



## Memorandum

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Date: October 11, 2001

From: Karen Lewis, Debbie Hathaway, SSP&A

To: Mike Velasquez, ACOE  
Kevin Flanigan, NMISC

Subject: Progress report, 09/09/01 to 10/06/01, MRGWSS Phase 3

Work on Phase 3 of the Middle Rio Grande Water Supply Study (MRG3) from September 10 to October 6 focused primarily on evaluating the statistical handling of terms in the water budget model. Work done, by task, during this period was:

### Task 1:

1. The probability distribution functions and goodness-of-fit tests used in the MRG Phase 2 study were reviewed.
2. Implementation of the statistical relationships within the risk modeling was reviewed, in particular with respect to correlated terms.
3. SSPA talked with Dr. Mark Morehead, Univ. of Idaho and Dr. Scott Peckham, Univ. of CO, geohydrologic modelers working in the American Rockies, about statistical relationships commonly used for modeling stream flow for mountain basins and with Dr. Anne Dougherty, statistician, Univ. of CO about general use of probability distribution functions and function selection.
4. SSPA talked with Nabil Shafike and Tim Ward from the MRG3 executive steering committee about their specific concerns with the probability distribution functions used for the MRG Phase 2 modeling.
5. An approach to handling probability distribution selection and fitting for use in the MRG3 study was outlined.

Upcoming work: SSPA will develop unbounded lognormal functions for describing water budget terms and compare them to the previously employed functions (bounded gamma, PearsonVI, beta, Weibull, logistic and loglogistic functions). If a reasonably good fit can be obtained with the unbounded lognormal functions, these functions will be used in future versions of the risk model. Agricultural and riparian evapotranspiration terms will be replaced with static values. We intend the static values to be a temporary measure as we plan to do further work establishing more realistic relationships between water availability and agricultural use.

### Task 2:

A draft memo on climate was completed and distributed to Kevin Flanigan and Nabil Shafike at the ISC on October 5, 2001 for review and comment.



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Task 3:

No work was done on Task 3 during this period.

Task 4:

Ways to use current risk model output to conduct a "failure" analysis (e.g. what is the probability of meeting Compact obligations given 3 years of average or below average flow) are being explored. Nabil Shafike, ISC, is working with SSPA directly on this.

Task 5:

In response to Executive Steering Committee feedback during our initial meeting of September 7, a letter was drafted and submitted to the Army Corp. of Engineers outlining SSPA's intent to roughly triple our effort under Task 5, the evaluation of alternatives proposed by the regional water planning groups. To offset this increase, we will reduce effort in less critical technical tasks. In particular, we plan to eliminate Task 3, the refinement of seasonal models. If further reduction of effort within the technical tasks is required, the task areas to be reduced will be determined as we move forward and become clearer on project needs.

Upcoming work: SSPA is currently arranging initial meetings with the Middle Rio Grand and Socorro-Sierra water planning groups during the first week of December.

Task 6:

1. Minutes from the Phase 3 Kick-off meeting were written up and submitted to Kevin Flanigan and Mike Velasquez for review and distribution to the executive steering committee members.
2. SSPA met with Kevin Flanigan and Nabil Shafike on October 5, 2001 in Albuquerque to discuss:
  - Statistical distributions used in the Phase 2 modeling and proposed changes in Phase 3;
  - The need to relate agricultural water consumption to water availability and possible resources for this task;
  - The handling of groundwater and San Juan-Chama water;
  - Work-in -progress by other entities that may hold promise for refining the estimates of ungaged tributary flow.