

Delivering water and power®

THE HISTORY OF THE SRP CANAL SYSTEM

THE HISTORY



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WATER, POWER AND COMMUNITY

The Salt River Project (SRP) began as a partnership between the federal government and landowners in Central Arizona — a partnership that has allowed the area to flourish.

When landowners formed the Salt River Valley Water Users' Association (the Association) over a century ago, it signaled a turning point in the rise of Phoenix as a major Southwestern city. SRP became one of the nation's first reclamation projects in 1903. Working with the federal government, the Association built dams along the Salt and Verde rivers that fed an extensive canal system. This infrastructure provided a regular flow of water to farmers who had previously faced a vicious cycle of drought and flood.

SRP grew and evolved to meet the needs of a growing and changing community. Between 1920 and 1930, SRP expanded its pioneering hydroelectric generation and built power lines to deliver electricity to people in rural areas of the Salt River Valley. Today, SRP's water storage and delivery system delivers roughly 800,000 acre-feet to the Salt River Valley every year.

For more than 120 years, Arizonans have looked to SRP for community leadership and dependable water and power. Today, SRP is continuing its legacy — providing low-cost, reliable water and electricity to people in the Valley so our communities can continue to thrive.



Zanjero cleaning up the Arizona Canal

THE ANCIENT SALT RIVER VALLEY

The Huhugam (River People), the ancestors of present-day Salt River Pima-Maricopa Indian and Gila River Indian communities, were farmers who inhabited much of central and southern Arizona for about 1,400 years before European and American explorers visited the region. They are well known for having built an extensive irrigation system using stone, wood and basket tools.

The ancient canal system traversed nearly 500 miles and may have served as many as 50,000 people at a time. Archaeologists don't know exactly why the ancient farmers stopped maintaining their canals around A.D. 1450, but it is suspected that environmental change, drought, violent floods and downcutting of rivers may have affected their ability to farm the Salt River Valley.

The Huhugam set the groundwork for today's SRP canal system, which follows many of the same paths.

Over the past 150 years, the remains of most ancient villages in the Salt River Valley have been plowed, leveled and paved over. Archaeologists in the 1920s had identified 150 miles of ancient canals and hundreds of village sites, most of which can no longer be seen from the ground, though traces of them persist beneath the modern landscape.

S'edav Va'aki Museum and Archaeological Park (located at 44th and Washington streets in Phoenix) is one of the few preserved large ancient villages in the Valley. The museum also preserves a portion of two remaining ancient canals.

The ancient canal system traversed nearly 500 miles.



THE SETTLERS

In the 1860s, a central Arizona gold rush brought an influx of people to the Salt River Valley.

In December 1867, a group of 17 of these new arrivals formed the Swilling Irrigation and Canal Company. They planned to take water from the Salt River by canal so they could grow crops to sell to miners in Wickenburg and to the U.S. Cavalry stationed at Fort McDowell. The waterway became known as the Swilling Ditch, later the Town Ditch or the Salt River Valley Canal.

By March 1868, farmers under the Swilling Irrigation and Canal Company harvested their first crops on land near the present-day Arizona State Hospital, located at 24th and Van Buren streets. During that same month, a government survey party came to the Valley and noted that a small community calling itself "Phoenix" had appeared on the scene.

Soon groups of farmers up and down the river were digging canals and building crude rock and brush diversion dams (or headings) to force a flow of water into the canal. These headings required constant maintenance, and the most successful projects were owned by private canal companies and associations, which assessed members a fee for construction and maintenance.



Irrigation canal and siphon tubes

SETTLERS FORM A WATER ASSOCIATION

A severe drought in the late 1890s created a water shortage in the Valley. At one point, the flow of the Salt River diminished to 25 cubic feet (about 187 gallons) per second. Thousands of acres of agricultural land went out of production. Orchards withered. Hundreds of people moved away.

In 1903, the Valley settlers formed the Salt River Valley Water Users' Association, which is still a part of SRP today. The Association pledged more than 200,000 acres of land as collateral for a government loan to build a massive water storage and delivery system.

That loan was made possible by the National Reclamation Act of 1902, which provided funding for the construction of water storage dams and canals and brought new hope to those who had struggled to develop the area.

Through the government loan, SRP's first dam was built by the U.S. Bureau of Reclamation (USBR). It was named after former President Theodore Roosevelt, whose foresight and commitment brought the project to life.

As the area grew, SRP added three more storage dams on the Salt River and two dams on the Verde River. These connected to an existing 1,300-mile system of canals and laterals, completing the water delivery system.

The water storage and delivery system brought new life to the land. More than any other single factor, this system was critical to the region's development.

ARIZONA CANAL (1883)

Measuring about 39 miles long, the Arizona Canal is the longest canal in SRP's system. It's the main canal that transports water to all others on the north side of the Salt River, and it generally marks the northern boundary of SRP's water service territory.

The canal was the work of the Arizona Canal Company, which was formed in December 1882. Construction began in May 1883 and was completed in 1885. Water began flowing the next year. The Arizona Canal helped bring water to the north and across to the West Valley, allowing for development of these areas. The original heading was the old Arizona Dam, located on the Salt River about a mile below the mouth of the Verde River. Unfortunately, that dam was destroyed in a spring flood in 1885. A stronger Arizona Dam was rebuilt by December 1886. Though the second Arizona Dam was the only pioneer diversion dam that survived the big flood of February 1891, it was damaged by a flood in 1905 during the construction of Roosevelt Dam.

In an effort to unify the Valley's water delivery system, the Secretary of Interior agreed to purchase the canal in 1906. The government assumed operations of the Arizona Canal in May of 1907.

GRAND CANAL (1878)

The Grand Canal is the oldest remaining pioneer canal on the north side of the Salt River. It was planned in 1877 and constructed in 1878 by the Grand Canal Company. The original heading of the Grand Canal was plagued by washouts, which would interrupt its water supply for months at a time, so the Old Crosscut Canal was built to provide a more reliable water supply from the Arizona Dam and the Arizona Canal. Today, the Grand Canal receives water from the Arizona Canal by way of the New Crosscut Canal.

The Grand Canal provided a better route for service of central Phoenix than the Salt River Valley Canal, which led to the abandonment of the Salt River Valley Canal in 1925.

The federal government purchased the Grand Canal for \$25,731 in June 1906, and it became part of SRP. At that time, the canal served about 17,000 acres.

THE CROSSCUT CANALS: OLD AND NEW

The Old Crosscut Canal was built near 48th Street by the Arizona Improvement Company to unify the entire northside canal system by connecting the Arizona and Grand canals. After the New Crosscut was built near 64th Street, the Old Crosscut was used only for drainage, emergency flood relief or during repairs to the New Crosscut. In 1975, SRP transferred the maintenance responsibilities for the Old Crosscut to the Flood Control District of Maricopa County and the City of Phoenix, which made improvements to increase the canal's capacity for flood control. The New Crosscut (or Arizona Crosscut) was financed and built by the Water Users' Association in 1912 and turned over to the U.S. Bureau of Reclamation upon completion in 1913. This canal leaves the Arizona Canal near 64th Street and crosses Papago Park before it drops 116 feet through penstocks (pipes) to the Crosscut Hydroelectric Generating Station south of Washington Street. Then it enters the Grand Canal. The completion of the New Crosscut Canal and hydro plant made electric power generation possible on the canals while still allowing for the efficient delivery of irrigation water. When it was built, the Crosscut Hydro Plant was the second-largest generating station on the SRP system (after Roosevelt Dam).

The New Crosscut Canal's bank is where the Valley's first concrete canal-side bicycle path was built in 1975.

SOUTH CANAL (1907)

The South Canal serves the very important purpose of taking water from the Salt River at the Granite Reef Diversion Dam to all of the other canals on the south side of the Salt River.

The South Canal was built by the federal government between 1907 and 1909 to unify the entire southside canal system. Originally, the South Canal was only 2 miles long before splitting into the Consolidated and Eastern canals. However, the Consolidated Canal, nearer to the river, was repeatedly damaged by floods. In 1920, the Eastern Canal was widened to become the main canal for the southside system. The entire 10-mile stretch to the division gates where the Consolidated and Tempe canals separate is now called the South Canal. The first South Canal hydro plant, built in 1912 at the split of the Consolidated and Eastern canals, was moved to its present site in 1924 to take advantage of a drop in the canal. From 1927 to 1929, the South Canal and parts of the Eastern and Consolidated canals were the first SRP canals (and among the first in the nation) lined with concrete. The concrete liner saved water and increased the supply to SRP and the Roosevelt Water Conservation District (RWCD).

The three most significant features along the canal are the Val Vista Water Treatment Plant, the Hennessy Wasteway and the South Consolidated Hydroelectric Plant. The Hennessy Wasteway is used to discharge excess rainwater from the Salt River. It is also used as the turnout to the Granite Reef Underground Storage Project (GRUSP). Located on a 350-acre site southwest of Granite Reef Diversion Dam, GRUSP stores water from the Salt River and water delivered through the Central Arizona Project. Water is contained at the site and allowed to sink into the ground, recharging the underground aquifer and bolstering groundwater resources. Managed by SRP, GRUSP is a partnership among SRP, six Valley cities and the Salt River Pima-Maricopa Indian Community.

Another feature on the South Canal is the RWCD pumping plant, which takes water from the South Canal into the RWCD Canal. West of Lindsay Road, the South Canal splits and becomes the Eastern Canal to the southeast and the Consolidated Canal to the southwest.

EASTERN CANAL (1909)

The Eastern Canal is a branch of the South Canal that originates west of Lindsay Road near McDowell Road in northeast Mesa.

Built by the federal government in 1909, the Eastern Canal replaced the old Highland Canal, which was one-quarter mile to the west. The Highland Canal had been completed in 1888.

Concerns about water rights, coupled with droughts in the late 1890s and early 1900s, helped motivate landowners served by the Highland Canal to pledge their property as collateral to form the Association. Today, the Eastern Canal is the site of the Town of Gilbert's water filtration plant.

CONSOLIDATED CANAL (1891)

Although it is the largest canal in Mesa (roughly 18 miles long), the Consolidated Canal wasn't built to serve any of the land within the present city limits.

Started in 1891, the canal was masterminded by Dr. A.J. Chandler and his Consolidated Canal Company. Chandler's desire was to bring water to the area that now bears his name. Because the canal was built during one of the driest periods in the Salt River's history, its owners faced supply problems. Lands with older water rights had first claim on the meager water supply in the Salt River, and the occasional surpluses that occurred were too small to cultivate new land.

Nevertheless, Chandler was imaginative. Recognizing the problems that owners of the Mesa and Tempe canal companies were having with brush diversion dams, he began bargaining.

In exchange for water to be saved by his proposals, Chandler offered to build a new diversion dam made of huge boulders. The south end of the dam tied into granite masonry abutments and wing walls — the head of the new canal.

Using a huge dredge, Chandler built a canal up to 26 feet deep. Two miles south of the heading, the canal emptied some of its water into the old Mesa Canal. The Consolidated Canal then divided into two branches as it does today. The Consolidated Canal also delivers to the Chandler Water Filtration Plant, which is located south of Pecos Road.

The branch heading west was called the Crosscut Canal, and for about two miles, it followed what is now Brown Road to the edge of a small mesa near the Tempe Canal. This spot is where Chandler built the Chandler Falls Power Plant that provided electricity to Mesa and Tempe.

By carrying Tempe Canal water through the Consolidated Canal, instead of through a sandy riverbed, canal owners were able to prevent a considerable amount of water loss from seepage. This "new" water became part of the Consolidated Canal, which followed the old Mesa Canal to Baseline Road and on to Chandler.

Recognizing the water savings that the Consolidated Canal made possible, the federal government later sought to acquire the canal as part of a unified water distribution system for the Association. Government engineers saw that all canals south of the Salt River could be interconnected by building a new 6-mile length of canal from Granite Reef Diversion Dam to the Consolidated Canal.

Negotiations to buy the Consolidated Canal began in 1907. It was sold to the government in November 1908 for \$187,000.

TEMPE CANAL (1871)

The Tempe Canal is the oldest continuously used main canal in SRP's system. Construction of the Tempe Canal was undertaken by the Tempe Irrigating Canal Company, which had originally been incorporated in 1870 as the Hardy Irrigating Canal Company, though the name was changed the following year. The first Tempe Canal headed in the Salt River near what is now Mesa Drive in Mesa. It flowed along 8th Street to downtown Tempe and on to the west where it also supplied the San Francisco Canal. (This route is still served by laterals, mostly piped.) A branch served the Broadway-Alameda area south of downtown. By 1875, as much as 3,800 acres were being irrigated from these branches. In the 1880s, further branches were dug south along Price Road (a portion now known as the Tempe Canal), west along Guadalupe Road and around the base of South Mountain to south Phoenix. Ultimately, these canals irrigated over 25,000 acres.

Charles Trumbull Hayden, the "Father of Tempe," was among the early homesteaders served by the canal. He first came to the Valley in 1870 and saw the need for a store, ferry service and flour mill at the river near what is now Mill Avenue. Hayden began building the mill in 1872. It began operation two years later, using power generated by water from the Tempe Canal by way of an extension ditch. Some of the earliest pioneers in this area were the Sotelo and Gonzales families, who both worked on the construction of an early branch of the Tempe Canal, the McKinney-Kirkland Ditch, and farmed in the area as well.

Due to solid water rights, Tempe Canal landowners did not join the Association when it was formed in 1903. Most landowners saw no reason to pledge their land as collateral for a federal government loan to build Roosevelt Dam. The Tempe Canal Company finally joined the Association in 1923, but not because of a shortage of water.

The increase in irrigation brought about by Roosevelt Dam raised the water table all over the Valley. Because of geological formations, land in Tempe was at high risk for waterlogging. The Association had the resources — including the electric power — to drain these lands with pumps, and its commitment to make Tempe a priority for drainage convinced the Tempe farmers to join the Association.



WESTERN CANAL (1912–1913)

The Western Canal was built to serve SRP lands in south Phoenix after the U.S. government tried but failed to purchase the Wormser Branch of the Tempe Canal. From 1911 to 1912, the government dug the canal from Price Road to 48th Street before suspending work due to funding problems. The government also built three feeder laterals to bring a water supply from the Consolidated Canal and a siphon to carry the Western Canal under the Tempe Canal. Farmers in the south Phoenix area formed the Western Canal Construction Company in 1912 to fund and build the canal from 48th Street to 19th Avenue. When completed, this section was deeded to the U.S. Bureau of Reclamation and the farms of south Phoenix finally had an assured supply of SRP water.

Some farmers in south Tempe and south Phoenix had lands on the lower slopes of South Mountain, which was above the Western Canal. In 1912, these farmers formed the Highline Canal Construction Company and sold stock. They raised \$100,000 to build a pumping plant, pipeline and canal. The pumping plant took water from a bay in the Western Canal and pumped it 40 feet uphill through a 1-mile pipe, where it emptied into the Highline Lateral for distribution.

From the Tempe Canal, the Western Canal heads west then turns and curves around to the northwest along the foothills of South Mountain. Roughly at the Maricopa Freeway, the canal continues its western jaunt, then dips to the southwest near 7th Avenue.

Drivers traveling along Baseline Road between the freeway and Central Avenue can see the Western Canal just north of the road. The Western Canal now has the Highline Pumping Plant, located east of Kyrene Road, to lift water to the Highline Canal.

THE CENTRAL ARIZONA PROJECT (1968)

As the state grew, SRP and other water providers understood that additional water supplies would be necessary to support Arizona's cities, agriculture, business and industry, so SRP helped advocate to bring a new reclamation project, the Central Arizona Project (CAP), to life. The CAP's canal system transports water across the desert from the Colorado River, carrying it to the state's central valley where it adds to the region's supply.

THE LATERALS

SRP's irrigation system includes hundreds of smaller "laterals" connecting to the main canals. These ditches take water from the large canals to delivery points in irrigated areas.

In 2013, SRP and the Bureau of Reclamation set aside 60 open lateral canal segments totaling 28 miles throughout the Valley as part of the Historic Lateral Canal Preservation program in order to preserve examples of this quickly disappearing canal type.

Of the 1,074 miles of drains and laterals, 919 are piped to help reduce water loss — and more are lined or piped each year.

Water is routed into and through these laterals using a series of turnout gates. Residential water shareholders take their water entitlement at regularly scheduled intervals throughout the year by opening valves that release water onto their property.

WATER TREATMENT PLANTS: CLEAN WATER FOR ALL

Most people in the Phoenix area get tap water through the SRP canal system. Eight municipal water treatment plants are located near the SRP canals. These facilities filter the water and then pump it through pipes to homes and businesses.

The cities act as agents for SRP water users when they accept SRP water and deliver treated water to residents. Cities pay an assessment charge to SRP for water delivered from SRP reservoirs to their treatment plants. Areas within cities but outside of the SRP water service area get water from wells or treatment plants located on the CAP Canal.

HYDRO PLANTS SITED ON CANALS

Canals can be used for more than just delivering water. Where there are large drops in elevation, small hydroelectric generating stations can be built. In fact, several have been used in the past, and two are serving SRP electric customers today.



Though no longer in use, the Crosscut Hydroelectric Plant sits on the north side of the Salt River near the Mill Avenue Bridge in Tempe. Built by the federal government between 1913 and 1914 and located on the New Crosscut Canal, the station generated power from a 116-foot drop that starts in Papago Park. Water was tunneled under Washington Street to the power house and then flowed into the Grand Canal. The station had a generating capacity of 3,000 kilowatts (kW).

The South Consolidated Hydroelectric Plant was completed in May 1981 on a 35-foot drop where the South Canal divides into the Eastern Canal and the Consolidated Canal (near Lindsay and McDowell roads northeast of Mesa). Partially funded by the U.S. Department of Energy, the station has a 1,400 kW generating capacity and is situated underground to minimize its environmental impact.

The reconstructed Arizona Falls hydroelectric plant opened in June 2003. The completed facility, located at 56th Street and Indian School Road, takes advantage of falling water from a natural 20-foot drop in the Arizona Canal to produce 750 kW of electricity. The new Arizona Falls is on the same site as one of the Valley's first hydroelectric plants that was built in the early 1900s. The restoration is the result of a joint effort between SRP, the City of Phoenix Arts Commission, the U.S. Bureau of Reclamation and the Arcadia neighborhood. The new Arizona Falls combines art, history and technology to generate clean electricity from the canal's waterfall. The roof of the new turbine building and the adjoining shade structure house solar panels to power ceiling fans on the public deck.

CANAL RECREATION

Today, an estimated 900,000 people enjoy walking, jogging and biking along the canal banks. The first paved path was completed in January 1975 along the New Crosscut Canal. Since then, over 80 miles of paved paths have been developed by cities working closely with SRP. These paths are ADA-compliant and oftentimes include lights, landscaping and commissioned public art. Most cities have built or are currently building path projects that provide a unique experience for the public to enjoy. One example is the City of Phoenix's Grand Canalscape project located along the Grand Canal between I-17 and the Phoenix/Tempe border.

WEED-EATING FISH

In early 1989, SRP introduced about 1,800 white amur, or grass carp, into parts of the canal system. Every year, the fish save SRP and its shareholders thousands of dollars on aquatic weed control costs. That's because a 7-pound amur can eat nearly three-fourths its body weight in vegetation a day. These weed-eating fish keep water flowing freely through the canals and reduce the need for chemical herbicides and mechanical labor.

CANAL MAINTENANCE

Every year, portions of SRP's major canals north and south of the Salt River are dried up for about a month so that construction and maintenance work can be performed. These dry-ups typically happen in the fall and winter when demand for water is lowest. During a dry-up, fish are relocated, weeds and debris are cleaned from the canals, and repairs are made to the canal lining.

All of the canals are lined with concrete to help stabilize the banks and minimize water loss. Local governments, utilities and developers use the dry-up periods to improve and build bridges over the canals and to under-cross the canals with utility services.



Canal maintennace, roundup of the white amur fish

CANAL SAFETY

Arizona's canals deliver water to many homes and businesses throughout the Valley, and that's what they were designed to do. They were not designed for swimming or recreation. Canals can be dangerous, so it's important to enjoy canal banks safely.

Follow these safety tips to avoid drowning or injury:

- Ö Watch people and pets around the canal at all times.
- Ö Never swim in the canals. This is extremely dangerous.
- Ö Keep away from the edges of canals. The edges can be slick, making it hard for someone to get out if they fall in.
- Ö Teach children about canal safety. Never jump into a canal to rescue a pet, toy or other item that may have fallen in. Call 911 for help.
- Ö If you see a person or animal in the canal, remain calm. Call 911 to report the emergency and your location.

- Ö Do not drink canal water. It has not been treated yet and is not safe to drink.
- Ö Swimming, canoeing, kayaking, water skiing and tubing are not allowed in canals for safety reasons.
- Ö Stay away from all SRP equipment and facilities, including catwalks and delivery gates.
- Ö Stay clear of any canal construction or maintenance activity.
- Ö Do not drive onto the canal banks. Only authorized service vehicles are allowed — other motorized vehicles are prohibited.

Before organizing an event along the canal, get permission from SRP. You can request an event license at **srp.net/specialeventlicensing** or send questions to **landinformation@srpnet.com**.





IRRIGATION SERVICE TERRITORY



FURTHER READING

CANAL HISTORY

Learn about the history of the canals and see the latest maps at **srp.net/canalhistory**.

History Map

Explore historic water and power features along the SRP canal system at **srp.net/history**.

Canal Recreation

Learn about canal trails and projects and find the latest canal recreation map at **srp.net/canals**.

Canal Safety

Read our tips for enjoying the canals safely at **srp.net/canalsafety**.

Special Events

Request a license for an event along the canals at **srp.net/specialeventlicensing** or **landinformation@srpnet.com**.

Water

Find out where your water comes from, and what SRP is doing to protect it, at **srp.net/water**.

Irrigation

To learn more about SRP's irrigation services, visit **srp.net/irrigation** or call **(602) 236-3333**.





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