-99;1911-	
0756	North Fork Pocatello Creek near Pocatello, Idaho	14.0	....	1961-
0757	South Fork Pocatello Creek near Pocatello, Idaho	4.3	1960-70.	
0759	Fort Hall Michaud Canal near Pocatello, Idaho	-	1964-	
0760	Bannock Creek near Pocatello, Idaho	230	1955-58	
0764	Michaud Canal at American Falls, Idaho	-	1957-	
0765	American Falls Reservoir at American Falls, Idaho	13,580	1926-	
0770	Snake River at Neeley, Idaho	a13,600	1906-	
0775	Rock Creek near Rockland, Idaho	182	1955-60.	
0776	East Fork Rock Creek near Rockland, Idaho	13.7	1960-64.	
0776.59	Raft River near Yost, Utah	146		1965-67.
0777	George Creek near Yost, Utah	7.84	1959-	
0780	Raft River at Peterson Ranch, near Bridge, Idaho	412	1946-53;1955-	
0785	Raft River near Bridge, Idaho	505	1909-15.	
0790	Clear Creek near Naf, Idaho	20.2	1910-11;1912*;1944-	
0790.7	Meadow Creek near Sublett, Idaho	36.8		1965-
0791	Cassia Creek above Stinson Creek, near Elba, Idaho	a7.2	1965-	
0792	Cassia Creek near Elba, Idaho	a84	1956-62....................	1963-67.
0795	Cassia Creek near Conant, Idaho	104	1909-12.	
0796	Sublett Creek at Sublett campground, near Sublett, Idaho	a24	1965-67.	
0798	Heglar Canyon tributary near Rockland, Idaho	7.72	....	1958;1962-
0800	North Side Minidoka Canal near Minidoka, Idaho	-	1908-	
0805	South Side Minidoka Canal near Minidoka, Idaho	-	1908-	
0810	Lake Walcott near Minidoka, Idaho	a15,700	1909-	
0815	Snake River near Minidoka, Idaho	a15,700	1910-	
0820	Snake River (at Montgomery Ferry) near Minidoka, Idaho	a15,730	1895-1910.	
0823	Marsh Creek near Albion, Idaho	a86	1966-	
0825	Goose Creek above Trapper Creek, near Oakley, Idaho	633	1911-16;1919-	
0830	Trapper Creek near Oakley, Idaho	53.7	1911-16;1919-	
0835	Oakley Reservoir near Oakley, Idaho	729	1912-	
0840	Goose Creek near Oakley, Idaho	a670	1909-11.	
0845	Birch Creek near Oakley, Idaho	a37	1912-16.	
0855	Minidoka North Side Pump Canal near Burley, Idaho	-	1956-	
0858	P. A. lateral near Milner, Idaho	-	1915-	
0860	Milner low-lift canal (Murtaugh Canal) near Milner, Idaho	-	1919-	
0865	Gooding Canal at Milner, Idaho	-	1929-	
0870	North Side Twin Falls Canal at Milner, Idaho	-	1909-	
0875	South Side Twin Falls Canal at Milner, Idaho	-	1909-	
0879	Lake Milner at Milner, Idaho	-	1911-27;1927- i	
0880	Snake River at Milner, Idaho	a17,180	1909-	
0885	Big Cottonwood Creek near Oakley, Idaho	a29	1909-15.	
0890	Dry Creek near Artesian City, Idaho	a42	1912.	
0895	Devils Washbowl Spring near Kimberly, Idaho	-	1950-59.	
0900	Snake River near Kimberly, Idaho	-	1923-	
0905	Snake River near Twin Falls, Idaho	-	1911-17;1919-47.	
0910	Blue Lakes Spring near Twin Falls, Idaho	-	1950-	
0915	Blue Lakes Outlet near Twin Falls, Idaho	-	1913-16*;1917-20;1921-47*.	
0920	Rock Creek near Rock Creek, Idaho	a80	1909-13;1938-39;1943-	
0925	McMullen Creek near Rock Creek, Idaho	22.7	1910;1912.	
0930	Rock Creek near Twin Falls, Idaho	277	1922-47.	
0935	Cedar Draw near Filer, Idaho	-	1955-58.	
0937	Niagara Springs near Buhl, Idaho	-	1958-	
0940	Snake River near Buhl, Idaho	-	1946-	
0945	Clear Lakes Outlet near Buhl, Idaho	-	1917-20.	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figure (calendar years)	Period of Record: Annual peaks (water years)
13-				
0950	Deep Creek near Buhl, Idaho	-	1955-58.	
0955	Box Canyon Springs near Wendell, Idaho	-	1950-	
0960	Salmon Falls Creek above upper Vineyard ditch, near Contact, Nev.	461	1914-15;1948-62.	
1040	Shoshone Creek near San Jacinto, Nev.	309	1914-15.	
1050	Salmon Falls Creek near San Jacinto, Nev.	a1,450	1909*;1910-16;1918-	
1053	Salmon Falls Creek tributary near Rogerson, Idaho	a4	....	1961-
1055	Salmon Falls Creek near Twin Falls, Idaho	a1,560	1909-10.	
1060	Salmon River Canal Co. canal near Rogerson, Idaho	-	1937-	
1065	Salmon River Canal Co. reservoir near Rogerson, Idaho	a1,610	1922-	
1066	Cedar Creek above reservoir, near Roseworth, Idaho	a36	1961-68.	
1066.5	House Creek near Roseworth, Idaho	a40	1961-68.	
1067	Cedar Creek Reservoir near Roseworth, Idaho	128	1957-65.	
1070	Cedar Creek near Roseworth, Idaho	a130	1909-14;1916;1957-67.	
1075	Devil Creek near Three Creek, Idaho	11.5	1912-14;1916.	
1080	Salmon Falls Creek near Buhl, Idaho	a2,100	1955-58;1960-61.	
1081.5	Salmon Falls Creek near Hagerman, Idaho	a2,120	1970-	
1085	Camas Creek at Eighteenmile shearing corral, near Kilgore, Idaho	210	1937-53; 1968-	
1090	Camas Creek near Kilgore (Dubois), Idaho	215	1921-27;1930.	
1095	Woods No. 1 ditch near Kilgore, Idaho	-	1930.	
1100	Woods Woodie ditch near Kilgore, Idaho	-	1930.	
1105	Lone Tree Reservoir near Kilgore, Idaho	-	1930*.	
1110	Camas Creek below Lone Tree Reservoir, near Kilgore, Idaho	a220	1930.	
1115	Camas Creek near Camas, Idaho	285	1921-26.	
1120	Camas Creek at Camas, Idaho	a400	1925-	
1125	Beaver Creek near Spencer, Idaho	115	1938-40.	
1129	Huntley Canyon at Spencer, Idaho	3.91	....	1962-
1130	Beaver Creek at Spencer, Idaho	a120	1940-52; 1968-	
1135	Beaver Creek at Dubois, Idaho	a220	1921-	
1140	Beaver Creek at Camas, Idaho	a510	1921-	
1145	Camas Creek near Hamer, Idaho	a880	1912-13.	
1150	Mud Lake near Terreton, Idaho	a1,130	1921-	
1155	Medicine Lodge Creek near Argora, Idaho	a160	1938-43.	
1160	Medicine Lodge Creek at Ellis Ranch, near Argora, Idaho	165	1940-	
1165	Medicine Lodge Creek near Small, Idaho	a270	1921-23;1940-49.	
1170	Birch Creek near Reno (Kaufman), Idaho	a320	1910-12;1921-23;1950-63.	
1170.2	Birch Creek at Blue Dome Inn, near Reno, Idaho	a380	1967-	
1170.3	Birch Creek at Eight-Mile Canyon Road, near Reno, Idaho	a400	1967-	
1172	Main Fork near Goldburg, Idaho	15.6	....	1962-
1173	Sawmill Creek near Goldburg, Idaho	74.3	1960-	
1175	Little Lost River near Clyde, Idaho	275	1910-13.	
1180	Little Lost River at Raymond Ranch, near Howe, Idaho	305	1921-24.	
1184	Wet Creek below Coal Creek, near Mackay, Idaho	11.2	....	1962-
1185	Wet Creek at Clyde School, near Howe, Idaho	115	1921-22;1923*.	
1187	Little Lost River below Wet Creek near Howe, Idaho	a440	1958-	
1190	Little Lost River near Howe, Idaho	703	1921-	
1195	Blaine County Investment Co's canal near Howe, Idaho	-	1924-	
1200	North Fork Big Lost River at Wild Horse, near Chilly, Idaho	114	1944-	
1205	Big Lost River at Howell Ranch, near Chilly, Idaho	450	1904-14;1920-	
1210	Big Lost River below Chilly Canal, near Chilly, Idaho	493	1921-22.	
1215	Big Lost River at Chilly Bridge, near Chilly, Idaho	502	1920.	
1220	Thousand Springs Creek near Chilly, Idaho	145	1912-14;1921-22.	
1225	Big Lost River below Chilly Sinks, near Chilly, Idaho	-	1921-22.	
1230	Big Lost River (back channel) below Chilly Sinks, near Chilly, Idaho	-	1921.	
1235	Big Lost River (east channel) above Mackay Reservoir, near Mackay, Idaho	-	1919-59.	
1240	Big Lost River (west channel) above Mackay Reservoir, near Mackay, Idaho	-	1919-59.	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
1245	Warm Spring Creek (east channel) near Mackay, Idaho	-	1919-59.	
1250	Warm Spring Creek (west channel) near Mackay, Idaho	-	1919-59.	
1255	Surface inflow to Mackay Reservoir, near Mackay, Idaho	766	1919-59.	
1260	Mackay Reservoir near Mackay, Idaho	788	1919-	
1265	Sharp ditch near Mackay, Idaho	-	1912-14;1919-69.	
1270	Big Lost River below Mackay Reservoir, near Mackay (near Mackay), Idaho	813	1903-6;1912-15;1919-	
1275	Streeter ditch near Mackay, Idaho	-	1913-14.	
1280	Cedar Creek above forks, near Mackay, Idaho	a4.1	1911-13.	
1285	Cedar Creek below forks, near Mackay, Idaho	a6.1	1911-13.	
1289	Lower Cedar Creek (Cedar Creek) above diversions, near Mackay, Idaho	8.26	1966-	1963-66
1290	Clark ditch near Mackay, Idaho	-	1920-22.	
1295	Cedar Creek (below powerplant) near Mackay, Idaho	a8.4	1920-22.	
1298	Alder Creek below South Fork, near Mackay, Idaho	27.6	1966- 68.	
1300	Alder Creek near Mackay, Idaho	a37	1920-22.	
1305	Big Lost River at Leslie, Idaho	a1,020	1919-22.	
1309	Antelope Creek above Willow Creek, near Darlington, Idaho	93.4	1966-	
1310	Antelope Creek near Darlington, Idaho	210	1913-16;1920-22.	
1315	Pass Creek near Leslie, Idaho	23.6	1920-22.	
1320	Big Lost River near Moore, Idaho	a1,310	1919-26.	
1325	Big Lost River near Arco, Idaho	a1,410	1946-61;1966-	
1330	Riley Creek Springs near Hagerman, Idaho	-	1950-51.	
1335	Brailsford ditch near Hagerman, Idaho	-	1951-59.	
1340	Riley Creek below Lewis Spring, near Hagerman, Idaho	-	1951-59.	
1345	Snake River near Hagerman, Idaho	-	1912-41.	
1350	Snake River below Lower Salmon Falls, near Hagerman, Idaho	-	1937-	
1352	Prairie Creek near Ketchum, Idaho	a18	....	1962-
1355	Big Wood River near Ketchum, Idaho	137	1948-	
1358	Adams Gulch near Ketchum, Idaho	10.9	....	1962-
1360	Big Wood River at Ketchum, Idaho	240	1920-21.	
1365	Warm Springs Creek at Guyer Hot Springs, near Ketchum, Idaho	a96	1940-59.	
1370	Warm Springs Creek near Ketchum, Idaho	a97	1920-21.	
1375	Trail Creek at Ketchum, Idaho	a67	1920-21.	
1380	East Fork Big Wood River at Gimlet, Idaho	-	1920-21.	
1385	Big Wood River at Gimlet, Idaho	438	1904-5*;1920-21.	
1390	Big Wood Slough at Hailey, Idaho	-	1915- 67.	
1395	Big Wood (Wood) River at Hailey, Idaho	a640	1889;1915- 67.	
1395.1	Big Wood River and Big Wood Slough combined discharge, at Hailey, Idaho	a640	1889;1915-	
1405	Big Wood River at Glendale Bridge, near Bellevue , Idaho	665	1920-21.	
1410	Big Wood River near Bellevue, Idaho	823	1911-	
1414	Deer Creek near Fairfield, Idaho	13.2	....	1961-
1415	Camas Creek (Malad River) near Blaine, Idaho	648	1912-21;1923-	
1420	Magic Reservoir near Richfield, Idaho	a1,600	1909-	
1425	Big Wood River below Magic Dam, near Richfield, Idaho	a1,600	1911-	
1430	Lincoln Canal near Richfield, Idaho	-	1925-48.	
1435	Lincoln Canal near Shoshone, Idaho	-	1925-48.	
1440	Big Wood River above North Gooding Canal, near Shoshone, Idaho	a1,770	1921-39.	
1445	Big Wood River below North Gooding Canal, near Shoshone, Idaho	a1,780	1911-39.	
1450	Big Wood River near Shoshone, Idaho	a1,860	1905-6;1908-13.	
1455	Big Wood River above Thorn Creek, near Gooding, Idaho	a1,940	1926-27.	
1457	Schooler Creek near Gooding, Idaho	2.22	....	1961-
1460	Thorn Creek Spillway near Gooding, Idaho	-	1928-48.	
1465	Big Wood (Malade) River at Gooding (Toponis), Idaho	a2,190	1896-99;1921-48.	
1470	Dry Creek near Blanche, Idaho	a34	1911-14.	
1473	Muldoon Creek near Garfield guard station, Idaho	12.2	....	1963-
1475	Muldoon Creek near Muldoon, Idaho	124	1925.	

Table A-1. Current and discontinued gaging stations in Idaho and adjacent areas.--Continued

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
1479	Little Wood River above High Five Creek, near Carey, Idaho	248	1958-	
1480	Little Wood River at Campbell Ranch, near Carey (near Carey), Idaho	267	1920-26;1941-42;1944-58.	
1482	Little Wood Reservoir near Carey, Idaho	279	1955-	
1484	Little Wood River below reservoir, near Carey, Idaho	280	1955-58.	
1485	Little Wood River near Carey, Idaho	312	1904-5*;1926-	
1490	Fish Creek above dam, near Carey, Idaho	a32	1920-39.	
1495	West Fork Fish Creek near Carey, Idaho	13.8	1920-22;1924-29.	
1500	Fish Creek near Carey, Idaho	62.9	1919-20;1923-39.	
1504	Loving Creek near Gannett, Idaho	-	1962-63.	
1505	Silver Creek near Picabo, Idaho	a88	1920-62.	
1510	Little Wood River near Richfield, Idaho	a570	1911-	
1515	Little Wood River at Shoshone, Idaho	a620	1922-59.	
1520	Little Wood River at Toponis (Gooding), Idaho	a680	1896-97;1899.	
1525	Big Wood (Malad) River near Gooding, Idaho	a2,990	1916-	
1530	King Hill Canal near Hagerman, Idaho	-	1930-	
1535	Malad (Malade) River near Bliss, Idaho	a3,000	1899.	
1540	Clover Creek near Bliss, Idaho	140	1938-43;1957-62............	1963-
1545	Snake River at King Hill, Idaho	a 35,800	1909-	
1550	King Hill Creek near King Hill, Idaho	83.6	1913;1938-41.	
1552	Burns Gulch near Glenns Ferry, Idaho	.76	....	1961-
1553	Little Canyon Creek at Stout Crossing near Glenns Ferry, Idaho	14.2	1965-	1961-65.
1553.5	Morrow Reservoir feeder canal near Glenns Ferry	-	1962-65.	
1554	Little Canyon Creek at Berry Ranch, near Glenns Ferry, Idaho	26.9	1960-65.	
1555	Little Canyon Creek near (at) Glenns Ferry, Idaho	52.4	1909-13;1939-43.	
1560	Cold Springs Creek near Hammett, Idaho	a65	1909-13.	
1565	Bennett Creek near Bennett, Idaho	21.3	1938-45.	
1570	Bennett Creek near Hammett (Medbury), Idaho	68.6	1909-13.	
1575	Rattlesnake Creek near Mountain Home, Idaho	a27	1917.	
1580	Willowdale Creek near Bennett, Idaho	5.04	1917.	
1585	Long Tom Reservoir near Bennett, Idaho	-	1924-25*.	
1590	Long Tom Creek below Long Tom Reservoir, near Bennett, Idaho	18.6	1917;1924-26.	
1595	Syrup Creek near Mountain Home, Idaho	32.6	1917.	
1600	Canyon Creek near Mountain Home, Idaho	90.9	1917.	
1605	Mountain Home feeder canal near Mountain Home, Idaho	-	1924-29;1931-69.	
1610	Mountain Home cooperative canal near Mountain Home, Idaho	-	1924-29;1930-47.	
1615	Bruneau River near Rowland, Nev.	a380	1913-18;1967-	1962-66.
1616	McDonald Creek near Rowland, Nev.	a11	....	1963-
1620	Bruneau River near Tindall, Idaho	a440	1910-12.	
1623	Jarbidge River near Murphy Hot Springs, Idaho	-	....	1963-65.
1624	Buck Creek near Jarbidge, Nev.	a 14	....	1963-
1625	East Fork Jarbidge River near Three Creek, Idaho	84.6	1928-33;1953-	
1626	Columbet Creek near Jarbidge, Nev.	a3.4	....	1963-
1627	Bruneau River near Grasmere, Idaho	-	....	1963-65.
1630	Sheep Creek near Tindall, Idaho	a 180	1910-13.	
1631	Cat Creek near Rowland, Nev.	-	....	1963-66.
1632	Sheep Creek near Grasmere, Idaho	-	....	1962-65.
1635	Marys Creek near Owyhee, Nev.	a 27	1913-15.	
1640	Marys Creek at Tindall, Idaho	a 110	1910-13.	
1641	Marys Creek near Grasmere, Idaho	-	....	1962-65.
1645	Louse Creek near Wickahoney, Idaho	a 76	1911.	
1650	Big Flat Creek (published as East Fork Bruneau River) near Three Creek, Idaho	a62	1912-14; 1916.	
1652	Big Flat Creek near Three Creek, Idaho	-	....	1963-66.
1653	Deer Creek near Three Creek, Idaho	-	....	1963-65.
1655	Three Creek near Three Creek, Idaho	a45	1912-14;1916.	
1660	Cherry Creek near Three Creek, Idaho	a22	1912-14;1916.	
1665	Deadwood Creek near Three Creek, Idaho	a22	1912-14;1916.	
1670	East Fork Bruneau River below Three Creek, near Three Creek (near Three Creek), Idaho	a210	1953-60....................	1962-65.
1673	East Fork Bruneau River tributary near Roseworth, Idaho	-	....	1963-65.

Table A-1. Current and discontinued gaging stations in Idaho and adjacent areas.--Continued

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
1675	East Fork Bruneau River near Hot Spring, Idaho	a620	1910-15;1948-	
1680	Bruneau River near Winter Camp Ranch, Idaho	a1,890	1946-51.	
1685	Bruneau River near Hot Spring, Idaho	a2,630	1909-15;1943-	
1690	Buckaroo ditch at Hot Spring, Idaho	-	1912-14.	
1695	Big Jacks Creek near Bruneau, Idaho	253	1938-49;1965-	
1700	Little Jacks Creek near Bruneau, Idaho	100	1938-49.	
1701	Sugar Creek tributary near Grasmere, Idaho	4.73	....	1961-
1705	Grandview Canal near Grand View, Idaho	-	1912-15.	
1710	Bruneau River near Grand View, Idaho	a3,270	1895-1903;1909-16;1945-49	
1715	C. J. Strike Reservoir near Grandview, Idaho	-	1952-67.	
1720	Castle Creek near Castle Creek, Idaho	a150	1910-11.	
1722	Fossil Creek near Oreana, Idaho	19.7	....	1961-
1725	Snake River near Murphy, Idaho	a41,900	1912-	
1728	Little Squaw Creek tributary near Marsing, Idaho	1.81	....	1961-
1730	Sucker Creek near Homedale, Idaho	342	1919-23.	
1735	Sucker (Succor) Creek at mouth, near Homedale, Idaho	413	1903-10.	
1780	Jordan Creek above Lone Tree Creek, near Jordan Valley, Oreg.	a440	1945-53;1955-	
1842	Roaring River near Rocky Bar, Idaho	a24	....	1963-
1845	Middle Fork Boise River near Twin Springs, Idaho	382	1946-50.	
1848	Beaver Creek near Lowman, Idaho	a9.3	....	1962-
1850	Boise River near Twin Springs, Idaho	a830	1911-	
1855	Cottonwood Creek at (near) Arrowrock Reservoir, Idaho	21.4	1914-18;1939-41.	
1860	South Fork Boise River near Featherville, Idaho	635	1945-	
1865	Lime Creek near Bennett, Idaho	131	1945-56.	
1870	Fall Creek near Anderson Ranch Dam, Idaho	55.3	1945-56.	
1875	Little Camas Creek at Little Camas Store, Idaho	-	1896*.	
1880	Little Camas Reservoir near Bennett, Idaho	31.8	1924-39*.	
1885	Little Camas Creek below reservoir, near Bennett, Idaho	31.8	1917.	
1890	Little Camas Canal at heading, near Bennett, Idaho	-	1917;1923-	
1895	Little Camas Canal below (above) Tunnel No. 9, near Bennett, Idaho	-	1917;1923-26.	
1900	Anderson Ranch Reservoir at Anderson Ranch Dam, Idaho	a980	1945-	
1905	South Fork Boise River at Anderson Ranch Dam, Idaho	982	1943-	
1910	South Fork Boise River near Lenox (Prairie), Idaho	a1,090	1911-47.	
1915	Smith Creek near Lenox, Idaho	50.3	1916-17.	
1920	Long Gulch Creek near Lenox, Idaho	10.5	1916.	
1925	Rattlesnake Creek near Lenox, Idaho	46.0	1915-17.	
1930	Willow Creek near Lenox, Idaho	55.1	1916-17.	
1935	Grouse Creek near Arrowrock, Idaho	8.0	1939-41.	
1940	Arrowrock Reservoir at Arrowrock, Idaho	a2,210	1917-	
1945	Boise River at Dowling Ranch, near Arrowrock, Idaho	a2,220	1911-55.	
1950	Gold Hill placer diversion from Moore Creek, near Idaho City, Idaho	-	1939-41.	
1955	Moore Creek above Granite Creek, near Idaho City, Idaho	37.0	1939-41.	
1960	Granite Creek near Idaho City, Idaho	a4.8	1939-41.	
1965	Bannock Creek near Idaho City, Idaho	5.75	1939-41;1950-	
1970	Pine Creek above Barry placer diversion, near Idaho City, Idaho	6.1	1940-41.	
1975	Pine Creek near Idaho City, Idaho	a6.5	1939-40.	
1980	Elk Creek above Gold Hill placer diversion, near Idaho City, Idaho	13.1	1940-41.	
1985	Elk Creek near Idaho City, Idaho	22.3	1939-40.	
1990	Moore Creek above Thorn Creek, near Idaho City, Idaho	119	1939-41.	
1995	Grimes Creek near New Centerville (Centerville), Idaho	a140	1909-10*;1966.	
2000	Mores (Moore) Creek above Robie Creek, near Arrowrock Dam (Arrowrock), Idaho	399	1950-	
2005	Robie Creek near Arrowrock Dam (Arrowrock), Idaho	15.8	1950-	
2010	Mores (Moore) Creek near Arrowrock, Idaho	426	1914*;1915-55.	
2015	Lucky Peak Reservoir near Boise, Idaho	a2,680	1954-	
2020	Boise River (below Moore Creek) near Boise, Idaho (Highland) (Arrowrock), Idaho	2,680	1895-1916;1950-53*;1954-	
2030	New York Canal near Barber, Idaho	-	1939-48.	

Table A-1. Current and discontinued gaging stations in Idaho and adjacent areas.--Continued

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
2035	Lake Lowell (Deer Flat Reservoir) near Caldwell, Idaho	-	1917-	
2037	Boise River at Barber, Idaho	a 2,690	1936;1937*.	
2040	Boise River below Ridenbaugh Canal, at Barber, Idaho	-	1938-39*.	
2045	Diversions from Boise River between near Boise (Dowling Ranch) and at Boise gaging stations, Idaho	-	1919-	
2050	Cottonwood Gulch at Boise, Idaho	16.0	1939-41.	
2055	Boise River at Boise, Idaho	2,760	1938-39*;1940-	
2060	Boise River at Strawberry Glen Bridge, near Boise, Idaho	a 2,800	1938-40.	
2065	Spring Valley Creek (Spring Creek) near Boise, Idaho	a 20	1911-12.	
2070	Spring Valley Creek near Eagle, Idaho	20.9	1954-	
2075	Dry Creek near Eagle, Idaho	59.4	1954-68	
2080	Dry Creek at Eagle, Idaho	66.4	1954-57.	
2085	Boise River (north channel) near Eagle, Idaho	-	1935-38.	
2090	Boise River (north channel) at Linder Bridge, near Eagle, Idaho	-	1938-39*.	
2095	Boise River (south channel) near Eagle, Idaho	-	1935-38.	
2100	Boise River at Star, Idaho	-	1938-39*.	
2103	Bryans Run near Boise, Idaho	7.03	....	1961-
2105	Boise River at Middleton, Idaho	-	1938-39*.	
2110	Boise River near (at) Caldwell, Idaho	a3,220	1895;1938-39*.	
2115	Drains crossing Phyllis canal to Boise River, Idaho	-	1935-38.	
2120	Diversions from Boise River between at Boise and Notus gaging stations, Idaho	-	1919-	
2125	Boise River at Notus, Idaho	a3,820	1920-	
2130	Boise River near Parma, Idaho	-	1938-39*.	
2343	Five Mile Creek near Lowman, Idaho	a7.8	....	1962-
2345	Clear Creek at Lowman, Idaho	59.6	1941-49.	
2350	South Fork Payette River at Lowman, Idaho	456	1941-	
2351	Rock Creek at Lowman, Idaho	14.6	....	1962-
2355	Deadwood River near Bernard, Idaho	10.4	1929-32.	
2360	Deadwood Reservoir near Lowman, Idaho	112	1935-	
2365	Deadwood River below Deadwood Reservoir (at Beaver Creek ranger station), near Lowman, Idaho	112	1926-	
2370	Deadwood River near Lowman, Idaho	a230	1921-53.	
2373	Danskin Creek near Grimes Pass, Idaho	10.1	....	1962-
2375	South Fork Payette River near Garden Valley, Idaho	779	1921-60.	
2376	Cabin Creek near Smiths Ferry, Idaho	.42	1960-67.	
2377	Control Creek near Smiths Ferry, Idaho	.59	1963-67.	
2380	(South Fork) Payette River near Banks, Idaho	a 1,200	1921-	
2383	Deep Creek near McCall, Idaho	a4.0	....	1962-
2385	Payette Lake at McCall (Lardo), Idaho	144	1921-	
2390	North Fork Payette River at McCall (Lardo), Idaho	144	1908-17;1919-	
2395	Fish hatchery diversion at McCall, Idaho	-	1942-53.	
2400	Lake Fork Payette River above Jumbo Creek, near McCall, Idaho	48.9	1945-	
2405	Lake Fork Payette River above reservoir, near McCall, Idaho	54.6	1926-45.	
2410	Lake Fork Reservoir near McCall, Idaho	a64	1926-	
2415	Lake Fork Payette River near McCall, Idaho	a64	1909-14.	
2420	Lake Irrigation District Canal near McCall, Idaho	-	1926-	
2425	Lake Fork Payette River below Lake Irrigation District Canal, near McCall, Idaho	a64	1940-	
2430	Cruzen Canal at Lake Fork, Idaho	-	1938-48.	
2435	Gold Fork River (Gold Fork Payette River) near Roseberry, Idaho	143	1920-21;1961-	
2440	North Fork Payette River at VanWyck, Idaho	608	1912-16;1919*;1920-24.	
2445	Cascade Reservoir at Cascade, Idaho	620	1948-	
2450	North Fork Payette River at Cascade, Idaho	620	1941-	
2454	Tripod Creek at Smiths Ferry, Idaho	8.63	....	1962-
2455	North Fork Payette River near Smiths Ferry, Idaho	893	1941-47.	
2460	North Fork Payette River near Banks, Idaho	933	1947-	
2465	Payette River at Banks, Idaho	a2,120	1922-29.	
2470	Porter Creek near Gardena, Idaho	21.2	1938-45.	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
2475	Payette River near Horseshoe Bend, Idaho	a2,230	1906-16;1919-	
2480	Shafer Creek near Horseshoe Bend, Idaho	a28	1911-12.	
2485	Harris Creek near Horseshoe Bend, Idaho	a17	1911-12.	
2489	Cottonwood Creek near Horseshoe Bend, Idaho	6.53	....	1961-
2490	Squaw Creek near Gross, Idaho	a21	1925-27.	
2495	Payette River near Emmett, Idaho	a2,680	1925-	
2500	Payette River near Letha, Idaho	a2,760	1952-53.	
2505	Payette River near New Plymouth, Idaho	a2,850	1952-53.	
2506	Big Willow Creek near Emmett, Idaho	47.4	1961-	
2506.5	Fourmile Creek near Emmett, Idaho	a6.5	....	1962-
2507	Langley Gulch near New Plymouth, Idaho	a3.9	....	1961-
2510	Payette River near Payette, Idaho	a3,240	1935-	
2513	West Branch Weiser River near Tamarack, Idaho	3.96	1959-	
2515	Weiser River at Tamarack, Idaho	36.5	1936-	
2520	Weiser River near Starkey, Idaho	66.6	1937-39.	
2525	East Fork Weiser River near Council, Idaho	a2.0	1932-43.	
2530	East Fork Weiser River near Starkey, Idaho	31.6	1937-39.	
2535	Weiser River at Starkey, Idaho	106	1920*;1939-49.	
2540	Lost Valley Reservoir near Tamarack, Idaho	29.4	1924;1926-66.	
2545	Lost Creek near Tamarack, Idaho	29.4	1910-14;1920-21;1924-69.	
2550	West Fork Weiser River near Fruitvale, Idaho	a78	1910-13;1919-25;1937-49.	
2555	Hornet Creek near Council, Idaho	107	1937-43.	
2560	Weiser River near Council, Idaho	390	1937-53.	
2565	Mesa Orchards Canal near Mesa, Idaho	-	1924;1928-55.	
2570	Middle Fork Weiser River near Mesa (at Middle Fork), Idaho	86.5	1910-13;1919-21;1937-49.	
2575	Johnson Creek below Johnson Park, near Council, Idaho	a5	1941-49.	
2580	Bacon Creek near Mesa, Idaho	.71	1944-49.	
2585	Weiser River near Cambridge, Idaho	605	1939-	
2590	Rush Creek powerplant tailrace near Cambridge, Idaho	-	1929-30.	
2595	Rush Creek at Cambridge, Idaho	a32	1938-43.	
2600	Pine Creek near Cambridge, Idaho	a54	1938-62.	
2605	Little Weiser River at Ruby Ranch, near Indian Valley, Idaho	80.3	1923.	
2610	Little Weiser River near Indian Valley, Idaho	81.9	1920-21;1923-27;1938-	
2615	Little Weiser River near Cambridge, Idaho	187	1920-26.	
2620	Sage Creek near Midvale, Idaho	5.56	1913.	
2625	Sommercamp Creek near Midvale, Idaho	a2.5	1913.	
2630	Miller Creek near Midvale, Idaho	.96	1913.	
2635	Weiser River above Crane Creek, near Weiser, Idaho	a1,160	1920-52.	
2640	Crane Creek Reservoir near Midvale, Idaho	242	1923-69.	
2645	Crane Creek near Midvale, Idaho	242	1910-16;1924-69.	
2650	Crane Creek Irrigation District Canal near Weiser, Idaho	-	1920-26.	
2655	Crane Creek at mouth, near Weiser, Idaho	288	1920-	
2660	Weiser River near (at) Weiser, Idaho	a1,460	1890-91;1894-1904;1910-14;1952-	
2665	Galloway Canal (Weiser Irrigation District Canal) near Weiser, Idaho	-	1920-	
2669	Spangler Reservoir near Weiser, Idaho	a56	1967-	
2670	Mann Creek near Weiser, Idaho	a56	1911-13;1920;1937-62........	1962-66.
2670.5	Mann Creek below Spangler Dam, near Weiser, Idaho	a56	1967-	
2671	Deer Creek near Midvale, Idaho	4.60	....	1962-
2675	Monroe Creek (upper station) near Weiser, Idaho	a7.2	1911-12.	
2680	Monroe Creek (lower station) near Weiser, Idaho	29.1	1911-13.	
2685	Monroe Creek above Sheep Creek, near Weiser, Idaho	a32	1945-49.	
2690	Snake River at Weiser, Idaho	a69,200	1895-*f;1910-	
2896	East Brownlee Creek (Brownlee Creek) near Brownlee ranger station, Idaho	7.97	....	1962-
2897	Brownlee Reservoir at Brownlee Dam, Idaho-Oregon State line	a72,590	1958-	
2900	Snake River at Oxbow, Oreg.	a72,800	1923-58;1967-	
2901.9	Pine Creek near Oxbow, Oreg.	a230	1966-	
2902	Snake River below Pine Creek, at Oxbow, Oreg.	a73,150	1958-67.	
2904	Kinney Creek near Homestead, Oreg.	7.90	....	1963-65.
2904.5	Snake River at Hells Canyon Dam, Idaho-Oregon State line	a73,300	1965-	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
2905	Snake River near Joseph, Idaho	a73,800	1955-	
2924	Beaver Creek near Stanley, Idaho	13.9	....	1963-
2925	Salmon River near Obsidian, Idaho	94.7	1940-53.	
2930	Alturua Lake Creek near Obsidian, Idaho	35.7	1940-53.	
2935	Salmon River near Pierson, Idaho	235	1911-13.	
2940	Lake Creek near Stanley, Idaho	44	1911-13	
2945	Salmon River at Stanley, Idaho	355	1921-25.	
2950	Valley Creek at Stanley, Idaho	147	1910*;1911-13;1921-	
2955	Salmon River below Valley Creek, at Stanley, Idaho	501	1925-60.	
2960	Yankee Fork Salmon River near Clayton, Idaho	195	1921-49.	
2965	Salmon River below Yankee Fork, near Clayton, Idaho	802	1921-	
2970	Warm Springs Creek at Robinson Bar, near Clayton, Idaho	a81	1921-23.	
2971	Peach Creek near Clayton, Idaho	a8.2	....	1962-
2973	Holman Creek near Clayton, Idaho	a6.1	....	1962-
2975	Big Boulder Creek near Clayton, Idaho	a27	1926-29.	
2980	East Fork Salmon River near Clayton, Idaho	497	1928-39.	
2983	Malm Gulch near Clayton, Idaho	10.0	....	1962-
2985	Salmon River near Challis, Idaho	a1,800	1928-	
2990	Challis Creek near Challis, Idaho	a85	1943-63.	
2992	Challis Creek below Jeff's Creek, near Challis, Idaho	91.2	1963-	
2995	Pahsimeroi River near Goldburg, Idaho	a65	1910-13.	
3000	Pahsimeroi River below sinks, near Goldburg, Idaho	176	1913.	
3005	Goldburg Creek near Goldburg, Idaho	a54	1910.	
3010	Goldburg Creek at mouth, near Goldburg, Idaho	a69	1913.	
3015	Big Creek near Patterson, Idaho	a70	1910-13.	
3017	Morse Creek above diversions, near May, Idaho	18.0	....	1962-
3018	Morse Creek near May, Idaho	19.9	....	1962-
3020	Pahsimeroi River near May, Idaho	a845	1929-59.	
3022	Twelvemile Creek near Salmon, Idaho	a23	....	1964-
3025	Salmon River at Salmon, Idaho	a3,760	1912-16;1919-	
3030	Texas Creek near Leadore, Idaho	71.4	1938-39;1955-63.	
3031	Hood Gulch near Leadore, Idaho	7.09	....	1962-
3035	Timber Creek near Leadore, Idaho	a57	1912;1938-39.	
3040	West Fork Timber Creek near Leadore, Idaho	16.5	1912.	
3042	Big Springs Creek near Leadore, Idaho	-	1959-61.	
3045	Eightmile Creek near Leadore, Idaho	a20	1912.	
3050	Lemhi River near Lemhi, Idaho	a890	1938-39;1955-63;1967-	1964-66.
3055	Lemhi River at Salmon, Idaho	a1,270	1928-43.	
3057	Dahlonega Creek at Gibbonsville, Idaho	a32	....	1962-
3058	Hughes Creek near North Fork, Idaho	15.7	....	1962-
3060	North Fork Salmon River at (near) North Fork, Idaho	214	1913*;1929-39.	
3065	Panther Creek near Shoup, Idaho	529	1944-	
3070	Salmon River near Shoup, Idaho	a6,270	1944-	
3075	Marsh Creek near Cape Horn, Idaho	a73	1922;1924.	
3080	Beaver Creek at Cape Horn, Idaho	a54	1922;1924.	
3085	Middle Fork Salmon River near Cape Horn, Idaho	138	1928-	
3090	Bear Valley Creek near Cape Horn, Idaho	a180	1921-60.	
3095	Middle Fork Salmon River near Meyers Cove, Idaho	a2,020	1931-39.	
3100	Big Creek near Big Creek, Idaho	a470	1944-58.	
3105	South Fork Salmon River near Knox, Idaho	a92	1928-60.	
3107	South Fork Salmon River, near Krassel ranger station, Idaho	a330	1966-	
3110	East Fork (of) South Fork Salmon River at Stibnite, Idaho	19.5	1928-42.	
3115	East Fork (of) South Fork Salmon River near Stibnite, Idaho	42.5	1928-41.	
3120	East Fork (of) South Fork Salmon River near Yellow Pine, Idaho	104	1928-43.	
3125	Johnson Creek near Landmark ranger station, Idaho	54.7	1942-49.	
3130	Johnson Creek at Yellow Pine, Idaho	213	1928-	
3135	Secesh River near Burgdorf, Idaho	104	1943-52.	
3138	Tailholt Creek near Yellow Pine, Idaho	a2.6	1959-62.	
3140	South Fork Salmon River near Warren, Idaho	a1,160	1931-43.	

Station number	Station name	Drainage area (sq mi)	Period of Record: Daily or monthly figures (calendar years)	Period of Record: Annual peaks (water years)
13-				
3145	Warren Creek near Warren, Idaho	a37	1943-49.	
3150	Salmon River near French Creek, Idaho	a12,270	1944-56.	
3155	Mud Creek near Tamarack, Idaho	15.8	1937-38;1939-43*;1945-59....	1962-
3160	Boulder Creek near Tamarack, Idaho	a6.5	1938-45.	
3163	Indian Creek near Pollock, Idaho	a2.7	....	1962-
3165	Little Salmon River at Riggins, Idaho	576	1951-	
3168	North Fork Shookumchuck Creek near White Bird, Idaho	15.6	1959-	
3170	Salmon River at White Bird, Idaho	a13,550	1910-17;1919-	
3172	Johns Creek near Grangeville, Idaho	6.55	....	1961-
3175	Deer Creek near Winchester, Idaho	19.1	1951-56.	
3343	Snake River near Anatone, Wash.	a92,960	1958-	
3353	Snake River at Lewiston, Idaho	-	1894*f;1910*.	
3360	Selway River (head of Clearwater River) above Meadow Creek, near Lowell, Idaho	a1,550	1944-49.	
3361	Meadow Creek near Lowell, Idaho	241	1963-	
3365	Selway (Selwa) River near Lowell, Idaho	a1,910	1911;1912 ;1929-	
3366	Swiftwater Creek near Lowell, Idaho	a5.7	....	1962-
3366.5	East Fork Papoose Creek near Powell ranger station, Idaho	a3.8	....	1962-
3368	Warm Spring Creek near Powell ranger station, Idaho	74.7	1956-59.	
3368.5	Weir Creek near Powell ranger station, Idaho	a13	....	1962-
3369	Fish Creek near Lochsa ranger station, Idaho	89.2	1957-67.	
3370	Lochsa River near Lowell, Idaho	a1,180	1910-12;1929-	
3371	Clear Creek near Kooskia, Idaho	a100	1962;1968.	
3372	Red Horse Creek near Elk City, Idaho	a9.2	....	1962-
3375	South Fork Clearwater River near Elk City, Idaho	261	1944-	
3377	Peasley Creek near Golden, Idaho	14.5	....	1962-
3380	South Fork Clearwater River near Grangeville, Idaho	865	1910-16;1923-63.	
3382	Sally Ann Creek near Stites, Idaho	a15	....	1961-
3385	South Fork Clearwater River at Stites (Kooskia), Idaho	a1,150	1910-12;1964-	
3388	Lawyer Creek near Nezperce, Idaho	a150	1967-	
3390	Clearwater River at Kamiah, Idaho	a4,850	1910-65.	
3395	Lolo Creek near Greer, Idaho	243	1911-12.	
3397	Canal Gulch Creek at Pierce ranger station, Idaho	a6.0	....	1962-
3399	Deer Creek near Orofino, Idaho	a6.8	....	1962-
3400	Clearwater River at Orofino, Idaho	a5,580	1930-38;1964-	
3405	North Fork Clearwater River at Bungalow ranger station, Idaho	996	1944-69.	
3406	North Fork Clearwater River at Canyon ranger station, Idaho	a1,360	1967-	
3410	North Fork Clearwater River near Ahsahka, Idaho	a2,440	1926-65.	
3410.5	Clearwater River near Peck, Idaho	8,040	1964-	
3411	Cold Springs Creek (Big Canyon Creek) near Craigmont, Idaho	8.07	....	1961-
3412	East Fork Potlatch River (Creek) below Mallory Creek, near Bovill, Idaho	18.2	1959-60.	
3413	Bloom Creek near Bovill, Idaho	3.66	1959-	
3414	East Fork Potlatch River (Creek) near Bovill, Idaho	42.5	1959-	
3415	Potlatch River (Creek) at Kendrick, Idaho	425	1946-60....................	1961-
3416	Arrow Gulch near Arrow, Idaho	2.80	....	1961-65.
3420	Mission Creek near Winchester, Idaho	a16	1940-45.	
3422	Twenty One Ranch Spring near Waha, Idaho	-	1958-60.	
3425	Clearwater River at Spalding, Idaho	a9,570	1926-	
3430	Clearwater River near Lewiston, Idaho	a9,640	1910-13;1924-27.	
3447	Deep Creek tributary near Potlatch, Idaho	2.90	....	1961-
3448	Deep Creek near Potlatch, Idaho	36.6	....	1961-
3450	Palouse River near Potlatch, Idaho	317	1914-19;1966-	

* Gage heights, or gage heights and discharge measurements only.
a Approximately.
b In reports of Bear River Hydrometric Data (U.S. Geological Survey open-file report).
c In reports of Water District 5, Idaho.
d In reports of Bear River Commission.
e In reports of Department of Energy, Mines and Resources, Canada.
f In reports of U.S. Weather Bureau.
g Approximately, about 122 sq mi in vicinity of Hayden Lake is noncontributing.
h Approximately, includes Bob Smith Creek.
i In reports of Water District 36, Idaho.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE IDAHO DEPARTMENT OF WATER ADMINISTRATION AND THE IDAHO DEPARTMENT OF HIGHWAYS

FIGURE 1.--MAPS OF IDAHO SHOWING REGIONS AND LOCATION OF GAGING STATIONS NOW OPERATING, DISCONTINUED, AND PROPOSED.