# Snow Survey Centennial Celebration
## 1906-2006

**The Navajo Nation Cooperative Snow Survey and Water Supply Forecasting Program**

Snow surveys have been conducted on the Navajo Nation since 1984 as a cooperative effort between the USDA's Natural Resources Conservation Service (NRCS), the Navajo Nation Water Management Branch (NNWMB), and the Navajo Nation Forestry Department (NNFD). During this period, thirteen snow courses were established. Ten remain active today. These snow courses are located in the Chuska Mountains and on the Defiance Plateau of northeastern Arizona, along the Arizona-New Mexico state line.

The snow survey data from these stations are primary used to forecast spring runoff from streams originating in the Chuska Mountains. Water levels for several small reservoirs are managed in accordance to these streamflow forecasts. This information is also important for drought contingency planning and for emergency management.

The forecast information and snow course data are published in the Arizona Water Supply Outlook Report, issued by NRCS. The report provides a record of snowpack data gathered from mountain locations in Arizona, along with the water supply outlook for the public.

The Navajo Nation snow surveyors are certified by the NRCS through attendance at the West-Wide Snow Survey School. Following NRCS guidelines, the snow courses are measured on the 1st and 15th of each month, beginning January 1 and continuing through April 1. A federal snow sampler is used to measure the water content of the snowpack. Accessing the sites can be difficult and requires the use of 4x4 vehicles, over snow machines, skis and snowshoes.

For the 22-year period of record from 1984 to the present time, the observed pattern of snow accumulation in the Chuska Mountains increases from January to a peak in mid March, followed by decreasing snowpacks by April 1. The greatest Chuska snow accumulations were measured in 1993, during a strong El Nino event. Record low snowpacks were recorded in 1999 as a result of a La Nina event, which dominated the regions weather through springtime.

On the Defiance Plateau, long-term data shows a similar pattern of snowpack accumulation to the Chuska Mountains, although with far less snow. The Defiance

Plateau supports a vast forest dominated by Ponderosa pine and mature stands of Pinon pine. The headwaters of the Ganado Lake watershed originate on the Plateau.

Snow survey personnel from NNWMB and NRCS have built on a working relationship established in the early 1980's when former tribal meteorologist Bob Becker and retired NRCS water supply specialist Ron Jones began to design the Nation's snow course network.

Additionally, the NNWMB staff has been measuring stream flow at Captain Tom Wash, Bowl Canyon Creek, and Wheatfields Creek for several years. In 1995, Tom Perkins, NRCS forecast hydrologist, National Water and Climate Center (NWCC), Portland, Oregon, developed water supply forecast equations for these streams. This effort has resulted in 21 water supply forecasts issued each season. These forecasts are published in the Arizona Water Supply Outlook Report each winter. NRCS has also been archiving the snow data at the NWCC since measurements began.

At the present-time, Jolene Tallsalt-Robertson serves as the hydrologist at NNWMB. Jerome Bekis and Irving Brady are the principle snow surveyors. Mr. Bekis and Mr. Brady have over 20 years experience with the NNWMB and they have great knowledge regarding the Nation's snow survey operations.

In the future, a SNOTEL site will be installed on tribal land adjacent to the Whiskey Creek snow course. Richard Armijo, New Mexico State Water Supply Specialist, is leading this effort for NRCS. If funds are available in coming years, the Beaver Springs snow course would also be a high priority for SNOTEL automation. It is the highest elevation station within the network, making it extremely attractive for water supply forecasting.

Automation of stream flow gaging stations with telemetry is also a high priority. And a new forecast point near the community of Kinlichee, Arizona, on Kinlichee Creek, will also be added to the system. A forecast equation is currently under development for Kinlichee Creek by NRCS.

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