

Memorandum

Date: February 18, 2003

From: Karen Lewis, Debbie Hathaway

To: Bob Wessely, MRGWA, Bob Prendergast, MRGWA, Mike Trujillo, MRGCOG; Kevin Flanigan, ISC; Mary Helen Follingstad, ISC; Mike Velasquez, USACE; Dominique Cartron, DBS&A

Subject: **Selected Planning Alternatives –Analysis of DBS&A Assessment of Hydrologic Impacts**

Background

The Middle Rio Grande Water Assembly and COG have developed a short-list of water planning alternatives. Under contract with the Water Assembly, Daniel B. Stephens (DBS&A) was retained to analyze 25 of these alternatives for technical, economic, legal and social/cultural feasibility. By letter of February 4, 2003, the COG requested that the ISC approve SSP&A's review of the draft DBS&A hydrologic analysis of six of these 25 alternatives, as part of the Middle Rio Grande Water Supply task to provide assistance to planning regions. By letter of February 4, 2003, the ISC authorized SSP&A to review the alternatives, with a budget of \$3000 for completion of this work. Due the limited budget and time allotted for this review, the alternatives have been reviewed only in "high-level" overview fashion. Time and budget did not permit a complete review of all supporting information, assumptions and methods. Additional, more detailed, review by SSP&A is planned at a later stage in the planning process.

The six selected alternatives submitted to SSP&A for this overview evaluation are:

- A-1 Restore Bosque habitat and manage vegetation in the Bosque to reduce evapotranspiration by selectively removing vegetation and promoting native plants.
- A-7 Meter and manage surface water distribution flows through all irrigation systems to conserve water.
- A-9 Develop conveyance alternatives for water transportation in agricultural irrigation systems.
- A-10 Develop and employ alternatives to maximize irrigation efficiency on all irrigated land in the region.
- A-45 Reduce open water evaporation in storage reservoirs by retaining water at higher elevations or latitudes, or by reducing surface areas (Note: limited SSPA comments only).
- A-46 Inject water treated to drinking water standards for aquifer storage in appropriate locations throughout the water planning region.

In this review, SSP&A attempted to identify major omissions and misrepresentations only. In particular, though the numerical spreadsheets detailing the technical computations were briefly reviewed, a comprehensive review was not possible, and SSP&A cannot verify that the numbers

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used and calculation performed are correct. Furthermore, due to the short timeframe available for review, SSP&A was unable to fully review all of the submitted material.

For the draft materials reviewed, technical comments were relayed directly to DBS&A such that DBS&A could address these comments before submitting their final work. This memo has been prepared for the Water Assembly and the Council of Governments as a summary of what SSP&A considers the salient points of our review of the draft DBS&A work.

Please note, SSPA comments with regard to water rights reflect our general understanding. However, many of these issues are subject to legal interpretation; our comments should not be construed to represent legal opinions.

A-1 Restore Bosque habitat and manage vegetation in the Bosque to reduce evapotranspiration by selectively removing vegetation and promoting native plants

There are many reasons why restoration of native Bosque habitat in the Middle Rio Grande region may be desirable. Such restoration may not produce “new” water for use by the region, however.

If the goal of this alternative is to remove non-native vegetation and re-engineer the area to recreate more “natural” conditions, such that native plants will naturally re-establish, the potential for increased water use within the re-engineered area, such as to recreate over-bank flooding, will need to be taken into account. Such re-engineering frequently increases consumptive water use. Increased water use will need to be offset by water savings elsewhere.

If non-native vegetation is simply cleared from the area, active management of cleared areas, preferably through re-vegetation with native plants, is required for clearing to result in a water savings. Native vegetation may not be able to colonize cleared areas without intervention or assistance, but it has been observed that non-natives can re-colonize these areas without intervention, often resulting in increases, rather than decreases in riparian consumption. It is true that in some local habitat-restoration projects, native vegetation has re-established without intervention. However, this has occurred only in areas where conditions are similar to “natural”, pre-human-intervention Rio Grande conditions. In general, non-natives have established themselves along the Rio Grande because conditions are now different from the historical, “natural” conditions in which the native species evolved; significant human engineering of the river system has occurred, and altered the riparian conditions.

We would like to note that the current river-bosque system is out of proportion for the amount of water now regularly conveyed by the river. Ideally, a re-engineering of the river and bosque would establish a braided flood plain with narrow bosque corridors on either side, similar to pre-development conditions. However, the entire floodplain and bosque corridor would be scaled down to reflect current river flows. The remaining areas on either side, areas that are currently riparian growth, would be vegetated with salt grasses or used as agricultural lands. Re-engineering coupled with re-scaling of the system might result in a net water “savings”.

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A-7 Meter and manage surface water distribution flows through all irrigation systems to conserve water.

A-9 Develop conveyance alternatives for water transportation in agricultural irrigation systems.

A-10 Develop and employ alternatives to maximize irrigation efficiency on all irrigated land in the region.

All three of these alternatives attempt to reduce MRGCD river diversions through increased irrigation system efficiency. It is important to stress that, though there are many benefits of increasing MRGCD efficiency, increases in efficiency will not result in "new" water.

The MRGCD operates by storing native water in El Vado reservoir, and then releasing this water according to the irrigation demand in its system over the course of the irrigation season. If efficiency improvements lead to decreased water demand within the MRGCD system, then the MRGCD will likely release less water from El Vado to meet this demand. The water that is saved in El Vado reservoir can then be used by the district to extend its irrigation season. Stored water in excess of that required to provide a full supply to all MRGCD irrigators would likely be carried over to subsequent years. Water in storage beyond the amount needed to satisfy MRGCD's irrigation demand, presumably in an amount that will be quantified through a Proof of Beneficial Use, and, ultimately, through adjudication, would not be available for the MRGCD to lease or sell, nor is it necessarily available for the MRG planning region. Native water beyond that needed to satisfy the MRGCD water right (and other earlier priority rights) would be administered by the State Engineer in accordance with State laws.

The MRGCD water bank may be a mechanism for leasing water to other entities. Currently, no senior water rights are available for lease. Beyond that, water rights can be purchased from pre-1907 water rights holders.

Increased efficiency within the MRG irrigation systems will result in changes to in-stream and drain flows and may result in environmental improvements. For example, conserved water stored in up-stream reservoirs would increase operational flexibility and may, therefore, increase management alternatives for maintaining endangered species habitat.

On-farm irrigation efficiencies in excess of 65% are unlikely to be achieved without a change in irrigation method. The Bureau of Reclamation, historically, has estimated that the Cochiti and Albuquerque Divisions have an estimated irrigation efficiency of 50%, and Belen Division has an estimated irrigation efficiency of 60%.

For the numerous small irrigators in the Albuquerque Division incentive programs for laser field-leveling, on-farm canal lining, and some form of irrigation advisory service to encourage improved farming practices, could bring the division efficiency up to about 60%, similar to that estimated for the Belen Division.

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A-45 Reduce open water evaporation in storage reservoirs by retaining water at higher elevations or latitudes, or by reducing surface areas (Note: not fully reviewed; limited SSPA comments only).

Storing water in upstream reservoirs has the potential to create “new” water by reducing the evaporative loss from water in storage. However, a portion of this “new” water may be offset by increased conveyance losses; if water is stored in up-stream reservoirs during spring run-off and run down the river during periods of higher evaporation and/or lower flow, conveyance losses will be significantly increased. Additionally, storing water upstream rather than in Elephant Butte Reservoir will leave sediments in the northern basin of Elephant Butte Reservoir (area north of the narrows) more regularly exposed, resulting in a 3 to 6 acre-foot per acre loss due to evaporation out of wet sediments and/or colonization by riparian vegetation. These losses need to be taken into account in calculating project costs and water savings.

A-46 Inject water treated to drinking water standards for aquifer storage in appropriate locations throughout the water planning region.

The only potential for generating “new” water through aquifer storage and recovery is through storage of water that would otherwise be stored in a reservoir, thereby retaining water that would otherwise be lost to evaporation. There is no other un-appropriated water in the planning region.

San Juan-Chama water, seasonal surface water and storm water flow, and treated municipal and/or industrial wastewater are currently accounted for in the water budgets. Though Albuquerque may become legally authorized to use this water for municipal and industrial purposes, it would only come at the expense of water currently in use by some other MRG entity and/or impact Compact deliveries. However, aquifer storage and recovery may allow the region to manage their water more efficiently.

Elephant Butte spill water should not be considered “new” water available to the MRG planning region. According to ISC staff, any evaluation of extra water potentially available would have to consider all the provisions of the Compact. Legal and technical arguments can be advanced that there is no excess spill water available for appropriation. Until an actual permit application by some party seeking to appropriate that water comes before the State Engineer and is vetted through the application evaluation process, it is highly uncertain whether or not any actual excess spill water is available.

If the project is used to store water that would otherwise be stored in a reservoir, the potential losses outlined in A-45 apply (increased conveyance losses, depending on timing and place of use of the water and evaporative losses from exposed reservoir areas). These may offset any “new” water generated.

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Final Comment

In addition to the above comments, it is important to note that State Engineer actions have operated on the assumption that water in the Rio Grande Basin is fully appropriated. To provide for new uses beyond those presently existing, water transfer from existing uses is the most likely mechanism to serve this purpose. Water savings stemming from efficiency improvements (whether in urban or agricultural sectors) may, in the administrative framework, be construed as elimination of "waste". The salvaged water would not likely be considered a source of water available for transfer; rather, this water would be considered public water, subject to usual rules of appropriation. In the case of the Rio Grande, elimination of non-beneficial use of waste has been pursued for decades (for example, phreatophyte control, drainage control, etc.) to support New Mexico's ability to meet Rio Grande Compact obligations. These substantial efforts have contributed to New Mexico's current compliance with the Compact but have yet to generate "new" water sufficient to support new appropriations. Regardless, the pursuit of improved efficiency provides many other benefits to the region and to the public, and is a worthwhile goal.