

STATE OF COLORADO

Colorado Water Conservation Board

Department of Natural Resources

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TO: Colorado Water Conservation Board Members

FROM: Joe Busto, Weather Modification Program Coordinator
Watershed Protection and Flood Mitigation Section

DATE: November 8, 2013

SUBJECT: **Agenda Item 27a, November 19-20, 2013 Board Meeting**
Finance – Construction Fund Non-Reimbursable Investment – En-Bloc
Weather Modification – Water User Cost Share Assistance

Introduction

Staff is requesting from the CWCB Non-Reimbursable Investment Program an appropriation of \$175,000 for the continuation of the Weather Modification Program. CWCB has provided grants to locally sponsored winter ground based cloud seeding programs since 2004. This was at the request of water users that started sponsoring cloud seeding programs after the sustained drought of the early 2000s. Currently, there are seven permitted programs operated by three different permit holders. Since 2007, every year downstream water users in NM, NV, AZ, and CA provide grants to the CWCB to match with our funding. Over forty entities partner in cloud seeding programs in the Upper Colorado, Grand Mesa, Gunnison, and Southwestern basins. New programs have been developed, new equipment has been deployed, new evaluation and refinement studies are underway. We also have updated WM Rules enacted in 2012 that also help support growth, development, and competition for this type of work. Staff believes that the CWCB funds are vital to leverage funds from four other states to provide grants and technical assistance to our locally sponsored cloud seeding programs. For every dollar CWCB spends, it leverages five dollars. Additional snowpack in our high mountain areas provides numerous benefits to the environment, recreation and water users.

Staff Recommendation

Staff recommends that the Board approve this request for the General Assembly to authorize this project and appropriate \$175,000 from the Construction Fund to the Department of Natural Resources for allocation to CWCB for the continuation of the Weather Modification Program.

CWCB Water Project Non-Reimbursable Investment Program Project Data Sheet

Sponsor: Colorado Water Conservation Board
Project Name: Weather Modification Program
Drainage Basin: Colorado, Gunnison, SW Basins

Total Project Cost: Over \$1 Million

CWCB NRI: \$175,000

Location: Statewide

Project Type: Grants, Equipment & Evals

Water Source: Various

Funding Source: Construction Fund

Type of Grantee: Water Districts & Ski Areas

The CWCB has had grants since 2004 and has been delegated the DNR-EDO's weather modification permitting program since 1987. The primary program is suspending operations based on avalanche snowpack thresholds. At right is our seven programs with colored shapes and ice nuclei generators shown as orange triangles.

Water Manager sponsored programs were developed after the drought of early 2000s. State to state agreements were signed in 2007 to provide grants. Each year the CWCB distributes grants from our agency and the New Mexico Interstate Stream Commission, Southern Nevada Water Authority, Central Arizona WCD, and California Six Agency Committee. These grants support

the commitment to work together towards regional water solutions. Colorado's programs are stable at ten years old or even older like 40 years at Vail/Beaver Creek. State of the art or industry standard operations in Colorado must be our goal. The updated WM Rules now require target control evaluations and after the first year the estimates are coming in at one to seven percent increases. The estimates in contractor reports are 10-15% so there is room for improvement. Staff has been working with Desert Research Institute of Reno, Nevada to bring in newer machines high elevation machines to increase effectiveness. Last year we have developed weather model displays for 100 points. A success story has at the Grand Mesa where City of GJ employees own and operate a lean effective program now with help from the CWCB and Lower Basin. Representatives from A State Council for Cloud Seeding will tour this retooled program in September 2013. Staff is developing liquid propane seeding for use as it was found to be safe, economical, reliable and cost effective and increases precipitation through a USBR research study. At right is the nation's first two-in-one seeder at the Cedaredge Water Treatment Plant deployed in October 2012. It dispenses propane during warm snowy periods and silver in colder snowy periods. This will help us adapt seeding to warming climate. Contractors don't use propane seeding but it is likely the perfect tool for many of our 29 ski areas so it merits exploration. A 2008 Board approved WM Strategic Plan staff balanced grants for operations, new equipment, and evaluations and teamed with the updated 2012 WM Rules we are beginning to see the fruits of that labor. Winter Park Ski Area requested a silver-in-snow analysis for proper targeting and estimates of increases. Silver in snow is convincing evidence of a seeding effect since background levels are filtered out and its silver above background in layers of snow pack. Denver Water will fund a plume modeling study to evaluate and refine current generator configurations. (graphic at right) Typically each year about \$1M is spent on cloud seeding with 175,000 or 17.5% from the CWCB and \$175,000 or 17.5% from the Lower Basin and New Mexico. For every dollar CWCB spends five is leveraged.

