STATE OF COLORADO

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TO: Colorado Water Conservation Board Members

FROM: Joe Busto – Watershed Protection & Flood Mitigation
Michelle Garrison – Water Supply Protection

DATE: March 3, 2009

SUBJECT: Agenda item 13, March 17-18, 2009 Board meeting (Informational Item)
Watershed Protection & Flood Mitigation Section – **Enhanced Snowpack Assessment Project Overview**

Introduction
The Enhanced Snowpack Assessment Project (Project) has been a CWCB led effort to look at new models and spatial data to determine value added if any to the current methodologies for water supply and flood forecasts. The two focal points have been experimental models. The first is a full energy mass balance snow model called **SNO**w **D**ata **A**ssimilation **S**ystem (SNODAS). The second is a National Weather Service distributed hydrologic model called Research Distributed Hydrologic Model (RDHM).

Background
Phase I started in 2004 with a contract between the Bureau of Reclamation and the CWCB to tailor the SNODAS data for Colorado and post it online. Riverside Technology, Inc. (RTi) has been a sub contractor for Phase II and III. In Phase II RTi coupled SNODAS distributed melt data with RDHM for streamflow simulations. In Phase III RTi coupled SNODAS and calibrated RDHM for basins significant for water supply (Williams Fork, Granby, and Dillon) in the Upper Colorado River Basin. RTi also developed GIS tools for post processing SNODAS data so that staff could easily provide statewide mapping of SNODAS and SNOTEL snow water equivalent. In addition to the Project focused in the Colorado River Basin the CWCB is also investigating the use of SNODAS data and hydrologic modeling to improve snowpack assessment and water supply forecasting in the Upper Rio Grande Basin. Staff has applied for $100,000 in Severance Tax funds and if approved, will continue these efforts in 2010. The Colorado Basin River Forecast Center (CBRFC) has sent the CWCB a letter (attachment). The CBRFC was the principal recipient of reports and products developed from Phase III of the Project.

Summary
This is an informational item with no board action requested. RTi will provide an overview of the Enhanced Snowpack Assessment Project since its inception in 2004. The Project has shown that spatial data sets and modeling techniques can be used to improve estimates of Colorado snowpack and streamflow forecasts.

Colorado Basin River Forecast Center (CBRFC)
2242 W. North Temple
Salt Lake City UT 84116

March 7, 2009

Michelle Garrison – Water Supply Protection
Joe Busto -- Watershed Protection & Flood Mitigation
Colorado Water Conservation Board
1313 Sherman St., Room 721
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Dear Michelle and Joe,

On behalf of the CBRFC, I would like to thank you and the CWCB for your support of the Enhanced Snowpack Assessment Project -- Phase III project performed by Riverside Technology Inc (RTI). This collaborative effort with the investigators at RTI provided an opportunity for detailed analysis of the National Weather Services Research Distributed Hydrologic Model and potential adjustment methods in snow melt dominated basins. As the CBRFC strives to improve our stream flow and water supply process, application of new tools and models are required.

Through this project the CBRFC directly benefitted from the following:

- Transfer of proprietary software developed by RTI that has aided in the application of RDHM across many basins in the Upper Colorado.
- A detailed methodology and supporting software package by which RDHM modeled snow states can be objectively adjusted with in situ observations.
- Calibrations of four important head water basins.
- Insight into the specific challenges associated with Distributed Hydrologic Modeling in complex mountainous terrain.

Opportunities to partner with private sector specialists, such as during Phase III, are uncommon in the National Weather Service. RTI brought a unique set of skills to the broader implementation of RDHM within our region. We look forward to future opportunities to work directly with CWCD and RTI as we tackle the challenges of water resource forecasting in the Colorado Basin.

Many thanks and kindest regards,

Edward P. Clark
Senior Hydrologist – Distributed Hydrologic Model Team Leader