The Salt River Project, Arizona
Operated by the Salt River Valley Water Users’ Association

July, 1937

ROOSEVELT DAM AND POWER PLANT

(latter nearly hidden by cliff).

Began in 1906—completed 1911. Additions to dam and power plant begun 1923 and completed 1924.

Spillways lowered 6 ft., 1936.

Type, gravity, arched form, rubble.

Length over all, ft. 1,125
Elevation top (coping) above sea, ft. 2,146
Height from bed rock, ft. 284
Thickness at base, ft. 184

Thickness at top, ft. 16

RESERVOIR: (Spillway Lowered 6 ft. in 1937)

Capacity, ac. ft. 1,522,000
Area, acres 17,800

Height, miles 23

Drainage area, square miles 5,760

Spillway capacity, sec. ft. 150,000

POWER PLANT: Capacity H. P. 24,000

Head ft. 112 to 228.5

MASONRY: In dam (1923) cu. yds. 342,970

COST: Dam and plant, 1927 $5,442,000

HORSE MESA DAM AND POWER PLANT

Began 1924—Completed 1927

Additional spillway provided 1936-37.

Type, variable-radius arch, concrete.

Length over all, ft. 784
Elevation top (coping) above sea, ft. 1,920
Height from bed rock, ft. 305
Thickness at base, ft. 57

Thickness at top, ft. 8

RESERVOIR: Capacity, ac. ft. 245,000
Area, acres 2,600

Length, miles 17

Drainage area, square miles 110

Spillway capacity, sec. ft. 150,000

POWER PLANT: Capacity, H. P. 43,000

Head ft. 266

CONCRETE: In dam (1927) cu. yds. 147,357

COST: Dam and plant, 1927 $4,237,000

MORMON FLAT DAM AND POWER PLANT

Dam began 1923 and completed 1925. Power plant began 1925 and completed 1926.

Spillway reconstructed 1937.

Type, variable-radius arch, concrete.

Length, over all, ft. 623
Elevation, top (coping) above sea, ft. 1,671
Height from bed rock, ft. 229
Thickness at base, ft. 20

Thickness at top, ft. 8

RESERVOIR: Capacity, ac. ft. 63,300
Area, acres 63,000

Length, miles 10

Drainage area, square miles 160

Spillway capacity, sec. ft. 150,000

POWER PLANT: Capacity, H. P. 10,000

Head ft. 147

CONCRETE: In dam (1926) cu. yds. 42,980

COST: Dam and plant, 1927 $1,559,000
LOCATION AND AREA. The Salt River Project is located in south central Arizona on both sides of the Salt River and comprises 245,000 acres (about 400 square miles) of farm land, exclusive of irrigated townsite areas. A partial water supply is also furnished to approximately 60,000 acres of adjacent non-project land.

WATER SUPPLY. The water supply comes from the Salt and Verde rivers, supplemented by 170 pumping plants for utilizing underground water. The two rivers drain a watershed of approximately 12,000 square miles, about evenly divided between them. They unite four miles above the Granite Reef diversion dam. Storage is provided on Salt River by Roosevelt (1,522,000 ac. ft.), Horse Mesa (425,000 ac. ft.), Mormon Flat (81,000 ac. ft.), and Stewart Mountain (70,000 ac. ft.) reservoirs, forming a continuous chain of lakes nearly 60 miles long, with total storage of 1,790,000 ac. ft. Storage (200,000 ac. ft.) is being provided on the Verde river at Bartlett dam (1936-1939). Project drainage is fully controlled by pumps. The canal and lateral system, exclusive of farm ditches, totals 1350 miles, over 30 miles of the major canals being lined with concrete. The main canals on the north and south sides of the river have capacities at their heads of approximately 2800 sec. ft. each.

POWER SYSTEM. The project operates eight hydro-electric power plants, with aggregate turbine capacity of 115,000 H. P. (simultaneous generating capacity, 103,000 H. P.). Out of 820 ft. fall from high water level at Roosevelt to the crest of Granite Reef Diversion dam, 723 ft. head is utilized for power at the four storage dams, while 297 ft. fall is utilized in four plants located on the canals in the valley. The transmission system, consisting of 1400 miles of power lines, of which 380 miles are primary lines of 10,000 to 110,000 volts, distributes energy for agricultural, mining and industrial use in Maricopa and adjoining counties, service being extended to every farm on the project. Approximately 60,000 H. P. standby steam power is available under contracts with the local power company and nearby mines.

HISTORY OF PROJECT DEVELOPMENT. A large part of the Salt River Project was cultivated in prehistoric times and many interesting remains of the ancient irrigation systems and villages still exist. White men first began irrigating here in 1867 and by 1900 approximately 150,000 acres had been brought under cultivation, an area greatly in excess of the capacity of the water supply without storage. In 1904 a contract was made with the U. S. Reclamation Service for the construction of Roosevelt dam, which was begun in 1906 and completed in 1911. The Government also built the Granite Reef diversion dam and acquired and improved the numerous independent canals and ditches, welding them into a unified system. The management of the project was turned over to the Salt River Valley Water Users’ Association in November, 1917. A program of additional storage and power development on Salt River, including the increase in capacity of the Roosevelt lake and power plant and the construction of the three dams and power plants between Roosevelt and Granite Reef, was begun in December, 1922, and completed in March, 1930. Water storage was increased 650,000 ac. ft. and the power generating capacity 85,000 H. P. The period since 1917 has seen the construction of the Cave Creek flood control dam, the system of drainage and irrigation pumping plants, the electrification of the valley, the improvement and extension of the power transmission system and numerous other items. The entire investment in project works in 1937 was $32,000,000, about evenly divided between the irrigation and power divisions. Construction of Bartlett dam on the Verde river, with spillway improvements at the four Salt river storage dams, and other work (1925-33) is estimated at $6,000,000.

STATUS OF LAND. There is no settlement problem on the project, since all land is in private ownership and highly developed. There are no public lands open for entry. Good general farming land sells from $150 to $300 an acre. Land adapted to citrus and otherwise especially favored, brings from $400 an acre up.
CLIMATE. The climate is semi-tropical. The elevation averages 1,200 ft. above sea level. The average rainfall over a period of 40 years is 7.5 inches. Snow is practically unknown. The percentage of possible sunshine, averaged for Phoenix, is 84. The summer days are hot, but the nights are fairly cool. The low humidity, however, makes the highest temperatures much less oppressive than lower temperatures in localities with higher humidity. The spring, fall and winter months are delightful. Winter temperatures permit the growing of citrus without frost protection in the more favored sections and of lettuce, peas, grain, alfalfa, pasture, etc., over the entire valley. Approximately 80 per cent of the project area is in winter crops. Such frosts as occur are light and the average period between the first killing frost in fall and the last killing frost in spring is 90 days.

CROP AND LIVESTOCK. The leading crops, from the standpoint of area, are cotton and alfalfa. Grain, which makes a good winter growth and furnishes excellent winter pasture, is third in acreage. A large area is devoted to cantaloupes in summer and to lettuce in the fall and winter. Dates, grapes and figs have long been grown, but it is only recently that dates have been planted in large commercial groves. A notable recent development is the great increase in citrus plantings. Plums and apricots, with some peaches and pears, are the principal deciduous fruits, but the areas planted and not extensive. Corn, hay, and the various sorghums are grown for feed and ensilage. Wheat, oats, and barley are the other principal grains. The wheat is of excellent milling quality. In 1937 there were 25,000 producing dairy cows on the project. Conditions are exceptionally favorable for an expansion of this industry. The excellent winter pasture supports large numbers of cattle and sheep. Very few hogs are raised, their production usually being a side issue to general farming. Natural conditions are ideal for poultry raising but the industry is considerably underdeveloped. The project is well supplied with meat-packing houses, flour mills, creameries, milk-condenseries, cotton gins and fruit packing houses.

TOWNS AND CITIES. There are 12 towns within the project limits, seven being incorporated. The largest towns are Phoenix, with population in 1937 of about 75,000; Mesa (4,000); Tempe (2,000); Chandler (1,600); and Glendale (4,000). Other small towns, 2,600. The rural population is approximately 55,000. In 1937, the project had 86 schools, representing an investment of $5,000,000, 79 churches and 7 banks. Phoenix is the state capital. Its institutions include 8 banks with deposits in 1936 of $51,000,000; 55 churches, 41 grade and grammar schools, 2 high schools, 2 colleges, 5 creameries, 15 public parks, 9 theatres, 46 hotels and 2 flour mills.

TRANSPORTATION. The project is served by the Southern Pacific and Santa Fe railroads. There are 350 miles of concrete paved roads within the project outside of towns and 600 miles of improved roads. Few farms are more than a mile from pavement. Fast truck services are operated to the Coast and eastern points and to marketing points within the state. Regular air mail and passenger service is maintained from Phoenix.

RECREATION. The nearby lakes and high, pine clad mountain region to the north and east are easily accessible in summer over excellent highways. The valley has a considerable winter population, and many maintain permanent homes. Abundant

(Continued on next page)
The Salt River Valley Water Users' Association is a corporation organized under Arizona laws in 1903 to take advantage of the Reclamation Act, so that a contract could be made (1904) with the Government whereby liens could be placed on project farm lands guaranteeing the payment (over a long period of time) of the cost of building Roosevelt dam and other projects.

The Bartlett dam and other construction by the U.S. Bureau of Reclamation (1935-39) increases the Federal investment in the project by about $6,000,000.

Accommodations are available, ranging from the various palatial hotels to well-equipped auto courts.

The project was turned over to the farmers in 1917; the unpaid construction debt was $10,000,000 of which $7,000,000 has since been repaid. These debt payments plus the additional development described have been financed by direct assessments collected from the landowners, by power revenues and by bond issues. The Bartlett dam and other construction by the U.S. Bureau of Reclamation (1935-39) increases the Federal investment in the project by about $6,000,000.
Salt River Project

(Identicall with Salt River Project Agricultural Improvement and Power District)

Arizona

Operated by the
Salt River Valley Water Users' Association

General Description

The Salt River Project, under the Roosevelt dam, is one of the first major irrigation projects undertaken by the U.S. Reclamation Service (now Bureau of Reclamation) under the National Reclamation Act. It covers parts of three counties in south central Arizona and includes Phoenix (80,000, the state capital), and other valley cities with a population in excess of 15,000. It comprises 240,000 acres (net) of highly developed farm land and furnishes a partial irrigation supply for 95,000 acres of non-project land.

The Salt River passes through the valley from east to west and picturesque mountains rise abruptly from the plain on all sides.

The investment in irrigation, power and other works is around $43,000,000. Besides the seven large dams pictured and described here, there are two major diversion dams, 1,400 miles of canals and laterals with over 10,000 structures, 1,500 miles of electric power lines with 20 large substations, 550 miles of telephone lines, 2 large warehouses, 2 office buildings, over 100 residences and 100 pumping plants. The normal operating force varies from 600 to 800 employees. The eight hydro-electric power plants and the 10,000 MW Diesel plant have a combined generating capacity of 130,000 H.P. 

Description of Project

There are 900 miles of surfaced highways within the project boundaries (not counting towns and cities) half of which are concrete or other hard paving. Farming is carried on throughout the entire 12 months and directly or indirectly supports a population in and adjacent to the project of nearly 200,000. Pioneer days here are long past and all lands, homes and communities are highly developed. The outstanding advantages offered to visitors and others are the resort features of climate and surroundings, pleasant living conditions (particularly for winter tourists and home seekers) and adaptability to citrus and other high-class horticulture likely to appeal to people of means.

History of Project

A large part of this area was cultivated in prehistoric times but abandoned long before the coming of white men. Many interesting remains of ancient villages and canals still exist. Modern irrigation began about 1867. The river flow is erratic, varying from a small stream to enormous floods. This supply at low river stage was inadequate for all the land attempted to be cultivated, while all flows in excess of immediate needs or canal capacities were wasted due to lack of storage facilities. In 1902 Congress passed the Reclamation Act and under it the Government financed and built Roosevelt dam, which enabled these flood waters to be stored and held over for use as needed. The dam was put in service in 1910, being finally completed in 1911. To efficiently divert the water from the river into the canals and to distribute it to the lands required a permanent diversion dam and a complete system of canals and laterals. These were also included in the Government work and a supplemental water supply made available from pumping plants to utilize...
The Salt River Valley Water Users Association built a 10,000-KW Diesel power plant to supplement its generating facilities. Four others at drops in main canals, together with the necessary underground water. A hydro-electric generating plant at Roosevelt dam and four others at drops in main canals, together with the necessary transmission lines, were provided to supply cheap power for pumping and other project operations. In November, 1917 the project was turned over as a going concern to the farmers, subject to payment of the unpaid balance on construction costs. From 1922 to 1930 the Water Users’ Association built the Horse Mesa, Mormon Flat and Stewart Mountain dams and power plants on the Salt river below Roosevelt, and the Cave Creek Flood Control dam. In 1928-29 additional Reclamation Act improvements, including the Bartlett dam and spillway improvements on the four Salt river storage dams, were made by the United States. The first changes from 25 to 60-cycle power were made in 1940 to utilize power from this source. In 1940 power from Boulder became available through the construction by the Bureau of a 140-mile high tension power line from Parker dam to Phoenix. The first changes from 25 to 60-cycle power were made in 1940 to utilize power from this source.

Of the total $21,000,000 capital investment by the United States to June 1939, $18,000,000 has been repaid. The balance is payable under the Reclamation Act in small long-term installments. The remaining $2,000,000 of capital investment has been financed by the farmers without Government aid, and carried out independently during the period 1917-1940. The outstanding features of these improvements have already been mentioned and are shown and described in the views and accompanying tabulations.

PROJECT LANDS. The Salt River Valley is roughly 20 miles wide and 50 miles long, the horizon being limited by a fringe of mountains on all sides. The surface is nearly level and the soil extends to great depths. Land values range from as low as $150 up to $1,500 per acre, depending on location, crop and improvements. It is all in private ownership and highly developed.

WATER SUPPLY. The main water supply is furnished by the Salt and Verde rivers, draining 13,000 square miles of mountain watershed. The four storage reservoirs on the Salt form a continuous chain of lakes nearly 60 miles long and with Bartlett reservoir on the Verde, will hold 1,972,000 ac.-ft. of stored flood waters. An important supplemental supply is obtained from 170 pumping plants for utilizing underground water. As an emergency, up to a third of the water delivered to the farms has been obtained from this source in years of extreme drought. The net cost to the farmer for water varies from around $0.80 to $8.00 per acre per season, depending on the crop and amount of water used, the average being about $4.00 per acre. This includes all operation, maintenance, and annual payments on construction costs.

POWER SYSTEM. Advantage is taken of the entire 735 ft. fall from high water level at Roosevelt to tail water below Stewart Mountain dam to develop power. Horse Mesa, Mormon Flat and Stewart Mountain are primarily power dams. However, they add 373,000 ac.-ft. to storage which, when needed, is available for irrigation. Irrigation storage is the fundamental purpose of Roosevelt although it develops 24,000 H.P. Four other hydro-electric plants on the canal system in the valley utilize 234 ft. total head for power. The 15,500 H.P. Diesel plant furnishes...
COPING, Normal High Water elev...
Spillway crest elev.......
Length, dam proper, ft...
Max. Ht. bedrock to deck, ft.
Arch thickness, base, ft..
Arch thickness, top, ft.
Cu. Yds. Concrete

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DRAINAGE AREA, sq. mi...
Spillway Cap'y. sec.-ft...
Lake Cap'y. ac. - ft...
Lake Area, acres...
Lake Length, miles...
Arch thickness, base, ft.
Arch thickness, top, ft.
Cost, dam & power plant...
Cu. Yds. Concrete...

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CROP ACREAGE - 1939
Barley, Oats, Wheat & Sorghum..... 44,893
Seed, Alfalfa & Beets........... 7,645
Hay, incl. Alfalfa, Alfalfa-grain & Alfalfa after Grain..... 105,850
Sudan Grass.................. 5,497
Pasture, Grain, Alfalfa, etc. 108,994
Pasture, Bermuda............. 12,447
Corn, Maize........................ 1,460
Gross Area Cropped 1939........... 450,217
Less Area Double-Cropped...... 223,058
Net Area Cropped 1939............ 227,159
Yards, Hays, Rights-of-Way, etc. 15,711
Gross Project Farm Area........... 242,870

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LIVESTOCK - 1939
Average Value, 5 Years ending 1939........... $3,463,684

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TRANSPORTATION. The project is served by the Southern Pacific and Santa Fe railroads and by numerous fast truck and bus lines. Phoenix owns its own airport and has daily air mail and passenger service.

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CLIMATE. Every variety of climate, from sub-tropical in the valley to cool temperate in the pine-clad mountains, may be found within two hours drive of Phoenix. The annual rainfall varies from 3 to 50 inches, with an average of 7. The percentage of sunshine is 84%.

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TOWNS AND CITIES. Phoenix (80,000 - 60,000 by 1940 census within corporate limits and 15,000 suburban) is a typically up-to-date American city with thoroughly modern schools, churches, hospitals, parks, banks, theatres, business houses and other institutions. There are 11 other cities and towns within the project.
### Salt River Project, Arizona

**Area project farms irrigated, acres** 240,000

**Area non-project land furnished part supply** 95,000

**Number project holdings - 1 acre and over, 1940** 10,000

**Number towns (seven incorporated), area in towns and cities, acres** 10,000

**Elev. Valley above Sea, ft.** 900-1,975

**Precipitation - average inches per year** 7

**Temperature - max. & min. degrees F** 25-115

**Population, 1940, Rural** 66,000

**Towns and Cities** 163,000

**Schools, number, 1940** 91

**Churches, number, 1940** 152

**Banks - number (including branches)** 7

**Deposits, 1940** $64,000,000

**Hotels, 1940 (exclusive of auto courts)** 65

**Hospitals (exclusive of sanitariums)** 7

**Highways, Federal, State & County,** 43,000,000

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
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<tbody>
<tr>
<td>Value from land per acre, 1940</td>
<td>$150-$1500</td>
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<tr>
<td>Cost of irrigation and power system</td>
<td>$45,000,000</td>
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<tr>
<td>Cost of water to users, per acre per year (including all operation, maintenance and debt service)</td>
<td>$2.50 to $8.00</td>
</tr>
<tr>
<td>Crop value - average 5 years ending 1939</td>
<td>$18,654,700</td>
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<tr>
<td>Livestock - average value</td>
<td>$3,463,684</td>
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