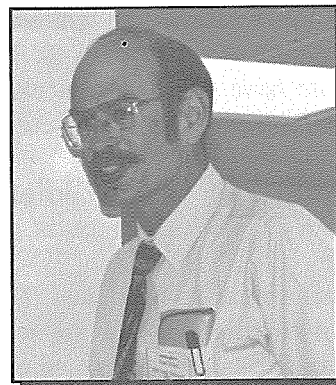


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## CONFLICT RESOLUTION ON THE PECOS: THE PECOS RIVER COMPACT

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From an engineering perspective, the history of the Pecos may be viewed in two parallel parts: 1) the development of irrigated agriculture and of engineering facilities to harness the river to these uses, and 2) the development of a system of apportioning the river's waters. This paper will address the relationship between these subjects over time, and trace the successes and failures of the relationship between New Mexico and Texas.

Large-scale irrigated agricultural water use on the Pecos in both New Mexico and Texas began concurrently in the late 1880s. Thereafter, water shortages occurred in both states, primarily due to the irregular nature of the river's flow and lack of surface water storage facilities. From the turn of the century, New Mexico and Texas water users actively opposed federal funding for

reservoir construction benefitting the other party.

In the early 1920s, partly as a result of the Colorado River Compact's success, the use of interstate compacts to apportion water between states was viewed favorably. In 1923, New Mexico and Texas enacted legislation to create jointly the Pecos River Compact Commission. The Commission met in El Paso in December 1924 and signed a compact in February 1925.

Articles of Agreement in the 1925 Compact provided:

1. The purpose of the Compact was to provide for the equitable division of unappropriated flood waters in the river system.
2. Existing rights to beneficial uses in both states were to be unimpaired.

3. No construction permits for storage in upper basin (above Fort Sumner) in excess of 10,000 acre-feet would be granted by New Mexico prior to January 1, 1940. This provision would have delayed replacement of the Carlsbad Project's McMillan Reservoir until after 1940.
4. New Mexico had rights to irrigate 76,000 acres from surface or storage in the middle basin.
5. Texas had a right to build Red Bluff Reservoir. Red Bluff provides a major on-stream storage for Texas, and is located on the New Mexico-Texas border.
6. Surplus waters above requirements for 76,000 acres in the middle basin and 40,000 acres in the lower basin (in Texas) would be divided equally between states.

For compact administration purposes, the upper basin is defined as the reach of the river above Fort Sumner, New Mexico. The middle basin is defined as the reach between Fort Sumner and the state line, and the lower basin is the reach between the state line and Girvin, Texas, approximately 200 river miles to the south. The river, its basins and its principal features are presented in Figure 1.

At the time of the 1925 Compact, the extent of water use on the Pecos was minor in relation to its development potential. Only two of the present six mainstream reservoirs had been completed. Therefore, the 1925 compacting process was comparatively simple because, given adequate financial resources for ultimate development, the Pecos could supply far more water than was being used at the time. The agreement failed because the two states focused on the status quo of the water supply as it existed in 1925, failing to recognize the river's potential. This failure resulted in reducing the interstate water relationship to the level of political strife which lasted through the next 15 years.

The New Mexico and Texas legislatures promptly ratified the Compact, but it was vetoed by the New Mexico governor. The veto was in part based on the fact that it was silent on replacement storage for Carlsbad. Texas continued to appeal to New Mexico for ratification of the

1925 Compact until 1931, when the Texas legislature repealed its ratification of the agreement.

The lack of a workable agreement, however, did not solve the pressing need for additional surface storage to ensure a stable water supply in both states. In 1926, the Congress authorized \$2 million to construct Red Bluff and rehabilitate irrigation works in Texas. The Act appeared to protect New Mexico's interests by providing that Texas should not have claim to any water used above Avalon Dam in New Mexico, then or in the future. However, the project was not immediately funded, since the Reclamation Fund was depleted. Ultimately, construction of Red Bluff was funded in 1933 and begun in 1934.

In 1935, the Bureau of Reclamation proposed construction of Alamogordo Dam, located above Fort Sumner, to replace storage lost in Lake McMillan. Texas opposed the project, fearing it would reduce the supply to Red Bluff. New Mexico countered by opposing funding to complete Red Bluff.

Negotiations mediated by the Secretary of the Interior to resolve this impasse led to the 1935 Alamogordo Agreement, which contained the following principal provisions:

1. Texas agreed to withdraw opposition to the construction of Alamogordo Reservoir.
2. New Mexico agreed not to deprive Texas of its share of flood waters originating above Avalon Dam over the past 20 years. This was apparently the first formulation of the principle of apportioning the river's waters based on flood flows.
3. New Mexico agreed to limit irrigation to a maximum of 76,000 acres in the middle basin, from either surface supply or storage.
4. Most importantly, the agreement committed the two states to negotiate a compact.

Red Bluff was completed in 1936, and Alamogordo Dam was completed in 1937. These two structures and a wet 1937 season solved the two states' immediate water supply needs.

In 1938, the Texas legislature passed a bill ratifying the Alamogordo Agreement as a compact, which was signed by the Texas governor. New Mexico however, refused to ratify, and con-

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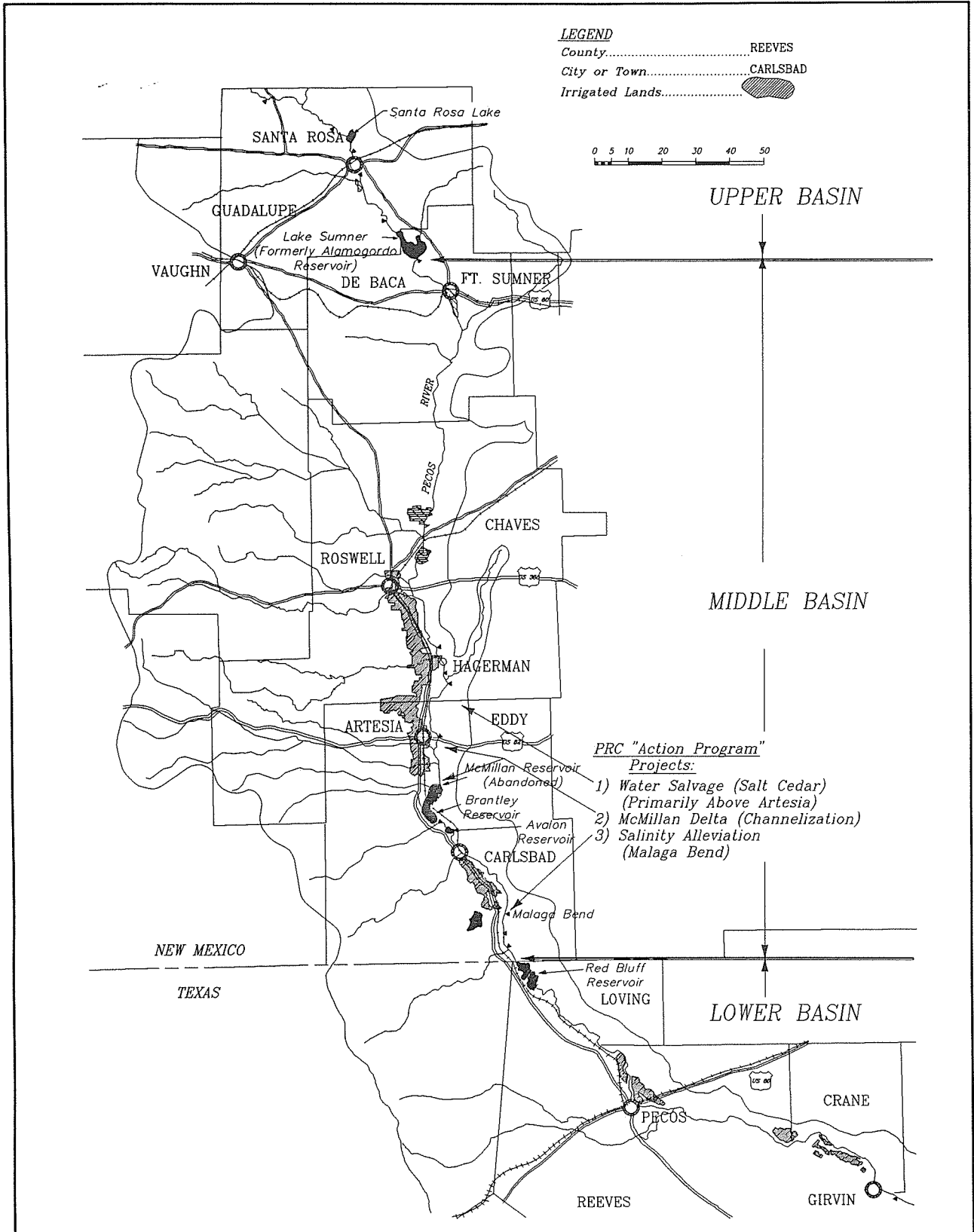


Figure 1. Pecos River Basin.

sidered the agreement an interim step toward a compact.

In 1941, Texas repealed its approval of the agreement "in order that the Texas Attorney General may bring suit ... " This ended the efforts to settle politically the differences between the states. Coincidentally, 1941 was the wettest year in the Pecos Basin on record, with an annual precipitation total having a recurrence interval of several hundred years.

Pursuant to the 1935 Agreement to negotiate a compact, the Pecos River Joint Investigation (PRJI) was initiated in 1939. This massive joint state and federal investigation initiated a level of engineering and hydrologic studies previously unequalled on the river. A disproportionately high level of engineering effort continues to be expended through the present time. The PRJI investigations proceeded for two years until the spring of 1941. These investigations developed much of the data and engineering methodology on which the 1949 Compact's apportionment provisions were based.

In May 1947, the Commission appointed an Engineering Advisory Committee with instructions to formulate engineering data to be used in compact negotiations, including an inflow-outflow formula to apportion river flows.

In 1948 the Engineering Advisory Committee completed its engineering analysis of the water supply and produced a report which was the basis of the "nine points" around which the compact was written. The principal element of controversy within the Compact was the fundamental apportionment provision (Article III(a)), which read:

New Mexico shall not deplete by man's activities the flow of the Pecos River at the New Mexico-Texas state line below an amount which will give to Texas a quantity of water equivalent to that available to Texas under the 1947 Condition.

In retrospect, it is evident that the final compact negotiations were conducted at a pace which was something more than "all due haste." In addition, it is clear that the final understand-

ings of the two parties resulting from these negotiations were far from identical. The primary misunderstandings concerned the computation of New Mexico's delivery obligation and the question of whose rights were protected.

The most famous story regarding these negotiations concerns the penultimate negotiating session which was held in Austin from November 8-13, 1948. The New Mexico contingent was located on the top floor of the Driscoll Hotel, with the Texas contingent on the first floor. The level of misunderstanding was so pronounced that all negotiation was carried out by Royce Tipton, the federal representative, who shuttled from the top to the bottom floor until an agreement was reached.

None of the negotiators are alive today, but it is surmised that Tipton allowed the two parties to understand different meanings of the final language. Considering Tipton's reputation for fairness, it is not suggested here that the misdirection was deliberate. Specifically, Texas apparently understood that Article III(a) meant that the level of flows in the river existing in 1947 would be protected. New Mexico apparently understood that water uses existing in New Mexico as of December 31, 1947 would be protected. At minimum, we know that this interpretation of the Compact was presented to the New Mexico legislature during hearings to ratify the Compact. Morgan Nelson, who continues to farm in East Grand Plains at the present time, was a legislator during those hearings, and has related this understanding.

The Compact was signed on December 3, 1948 and was promptly ratified and signed into law by President Truman on June 9, 1949.

The status of the Pecos River at the time of the 1949 Compact was essentially a fully appropriated stream system. The compact divided the river based on development existing in 1947. All components of surface and related groundwater flows up to and including unappropriated flood waters were studied, quantified, and included in the river's division. By comparison with the 1925 Compact, no surplus waters, nor waters potentially developable in the future remained, either

physically in the river itself or outside the understandings of the compacting states.

A key element of the Compact was the division of flood inflows between the states. The Pecos River Compact is the only Compact in New Mexico in which an accounting of flood waters is used to divide the river, as opposed to a division of the river as a whole. The Compact and the later Supreme Court decree provide that New Mexico shall deliver an amount of water to Texas equal to approximately 45 percent of the sum of flows past Alamogordo Dam plus flood inflows between Alamogordo Reservoir and the state line.

Flood inflows are defined as flows resulting from rainfall events. Flood inflows are a major component of the Pecos water supply, but are inherently highly variable and unpredictable, and intrinsically difficult to estimate. Under this arrangement, New Mexico receives the beneficial use of base inflows to the river.

Basically, flood inflows may be determined either by gaging tributaries or as a residual in a water balance for a specific reach of stream. Gaging tributaries provides a reliable measurement, and is used in the Artesia to Carlsbad reach, but is too expensive to use throughout the river. The computation of flood inflow as a residual in a water balance is an imprecise method heavily influenced by the methodology and precision of the estimates of all other water balance elements.

The problem is illustrated with a schematic of a typical river reach in Figure 2. Flood inflows are obtained by subtracting the sum of the known inflows from the sum of the outflows. In this example, it may be particularly difficult to estimate base inflow and channel loss. Base inflow typically appears as hundreds of small seeps feeding the river in the reach, and thus is not susceptible to direct measurement. Engineers might estimate this base inflow based on a corre-

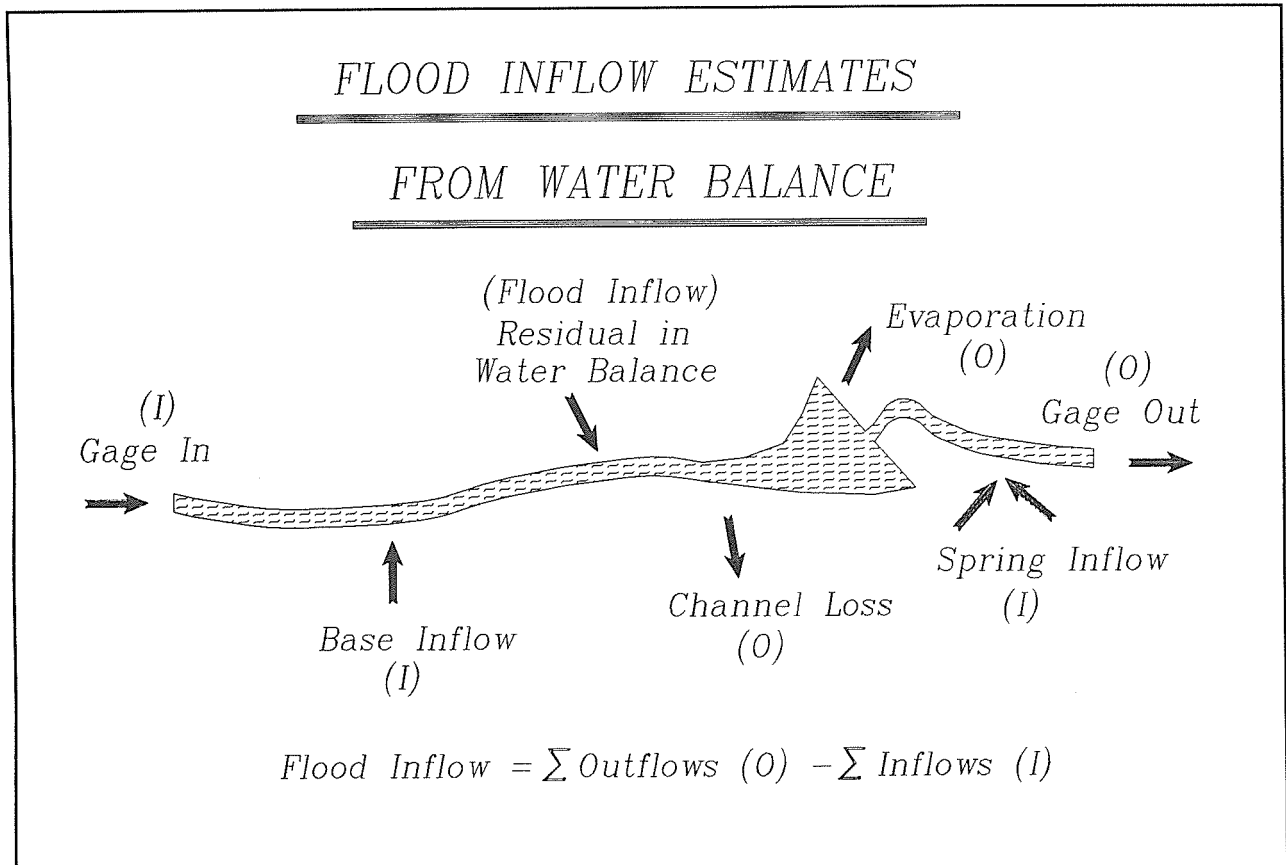


Figure 2. Flood inflow estimates from water balance.

lation with precipitation, or a correlation with groundwater levels, or hydrograph scalping. Because of the nature of the water balance, any error in selecting the method of base inflow estimation (or in making the computation) is reflected in the computed flood inflow, which is in turn reflected in the computation of New Mexico's delivery obligation.

The difficulty in making these extremely crucial determinations has necessitated the expenditure of many man-years of work, and has dictated the pattern of reliance of Compact Commissioners on the professional expertise and judgements of their engineer advisors, both in defining the methods to quantify flood inflows and in making the annual estimates.

The concept of the Compact originally was that the Commission had full authority to change the method or perfect the technique of evaluating deliveries and the 1947 condition, as long as the result was directed at determining the 1947 condition embodied in Article III(a). It was understood by the engineer advisors to the Pecos River Compact Commission that elements of the 1948 studies needed refinement. Items of concern included errors, extremely limited data sets, and necessary improvements to methods of data analysis.

During the period from 1952 through 1957, Texas' engineers on the inflow-outflow subcommittee recognized and approved corrections to errors in the computation of flood inflows, but maintained that the original Compact curve which defined the 1947 inflow-outflow relation was not subject to revision. New Mexico's engineers understood that each change in the method of computation of annual flood inflows required a recomputation of flood inflows for each year prior to 1947, and thus a change in the plotting of the inflow-outflow relationship itself. The original inflow-outflow curve is presented as Figure 3.

In July 1957, the Commission authorized a restudy of the 1947 condition relationship by a "Subcommittee on the Review of Basic Data." It did so following the Commission's legal committee's report suggesting the Commission had the authority to modify the terms of the 1947 inflow-

outflow relationship. The stated purpose of the study was to determine whether the relationships depicted by the original inflow-outflow curves should be modified.

This subcommittee produced a "Report on Review of Basic Data" (RBD) which was adopted by the Commission on January 31, 1961. Using methods and data in this report, the subcommittee completed compact accounting computations for the 1949 through 1961 period. At the November 9, 1962 meeting the Commission approved the revised computation of a negative 5,300 acre-foot departure through 1961. During the three-year period in which this subcommittee developed the RBD, a remarkable level of cooperation and consensus existed between the New Mexico and Texas engineers. Although the Review of Basic Data was never completed, it represented a second independent development of the data and methods to be used to evaluate the 1947 Condition and to estimate New Mexico's delivery obligation.

The Pecos River Compact is unique in that in addition to apportioning the waters of the river it provided that the compacting states would act cooperatively to improve water quality, and salvage wasted water to improve the limited, diminishing supply. In 1953 the Commission approved an "Action Program" developed by the Engineer Advisors which was designed to:

1. Rechannel the river between Artesia and McMillan Dam. This reach of the river suffered large carriage losses as it crossed the delta created by McMillan Reservoir. A low-flow channel and floodway were proposed to reduce these losses.
2. Reduce brine inflow at Malaga Bend. Malaga Bend, located several miles above the Texas-New Mexico state line, contributes large volumes of salt to the river through saline springs which adversely impact agricultural uses of Pecos waters in Texas. It was proposed to intercept these brines in a well and pump them to a dry lakebed, where the water would evaporate.
3. Eradicate salt cedars in the Middle Basin. Salt cedar acreage had expanded greatly through the 1950s. Salvage of water through

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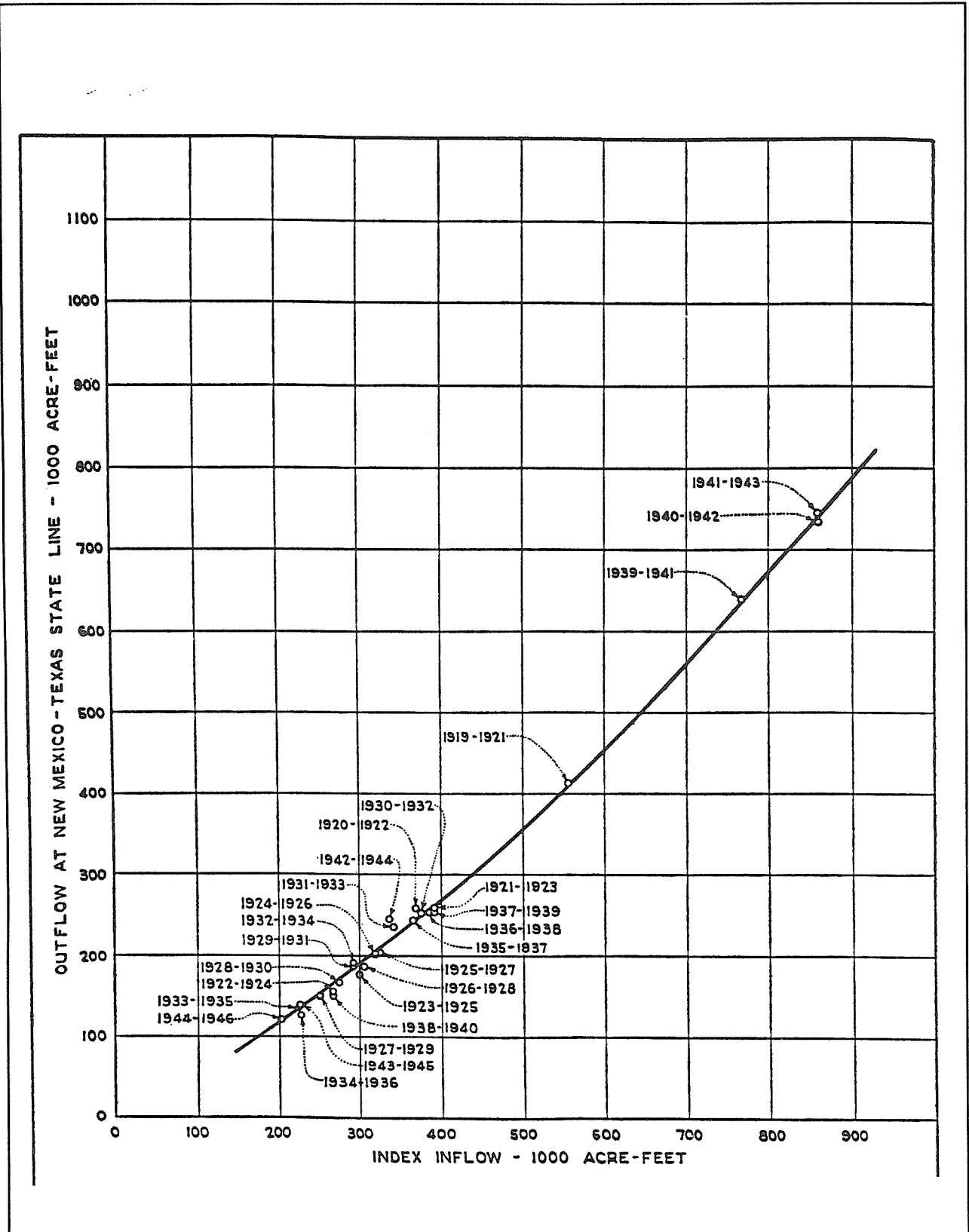


Figure 3. Flood inflow-outflow curve from Alamogordo Dam to New Mexico—Texas state line (Pecos River Compact).

eradication of salt cedar was viewed as a major source of "new" water for the river.

The Commission retained Robert Lingle as director of the "Action Program." Lingle was the program's administrator as well as its promoter and lobbyist in Washington. In 1958, Public Law 85-333 was enacted to channelize the river in the McMillan delta and for salinity alleviation. In 1963 Public Law 88-594 was enacted to clear phreatophytes. Both the salt cedar eradication project and the salinity alleviation project at Malaga Bend were ultimately funded and constructed. The improvements in water supply resulting from the successful implementation of these engineering projects during the 1955-1975 period by the Commission represented a high point in the Texas/New Mexico relationship.

During the period after 1962, little progress was made to complete the definition of the 1947 inflow-outflow relationship. In July 1970, the new Texas Commissioner demanded that the Commission account for delivery of Pecos waters on the basis of the original Compact inflow-outflow engineering analysis. By January 1971, the Texas Engineer Advisors produced a report using the original formulation that determined New Mexico's deliveries to be delinquent in the amount of 1,100,000 acre-feet since the inception of the Compact. This equaled an average annual deficit of 57,000 acre-feet per year.

At the Commission's meeting of February 1974, the Texas commissioner formally announced Texas' "repudiation of the Review of Basic Data and all prior agreements and actions by the Commission" because, in his view, the Review of Basic Data had operated to deprive Texas of water.

Fourteen years of litigation followed. The case was argued before three Special Masters appointed by the Supreme Court. Key rulings in this case included the following:

1. Texas' position that the 1947 Condition as defined by the original inflow-outflow relationship could not be changed, was rejected. Special Master Breitenstein ruled that neither state was bound by the errors in the original 1947 studies.

2. New Mexico's position that the Compact protected all water uses existing in New Mexico as of December 31, 1947 was rejected. Judge Breitenstein ruled that "If all New Mexico uses are protected, all of the inadequate supply of the inconstant stream in times of drought could be consumed in New Mexico in complete disregard of Texas rights. Texas is entitled to its equitable share." In addition, Judge Breitenstein concluded that the 1947 condition refers to the river's status as of the beginning of 1947.

Regarding the central issue of the division of the river's waters, the disputed issues of the most appropriate methodologies to be used in deriving flood inflows were argued a third time before the Special Master. The result was the third definition of the 1947 condition inflow-outflow curve and a determination that New Mexico had undelivered to Texas at an average rate of 10,000 acre-feet per year for the 34-year period from 1950 through 1983. The revised curve and methodology were incorporated into a River Master's Manual under which the river is now administered.

New Mexico responded to the Supreme Court Decree by undertaking a comprehensive program of water-use management in the Pecos Stream System. The centerpiece of this project is a \$40 million program to purchase and retire approximately 18,000 acres of irrigated land, sufficient to increase state line flows in the Pecos by 15,000 acre-feet annually. At present, this program has been funded a total of \$20.8 million, and has purchased approximately 32 percent of the required water supply.

Much of the constructive work product of the two states during the 1949-1970 period, as embodied in the Review of Basic Data and the Commission's "Action Program" has now either been superseded by the 1988 Supreme Court Decree or has lapsed into non-use. The decree has resolved the primary dispute between the states by establishing an inflow-outflow curve and by defining the method for computing flood inflows for use with that curve. By its appointment of a Pecos River Master, the court provided an arbiter of future disputes concerning methods



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and calculations of New Mexico's delivery obligations. In the future, the Commission may look forward to a new "Action Program" to assist in solutions of water quantity and quality problems on the river. Two possible elements of a new program could be a revival of the Malaga Bend salinity alleviation project and cooperation between the states to deal with the new challenges posed by environmental concerns and endangered species issues on the Pecos River.