

## FY16 NM WRRI Research Progress Report Form

Report Due Date: December 1, 2015

- **Project Title:** A Dynamic Statewide Water Budget for New Mexico
- **Investigators:** *Principal:* Jesse Roach Ph.D., Tetra Tech Inc. *Unfunded Collaborators:* Vince Tidwell Ph.D., Sandia National Laboratories, Bruce Thompson Ph.D., University of New Mexico. *Other researcher:* Kenneth Peterson M.S., New Mexico State University
- **Description:** The dynamic, statewide water budget (DSWB) is synthesizing water supply and demand information from across the state into a single, easily accessible location, and in such a way that users can view information at a variety of spatial scales. The overall objective of the project is a holistic view of water resources in the state to help support local and regional education and planning to improve stewardship of New Mexico's limited and critically important water resources.
- **Methodology:** The DSWB is being built by pulling existing information from a variety of sources, predominately the New Mexico Office of the State Engineer / Interstate Stream Commission's Regional Water Plans (NM-OSE-ISC, 1999-2008), the New Mexico Office of the State Engineer's Water Use reports (Longworth, Valdez, Magnuson, & Richard, 2013) and USGS stream gage information.
- **Results to Date and Work Remaining:**
  - a. Results from 2014-2015 work include development of a monthly timestep mass balance accounting of water stocks and flows in New Mexico by major river basins of the state from 1975 through 2013 are summarized in the Phase I final project report (Peterson, Roach, and Thompson, 2015).
  - b. Results from Q1 (July – September 2015) as reported in the October 1<sup>st</sup> Quarterly Report
    - Water Water Planning Region (WPR) spatial scale calculations set up and initial data developed.
  - c. Results since October 1<sup>st</sup> 2015
    - WPR spatial scale completed. New methodologies were developed for calculating mass balance terms at the WPR as compared to the River Basin scale. At the River Basin scale runoff and baseflow components were calculated by partitioning total net gains/losses between all gaged river stretches within a river basin. At the WPR due to the finer spatial scale, runoff and baseflow components are solved for as closure terms to the surface water system, using only data from inflow and outflow stream gages. Methodologies for other mass balance terms are unchanged from the methodologies used and documented in 2014-2015. Groundwater storage change data available at the WPR scale is used to calibrate the mass balance by partitioning surplus surface water in the surface water system into surface water losses to groundwater and surface water evaporation so that groundwater storage changes are representative of values in published literature, where available. The greater availability of hydrologic studies at sub-basin and

WPR's provides more confidence in modeled values at the WPR versus the River Basin scale. As a result, the WPR results are aggregated to the River Basin scale to provide consistent statewide values at both spatial scales.

- Draft of county level mass balance terms completed. County level calculations follow the same conceptual approach as the WPR calculations, however data availability, especially for surface water flows both in natural channels and conveyance systems across county lines was a challenge. Estimating stream flows at county lines required development of correlations between stream gages of shorter record but more strategic location with stream gages of longer record. Conveyance system flows, which had not been an issue across WPR lines required mining of data from MRGCD gages due to significant water movement across county lines in irrigation conveyance infrastructure in the Middle Rio Grande.

d. Remaining work to be completed by June 30, 2016:

- Quantification and display of uncertainty
- Water energy nexus information
- Graphic User Interface enhancements
- Future base case scenario analysis
- Outreach and support

6. **Student participation:** None

7. **Special recognition awards or notable achievements:** None.

8. **References:**

Longworth, J. W., Valdez, J. M., Magnuson, M. L., & Richard, K. (2013). *New Mexico Water Use by Categories 2010*. Santa Fe: New Mexico Office of the State Engineer.  
NM-OSE-ISC. (1999-2008). *New Mexico Regional Water Plans*. Santa Fe: New Mexico Office of the State Engineer / Interstate Stream Commission.  
Peterson, K., Roach, J., Thompson, B. (2015). *A Dynamic Statewide Water Budget for New Mexico: Phase I - Major River Basins*. New Mexico Water Resources Research Institute Draft Technical Completion Report Index # 124273. Las Cruces

9. **Progress toward uploading data to a common/standardized platform:** The model and report from 2014-2015 have been made available on the internet via the WRRI website. We have open communication with Fereshteh Soltani and Jon Williams at NMSU about the type of data the model produces. Generally, the output from the DSWB is available in Microsoft EXCEL file format.

10. **Provide two PP slides that provide summary information on your project appropriate for viewing by state legislators.**