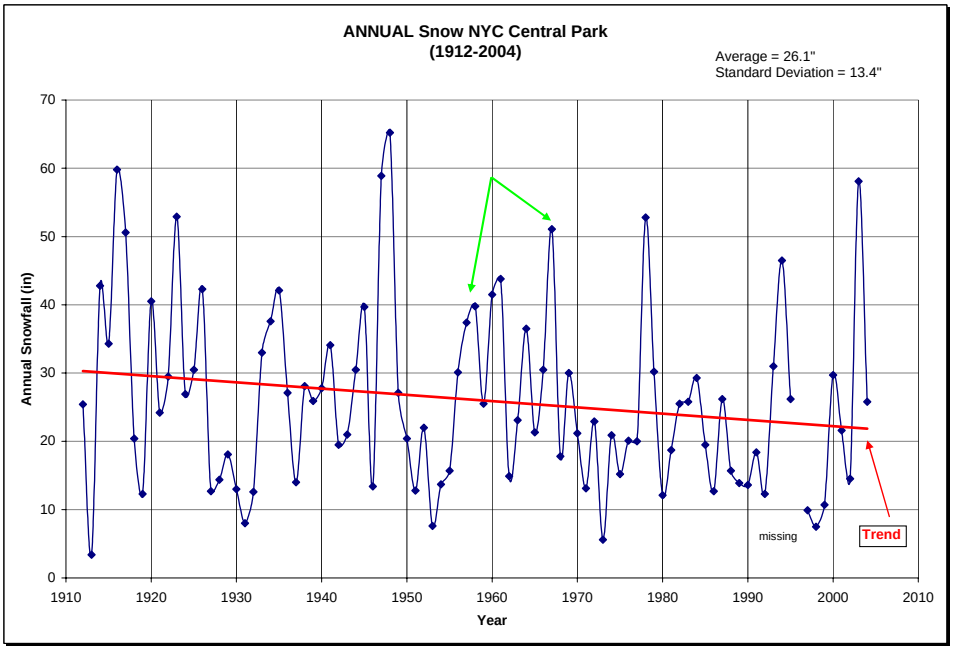
Snow Survey Centennial Celebration
1906-2006

The following article is from the newest member of the NWCC team, Jan Curtis.

Outside Inside: A New Climatologist's Perspective

My experience with snow as an amateur and professional has been quite varied throughout the years. As a kid growing up in NYC, the late 1950s through the 1960s had its share of snowstorms during the era known as global cooling. Perhaps this was the catalyst that propelled me into making weather a career.



Years later when I become Wyoming's State Climatologist, I walked into what would be perhaps the worst drought to hit the state in over a century. When Mark Twain remarked that, "In the West, liquor is for drinking and water is for fighting", he wasn't very far from the truth. This became my mantra and I quickly became the state's point man on all drought related issues. Now as it turned out, Wyoming lost more than $600 million due to actual crop losses and unrealized crop yields during this great drought. This also included the sale of 25% of the state's heritage stock of cattle. In 2002, many dry land farm operations were a complete loss. In some areas, no hay was cut and no dry land corn was harvested. By January 2003, many ranchers were running low on hay. With little or no cash reserve to purchase more

hay, some sold their livestock outright in a complete liquidation to pay off debt and escape bankruptcy. Things were quite grim. Even the USDA's dry milk subsidy was of limited aid.

Working with the National Drought Mitigation Center and my Farm Service Agency contacts, I quickly implemented periodic drought assessments, based on data produced by the NRCS-National Water & Climate Center (NWCC). Their real-time SNOTEL reports and water supply forecast probability charts enabled me to better understand the complexities inherent in drought monitoring and forecasting. This information also helped me forge a close relationship with other Federal Agencies as we looked at current mountain snow pack, soil moisture, reservoir levels, climatology, and long range weather forecasts to determine future water supplies. These coordination efforts resulted in my ability to provide many timely drought updates to government officials and local stakeholders. This proactive approach at customer service proved to save many a land holder from suffering worse economic woes. An informed consumer does make better economic choices. That's for sure.

In 2004, I revised the 1986 Wyoming Climate Atlas by incorporating much of the NWCC datasets, including SNOTEL and PRISM. This atlas was sent in hardcopy to all schools, libraries, local, state, and federal agencies within Wyoming and was made available over the internet. The success of this atlas was clearly measured by a marked decrease in customer requests for data via phone, email, and office visits. However, I felt that by using the NWCC products in graphic and table format, the user had the best understanding of what these data could provide. However, like all good things, climate data can always be improved and when I had the opportunity to work at the NWCC, I found myself in just that position to make this happen.

Traditional climate data includes average temperatures, total precipitation, and extremes, usually based on a 30-year period of record. These "Normals" are updated at the start of each decade and change with each update. While these data are beneficial for planning activities, average weather (climate) conditions are seldom experienced, especially during shorter time intervals and especially over the West, where inter-annual variability often provokes weather elements to swing by more than a standard deviation. With computers, climate data can now be easily compiled to show statistical probabilities for a given weather element. And, as the period of observations increase, important observed trends can be shown along with their implications (i.e., impacts on the environment or water supplies).

For example, in Wyoming, forage production of non-irrigated grasslands is strongly tied to precipitation events at a specific time of year. In Saratoga, WY, biomass yields are directly correlated to precipitation that falls during the period of 12 to 19 April and is independent of precipitation that falls at other times of the year. This simple relationship provides a reliable management tool for herd distribution since it takes up to 40 acres to feed one cow in this arid regime. Timing of precipitation is everything!

In another study over the Great Plains, the distribution of precipitation over time (e.g. a lot of small events vs. a fewer larger events) has an important impact on grazing and biodiversity. Distribution of precipitation is everything!

In yet another research effort, as night temperatures increase over the Great Plains, forage grasses decrease, became less tolerant to drought, and resulted in poorer grazing opportunities. Trends in temperature are everything!

Well, obviously, weather (climate) impacts everything and is a truly an interdisciplinary science. This will become increasingly evident as we see the population explode over the West. Water supplies that are currently vulnerable might also be stressed with any continued regional warming. Important mountain snow pack runoff may be less during the springtime melt period, with a potentially shorter snow accumulation season. While eco-systems will undoubtedly change and adapt, our ability to maintain or improve our quality of life will become increasingly problematic.

Technology has kept up with changing demographics and changing climate since the Dust Bowl era. Agricultural yields continue to increase through better soil management, irrigation methods, genetic engineering, and environmental protection measures. By using new decision aid tools such as GIS, farmers, ranchers, municipalities, industry, and government now have the capability to maximize their access and use of renewable and limited natural resources.

The bottom line is that we need to integrate all weather and hydrological networks and add important soil moisture and mountain snow monitoring capabilities, whether remotely sensed or in-situ and produce useful climate products that are easy to use and understand and that are adaptable to changing requirements.

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