Eleventh Annual Report

of the

RIO GRANDE COMPACT COMMISSION

1949

TO THE GOVERNORS OF

Colorado, New Mexico and Texas

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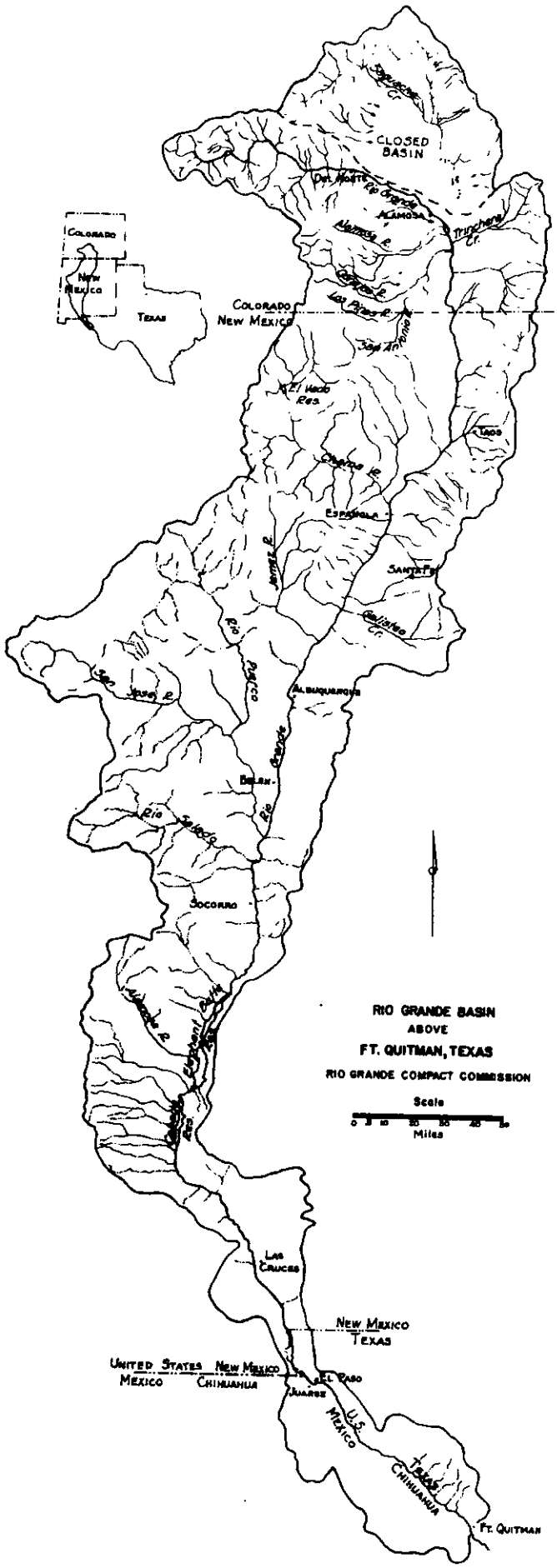
CLOSED BASIN
Colorado
New Mexico
Texas
COLORADO
NEW MEXICO
Alamosa
Trinchera Cr.
Conejos R.
Los Pinos R.
San Antonio
El Vado Res.
Taos
Chama R.
Española
Santa Fe
Jemez R.
Rio Puerco
Galisteo Cr.
San Jose R.
Albuquerque
Rio Grande
Belen
Rio Salado
Socorro
Alamosa R.
Elephant Butte Res.
Las Cruces
NEW MEXICO
TEXAS
UNITED STATES
MEXICO
NEW MEXICO
CHIHUAHUA
El Paso
Juarez
U.S.
MEXICO
TEXAS
CHIHUAHUA
Ft. Quitman
RIO GRANDE BASIN
ABOVE
FT. QUITMAN, TEXAS
RIO GRANDE COMPACT COMMISSION
Scale
Miles

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CO 1958

COLORADO
M. C. HINDERLIDER
STATE ENGINEER
DENVER, COLO.

TEXAS
LOUIS A. SCOTT
FIRST NAT'L BANK BLDG.
EL PASO, TEXAS

Rio Grande Compact Commission

NEW MEXICO
JOHN H. BLISS
STATE ENGINEER
SANTA FE, NEW MEXICO

UNITED STATES
BERKELEY JOHNSON, CHAIRMAN
POST OFFICE BOX 277
SANTA FE, NEW MEXICO

SECRETARY
RIO GRANDE COMPACT COMMISSION
POST OFFICE BOX 277
SANTA FE, NEW MEXICO

February 24, 1950

His Excellency, Thomas J. Mabry,
Governor of the State of New Mexico,
Santa Fe, New Mexico.

His Excellency, Allan Shivers,
Governor of the State of Texas,
Austin, Texas.

His Excellency, W. Lee Knous,
Governor of the State of Colorado,
Denver, Colorado.

Sirs:

The Eleventh Annual Meeting of the Rio Grande Compact Commission was held in Santa Fe, New Mexico, on February 23 and 24, 1950, at which time the Commission reviewed the records of stream flow at all Compact Index Stations and found that:

(a) On January 1, 1949, Colorado had an accrued credit of 130,100 acre feet. In 1949, Colorado earned an annual credit of 32,000 acre feet. After required adjustments for evaporation losses, Colorado had an accrued credit of 144,700 acre feet on December 31, 1949.

(b) On January 1, 1949, New Mexico had an accrued debit of 286,400 acre feet. In 1949, New Mexico earned an annual credit of 1,200 acre feet. After required adjustments for evaporation losses, New Mexico had an accrued debit of 280,400 acre feet on December 31, 1949.

(c) Prior to January 1, 1949, releases of usable water from Project Storage had amounted to 63,900 acre feet in excess of 790,000 acre feet per year since the occurrence of spill in 1942. In 1949, the release of usable water from Project Storage was 713,200 acre feet. After required adjustments for evaporation, the accrued under-release of usable water was 14,300 acre feet on December 31, 1949.

The expenses for administration of the Compact during the fiscal year ending June 30, 1949 were $18,792, of which $6,900 was borne by the United States and the balance of $11,892 was borne equally by the three States.

Factual data and records bearing on the administration of the Compact are available in the files of the Commission in the office of the District Engineer, U. S. Geological Survey, Santa Fe, New Mexico.

Respectfully yours,

Commissioner for New Mexico

Commissioner for Texas

Commissioner for Colorado

RIO GRANDE COMPACT

The State of Colorado, the State of New Mexico, and the State of Texas, desiring to remove all causes of present and future controversy among these States and between citizens of one of these States and citizens of another State with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas, and being moved by consideration of interstate comity, and for the purpose of effecting an equitable apportionment of such waters, have resolved to conclude a Compact for the attainment of these purposes, and to that end, through their respective Governors, have named as their respective Commissioners:

For the State of Colorado	M. C. Hinderlider
For the State of New Mexico	Thomas M. McClure
For the State of Texas	Frank B. Clayton

who, after negotiations participated in by S. O. Harper, appointed by the President as the representative of the United States of America, have agreed upon the following articles, to-wit:

ARTICLE I

(a) The State of Colorado, the State of New Mexico, the State of Texas and the United States of America, are hereinafter designated "Colorado," "New Mexico," "Texas," and the "United States," respectively.

(b) "The Commission" means the agency created by this Compact for the administration thereof.

(c) The term "Rio Grande Basin" means all of the territory drained by the Rio Grande and its tributaries in Colorado, in New Mexico, and in Texas above Fort Quitman, including the Closed Basin in Colorado.

(d) The "Closed Basin" means that part of the Rio Grande Basin in Colorado where the streams drain into the San Luis Lakes and adjacent territory, and do not normally contribute to the flow of the Rio Grande.

(e) The term "tributary" means any stream which naturally contributes to the flow of the Rio Grande.

(f) "Transmountain Diversion" is water imported into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande Basin, exclusive of the Closed Basin.

(g) "Annual Debits" are the amounts by which actual deliveries in any calendar year fall below scheduled deliveries.

(h) "Annual Credits" are the amounts by which actual deliveries in any calendar year exceed scheduled deliveries.

(i) "Accrued Debits" are the amounts by which the sum of all annual debits exceeds the sum of all annual credits over any common period of time.

(j) "Accrued Credits" are the amounts by which the sum of all annual credits exceeds the sum of all annual debits over any common period of time.

(k) "Project Storage" is the combined capacity of Elephant Butte Reservoir and all other reservoirs actually available for the storage of usable water below Elephant Butte Reservoir and above the first diversion to lands of the Rio Grande Project, but not more than a total of 2,638,860 acre-feet.

(l) "Usable Water" is all water, exclusive of credit water, which is in project storage and which is available for release in accordance with irrigation demands, including deliveries to Mexico.

(m) "Credit Water" is that amount of water in project storage which is equal to the accrued credit of Colorado, or New Mexico, or both.

(n) "Unfilled Capacity" is the difference between the total physical capacity of project storage and the amount of usable water then in storage.

(o) "Actual Release" is the amount of usable water released in any calendar year from the lowest reservoir comprising project storage.

(p) "Actual Spill" is all water which is actually spilled from Elephant Butte Reservoir, or is released there-from 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.

(q) "Hypothetical Spill" is the time in any year at which usable water would have spilled from project storage if 790,000 acre-feet had been released therefrom at rates proportional to the actual release in every year from the starting date to the end of the year in which hypothetical spill occurs; in computing hypothetical spill the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following the effective date of this Compact, and thereafter the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following each actual spill.

ARTICLE II

The Commission shall cause to be maintained and operated a stream gaging station equipped with an automatic water stage recorder at each of the following points, to-wit:

(a) On the Rio Grande near Del Norte above the principal points of diversion to the San Luis Valley;

(b) On the Conejos River near Mogote;

(c) On the Los Pinos River near Ortiz;

(d) On the San Antonio River at Ortiz;

(e) On the Conejos River at its mouth near Los Sauces;

(f) On the Rio Grande near Lobatos;

(g) On the Rio Chama below El Vado Reservoir;

(h) On the Rio Grande at Otowi Bridge near San Ildefonso;

(i) On the Rio Grande near San Acacia;

(j) On the Rio Grande at San Marcial;

(k) On the Rio Grande below Elephant Butte Reservoir;

(l) On the Rio Grande below Caballo Reservoir.

Similar gaging stations shall be maintained and operated below any other reservoir constructed after 1929, and at such other points as may be necessary for the securing of records required for the carrying out of the Compact; and automatic water stage recorders shall be maintained and operated on each of the reservoirs mentioned, and on all others constructed after 1929.

Such gaging stations shall be equipped, maintained and operated by the Commission directly or in cooperation with an appropriate Federal or State agency, and the equipment, method and frequency of measurement at such stations shall be such as to produce reliable records at all times.

ARTICLE III

The obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico State Line, measured at or near Lobatos, in each calendar year, shall be ten thousand acre-feet less than the sum of those quantities set forth in the two following tabulations of relationship, which correspond to the quantities at the upper index stations:

DISCHARGE OF CONEJOS RIVER

Quantities in thousands of acre-feet

Conejos Index Supply (1)	Conejos River at Mouths (2)
100	0
150	20
200	45
250	75
300	109
350	147
400	188
450	232
500	278
550	326
600	376
650	426
700	476

Intermediate quantities shall be computed by proportional parts.

(1) Conejos Index Supply is the natural flow of Conejos River at the U. S. G. S. gaging station near Mogote during the calendar year, plus the natural flow of Los Pinos River at the U. S. G. S. gaging station near Ortiz and the natural flow of San Antonio River at the U. S. G. S. gaging station at Ortiz, both during the months of April to October, inclusive.

(2) Conejos River at Mouths is the combined discharge of branches of this river at the U. S. G. S. gaging stations near Los Sauces during the calendar year.

DISCHARGE OF RIO GRANDE EXCLUSIVE OF CONEJOS RIVER

Quantities in thousands of acre-feet

Rio Grande at Del Norte (3)	Rio Grande at Lobatos less Conejos at Mouths (4)
200	60
250	65
300	75
350	86
400	98
450	112
500	127
550	144
600	162
650	182
700	204
750	229
800	257
850	292
900	335
950	380
1,000	430
1,100	540
1,200	640
1,300	740
1,400	840

Intermediate quantities shall be computed by proportional parts.

(3) Rio Grande at Del Norte is the recorded flow of the Rio Grande at the U. S. G. S. gaging station near Del Norte during the calendar year (measured above all principal points of diversion to San Luis Valley) corrected for the operation of reservoirs constructed after 1937.

(4) Rio Grande at Lobatos less Conejos at Mouths is the total flow of the Rio Grande at the U. S. G. S. gaging station near Lobatos, less the discharge of Conejos River at its Mouths, during the calendar year.

The application of these schedules shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) any new or increased depletion of the runoff above inflow index gaging stations; and (c) any transmountain diversions into the drainage

basin of the Rio Grande above Lobatos.

In event any works are constructed after 1937 for the purpose of delivering water into the Rio Grande from the Closed Basin, Colorado shall not be credited with the amount of such water delivered, unless the proportion of sodium ions shall be less than forty-five percent of the total positive ions in that water when the total dissolved solids in such water exceeds three hundred fifty parts per million.

ARTICLE IV

The obligation of New Mexico to deliver water in the Rio Grande at San Marcial, during each calendar year, exclusive of the months of July, August and September, shall be that quantity set forth in the following tabulation of relationship, which corresponds to the quantity at the upper index station:

DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE
AND AT SAN MARCIAL EXCLUSIVE OF
JULY, AUGUST AND SEPTEMBER

Quantities in thousands of acre-feet

Otowi Index Supply (5)	San Marcial Index Supply (6)
100	0
200	65
300	141
400	219
500	300
600	383
700	469
800	557
900	648
1000	742
1100	839
1200	939
1300	1042
1400	1148
1500	1257
1600	1370
1700	1489
1800	1608
1900	1730
2000	1856
2100	1985
2200	2117
2300	2253

Intermediate quantities shall be computed by proportional parts.

(5) The Otowi Index Supply is the recorded flow of the Rio Grande at the U. S. G. S. gaging station at Otowi Bridge near San Ildefonso (formerly station near Buckman) during the calendar year, exclusive of the flow during the months of July, August, and September, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi Bridge.

(6) San Marcial Index Supply is the recorded flow of the Rio Grande at the gaging station at San Marcial during the calendar year exclusive of the flow during the months of July, August, and September.

The application of this schedule shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) depletion after 1929 in New Mexico at any time of the year of the natural runoff at Otowi Bridge; (c) depletion of the runoff during July, August and September of tributaries between Otowi Bridge and San Marcial, by works constructed after 1937; and (d) any transmountain diversions into the Rio Grande between Lobatos and San Marcial.

Concurrent records shall be kept of the flow of the Rio Grande at San Marcial, near San Acacia, and of the release from Elephant Butte Reservoir to the end that the records at these three stations may be correlated. (Note: See Resolution of the Commission at page 15).

ARTICLE V

If at any time it should be the unanimous finding and determination of the Commission that because of changed physical conditions, or for any other reason, reliable records are not obtainable, or cannot be obtained, at any of the stream gaging stations herein referred to, such stations may, with the unanimous approval of the Commission, be abandoned, and with such approval another station, or other stations, shall be established and new measurements shall be substituted which, in the unanimous opinion of the Commission, will result in substantially the same results, so far as the rights and obligations to deliver water are concerned, as would have existed if such substitution of stations and measurements had not been so made. (Note: See Resolution of the Commission at page 15).

ARTICLE VI

Commencing with the year following the effective date of this Compact, all credits and debits of Colorado and New Mexico shall be computed for each calendar year, provided, that in a year of actual spill no annual credits nor annual debits shall be computed for that year.

In the case of Colorado, no annual debit nor accrued debit shall exceed 100,000 acre-feet, except as either or both may be caused by holdover storage of water in reservoirs constructed after 1937 in the drainage basin of the Rio Grande above Lobatos. Within the physical limitations of storage capacity in such reservoirs, Colorado shall retain water in storage at all times to the extent of its accrued debit.

In the case of New Mexico, the accrued debit shall not exceed 200,000 acre-feet at any time, except as such debit may be caused by holdover storage of water in reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and San Marcial. Within the physical limitations of storage capacity in such reservoirs, New Mexico shall retain water in storage at all times to the extent of its accrued debit. In computing the magnitude of accrued credits or debits, New Mexico shall not be charged with any greater debit in any one year than the sum of 150,000 acre-feet and all gains in the quantity of water in storage in such year.

The Commission by unanimous action may authorize the release from storage of any amount of water which is then being held in storage by reason of accrued debits of Colorado or New Mexico; provided, that such water shall be replaced at the first opportunity thereafter.

In computing the amount of accrued credits and accrued debits of Colorado or New Mexico, any annual credits in excess of 150,000 acre-feet shall be taken as equal to that amount.

In any year in which actual spill occurs, the accrued credits of Colorado, or New Mexico, or both, at the beginning of the year shall be reduced in proportion to their respective credits by the amount of such actual spill; provided that the amount of actual spill shall be deemed to be increased by the aggregate gain in the amount of water in storage, prior to the time of spill, in reservoirs above San Marcial constructed after 1929; provided, further, that if the Commissioners for the States having accrued credits authorize the release of part, or all, of such credits in advance of spill, the amount so released shall be deemed to constitute actual spill.

In any year in which there is actual spill of usable water, or at the time of hypothetical spill thereof, all accrued debits of Colorado, or New Mexico, or both, at the beginning of the year shall be cancelled.

In any year in which the aggregate of accrued debits of Colorado and New Mexico exceeds the minimum unfilled capacity of project storage, such debits shall be reduced proportionally to an aggregate amount equal to such minimum unfilled capacity.

To the extent that accrued credits are impounded in reservoirs between San Marcial and Courchesne, and to the extent that accrued debits are impounded in reservoirs above San Marcial, such credits and debits shall be reduced annually to compensate for evaporation losses in the proportion that such credits or debits bore to the total amount of water in such reservoirs during the year.

ARTICLE VII

Neither Colorado nor New Mexico shall increase the amount of water in storage in reservoirs constructed after 1929 whenever there is less than 400,000 acre-feet of usable water in project storage; provided, that if the actual releases of usable water from the beginning of the calendar year following the effective date of this Compact, or from the beginning of the calendar year following actual spill, have aggregated more than an average of 790,000 acre-feet per annum, the time at which such minimum stage is reached shall be adjusted to compensate for the difference between the total actual release and releases at such average rate; provided, further, that Colorado, or New Mexico, or both, may relinquish accrued credits at any time, and Texas may accept such relinquished water, and in such event the state, or states, so relinquishing shall be entitled to store water in the amount of the water so relinquished.

ARTICLE VIII

During the month of January of any year the Commissioner for Texas may demand of Colorado and New Mexico, and the Commissioner for New Mexico may demand of Colorado, the release of water from storage reservoirs constructed after 1929 to the amount of the accrued debits of Colorado and New Mexico, respectively, and such releases shall be made by each at the greatest rate practicable under the conditions then prevailing, and in proportion to the total debit of each, and in amounts, limited by their accrued debits, sufficient to bring the quantity of usable water in project storage to 600,000 acre-feet by March first and to maintain this quantity in storage until April thirtieth, to the end that a normal release of 790,000 acre-feet may

be found from project storage in that year.

ARTICIE IX

Colorado agrees with New Mexico that in event the United States or the State of New Mexico decides to construct the necessary works for diverting the waters of the San Juan River, or any of its tributaries, into the Rio Grande, Colorado hereby consents to the construction of said works and the diversion of waters from the San Juan River, or the tributaries thereof, into the Rio Grande in New Mexico, provided the present and prospective uses of water in Colorado by other diversions from the San Juan River, or its tributaries, are protected.

ARTICLE X

In the exent water from another drainage basin shall be imported into the Rio Grande basin by the United States or Colorado or New Mexico, or any of them jointly, the State having the right to the use of such water shall be given proper credit therefor in the application of the schedules.

ARTICLE XI

New Mexico and Texas agree that upon the effective date of this Compact all controversies between said States relative to the quantity or quality of the water of the Rio Grande are composed and settled; however, nothing herein shall be interpreted to prevent recourse by a signatory state to the Supreme Court of the United States for redress should the character or quality of the water, at the point of delivery, be changed hereafter, by one signatory State to the injury of another. Nothing herein shall be construed as an admission by any signatory state that the use of water for irrigation causes increases of salinity for which the user is responsible in law.

ARTICLE XII

To administer the provisions of this Compact there shall be constituted a Commission composed of one representative from each State, to be known as the Rio Grande Compact Commission. The State Engineer, of Colorado shall be ex-officio the Rio Grande Compact Commissioner for Colorado. The State Engineer of New Mexico shall be ex-officio the Rio Grande Compact Commissioner for New Mexico. The Rio Grande Compact Commissioner for Texas shall be appointed by the Governor of Texas. The President of the United States shall be requested to designate a representative of the United States to sit with such Commission, and such representative of the United States, if so designated by the President, shall act as Chairman of the Commission without vote.

The salaries and personal expenses of the Rio Grande Compact Commissioners for the three States shall be paid by their respective States, and all other expenses incident to the administration of this Compact, not borne by the United States, shall be borne equally by the three States.

In addition to the powers and duties hereinbefore specifically conferred upon such Commission, and the members thereof, the jurisdiction of such Commission shall extend only to the collection, correlation and presentation of factual data and the maintenance of records having a bearing upon the administration of this Compact, and, by unanimous action, to the making of recommendations to the respective States upon matters connected with the administration of this Compact. In connection therewith, the Commission may employ such engineering and clerical aid as may be reasonably necessary within the limit of funds provided for that purpose by the respective States. Annual reports compiled for each calendar year shall be made by the Commission and transmitted to the Governors of the signatory States on or before March first following the year covered by the report. The Commission may, by unanimous action, adopt rules and regulations consistent with the provisions of this Compact to govern their proceedings.

The findings of the Commission shall not be conclusive in any court or tribunal which may be called upon to interpret or enforce this Compact.

ARTICLE XIII

At the expiration of every five year period after the effective date of this Compact, the Commission may, by unanimous consent, review any provisions hereof which are not substantive in character and which do not affect the basic principles upon which the Compact is founded, and shall meet for the consideration of such questions on the request of any member of the Commission; provided, however, that the provisions hereof shall remain in full force and effect until changed and amended within the intent of the Compact by unanimous action of the Commissioners, and until any changes in this Compact are ratified by the legislatures of the respective states and consented to by the Congress, in the same manner as this Compact is required to be ratified to become effective.

ARTICLE XIV

The schedules herein contained and the quantities of water herein allocated shall never be increased nor diminished by reason of any increase or diminution in the delivery or loss of water to Mexico.

ARTICLE XV

The physical and other conditions characteristic of the Rio Grande and peculiar to the territory drained and served thereby, and to the development thereof, have actuated this Compact and none of the signatory states admits that any provisions herein contained establishes any general principle or precedent applicable to other interstate streams.

ARTICLE XVI

Nothing in this Compact shall be construed as affecting the obligations of the United States of America to Mexico under existing treaties, or to the Indian Tribes, or as impairing the rights of the Indian Tribes.

ARTICLE XVII

This Compact shall become effective when ratified by the legislatures of each of the signatory states and consented to by the Congress of the United States. Notice of ratification shall be given by the Governor of each State to the Governors of the other States and to the President of the United States, and the President of the United States is requested to give notice to the Governors of each of the signatory states of the consent of the Congress of the United States.

IN WITNESS WHEREOF, the Commissioners have signed this Compact in quadruplicate original, one of which shall be deposited in the archives of the Department of State of the United States of America and shall be deemed the authoritative original, and of which a duly certified copy shall be forwarded to the Governor of each of the signatory States.

Done at the City of Santa Fe, in the State of New Mexico, on the 18th day of March, in the year of our Lord, One Thousand Nine Hundred and Thirty-Eight.

(Sgd.) M. C. HINDERLIDER

(Sgd.) THOMAS M. McCLURE

(SGD.) FRANK B. CLAYTON

APPROVED:
(Sgd.) S. O. HARPER

RESOLUTION ADOPTED BY 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

R E S O L U T I O N

Whereas, at the Annual Meeting of the Rio Grande Compact Commission in the year 1945, the question was raised as to whether or not a schedule for delivery of water by New Mexico during the entire year could be worked out, and

Whereas, at said meeting the question was referred to the Engineering Advisers for their study, recommendations and report, and

Whereas, said Engineering Advisors have met, studied the problems and under date of February 24, 1947, did submit their Report, which said Report contains the findings of said Engineering Advisors and their recommendations, and

Whereas, The Compact Commission has examined said Report and finds that the matters and things therein found and recommended are proper and within the terms of the Rio Grande Compact, and

Whereas, the Commission has considered said Engineering Advisors' Report and all available evidence, information and material and is fully advised:

Now, Therefore, Be it Resolved:

The Commission finds as follows:

(a) That because of change of physical conditions, reliable records of the amount of water passing San Marcial are no longer obtainable at the stream gaging station at San Marcial and that the same should be abandoned for Compact purposes.

(b) That the need for concurrent records at San Marcial and San Acacia no longer exists and that the gaging station at San Acacia should be abandoned for Compact purposes.

(c) That it is desirable and necessary that the obligations of New Mexico under the Compact to deliver water in the months of July, August, September should be scheduled.

(d) That the change in gaging stations and substitution of the new measurements as hereinafter set forth will result in substantially the same results so far as the rights and obligations to deliver water are concerned, and would have existed if such substitution of stations and measurements had not been so made.

Be it Further Resolved:

That the following measurements and schedule thereof shall be substituted for the measurements and schedule thereof as now set forth in Article IV of the Compact:

"The obligation of New Mexico to deliver water in the Rio Grande into Elephant Butte Reservoir during each calendar year shall be measured by that quantity set forth in the following tabulation of relationship which corresponds to the quantity at the upper index station:

DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE
AND ELEPHANT BUTTE EFFECTIVE SUPPLY

Quantities in thousands of acre-feet

Otowi Index Supply (5)	Elephant Butte Effective Index Supply (6)
100	57
200	114
300	171
400	228
500	286
600	345
700	406
800	471
900	542
1000	621
1100	707
1200	800
1300	897
1400	996
1500	1095
1600	1195

DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE AND ELEPHANT BUTTE EFFECTIVE SUPPLY

Quantities in thousands of acre-feet

Otowi Index Supply (5)	Elephant Butte Effective Index Supply (6)
1700	1295
1800	1395
1900	1495
2000	1595
2100	1695
2200	1795
2300	1895
2400	1995
2500	2095
2600	2195
2700	2295
2800	2395
2900	2495
3000	2595

Intermediate quantities shall be computed by proportional parts.

(5) The Otowi Index Supply is the recorded flow of the Rio Grande at the U. S. G. S. gaging station at Otowi Bridge near San Ildefonso (formerly station near Buckman) during the calendar year, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi Bridge.

(6) Elephant Butte Effective Index Supply is 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.

The application of this schedule shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations;

(b) Depletion after 1929 in New Mexico of the natural runoff at Otowi Bridge; and (c) any transmountain diversions into the Rio Grande between Lobatos and Elephant Butte Reservoir."

Be it Further Resolved:

That the gaging stations at San Acacia and San Marcial be and the same are hereby abandoned for Compact purposes.

Be it Further Resolved:

That this Resolution has been passed unanimously and shall be effective January 1, 1949, if within 120 days from this date the Commissioner for each State shall have received from the Attorney General of the State represented by him, an opinion approving this Resolution, and shall have so advised the Chairman of the Commission, otherwise, to be of no force and effect.

(Note: The following paragraph appears in the Minutes of the Annual Meeting of the Commission held at Denver, Colorado, February 14-16, 1949:

"The Chairman announced that he had received, pursuant to the Resolution adopted by the Commission at the Ninth Annual Meeting on February 24, 1948, opinions from the Attorneys General of Colorado, New Mexico and Texas that the substitution of stations and measurements of deliveries by New Mexico set forth in said resolution was within the powers of the Commission").

RULES AND REGULATIONS FOR ADMINISTRATION OF THE RIO GRANDE COMPACT

A Compact, known as the Rio Grande Compact, between the states of Colorado, New Mexico and Texas, having become effective on May 31, 1939 by consent of the Congress of the United States, which equitably apportions the waters of the Rio Grande above Fort Quitman and permits each State to develop its water resources at will, subject only to its obligations to deliver water in accordance with the schedules set forth in the Compact, the following Rules and Regulations have been adopted for its administration by the Rio Grande Compact Commission; to be and remain in force and effect only so long as the same may be satisfactory to each and all members of the Commission, and provided always that on the objection of any member of the Commission, in writing, to the remaining two members of the Commission after a period of sixty days from the date of such objection, the sentence, paragraph or any portion or all of these rules to which any such objection shall be made, shall stand abrogated and shall thereafter have no further force and effect; it being the intent and purpose of the Commission to permit these rules to obtain and be effective only so long as the same may be satisfactory to each and all of the Commissioners.

GAGING STATIONS

Responsibility for the equipping, maintenance and operation of the stream gaging stations and reservoir gaging stations required by the provisions of Article II of the Compact shall be divided among the signatory states as follows:

(a) Gaging stations on streams and reservoirs in the Rio Grande Basin above the Colorado-New Mexico boundary shall be equipped, maintained, and operated by Colorado in cooperation with the United States Geological Survey.

(b) Gaging stations on streams and reservoirs in the Rio Grande Basin below Lobatos and above San Marcial shall be equipped, maintained and operated by New Mexico in cooperation with the U. S. Geological Survey; the gaging station on the Rio Grande at San Marcial shall likewise be the responsibility of New Mexico to the extent that this station is not maintained and operated by the International Boundary Commission, or some other Federal Agency.

(c) Gaging stations on Elephant Butte Reservoir and on Caballo Reservoir, and the stream gaging stations on the Rio Grande below those reservoirs shall be equipped, maintained and operated by or on behalf of Texas through the agency of the U. S. Bureau of Reclamation.

The equipment, method and frequency of measurements at each gaging station shall be sufficient to obtain records at least equal in accuracy to those classified as "good" by the U. S. Geological Survey. Water stage recorders on the reservoirs specifically named

in Article II of the Compact shall have sufficient range below maximum reservoir level to record major fluctuations in storage. Staff gages may be used to determine fluctuations below the range of the water stage recorders on these and other large reservoirs, and staff gages may be used upon approval of the Commission in lieu of water stage recorders on small reservoirs, provided that the frequency of observation is sufficient in each case to establish any material changes in water levels in such reservoirs.

RESERVOIR CAPACITIES

Colorado shall file with the Commission a table of areas and capacities for each reservoir in the Rio Grande Basin above Lobatos constructed after 1937; New Mexico shall file with the Commission a table of areas and capacities for each reservoir in the Rio Grande Basin between Lobatos and San Marcial constructed after 1929; and Texas shall file with the Commission tables of areas and capacities for Elephant Butte Reservoir and for all other reservoirs actually available for the storage of water between Elephant Butte and the first diversion to lands under the Rio Grande Project.

Whenever it shall appear that any table of areas and capacities is in error by more than five percent, the Commission shall use its best efforts to have a re-survey made and a corrected table of areas and capacities to be substituted as soon as practicable. To the end that the records of flow of the Rio Grande at San Marcial, at San Acacia, and below Elephant Butte Reservoir may be correlated, the Commission shall use its best efforts to have the rate of accumulation and the place of deposition of silt in Elephant Butte Reservoir checked at least every three years.

ACTUAL SPILL /1

(a) Water releases from Elephant Butte in excess of Project requirements, which is currently passed through Caballo Reservoir, prior to the time of spill, shall be deemed to have been Usable Water released in anticipation of spill, or Credit Water if such release shall have been authorized.

(b) Excess releases from Elephant Butte Reservoir, as defined in (a) above, shall be added to the quantity of water actually in storage in that reservoir, and Actual Spill shall be deemed to have commenced when this sum equals the total physical capacity of that reservoir, to the level of the uncontrolled spillway i.e.-2,219,000 acre feet in 1942.

(c) All water actually spilled at Elephant Butte Reservoir, or released therefrom, in excess of Project requirements, which is currently passed through Caballo Reservoir, after the time of spill, shall be considered as Actual Spill, provided that the total quantity of water then in storage in Elephant Butte Reservoir exceeds the physical capacity of that reservoir at the level of the sill of the spillway gages i.e.-1,830,000 acre feet in 1942.

/1 Adopted at Fifth Annual Meeting, February 24, 1943

(d) Water released from Caballo Reservoir in excess of Project requirements and in excess of water currently released from Elephant Butte Reservoir, shall be deemed Usable Water released, excepting only flood water entering Caballo Reservoir from tributaries below Elephant Butte Reservoir.

EVAPORATION LOSSES /2

The Commission shall encourage the equipping, maintenance and operation, in cooperation with the United States Weather Bureau or other appropriate agency, of evaporation stations at Elephant Butte Reservoir and at or near each major reservoir in the Rio Grande Basin within Colorado constructed after 1937 and in New Mexico constructed after 1929. The net loss by evaporation from a reservoir surface shall be taken as the difference between the actual evaporation loss and the evapo-transpiration losses which would have occurred naturally, prior to the construction of such reservoir. Changes in evapo-transpiration losses along stream channels below reservoirs may be disregarded.

"Net losses by evaporation, as defined above, shall be used in correcting Index Supplies for the operation of reservoirs upstream from Index Gaging Stations as required by the provisions of Article III and Article IV of the Compact".

"In the application of the provisions of the last unnumbered paragraph of Article VI of the Compact:

(a) Evaporation losses for which accrued credits shall be reduced shall be taken as the difference between the gross evaporation from the water surface of Elephant Butte Reservoir and rainfall on the same surface.

(b) Evaporation losses for which accrued debits shall be reduced shall be taken as the net loss by evaporation as defined in the first paragraph".

"In determination of Hypothetical Spill and in the application of the provisions of Article VII of the Compact, the correction for change in evaporation losses shall be taken as the difference between the gross loss by evaporation from Elephant Butte Reservoir, which would have occurred if 790,000 acre feet of usable water had been released from Project Storage each year and the corresponding losses which actually did take place."

/2 Amended at Tenth Annual Meeting, February 14, 1949.

ADJUSTMENT OF RECORDS

The Commission shall keep a record of the location, and description of each gaging station and evaporation station, and, in the event of change in location of any stream gaging station for any reason, it shall ascertain the increment in flow or decrease in flow between such locations for all stages. Wherever practicable, concurrent records shall be obtained for one year before abandonment of the previous station.

NEW OR INCREASED DEPLETIONS

In the event any works are constructed which alter or may be expected to alter the flow at any of the Index Gaging Stations mentioned in the Compact, or which may otherwise necessitate adjustments in the application of the schedules set forth in the Compact, it shall be the duty of the Commissioner specifically concerned to file with the Commission all available information pertaining thereto, and appropriate adjustments shall be made in accordance with the terms of the Compact; provided, however, that any such adjustments shall in no way increase the burden imposed upon Colorado or New Mexico under the schedules of deliveries established by the Compact.

TRANSMOUNTAIN DIVERSIONS

In the event any works are constructed for the delivery of waters into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande Basin, such waters shall be measured at the point of delivery into the Rio Grande Basin and proper allowances shall be made for losses in transit from such points to the Index Gaging Station on the stream with which the imported waters are comingled.

QUALITY OF WATER

In the event that delivery of water is made from the Closed Basin into the Rio Grande, sufficient samples of such water shall be analyzed to ascertain whether the quality thereof is within the limits established by the Compact.

SECRETARY a/

The Commission, subject to the approval of the Director, U. S. Geological Survey, to a cooperative agreement for such purposes, shall employ the U. S. Geological Survey on a yearly basis, to render such engineering and clerical aid as may reasonably be necessary for administration of the Compact.

Said agreement shall provide that the Geological Survey shall:

(1) Collect and correlate all factual data and other records having a material bearing on the administration of the Compact and keep each Commissioner advised thereof.

a/ The Substitution of this section for the section titles "Reports to Commissioners" was adopted at Tenth Annual Meeting, February 22, 1948.

(2) Inspect all gaging stations required for administration of the Compact and make recommendations to the Commission as to any changes or improvements in methods of measurement or facilities for measurement which may be needed to insure that reliable records be obtained.

(3) Report to each Commissioner by letter on or before the fifteenth day of each month, except January a summary of all hydrographic data then available for the current year - on forms prescribed by the Commission - pertaining to:

(a) Deliveries by Colorado
(b) Deliveries by New Mexico
(c) Operation of Project Storage

(4) Make such investigations as may be requested by the Commission in aid of its administration of the Compact.

(5) Act as Secretary to the Commission and submit to the Commission at its regular meeting in February a report on its activities and a summary of all data needed for determination of debits and credits and other matters pertaining to administration of the Compact.

COSTS

In February of each year the Commission shall adopt a budget for the ensuing fiscal year beginning July first.

Such budget shall set forth the total cost of maintenance and operating of gaging stations, of evaporation stations, the cost of engineering and clerical aid, and all other necessary expenses excepting the salaries and personal expenses of the Rio Grande Compact Commissioners.

Contributions made directly by the United States and the cost of services rendered by the United States without cost shall be deducted from the total budget amount; the remainder shall then be allocated equally to Colorado, New Mexico and Texas.

Expenditures made directly by any State for purposes set forth in the budget shall be credited to that state; contributions in cash or in services by any State under a cooperative agreement with any Federal agency shall be credited to such state, but the amount of the Federal contribution shall not so be credited; in event any State, through contractual relationships, causes work to be done in the interest of the Commission, such State shall be credited with the cost thereof, unless such cost is borne by the United States.

The Secretary shall present to each participating state through the Commissioner of such State, a certified statement of one-third of the cost of his salary, traveling expense, the expense incident to the maintenance of the offices of the Commission, and such Commissioner shall arrange for the prompt payment thereof by the appropriate agency of his state.

The Commissioner of each state shall report at the annual meeting each year the amount of money expended during the year by the state which he represents, as well as the portion thereof contributed by all cooperating federal agencies, and the Commission shall arange for such proper reimbursement in cash or credits between states as may be necessary to equalize the contributions made by each state in the equipment, maintenance and operation of all gaging stations authorized by the Commission and established under the terms of the Compact.

It shall be the duty of each Commissioner to endeavor to secure from the Legislature of his state an appropriation of sufficient funds with which to meet the obligations of his state, as provided by the Compact.

MEETING OF COMMISSION

The Commission shall meet in February of each year for the consideration and adoption of the annual report for the calendar year preceeding, and for the transaction of any other business consistent with its authority. The annual meeting in 1940 shall be held at Monte Vista, Colorado, and thereafter rotate alphabetically according to the states, the place in each state to be designated by the Commissioner from that state. Other meetings as may be deemed necessary shall be held at any time and place set by mutual agreement, for the consideration of data collected and for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approved by the Commissioner from each of the three signatory States.

(Signed) M. C. HINDERLIDER

M. C. Hinderlider
Commissioner for Colorado

(Signed) THOMAS M. McCLURE

Thomas M. McClure
Commissioner for New Mexico

(Signed) JULIAN P. HARRISON

Julian P. Harrison
Commissioner for Texas

Adopted: December 19, 1939

RECORDS OF DELIVERIES AND RELEASES

At the Annual Meeting of the Commission in February of each year, the records of actual and scheduled deliveries and releases and the computations of debits and credits for the year just ended are examined and adopted as official. Those records and computations for 1949 approved and adopted by the Commission are shown on the next three pages.

The obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico state line was computed as prescribed in Article III of the Compact, the delivery at the state line was obtained from records of stream flow adjusted as prescribed in Article III. The Reduction of Credits, item C6, is prescribed in Article VI of the Compact and was computed in accordance with the provisions of the Rules and Regulations.

At the end of the year the obligation of New Mexico to deliver water to Elephant Butte reservoir was computed as prescribed in the Resolution of the Commission adopted at the Tenth Annual Meeting and set forth on Page ; the actual delivery was computed from actual stream flow record and record of operation of Elephant Butte Reservoir, and was adjusted as prescribed in Article IV of the Compact. Item N M 4, Reduction of Debits by Evaporation, is in accordance with the last paragraph of Article VI and the Rules and Regulations.

During the past four years the annual release from Project Storage has been less than the normal release of 790,000 acre-feet as stated in the Compact. The actual release during the year was measured at stream flow stations below Caballo Dam; the Actual Net Evaporation Loss in Year and Evaporation Loss if No Departure were both computed as provided in Article VI of the Compact and the Rules and Regulations.

RIO GRANDE COMPACT

DELIVERIES BY COLORADO AT STATE LINE

YEAR 1949

Quantities in Thousands of Acre Feet to Nearest Hundred

MONTH	CONEJOS INDEX SUPPLY										RIO GRANDE INDEX SUPPLY								DELIVERIES			
	MEASURED FLOW				ADJUSTMENTS				SUPPLY			ADJUSTMENTS					SUPPLY					
	CONEJOS AT MOGOTE	LOS PINOS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE	OTHER ADJUSTMENTS	NET ADJUSTMENT	SUPPLY IN MONTH	ACCUMULATED TOTAL	RECORDED FLOW NEAR DEL NORTE	STORAGE AT END OF MONTH	CHANGE IN STORAGE	TRANSMOUNTAIN DIVERSIONS	OTHER ADJUSTMENTS	NET ADJUSTMENT	SUPPLY IN MONTH	ACCUMULATED TOTAL	CONEJOS RIVER AT MOUTH NEAR LOS SAUCES	RIO GRANDE LESS CONEJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	———	———	———	———	0	———	———	———	———	———	———	0.3	———	———	———	———	———	———	———	———	———	———
JAN	3.1	———	———	3.1	0	0	—	0	3.1	3.1	11.4	.3	0	0	—	0	11.4	11.4	2.9	14.4	17.3	17.3
FEB	2.5	———	———	2.5	0	0	—	0	2.5	5.6	10.7	.3	0	0	—	0	10.7	22.1	3.3	13.0	16.3	33.6
MAR	4.1	———	———	4.1	0	0	—	0	4.1	9.7	16.7	.3	0	0	—	0	16.7	38.8	3.5	21.4	24.9	58.5
APR	20.7	12.5	7.2	40.4	0	0	—	0	40.4	50.1	53.7	.3	0	0	—	0	53.7	92.5	7.9	15.4	23.3	81.8
MAY	69.0	47.1	13.8	129.9	0	0	—	0	129.9	180.0	166.7	.4	+ 0.1	0	—	+ .1	166.8	259.3	53.0	35.6	88.6	170.4
JUN	114.7	28.6	1.7	145.0	0	0	—	0	145.0	325.0	346.3	.4	0	0	—	0	346.3	605.6	81.0	175.5	256.5	426.9
JUL	47.9	7.3	.4	55.6	0	0	—	0	55.6	380.6	156.5	.4	0	0	—	0	156.5	762.1	14.7	71 3	86.0	512.9
AUG	10.7	1.6	0	12.3	0	0	—	0	12.3	392.9	80.5	.4	0	0	—	0	80.5	842.6	.8	9.7	10.6	523.5
SEPT	5.1	1.0	0	6.1	0	0	—	0	6.1	399.0	27.6	.3	- 0.1	0	—	- .1	27.5	870.1	.9	4.7	5.6	529.1
OCT	5.0	1.3	.1	6.4	0	0	—	0	6.4	405.4	21.8	.3	0	0	—	0	21.8	891.9	1.0	6.6	7.6	536.7
NOV	3.7	———	———	3.7	0	0	—	0	3.7	409.1	16.2	.3	0	0	—	0	16.2	908.1	2.1	14.6	16.7	553.4
DEC	2.4	———	———	2.4	0	0	—	0	2.4	411.5	11.4	.3	0	0	—	0	11.4	919.5	2.9	16.4	19.3	572.7
YEAR	288.9	99.4	23.2	411.5	———	0		0	411.5	———	919.5	———	0	0			919.5	———	174.0	398.6	572.7	———

REMARKS:

SUMMARY OF DEBITS AND CREDITS

	ITEM	DEBIT	CREDIT	BALANCE
C1	Balance at Beginning of Year	———	———	Cr. 130.1
C2	Scheduled Delivery from Conejos River	198.1	———	Dr. 68.0
C3	Scheduled Delivery from Rio Grande	352.6	———	Dr. 420.6
C4	Actual Delivery at Lobatos plus 10 000 Acre Feet	———	582.7	Cr. 162.1
C5	Reduction of Debits % Evaporation	———	0	Cr. 162.1
C6	Reduction of Credits % Evaporation	17.4	———	Cr. 144.7
C7		———	———	144.7
C8	Balance at End of Year			

RIO GRANDE COMPACT

DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE

001284

YEAR 1949

Quantities in Thousands of Acre Feet to Nearest Hundred

MONTH	NATURAL FLOW AT OTOWI BRIDGE							TOTAL WATER STORED IN NEW MEXICO ABOVE SAN MARCIAL AT END OF MONTH	ELEPHANT BUTTE EFFECTIVE SUPPLY					
	RECORDED FLOW AT OTOWI BRIDGE	STORAGE IN RESERVOIRS LOCATED TO OTOWI			OTHER ADJUSTMENTS PER ARTICLE III	OTOWI INDEX SUPPLY			STORAGE IN ELEPHANT BUTTE RESERVOIR		RECORDED FLOW BELOW ELEPHANT BUTTE DAM	ADJUSTMENT OF MEASUREMENTS	ACTUAL EFFECTIVE SUPPLY	
		TOTAL AT END OF MONTH	CHANGE GAIN (+) LOSS (-)	EVAPORATION DURING MONTH		DURING MONTH (2+4+5+6)	ACCUMULATED TOTAL		AT END OF MONTH	CHANGE GAIN (+) LOSS (-)			DURING MONTH (11+12+13)	ACCUMULATED TOTAL
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	—	142.7	—	—	—	—	0	145.6	492.0	—	—		—	0
JAN	36.3	145.8	+ 3.1	0	—	39.4	39.4	148.5	496.1	+ 4.1	32.3	—	36.4	36.4
FEB	76.6	99.9	- 45.9	0	—	30.7	70.1	102.7	517.3	+ 21.2	31.2	—	52.4	88.8
MAR	136.3	17.5	- 82.4	.2	—	54.1	124.2	20.4	530.5	+ 13.2	95.3	—	108.5	197.3
APR	102.7	103.2	+ 85.7	.3	—	188.7	312.9	107.2	508.3	- 22.2	89.6	—	67.4	264.7
MAY	235.0	200.2	+ 97.0	.7	—	332.7	645.6	204.1	570.7	+ 62.4	104.2	—	166.6	431.3
JUN	366.0	199.2	- 1.0	.6	+ 0.1 a/	365.7	1,011.3	202.6	709.9	+ 139.2	100.9	—	240.1	671.4
JUL	158.7	196.3	- .9	.7	—	158.5	1,169.8	201.6	793.3	+ 83.4	83.1	—	166.5	837.9
AUG	50.6	182.4	- 15.9	.9	—	35.6	1,205.4	185.5	746.8	- 46.5	63.8	—	17.3	855.2
SEPT	43.9	166.2	- 16.2	.6	—	28.3	1,233.7	168.9	714.0	- 32.8	52.6	—	19.8	875.0
OCT	36.6	158.7	- 7.5	.4	—	29.5	1,263.2	161.1	663.9	- 50.1	51.4	—	1.3	876.3
NOV	38.5	158.7	0	.3	—	38.8	1,302.0	161.3	639.8	- 24.1	54.6	—	30.5	906.8
DEC	41.4	159.9	+ 1.2	.1	—	42.7	1,344.7	162.7	621.0	- 18.8	54.5	—	35.7	942.5
YEAR	1,322.6	—	+ 17.2	4.8	+ 0.1 a/	1,344.7	—	—	—	+ 129.0	813.5	—	942.5	—

REMARKS: a/ Stock tanks.

SUMMARY OF DEBITS AND CREDITS

	ITEM	DEBIT	CREDIT	BALANCE
NM 1	Balance at Beginning of Year	—	—	Dr. 286.4
NM 2	Scheduled Delivery at Elephant Butte	941.3	—	Dr. 1227.7
NM 3	Actual Elephant Butte Effective Supply	—	942.5	Dr. 285.2
NM 4	Reduction of Debits % Evaporation	—	4.8	Dr. 280.4
NM 5	Reduction of Credits % Evaporation	0	—	Dr. 280.4
NM 6				
NM 7				
NM 8	Balance at End of Year	—	—	Dr. 280.4

RIO GRANDE COMPACT

RELEASE AND SPILL FROM PROJECT STORAGE

YEAR 1949

Quantities in Thousands of Acre Feet to Nearest Hundred

MONTH	TOTAL PROJECT STORAGE CAPACITY AVAILABLE AT END OF MONTH a/	USABLE WATER IN STORAGE			UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH	CREDIT WATER IN STORAGE			FLOOD WATER IN STORAGE IN CABALLO RESERVOIR AT END OF MONTH	TOTAL WATER IN PROJECT STORAGE AT END OF MONTH	RIO GRANDE BELOW CABALLO DAM							
		ELEPHANT BUTTE RESERVOIR	CABALLO RESERVOIR	TOTAL AT END OF MONTH		COLORADO CREDIT WATER	NEW MEXICO CREDIT WATER	TOTAL AT END OF MONTH			MEASURED FLOW AT CABALLO GAGING STATION	INTERVENING DIVERSIONS TO CANALS	TOTAL RELEASE AND SPILL	SPILL FROM STORAGE			USABLE RELEASE	
														CABALLO FLOOD WATER	CREDIT WATER	USABLE WATER	NET DURING MONTH	ACCUMULATED TOTAL
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2,530.0	361.9	99.5	461.4	2,068.6	130.1	0	130.1	0	591.5	———	———	———	———	———	———	———	0
JAN	2,530.0	366.0	130.5	496.5	2,033.5	130.1	0	130.1	0	626.6	0.2	0	0.2	0	0	0	0.2	0.2
FEB	2,530.0	387.2	158.6	545.8	1,984.2	130.1	0	130.1	0	675.9	.1	0	.1	0	0	0	.1	.3
MAR	2,530.0	400.4	161.7	562.1	1,967.9	130.1	0	130.1	0	692.2	94.8	.1	94.9	0	0	0	94.9	95.2
APR	2,530.0	378.2	149.0	527.2	2,002.8	130.1	0	130.1	0	657.3	101.1	.2	101.3	0	0	0	101.3	196.5
MAY	2,530.0	440.6	163.6	604.2	1,925.8	130.1	0	130.1	0	734.3	86.1	.1	86.2	0	0	0	86.2	282.7
JUN	2,530.0	579.8	149.1	728.9	1,801.1	130.1	0	130.1	0	859.0	113.2	.1	113.3	0	0	0	113.3	396.0
JUL	2,530.0	663.2	103.3	766.5	1,763.5	130.1	0	130.1	0	896.6	134.5	.1	134.6	0	0	0	134.6	530.6
AUG	2,530.0	616.7	41.6	658.3	1,871.7	130.1	0	130.1	0	788.4	129.2	.3	129.5	0	0	0	129.5	660.1
SEPT	2,530.0	583.9	67.9	651.8	1,878.2	130.1	0	130.1	0	781.9	31.6	0	31.6	0	0	0	31.6	691.7
OCT	2,530.0	533.8	103.1	636.9	1,893.1	130.1	0	130.1	0	767.0	13.0	.1	13.1	0	0	0	13.1	704.8
NOV	2,530.0	509.7	147.0	656.7	1,873.3	130.1	0	130.1	0	786.8	6.0	0	6.0	0	0	0	6.0	710.8
DEC	2,530.0	490.9	194.7	685.6	1,844.4	130.1	0	130.1	0	815.7	2.4	0	2.4	0	0	0	2.4	713.2
YEAR	———	———	———	———	———	———	———	———	———	———	712.2	1.0	713.2	0	0	0	713.2	———

REMARKS: a/ Estimated siltation since last survey 13,500 A. F.; Capacity last year 2,543,500 A.F.

ACCRUED DEPARTURE FROM NORMAL RELEASE

	ITEM	DEBIT	CREDIT	BALANCE
P1	Accrued Departure at Beginning of Year	———	———	Dr. 63.9
P2	Actual Release during Year	713.2	———	Dr. 777.1
P3	Normal Release for Year	———	790.0	Cr. 12.9
P4	Actual Evaporation from Elephant Butte Reservoir	146.8	———	Dr. 133.9
P5	Evaporation Loss if No Accrued Departure	———	148.2	Cr. 14.3
P6				
P7	Accrued Departure at End of Year	———	———	Cr. 14.3

TIME OF HYPOTHETICAL SPILL: Did not occur.

WATER SUPPLY

The very large accumulation of snow in the mountainous headwater areas of the Rio Grande and tributaries resulted in an larger than normal run-off, the total discharge approximating that of 1948.

The year was notable for the change from a wet winter and spring to a dry fall and early winter particularly in New Mexico where the precipitation was below normal from August to December.

Accuracy of Records

The Rules and Regulations of the Commission state that the equipment, method and frequency of measurements at each gaging station shall be sufficient to obtain records at least equal in accuracy to those classified as "good" by the U. S. Geological Survey. Within the physical limitations of stream gaging the agencies obtaining records at Compact gaging stations have complied with these regulations.

Each station description includes a statement in regard to the accuracy of the records. "Excellent" indicates that, in general, the daily records are accurate within 5 percent; "good", within 10 per cent; "fair", within 15 per cent; "poor", 16 or greater per cent. These standards of accuracy are the same as those followed by the U. S. Geological Survey.

Acknowledgements.

Water supply data contained in the following pages of this report have been supplied by Federal and State agencies, and by several individuals.

The office of the State Engineer of Colorado furnished records of discharge for the following:

Rio Grande near Del Norte, Colorado.
Rio Grande near Lobatos, Colorado.
Conejos River near Mogote, Colorado.
Conejos River near Los Sauces, Colorado.
San Antonio River at Ortiz, Colorado.
Los Pinos River near Ortiz, Colorado.

Records of storage in Troutvale Reservoir No. 2, Squaw Lake and Fuchs Reservoirs were supplied by the Colorado Special Deputy State Engineer at Monte Vista, Colorado with the cooperation of the respective owners viz: Earl Brown, Craton Sanderson and Fred Fuchs.

Records of Transmountain Diversions were supplied by the Colorado Special Deputy State Engineer at Monte Vista, Colorado with the cooperation of the owners, viz: Craton Sanderson, the Underwood Estate, George and Harley Fuchs, Leon Raber and Frank Lohr.

The U. S. Geological Survey in cooperation with the New Mexico Interstate Streams Commission furnished the following records:

Rio Grande at Otowi Bridge near San Ildefonso, New Mexico.
Rio Chama below El Vado Dam near Tierra Amarilla, New Mexico.
Storage in Carson Reservoir near Stong, New Mexico.
Storage in Nichols Reservoir near Santa Fe, New Mexico.

The U. S. Geological Survey in cooperation with the New Mexico Interstate Stream Commission and the Middle Rio Grande Conservancy District furnished the record of storage in El Vado Reservoir near Tierra Amarilla, New Mexico.

The New Mexico Power Company at Santa Fe, New Mexico cooperated in furnishing the record of storage in McClure (Granite Point) Reservoir near Santa Fe, New Mexico.

The United Pueblos Agency, Albuquerque, New Mexico, furnished the records of storage in:

Acomita Reservoir near San Fidel, New Mexico.
New Laguna Reservoir at Laguna, New Mexico.
Paguate Reservoir near Laguna, New Mexico.

The U. S. Bureau of Reclamation, El Paso, Texas, furnished the following records:

Discharge of Rio Grande below Elephant Butte Dam, New Mexico.
Discharge of Rio Grande below Caballo Dam, New Mexico.
Storage in Elephant Butte Reservoir.
Storage in Caballo Reservoir.

The Rio Grande Compact Commission acknowledges the cooperation received from these agencies and individuals.

MONTHLY SUMMARY OF DISCHARGE

RIO GRANDE NEAR DEL NORTE, COLORADO

Location.- Water stage recorder in Sec. 29, T. 40 N., R. 5 E., 5 miles upstream from Pinos Creek, and 6 miles west of Del Norte, at State Bridge. From 1889 to September 1907, station maintained at site 4 miles downstream. Records are comparable.

Drainage Area.- 1,320 square miles. Zero of gage is 7,982.21 feet above mean sea level, datum of 1929.

Records available.- October 11, 1889 to December 31, 1949.

Extremes.- Maximum discharge during year, 10,000 second-feet June 19 (gage height 6.16 feet); minimum daily discharge 140 second-feet December 3.

1889-1949: Maximum discharge 18,000 second-feet October 5, 1911 (from rating curve extended above 6,000 second-feet); minimum daily, 88 second-feet December 20, 1945.

Remarks.- Records considered excellent above 350 second-feet and good below, except those for period of ice effect, January 1-March 24, December 2-31, which were computed on basis of 8 discharge measurements, weather records, and are fair. Diversions for irrigation above station, total capacity 117,600 acre-feet, and by several smaller ones.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	5,775	210	155	186	11,450
February	5,372	230	160	192	10,660
March	8,399	380	195	271	16,660
April	27,058	2,300	235	902	53,670
May	84,030	3,920	1,800	2,711	166,700
June	174,570	9,750	3,310	5,819	346,300
July	78,910	4,670	1,420	2,545	156,500
August	40,590	1,740	1,030	1,309	80,510
September	13,916	1,030	332	464	27,600
October	10,994	416	302	355	21,810
November	8,185	314	230	273	16,230
December	5,773	215	140	186	11,450
Year 1949	463,572	9,750	140	1,270	919,500

RIO GRANDE NEAR LOBATOS, COLORADO

Location.- Water stage recorder in Sec. 22, T. 33 N., R. 11 E., 6 miles north of Colorado-New Mexico State line, 7 miles downstream from Culebra Creek, at highway bridge 10 miles east of Lobatos.

Drainage Area.- 7,700 square miles (includes 2,940 square miles in closed basin). Zero of gage is 7,426.79 feet above mean sea level, datum of 1929.

Records Available.- June 1899 to September 1913 and October 1933 to December 1949 in reports of Geological Survey. June 1899 to December 1949 in reports of State Engineer.

Extremes.- Maximum discharge during year 9,330 second-feet June 22 (gage height 7.68 feet); minimum daily discharge 78 second-feet September 23,24.

1899-1949: Maximum discharge 13,100 second-feet June 8, 1905, from rating curve extended above 8,000 second-feet; minimum daily discharge 5.0 second-feet August 4, 1940.

Remarks.- Records considered excellent above 100 second-feet and good below except those for periods of ice effect January 1 to March 9 and December 4-31, which were computed on basis of 6 discharge measurements, weather records, and are fair. Diversions for irrigation above station. Flow regulated by many reservoirs on headwaters.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	8,705	310	248	281	17,270
February	8,222	400	255	294	16,310
March	12,559	510	211	405	24,910
April	11,742	1,090	219	391	23,290
May	44,654	2,410	951	1,440	88,570
June	129,333	9,110	973	4,311	256,500
July	43,340	4,000	268	1,398	85,960
August	5,323	276	86	172	10,560
September	2,819	106	78	94.0	5,590
October	3,826	159	86	123	7,590
November	8,444	401	119	281	16,750
December	9,726	384	215	314	19,290
Year 1949	288,693	4,000	78	791	572,600

RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, NEW MEXICO

Location.- Water-stage recorder, lat. 35°52'25", long. 106°08'35", in San Ildefonso Pueblo Grant, 250 feet downstream from highway bridge, 1 3/4 miles south west of San Ildefonso Pueblo, 2½ miles downstream from Rio Pojoaque and 7 miles west of Pojoaque. Datum of gage is 5,488.48 feet above mean sea level, datum of 1929.

Drainage area.- 14,300 square miles (includes 2,940 square miles in closed basin in northern part of San Juan Valley, Colorado).

Records available.- February 1895 to December 1905, June 1909 to December 1949.

Extremes.- Maximum discharge during year 10,700 second-feet June 23, 1941 (gage height 8.56 feet); minimum daily 373 second-feet October 8

1931-1949: Maximum discharge 22,500 second-feet May 16, 1941; maximum gage height, 13.70 feet May 14, 1941; minimum daily discharge, 128 second-feet June 21, 1934.

Remarks.- Records good except those for periods of no gage height record, which are fair. Flow partly regulated by El Vado Reservoir. Diversion above station for irrigation.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	18,303	692	391	590	36,300
February	38,633	2,420	553	1,380	76,630
March	68,730	2,600	1,200	2,217	136,300
April	51,783	3,580	818	1,726	102,700
May	118,490	5,080	2,600	3,822	235,000
June	184,540	10,200	3,360	6,151	366,000
July	80,000	5,440	1,050	2,581	158,700
August	25,520	1,480	423	823	50,620
September	22,126	2,150	391	738	43,890
October	18,476	1,280	373	596	36,650
November	19,397	775	515	647	38,470
December	20,868	799	431	673	41,390
Year 1949	666,866	10,200	373	1,827	1,323,000

RIO GRANDE BELOW ELEPHANT BUTTE DAM, NEW MEXICO

Location.- Water-stage recorder, lat. 33°09'05", long. 107°12'10", in NE¼ sec. 25, T.13 S., R. 4 W. (projected), 3,800 feet downstream from Elephant Butte Dam.

Records available.- October 1916 to December 1949.

Average discharge.- 33 years, 1,188 second-feet.

Extremes.- Maximum daily discharge during year, 2,020 second-feet May 22, 1942; no flow at times.

Remarks.- Records good. Many diversions above station for irrigation. Flow regulated by Elephant Butte Reservoir.

Cooperation.- Records for January to November furnished by U. S. Bureau of Reclamation. Station maintained by U. S. Geological Survey after November 30.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	16,311	780	87	526	32,350
February	15,761	867	204	563	31,260
March	48,048	2,020	548	1,550	95,300
April	45,190	1,970	1,320	1,506	89,630
May	52,530	1,940	1,040	1,695	104,200
June	50,860	1,920	1,350	1,695	100,900
July	41,893	1,640	993	1,351	83,090
August	32,147	1,350	718	1,037	63,760
September	26,503	1,060	572	883	52,570
October	25,896	1,260	517	835	51,360
November	27,513	1,140	648	917	54,570
December	27,479	1,040	645	886	54,500
Year 1949	410,131	2,020	87	1,124	813,490

MONTHLY SUMMARY OF DISCHARGE

RIO GRANDE BELOW CABALLO DAM, NEW MEXICO

Location.- Water-stage recorder, lat. 32°53'05", long. 107°17'30" in NE¼ SW¼ sec. 30 T. 16 S., R. 4 W., 600 feet upstream from Bojarques bridge, 4,200 feet downstream from Caballo Dam, 1 1/3 miles upstream from Percha diversion dam, 3 miles northeast of Arrey and 5 miles south of Caballo. Datum of gage is 4,140.9 feet above mean sea level. Prior to January 1, 1946 at datum 5.00 feet higher.

Records available.- January 1938 to December 31, 1949.

Extremes.- Maximum daily discharge during year, 2,830 second-feet April 1; minimum daily discharge 2.1 second-feet January 17 and February 4-13, 15-25.

1938-49: Maximum daily discharge 7,650 second-feet May 20, 1942; minimum daily discharge 1.3 second-feet November 18-21, December 12-27, 1940.

Remarks.- Records good. Considerable diversion above station for irrigation. Flow regulated by Caballo Reservoir.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	78.7	2.9	2.1	2.5	160
February	60.2	2.5	2.1	2.2	120
March	47,812	2,800	2.5	1,542	94,830
April	50,970	2,830	1060	1,699	101,100
May	43,400	1,760	1000	1,400	86,080
June	57,090	2,380	1180	1,903	113,240
July	67,810	2,760	1,610	2,187	134,500
August	65,110	2,480	1,640	2,100	129,140
September	15,947.6	1,980	2.3	532	31,630
October	6,576.2	832	2.3	212	13,040
November	3,021.6	653	2.9	101	5,990
December	1,209.1	446	3.1	39.0	2,400
Year 1949	359,085.4	2,830	2.1	984	712,230

BONITA DITCH BELOW CABALLO DAM, NEW MEXICO.

Location.- Diverts directly from the reservoir for the irrigation of lands on the right bank of the river. The total release from Project Storage, as used in computations of the Compact Commission, is the combined flow of Bonita Ditch and Rio Grande below Caballo Dam.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	–	–	–	–	0
February	–	–	–	–	0
March	–	–	–	–	109
April	–	–	–	–	195
May	–	–	–	–	139
June	–	–	–	–	126
July	–	–	–	–	65
August	–	–	–	–	314
September	–	–	–	–	9
October	–	–	–	–	44
November	–	–	–	–	0
December	–	–	–	–	0
Year 1949	–	–	–	–	1001

MONTHLY SUMMARY OF DISCHARGE

CONEJOS RIVER NEAR MOGOTE, COLORADO

Location.- Water stage recorder, lat. 37°03', long. 106°, in SE¼ sec. 34, T. 33 N., R. 7 E., three quarters of a mile downstream from Fox Creek and 5½ miles west of Mogote.

Drainage Area.- 282 square miles.

Records Available.- September 1899 to March 1900; April 1903 to October 1905 at site one mile downstream; March 1907 to October 1911 at site 3 miles upstream; January 1912 to December 1949 at present site.

Extremes.- Maximum discharge during year, 3410 second-feet June 19 (gage height 5.20 feet); minimum daily discharge 30 second-feet, December 11.

1899-1900, 1903-05, 1907-49: Maximum discharge 9,000 second-feet October 5, 1911 (gage height 8.50 feet, site and datum then in use), from rating curve extended above 3,500 second-feet; minimum discharge 18 second-feet (discharge measurement) December 19, 1939.

Remarks.- Records considered good. No diversion regulations above station.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	1,573	58	42	50.7	3,120
February	1,267	55	42	45.2	2,510
March	2,085	107	47	67.3	4,140
April	10,446	935	56	348	20,720
May	34,768	1,850	584	1,122	68,960
June	57,780	3,070	1,210	1,926	114,600
July	24,163	1,510	338	779	47,930
August	5,399	377	83	174	10,710
September	2,545	161	61	84.8	5,050
October	2,500	117	64	80.6	4,960
November	1,879	74	51	62.6	3,730
December	1,224	55	30	39.5	2,430
Year 1949	145,629	3,070	30	399	288,900

CONEJOS RIVER NEAR LA SAUCES, COLORADO

Location.- Two water-stage recorders (two channels), lat. 37°23', long. 105°45', in sec. 2, T. 35 N., R. 11 E., half a mile upstream from mouth and 2 miles north of La Sauces. Datum of gage (north channel) is 7,495.02 feet above mean sea level (Colorado State Highway Department bench mark.)

Drainage Area.- 887 square miles.

Records Available.- March 1921 to December 1949.

Extremes.- Maximum discharge during year 2,690 second-feet June 20; minimum daily discharge 1.6 second-feet Aug. 5.

1921-1949: Maximum discharge 3,890 second-feet May 15, 1941; no flow July 21 to September 8, 1934.

Remarks.- Records considered good. Diversions for irrigation above station.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	1,464	52	42	47.2	2,900
February	1,666	77	50	59.5	3,300
March	1,744	76	41	56.3	3,460
April	4,003	554	46	133	7,940
May	26,733	1,410	402	862	53,020
June	40,832	2,540	583	1,361	80,990
July	7,412	599	22	239	14,700
August	376.6	15	1.6	12.1	747
September	468	28	10	15.6	928
October	529	24	11	17.1	1,050
November	1,059	45	10	35.3	2,100
December	1,458	54	41	47.6	2,890
Year 1949	87,744.6	2,540	1.6	240	174,000

MONTHLY SUMMARY OF DISCHARGE

SAN ANTONIO RIVER AT ORTIZ, COLORADO

Location.- Water-stage recorder, lat. 37°00', long. 106°02', in New Mexico, in sec. 19, T. 32 N., R. 9 E., a quarter of a mile south of Colorado-New Mexico State line, half a mile south of Ortiz and half a mile upstream from Los Pinos Creek.

Drainage Area.- 110 square miles.

Records Available.- January to October 1915, May to October 1920, October 1924 to December 1949.

Extremes.- Maximum discharge during year, 520 second-feet May 12 (gage height 3.19 feet); no flow at times.

1915, 1919-20, 1924-49: Maximum discharge, 1,750 second-feet April 15, 1937 (gage height 5.36 feet), from rating curve extended above 1,100 second-feet; no flow at times.

Remarks.- Records considered good above 20 second-feet and fair below. A few small diversions above station for irrigation.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	62.0	–	–	2.0	123
February	112.0	–	–	4.0	222
March	248.0	–	–	8.0	492
April	3,609	369	13	120	7,160
May	6,943	435	77	224	13,770
June	862.8	82	4.6	28.8	1,710
July	180.8	38	.8	5.83	359
August	20.6	5.8	0	.66	41
September	.6	.2	0	.02	1.2
October	70.8	4.6	0	2.28	140
November	151.7	7.6	2.5	5.06	301
December	55.8	–	–	1.8	111
Year 1949	12,317.1	435	0	33.7	24,430

LOS PINOS RIVER NEAR ORTIZ, COLORADO

Location.- Water-stage recorder, lat. 36°58', long. 106°03', in New Mexico, in N½ sec. 34, T. 32 N., R. 8 E., 1 mile south of Colorado-New Mexico State line, 2 miles southwest of Ortiz and 2½ miles upstream from mouth.

Drainage Area.- 167 square miles.

Records Available.- January 1914 to November 1920, October 1924 to December 1947. (No winter records most years).

Extremes.- Maximum discharge during year, 1,620 second-feet May 15 (gage height 4.57 feet); minimum daily 11 second-feet September 8 and 9.

1914-20, 1924-1949: Maximum discharge 3,160 second-feet May 12, 1941; minimum 5 second-feet August 11, September 19, 1934.

Remarks.- Records considered good except those during periods of ice effect January 1 to March 18, December 1-31, which were computed on basis of 7 discharge measurements and weather records and are fair. Diversions for irrigation above station.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	403	–	–	13	799
February	420	–	–	15	833
March	812	45	16	26.2	1,610
April	6,312	790	29	210	12,520
May	23,745	1,200	491	766	47,100
June	14,428	663	236	481	28,620
July	3,675	266	47	119	7,290
August	798	69	12	25.7	1,580
September	506	38	11	16.9	1,000
October	676	27	16	21.8	1,340
November	680	33	15	22.7	1,350
December	474	–	–	15.3	940
Year 1949	52,929	1,200	–	145	104,982

MONTHLY SUMMARY OF DISCHARGE

RIO CHAMA BELOW EL VADO DAM, NEW MEXICO

Location.- Water-stage recorder, lat. 36°34'50", long. 106°43'30", in NW¼ sec. 15, T. 27 N., R. 2 E., (projected), 1.5 miles downstream from El Vado Dam, 217 miles upstream from Rio Nutrias and 13 miles southwest of Tierra Amarilla.

Records available.- October 1935 to December 1949.

Extremes.- Maximum discharge during year, 2,940 second-feet June 19 (gage height 5.20 feet); minimum daily 6.2 second feet April 10-12.

1935-49: Maximum discharge 6,010 second-feet May 17, 1941 (gage height 6.89 feet); maximum gage height 9.63feet May 30, 1937, site and datum then in use; minimum daily discharge, 0.9 secondfeet Dec. 30, 1946.

Remarks.- Records good above 10 second-feet, fair below. Diversions above station for irrigation. Flow regulated by El Vado Reservoir.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	374	13	11	12.1	742
February	20,736	1,480	10	741	41,130
March	39,670	1,430	618	1280	78,680
April	3,088.0	1,200	6.2	103	6,120
May	22,849.4	2,270	8.2	737	45,320
June	34,355	1,850	410	1145	68,140
July	9,392	435	222	303	18,630
August	11,301	1,510	151	365	22,420
September	8,309	1,500	59	277	16,480
October	5,498	824	48	177	10,910
November	1,410	50	44	47.0	2,800
December	658	44	12	21.2	1,310
Year 1949	157,640.4	2,270	6.2	432	312,700

SANTA FE CREEK NEAR SANTA FE, NEW MEXICO

Location.- Water-stage recorder and concrete control, lat. 35°41'15", long. 105°50'35", in NE¼SE¼ sec. 23, T. 17 N., R. 10 E., about 0.4 mile downstream from McClure Dam (name changed) and 5½ miles east of Santa Fe. Prior to October 1, 1947 at site 0.3 mile upstream at different datum.

Records available.- May to June 1910 at site 3 miles downstream. January 1910 to December 1949.

Extremes.- Maximum daily discharge during year 44 second-feet June 11 (gage height 2.49 feet); minimum daily 1.2 second feet in February and March.

1930-49: Maximum discharge, 418 second-feet April 23, 1942 (gage height 3.51 feet, site and datum then in use) from rating curve extended above 150 second-feet; minimum daily, 0.2 second-feet Dec. 3-14, 16-29, 1943.

Remarks.- Records good except those for periods of no gage height record, which are fair. Flow regulated by McClure Reservoir. No diversion above station.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	52.8	1.8	1.7	1.70	105
February	42.4	1.7	1.2	1.51	84
March	41.8	1.8	1.2	1.35	83
April	242.0	4.1	1.7	8.07	480
May	905	41	20	29.2	1,800
June	785	44	20	26.2	1,560
July	221.3	20	3.0	7.14	439
August	392	19	10	12.6	778
September	369.8	19	9.8	12.3	733
October	186.6	14	4.4	6.02	370
November	117.5	4.4	3.3	3.92	233
December	179.1	6.0	4.6	5.78	355
Year 1949	3,535.3	44	1.2	9.69	7,020

STORAGE IN RESERVOIRS

1949

SQUAW LAKE RESERVOIR - Dam and staff gage located in approximate Sec. 12, T. 39 N., R. 4 W., N.M.P.M., on Squaw Lake. Total capacity of reservoir, 158 acre-feet as determined by original survey. Water used for irrigation of lands below the Del Norte gaging station.

TROUTVALE NO. 2 RESERVOIR - Dam and staff gage located in Sec. 10, T. 41 N., R. 3 W., N.M.P.M., on South Clear Creek. Total capacity of reservoir, 435 acre-feet as determined by original survey. Water is used for fish culture with only occasional sale for irrigation.

FUCHS RESERVOIR - Dam and staff gage located in Secs. 2 and 11, T. 37 N., R. 4 E., N.M.P.M., on Pinos Creek. Total capacity of reservoir, approximately 249 acre-feet. Water used for irrigation of lands adjacent to Pinos Creek.

Last Day of	SQUAW LAKE			TROUTVALE NO. 2			FUCHS					
	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.			
Dec. '43	1.2	20		7.6	257			0	0			
Jan.	1.3	21	+ 1	7.6	257	0		0	0			
Feb.	1.3	21	0	7.6	257	0		0	0			
Mar.	1.3	21	0	7.6	257	0	5.5	34	+ 34			
Apr.	3.0	50	+ 29	7.6	257	0	11.0	110	+ 76			
May	6.0	104	+ 54	7.6	257	0	17.1	237	+ 127			
June	8.0	140	+ 36	7.6	257	0	17.1	237	0			
July	8.0	140	0	7.6	257	0	6.9	50	- 187			
Aug.	7.3	128	- 12	7.6	257	0	6.9	50	0			
Sept.		0	- 128	7.6	257	0	6.9	50	0			
Oct.		0	0	7.6	257	0	6.9	50	0			
Nov.		0	0	7.6	257	0	6.9	50	0			
Dec.		0	0	7.6	257	0	6.9	50	0			
Year	—	—	- 20	—	—	0	—	—	+ 50			

CARSON RESERVOIR - Dam and water-stage recorder located in NW¼ Sec. 12, T. 25 N., R. 10 E., on Aguaje de la Petaca. Total capacity of reservoir 5,684 acre-feet as determined by survey of 1941. Water used for irrigation of lands of the Carson Reclamation District. Completed 1940.

EL VADO RESERVOIR - Dam and water-stage recorder (staff gage only below elevation 6,878.0 feet) located in SE¼ Sec. 4, T. 27 N., R. 2 E., on Rio Chama. Total capacity of reservoir, 197,530 acre-feet at elevation 6,902.0 feet (top of spillway gates) as determined by survey of 1944.

McCLURE (formerly GRANITE POINT) RESERVOIR ENLARGEMENTS - Dam and staff gage in SW¼ Sec. 24, T. 17 N., R. 10 E., in Santiago Ramirez Grant, on Santa Fe Creek. Original reservoir, capacity 561 acre-feet, was completed in 1926 and is not subject to Compact administration; in 1935 permanent flash boards were installed in spillway increasing capacity to 650 acre-feet; in 1947 both dam and spillway were raised increasing total capacity to 2,614 acre-feet.

NICHOLS RESERVOIR - Dam, staff gage and water-stage recorder located in NE¼ Sec. 21, T. 17 N., R. 10 E., on Santa Fe Creek. Total capacity of reservoir, 796 acre-feet as determined by original survey in 1942. Water is for municipal use in Santa Fe. Completed in 1942.

Last Day of	CARSON			EL VADO			McCLURE (GRANITE POINT) 1935 and 1947 ENLARGEMENTS			NICHOLS		
	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.			
Dec. '48		0		6883.3	142,700		—	1080		—	531	
Jan.		0	0	84.5	145,800	+ 3,100	—	1020	- 60	—	412	- 119
Feb.		0	0	64.4	99,880	- 45,920	—	1050	+ 30	—	358	- 54
Mar.		0	0	6799.0	17,490	- 82,390	—	1250	+ 200	152.9	335	- 23
Apr.		380	+ 380	6865.9	102,800	+ 85,310	—	2020	+ 770	168.6	734	+ 399
May		0	- 380	6902.8	200,200	+ 97,400	—	2080	+ 60	171.4	823	+ 89
June		0	0	02.5	199,200	- 1,000	—	1910	- 170	170.4	790	- 33
July		100	+ 100	02.2	198,200	- 1,000	—	2080	+ 170	169.1	749	- 41
Aug.		0	- 100	97.2	182,400	- 15,800	—	2020	- 60	167.2	692	- 57
Sept.		0	0	91.8	166,200	- 16,200	—	1780	- 240	167.3	695	+ 3
Oct.		0	0	89.2	158,700	- 7,500	—	1650	- 130	164.6	614	- 81
Nov.		0	0	89.2	158,700	0	—	1560	- 90	162.9	569	- 45
Dec.		0	0	89.6	159,900	+ 1,200	—	1310	- 250	166.9	682	+ 113
Year		—	0			+ 17,200	—	—	+ 230	—	—	+ 151

STORAGE IN RESERVOIR

1949

ACOMITA RESERVOIR - Dam and Staff gage located in SE¼ Sec. 29, T. 10 N., R. 7 W., on San Fidel Arroyo; water for reservoir is diverted from Rio San Jose. Total capacity of reservoir, 850 acre-feet as determined by orginal survey in 1937. Water is used for irrigation of lands on Acoma and Laguna Indian Reservation. Completed 1938.

NEW LAGUNA RESERVOIR - Dam and staff gage located in SW¼ Sec. 1, T. 9 N., R. 6 W., on Rio San Jose. Total capacity of reservoir, 683 acre-feet as determined by survey in 1938. Water used for irrigation of lands on Laguna Indian Reservation. Completed 1934.

PAGUATE RESERVOIR - Dam and staff gage located in NE¼ Sec. 26, T. 10 N., R. 5 W., on Paguate Creek. Total capacity of reservoir, 976 acre-feet as determined by original survey. Water used for irrigation of lands on Laguna Indian Reservation. Completed 1938.

Last Day of	ACOMITA			NEW LAGUNA			PAGUATE		
	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.
Dec.48		410			230			730	
Jan.		690	+ 280		210	- 20		400	- 330
Feb.		830	+ 140		180	- 30		410	+ 10
Mar.		770	- 60		150	- 30		420	+ 10
Apr.		720	- 50		120	- 30		410	- 10
May		570	- 150		100	- 20		320	- 90
June		430	- 140		90	- 10		180	- 140
July		300	- 130		230	+ 140		10	- 170
Aug.		140	- 160		160	- 70		100	+ 90
Sept.		50	- 90		130	- 30		100	0
Oct.		0	- 50		160	+ 30		40	- 60
Nov.		320	+ 320		190	+ 30		0	- 40
Dec.		650	+ 330		220	+ 30		0	0
Year		—	+ 240		—	- 10		—	- 730

ELEPHANT BUTTE RESERVOIR - Dam and gages located in NW¼ Sec. 30, T. 13 S., R. 3 W., on Rio Grande. Total capacity of reservoir, 2,197,600 acre-feet as determined by survey in 1946. Water is used for power development and irrigation in New Mexico and Texas.

CABALLO RESERVOIR - Dam and gages located in SW¼ Sec. 19, T. 16 S., R 4 W., on Rio Grande. Total capacity of reservoir, 345,870 acre-feet as determined by original survey. Water is used to irrigate lands in New Mexico and Texas.

PROJECT STORAGE - The combined storage of Elephant Butte and Caballo Reservoirs. Total Project Storage capacity, 2,543,470 acre-feet of which 100,000 acre-feet in Caballo Reservoir is for flood control.

Last Day of	ELEPHANT BUTTE			CABALLO			PROJECT STORAGE		
	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.	Gage-Height Ft.	Contents Ac.-Ft.	Change Ac.-Ft.
Dec.48	4329.96	492,000		4352.70	99,480			591,480	
Jan.	30.03	494,100	+ 2,100	57.80	130,500	+ 31,020		624,600	+ 33,120
Feb.	31.89	517,300	+ 23,200	61.79	158,620	+ 28,120		675,920	+ 51,320
Mar.	32.92	530,500	+ 13,200	62.19	161,660	+ 3,040		692,160	+ 16,240
Apr.	31.17	508,300	- 22,200	60.48	148,950	- 12,710		657,250	- 34,910
May	36.01	570,700	+ 62,400	62.44	163,590	- 14,640		734,290	+ 77,040
June	45.85	709,900	+ 139,200	60.50	149,090	- 14,500		858,990	+124,700
July	51.17	793,300	+ 83,400	52.37	103,280	- 45,810		896,580	+ 37,590
Aug.	48.24	746,800	- 46,500	38.44	41,580	- 61,700		788,380	-108,200
Sept.	46.12	714,000	- 32,800	46.00	67,900	+ 26,320		781,900	- 6,480
Oct.	42.73	663,900	- 50,100	53.34	103,110	+ 35,210		767,010	- 14,890
Nov.	41.05	639,800	- 24,100	60.21	147,000	+ 43,890		786,800	+ 19,790
Dec.	39.71	621,000	- 18,800	66.41	194,710	+ 47,710		815,710	+ 28,910
Year	—	—	+ 129,000	—	—	+ 95,230			+224,230

TRANSMOUNTAIN DIVERSIONS
1949

WEMINUCHE PASS (East Ditch) Fuchs

Bristol 8-day recorder and 3-foot wooden Parshall flume. Ditch crosses Continental Divide at Lat. 37°41' N., Long. 107°19' W., in Sec. 4, T. 39 N., R. 4 W., (projected survey), 25 miles southwest of Creede, Colorado. Diversion originates on North Fork of the Rio de los Pinos, a tributary to the San Juan River; empties into Weminuche Creek, a tributary of the Rio Grande. Diversion is from Rio Grande above the Del Norte gaging Station.

Month	Second-foot-days	Maximum	Minimum	Mean	Discharge in Acre-Feet
May	0	0	0	0	0
June	0	0	0	0	0
July	3.5	3.1	2.6	2.8	20
August	26.0	2.3	0.8	1.4	70
September	0	0	0	0	0
Total	29.5	3.1	0.8	—	90

WEMINUCHE PASS (West Ditch) FABER-LOHR

Bristol 8-day recorder and 3-foot wooden Parshall flume. Ditch crosses Continental Divide at Lat. 37°41' N., Long. 107° 19' W., in Sec. 4 T. 39 N., R. 4 W., (projected survey), 25 miles southwest of Creede, Colorado. Diversion originated on left bank of Rincon La Vaca Creekm a tributary of the Rio de los Pinos in the San Juan River Basin; empties into Weminuch Creek, a tributary of the Rio Grande. Diversion is from Rio Grande above the Del Norte Gaging Station.

Month	Second-foot-days	Maximum	Minimum	Mean	Discharge in Acre-feet
May	0	0	0	0	0
June	0	0	0	0	0
July	3.5	8.7	6.0	8.0	53
August	31.0	7.3	1.9	4.0	255
September	17.0	3.6	1.8	2.6	92
Total	51.5	8.7	1.8	—	400

TABOR

Bristol 8-day recorder and 2-foot wooden Parshall flume. Ditch crosses Continental Divide at Lat. 37° 56' N., 107°11' W., in Sec. 34, T. 43 N., R. 3 W., (projected survey), adjacent to Colorado State Highway No. 149, 14 miles northwest of Creede, Colorado. Diversion originates from right bank of Cebolla Creek, a tributary to the Gunnison River; empties into Deep Creek, a tributary to Clear Creek in the Rio Grande Basin. Diversion is from Rio Grande above the Del Norte gaging station.

Month	Second-foot-days	Maximum	Minimum	Mean	Discharge in acre-feet
May	0	0	0	0	0
June	0	0	0	0	0
July	0	0	0	0	0
August	0	0	0	0	0
September	0	0	0	0	0
Total	0	0	0	0	0

SQUAW PASS

Bristol 8-day recorder and 2-foot wooden Parshall flume. Ditch crosses Continental Divide at Lat. 37°36' N., Long. 107°13' W., 24 miles southwest of Creede, Colorado. Diversion intercepts headwaters of Williams Creek, a tributary of Huerto Creek in the San Juan Basin; empties into Squaw Creek, a tributary of the Rio Grande above the Del Norte gaging station. Diversion is from Rio Grande below the Del Norte gaging station.

Month	Second-foot-days	Maximum	Minimum	Mean	Discharge in acre-feet
May	0	0	0	0	0
June	0	0	0	0	0
July	0	0	0	0	0
August	0	0	0	0	0
September	0	0	0	0	0
Total	0	0	0	0	0

TREASURE PASS

Bristol 8-day recorder and 2-foot wooden Parshall flume. Ditch crosses Continental Divide at Lat. 37°29' N., Long. 106°48' W., in Sec. 32, T. 38 N., R. 2 E., (projected survey), adjacent to U. S. Highway No. 160 on the summit of Wolf Creek Pass, 17 miles southwest of South Fork, Colorado. Diversion originates on Wolf Creek, a tributary to South Fork in the Rio Grande Basin. Diversion is from the Rio Grande below the Del Norte gaging station.

Month	Second-foot-days	Maximum	Minimum	Mean	Discharge in acre-feet
May	0				0
June	0				0
July	0				0
August	0				0
September	0				0
Total	0				0

PIEDRA PASS

Bristol 8-day recorder and 2-foot metal Parshall flume. Ditch crosses Continental Divide at Lat. 37°35' N., Long. 107°00' W., in Sec. 4 T. 38 N., R. 1 W., (projected survey), 20 miles south of Creede, Colorado. Diversion originates on the headwaters of the Piedra River, a tributary to the West Fork of the San Juan River in the San Juan Basin; empties into South River, a tributary to the Rio Grande. Diversion is from the Rio Grande above the Del Norte gaging station.

Month	Second-foot-days	Maximum	Minimum	Mean	Discharge in acre-feet
May	0				0
June	0				0
July	0				0
August	0				0
September	0				0
Total	0				0

EVAPORATION AND PRECIPITATION

The last paragraph of Article VI of the Compact states, in part, --- "such credits and debits shall be reduced annually to compensate for evaporation losses in the proportion that such credits or debits bear to the total amount of water in such reservoirs during the year."

To provide the data needed for the computation of such evaporation losses the Commission has encouraged the establishment and operation of evaporation stations near each major reservoir in the basin as well as at other selected locations.

Evaporation and precipitation records from stations in Colorado and New Mexico are tabulated on the following page. At some of the stations in the higher elevations it was not possible to obtain evaporation records throughout the winter period.

The measurements of evaporation were made in accordance with standard practice for the type of pan in use. Measurements of precipitation were made in standard 8-inch rain gages, which were supplemented at some stations by recording rain gages. For both evaporation and precipitation the unit of measure is the inch.

Records for the evaporation stations at Agricultural College, Elephant Butte Dam and El Vado Dam antedated the creation of the Commission; the station at Bosque del Apache was installed for the U. S. Fish and Wildlife Service. All others were established at the request of the Commission.

The Rio Grande Compact Commission gratefully acknowledges the cooperation of the U. S. Weather Bureau for furnishing the evaporation and precipitation records contained in this report.

EVAPORATION AND PRECIPITATION

1949

WAGON WHEEL GAP, COLORADO - In Mineral County, elevation 8,500 feet, lat. 37° 46', long. 106° 49', near Creede. Standard Class A pan anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages.

CONEJOS DAM, COLORADO - In Conejos County, elevation 8,500 feet, lat. 37° 04', long. 106° 16', 15 miles west of Antonito. Standard Class A pan, anemometer, maximum and minimum thermometers, and standard 8-inch rain gage.

SAN LUIS LAKES, COLORADO - In Alamosa County, elevation 7,530 feet, lat. 37° 39', long. 105° 48'. Standard Class A pan, anemometer, maximum and minimum thermometers and standard 8-inch rain gage.

EL VADO DAM, NEW MEXICO.- In Rio Arriba County, elevation 6,796 feet, lat. 36° 36', long. 106° 44', at El Vado Dam near Tierra Amarilla. Standard Class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages.

SANTA FE, NEW MEXICO - In Santa Fe County, elevation 7,240 feet, lat. 35° 41', long. 105° 56', 2 miles southeast of Santa Fe. Standard Class A pan, anemometer, maximum and minimum thermometers and standard 8-inch rain gage.

BOSQUE DEL APACHE, NEW MEXICO - In Socorro County, elevation 4,520 feet, lat. 33°46', long. 106° 54', 7 miles south of San Antonio. Standard Class A pan, anemometer, maximum and minimum thermometers, standard 8-inch rain gage.

ELEPHANT BUTTE DAM, NEW MEXICO - In Sierra County, elevation 4,576 feet, lat. 33° 09', long. 107° 11', 4 miles northeast of Hot Springs. Standard Class A pan, anemometer, maximum and minimum thermometers and standard 8-inch rain gage.

CABALLO DAM, NEW MEXICO - In Sierra County, elevation 4,190 feet, lat. 32° 54', long. 107° 18', at Caballo Dam and 16 miles south of Hot Springs. Standard Class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages.

AGRICULTURAL COLLEGE, NEW MEXICO - In Dona Ana County, elevation 3,909 feet, lat. 32°17', long. 106° 45', 3 miles south of Las Cruces, at State College. Standard Class A pan, anemometer, maximum and minimum thermometers, standard 8-inch rain gage.

STATION		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WAGON WHEEL GAP, COLO.	EVAP.	-	-	-	-	6.13	6.98	6.56	6.84	-	8.16	-	-	-
	PRECIP.	2.20	0.47	0.75	0.35	1.80	2.40	2.53	0.68	1.23	0.89	0.05	0.75	14.10
CONEJOS DAM, COLO.	EVAP.	-	-	-	7.55	8.95	8.48	8.81	10.23	7.59	-	-	-	-
	PRECIP.	0.37	0.19	0.14	0.75	1.63	1.33	2.24	0.99	0.62	0.41	0.07	0.09	8.83
SAN LUIS LAKES, COLO.	EVAP.	-	-	-	5.68	8.40	8.64	9.06	7.65	5.68	4.07	-	-	-
	PRECIP.	0.34	0.08	0.32	0.30	1.67	0.87	1.29	0.78	0.83	0.10	0.00	0.03	6.61
EL VADO DAM, N. MEX.	EVAP.	-	-	-	-	7.19	8.06	8.09	8.42	6.42	-	-	-	-
	PRECIP.	2.49	1.10	0.90	1.89	0.91	3.36	2.20	1.41	0.98	0.96	0.37	0.38	16.05
SANTA FE, N. MEX.	EVAP.	-	-	-	-	9.41	7.59	-	8.69	6.96	5.69	4.56	-	-
	PRECIP.	1.09	0.23	0.42	0.63	1.18	4.38.	7.64	1.23	1.40	0.37	T	0.39	18.96
BOSQUE DEL APACHE, N.M.	EVAP.	2.23	4.64	8.13	9.69	12.72	14.34	12.14	12.07	8.21	7.46	4.18	2.76	99.57
	PRECIP.	0.87	0.01	0.20	0.42	0.29	0.26	1.55	0.40	2.34	1.41	0.00	0.30	8.05
ELEPHANT BUTTE DAM, NM	EVAP.	2.15	4.96	9.47	10.53	16.05	15.28	14.25	14.01	4.61	8.82	5.89	3.65	114.67
	PRECIP.	0.91	0.32	0.06	0.25	1.54	0.44	1.21	0.93	2.56	0.27	0.00	0.19	8.68
CABALLO DAM, N. MEX.	EVAP.	-	4.89	9.38	10.23	14.96	14.03	13.20	12.77	9.44	8.38	5.27	3.32	-
	PRECIP.	0.97	0.72	0.07	0.35	1.15	0.79	3.07	0.35	1.68	0.24	0.00	0.25	9.84
AGRICULTURAL COLLEGE NM	EVAP.	2.02	4.21	8.67	9.70	13.43	13.09	11.53	10.12	8.40	6.43	4.24	2.49	94.33
	PRECIP.	1.85	0.46	0.07	0.06	0.79	0.15	1.14	0.72	2.37	0.88	T	0.51	9.01

BUDGET
for
FISCAL YEAR ENDING JUNE 30, 1951

ADOPTED AT ELEVENTH ANNUAL MEETING
February 25, 1950

ITEM	TOTAL COST	Borne by United States	Borne by States		
			Colorado	New Mexico	Texas
Gaging Stations					
In Colorado	$3,500	$1,700	$1,800	–	–
In New Mexico					
Above Caballo Reservoir	7,900	5,500	–	$2,400	–
Caballo Reservoir and below	2,100	–	–		$2,100
Sub-total	$13,500	$7,200	$1,800	$2,400	$2,100
Administration					
U.S. G. S. Contract	4,000	400	1,200	1,200	1,200
Other Expenses	900		300	300	300
Sub-total	$4,900	$ 400	$1,500	$1,500	$1,500
Total of Budget	$18,400				
Borne by United States	7,600	$7,600			
Borne by States	$10,800		$3,300	$3,900	$3,600
Cash Adjustments			Dr$ 300	Cr.$ 300	$ 0

COST OF OPERATION
for
FISCAL YEAR ENDING JUNE 30, 1949.

ITEM	TOTAL COST	Borne by United States	Borne by States		
			Colorado	New Mexico	Texas
Gaging Stations					
In Colorado	$3,500	$1,700	$1,800	–	–
In New Mexico					
Above Elephant Butte	7,600	4,600	–	$3,000	–
Below San Marcial	2,600	200	–	–	$2,400
Sub-Total	$13,700	$6,500	$1,800	$3,000	$2,400
Administration	5,092	400	1,546	1,600	1,546
Total	$18,792	$6,900	$3,346	$4,600	$3,946
Borne by United States	6,900				
Net borne by States	$11,892		$3,346	$4,600	$3,946
Share of each State	–		3,964	3,964	3,964
Cash Adjustment			Dr.$ 618	Cr $ 636	Dr$ 18