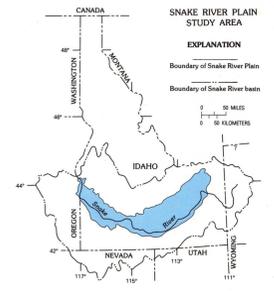


# 1980 IRRIGATED ACREAGE AND OTHER LAND USES

**INTRODUCTION**  
This report is a series resulting from the U.S. Geological Survey's Snake River Plain RASA (Regional Aquifer System Analysis) study that began in October 1979. One purpose of the RASA study was to determine effects of conjunctive use of ground and surface water on the hydrologic system (Lindholm, 1981, p. 10). Irrigation is by far the largest water use on the Snake River Plain and is a main source of ground-water recharge. Thus, accurate irrigation water-use data are needed to assess the hydrologic effects of past and present irrigation. To help quantify irrigation-water use, irrigated areas on the plain were delineated for selected years from published reports and 1980 from Landsat data. The purposes of this report are to present results of the 1980 delineation of irrigated lands and other land uses and to describe historical development of irrigated agriculture on the Snake River Plain. Historic and 1980 data were used in ground-water flow models and other parts of the RASA study to help determine long-term effects of irrigation.



The Snake River Plain is an alluvial area of about 15,600 mi<sup>2</sup> in Idaho and eastern Oregon. The boundary of the plain was defined on the basis of topography and geology. The plain slopes generally westward from an altitude of about 6,000 ft above sea level in the east to about 2,100 ft in the west, and is flat relative to the surrounding mountains that range from 6,000 to 12,000 ft in altitude. The entire plain is drained by the Snake River and its tributaries.

The eastern part of the plain is underlain largely by Quaternary volcanic rocks (mainly basalt) with interbedded sedimentary rocks along the margins. Basalts, which constitute most of the Snake Plain aquifer (Mundorf, 1964, p. 142), yield large quantities of water to wells. The western part of the plain is underlain largely by Quaternary and Tertiary sedimentary rocks. Sand and gravel cones and some basalts near Mountain Home are the main aquifers. Contacts between Quaternary rocks underlying the plain and surrounding Tertiary and older rocks define much of the study area boundary. The geotectonic framework of the Snake River Plain was described in another RASA series report (Whitehead, 1984).

The climate of the plain is characterized as semiarid. Mean annual precipitation in the central part of the plain ranges from about 7 to 12 in; however, on the margins, higher altitudes and orographic effects result in more precipitation. As much as 20 in annually falls on the extreme northeastern part. Most surface flow and recharge to ground water originates as precipitation on surrounding mountains.

The economy of the plain is dominated by irrigated agriculture. In 1980, more than 3 million of the 9.8 million acres on the plain were irrigated. Principal crops include potatoes, hay, small grains, and sugar beets. Crop evapotranspiration accounts for about 96 percent of consumptive water use in Idaho (Solley and others, 1983).

Several investigators have estimated irrigated acreage and other land uses on parts of the Snake River Plain on the basis of data from 1975 and earlier. The IDWR (Idaho Department of Water Resources, 1979) mapped irrigated acreage for 16 counties in southern Idaho. The U.S. Department of Agriculture (1976) described agricultural land and water use in the Snake River basin; and the Idaho Division of Budget, Policy Planning, and Coordination (1978) assembled county land-use statistics from analysis of Landsat imagery. The IDWR irrigated acreage maps were updated to 1979 by the U.S. Bureau of Reclamation (1980) for the Pacific Northwest River Basins Commission.

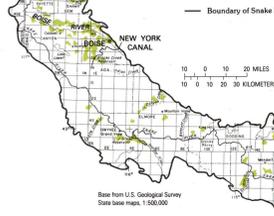
An part of the RASA study, the U.S. Geological Survey cooperated with IDWR and the U.S. Bureau of Reclamation to map 1980 land use from digital Landsat data. Accurate and current irrigated acreage data were needed for direct input to the RASA study ground-water flow models. Irrigated acreage data also were needed for water-budget analyses to help estimate the amount of ground-water recharge and discharge attributable to irrigation. The 1980 land-use map is presented to document land-use data used in the models and to make the results available to resource managers.

**ACKNOWLEDGMENTS**  
The authors gratefully acknowledge the assistance of Leonard Gaydon, U.S. Geological Survey, Ames Research Center, Moffett Field, California, for his assistance and guidance with remote sensing throughout the study; and Tom Spitting, U.S. Geological Survey, Western Mapping Center, Thematic Mapping Unit, Menlo Park, California, for his assistance in printing this report.

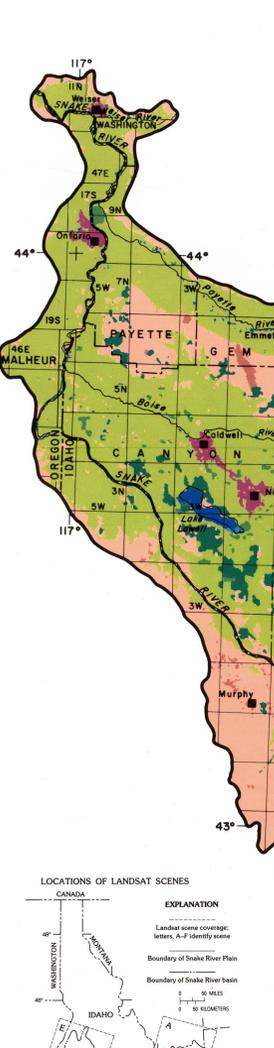
**METHODS**  
The remote-sensing approach for mapping irrigated acreage and other land uses was chosen because: (1) it is efficient, in terms of cost and time, relative to other means of identifying land use over a large area; (2) the techniques are repeatable for verification of results and for comparison among years; and (3) the statistical validity of results can be quantified. The Idaho Image Analysis Facility of the IDWR mapped land-use classes on the Snake River Plain from digital Landsat multispectral scanner data, in cooperation with the U.S. Geological Survey and with supplemental funding from the U.S. Bureau of Reclamation. Data were analyzed from six single-date Landsat scenes from July and August 1980. Computer analysis was supported by aerial photographs, topographic maps, and ground surveys. An unpublished document by H. A. Anderson (IDWR, written commun., 1982) describes the methods used and their accuracy.

Table 1.—Identification information for Landsat scenes

Scene	Identification number	Date
A	22028-17344	8-11-80
B	22028-17350	8-11-80
C	22029-17405	8-12-80
D	22013-17462	7-28-80
E	22013-17514	7-27-80
F	22013-17520	7-27-80



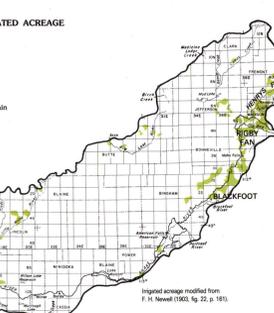
**IRRIGATION HAS BEEN PRACTICED ON THE SNAKE RIVER PLAIN FOR THE PAST 140 YEARS.**  
The first reported irrigation on the Snake River Plain was in 1843 on lands adjacent to the Boise River (Caldwell and Wells, 1974, p. 31). By 1854, most irrigable lands immediately adjacent to the river were in production. Local interest in expanding irrigation beyond the flood plain was stimulated by initiation of mining in the Boise River valley in 1862. Foundry of the city of Boise in 1863 and the consequent influx of people. Several local private companies constructed small canal systems that brought water to higher grounds. Development of the remaining irrigable lands required major engineering projects—projects too expensive for small, local enterprises. Development on the eastern plain began in about 1880 and followed the same sequence as in the Boise River valley. Initial irrigation along the Snake River above Blackfoot (mainly on Rigby Flats) and along the Henry Fork and Teton Rivers was concentrated on lands adjacent to the rivers within reach of short canals. In the 1880's, Congress actively encouraged reclamation of desert lands and expansion of irrigated acreage throughout the arid West.



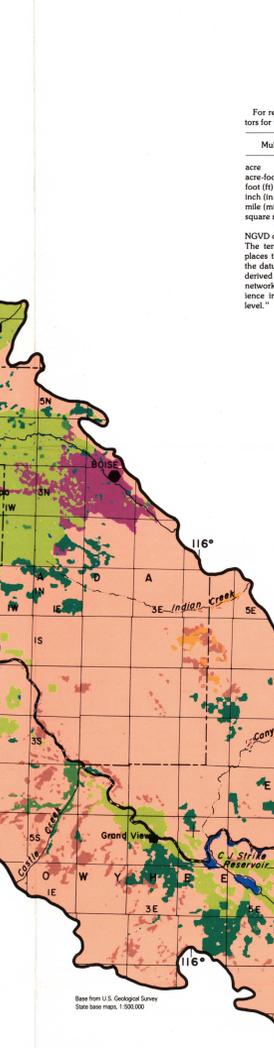
**CONVERSION FACTORS**  
For readers who prefer to use metric units, conversion factors for terms used in this report are listed below:

Multiply	By	To obtain
acre	4,047	square meter
acre-foot (acre-ft)	1,233	cubic meter
foot (ft)	0.3048	meter
inch (in.)	25.40	millimeter
mile (mi)	1,609	kilometer
square mile (mi <sup>2</sup> )	2,590	square kilometer

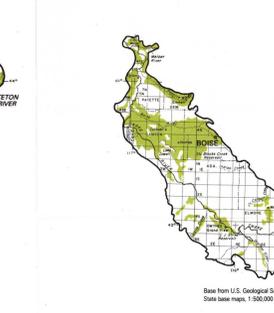
NGVD of 1929 (National Geodetic Vertical Datum of 1929): The term "National Geodetic Vertical Datum of 1929" replaces the formerly used term "mean sea level" to describe the datum for altitude measurements. The geoidetic datum is derived from a general adjustment of the first-order leveling networks in both the United States and Canada. For convenience in this report, the datum also is referred to as "sea level."



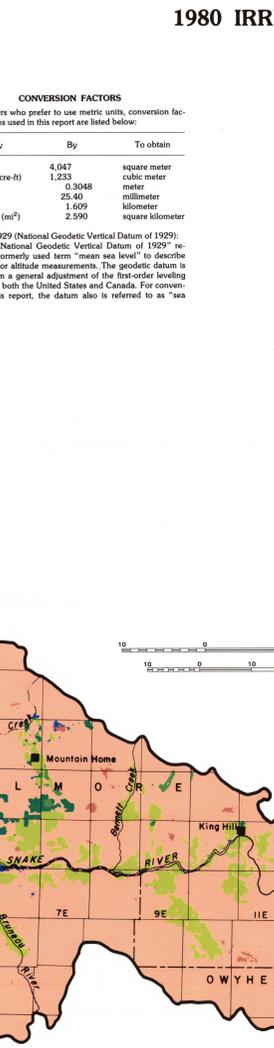
**BY 1929, ABOUT 2.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



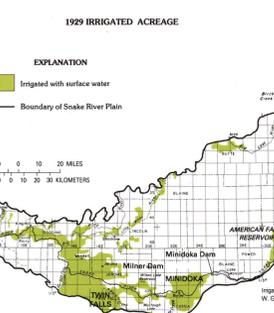
**IRRIGATED ACREAGE CONTINUED TO INCREASE BUT AT A REDUCED RATE THROUGHOUT THE DEPRESSION AND WORLD WAR II.**  
Unfavorable economic conditions between 1929 and 1945 discouraged development of large irrigation projects. The increase of 300,000 irrigated acres during this period consisted mostly of small-scale local developments adjacent to existing irrigated areas across the plain. Typical of such increases are those in the Big Wood River valley and Owyhee basin. Average per-acre value of crops grown on the Snake River Plain began falling about 1920 and reached an extreme low in 1932 (Caldwell and Wells, 1974, p. 63). Low crop values and loss of markets owing to the nationwide depression temporarily discouraged large increases in irrigated agriculture. During the early 1900's, a plentiful water supply encouraged overexpansion of irrigation in the Big Wood River valley. A series of dry years after 1921 showed the need for more water. Minner-Gooding Canal was built in 1931 to supply additional irrigation water to the Big Wood River area. Thus, the canal did not contribute to large increases in irrigated acreage (Simons, 1953, p. 67, 68). Completion of Owyhee Reservoir (about 52 air miles west of Boise, off the map) in Oregon in 1932 and of facilities for Gem Irrigation District in 1937 resulted in some expansion of irrigated acreage on the extreme western part of the plain. Between 1930 and 1945, irrigated area in the Owyhee basin below the reservoir increased by about 90,000 acres (Simons, 1953, p. 76, 77). Federal aids to irrigation in the 1930's were mostly used to increase reservoir storage capacity and to expand existing irrigated areas. With increased storage capacity, water supply for acreage already in production was stabilized. According to the map (above), about 2.5 million acres were irrigated with surface water by 1945.



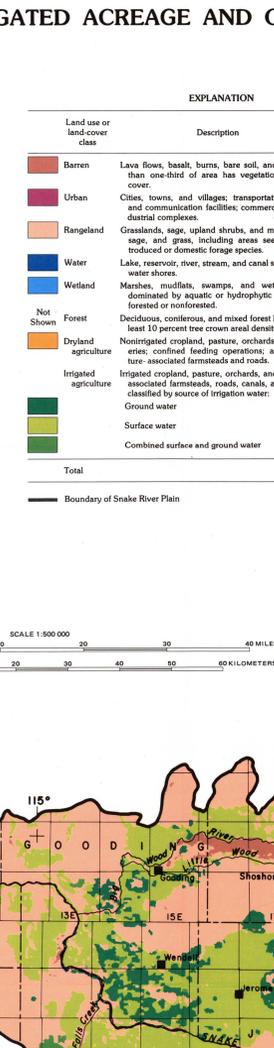
**GROUND WATER BECAME AN IMPORTANT SOURCE OF IRRIGATION WATER ON THE SNAKE RIVER PLAIN AFTER 1945.**  
In earlier years, a few irrigation wells had been drilled, but ground water did not become an important source of irrigation water until the late 1940's. By that time, surface water rights to natural flow had long been appropriated, the best storage sites were developed, lands adjacent to rivers were already irrigated, and irrigation pump technology had improved enough to make ground-water pumping economically feasible. When demand for irrigation water increased after World War II, ground water was the logical source of supply. The Mud Lake area was one of the first areas on the plain in which ground water was used extensively for irrigation. The area is underlain by a shallow, highly productive aquifer that makes ground-water development easy and cheap. As early as the 1920's, irrigators pumped ground water from shallow wells (Stearns and others, 1939, p. 106), but post-World War II irrigation was with surface water. After 1945, ground-water pumping in the Mud Lake area increased steadily. Between 1946 and 1967, electrical power consumption for irrigation increased 10-fold (Ratton and Chapman, 1969, fig. 2, p. 44). The Bureau of Reclamation's Minidoka Project was the first Federal project in Idaho to use both surface and ground water for irrigation.



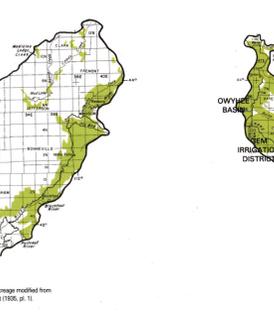
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Water rights for most natural flow in the Snake River were decreed by 1908, and in low water years, supplies were inadequate. Supply was augmented by federally financed construction of additional dams and reservoirs both on and off the plain. The largest, American Falls Reservoir on the Snake River, has a total storage capacity of 1,700,000 acre-ft. A summary history of reservoir development and changes in storage capacity as they relate to changes in irrigated acreage was presented by Kjelstrom (1984). In addition to providing funds for construction projects, the Reclamation Act provided funding for irrigation activities. The act established the U.S. Reclamation Service (later the U.S. Bureau of Reclamation), which worked with irrigation districts and water-user associations rather than with private enterprises. Thus, the Reclamation Act encouraged farmers to form cooperative irrigation organizations. Most of the large irrigation projects on the plain were completed by 1920. Demand for new irrigated acreage and reclamation facilities slowed dramatically in the late 1920's as prices for farm products declined.



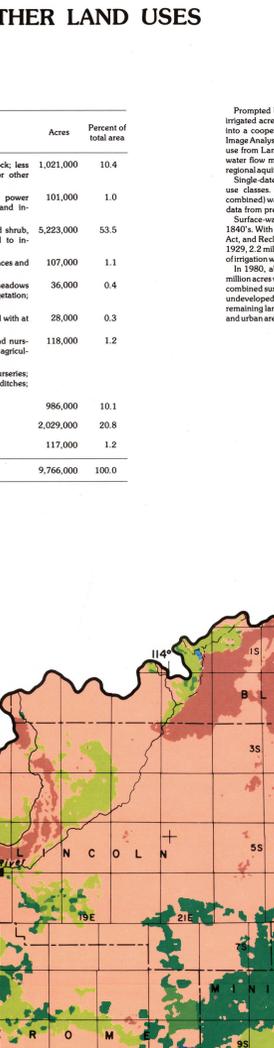
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



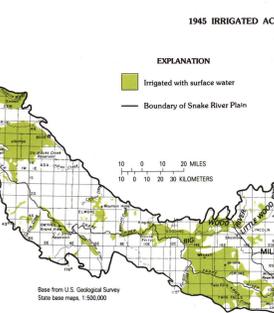
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



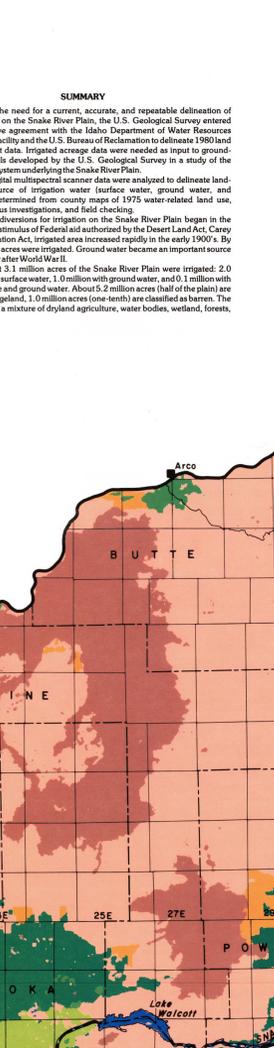
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



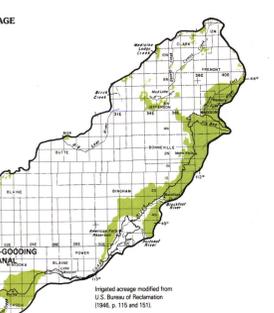
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



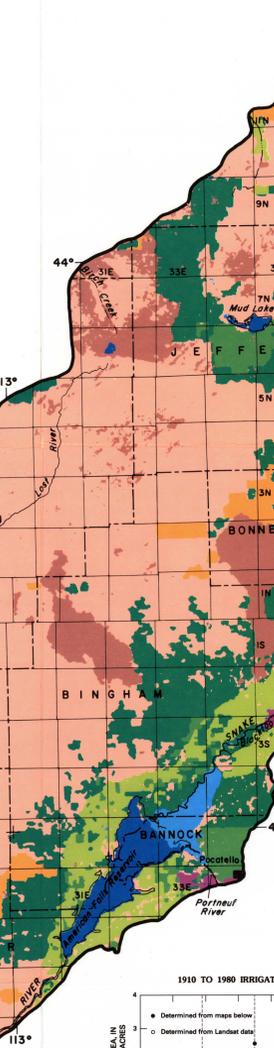
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



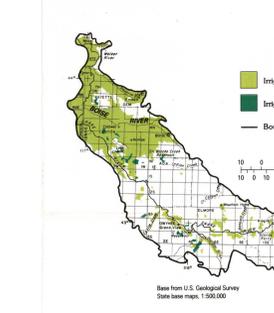
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



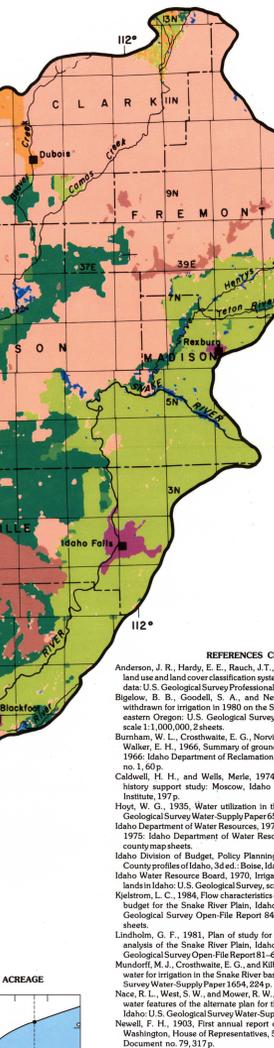
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



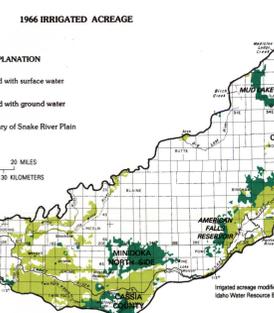
**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south



**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south

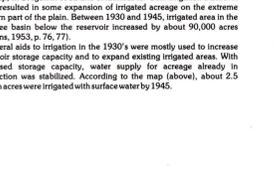


**BY 1945, ABOUT 5.2 MILLION ACRES WERE IRRIGATED ON THE SNAKE RIVER PLAIN.**  
Irrigated acreage expanded rapidly in the early 1900's, largely as a result of effective use of Federal reclamation assistance. The Carey Act of 1894 and the Reclamation Act of 1902 facilitated access to public lands to individuals for private reclamation and provided Federal financing for large-scale reclamation projects. The new Federal involvement provided coordination and funding for construction of dams, reservoirs, and canals, which stimulated rapid expansion of irrigated acreage. The Twin Falls Project was developed under the Carey Act. Beginning in 1905, Snake River water was diverted at Minner Dam to irrigate previously undeveloped lands north and south of the river. Within 10 years, more than 300,000 acres were irrigated in the Twin Falls Tracts. The Boise and Minidoka Projects were developed under the Reclamation Act. By 1900, irrigation had been practiced in the Boise River valley for about 60 years. Since the 1900's, private attempts to expand irrigated acreage had been unsuccessful, owing to lack of coordination and inadequate funding. The Reclamation Act provided solutions to these problems. After the Boise Project was approved in 1906, storage facilities were added, canals were completed, and the first water was delivered in 1907. Irrigated acreage increased steadily, and with the completion of Arnerock Reservoir (about 15 air miles east of Boise, off the map) in 1915, expanded beyond the Boise River valley. The Minidoka Project was authorized in 1904 and, starting in 1907, delivered irrigation water to about 120,000 acres on the north and south

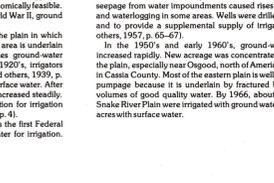
**EXPLANATION**

Land use or land-cover class	Description	Acres	Percent of total area
Barren	Lava flows, basalt, bums, bare soil, and rock; less than one-third of area has vegetation or other cover.	1,021,000	10.4
Urban	Cities, towns, and villages; transportation, power and communication facilities; commercial and industrial complexes.	101,000	1.0
Rangeland	Grasslands, sage, upland shrubs, and mixed shrub, sage and grass, including areas seeded to introduced or domestic forage species.	5,223,000	53.5
Water	Lake, reservoir, river, stream, and canal surfaces and water shores.	107,000	1.1
Wetland	Marshes, wetlands, swamps, and wet meadows dominated by aquatic or hydrophytic vegetation, forested or nonforested.	36,000	0.4
Not Shown	Forest	28,000	0.3
	Dryland agriculture	118,000	1.2
	Irrigated agriculture		
	Ground water	986,000	10.1
	Surface water	2,029,000	20.8
	Combined surface and ground water	117,000	1.2
Total		9,766,000	100.0

Boundary of Snake River Plain



**LARGE INCREASES IN IRRIGATED AREA OCCURRED IN THE EARLY 1900'S AND IN THE 1950'S.**  
Kjelstrom (1984) estimated annual irrigated acreage on the Snake River Plain for 1910 through 1980. Estimates reported here for several specific years differ from Kjelstrom's because of slightly different study areas and different estimation methods. Although estimates of irrigated acres for individual years differ, long-term trends are comparable. Discrepancies in estimates point out the need for consistent use of repeatable techniques to determine irrigated acreage. The recent application of remote sensing to land-use classification provides this capability.



**REFERENCES CITED**  
Anderson, J. R., Hardy, E. E., Rauch, J. T., and Witmer, R. E., 1976. A land-use and land-cover classification system for use with remote-sensor data. U.S. Geological Survey Professional Paper 964, 28 p.  
Bigelow, B. B., Goodell, S. A., and Newton, G. D., 1984. Water withdrawn for irrigation in 1980 on the Snake River Plain, Idaho and eastern Oregon. U.S. Geological Survey Open-File Report 84-434, scale 1:1,000,000, 2 sheets.  
Burnham, W. L., Crosthwaite, E. G., Norvick, R. F., Waite, H. A., and Walker, E. H., 1966. Summary of ground-water conditions in Idaho, 1966. Idaho Department of Reclamation, Water Information Bulletin no. 1, 60 p.  
Caldwell, H. H., and Wells, Marie, 1974. Economic and ecological history support study. Moscow, Idaho: Water Resources Research Institute, 197 p.  
Hayt, W. G., 1952. Water utilization in the Snake River basin. U.S. Geological Survey Water-Supply Paper 657, 379 p.  
Idaho Department of Water Resources, 1978. Water-related land use—1975. Idaho Department of Water Resources, scale 1:126,720, 16 county maps.  
Idaho Department of Water Resources, 1970. Irrigated and potentially irrigable lands in Idaho. U.S. Geological Survey Bulletin 1460, 200 p.  
Kjelstrom, L. C., 1984. Flow characteristics of the Snake River and water budget for the Snake River Plain, Idaho and eastern Oregon. U.S. Geological Survey Open-File Report 84-052, scale 1:1,000,000, 2 sheets.  
Lindholm, G. F., 1981. Plan of study for the regional aquifer