**Water Acquisition and Management Subcommittee Position Paper:**
**Comprehensive Restoration of the San Acacia Reach**

## History/Description of Current System

The Middle Rio Grande Project, authorized by the Flood Control Acts of 1948 and 1950 (Public Laws 80-858 and 81-516, respectively), in addition to providing for flood control and rehabilitation of the Middle Rio Grande Conservancy District, authorized the Bureau of Reclamation to reduce non-beneficial consumption of water by native vegetation in the flood plain of the Rio Grande above Caballo Reservoir. One of the main goals of this legislation was to assist New Mexico with meeting its obligations under the Rio Grande Compact.

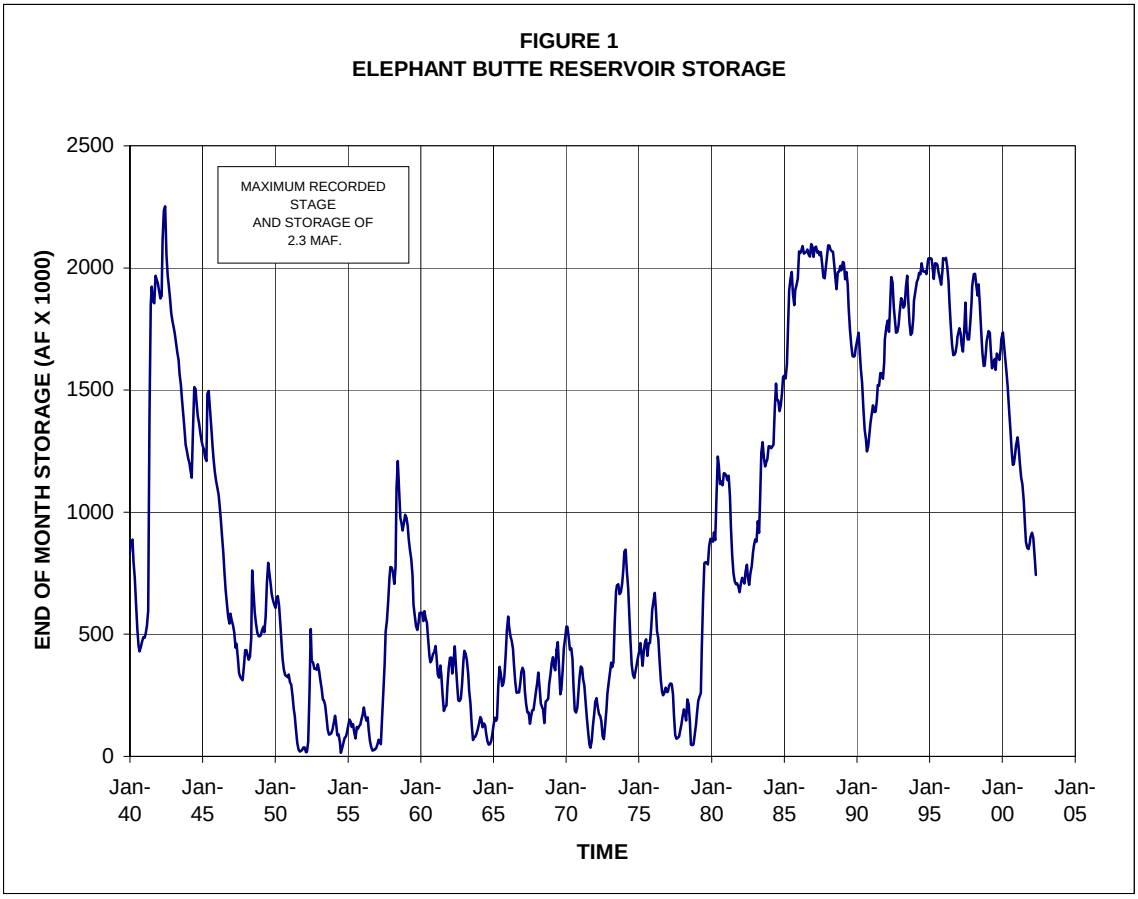
A comprehensive plan to implement these authorities was developed jointly in 1947 by Reclamation and the Corps of Engineers,[1] and included elements of river channel rectification and maintenance. More specific plans were detailed in a 1952.[2] The plan called for a floodway with a maximum capacity of 8,000 cubic feet per second and a bottom width of 500 feet for the reach from the south boundary of the MRGCD to the head of Elephant Butte Reservoir with maintenance dredging through the life of the project. The goal was to relieve the sedimentation problem between Socorro and San Marcial.

The sediment transport problem in this reach was created by the construction of Elephant Butte Reservoir. In 1941 Elephant Butte reservoir reached its highest level ever recorded (Figure 1) with a storage volume of about 2.3 million AF (compared to the current capacity of about 1.95 MAF). Slack reservoir water levels extended up to about Ft. Craig. These slack high water levels persisted for about two years and resulted in the deposition of a massive sediment delta in the upper levels of the reservoir that quickly became infested with salt cedar. Any semblance of a main river channel was quickly lost. The reach between Bosque del Apache and the Narrows of the reservoir essentially turned into a continuous salt cedar choked swamp.

Later high reservoir levels in the mid-1980s and 1990s have also attributed additional sediment to the reservoir delta. In addition to the reservoir delta, the riverbed has been rising (aggrading) in the San Marcial reach at an average rate of 0.23 feet per year (24 feet between 1895 and 1989)[3]. The riverbed between Socorro and the reservoir has become filled with sediment to the extent that the river in this reach is drastically perched above the adjacent valley floor.

[1] "Plan for Development, Middle Rio Grande Project, Rio Grande Basin, New Mexico," 1947, U.S. Department of the Interior, Bureau of Reclamation.
[2] "Definite Plan Report, Volume 1A, Initial Stage Channel Rectification, Middle Rio Grande Project, Rio Grande Basin, New Mexico," 1952, U.S. Department of the Interior, Bureau of Reclamation.
[3] BOR, Rio Grande and LFCC Modifications Draft EIS, 2000.

**FIGURE 1**
**ELEPHANT BUTTE RESERVOIR STORAGE**




Instead of routine dredging which would have facilitated a functional river channel through both the sediment delta and the aggrading riverbed, the Low Flow Conveyance Channel was built, and all return flows from the Socorro Division of the MRGCD and the Bosque del Apache National Wildlife Refuge were routed to the LFCC instead of the river. The LFCC also collects groundwater inflow as the valley thalweg (drainage). Near San Marcial the LFCC was constructed with an invert elevation approximately 18 feet below the riverbed, since reduced to about 12 feet by a higher accumulation of sediment in the LFCC versus the river[4].

The LFCC was designed to efficiently carry all flows below San Acacia up to 2,000 cfs, with higher flows to be routed down the river channel which was designated as the "Rio Grande Floodway". Minimal work was done on the river channel to allow it to inefficiently carry higher flows in excess of 2,000 cfs. The Floodway receives no irrigation return flows and no groundwater inflows (drainage). It instead loses flow by seepage to the LFCC and shallow alluvial aquifer and standing surface water bodies, all at lower head, to both the east and west. Essentially the Rio Grande was sacrificed in shortsighted favor of the LFCC.

[4] Ibid.

It turned out to be very shortsighted. The LFCC only functioned at full capacity for its full length (San Acacia to the Narrows) for about 15 years, from 1959 to 1974.[5] But during the time that it did functioned properly, the LFCC played an important part in allowing New Mexico to overcome an accumulated debit under the Compact of over 500,000 AF. But it was not so much the ability to actively divert flows to the LFCC that were significant, but the fact that a relatively free-flowing thalweg channel of any sort, free of sediment deposits and salt cedar impediments existed without excessive riparian ET depletions. (Riparian depletions between San Acacia and Elephant Butte are currently estimated at about 110,000 AFY compared to more than 140,000 AF prior to the Middle Rio Grande Project.)

In the early 1980s, as Elephant Butte again returned to high stage, the lower portion of the LFCC below Ft. Craig become obliterated and non-functional due to deposition of sediment. Since that time Reclamation has performed no maintenance on the LFCC and has only performed minimal work in the Floodway, such as the cutting of pilot channels through sediment blockages and the reservoir delta. Since 1985 all flows below San Acacia have essentially been routed down the Floodway.

**Potential Re-Engineering Elements**

The major re-engineering elementof the reach below San Acacia would consist of the removal of the LFCC and dredging or reconstruction of the river channel as the valley thalweg. Removal of salt cedar and other exotic phreatopytes would also be performed. A system of riverside drains discharging to the river would be installed to provide hydraulic control of groundwater levels.

Such a re-engineering and reconfiguring would potentially result in the following:

- The combination of groundwater drainage, irrigation return flows and decreased riparian depletions would result in perennial river flows except under the most extreme drought conditions.

- The need for supplemental flows in this reach would be alleviate or eliminated.

Such a project would require Congressional authorization that would allow performance of future aggressive river maintenance activities such as dredging and pilot channeling as necessary with a minimum of environmental review and permitting, or even an outright exemption.

**Conclusions and Recommendations**

1. The current lack of the sustainability of low flows in the Rio Grande below San Acacia is due to both excessive riparian depletions and the fact that the river channel is not the thalweg of the valley - it receives no irrigation return flows and no groundwater inflow and instead loses flow its entire reach.

[5] For a concise description of the history of the LFCC see pages A-8 and A-9 of the 1999 RGSM Recovery Plan.

2. The portion of the Middle Rio Grande Project designed and constructed below San Acacia (the LFCC and the Floodway) did not permanently solve the Compact delivery problem because it did not deal effectively with the real problem – the movement of sediment through the system below San Acacia.

3. The combination of groundwater drainage, irrigation return flows and decreased riparian depletions that would result by re-engineering and reconfiguring the reach below San Acacia would result in perennial river flows except under the most extreme drought conditions, thus alleviating or eliminating the need for supplemental flows in this reach.

4. The Program should either seek Federal funding for a full feasibility study or should seek proposals for such a study in the next round of RFPs.