

Written Testimony of
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Director of Programs – Rocky Mountain Climate Organization
Subcommittee on Agriculture, Rural Development, Food and Drug Administration,
and Related Agencies
Committee on Appropriations, U.S. House of Representatives
Concerning
Fiscal Year 2011 Budget Request for Climate Data Monitoring Networks

March 19, 2010

This statement is being submitted on behalf of the following representatives of government agencies, water providers, and organizations with a stake in Colorado's water future:

Nolan Doesken
Colorado State Climatologist

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General Manager
Colorado River Water Conservation District

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Director of Planning
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Specifically, we respectfully request your consideration of inclusion of additional FY 2011 funding for the following programs:

- Department of Agriculture, Natural Resources Conservation Service, Snowpack Telemetry Program
 - Additional monitoring stations - \$2,275,000, and for FY 2012 and years beyond, \$260,000 per year for recurring annual operations and maintenance costs.
 - Soil moisture and sublimation instrumentation - \$650,000, and for FY 2012 and years beyond, \$520,000 per year for recurring annual operations and maintenance costs.
- Department of Agriculture, line item to be determined- \$335,000 and for FY 2012 and years beyond, \$195,000 per year for recurring annual operations and maintenance costs.

Since 2007 our organizations, and others in Colorado, have been collaborating on strategies to prepare for the changes that scientists have identified as the likely impacts of climate change on Colorado's most critical natural resource – the water resources that enable our people, commerce, and natural systems to thrive. Key to our ability in Colorado, and across the West, to understand and adapt to the effects of climate change on water supplies will be good information on what changes are occurring with respect to such key elements as temperatures, precipitation, snowpack, the timing of snowmelt, streamflows, and soil moisture. The data collection systems that currently exist to gather this information were not designed to track changes in climate, and so are incomplete to meet today's needs. Many of the programs for collecting and disseminating these data have deteriorated or have been diverted over the last quarter-century, with the result that many long-term climate and streamflow records have been interrupted.

The additional climate/water monitoring needs we identify are for systems in Colorado and the Upper Colorado River Basin, but they are needed for national reasons, as well. The state of Colorado supplies 70 to 75 percent of the water in the Colorado River. About 30 million Americans, or about one-tenth of all Americans, living in seven states – Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming – depend on Colorado River water. The largest city in each of those seven states depends on Colorado River water. Twenty-two of the 32 largest cities in those seven states depend on Colorado River water. Fifteen percent of the nation's crops and 13 percent of the nation's livestock depend on Colorado River water. Some of the nation's most spectacular natural resources, including our largest concentration of national parks, depend on Colorado River water.

Yet scientists consistently tell us that a changed climate is likely to reduce the flow of the Colorado River. As this is already the most over-allocated river in the nation, this presents a challenge of great national significance.

No less important to those who depend on them are the other rivers that originate in Colorado, including the Rio Grande, Arkansas, and North and South Platte rivers, which supply additional millions of Americans not just in our state but in downstream states. These rivers, too, may be substantially affected by the hotter and drier conditions projected to result in the interior West from a changed climate.

To be able to address these challenges, we have a pressing, critical need to know more than we now do about our water resources and how they may be affected over time. That is the purpose of our proposal for relatively modest increases in these key budget accounts:

1. Department of Agriculture, Natural Resources Conservation Service (NRCS), Snow Telemetry (SNOTEL) stations
 - a. NRCS installs, operates, and maintains SNOTEL – an extensive, automated system designed to collect snowpack and related climatic data in the Western United States and Alaska. There is widespread desire for more SNOTEL stations in the Upper Colorado River basin, to provide a stronger basis for seasonal runoff forecasts. Climate change and its effects on the distribution of snow pack with elevation is also a concern among water managers in the basin. The installation of SNOTEL stations to provide a transect across the topographic gradient is required to better understand this phenomenon. While there have been some new installations made recently in watersheds of the Blue, Fraser, and Gunnison Rivers, an additional 65 stations are needed in the Upper Colorado River Basin to augment the existing 117 stations.

Our funding request: SNOTEL stations cost approximately \$35,000 to install, and \$4,000 per year thereafter to operate and maintain. Our FY 2011 request is for \$2,275,000 to fund station installation costs, and for FY 2012 and years beyond, \$260,000 per year for annual recurring operations and maintenance costs.

- b. There is also a widespread perception among water managers that seasonal runoff volumes in recent years have not been commensurate with observed snow pack accumulations. Consequently, there is a desire for greater insight into the physical processes governing the fate of the snow pack, with particular interest in sublimation and soil moisture as potential explanatory factors. Unfortunately, these processes are observed to a very limited extent, leading to the suggestion that SNOTEL stations be fitted with additional instrumentation to measure soil moisture and atmospheric variables governing sublimation (radiation, wind, humidity, etc).

Our funding request: Cost of installation of these instruments runs around \$10,000 per site. While O&M of soil moisture instruments is not high, the atmospheric sensors do require significant ongoing care. The estimated cost to maintain SNOTEL stations with these additional instruments is \$8,000 per year. Our FY 2011 request is for \$650,000 to fund installation of instruments, and for FY 2012 and years beyond, \$520,000 per year to fund recurring annual operations and maintenance costs.

2. Department of Agriculture, Colorado Agricultural Meteorological Network (CoAgMet) evapotranspiration monitoring, line item to be determined

This request falls outside of the auspices of the Upper Colorado River Basin, but is critical for ensuring adequate climate monitoring over Colorado's agricultural lands. In collaboration with several federal, state and local organizations, CoAgMet was established as a specialized monitoring network twenty years ago. CoAgMet currently consists of 60 stations and is designed to provide meteorological and climatological information most needed for agricultural production, research and planning. This network is particularly well suited for estimating and tracking evapotranspiration (ET) from irrigated croplands. With nearly twenty years of data, the network is just now getting to the point where analyses to detect trends are feasible. Projected changes in Colorado temperatures will likely cause changes in ET and it is critical that we have the capabilities to track this over time.

Colorado state government's ongoing budget challenges are forcing it to downsize this network by as much as 50 percent by the end of 2010. This is a very serious matter. Prior to the economic downturn, there was an identified need for 22 additional observing sites in eastern Colorado plus six sites in the irrigated valleys of western Colorado to better track climatic conditions (wind, humidity, solar energy, soil temperature, etc.) affecting agriculture. The cost of purchasing and installing a new station is approximately \$10,000. Annual maintenance costs are \$2,000 - \$2,500/year per station depending on location. There is also an interest in soil moisture monitoring over Colorado's dryland agricultural areas. Instrumentation could be added to the CoAgMet stations in non-irrigated environments to meet this need at a cost of \$2,500 per site.

Our funding request: Our FY 2011 request to complete the CoAgMet network is \$335,000 (\$280,000 for hardware and installation of new stations, plus \$55,000 for soil moisture instrumentation in the 22 new stations in eastern Colorado). For FY 2012 and years beyond, our request is for \$195,000 per year in recurring annual operations and maintenance costs.

We would welcome the opportunity to discuss these requests further, and stand ready to supply additional information as needed. I can be reached at the Rocky Mountain Climate Organization at 303-887-4626 or easley@rockymountainclimate.org. I can engage with others on behalf of whom this testimony is submitted to get additional information if that would be helpful.