Snow Survey Centennial Celebration
1906-2006

The Salt River Project and the Arizona Cooperative Snow Survey & Water Supply Forecasting Program – June 12, 2006 Centennial Celebration Weekly Newsletter

Photo Credit: SRP. Lake Roosevelt, March 2005

The Salt River Project (SRP) is one of the largest public power utilities in the United States. SRP provides electricity to more than 2 million customers in a 2,900 square-mile service area. SRP is also the largest water supplier in the Phoenix metropolitan-area, delivering nearly 1 million acre-feet of water per year to agricultural and municipal water users.

Nearly a century ago, in 1903, SRP was established by local citizens and landowners. These water pioneers ranged from ranchers, farmers, engineers and business people concerned with the long-term viability of the Salt River valley. These pioneers formed the Salt River Valley Water Users' Association, still a part of today's SRP, and pledged more than 200,000 acres of their own land as collateral for a government loan to build a massive water storage and delivery system.

The loan was made possible by the National Reclamation Act of 1902, which provided federal funding for the construction of water storage dams and canals. With the government loan, a dam was built on the Salt River and named after President Theodore Roosevelt, whose commitment brought the project to life.

Today, the SRP system covers the 13,000 square-mile watershed of the Verde and Salt River basins, where water originates to fill six lakes including Horseshoe and Bartlett, both on the Verde River, and Roosevelt, Apache, Canyon, and Saguaro, all on the Salt River. These reservoirs are multi-purpose and produce electricity from hydroelectric generating stations at the four dams on the Salt River, while the water stored in the reservoirs is also used for recreation by the public.

The SRP water storage and distribution facilities supply the city of Phoenix with a major portion of its water supply. The cities of Scottsdale, Tempe, Mesa, Gilbert, Chandler, Avondale, Glendale, Peoria, and Tolleson also contract with SRP for water supplies.

The elevation of the project area ranges from 1,100 feet in the desert to over 12,000 feet on the watershed. The agricultural area is semi-desert by nature, with

mean annual precipitation at 8.3 inches; so irrigation is a necessity. The mean annual temperature is 74°F, which allows for year-round crop production.

Soils found in the SRP service area consist of various alluvial loams, with pockets of clay soils, which are generally deep and fertile. Principle crops grown are alfalfa, cotton, citrus, and some vegetables. Sorghum and corn silage are popular second crops for multiple cropping systems.

Arizona Snow Survey Program

The first snow courses were established in Arizona in 1938 by Arch Work and Ralph Parshall according to Dick Enz, a retired Soil Conservation Service (SCS) snow survey supervisor in Phoenix, Arizona. At the time, Arch Work and Ralph Parshall worked for the Bureau of Agricultural Engineering, later to become the Agricultural Research Service (ARS). Carl Harris, an irrigation engineer with SCS Research had early responsibility for the Arizona snow survey program. About 1950, snow survey was transferred to SCS Operations and Bill Anderson took over the program as part of his engineering specialist duties. As area engineer at the Prescott office, Dick Enz worked with Bill Anderson when they laid out the Gaddes Canyon snow course on Mingus Mountain in 1954. Dick Enz measured the snow course for the next 6-years.

Borden Goodwin, SRP, secures the snow tube, while Jim D'Amello, USFS, holds the weighing scale suspended from a ski pole. Jan. 1965.

In 1956 the West-Wide Snow Survey Training School was held at Alta, Utah. Three snow surveyors attended from Arizona including Bill Anderson, Dick Enz, and Borden Goodwin from SRP. Mr. Goodwin made many snow survey trips and snowpack measurements with SCS and U.S. Forest Service (USFS) staffs through the 1950s and 1960s. In 1957 or '58, George Watt replaced Bill Anderson as manager of the snow survey program and proceeded to develop the first reliable forecast equations for Arizona streams. George Watt worked closely with Dick Enz after Enz transferred from the Prescott office to Phoenix.

By 1960, George Watt had assumed responsibility for the new PL566 Watershed Program and his collateral work as engineering specialist and hydrologist kept him too busy to devote sufficient time to snow survey operations. As a result, Dick Enz assumed the responsibility as state snow survey supervisor and irrigation specialist. Dick Enz held these positions for the next 20-years.

In the beginning it was mostly irrigation work, says Enz, however, the workload slowly shifted to snow survey operations, especially with the installation of snow telemetry (SNOTEL) equipment in the late 1970s.

In the 1950s and '60s, the snow surveyors used a snow cat, which was developed by the Utah Scientific Foundation at Utah State University. It consisted of a Jeep equipped with a wooden cleated track, steering clutches and a heavy steel ski on the end of a boom. In deep snow it was difficult to steer and the clutches heated up and smoked if used too much.

At the time, SRP supplied a man (Borden Goodwin) and a 4x4 Dodge Power Wagon to transport the snow cat from Flagstaff to Springerville, Arizona. Snow surveys were made along the way in the Verde watershed in the Morman Mountain

area, along the central Mogollon Rim south-west of Heber, Arizona, and in the White Mountains south-west of Springerville, Arizona. It took four days to complete the scheduled snow surveys during the winter months. The snow cat and truck were stored at U.S. Forest Service compounds in Flagstaff and Springerville alternately between runs.

Dick Enz monitors soil moisture in the Salt River watershed. March 1966.

When smaller snowmobiles became available the snow cat was stored in Greer, Arizona for use in the White Mountains surveys. Snowmobiles were used in the Flagstaff-area snow surveys and Dick Enz made the central Mogollon Rim surveys out of his Phoenix office. It made for a long day, said Enz, especially after the Baker Butte snow course was added. It didn't matter much, because Enz liked to get out and see the snow conditions firsthand, as it helped him greatly when developing the streamflow forecasts for the rivers and streams.

Dick Enz retired from the SCS in 1980 to be followed by Ron Jones who transferred from Portland, Oregon the same year. Ron Jones operated the Arizona snow survey program for the agency until his retirement in April 1994.

At present-time, Larry Martinez serves as the NRCS state water supply specialist and provides overall coordination for the Arizona snow survey program. At the SRP, cooperative snow surveyors at the Water Resources Operations office include Charlie Ester, Dallas Reigle, and Tim Skarupa.

Additionally, U.S. Forest Service staffs from across the state also contribute valuable in-kind assistance to make snowpack measurements each winter. At the Grand Canyon, National Park Service rangers contribute assistance during winter to conduct snow measurements at the North and South Rim snow courses.

On the Navajo Indian Reservation, tribal technicians conduct snow survey measurements each winter to build a data base to help manage their water resources. In a partnership, NRCS hydrology specialists use the snow data to forecast water supplies from streams originating in the Chuska Mountain.

Closing Remarks

Today, as in the past, one of the unique aspects of snow survey operations in Arizona is the close working relationship with the SRP. At forecast time the NRCS and SRP closely coordinate their forecast work. This results in forecast figures that are used by both parties. Water resource operations within SRP are affected by these figures and system reservoirs are managed in accordance to these runoff estimates for the most part.

The SRP has also been an active participant and supporter of the Western Snow Conference (WSC). In that regard, SRP, NRCS, and other partners worked together to successfully organize and carryout the 2003 WSC held in Scottsdale, Arizona.

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