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S. E. Reynolds

Philip B. Mutz

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WATER DELIVERIES UNDER THE RIO GRANDE COMPACT¹

by
S. E. Reynolds² and Philip B. Mutz³

A review of the record of the deliveries of the States of Colorado and New Mexico and the releases of water from project storage⁴ under the Rio Grande Compact between the States of Colorado, New Mexico and Texas may be of interest to students of the practical aspects of interstate water compacts. Plate I illustrates those records.

The accrued credits,⁵ or accrued debits,⁶ of the State of Colorado and the State of New Mexico at the end of each calendar year as determined at the following regular meeting of the Rio Grande Compact Commission are plotted on Plate I. The amount of water released from project storage for beneficial use in New Mexico and Texas and for delivery to Mexico under the Mexican Treaty of 1906⁷ during the calendar year indicated is also plotted.

Perhaps the most striking feature of Plate I is its illustration of the fact that both Colorado and New Mexico have been in a debit status during most of the time since the Compact became effective. Also well illustrated is the fact that releases from project storage have been less than the contemplated normal release⁸ of 790,000 acre-feet per year in all but four of the thirty-three years of Compact administration.

The practical effect of the almost continuous debit status of the two upstream states has been, by operation of the provisions of unnumbered paragraphs 2 and 3 of Article VI, to restrict the use of reservoirs constructed after 1937 in Colorado above Lobatos and after 1929 in New Mexico above San Marcial.

1. Rio Grande Compact (1938), N.M. Stat. Ann. § 75-34-3 (1953), Act of May 31, 1939, ch. 155, 53 Stat. 785. [hereinafter Rio Grande Compact]

2. Rio Grande Compact Commissioner for New Mexico.

3. Engineer Advisor to Rio Grande Compact Commissioner for New Mexico.

4. Project storage: the combined capacity of Elephant Butte Reservoir and all other reservoirs actually available for the storage of usable water below Elephant Butte and above the first diversion to lands of the Rio Grande Project, but not more than a total of 2,638,860 acre-feet. Rio Grande Compact, Article I.

5. Accrued credits: the amounts by which the sum of all annual credits exceeds the sum of all annual debits over any common period of time. Rio Grande Compact, Article I.

6. Accrued debits: the amounts by which the sum of all annual debits exceeds the sum of all annual credits over any common period of time. Rio Grande Compact, Article I.

7. Convention between the United States of America and Mexico, May 21, 1906, 34 Stat. 785, T.S. No. 455.

8. The definition of hypothetical spill in Article I of the Rio Grande Compact is based on an annual release from project storage of 790,000 acre-feet. *See also* Rio Grande Compact, Articles VII and VIII.

NEW MEXICO

The year 1940 was the first full calendar year after the effective date of the Compact and thus the first year of accounting under the Compact.⁹ In that first year New Mexico accrued a debit of 58,900 acre-feet, but in the next year over-delivered by 108,300 acre-feet to achieve an accrued credit of 49,400 acre-feet. This credit was wiped out in 1942 by actual spill¹⁰ under the provisions of unnumbered paragraph 6 of Article VI; from that time until the end of 1972 New Mexico was continuously in a debit status.

It appears that the floods of 1941 and 1942, which caused New Mexico's credit water to spill from project storage in 1942, also caused serious deterioration of the channel of the Rio Grande in New Mexico between Otowi gage¹¹ and San Marcial. The deteriorated channel condition made it impossible for New Mexico to continue the pattern of beneficial use existing before the Compact, and still deliver water to Elephant Butte Reservoir in the same relation to the flow at Otowi gage that had existed during the period of record upon which the Compact was based.

By the end of 1956 New Mexico's accrued debit under the Compact had mounted to 529,400 acre-feet. This fact demonstrates a feature of the Compact which is often overlooked. In entering an agreement obligating deliveries to Elephant Butte Reservoir in a specific relationship to the flow at Otowi gage, New Mexico assumed the risk that the channel conditions below Otowi gage would deteriorate from the conditions which existed in the period of record upon which the Compact is based. Those familiar with that reach of the stream will appreciate the magnitude of the risk, and the accrued debit in 1956 demonstrates that the stakes were high. Accompanying the risk, of course, is the corollary opportunity to benefit from improved channel conditions.

In 1951, with New Mexico's accrued debit calculated at 263,100 acre-feet, Texas filed in the United States Supreme Court a complaint against the State of New Mexico asking that the defendant be enjoined from diverting the waters of Rio Grande above San Marcial

9. Rio Grande Compact, Article VI, unnumbered paragraph 1.

10. Actual spill: all water which is actually spilled from Elephant Butte Reservoir, or is released therefrom for flood control, in excess of the current demand on project storage and which does not become usable water by storage in another reservoir; provided, that actual spill of usable water cannot occur until all credit water shall have been spilled. Rio Grande Compact, Article I.

11. U.S.G.S. Gaging Station at Otowi Bridge near San Ildefonso, which is used to determine the Otowi Index Supply upon which New Mexico's delivery obligation is based. Rio Grande Compact, Article IV and Resolution Adopted by the Rio Grande Compact Commission, February 22-24, 1948.

and that a watermaster be appointed to enforce the Court's decree.¹² By the time this suit was dismissed in 1957, New Mexico's accrued debit was calculated at 529,400 acre-feet.

In 1948, with New Mexico's accrued debit standing at 176,800 acre-feet, the Congress, apprised of excessive losses of Rio Grande flows between Otowi gage and Elephant Butte Reservoir and of serious flood threats in that reach, particularly in the vicinity of Albuquerque, authorized the Middle Rio Grande Project. This authorization,¹³ together with a subsequent authorization,¹⁴ gave approval for the Bureau of Reclamation and the Corps of Engineers to cooperatively rectify the channel of Rio Grande, rehabilitate the works of the Middle Rio Grande Conservancy District, construct and rehabilitate levees, and construct and operate the Jemez Dam and Reservoir Project, Cochiti-Galisteo Dams and Reservoirs Project, and the Abiquiu Dam and Reservoir Project. Plate I suggests that the early stages of these works began to be reflected in New Mexico's improved Compact deliveries by about 1953; the rate at which the state's accrued debit was mounting began to decline. As the work authorized was accomplished New Mexico's delivery record improved and, with only four exceptions (1959, 1963, 1964 and 1965), New Mexico's annual delivery has exceeded the Compact requirement each year since 1956.

The cost of the works constructed to date under the Middle Rio Grande Project and subsequent authorizations is about \$160 million. Not all of this cost, of course, is assignable to the works needed to reduce waste and improve New Mexico's ability to meet its Compact delivery requirements; much of it is chargeable to the protection of life and property in the Middle Valley from floods.

There can be no doubt that the November 29, 1956 Order of the New Mexico State Engineer assuming jurisdiction over the drilling of wells and the appropriation of groundwater in the Rio Grande Basin above Elephant Butte Reservoir contributed to the liquidation of the New Mexico debit by preventing new ground water appropriations that would have diminished the flow of Rio Grande above Elephant Butte Reservoir and thus delayed the realization of credit status for New Mexico.

It is of interest to note that in the years 1968 and 1969 New Mexico's accrued debit was reduced by about 200,000 acre-feet. This large reduction can be attributed in part to the low level and rela-

12. *Texas v. New Mexico*, 352 U.S. 991 (1957).

13. Act of June 30, 1948, ch. 771, 62 Stat. 1171, Public Law 858, 80th Congress, approved June 30, 1948.

14. Act of July 14, 1960, § 201, 74 Stat. 480, 492.

tively small exposed water surface at Elephant Butte Reservoir during these two years. New Mexico must bear the burden of evaporation from Elephant Butte Reservoir. Under the 1948 Resolution of the Commission,¹⁵ New Mexico's delivery is denominated "Elephant Butte Effective Index Supply," which is defined as "the recorded flow of the Rio Grande at the gaging station below Elephant Butte Dam during the calendar year plus the net gain in storage in Elephant Butte Reservoir during the same year or minus the net loss in storage in said reservoir, as the case may be." Thus the evaporation from Elephant Butte Reservoir is, in effect, deducted from the amount of water delivered by New Mexico.

The breakthrough for New Mexico came in 1972 with an over-delivery of 153,600 acre-feet. Because of the limitation on annual credits established by unnumbered paragraph 5 of Article VI, New Mexico could be credited with only 150,000 acre-feet of this over-delivery; however, this amount was sufficient to eliminate New Mexico's remaining accrued debit of 107,200 acre-feet and leave the state with a credit of 41,700 acre-feet in Elephant Butte Reservoir.

The large over-delivery in 1972 illustrates another little-recognized feature of the Compact. New Mexico's annual delivery obligation is set by the flow at Otowi gage, most of which results from snow melt runoff. The Middle Rio Grande Conservancy District is able to divert only a relatively small part of the flash floods resulting from summer thunderstorms below Otowi gage. Thus, in a year of deficient snowpack and abundant thunderstorm activity below Otowi gage, such as was the case in 1972, New Mexico's delivery obligation is low and the prospects for an over-delivery by New Mexico are good.

Conversely, in years of abundant snowpack and high snow melt runoff, New Mexico's delivery obligation is high and the ability to divert and consume the natural flow is enhanced. If, as in 1973, the spring runoff is not followed by abundant thunderstorm runoff below Otowi gage, there is a probability of an under-delivery by New Mexico for the year.

COLORADO

Colorado also accrued a small debit, 19,400 acre-feet, in the first year of accounting under the Rio Grande Compact. At the end of 1941, Colorado had an accrued credit of 127,000 acre-feet which was wiped out by spill from project storage in 1942. Thereafter, except in 1943 and 1947, Colorado maintained a comfortable credit

15. Resolution Adopted by the Rio Grande Compact Commission at the Annual Meeting held at El Paso, Texas, February 22-24, 1948, changing gaging stations and measurements of deliveries by New Mexico.

status through 1951. Plate I indicates that Colorado reduced her credit by 119,700 acre-feet in 1950. This reduction in credit was not due entirely to an under-delivery for the year; in 1950 Colorado relinquished, pursuant to Article VII, 60,000 acre-feet of her accrued credits.

It appears that water management practices of hydrologic conditions, or both, changed in Colorado in 1950. In the years 1950 through 1967 Colorado consistently under-delivered, with minor exceptions in 1958 and 1966, until her accrued debit totalled 944,400 acre-feet at the end of 1967.

In 1966 Texas and New Mexico sued Colorado in the U. S. Supreme Court¹⁶ to enforce the Compact. The Court accepted jurisdiction and in May of 1968 the three states filed a "Memorandum of the Parties Relative to Motion for Continuance" in which they requested that the Court continue the case indefinitely on the condition that the State of Colorado undertake to deliver water at the Colorado-New Mexico state line to meet every year the delivery obligation established by the schedules of Article III of the Compact. The continuance was granted; in 1968 and each subsequent year Colorado exceeded her annual delivery obligation and her accrued debit at the end of 1972 was 766,200 acre-feet. It is apparent that Colorado's accomplishment is attributable to a number of measures including the curtailment of diversions enforced by agents of the state, improved drainage works, and control of groundwater use under the Water Right Determination and Administration Act of 1969.¹⁷

CONCLUSION

For most of the 33 years of Rio Grande Compact administration both Colorado and New Mexico have been in debit status and the use of reservoirs in both states has been restricted. By 1972 New Mexico had liquidated her debit and Colorado had established a definite trend toward credit status.

16. *Texas v. Colorado*, 391 U.S. 901 (1968).

17. *Colo. Rev. Stat. Ann.* § § 148-21-1 to -45 (Supp. 1969).