WATER-RESOURCES ACTIVITIES OF THE U.S. GEOLOGICAL SURVEY IN IDAHO, OCTOBER 1987 THROUGH SEPTEMBER 1988

Compiled by *Barbara N. Kemp*

U.S. GEOLOGICAL SURVEY

Open-File Report 89-419

Boise, Idaho

1989

UNITED STATES DEPARTMENT OF THE INTERIOR

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MESSAGE FROM THE IDAHO DISTRICT CHIEF

For many years, the Water Resources Division has maintained a significant role in furthering knowledge of surface water, ground water, and water quality in the State. Because complete and up-to-date data bases are necessary for the wise management and use of the ground- and surface-water resources of the State, the Idaho District places a heavy emphasis on the collection of hydrologic data. Availability of water and competition for its use continue to be the focus of the Division's data-collection activities in Idaho.

With agriculture continuing to be the principal use of water in Idaho and accounting for about 91 percent of the water withdrawn from wells and diverted from streams, the potential for degradation of water from these activities always exists. Increasing awareness of the limits of our ground- and surface-water supplies and of the potential for degrading these resources has generated more and more studies in the areas of water supply and demand and water quality.

Continuing or new interpretive studies in 1988 include: (1) Completion of a cross-sectional ground-water flow model in the vicinity of Thousand Springs, the principal discharge area for the eastern Snake River Plain aquifer; (2) quantification of the water resources in the Bannock Creek area of the Fort Hall Indian Reservation for protection of the Shoshone-Bannock Indian Tribes' water rights; (3) determination of whether concentrations of selected major and minor ions and organic compounds in water, bottom sediments, and biota at American Falls Reservoir exceed known standards or criteria; (4) delineation of aquifers and other hydrologic information in Idaho, Oregon, Washington, Montana, North and South Dakota, and Wyoming for the National Ground-Water Atlas; (5) continued monitoring and evaluation of radioactive and chemical waste disposal on ground-water quality at the INEL (Idaho National Engineering Laboratory); and (6) continued sampling of shallow ground water in agricultural areas of the State to delineate areas with high concentrations of dissolved nitrogen.

In the future, the collection of surface-water, ground-water, and water-quality data will continue to play a significant role in all Survey activities--especially as the State of Idaho moves toward adjudication of water rights. Future water-resources studies will include all phases of the hydrologic system, but will emphasize availability and quality of water.

The Idaho District program has grown considerably over the past several years. This growth has come as a result of the increasing need for more data and answers to hydrologic problems caused by increasing agriculture and urbanization. The opportunities to become involved in working with State and Federal agencies responsible for the wise management of our

water resources have presented the U.S. Geological Survey with numerous challenges, and I look forward to the challenges in the coming years.

Jerry L. Hughes
Idaho District Chief
Geological Survey
Water Resources Division
Boise, Idaho

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ILLUSTRATIONS

GEOLOGICAL SURVEY ORIGIN

The U.S. Geological Survey was established by an act of Congress on March 3, 1879, to provide a permanent Federal agency to conduct the systematic and scientific "classification of the public lands, and examination of the geological structure, mineral resources, and products of national domain." An integral part of that original mission includes publishing and disseminating the earth-science information needed to understand, to plan the use of, and to manage the Nation's energy, land, mineral, and water resources.

Since 1879, the research and fact-finding role of the Survey has grown and been modified to meet the changing needs of the Nation. As part of that evolution, the Survey has become the Federal Government's largest earth-science research agency, the Nation's largest civilian mapmaking agency, the primary source of data on the Nation's surface- and ground-water resources, and the employer of the largest number of professional earth scientists. Today's programs serve a diversity of needs and users. Programs include:

- Conducting detailed assessments of the energy and mineral potential of the Nation's land and offshore areas.
- Investigating and issuing warnings of earthquakes, volcanic eruptions, landslides, and other geologic and hydrologic hazards.
- Conducting research on the geology of the United States.
- Studying the geologic features, structure, processes, and history of the other planets in our solar system.
- Conducting topographic surveys and preparing topographic and thematic maps and related cartographic products.
- Developing and producing digital cartographic data bases and products.
- Collecting data on a routine basis to determine the quantity, quality, and use of surface and ground water.
- Conducting water-resource appraisals in order to describe the consequences of alternative plans for developing land and water resources.
- Using remotely sensed data to develop new cartographic, geologic, and hydrologic research techniques for natural resources planning and management.

- Providing earth-science information through an extensive publications program and a network of public access points.

Along with its continuing commitment to meet the growing and changing earth-science needs of the Nation, the Survey remains dedicated to its original mission to collect, analyze, interpret, publish, and disseminate information about the natural resources of the Nation--providing "earth science in the public service."

WATER RESOURCES DIVISION

BASIC MISSION AND PROGRAM

The mission of the Water Resources Division is to provide the hydrologic information and understanding needed for the optimum utilization and management of the Nation's water resources for the overall benefit of the people of the United States.

This is accomplished, in large part, through cooperation with other Federal and non-Federal agencies, by:

- Collecting, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources;

- Conducting analytical and interpretive water-resource appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface water and ground water;

- Conducting supportive basic and problem-oriented research in hydraulics, hydrology, and related fields of science to improve the scientific basis for investigations and measurement techniques, and to quantitatively predict the response of hydrologic systems to stress, either natural or manmade;

- Disseminating water data and results of investigations and research through reports, maps, computerized information services, and other forms of public releases;

- Coordinating the activities of Federal agencies in the acquisition of water data for streams, lakes, reservoirs, estuaries, and ground waters; and

- Providing scientific and technical assistance in hydrologic fields to other Federal, State, and local agencies, to licensees of the Federal Energy Regulatory Commission, and to international agencies on behalf of the Department of State.

IDAHO DISTRICT ORGANIZATION

The Idaho and Nevada Districts of the Water Resources Division, which were combined to form the Idaho-Nevada District in 1982, were separated in 1987. The Idaho District, headquartered in Boise, is under the direction of the District Chief. The organization chart (fig. 1) shows the main operating sections and support units. In conducting its FY (fiscal year) 1988 activities, the Idaho District employed a total of 83 persons (69 full time and 14 other than full time)--47 in the Boise office, 11 in the Idaho Falls Field Headquarters, 5 in the Sandpoint Field Headquarters, 5 in the Twin Falls Field Headquarters, and 15 at the INEL (Idaho National Engineering Laboratory) Project Office.

TYPES OF FUNDING

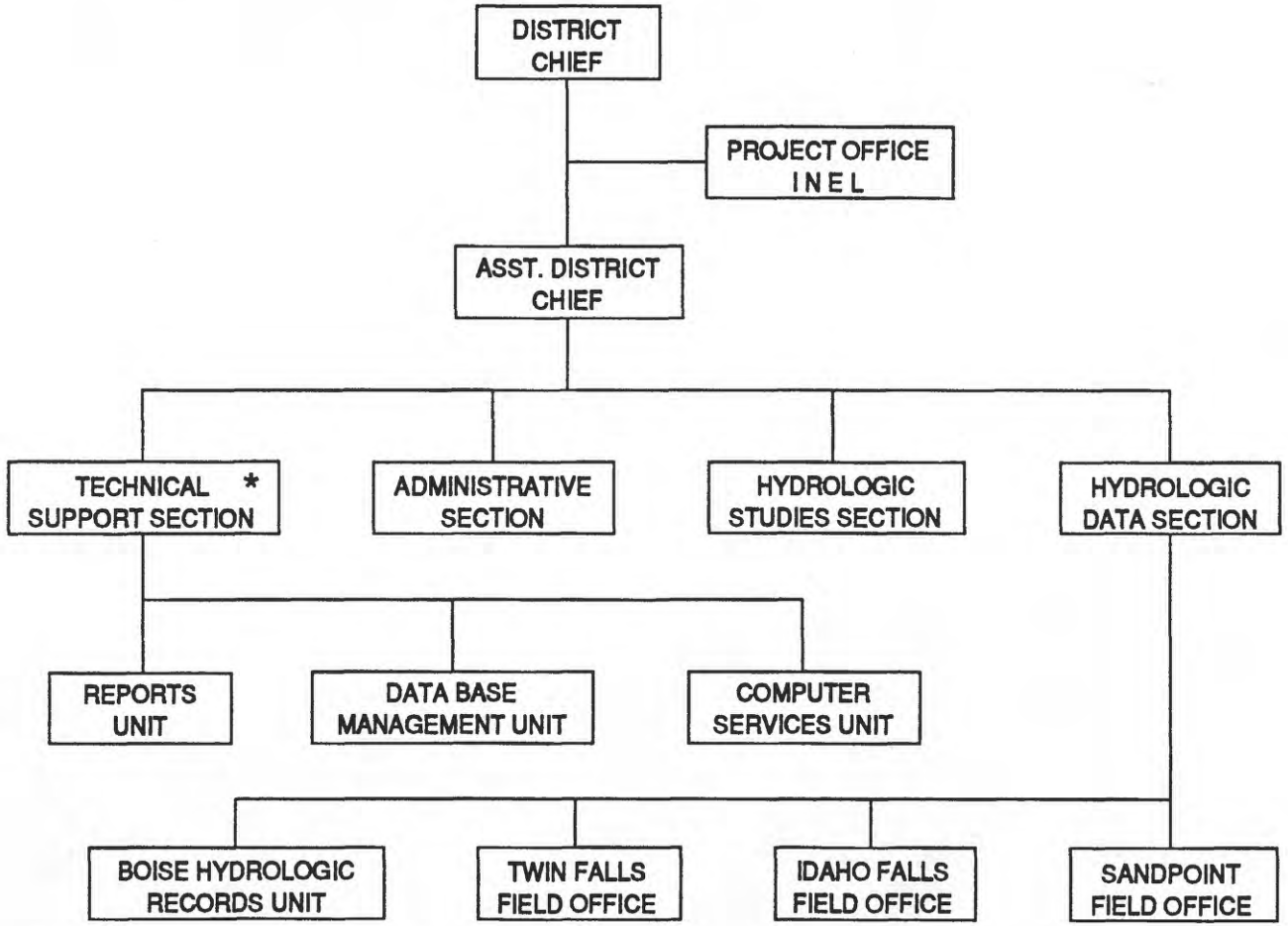
The U.S. Geological Survey and agencies of the State of Idaho have had joint funding agreements for the systematic collection of streamflow data since 1909 and for interpretive ground-water studies and ground-water data collection since 1946.

In FY 1988, the following State, local, and Federal agencies participated in cooperative programs with the Idaho District:

STATE AND LOCAL

College of Southern Idaho
County of Shoshone
Idaho Department of Fish and Game
Idaho Department of Health and Welfare
Idaho Department of Water Resources
Shoshone-Bannock Tribes, Fort Hall Indian Reservation
Southwest Irrigation District
Sun Valley Water and Sewer District
Teton County
Water District 01
Water District 31
Water District 32D

IDAHO DISTRICT
ORGANIZATION CHART



* Assistant District Chief supervises this section

Figure 1.--Idaho District organization.

FEDERAL

Federal Energy Regulatory Commission
National Park Service
Air Force
Army Corps of Engineers
Bonneville Power Administration
Bureau of Land Management
Bureau of Reclamation
Department of Energy
Environmental Protection Agency
Forest Service
Geological Survey

Proportional amounts of funding from all contributing agencies are shown in figure 2.

WATER CONDITIONS

In a semiarid agricultural State such as Idaho, a major part of the economy relies on a perennial abundance of water for irrigation and electric power supply. Reservoirs provide water for irrigation, mostly on the Snake River Plain in southern Idaho, and for electric power generation. Presently, all the flow in the Snake River is appropriated for use, and use of ground water for irrigation has increased.

In 1985, about 87 percent of the people in Idaho depended on ground water for domestic supply; however, withdrawals for public and rural domestic supplies amounted to only about 6 percent of total ground-water withdrawal. By far the largest use of ground water in the State is irrigated agriculture. In 1985, about 91 percent of total ground-water withdrawals were for irrigation. In several areas of the State, ground-water levels have been declining steadily. Since 1962, the Idaho Department of Water Resources has identified eight areas on the Snake River Plain where overall water-level declines are significant. These areas, designated as Critical Ground-Water Areas, presently are closed to further development. Water-level declines have warranted designation of Ground-Water Management Areas in five other areas of the Snake River Plain. Development in these areas is restricted.

State and Local Funds	**$ 1,089,775**
Federal Funds - - - - - -	**$ 3,057,175**
TOTAL - - - - - - - - - - - -	**$ 4,146,950**

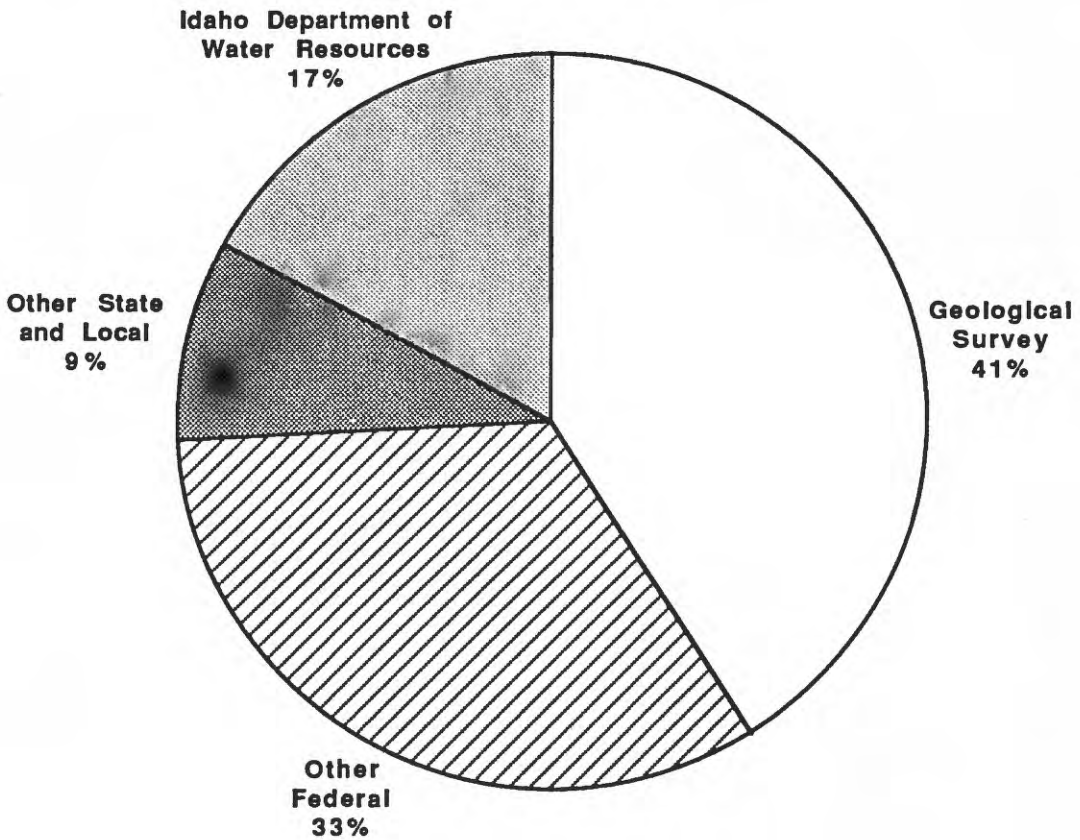


Figure 2.--Idaho District funding, fiscal year 1988

GROUND WATER

During the 1988 water year (October 1, 1987, to September 30, 1988), ground-water levels in wells penetrating the sand and gravel aquifer in the Boise Valley were below average the entire year and reached a new low water level for September. Water levels were below average January through September in the eastern part of the Snake River Plain aquifer and were below average March through September in the western part of the aquifer. Water levels were below average the entire year in the south-central and southwestern parts of the aquifer but did not reach new low readings. Various aspects of ground water in the State are shown in figures 3 and 4.

SURFACE WATER

The 1988 water year began with no relief from the drought conditions that had persisted through 1987. An atmospheric high pressure system remained over the entire northwest and diverted the normal cool, moist, westerly flow of air north and south of Idaho. Precipitation statewide remained well below seasonal normals and Idaho streamflows continued to recede to below-median levels.

Although precipitation was near normal in November 1987, dry conditions returned in December. Streamflows remained in the very low to low range except for the upper Snake River, which was in the normal range.

January of 1988 was cold and dry--snowfall was well below normal throughout the Pacific Northwest--but February was warm and mild. Many northwest weather stations recorded the driest February ever, and record-breaking high temperatures for the month were logged at Lewiston, Boise, Twin Falls, and Pocatello. Streamflows statewide remained in the very low to low range.

Although valley precipitation was normal to very high in March and near normal in April and May, mountain snowpack accumulation rates were below average. Only the upper Snake River basin contained a near-normal snowpack; mountains in the central and panhandle areas of Idaho contained about 60 percent of normal snowpack. Snowmelt peaked before the end of May in all major Idaho basins, but owing to unusually dry mountain soils, snowpacks were depleted without a substantial increase in streamflows and runoff was insufficient to fill most irrigation reservoirs.

Precipitation in the Kootenay[1] River basin in Canada and in most of the Idaho panhandle was near normal, and streamflows were in the median to high

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[1]"Kootenay" is the preferred spelling in Canada; "Kootenai" is the preferred spelling in the United States.

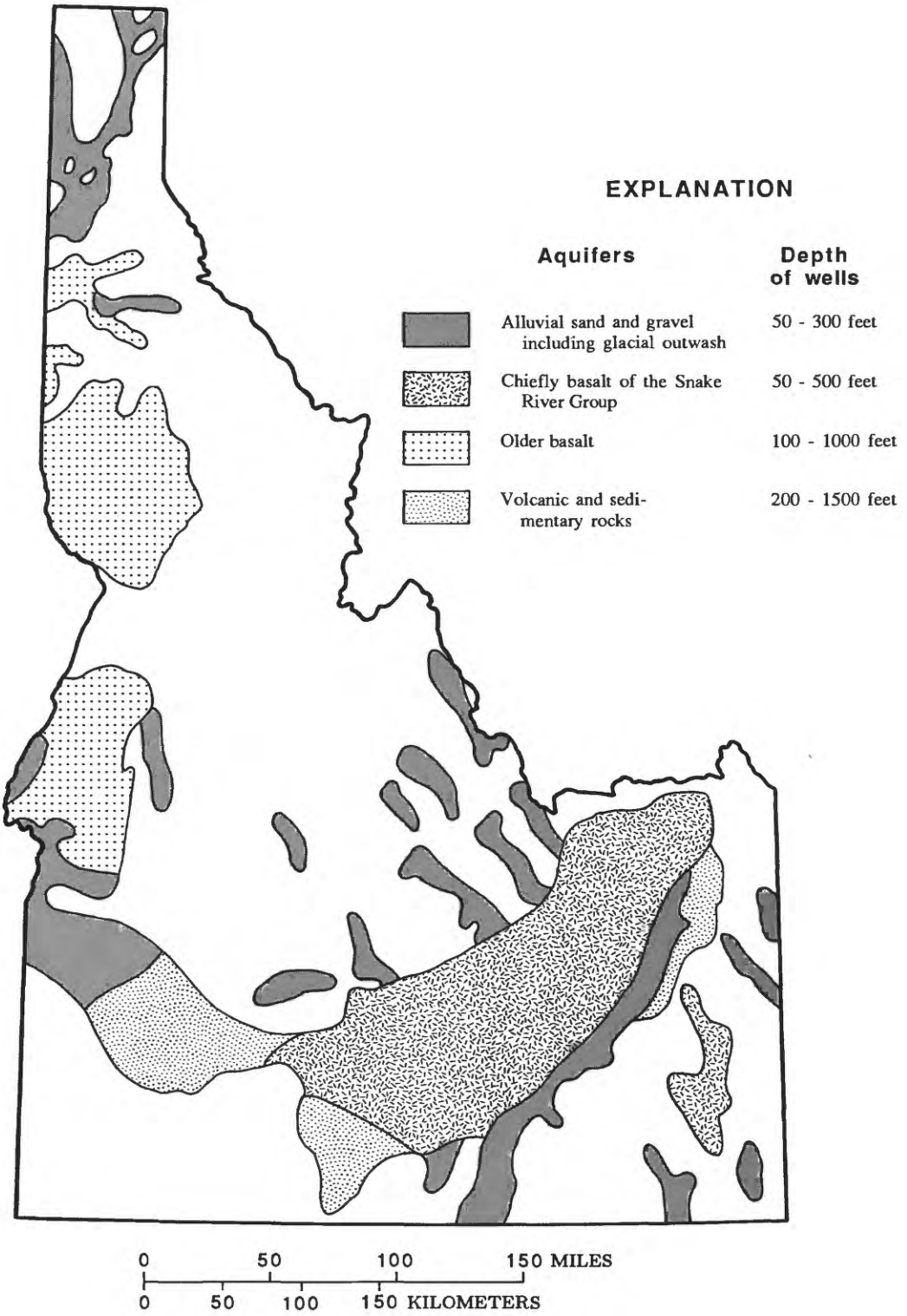


Figure 3.--Principal aquifers and common depths of wells.

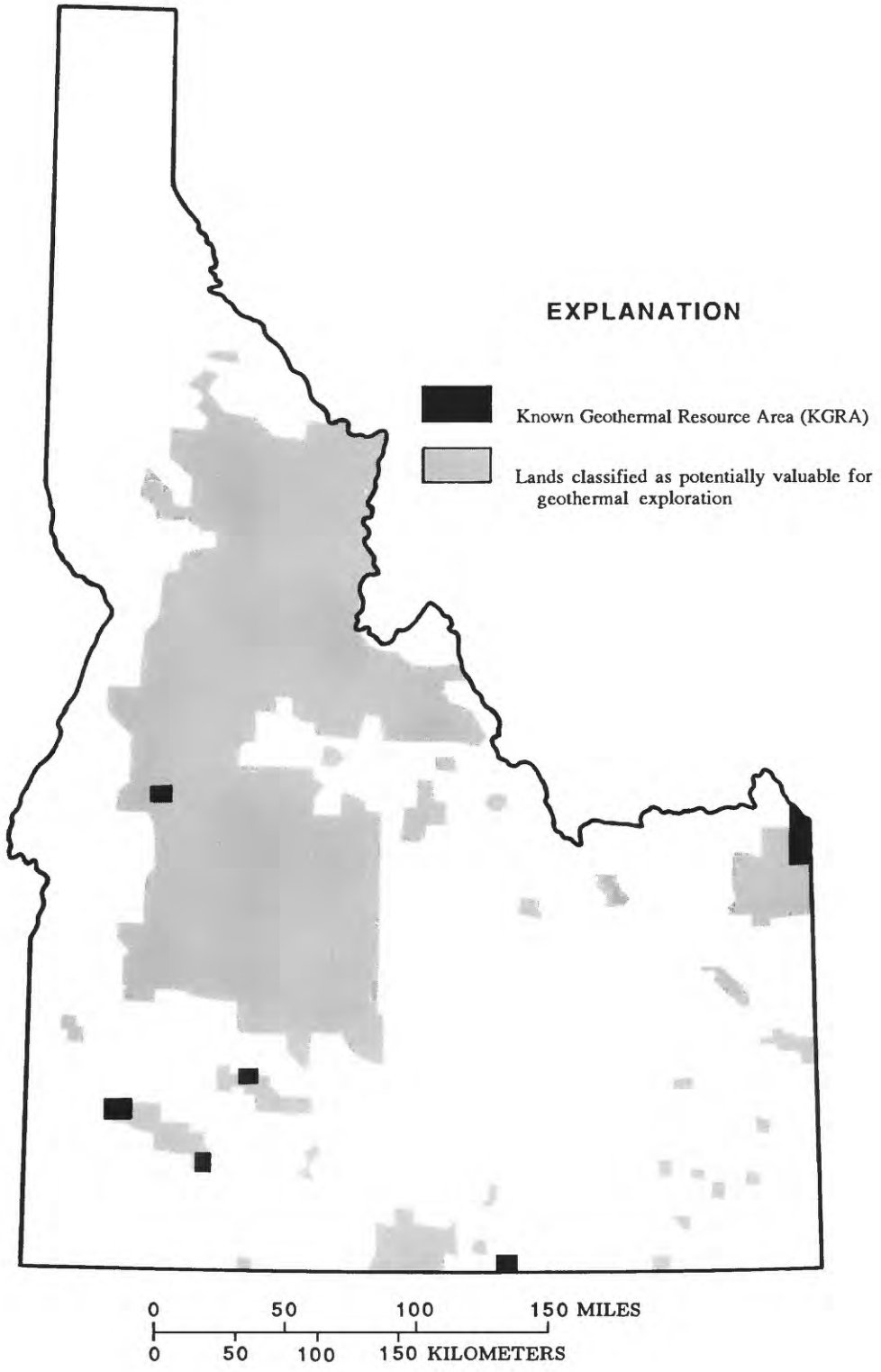


Figure 4.--Locations of Known Geothermal Resource Areas (KGRA's) and areas classified as potentially valuable for geothermal exploration.

range through the end of June. However, by the end of July, precipitation was well below normal and temperatures were well above normal in the Kootenay River basin and throughout Idaho. Streamflows were in the very low to low range. The International Boundary station, Kootenai River at Porthill, Idaho, recorded a mean annual flow of 12,350 cubic feet per second for the 1988 water year. This flow rate ranks 46th in the 60-year period of record at this site. By comparison, the flow rate for the 1977 water year, recognized as a low-water year in the Pacific Northwest, ranked 52nd in the period of record.

Drought conditions prevailed statewide through the end of the water year. Most Idaho streamflows receded to baseflow levels about 1 month earlier than normal, and reservoir storage in Idaho was nearly depleted. During the irrigation season, great quantities of stored water were withdrawn to bring crops to maturity, and irrigation-water supplies rapidly declined. Most small irrigation reservoirs were severely depleted and, in some cases, emptied. On July 1, Magic Reservoir near Richfield was empty for the first time since 1935. Large withdrawals of stored water for generation of hydroelectric power contributed to the depletion of reservoir storage in Idaho.

Various aspects of surface water in the State are shown in figures 5-7.

WATER QUALITY

The natural water-quality characteristics of surface and ground water result largely from the dissolution of minerals from surrounding rocks and soils. Land uses such as agriculture, grazing, logging, mining, and urbanization (fig. 8) can alter natural water quality and affect its suitability for beneficial uses such as public or agricultural water supply, recreation, and fisheries. Water quality in Idaho generally is perceived to be good and water is suitable for most beneficial uses. This perception is, however, highly qualitative because many kinds of quantitative water-quality data are not routinely collected. Idaho lacks a network of stations for monitoring water-quality constituents such as sediment, temperature, pH, dissolved oxygen, trace elements, toxic substances, and radionuclides. The resultant paucity of water-quality data has made it difficult to identify time trends, to assess long-term effectiveness of best management practices, or to locate surface or ground water with impaired beneficial uses.

In Idaho, dissolved-solids concentration is one of the few water-quality constituents that has been monitored statewide over a long term. Dissolved-solids concentrations are higher in southern Idaho than in central or northern Idaho (fig. 9), mainly because of differences in rock type.

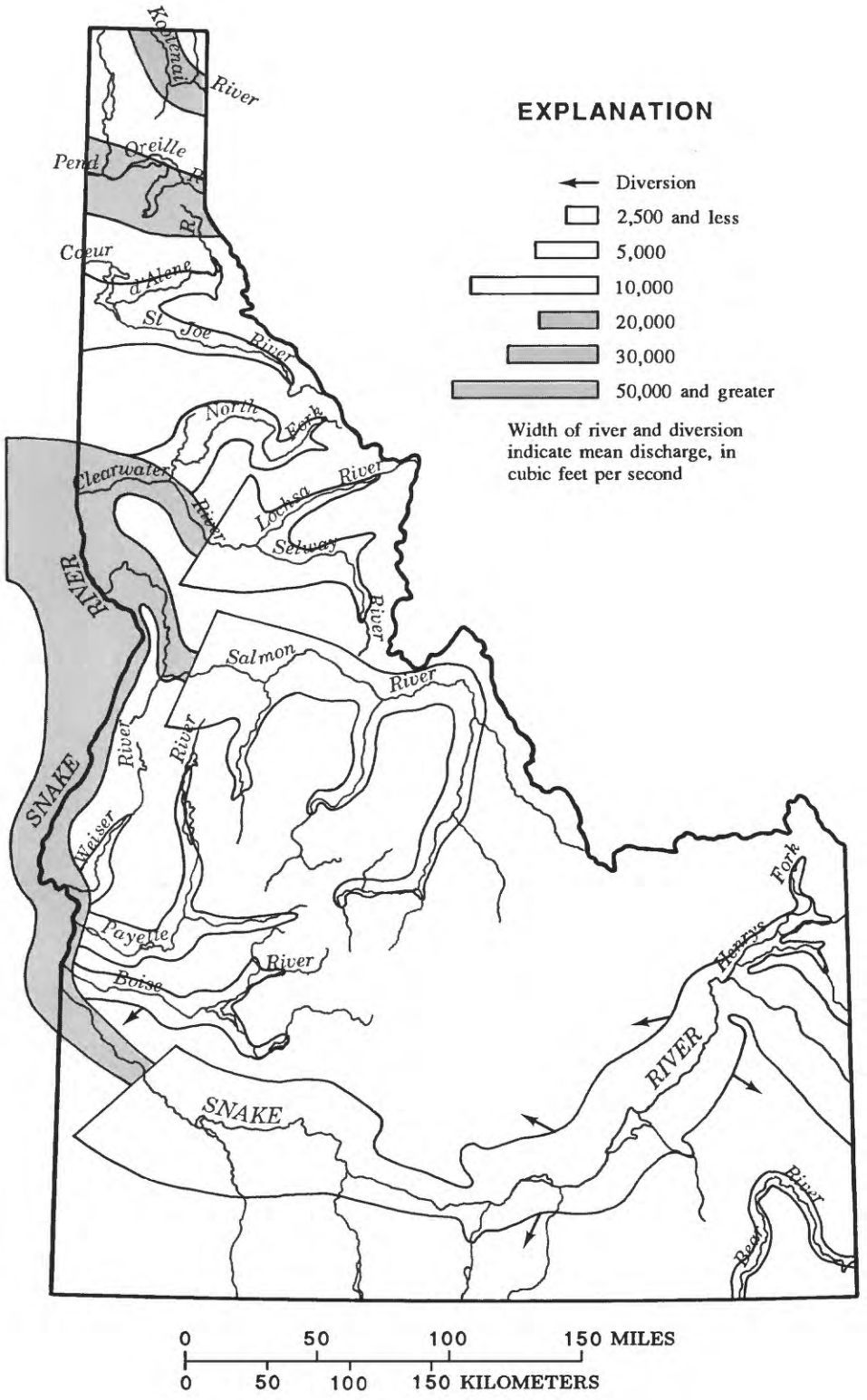


Figure 5.--Mean discharge of principal streams and diversions.

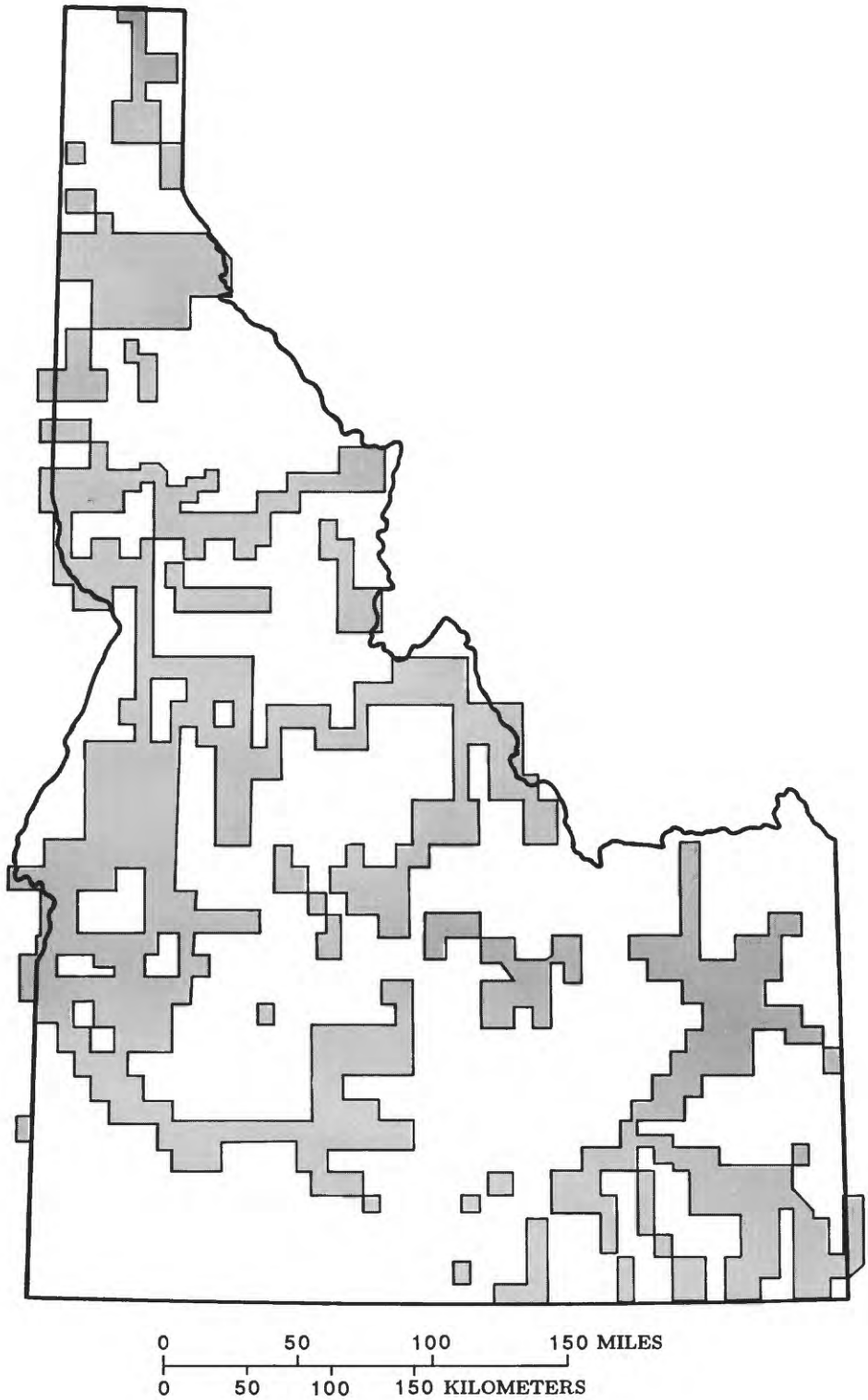


Figure 6.--Areas for which flood-prone-area maps are available.

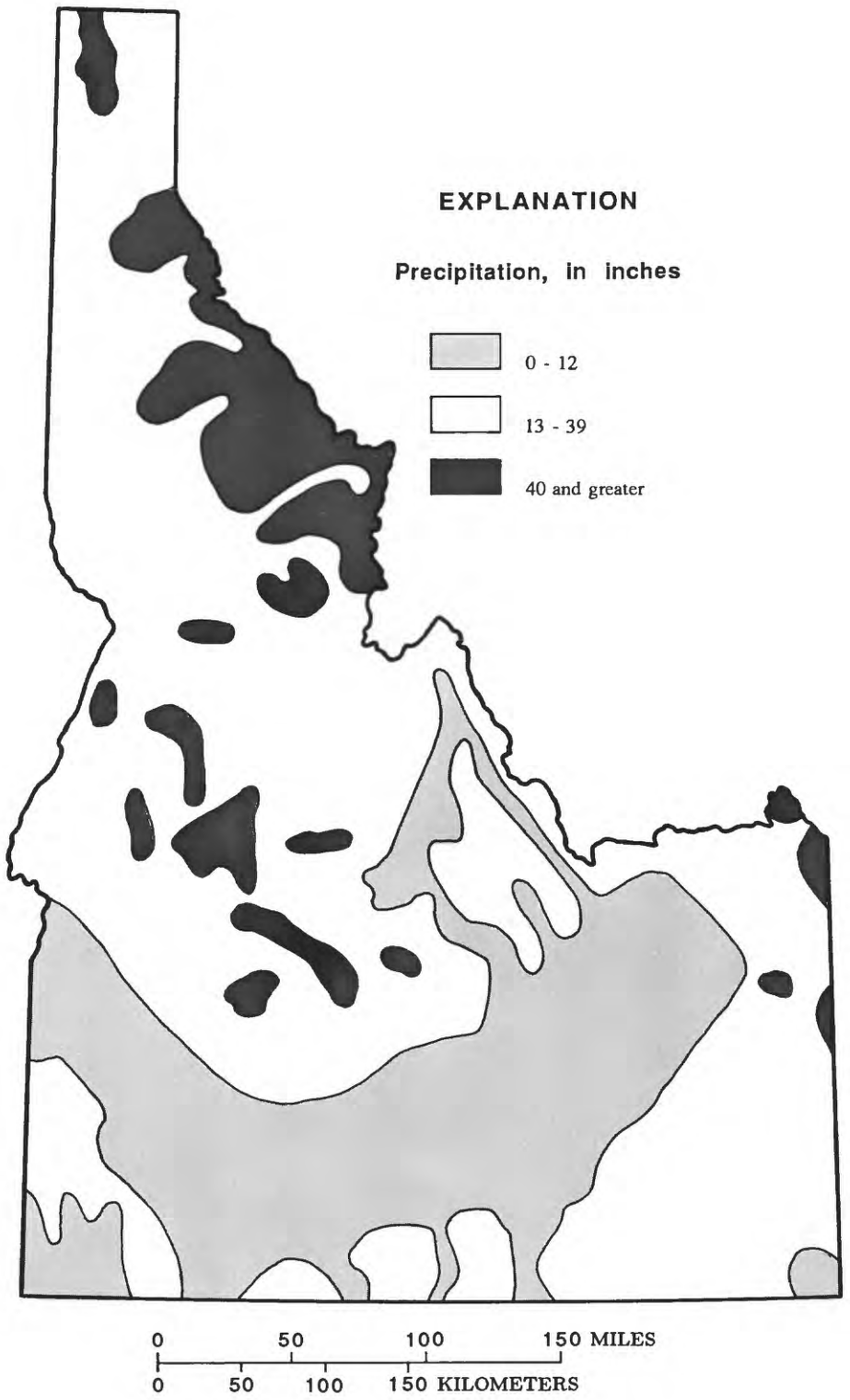


Figure 7.--Mean annual precipitation (Data from National Weather Bureau, NOAA).

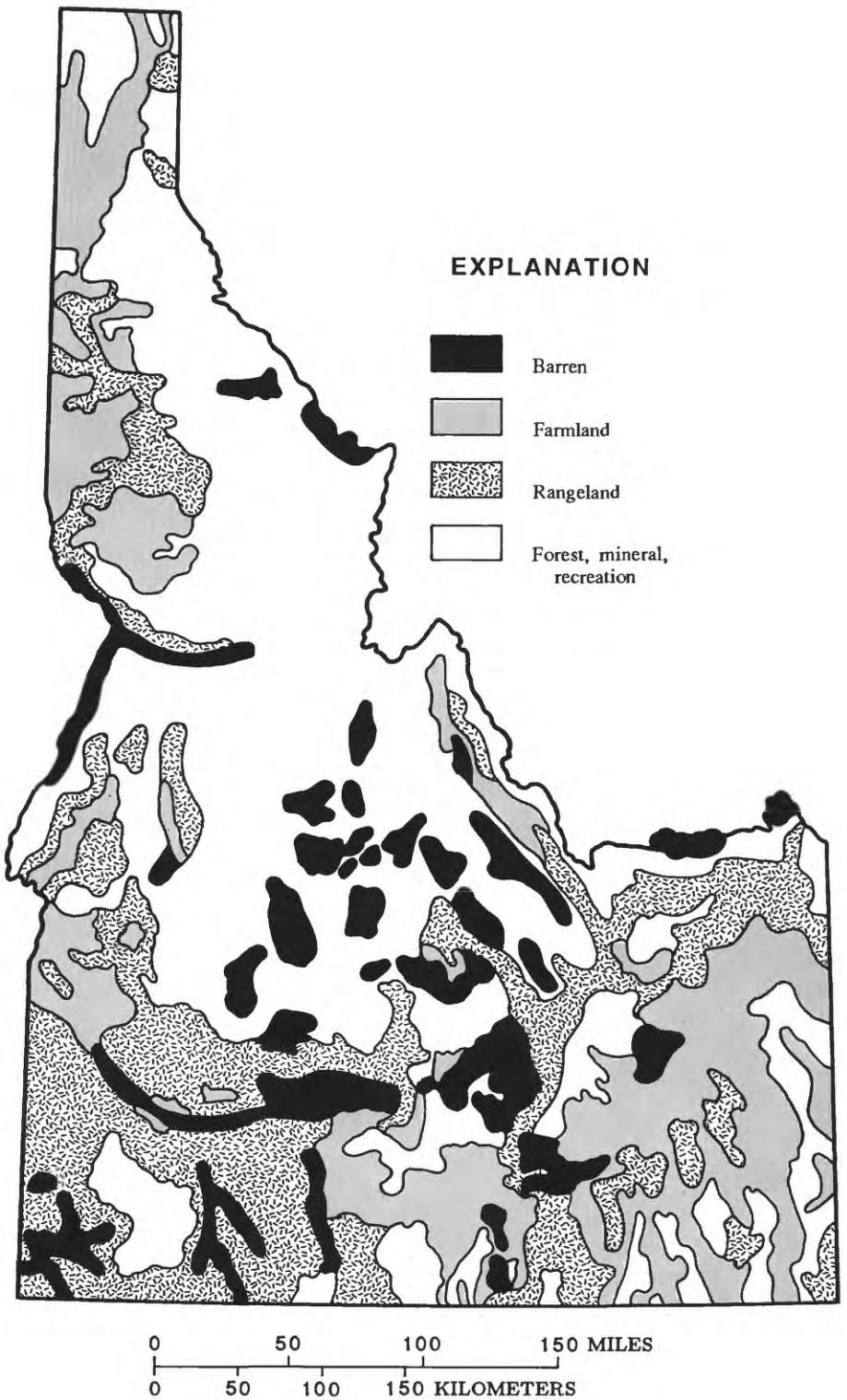


Figure 8.--Principal land use.

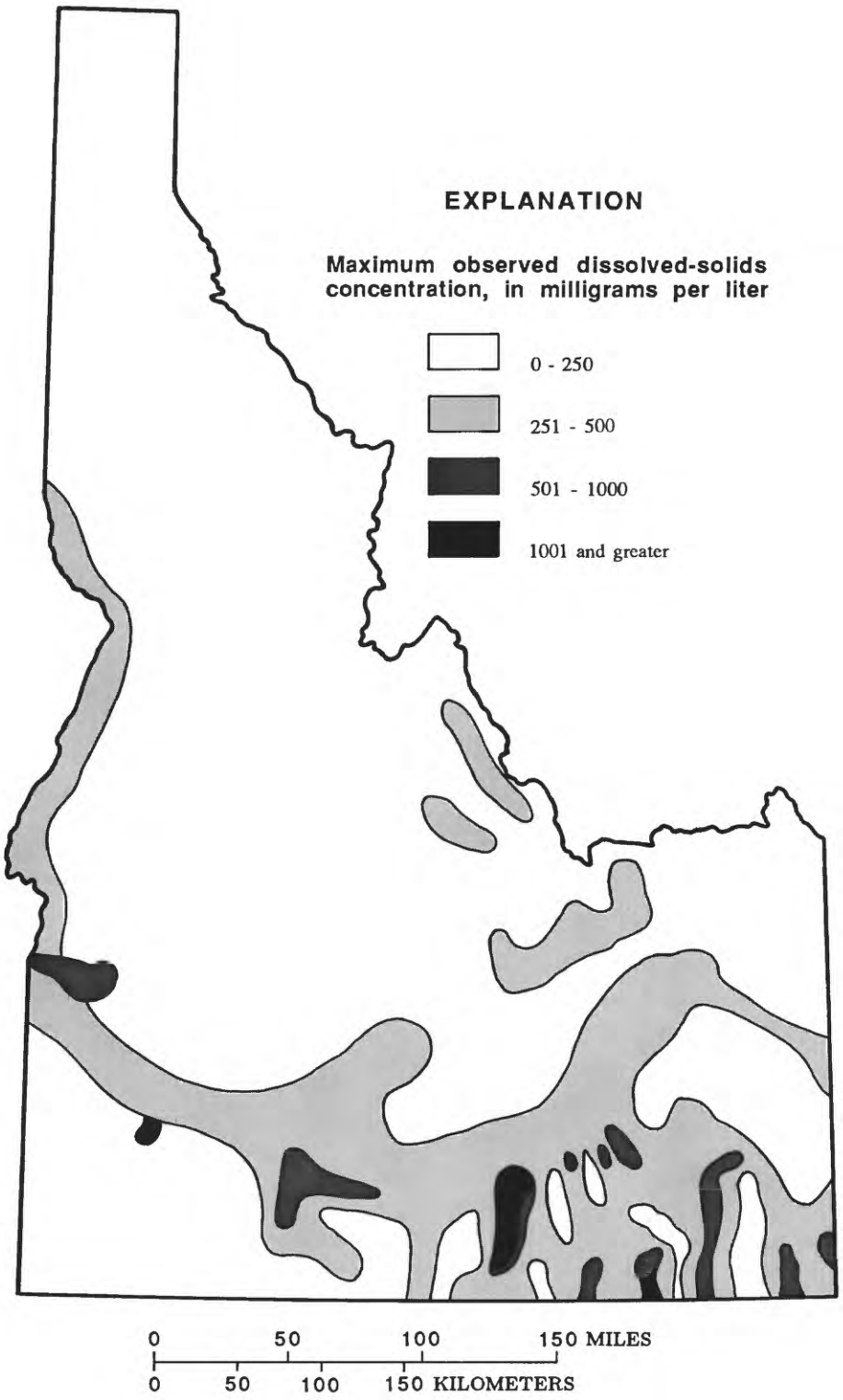
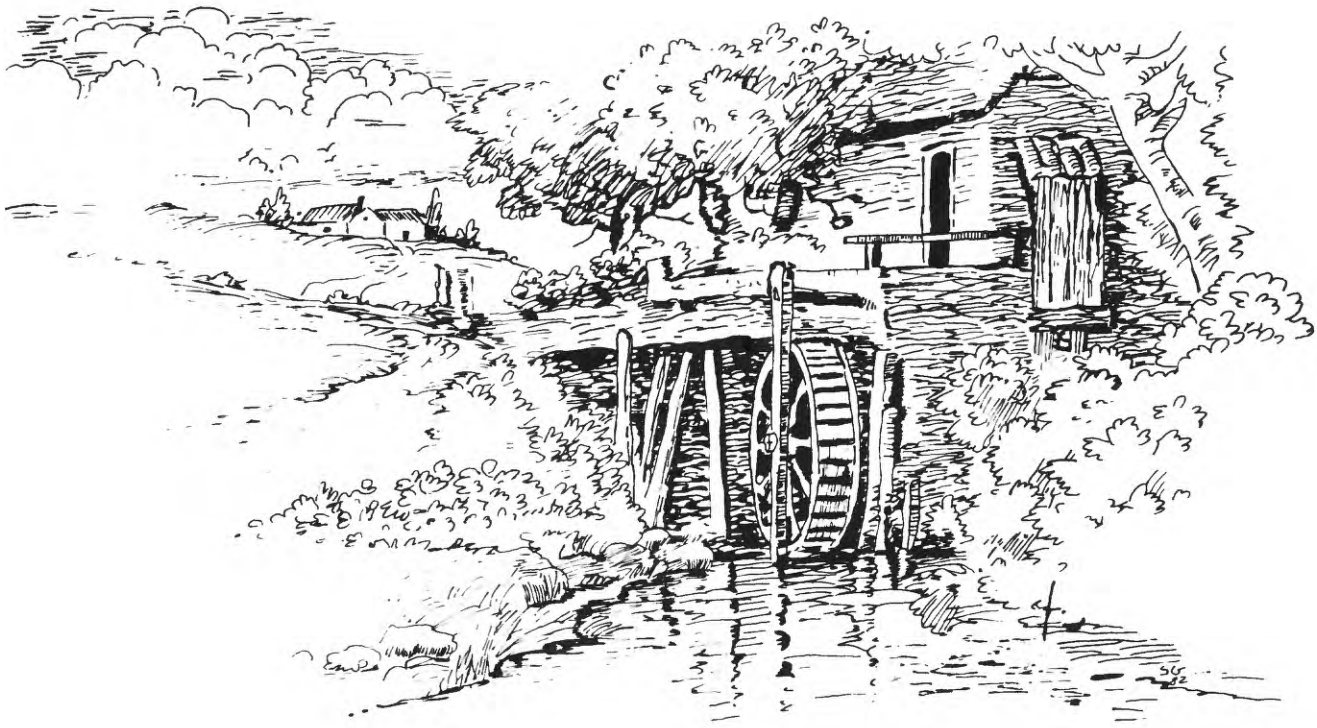


Figure 9.--Dissolved-solids concentration in surface water.



STATUS OF PROJECTS

The Idaho District program in FY 1988 consisted of 18 funded projects, which are described in the following section.

Projects 001, 002, 003, and 004 are continuing hydrologic-data collection projects. The locations and types of surface-water and water-quality data (projects 001 and 003) collected are shown in figures 10-17. Locations of observation wells where water levels (project 002) are measured are shown in figures 18-24. Wells that are part of hydrologic-studies projects are not shown in these figures. Water levels and other related data for project wells are available from the Idaho District office at the address shown on the inside front cover.

The following figures 10-24 show locations of surface-water and water-quality measurement sites and locations of observation wells in various parts of Idaho.

EXPLANATION

PART 12 — River basin boundary and number

▲ 414200 — Gaging station and number; inverted symbol indicates water-quality station

Chemical-measurement site

Temperature-measurement site

Biological-measurement site

Sediment-measurement site

• 24DDB1 — Observation well and number

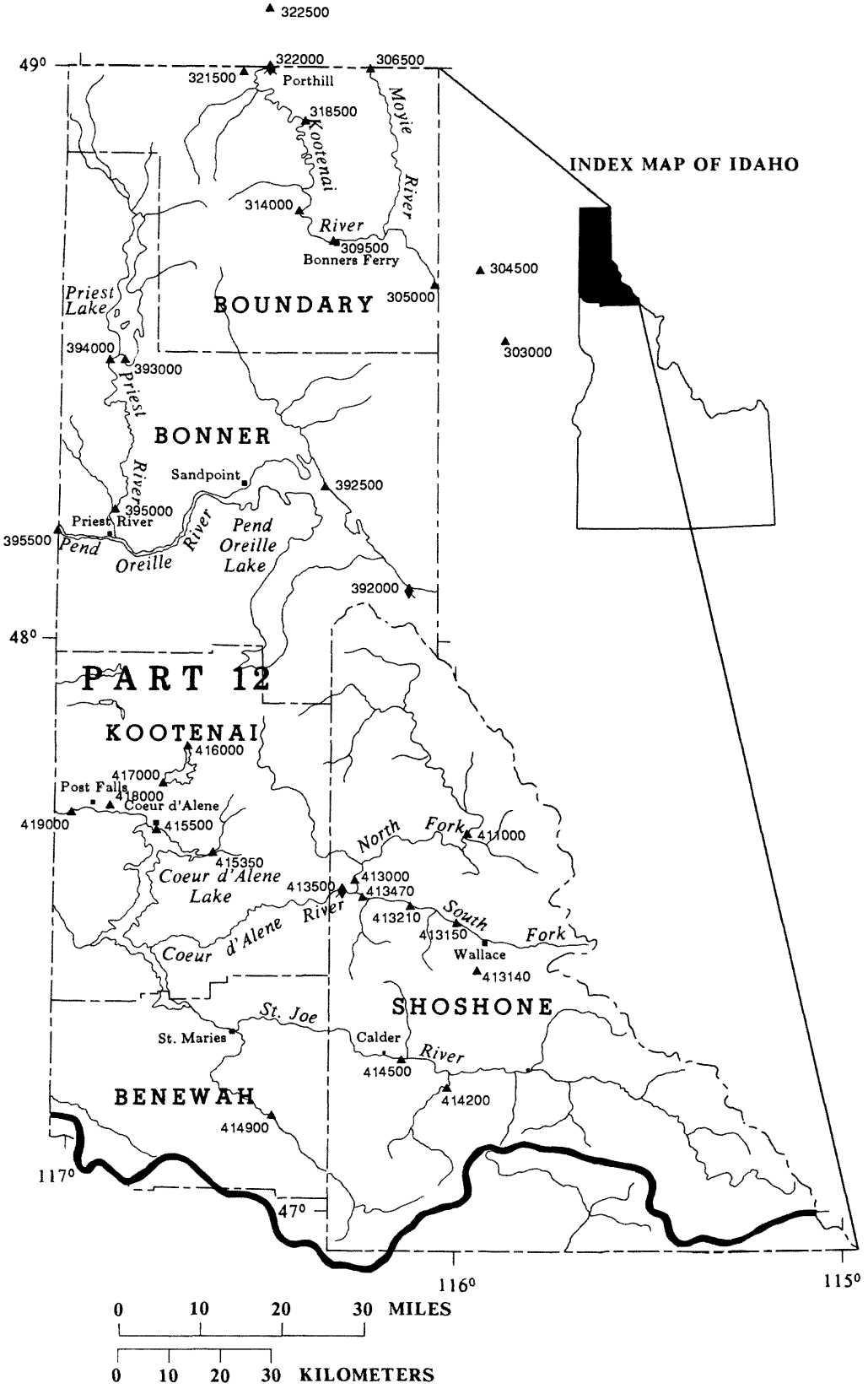


Figure 10.--Locations of surface-water and water-quality measurement sites in north Idaho.

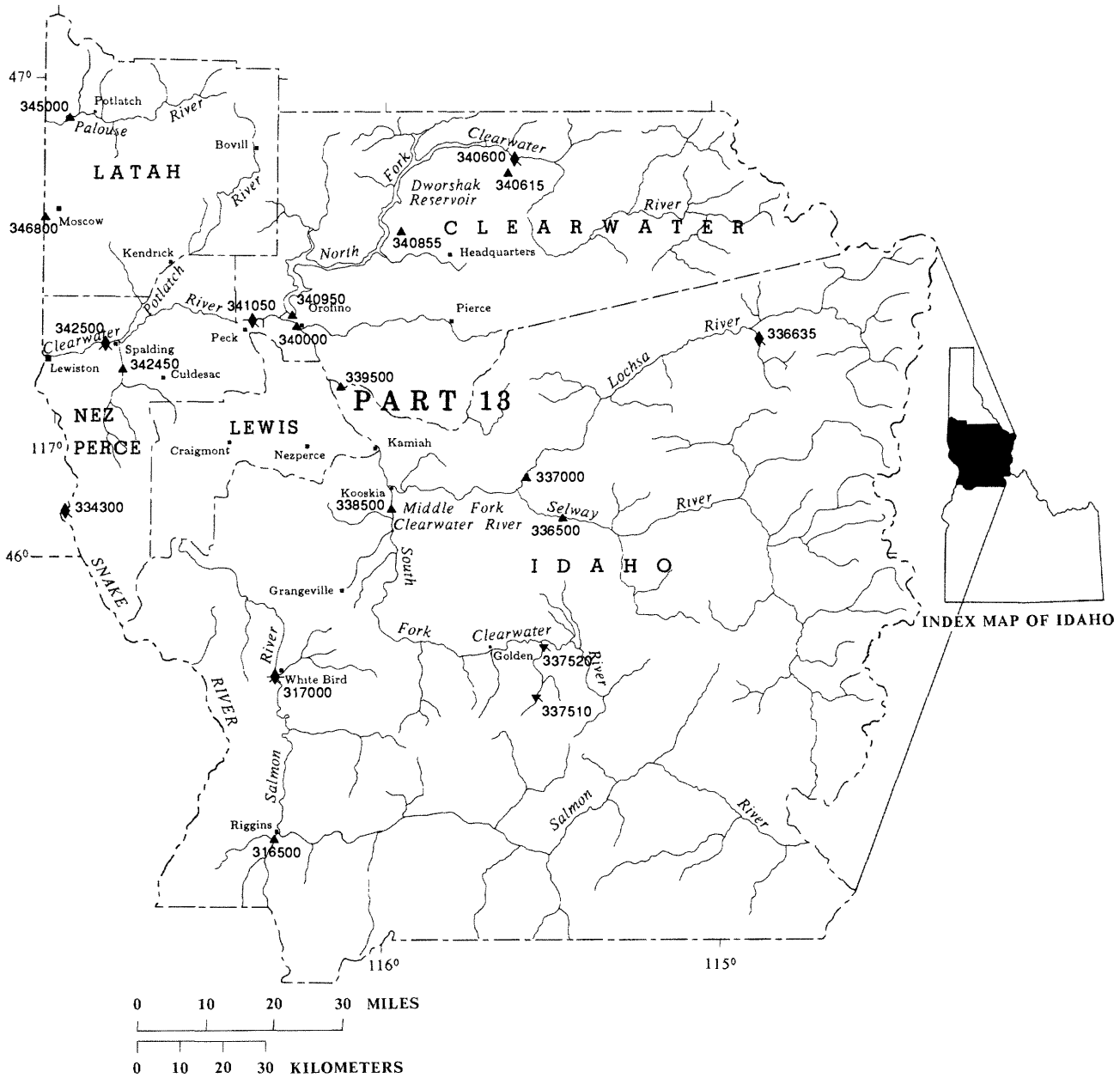


Figure 11.--Locations of surface-water and water-quality measurement sites in north-central Idaho.

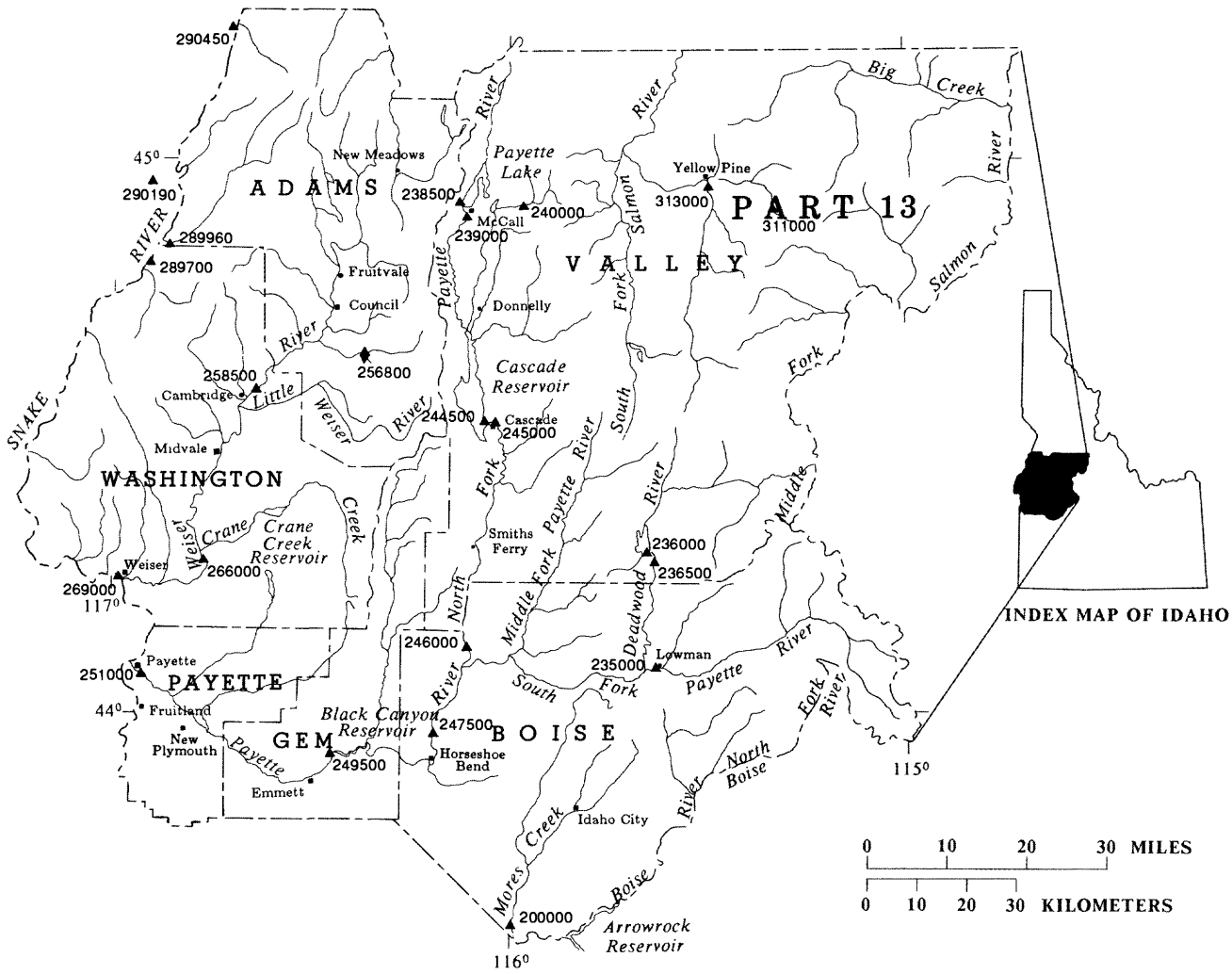


Figure 12.--Locations of surface-water and water-quality measurement sites in west-central Idaho.

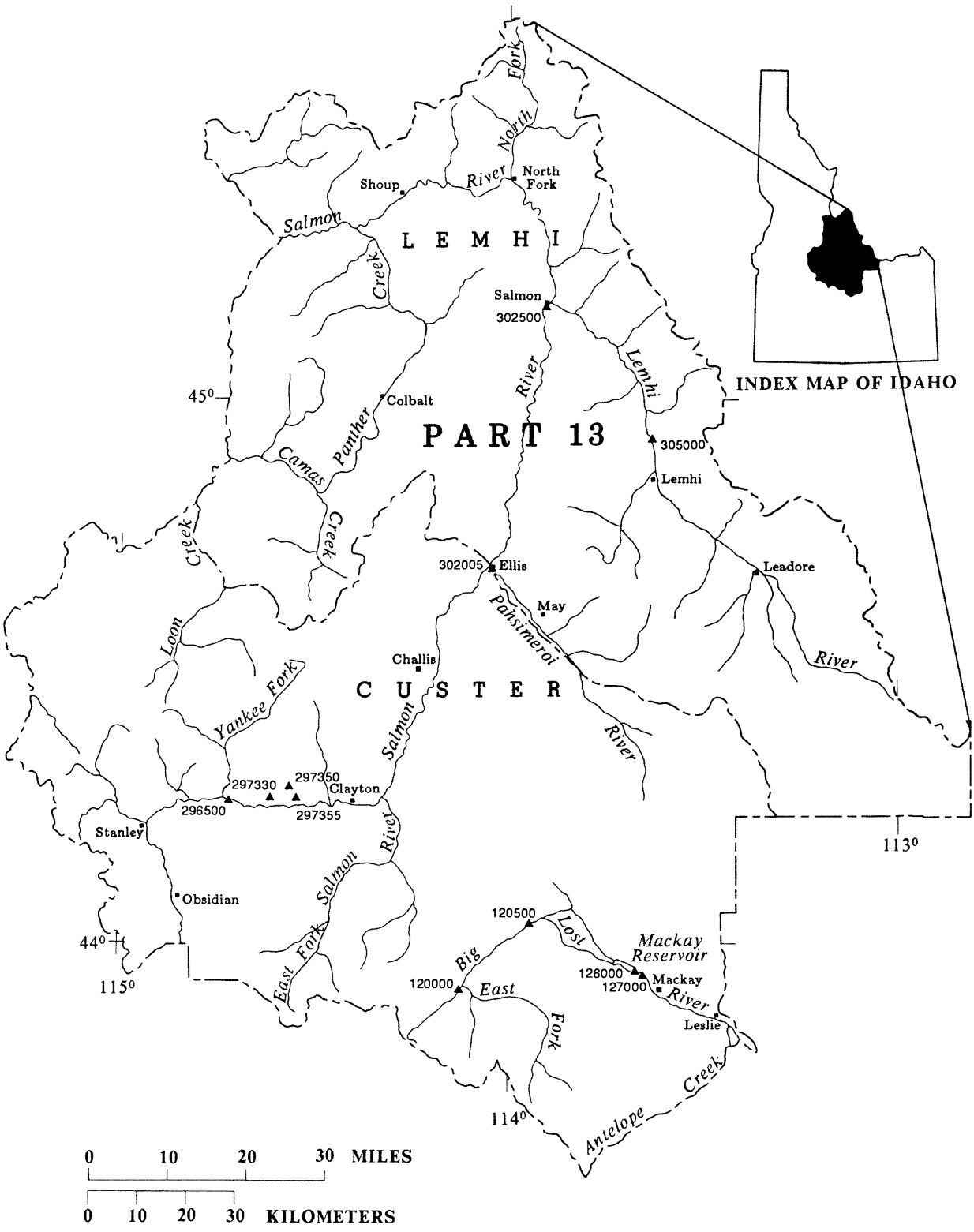


Figure 13.--Locations of surface-water and water-quality measurement sites in east-central Idaho.

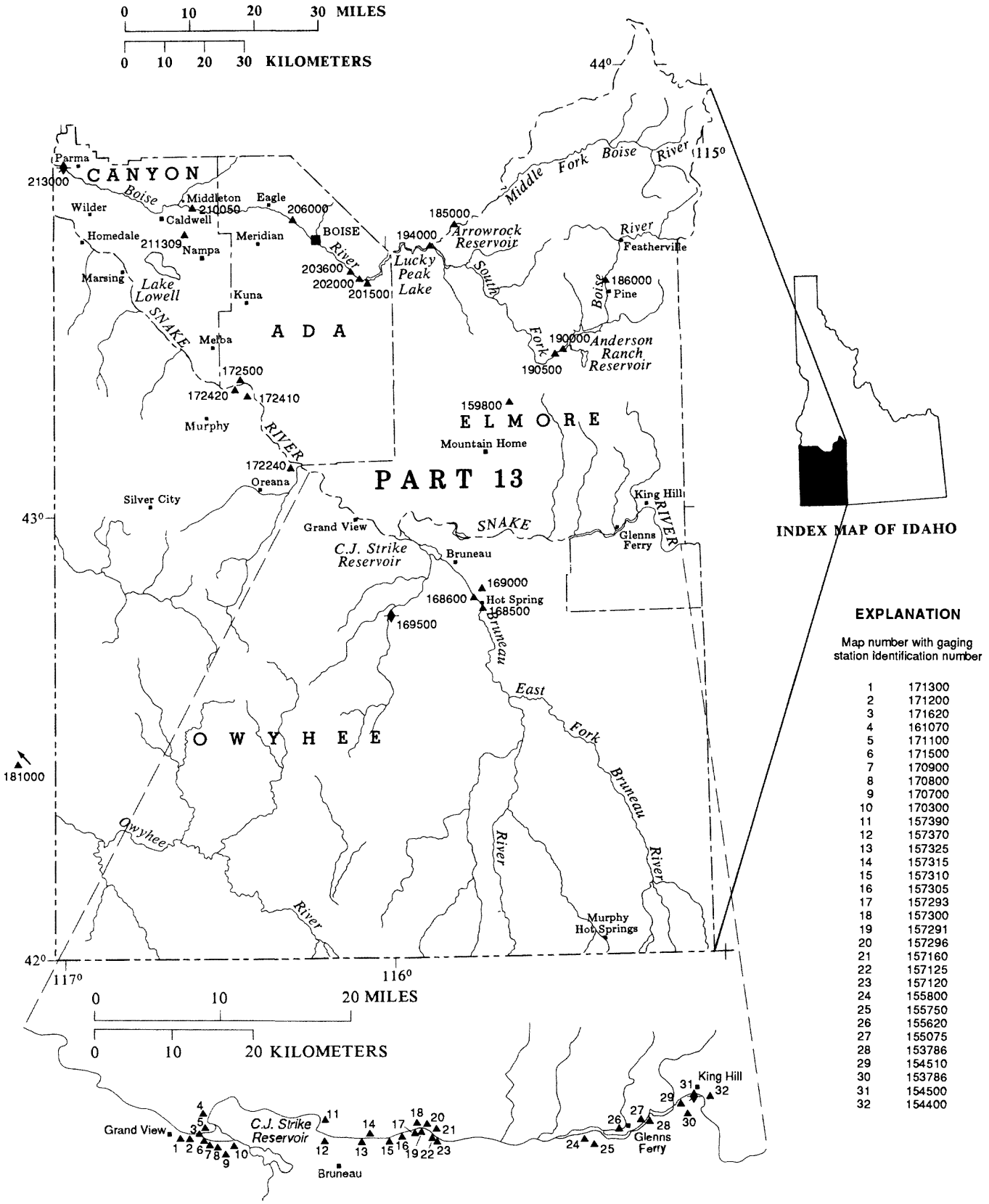


Figure 14.--Locations of surface-water and water-quality measurement sites in southwest Idaho.

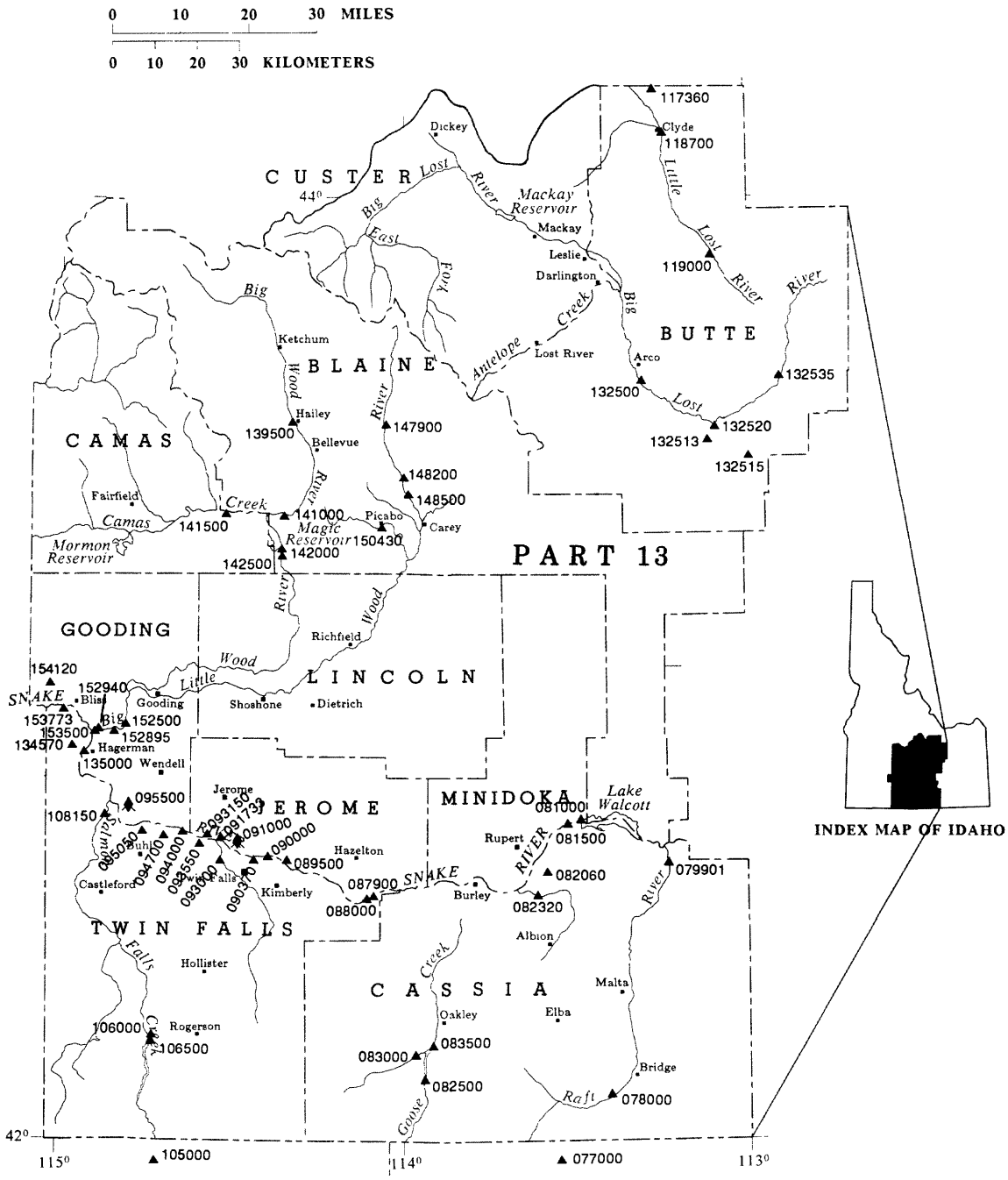


Figure 15.--Locations of surface-water and water-quality measurement sites in south-central Idaho.

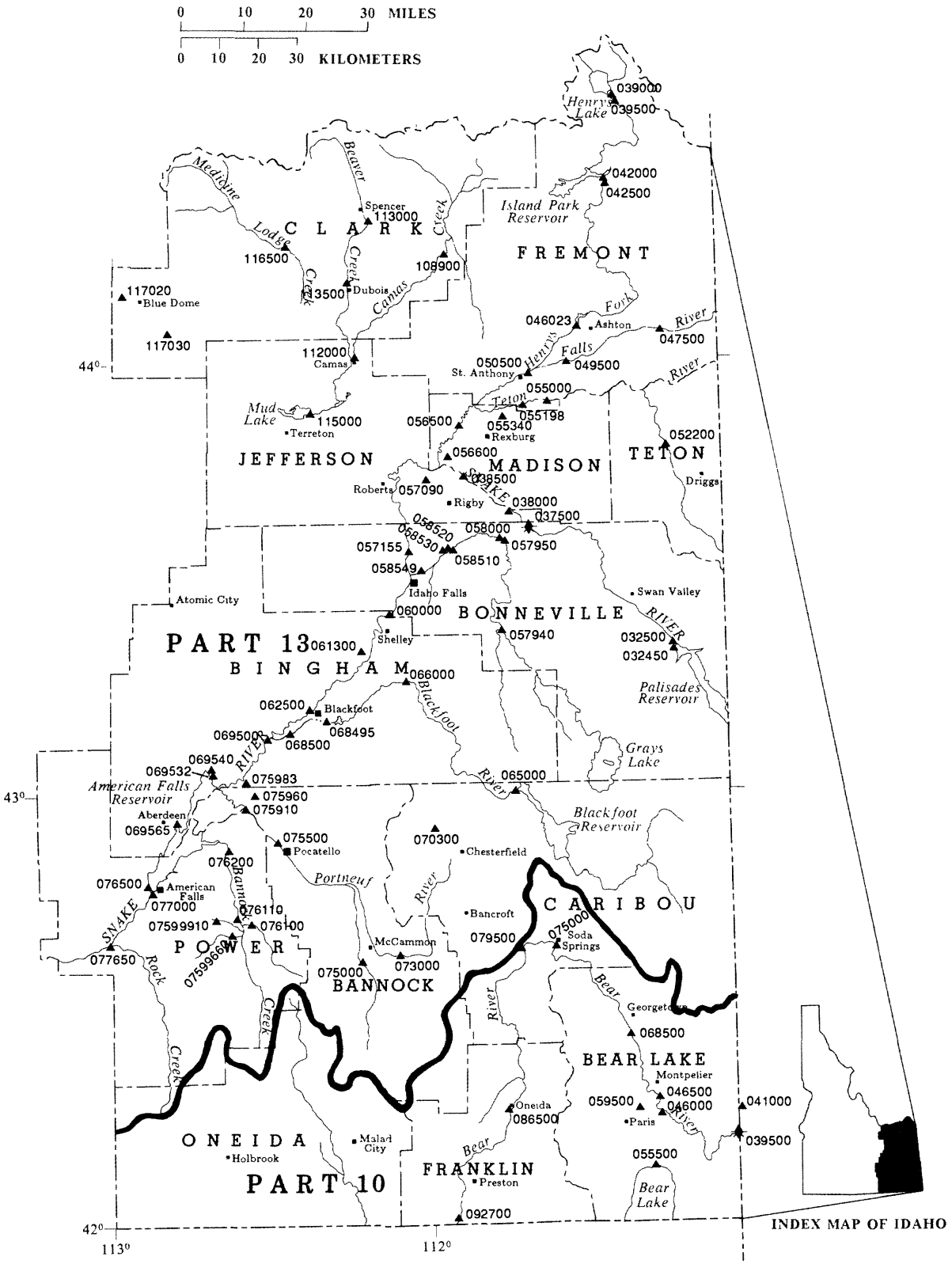


Figure 16.--Locations of surface-water and water-quality measurement sites in southeast Idaho.

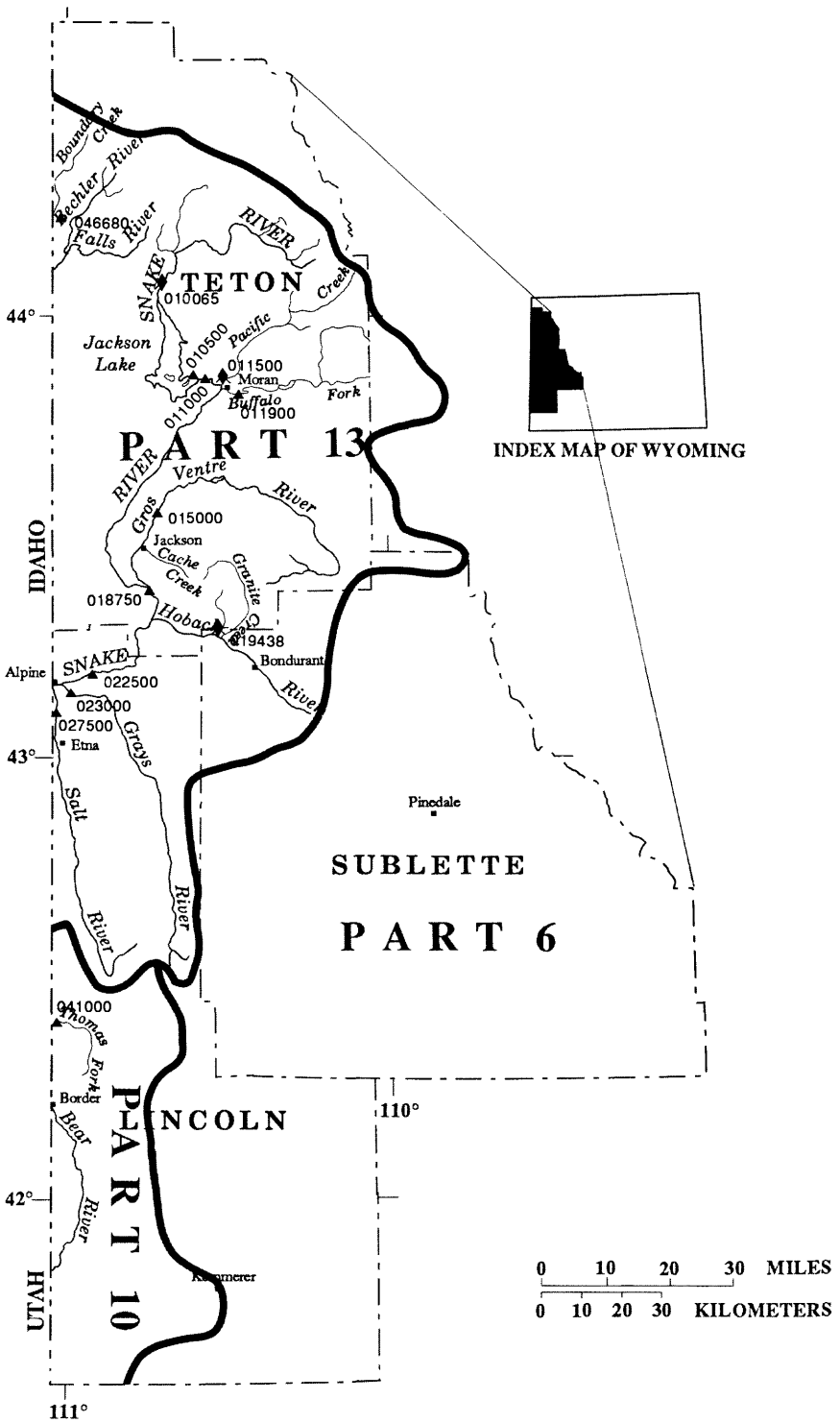


Figure 17.--Locations of surface-water and water-quality measurement sites in west-central Wyoming.

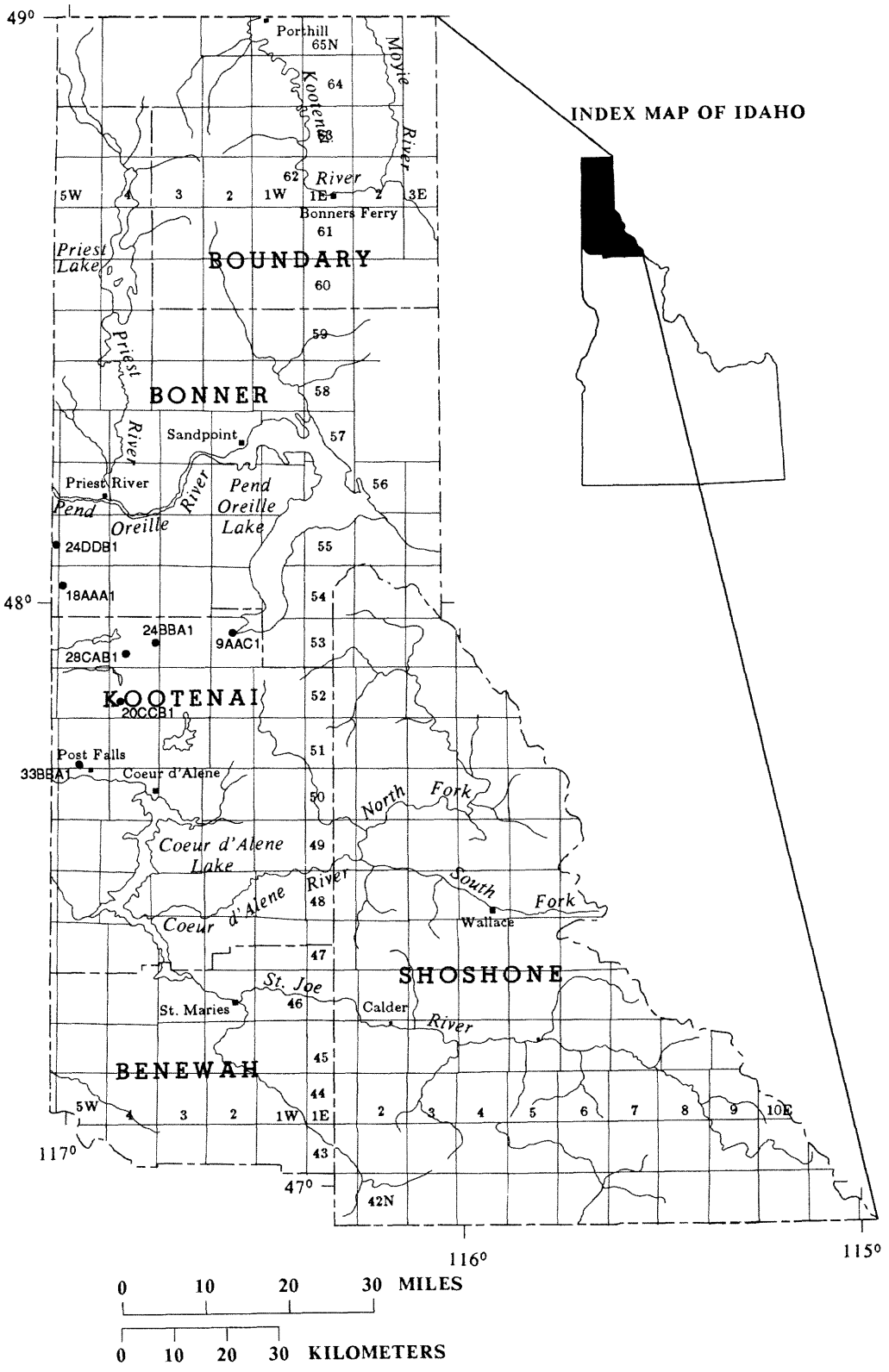


Figure 18.--Locations of observation wells in north Idaho.

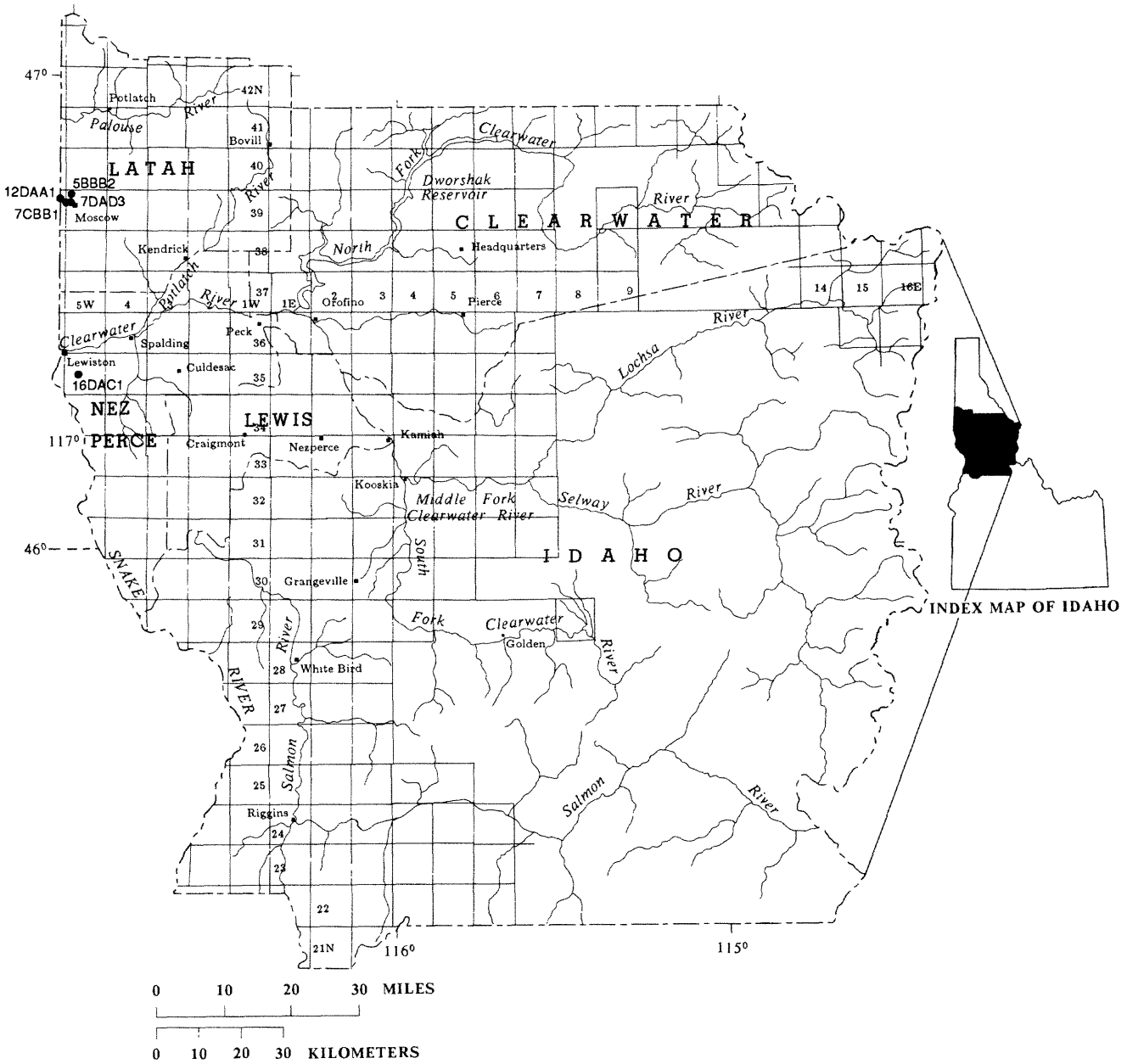


Figure 19.--Locations of observation wells in north-central Idaho.

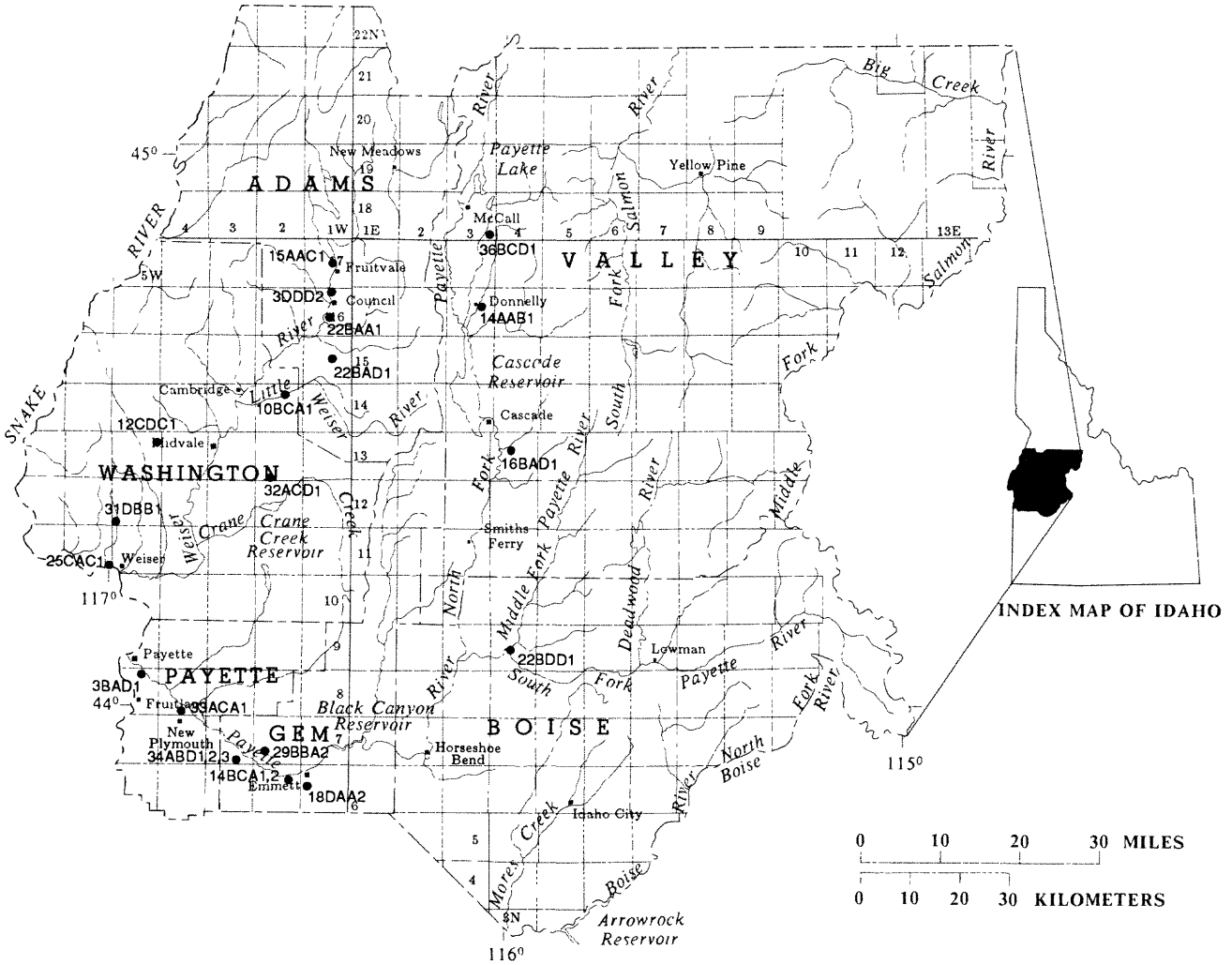


Figure 20.--Locations of observation wells in west-central Idaho.

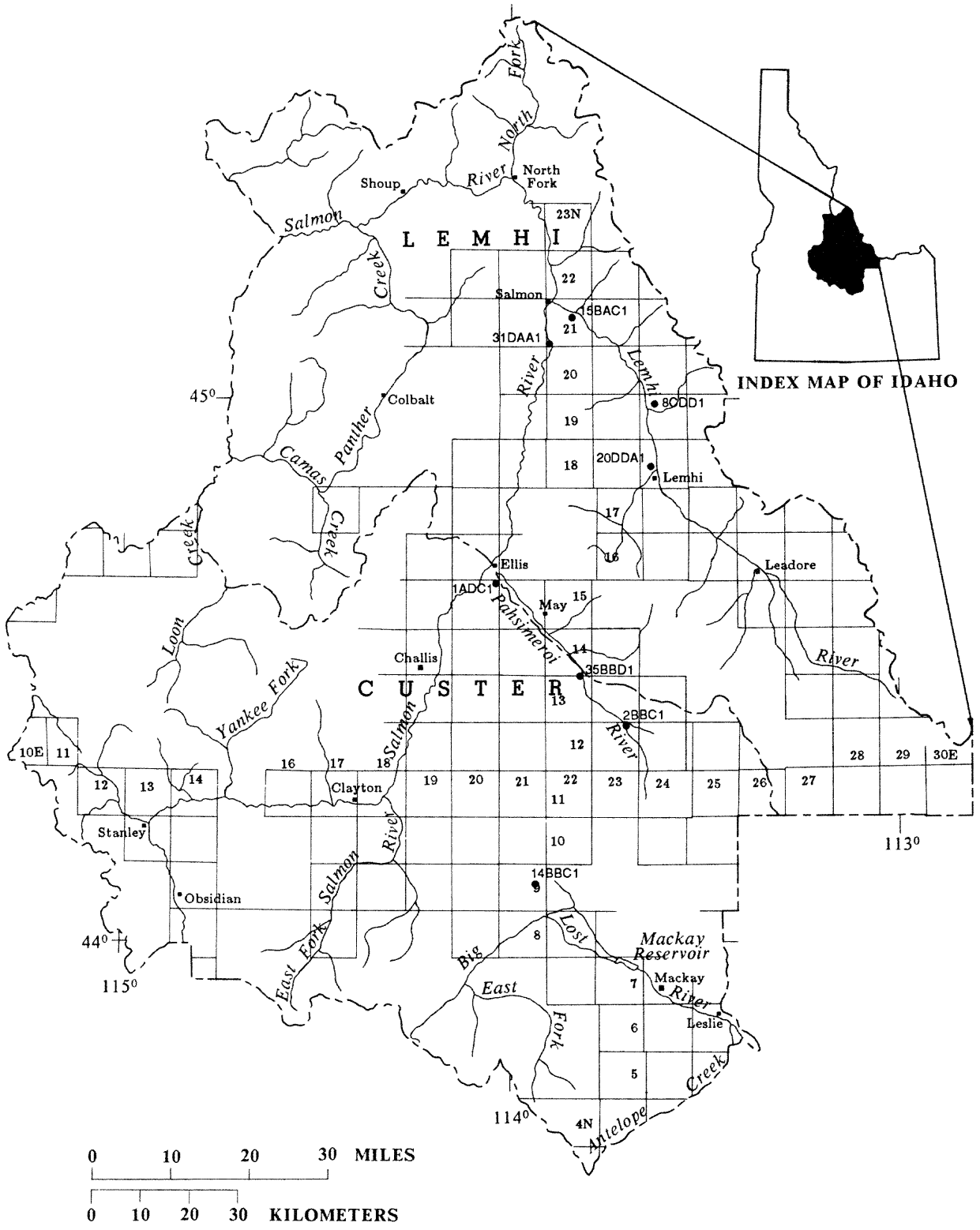


Figure 21.--Locations of observation wells in east-central Idaho.

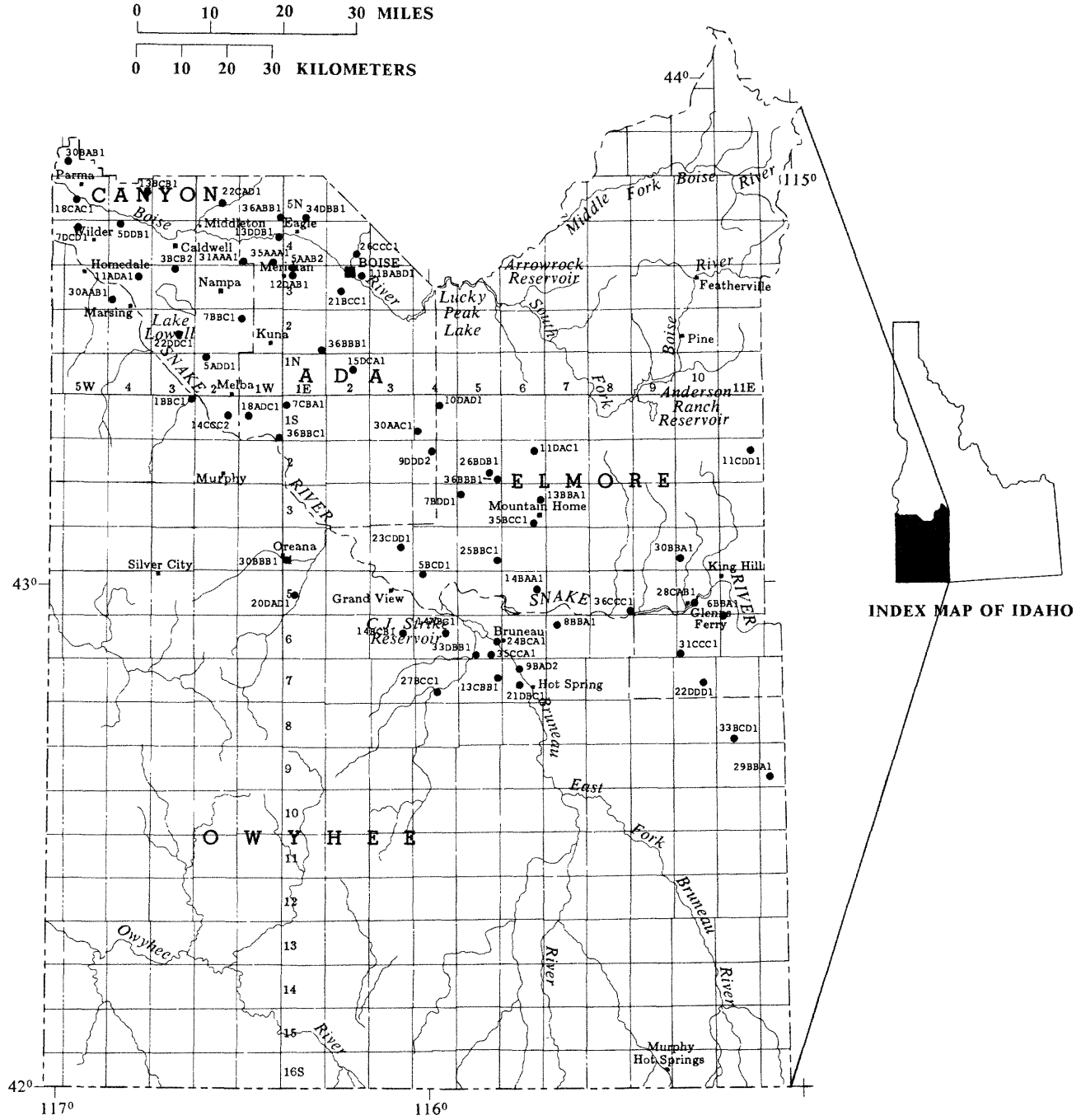
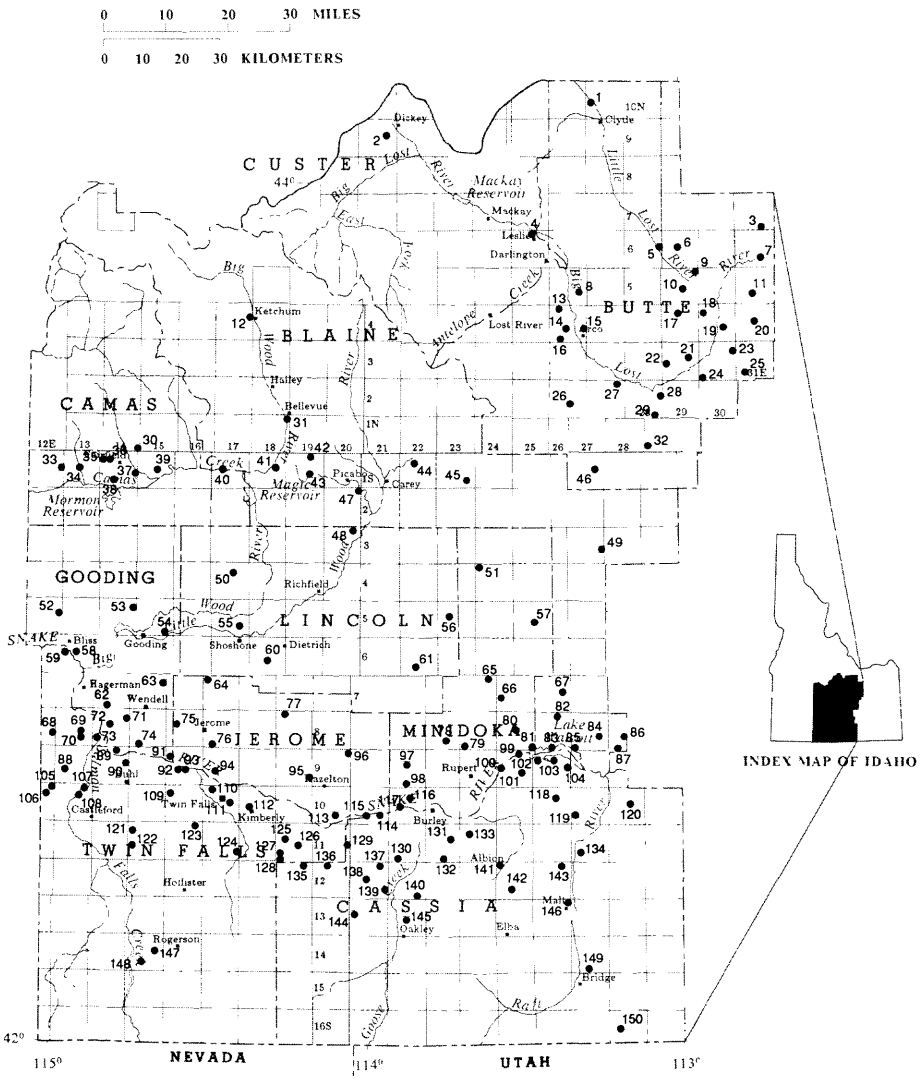


Figure 22.--Locations of observation wells in southwest Idaho.

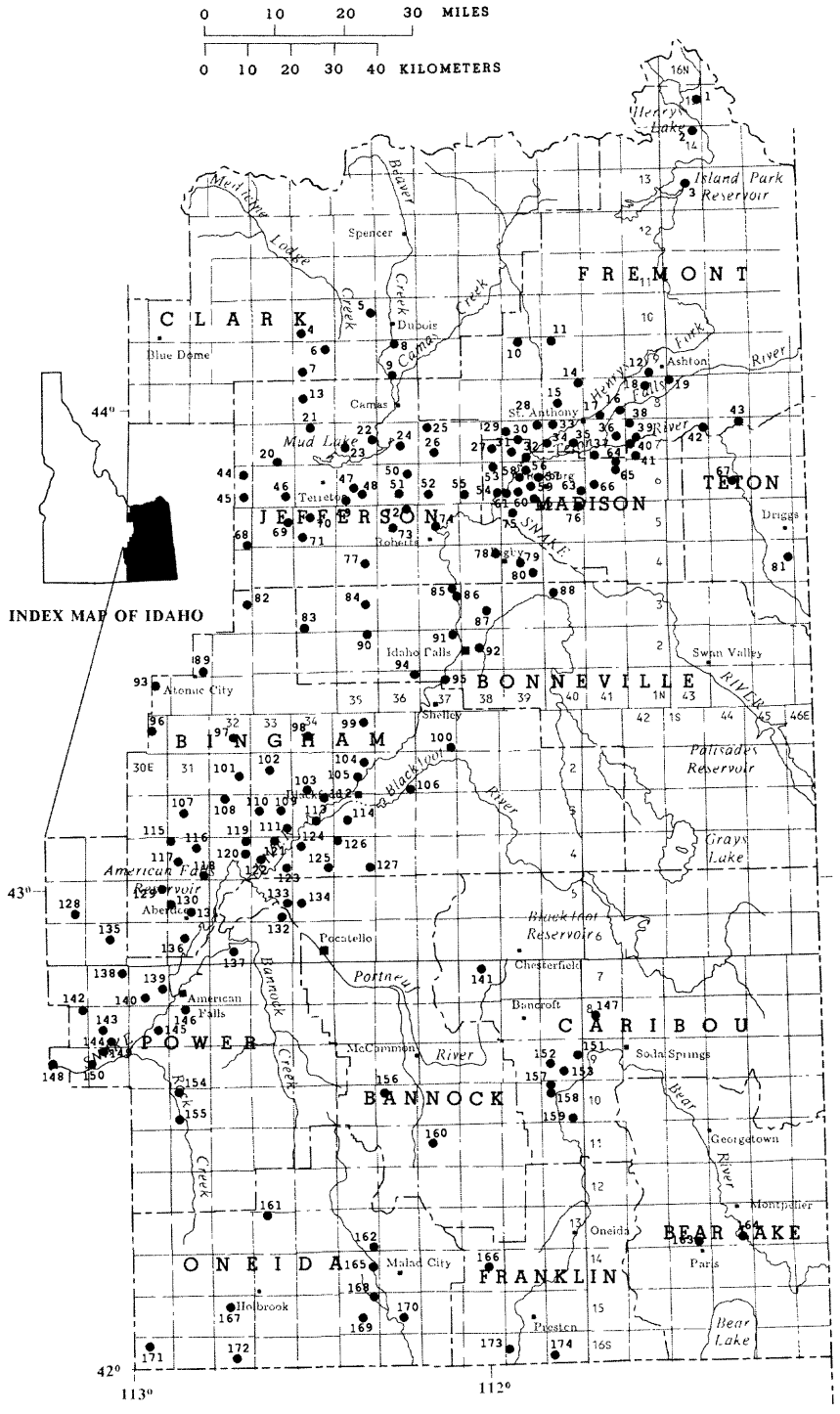


EXPLANATION

Tabulation of wells

1	19CCA1	76	32AAA1
2	14BBC1	77	5DAB1
3	34BDD1	78	27BDC1
4	3AAA1	79	31DAC1
5	13DDA1	80	16DAC1
6	16DDD1	81	36DAA1
7	27BDD1	82	3DCC1
8	23CDA1	83	33BCB1,2
9	1BBB1	84	23DDD1
10	23CDD1	85	31DDA1
11	28CCC1	86	21AAC1
12	13AAB1	87	32CDD1
13	5DCB1	88	20CCD1
14	21ABB1	89	3BAA1
15	26DCD1	90	13DDD1
16	32CBB1	91	7DCA1
17	9DCD1	92	20ADD1
18	7ADB1	93	21DCD1
19	22BDD1	94	20CAA1
20	16ADC1	95	25BBC1
21	14CBD1	96	1DAA1
22	19CBB1	97	16CDB1
23	12CDD1	98	33ADA1
24	31AAD1	99	3CAC1
25	29DDC1	100	18DDA1
26	22DDA1,2	101	23DBA1
27	2DDC1	102	7AAB1,2,3
28	13ADD1	103	10DDD1
29	35AAC1	104	13CCC1
30	36DAD1	105	1ACD1
31	1DAA1	106	11DBD1
32	30BBD1	107	2DCD1
33	13BAA1	108	10BBC1
34	16BBB1	109	7DAC1
35	7DDD1	110	5DAA1
36	8DDB1	111	14DCD1
37	24ADA1	112	20DDD1
38	28DDC1	113	27BCC1
39	16ABA1	114	26AAA1
40	17BBB1	115	28BCB1
41	14AAB1	116	10AAD1
42	3CCB2	117	20CDC1
43	22AAA1	118	10ABB1
44	9CCA1	119	30CCC1
45	26CCC1	120	15ADB1
46	14DCC1	121	7ACB1
47	1ACC2	122	19AAA1
48	2DDA1	123	2BBB1
49	24DDA1	124	25DDD2
50	10BBA1	125	17ABA1
51	6BBC1	126	23CDA1
52	13DAB1	127	30ADD1
53	12AAA1	128	31ADD1
54	35DBD2	129	24DDD1
55	26ACA1	130	32CCC1
56	17CAA1	131	14DDD1
57	22DAD1	132	34CDC1
58	16AAD1	133	8CCD1
59	18ABC1	134	29AAA1
60	22AAA1	135	2BBB1
61	28CDD1	136	4DBC1
62	33BBB1	137	2DAA1
63	12CBA1,4,5	138	16DCC1
64	6ACA1	139	25CCC1
65	2ADD1	140	35BCC1
66	19BAA1	141	6DCC1
67	14CCC1	142	28AAA3
68	24CCC1	143	2ACC1
69	23CCD1	144	18BBC1
70	26AAD1	145	21CCD1,2,3
71	12CBC1	146	1CCC1
72	16CBB1	147	14CBD1
73	30DDB1	148	28BAD2
74	32CBB1	149	33CDD1
75	17CCC1	150	20CDC1

Figure 23.--Locations of observation wells in south-central Idaho.

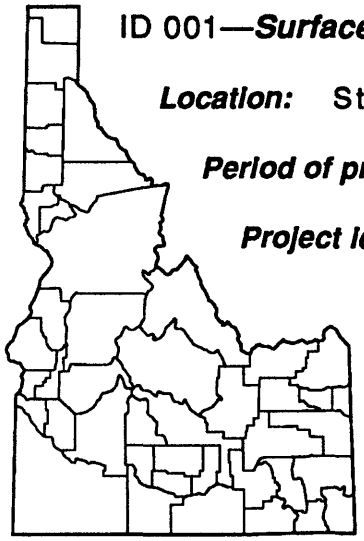


EXPLANATION

Tabulation of wells

1	13BCA1	88	8BAA1
2	2AAC1	89	35DCC1
3	15ADC1	90	2BBC1,2,3
4	29BDD1	91	2ABA1
5	13CBC1	92	16ADD1
6	11ADD1	93	10BBA1
7	29DAA1	94	1CCB1
8	4BAA1	95	10CBB1
9	33CBB1	96	15BCA1
10	4AAC1	97	22BDB1
11	5DDD1	98	21DAC1
12	34DDA1	99	11CAD1
13	17CCC3,4,5,6,7	100	36CDA1
14	1CAD1	101	23BBB1
15	21DDD2	102	16ABB1
16	25CBB1	103	33BBA1
17	33ABB1	104	11DDD1,2
18	9BAB1	105	22DAC1
19	6BAA1	106	36CDD1
20	34AAA1	107	16CBB1
21	4CDC1	108	4ACA1
22	13AAD1,2,4	109	14BBA1
23	20CBD1	110	17AAD1
24	22ABD4	111	25CCC1
25	5BCC1	112	2BCC3
26	28CCD1	113	22DAB1
27	23DBA1,3,6	114	21ADA1
28	1CCD1	115	6BBD1
29	7BDA1	116	11ABA1
30	16DBB1,2,3	117	20BBB1
31	29CDC1	118	36ABA1
32	34CCB1	119	1CBA1,3,4
33	5DBC1	120	13CBB1
34	19ADD2,3,4	121	3CBB2
35	23CCB1	122	20CBB1,2,3,4
36	14ABA1	123	25DDB1,2
37	32DDA1	124	8DBD1,2,3
38	6DDA1	125	25BCC1
39	17BAD1	126	6BBB1
40	19ABA1	127	25DBC1
41	32BBB1	128	26BBD1
42	12BCB1	129	12BBA1
43	2AAA1	130	19DDC1
44	11ABA1	131	27ABA1
45	26CDB1	132	35CDC1
46	26DDB1	133	24CCC1,2,3
47	21AAB1	134	20CBB2
48	27DDA1	135	15BBC1
49	32DDD1	136	16BAB1
50	11ABA1,2,3,4	137	27ADC1
51	27BAA1	138	12CCC1
52	29ACA1,2,4	139	24DDC1
53	2DBD1	140	28BBC1
54	25ACB4	141	10CCD1
55	30BAD2,3,4	142	1AAA2
56	10BBB1,2,3.4	143	21ADD2
57	13ABA1	144	34CBC1,2,3
58	16DAA1	145	23DCC1
59	23AAC2	146	4CBB1
60	28BBB1	147	17CAB1
61	30ADC1,2,3	148	18BAD1,2,3
62	35CBB2	149	4BCA1
63	25BCB1	150	18CDA1
64	2BDC1	151	13ACB1
65	11CDB1	152	20BDB1
66	20BDC1	153	27BCD1
67	22DDC1	154	5DAD1
68	36ADD1	155	29BBA1
69	13BDC1,2,3	156	8DDD1
70	9BDA1	157	5BDD1
71	29DAA1	158	8BBA1
72	2BDA1,2,3	159	35BDD1
73	21DAC1	160	16BBB1
74	21DBB1,3	161	4ADD1
75	8DAD1	162	36CCD1
76	1CCD1	163	35CCD1
77	14AAA1	164	26BAD1
78	12BBB1,2,3,4,5	165	13DBA1
79	16DAD1	166	15CDC1
80	26DAA1	167	9AAA2
81	13ADA1	168	1DAA1
82	13DCA1	169	22AAB1
83	32BBC1	170	22ABA1
84	14DDD1	171	9ABB2
85	2CBD1	172	27DAB1
86	12BDB1	173	18CDA1
87	22BAB1	174	29CCB1

Figure 24.--Locations of observation wells in southeast Idaho.



ID 001—*Surface-Water Stations*

Location: Statewide

Period of project: Continuous since July 1889

Project leader: William A. Harenberg

Objectives: Collect surface-water data to meet the needs for: (1) Assessment of water resources; (2) operation of reservoirs or industries; (3) forecasting; (4) disposal of wastes; (5) determination of discharge to accompany water-quality measurements; (6) legal requirements; and (7) research, planning, and design studies that define the statistical properties of and trends in streamflow and lake levels.

Approach: Measure and record stage and discharge of streams and stage and contents of lakes and reservoirs, using standard methods of data collection as described in the series "Techniques of Water Resources Investigations of the United States Geological Survey." (For more information on this series, see p. 58, "Publications of the U.S. Geological Survey.") Collect partial-record data at sites where continuous-record data are not required.

Progress In FY 1988: Collected and compiled stage and discharge data for 244 gaging stations, stage only for 2 gaging stations, stage or elevation for 8 lakes and reservoirs, contents only for 23 lakes and reservoirs, and partial-record data.[2] Incorporated data as part of the WATSTORE (National Water Data Storage and Retrieval) system. (For more information on this system, see p. 58, "Water-Data Program.") The Idaho District is also engaged in establishing a "real-time" data network to provide a continuous record of river stage and discharge. Such data are used for: (1) Prompt identification of extreme flows that could have an effect on the safety of life and property, (2) decision making where high flows might affect the management of hazardous waste materials, (3) irrigation and hydrologic project operations, and (4) joint operation of selected Canadian gaging stations under the Boundary Waters Treaty with the International Joint Commission on Waterways.

Plans for FY 1989: Continue to collect and compile stage and discharge data at 285 continuous record sites. Collect and compile data collected at numerous miscellaneous sites. Add new data to WATSTORE and publish results at end of water year. Continue operation of all surface-water data networks.

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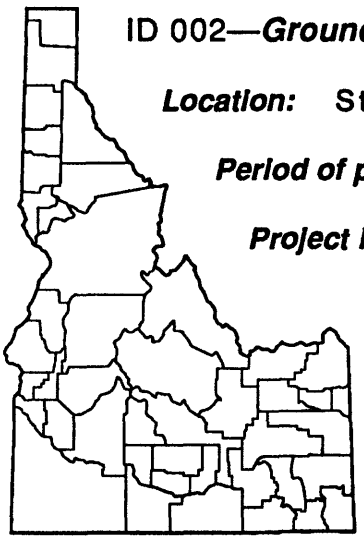
[2] Some data supplied by the Idaho Power Company, Oakley Canal Company, Salmon River Canal Company, Utah Power and Light Company, Washington Water Power Company, and Water Districts 01, 31, 32, 33, 34, 37, 37N, 63, and 65K.

Funding sources: Federal Energy Regulatory Commission, Idaho Department of Fish and Game, Idaho Department of Health and Welfare, Idaho Department of Water Resources, International Joint Commission (Waterways Treaty), Teton County (Wyoming) Commissioners, U.S. Army Corps of Engineers, U.S. Bonneville Power Administration, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Department of Energy, U.S. Geological Survey, and Water District 01.

Reports:

Harenberg, W.A., Jones, M.L., O'Dell, Ivalou, and Cordes, S.C., 1988, Water resources data, Idaho, water year 1987: U.S. Geological Survey Water-Data Report ID-87-1, 655 p.

-----1989, Water resources data, Idaho, water year 1988: U.S. Geological Survey Water-Data Report ID-88-1, 669 p.



ID 002—*Ground-Water Stations*

Location: Statewide

Period of project: Continuous since July 1946

Project leader: Michael L. Jones

Objectives: (1) Establish and maintain an observation-well network sufficient to provide a long-term data base so that the general response of the hydrologic system to climatic variations and induced stresses is known and potential problems can be identified early enough to allow proper planning and management of the water resource, and (2) provide a data base with which short-term records acquired in areal studies can be compared and analyzed.

Approach: (1) Select wells in which water-level fluctuations will be representative of the aquifers to be monitored, (2) make water-level measurements in these wells periodically or continuously by means of a recording device, (3) keep tabular and graphical (hydrograph) records of the water-level fluctuations, and (4) evaluate and revise the network on a continual basis to provide the best possible coverage at the least possible cost.

Progress in FY 1988: Measured water levels annually, semiannually, quarterly, bimonthly, or monthly in 350 wells and continuously in 25 wells equipped with automatic recorders. Also, measured water levels bimonthly and monthly in 77 wells for the U.S. Bureau of Reclamation.

Plans for FY 1989: Continue to update and process well data for storage and retrieval in the automated data base. The number of sites maintained for specific projects will increase those operated as part of the statewide network will remain the same.

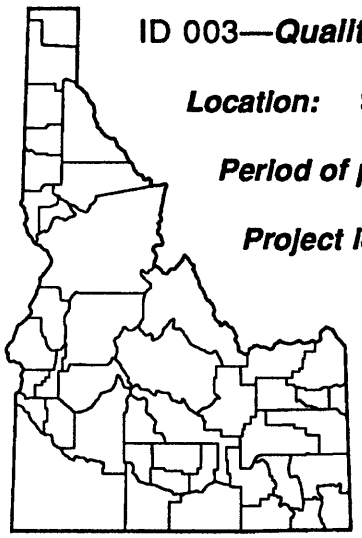
Funding sources: College of Southern Idaho, Idaho Department of Water Resources, Shoshone-Bannock Tribes, U.S. Bureau of Reclamation, U.S. Geological Survey, and Water District 31.

Reports:

Harenberg, W.A., Jones, M.L., O'Dell, Ivalou, and Cordes, S.C., 1988, Water resources data, Idaho, water year 1987: U.S. Geological Survey Water-Data Report ID-87-1, 655 p.

-----1989, Water resources data, Idaho, water year 1988: U.S. Geological Survey Water-Data Report ID-88-1, 669 p.

Jones, M.L., and Tungate, A.M., 1989, Hydrographs of water levels in observation wells in Idaho, 1982-88: U.S. Geological Survey Open-File Report 89-232, 330 p.



ID 003—*Quality-of-Water Stations*

Location: Statewide

Period of project: Continuous since July 1966

Project leader: Ivalou O'Dell

Objectives: Provide a national base of surface-water quality data for broad Federal and State planning and action programs and provide data for Federal management of interstate and international waters.

Approach: Establish and operate a network of water-quality stations to provide data on average chemical concentrations, loads, and time trends as required by planning and management agencies. Use standard methods of water-sample collection and preparation for laboratory analyses. Make applicable field determinations of water quality.

Progress in FY 1988: Collected water-quality data routinely at 212 stations. Determined water temperature and specific conductance at 212 stations; pH, dissolved oxygen, and inorganic constituents at 11 stations; and biological data at 11 stations. Six of the 212 stations are also part of NASQAN (National Stream Quality Accounting Network), which detects nationwide trends in water quality. Three of the 212 stations are part of the National Hydrologic Benchmark Network, which provides data representative of basins relatively undisturbed by human activities. Collected water-quality data bimonthly at six NASQAN stations, one benchmark station, and at Snake River above Jackson Lake at Flagg Ranch, Wyo. Collected water-quality data quarterly at two benchmark stations and at Little Granite Creek near Bondurant, Wyo. Collected continuous records of water temperature at 10 stations.

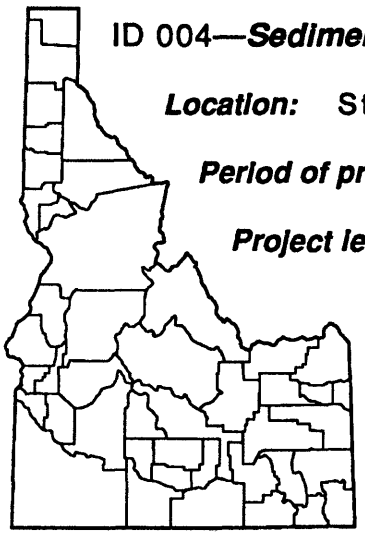
Plans for FY 1989: Continue to collect water-quality data at NASQAN and benchmark stations. Continue to collect water-quality data bimonthly at Snake River above Jackson Lake at Flagg Ranch, Wyo., and quarterly at Little Granite Creek near Bondurant, Wyo. Collect continuous records of water temperature at eight stations.

Funding sources: Federal Energy Regulatory Commission, Idaho Department of Fish and Game, Idaho Department of Health and Welfare, National Park Service, U.S. Army Corps of Engineers, and U.S. Geological Survey.

Reports:

Harenberg, W.A., Jones, M.L., O'Dell, Ivalou, and Cordes, S.C., 1988, Water resources data, Idaho, water year 1987: U.S. Geological Survey Water-Data Report ID-87-1, 655 p.

-----1989, Water resources data, Idaho, water year 1988: U.S. Geological Survey Water-Data Report ID-88-1, 669 p.



ID 004—*Sediment Stations*

Location: Statewide

Period of project: Continuous since November 1968

Project leader: Ivalou O'Dell

Objectives: Provide a national base of sediment data for use in broad Federal and State planning and action programs and provide data for Federal management of interstate and international waters.

Approach: Establish and operate a network of sediment stations to collect data that define spatial and temporal averages and trends of sediment concentration, sediment discharge, and particle size of sediment being transported by rivers and streams.

Progress in FY 1988: Collected suspended-sediment samples daily by PS 69 automatic pumping sampler at Kootenai River at Porthill. Collected suspended-sediment samples bimonthly at six NASQAN stations, one benchmark station, and at Snake River above Jackson Lake at Flagg Ranch, Wyo., and quarterly at two benchmark stations. Collected suspended- sediment samples monthly (weekly during spring runoff) at Clark Fork near Cabinet, Idaho. During spring runoff, collected suspended-sediment samples weekly at Granite and Little Granite Creeks near Bondurant, Wyo. and Pacific Creek at Moran, Wyo. During spring runoff, collected bedload samples at Pacific Creek and Little Granite and Granite Creeks.

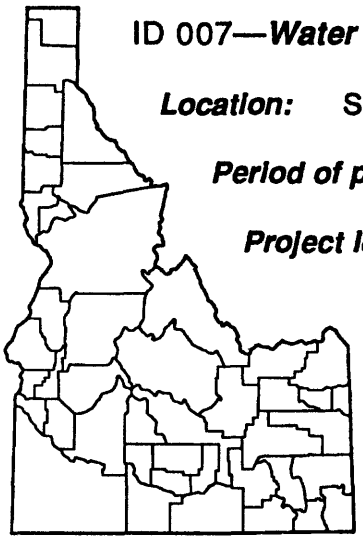
Plans for FY 1989: Collect suspended-sediment samples daily at Kootenai River at Porthill, bimonthly at six NASQAN sites, and quarterly at two benchmark sites. Collect sediment samples bimonthly (weekly during spring runoff) at Snake River above Jackson Lake at Flagg Ranch, Wyo. Collect sediment samples weekly during spring runoff at Granite and Little Granite Creeks near Bondurant, Wyo., and Pacific Creek at Moran, Wyo. Collect bedload samples weekly during spring runoff at Snake River above Jackson Lake at Flagg Ranch, Wyo., Pacific Creek, and at Granite and Little Granite Creeks.

Funding sources: Idaho Department of Health and Welfare, International Joint Commission (Waterways Treaty), and U.S. Geological Survey.

Reports:

Harenberg, W.A., Jones, M.L., O'Dell, Ivalou, and Cordes, S.C., 1988, Water resources data, Idaho water year 1987: U.S. Geological Survey Water-Data Report ID-87-1, 655 p.

-----1989, Water resources data, Idaho, water year 1988: U.S. Geological Survey Water Data Report ID-88-1, 669 p.



ID 007—***Water Use***

Location: Statewide

Period of project: Continuous since October 1978

Project leader: Molly A. Maupin

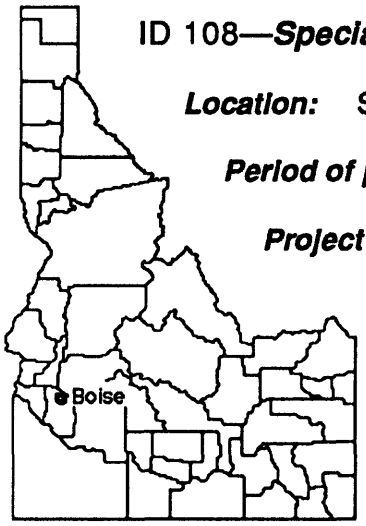
Objectives: Evaluate for the State of Idaho the NWUDS (National Water Use Data System) and other data-management systems to establish a water-use data collection and dissemination program that will be responsive to needs of users at both State and national levels.

Approach: Contract with governmental and private agencies currently collecting water data to establish a framework for coordination of water-use data. Identify future data needs and determine the best way to meet those needs. Investigate and develop new techniques for better data collection. Review the NWUDS State level data-elements dictionary, prepare a guide to Idaho water-data information sources, and, every fifth year, furnish written documentation of study results.

Progress in FY 1988: Generated data for all water-use categories for 1987 and entered into the NWUDS.

Plans for FY 1989: Generate data for 1988 and enter into the NWUDS.

Funding sources: Idaho Department of Water Resources and U.S. Geological Survey.



ID 108—*Special Hydrologic and Hydraulic Studies*

Location: Southwestern Idaho

Period of project: January 1988 to June 1988

Project leader: H.W. Young

Objectives: Provide special hydrologic and hydraulic studies as requested by other Federal and State agencies. Following Western Region approval, assign experienced district hydrologists to conduct specialized studies.

Approach: Experienced hydrologists will use latest available techniques to provide the requested work, contacting Western Region specialists as required. All data collected or compiled will be considered for publication in the Open-File Report series or, if significant results accrue, in the Water-Resources Investigations Report series or other appropriate publication series.

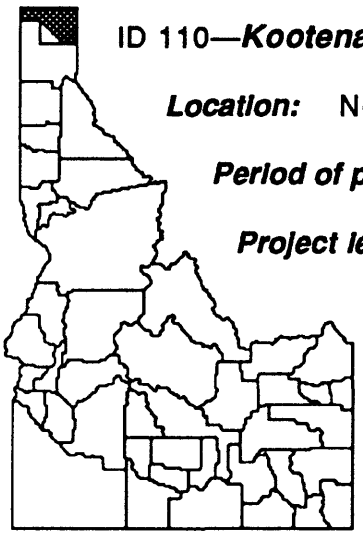
Progress in FY 1988: This special study was conducted to investigate and define chemical, physical, and isotopic characteristics of thermal water in the Boise area. Thirty-seven thermal-water wells and three nonthermal springs in the Boise area were inventoried. The well inventory included water use, water levels, and well-construction data. Water samples for chemical and isotopic analyses were collected from 18 thermal-water wells and 3 nonthermal springs.

Plans for FY 1989: Activate as need arises.

Funding source: U.S. Department of Energy.

Report:

Young, H.W., Parliman, D.J., and Mariner, R.H., 1988, Chemical and hydrologic data for selected thermal-water wells and nonthermal springs in the Boise area, southwestern Idaho: U.S. Geological Survey Open-File Report 88-471, 35 p.



ID 110—*Kootenay Lake Board of Control*

Location: Northern Idaho, Kootenai River basin

Period of project: Continuous since January 1938

Project leader: Jerry L. Hughes

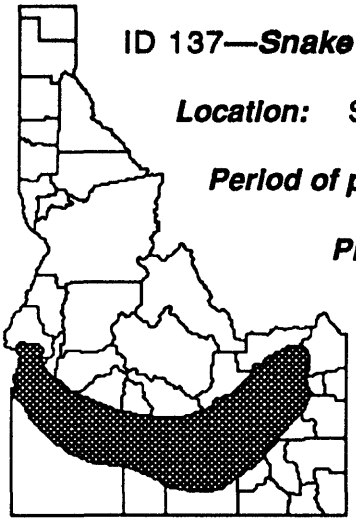
Objective: Fulfill United States' responsibilities under the terms of the continuing International Waterways Treaty program. The Board serves as advisor to the International Joint Commission.

Approach: Attend scheduled meetings and inspection trips. Review hydrologic data concerning regulation of Kootenay Lake or effects of Libby Dam operation on Kootenay Lake.

Progress in FY 1988: Revised the Annual Report of the Kootenay Lake Board of Control to reflect operations of the previous 12 months. District hydrographers made thrice-yearly inspections and measurements of the Kootenay River at Grohman Narrows, British Columbia, and forwarded the information to Canada's Inland Water Directorate at Vancouver. Robert W. Harper, Idaho Data Chief, accompanied personnel from the U.S. Army Corps of Engineers and representatives from Canada on a tour of the projects in Canada in September 1987.

Plans for FY 1989: Rerun a 20-mile level line to accurately determine the fall between the Kootenai River at Klockmann Ranch and Kootenai River at Porthill gaging stations. Continue to collect data on the Kootenai River and at Kootenay Lake.

Funding source: International Joint Commission (Waterways Treaty).



ID 137—***Snake River Plain RASA (Regional Aquifer-System Analysis)***

Location: Southern Idaho

Period of project: October 1979 to September 1992

Project leader: Gerald F. Lindholm

Objectives: (1) Describe geologic, hydrologic, and chemical-quality aspects of the aquifer system; (2) evaluate the water-supply potential of the system; and (3) predict responses of the system to changes in ground-water development through the use of hydrologic-system models.

Approach: Phase I: (1) Establish liaison committees and review existing literature and data bases, and plan and contract for geophysical and geological mapping and test drilling; (2) compile existing data, collect additional data, and develop regional ground-water flow models; and (3) use models to evaluate aquifer systems and simulate projected water-use schemes to evaluate hypothetical future conditions. Phase II: (1) Identify and quantify key parts of the regional hydrologic system.

Progress in FY 1988: Obtained Director's approval for a Phase I report on the western Snake River Plain. Completed Phase II studies of the American Falls area and the Big Lost River basin and submitted reports for review. As part of the Phase II study of Thousand Springs, measured spring discharges between Milner and King Hill and collected samples for chemical analyses. Deepened an existing well from 900 to 1,017 feet and installed a piezometer. Drilled two test holes, one 450 and one 600 feet deep, 3 miles from the Snake River in line with Thousand Springs and the RASA I test hole. Installed piezometers at various depths in the new holes. Developed a cross-sectional model along a ground-water flowpath that runs through the RASA test holes and Thousand Springs. Modeled the springs as a seepage face. Began comparing chemistry of water from basalt of the Snake River Group with chemistry of water from older Banbury Basalt to determine whether water chemistry might indicate the source of spring discharges.

Plans for FY 1989: Calibrate and use the model to analyze geologic controls on ground-water discharge in the Thousand Springs area. Collect and analyze water samples from the new piezometers. Write a report to summarize study findings.

Funding source: U.S. Geological Survey.

Reports:

Garabedian, S.P., 1989, Hydrology and digital simulation of the regional aquifer

system, eastern Snake River Plain, Idaho: U.S. Geological Survey Open-File Report 87-237, 151 p.

Goodell, S.A., 1988, Water use on the Snake River Plain, Idaho and eastern Oregon: U.S. Geological Survey Professional Paper 1408-E, 51 p.

Lindholm, G.F., 1988, Hydrogeologic overview of the eastern Snake River Plain, Idaho [abs.]: Geological Society of America Abstracts with Programs, v. 20, no. 6.

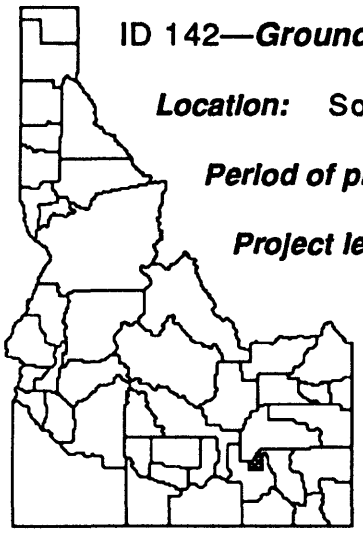
-----1988, Idaho water use—power and potatoes: American Water Resources Association Symposium on Water Use, Tucson, Ariz., August 1988, Poster Session contribution.

-----1988, Snake River Plain regional aquifer system study: American Water Resources Association Monograph Series no. 14, p. 15-36.

Lindholm, G.F., Garabedian, S.P., Newton, G.D., and Whitehead, R.L., 1988, Configuration of the water table and depth to water, spring 1980, water-level fluctuations, and water movement in the Snake River Plain regional aquifer system, Idaho and eastern Oregon: U.S. Geological Survey Hydrologic Investigations Atlas HA-703, scale 1:500,000.

Spinazola, J.M., 1988, Examining ground-water/surface-water relations in the American Falls area, southeastern Idaho, with a three-dimensional groundwater flow model [abs.]: Geological Society of America Abstracts with Programs, v. 20, no. 6.

Wood, W.W., and Low, W.H., 1988, Solute geochemistry of the Snake River Plain regional aquifer system: U.S. Geological Survey Professional Paper 1408-D, 79 p.



ID 142—*Ground Water, Michaud Flats*

Location: Southeastern Idaho

Period of project: October 1980 to September 1988

Project leader: Nathan D. Jacobson

Objectives: Describe degree and extent of ground-water contamination, identify major data gaps, and establish a ground-water monitoring network. Using data obtained, determine the occurrence and movement of ground water, describe hydrologic and geologic framework, identify land-use activities or waste-disposal practices that are potential sources of contamination, and identify in-plant processing procedures implemented by local industrial complexes to control ground-water contamination.

Approach: (1) Obtain historical water-quality data and review available literature, (2) design a water-quality monitoring network to provide for semiannual sampling at selected sites, and (3) obtain water-level measurements and water-quality samples from wells and springs.

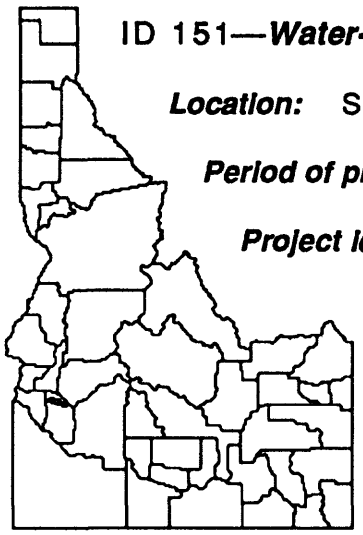
Progress in FY 1988: As part of the continuing water-quality network, collected water samples annually from five wells and one spring for chemical and radiochemical analyses. Completed a report summarizing data collected since 1983.

Plans for FY 1989: Publish data report.

Funding sources: Shoshone-Bannock Tribes and U.S. Geological Survey.

Report:

Jacobson, N.D., 1989, Water-quality data for selected sites on Michaud Flats, Fort Hall Indian Reservation, Idaho, December 1982 to July 1987: U.S. Geological Survey Open-File Report 89-71, 26 p.



ID 151—*Water-Quality Evaluation, Boise River*

Location: Southwestern Idaho

Period of project: July 1987 to December 1988

Project leader: Steven A. Frenzel

Objectives: Determine the impact of effluent discharges from the City of Boise's Lander Street and West Boise wastewater-treatment facilities on the physical, chemical, and biological quality of the Boise River.

Approach: (1) Conduct surveys of algal, benthic, and fish communities (in October 1987 and February 1988); (2) characterize the chemical nature of the effluent, river water, and river sediment; and (3) characterize the physical nature of streamflow and dispersion of the effluent.

Progress in FY 1988: Collected physical, chemical, and biological data upstream and downstream from the City of Boise's wastewater-treatment facilities. Published two reports summarizing data collected from October 1987 to March 1988. Began writing interpretive report.

Plans for FY 1989: Complete interpretive report and publish.

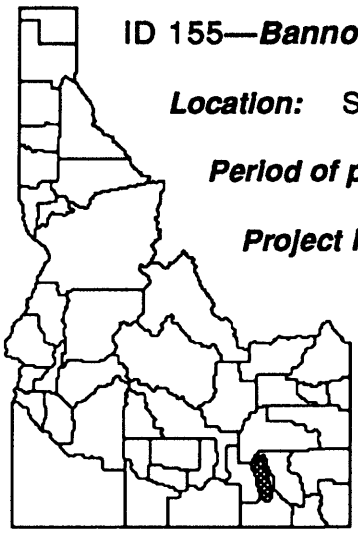
Funding sources: City of Boise and U.S. Geological Survey.

Reports:

Frenzel, S.A., 1988, Physical, chemical, and biological characteristics of the Boise River from Veterans Memorial Parkway, Boise to Star, Idaho, October 1987 to March 1988: U.S. Geological Survey Water-Resources Investigations Report 88-4206, 48 p.

Frenzel, S.A., and Hansen, T.F., 1988, Water-quality data for the Boise River, Boise to Star, Idaho, January to March 1988: U.S. Geological Survey Open-File Report 88-474, 14 p.

-----1988, Water-quality data for the Boise River, Boise to Star, Idaho, October to December 1987: U.S. Geological Survey Open-File Report 88-171, 11 p.



ID 155—*Bannock Creek Hydrology*

Location: Southeastern Idaho

Period of project: October 1986 to September 1989

Project leader: Joseph M. Spinazola

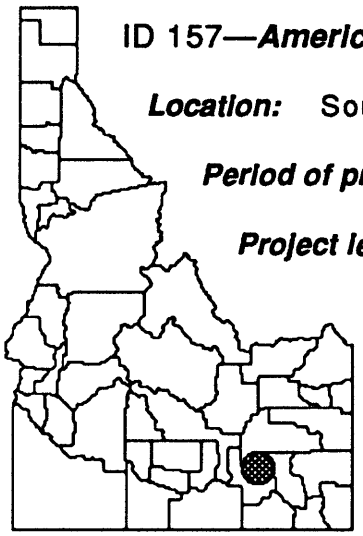
Objectives: Describe the general hydrology of and determine water yield from the Bannock Creek basin on the Fort Hall Indian Reservation.

Approach: Phase I: (1) Compile existing geologic and hydrologic data, (2) inventory and measure all wells and springs and construct water-level contour map, (3) complete seismic refraction study, and (4) obtain discharge measurements at sites on Bannock Creek and principal tributaries. Phase II: (1) Locate sites for and drill four to six test holes, (2) complete geophysical logs in test holes and other available wells, (3) conduct aquifer tests in about four wells and obtain specific capacity data in others, and (4) obtain groundwater samples for chemical analyses. Phase III: Complete report describing hydrology and yield of the basin.

Progress in FY 1988: Collected the following basic data: (1) Continuous water-level measurements in three wells and monthly measurements in 20 wells; (2) continuous stage measurements at five streamflow sites on Bannock Creek and major tributaries; (3) 24 water-quality samples from wells, springs, and streams; and (4) inventory, discharge, and water-quality data for 24 springs. Entered ground-water, spring, streamflow, and water-quality data into electronic data bases. Installed seven piezometers at depths from 100 to 400 feet in completed test holes to define aquifer bottom or to serve as observation wells. Completed seismic refraction profiles at five sites. Completed report outline and rough draft for introductory and geology sections.

Plans for FY 1989: Complete collection and compilation of hydrologic data. Analyze data to characterize basin geohydrology and determine basin yield. Complete report.

Funding sources: Shoshone-Bannock Tribes and U.S. Geological Survey.



ID 157—***American Falls Irrigation Drainage***

Location: Southeastern Idaho

Period of project: October 1987 to September 1989

Project leader: Walton H. Low

Objectives: Determine whether concentrations of selected major and minor ions and organic compounds in water, bottom sediments, and biota at American Falls Reservoir exceed known standards or criteria.

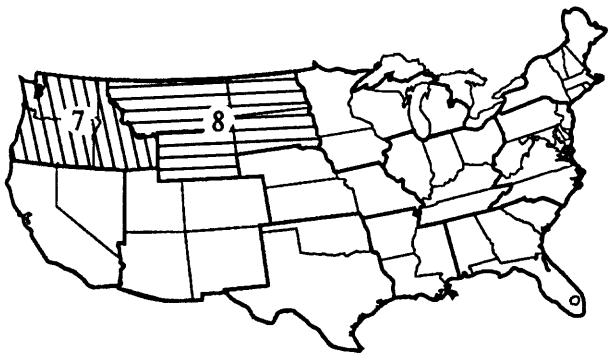
Approach: Once during irrigation season, collect samples of water, bottom sediment, aquatic plants, benthic invertebrates, fish, and waterbirds and analyze for selected major and minor ions and organic compounds. Once after irrigation season, collect water samples and analyze for selected major and minor ions.

Progress in FY 1988: Collected water and bottom-sediment samples and submitted to the laboratory for selected chemical analyses. Collected plant, invertebrate, fish, and waterbird samples and submitted to the laboratory for analyses.

Plans for FY 1989: Complete report and submit for Director's approval.

Funding sources: Department of the Interior, Office of the Secretary.

ID 159—***National Ground-Water Atlas***



Location: Idaho, Oregon, and Washington (Segment 7); Montana, North Dakota, South Dakota, and Wyoming (Segment 8)

Period of project: October 1987 to September 1990

Project leader: Richard L. Whitehead

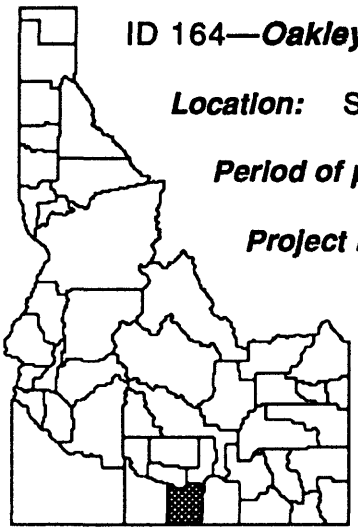
Objectives: (1) Provide a summary of the Nation's ground-water resources for an audience that includes the general public, consultants, planners, colleges and universities, Congressional staffs, and other governmental agencies; and (2) synthesize ground-water information from many sources into a single document that can be used to respond to requests for information.

Approach: (1) Compile existing information, including reports resulting from the Regional Aquifer-Systems Analysis; (2) divide the study into 13 multi-State segments; and (3) obtain new information from Districts as it becomes available.

Progress in FY 1988: Completed data compilation for segment 7 and obtained colleague review. Completed data collection for segment 8 in Montana and Wyoming.

Plans for FY 1989: Obtain Director's approval for segment 7 atlas. Complete data collection in North Dakota and South Dakota and submit segment 8 atlas for review.

Funding: U.S. Geological Survey.



ID 164—*Oakley Fan Artificial Recharge*

Location: Southern Idaho

Period of project: August 1984 to September 1988

Project leader: H.W. Young

Objectives: (1) Describe the geohydrology of the area, (2) develop a ground-water flow model to evaluate effects of recharge on the aquifer system, and (3) establish a water-level and water-quality monitoring program following injection testing to evaluate possible effects of recharge on the hydrologic system.

Approach: Phase I: (1) Collect and evaluate available data; (2) obtain geophysical logs for selected wells; (3) conduct surface geophysical surveys as needed; (4) estimate recharge, pumpage, and outflow; (5) conduct aquifer tests; (6) obtain water samples for chemical and isotopic analyses; and (7) determine boundary conditions and develop a mathematical model. Phase II: (1) Conduct injection tests, (2) establish a water-level and water-quality monitoring network, (3) refine earlier modeling results using newest data, and (4) prepare a report describing results of the study.

Progress in FY 1988: Completed report describing results of the interpretive study. Continued to collect data at sites established during the study to reflect hydrologic conditions during a drought year. Presented a poster session describing the study at the American Society of Civil Engineers Recharge Symposium in Anaheim, Calif.

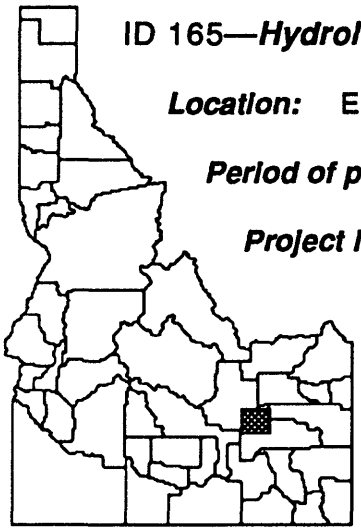
Plans for FY 1989: Continue to monitor about 30 wells in the ground-water monitoring network to retain data continuity until activity resumes as part of the High Plains Aquifer Recharge Program.

Funding sources: U.S. Geological Survey and Southwest Irrigation District.

Reports:

Newton, G.D., and Young, H.W., 1988, Aquifer response to artificial recharge in the Cottonwood area, south-central Idaho: American Society of Civil Engineers, Irrigation and Drainage Division, International Symposium on Artificial Recharge of Ground Water, Anaheim, Calif., August 1988, Poster Session contribution.

Young, H.W., and Newton, G.D., 1989, Hydrology of the Oakley Fan area, south-central Idaho: U.S. Geological Survey Water-Resources Investigations Report 88-4065, 73 p.



ID 165—*Hydrology of Subsurface Waste Disposal*

Location: East-central Idaho

Period of project: Continuous since 1959

Project leader: Larry J. Mann

Objectives: Assess the effects on ground water of radioactive and chemical waste disposal at INEL (Idaho National Engineering Laboratory) and determine principles of water and solute movement in fractured rocks. Map and describe distribution patterns of waste products in ground water so future patterns can be predicted. Evaluate hydrogeochemical controls on subsurface migration of solutes from buried solid radioactive waste. Evaluate hydrologic properties of the deep aquifers in the Snake River Plain.

Approach: (1) Compare current and historical hydrologic data to evaluate distribution and dispersion patterns and rates of water and solute movement, dilution factors, and mass balances of various components; (2) evaluate radiochemical, geochemical, and hydraulic processes affecting changes in water chemistry; (3) using digital models, study hydraulic dispersion, radioactive decay, and sorption phenomena; and (4) provide instrumentation for studying the unsaturated zone underlying a solid-waste burial ground to determine solute transport toward the regional aquifer.

Progress in FY 1988: Continued studies of the distribution and migration of radioactive- and chemical-waste products and provided consultation to the Department of Energy and its contractors, the U.S. Environmental Protection Agency, Region 10, and the State of Idaho. Published reports describing the unsaturated zone at the Radioactive Waste Management Complex, concentrations of purgeable organic compounds and trace metals in ground water, and concentrations of iodine-129 in ground water. Prepared seven other reports for publication. Completed instrumentation of a simulated low-level radioactive-waste pit and maintained instrumentation at two test trenches. Provided more than 20 briefings regarding quality of water at the INEL to many elected officials and political candidates. Completed well tests at about 80 sites at the INEL and installed four gaging stations on small, topographically closed drainage basins on the Snake River Plain to quantify potential recharge to the aquifer and the recurrence interval of floods.

Plans for FY 1989: Continue data-collection programs and work initiated in FY 1988. Publish the seven reports prepared in 1988 and begin development of a ground-water flow model for the Snake River Plain aquifer in the vicinity of the INEL. Select two more small drainage basins and install gaging stations. Prepare five reports describing geohydrologic and water-quality conditions at the INEL.

If funding is identified, establish a library for about 20,000 feet of cores collected since the early 1950's as part of several drilling programs in the area.

Funding source: U.S. Department of Energy.

Reports:

Knobel, L.L., and Mann, L.J., 1988, Radionuclides in ground water at the Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Open-File Report 88-731 (DOE/ID-22077), 37 p.

Mann, L.J., Chew, E.W., Morton, J.S., and Randolph, R.B., 1988, Iodine-129 in the Snake River Plain aquifer at the Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Water-Resources Investigations Report 88-4165 (DOE/ID-22076), 27 p.

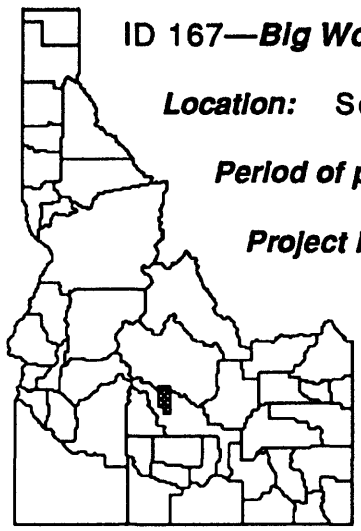
Mann, L.J., and Knobel, L.L., 1987, Purgeable organic compounds in ground water at the Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Open-File Report 87-766 (DOE/ID-22074), 23 p.

-----1988, Concentrations of nine trace metals in ground water at the Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Open-File Report 88-332 (DOE/ID-22075), 17 p.

Pittman, J.R., Jensen, R.J., and Fischer, P.R., 1988, Hydrologic conditions at the Idaho National Engineering Laboratory, 1982 to 1985: U.S. Geological Survey Water-Resources Investigations Report 89-4008 (DOE/ID-22078), 73 p.

Rightmire, C.T., and Lewis, B.D., 1987, Geologic data collected and analytical procedures used during a geochemical investigation of the unsaturated zone, Radioactive Waste Management Complex, Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Open-File Report 87-246 (IDO/ID-22072), 83 p.

-----1987, Hydrogeology and geochemistry of the unsaturated zone, Radioactive Waste Management Complex, Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Water-Resources Investigations Report 87-4198 (IDO/ID-22073), 89 p.



ID 167—*Big Wood River Hydrology*

Location: South-central Idaho

Period of project: October 1985 to September 1988

Project leader: Steven A. Frenzel

Objectives: Determine the quantity of ground- and surface-water resources in the upper Big Wood River valley. Evaluate the suitability of these resources for present and anticipated uses.

Approach: (1) Collect and tabulate geologic, hydrologic, and water-use data; (2) inventory existing wells in the area; (3) obtain water samples from selected wells and streams for chemical analyses; (4) complete seismic-refraction profile across mouth of valley to determine thickness of unconsolidated deposits; (5) determine tributary inflows and gains and losses along lower Big Wood River; and (6) determine a water budget for the basin.

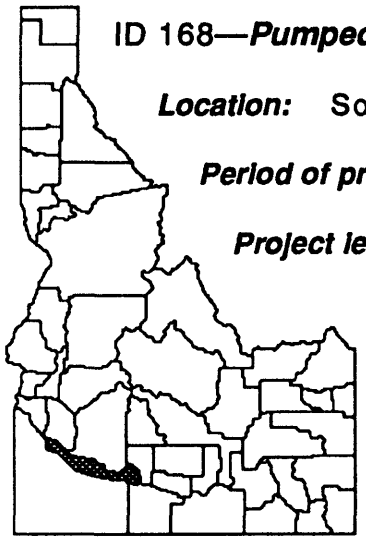
Progress in FY 1988: Calculated water budget for upper Big Wood River valley for 1986 and 1987 water years and for long-term average conditions represented by 1940-79 water years. Prepared interpretive report.

Plans for FY 1989: Publish report.

Funding sources: Sun Valley Water and Sewer District and U.S. Geological Survey.

Report:

Frenzel, S.A., 1989, Water resources of the upper Big Wood River basin, Idaho: U.S. Geological Survey Water-Resources Investigations Report 89-4018, 47 p.



ID 168—***Pumped Diversions***

Location: Southern Idaho

Period of project: October 1986 to September 1988

Project leader: Luther C. Kjelstrom

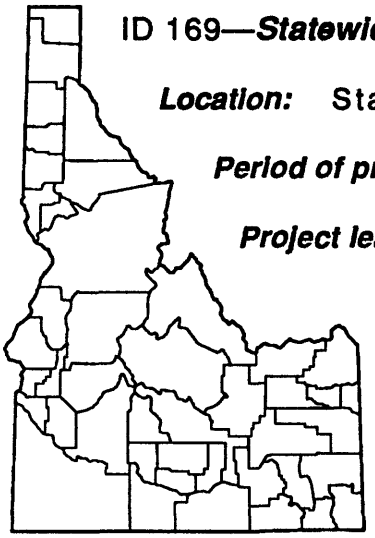
Objectives: Define accurate, reliable, and cost effective methods for quantifying pumped withdrawals from the Snake River and identify the best methods for providing long-term records of withdrawals.

Approach: (1) Evaluate sites where water currently is being pumped from the Snake River and select seven representative sites for study; (2) identify potential direct and indirect devices and other estimation methods for measuring flow in closed conduits; (3) evaluate measuring methods for feasibility; (4) furnish study sites with conventional measuring equipment and with various test instruments; (5) collect flow data using both conventional and test methods; and (6) evaluate and report the accuracy, reliability, and relative costs of each test method.

Progress in FY 1988: Installed in-line flow meter and used data loggers to compute and record discharge data at 20 pumping-plant sites. Operated open-channel gaging stations at nine sites. Checked accuracy of in-line flow meters by comparison with measurements made using ultrasonic flow meter; checked accuracy of ultrasonic flow-meter measurements by comparison with current-meter measurements made in open channels.

Plans for FY 1989: Publish 1988 data in annual water data report. Complete report describing performance of measuring devices and evaluating data.

Funding sources: Idaho Department of Water Resources, University of Idaho, and U.S. Geological Survey.



ID 169—*Statewide Ground-Water Quality*

Location: Statewide

Period of project: October 1986 to September 1990

Project leader: H.W. Young

Objectives: Design and implement a ground-water quality monitoring network to detect changes in or degradation of water quality that may result from natural or human-induced causes.

Approach: Phase I (year 1): (1) Evaluate earlier (1979) work describing ground-water quality monitoring alternatives, including major elements of the Ground-Water Quality Management Plan for Idaho, proposed by the Idaho Department of Health and Welfare; and (2) establish and maintain a ground-water quality data base to define current water-quality conditions in selected aquifers, and establish a monitoring network and sampling frequency schedule. Phase II (years 2 and 3): Collect hydrologic and chemical data at all established sites. At the end of the third year, prepare a report summarizing results of the study. Phase III (years 4-8): Continue to sample network sites and submit annual reports summarizing work for the year. At the end of the eighth year, prepare a comprehensive report that discusses the causes of any changes in ground-water quality.

Progress in FY 1988: Inventoried 60 wells on the Fort Hall Indian Reservation and 59 wells on the Rathdrum Prairie. Collected ground-water samples at each well for onsite analyses including: water temperature, pH, alkalinity, specific conductance, dissolved chloride, and dissolved nitrite plus nitrate as nitrogen. When onsite nitrite plus nitrate as nitrogen exceeded 6 milligrams per liter at Fort Hall and two milligrams per liter at Rathdrum Prairie, collected water samples for nutrient analyses at the Survey's National Laboratory. Collected samples at 19 wells at Fort Hall for fecal coliform and fecal streptococci bacteria. Collected water samples from 24 thermal-water wells and springs and nonthermal springs in the Twin Falls and Big Wood River areas. Analyzed these samples for common anions and cations and the stable isotopes deuterium, oxygen-18, and carbon-13. Submitted results of these analyses to the Idaho Department of Water Resources.

Plans for FY 1989: Resample 20 wells on the Fort Hall Indian Reservation. Discuss conducting additional studies in the Rathdrum Prairie and Fort Hall areas. Consider similar nitrogen studies in other areas with personnel from the Idaho Department of Health and Welfare. Collect water samples from about 20 thermal-water wells and springs and nonthermal springs along the northern boundary of the Snake River Plain for the Idaho Department of Water Resources.

Funding sources: Idaho Department of Health and Welfare, Shoshone-Bannock Tribes, and U.S. Geological Survey.

Reports:

Parliman, D.J., and Young, H.W., 1988, Selected water-quality data for the Fort Hall Indian Reservation, southeastern Idaho, July 1988: U.S. Geological Survey Open-File Report 88-496, scale 1:100,000.

Young, H.W., Jones, M.L., and Parliman, D.J., 1989, Selected water-quality data for the Rathdrum Prairie aquifer, north Idaho, September 1988: U.S. Geological Survey Open-File Report 88-703, scale 1:100,000.

OTHER HYDROLOGIC WORK BY THE IDAHO DISTRICT

As part of its responsibility to provide water information to all users, the Geological Survey is involved in numerous activities in addition to the regular programs of data collection and hydrologic investigations. One of these activities is to provide a Survey representative to serve on advisory committees or ad hoc groups. Some of the current special activities are described below:

Committee and Task Force Memberships--Idaho District personnel work as members and advisors to committees and task forces including the Idaho Technical Committee on Hydrology, the Idaho Department of Health and Welfare Water Quality Technical Advisory Committee, the Swan Falls Technical Advisory Committee, the Columbia River Water Management Group, International Kootenay Lake Board of Control, and the Idaho Natural Resources Roundtable.

Review of Environmental Impact Statements and other agency reports--The Water Resources Division reviews Environmental Impact Statements to ensure that available hydrologic data are used, that they are used correctly, and that the effects of construction on water features and resources is accurately evaluated.

Assistance to other agencies and individuals--In addition to the Survey's formal programs and studies, water information and assistance are provided to other agencies with specific problems. The Idaho District continually receives calls, visits, and mail requests for information on ground-water availability, streamflow data, and water quality from landowners, consultants, public officials, and business concerns. Federal regulations prohibit activity that encroaches on the work of professional consultants, but much information and assistance are provided to professional engineers, geologists, and other consultants.

Special activities--The Idaho District is called on for certain work not covered under specific projects or data-collection programs. These activities include obtaining hydrologic data to document significant events--droughts, floods, volcanic eruptions, earthquakes, and hazardous-waste spills--and giving presentations concerning aspects of water resources at symposia and seminars. The Idaho District also investigates hydrologic effects and data needs related to small hydroelectric power development for the Federal Energy Regulatory Commission.

SOURCES OF WRD PUBLICATIONS AND INFORMATION

Publications of the U.S. Geological Survey.--Professional Papers, Water-Supply Papers, and Bulletins are sold by the U.S. Geological Survey at the following address: Books and Open-File Reports, Federal Center, Bldg. 810, Box 25425, Denver, CO 80225. Also available from Books and Open-File Reports are single copies of Circulars still in print, and manuals from the series entitled "Techniques of Water-Resources Investigations of the United States Geological Survey," which describe procedures for planning and executing specialized work in water-resources investigations. Hydrologic Investigations Atlases, Hydrologic Unit Maps, and other maps pertaining to Idaho are sold by U.S. Geological Survey, Map Distribution, Federal Center, Box 25286, Denver, CO 80225.

Geological Survey Water-Resources Investigations Reports and Open-File Reports are available for inspection at the Idaho District Office, Water Resources Division, 230 Collins Road, Boise, ID 83702; information on their availability also may be obtained from the Idaho District Chief at the above address. In addition, those reports having an alpha-numeric designation in parentheses at the end of the citation may be purchased as paper copy or microfiche from NTIS (National Technical Information Service), U.S. Department of Commerce, 5265 Port Royal Road, Springfield, VA 22161. These numbers are required when ordering from NTIS. The annual publication series entitled, "U.S. Geological Survey Water-Data Report," is also available from NTIS. Ordering information may be obtained from the offices listed on the inside cover page of this report.

New reports are announced monthly in "New Publications of the U.S. Geological Survey," subscriptions to which are available upon request from the U.S. Geological Survey, Books and Open-File Reports, Federal Center, Bldg. 810, Box 25425, Denver, CO 80225.

Water-Data Program.--Water-data stations at selected locations throughout the Nation are used by the Geological Survey to obtain records on stream discharge and stage, reservoir and lake storage, ground-water levels, well and spring discharge, and the quality of surface and ground water. These data provide a continuing record of the quantity and quality of the Nation's surface- and ground-water resources, and thus provide the hydrologic information needed by Federal, State, and local agencies and the private sector for developing and managing land and water resources. All data collected are stored in the Survey's WATSTORE system and are available to water planners and others involved in making decisions that affect the State's water resources. These data can be retrieved in machine-readable form or in the form of computer-printed tables, statistical analyses, or graphs. The data also are published by water year for

each State in the annual data reports. Information about the Water-Data Program can be obtained from the Idaho District.

NAWDEX.--The National Water Data Exchange was established to assist users of water data to identify, locate, and acquire needed data. It provides a nationwide service for indexing and describing the characteristics of data available from the entire spectrum of data-collection activities throughout the Federal and non-Federal water-data community. NAWDEX maintains two data bases: (1) A Water-Data Sources Directory, and (2) a Master Water-Data Index, which identifies and describes water data available. NAWDEX services can be obtained from the Idaho District. A leaflet explaining NAWDEX services is available from the NAWDEX Program Office, U.S. Geological Survey, 421 National Center, Reston, VA 22092.

SOURCES OF INFORMATION ON

U.S. GEOLOGICAL SURVEY PROGRAMS IN IDAHO

HYDROLOGY

Idaho District Chief
Geological Survey
Collins Road
Boise, ID 83702

Phone: (208) 334-1750

MAPS

Map Distribution
U.S. Geological Survey
Federal Center, Box 25286
Denver, CO 80225

Phone: (303) 236-7477

GEOLOGY

Assistant Chief Geologist
Geological Survey
Middlefield Road, MS 919
Menlo Park, CA 94025

Phone: (415) 323-8111
(ext. 2214)

TEXT PRODUCTS

Books and Open-File Reports
U.S. Geological Survey
Federal Center, Bldg. 810
Box 25425
Denver, CO 80225

Phone: (303) 236-7476

GENERAL INFORMATION

Regional Hydrologist
Geological Survey
Middlefield Road
Menlo Park, CA 94025

Phone: (415) 329-4403
(ext. 4414)

Earth Science Information Center
U.S. Geological Survey
8105 Federal Building
125 South State Street
Salt Lake City, UT 84138

Phone: (801) 524-5652