

FY15 NM WRRI Research Progress Report Form

Quarterly Report for October – December 2014

1. **Project Title:** Statewide Water Assessment: Surface-Water Inflow, Outflow, Gains, and Losses in New Mexico.
2. **Investigators (names, university/agency):** Nathan Myers, Matt Ely, and Joe Affinati, U.S. Geological survey, Albuquerque, NM
3. **Brief description of project, research objectives, and impacts on New Mexico (provide performance measures and outcomes):** Surface water is the primary source of water for irrigators along major stream corridors in New Mexico and is increasingly being utilized by large municipalities, such as Albuquerque and Santa Fe, for potable water supply. Minimum surface-water flows into and out of the State are regulated by interstate compacts, but the total quantity of surface water can vary widely from year to year. In addition, the timing and volume of peak surface-water flows is changing because of changes in precipitation patterns and increases in mean annual temperatures.

The objectives of the proposed work are to

- Quantify the volume of streamflow entering and leaving New Mexico at selected stream gages at or near State borders and at Interstate Compact gages and
- Quantify streamflow gains and losses between selected gages in New Mexico.

The data will be provided as a set of Geographic Information System (ArcGIS) files, suitable for integration into a Statewide Water Assessment database. Within a Statewide Water Assessment database streamflow data and derived statistics could be used by water managers to plan for the best patterns of storage and use of surface water within the State while still meeting Compact obligations.

4. **Brief description of methodology:** Daily mean streamflow data will be obtained from the network of USGS streamflow gages in New Mexico and adjacent states. Gages selected for data analysis will include gages along major streams and selected tributaries in the State. Where major streams cross State borders, a gage near the border, either in New Mexico or in the adjoining State, will be included in the set of gages selected for analysis. Daily mean streamflow data and derivative products will be stored in ArcGIS files that are compatible with others being prepared for the Statewide Water Assessment database. Differences in monthly mean streamflow at selected gages will be analyzed for gains and losses in streamflow. For visualization of patterns of streamflow gains and losses, stream reaches between selected gages will be categorized on a seasonal basis as strongly gaining, gaining, no gain/loss, losing, and strongly losing.

5. Brief description of results to date and work remaining:

- **Results to Date**
 - An initial selection of candidate streams has been done.
 - Gages along the candidate streams have been identified.
 - Initial streamflow data for analyses has been obtained.

- Screening of candidate streams is done.
- Screening of gages is done.
- Downloaded streamflow data for selected gages.
- Loaded streamflow data into GIS files.
- Currently exploring temporal and spatial aspects of streamflow data.
- Best time interval for analyses appears to be annual, but a monthly analysis period may be appropriate where gages are close together and there are few gains or losses between the gages.
- Computing differences in streamflow for gages and stream reaches is done for the Gila, San Francisco, San Juan, Cimarron, and Canadian Rivers.
- Gaining and losing stream reaches are being identified as we go.
- Working on ARCGIS animation where by gaging station symbol size varies according to magnitude of annual flows and river reach color and line width vary according to gain or loss and volume of gain or loss, respectively.
- Animation of annual streamflow at gages and for selected stream reaches is in progress. We need to standardize display formats before this task is finalized.
- An annotated outline of the final report has been prepared and is in review.

- **Work Remaining**

- Explore temporal and spatial aspects of streamflow data. This element probably will be completed during report writing.
- Finish ARCGIS animation setup.
- Document digital data sets (metadata).
- Write report.

6. Student participation - List all students participating in the project, their classification level (undergraduate, masters, Ph.D., post doc) and their field of study (degree major):

- Joe Affinati, Masters Candidate, University of New Mexico Water Resources Program.

7. Provide special recognition awards or notable achievements as a result of the research. Include publications in progress (all published work supported wholly or in part of NM WRRI must bear an acknowledgment of support):

- NA

8. Include references as needed (limit to one additional page)

- NA

9. Provide a few sentences on progress toward uploading data to a common/standardized platform, if applicable.

- Data is being prepared in ARCGIS and will be documented according to Federal Geographic Data Committee (FGDC) and USGS standards for release of digital data sets.