



To: Interested party

From: Sharon B. Megdal, Director *SBM*

Date: March 2014

Re: Workshop to consider the transferability of Groundwater, Climate and Stakeholder Engagement (GCASE) project methodology

On behalf of the University of Arizona Water Resources Research Center (WRRC) and the Hydrologic Research Center (HRC) of San Diego, I invite you to participate in a workshop during which we will seek your input regarding the transferability to other regions of the project, *Groundwater, Climate and Stakeholder Engagement (GCASE)*. This NOAA-funded project, which carries the official title "Incorporating Climate Information and Stakeholder Engagement in Groundwater Resources Planning and Management," seeks to support groundwater management decision making with an innovative modeling framework and stakeholder engagement methodology. The WRRC serves as the lead for the stakeholder engagement, while Dr. Eylon Shamir of HRC leads the modeling effort.

We are holding a series of workshops in April to investigate the transferability of these methodologies within Arizona and hope you will attend one. The workshops will present results of the project case study to date and explore the opportunities to utilize the project's methodology and modeling framework.

The project's case study focused on the micro-basins in the Santa Cruz Active Management Area. Using a groundwater model developed by Arizona Department of Water Resources (ADWR), the project evaluates the aquifer recharge responses to precipitation and streamflow scenarios that are likely to result from climate change. Please see the attached Project Summary for details.

The workshops will be held in cooperation with our co-hosts at the following dates and locations.

Prescott Workshop

April 22, 1:30pm – 3:30pm
Yavapai County Cooperative Extension
840 Rodeo Drive
Prescott, AZ 86305

Tucson Workshop

April 29, 1:30pm – 3:30pm
Pima Association of Governments
1 East Broadway Boulevard
Tucson, AZ 85701

Phoenix Workshop

April 23, 9:00am – 11:00am
Arizona Department of Water Resources
3550 North Central Avenue, 2nd Floor
Phoenix, AZ 85012

Upper San Pedro Workshop

April 30, 10:00am – 12:00pm
Upper San Pedro Partnership
4115 East Foothills Drive
Sierra Vista, AZ 85635

We sincerely hope you can attend one of the workshops. Please RSVP to our graduate assistant Jacob Prietto (jprietto@email.arizona.edu). In addition to the attached summary, project information can be found on our project webpage (wrrc.arizona.edu/GCASE). Please contact Jacob or Susanna Eden (seden@cals.arizona.edu) with any comments or questions you may have. We look forward to hearing from you and apologize for duplicate invitations.



GROUNDWATER, CLIMATE AND STAKEHOLDER ENGAGEMENT (GCASE) Project Summary for Transferability Workshops – March 2014

*Official Project Title: Incorporating Climate Information and Stakeholder Engagement
in Groundwater Resources Planning and Management*
NOAA – SARP Award Number: NA12OAR4310092

The University of Arizona Water Resources Research Center (WRRC) and the Hydrologic Research Center (HCR) have been conducting research designed to help water managers understand the implications of climate uncertainties for surface water flows and groundwater recharge through a collaborative model development process. The project combines an innovative modeling framework with stakeholder engagement. Funding is provided by the National Oceanic and Atmospheric Administration (NOAA) Climate and Societal Interactions Sectoral Applications Research Program.

GCASE has focused initially on groundwater basins within the Santa Cruz Active Management Area (SCAMA) in Arizona, located near the international border with Sonora, Mexico. The modeling framework is based on a groundwater model of the SCAMA developed by the Arizona Department of Water Resources (ADWR). The surface water modeling framework was developed by the HRC in collaboration with ADWR and utilizes an hourly rainfall-generator to produce ensembles of rainfall simulations. These ensembles, or groups of multiple simulations, are used as input for a hydrologic model that transforms the hourly precipitation into simulated mean daily streamflow. Streamflow scenarios generated in this way provide input to the enhanced regional groundwater flow model developed by ADWR. This allows the model to analyze output in a probabilistic manner, bringing into focus the uncertainty in the natural system. GCASE incorporates the additional uncertainties of climate change. The modeling framework can analyze scenarios under historic conditions and the likely future conditions projected by refined climate change models. By varying assumptions regarding groundwater pumping, model outputs show a range of likely future aquifer conditions.

A project advisory committee consists of: Michael Lacey, ADWR; Greg Kornrumpf, Salt River Project; James Leenhouts, U.S. Geological Survey; Alejandro Barcenas, City of Nogales, Arizona. The GCASE stakeholder engagement strategy includes a series of workshops used to interest and engage stakeholders. Milestone Workshop 1 was hosted by Nogales, Arizona on April 11, 2013. Presentations explained the generation of the climate projections and modifications to the modeling framework. Stakeholders learned of the initial case study results, which consist of eighteen hypothetical scenarios defined by the combinations of three pumpage goals, three groundwater level limits, and historic and future rainfall scenarios. For example, one scenario set a goal of pumping 3,000 acre-feet per year and limited pumping so that the groundwater level did not fall below 20 feet from land surface.



The probability of reaching the 3,000 acre-foot goal was substantially lower using projected future climate than using historic climate data. Stakeholders discussed these results and raised questions about the capabilities of the modeling framework to show responses of the aquifer to various water management strategies. Stakeholders also discussed the option of determining pumping limits based on the maintenance of riparian vegetation. A presentation summarizing studies on the relationships between riparian vegetation and groundwater levels provided background for this conversation.

Milestone Workshop 2 was held on November 20, 2013, at the WRRC Sol Resnick Conference Room in Tucson, Arizona. Results of the additional modeling analysis, based on stakeholder questions and suggestions made at the Milestone Workshop 1 were presented. Discussion that followed included the project's potential uses as a water management tool and transferability opportunities.

Webpage: <http://wrcc.arizona.edu/GCASE>

Contacts: Susanna Eden, WRRC
(520) 621-5670
seden@cals.arizona.edu

Jacob Prietto, WRRC
(520) 621-9938
jprietto@email.arizona.edu