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PROFILE SURVEYS ALONG HENRYS FORK, IDAHO AND LOGAN RIVER AND BLACKSMITH FORK, UTAH

PREPARED UNDER THE DIRECTION OF

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PROFILE SURVEYS ALONG HENRYS FORK, IDAHO, AND LOGAN RIVER AND BLACKSMITH FORK, UTAH.

Prepared under the direction of W. H. HERRON, Acting Chief Geographer.

INTRODUCTION.

In order to determine the location of undeveloped water powers the United States Geological Survey has from time to time, alone and in cooperation with State organizations, made surveys and profiles of some of the rivers of the United States that are adapted to the development of power by low or medium heads of 20 to 100 feet.

The surveys are made by means of plane table and stadia. Elevations are based on heights derived from primary or precise levels of the United States Geological Survey. The maps are made in the field, and show not only the outlines of the river banks, the islands, the positions of rapids, falls, shoals, and existing dams, and the crossings of all ferries and roads, but the contours of banks to an elevation high enough to indicate the possibility of using the stream. The elevations of the various bench marks left are noted on the field sheets in their proper positions. The figures given with the gaging stations shown on the maps indicate the elevation of the zero of the gage.

HENRYS FORK, IDAHO.

GENERAL FEATURES OF SNAKE RIVER BASIN.

Snake River, the largest tributary of the Columbia, rises among the high peaks of the Rocky Mountains in Yellowstone National Park, western Wyoming, and eastern Idaho, heading in the divide from which streams flow northward and eastward into the Missouri, southward to the Colorado and the lakes of the Great Basin, and westward to the Columbia. From Shoshone, Lewis, and Hart lakes, in Yellowstone National Park, the South Fork of the river flows southward, broadening into Jackson Lake (4 miles wide and 18 miles long), and passing through Jackson Valley (8 miles wide and 40 miles long), beyond which, near the Idaho-Wyoming line, it enters a long canyon. In the southern part of Fremont County, Idaho, it receives Henrys Fork, below which it flows southward and westward across Idaho to a point near Homedale, near the Oregon-Idaho line, where it turns abruptly northward and forms for about 170 miles the boundary between Idaho and Oregon and for 30 miles more that between Idaho and Washington. It enters Washington at Lewiston,

flows northwest, west, and southwest, and joins the Columbia near Pasco.

Practically all the important tributaries of Snake River have their sources in the high mountains, which are heavily timbered. The most heavily timbered areas are at the head of the river, in the Yellowstone Park region, the upper areas of Teton, Fall, and Henrys Fork in eastern Idaho, and those of upper Boise and Payette rivers in central Idaho.

Precipitation in the Snake River basin ranges from 6 or 8 inches in the valley to 50 inches at the head of many of the tributaries. The precipitation in the higher altitudes is practically all in the form of snow, but the snowfall in the lower valleys, below American Falls, Idaho, is comparatively light. During the last few years there has been considerable rainfall, and dry farming has been practiced successfully in the valleys in the vicinity of Idaho Falls, Blackfoot, and St. Anthony, Idaho. The temperature in these valleys ranges from 100° in the summer to 35° below zero in the winter; in the Twin Falls and Boise valleys the temperature ranges from approximately 110° in the summer to zero in the winter.

The driest year recorded in the drainage basin was 1905; the wet years were 1896, 1899, 1904, 1907, and 1909.

Snake River basin has many feasible storage sites, but only a very few have been developed. About 400,000 acre-feet can be stored in Jackson Lake by a dam which has been constructed by the United States Reclamation Service. The largest site is at Swan Valley, on Snake River, and the water available for storage is approximately 4,000,000 acre-feet. Reservoir sites are found also on Henrys Fork, Fall, Teton, Boise, and Payette rivers. Many of these sites will no doubt be used at some future time by the United States Reclamation Service in connection with the Minidoka and Payette-Boise projects.

Irrigation has reached a high stage of development in the Snake River valley, yet approximately 6,000,000 acre-feet of water annually runs to waste. Eventually these flood waters will be stored and used to irrigate thousands of acres of arid land.

The streams afford enormous water powers, but only a few sites have been developed owing to the lack of market. Large power plants have been installed at Horseshoe Bend on the Payette, at the mouth of the canyon on the Boise, and on Snake River at American Falls, Shoshone Falls, Salmon Falls, and at the Minidoka dam. Many other smaller plants are also in use.

The upper drainage basin of the South Fork comprises the timbered mountainous country west and southwest of Yellowstone Lake. The east side of its valley is bounded by the Wind River Range, from the slopes of which it receives a large number of tributaries, and the west side by the high Teton Mountains. Most of the drainage from Teton Mountains flows westward through Teton River into Henrys Fork.

SURVEYS AND GAGING STATIONS.

The results of surveys along Henrys Fork in 1915 are presented in the plans and profiles which form Plates I–VIII.

The United States Geological Survey has maintained gaging stations on Henrys Fork at Warm River, Idaho (1910–1916), near Ora, Idaho (1902–1909), in canyon above mouth of Fall River, Idaho (1890–91), and near Rexburg, Idaho (1909–1916).

LOGAN RIVER BASIN.

GENERAL FEATURES.

Logan River rises on the west slope of the Bear River Range, flows southwest and then northwest, and unites with the Bear near Benson, Utah. Its basin is rough and rugged, the elevations ranging from 4,500 to 9,000 feet above sea level and the river being confined largely to a steep, rough channel in a comparatively narrow canyon. Probably three-fourths of the precipitation in this basin is snow, the melting of which supplies the principal part of the spring and summer flow; the late summer and winter flow is derived chiefly from springs, which are well distributed over the basin. In its upper course the Logan receives many short, swift tributaries. Temple Fork and South Fork, which enter, respectively, 10 miles and 15 miles above Logan, are perennial streams that furnish one-third to one-fourth of the total flow. Blacksmith Fork comes in below Logan. The entire flow of this river, after being used to develop power at two electric plants near the mouth of the canyon, is diverted for irrigation. None of the run-off is stored at present.

The results of surveys along Logan River and Blacksmith Fork in 1914 are presented as Plates IX and X.

GAGING STATIONS.

The Geological Survey has maintained the following gaging stations on Logan River and Blacksmith Fork. The stations are arranged in downstream order, the position of tributaries being indicated by indention. A dash after the date indicates that station was being maintained June 30, 1916. A period after the date indicates discontinuance.

Logan River near Logan, Utah, 1896–1912.
Logan River above State dam, near Logan, Utah, 1913–
Logan River below State dam, near Logan, Utah, 1913–
  Utah Power & Light Co.'s tailrace near Logan, Utah, 1913.
  Logan, Hyde Park, and Smithfield canal near Logan, Utah, 1904; 1906–1907; 1909; 1912–
  Logan Northern canal near Logan, Utah, 1913–
  Blacksmith Fork above Utah Power & Light Co.'s dam near Hyrum, Utah, 1914–
  Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, 1914–
  Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, 1900–1902; 1904–1910; 1914–
    Blacksmith Fork power-plant race near Hyrum, Utah, 1904–1910; 1914–

PUBLICATIONS.

The following publications of the Geological Survey contain the results of investigations of stream flow at the stations indicated in the preceding lists:

Henrys Fork:

Annual Reports: Twelfth, Part II; Thirteenth, Part III.

Water-Supply Papers: 85, 100, 135, 178, 214, 252, 272, 292, 312, 362-B, 362-B, 393.

Logan River basin:

Annual Reports: Eighteenth, Part IV; Nineteenth, Part IV; Twentieth, Part IV; Twenty-second, Part IV.

Water-Supply Papers: 11, 16, 28, 38, 51, 66, 75, 85, 100, 133, 176, 212, 250, 270, 290, 310, 330, 360.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below:

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will, on application, furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Boston, Mass., Customhouse.
Albany, N. Y., Room 18, Federal Building.
Atlanta, Ga., Post Office Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
St. Paul, Minn., Old Capitol Building.
Austin, Tex., Old Post Office Building.
Helena, Mont., Montana National Bank Building.
Denver, Colo., 403 New Post Office Building.
Phoenix, Ariz., 417 Fleming Building.
Salt Lake City, Utah, 421 Federal Building.
Boise, Idaho, 615 Idaho Building.
Tacoma, Wash., 406 Federal Building.
Portland, Oreg., 416 Couch Building.
San Francisco, Cal., 328 Customhouse.
Los Angeles, Cal., 619 Federal Building.
Honolulu, Hawaii, Kapiolani Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

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