Ninth Annual Report

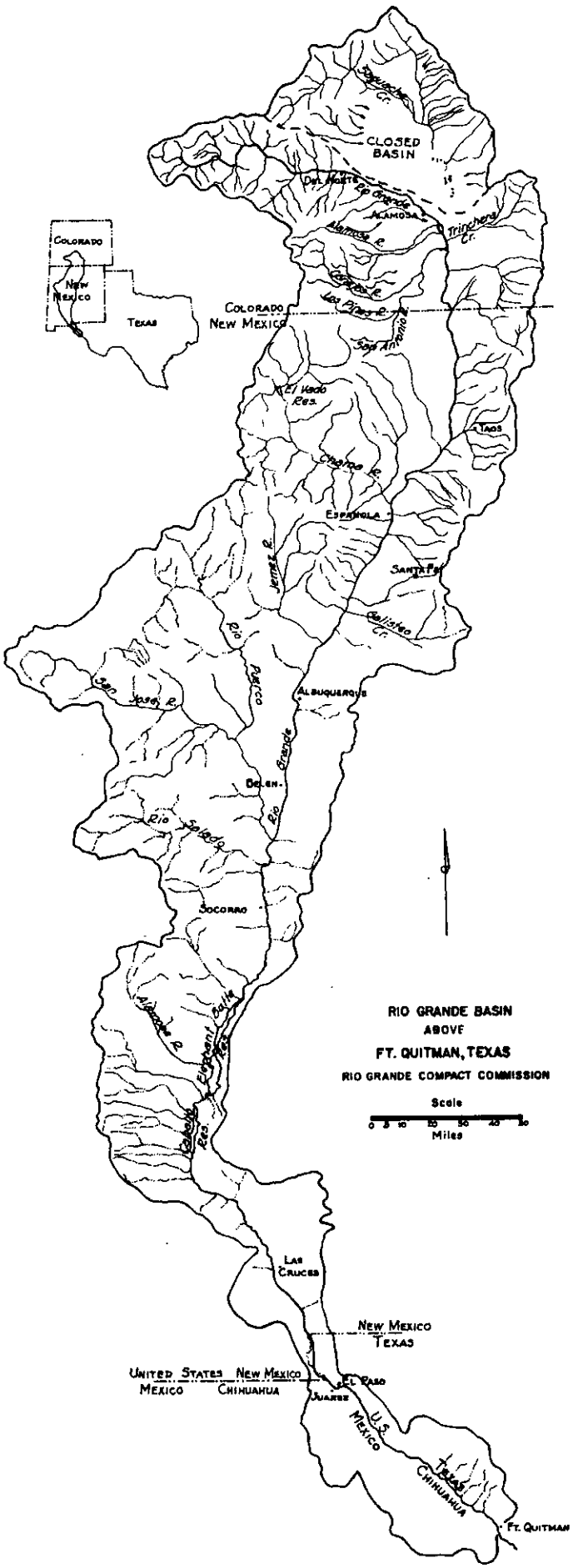
of the

RIO GRANDE COMPACT COMMISSION

1947

TO THE GOVERNORS OF

Colorado, New Mexico and Texas


CLOSED BASIN
Trinchera Cr.
Del Norte
Rio Grande
Alamosa
Alamosa R.
Conejos R.
Los Pinos R.
Colorado
New Mexico
Texas
Colorado
New Mexico
Santa Fe
El Vado Res.
Chama R.
Taos
Española
Jemez R.
Rio Puerco
Santa Fe
Galisteo Cr.
San Jose R.
Albuquerque
Rio Grande
Belen
Rio Salado
Socorro
Alamosa R.
Elephant Butte Res.
Caballo 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
0 5 10 20 30 40 50
Miles

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COLORADO
M. C. HINDERLIDER
STATE ENGINEER
DENVER, COLORADO

TEXAS
J. E. QUAID
316 CAPLES 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

El Paso, Texas
February 24, 1948.

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

His Excellency, Beauford H. Jester,
Governor of the State of Texas
Austin, Texas.

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

Sirs:

The Ninth Annual Meeting of the Rio Grande Compact Commission was held in El Paso, Texas, on February 22,23 and 24, 1948, at which time the Commission reviewed records of stream flow at all Compact Index Stations and found:

(a) On January 1, 1947, Colorado had an accrued credit of 37,300 acre feet. In 1947, Colorado incurred an annual debit of 56,100 acre feet. After required adjustments for evaporation losses, Colorado had an accrued debit of 18,800 acre feet on December 31, 1947.

(b) On January 1, 1947, New Mexico had an accrued debit of 105,400 acre feet. In 1947 New Mexico incurred an annual debit of 71,400 acre feet. After required adjustment for evaporation losses, New Mexico had an accrued debit of 176,800 acre feet on December 31, 1947.

(c) Prior to January 1, 1947, the releases of usable water from Rio Grande Project Storage had amounted to 200,900 acre feet in excess of the normal release of 790,000 acre feet provided by the Compact.
In 1947, the release of usable water from Project Storage was 728,300 acre feet. After required adjustments for evaporation losses, the accrued excess release of usable water was 122,700 acre feet on December 31, 1947.

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The expenses for administration of the Compact during the fiscal year ending June 30, 1947, were $18,400 of which $9,400 was borne by the United States and the balance of $9,000 was borne by the three States in the amount of $3,000 each.

Factual data and records bearing on the administration of the Compact are available in the files of the Commission.

Respectfully yours,

M. C. Hinderlider, Rio Grande
Compact Commissioner for Colorado.

John H. Bliss, Rio Grande
Compact Commissioner for New Mexico.

John E. Quaid, Rio Grande
Compact Commissioner for Texas.

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 considerations 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 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 therefrom for flood control, in excess of the current demand on project storage and which does not become usable water by storage in another reservoir; provided, that actual spill of usable water cannot occur until all credit water shall have been spilled.

(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 mouths 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 per cent 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.

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.

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 made from project storage in that year.

ARTICLE 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 event 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 thereafter 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 increase 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 losses 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.

S/ M. C. Hinderlider
M. C. HINDERLIDER

S/ Thomas M. McClure
THOMAS M. McCLURE

S/ Frank B. Clayton
FRANK B. CLAYTON

APPROVED:

S/ S. O. Harper
S. O. HARPER

RATIFIED BY:

Colorado, February 21, 1939
New Mexico, March 1, 1939
Texas, March 1, 1939

Passed Congress as Public Act No. 96, 76th Congress
Approved by the President, May 31, 1939

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 State 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 observations 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 per cent, 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.

EVAPORATION LOSSES

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.

ADJUSTMENTS 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 contructed 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 commingled.

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.

REPORTS TO COMMISSIONERS a/

The Commission, subject to the approval of the Director of the United States Geological Survey, shall enter into a cooperative agreement with the Geological Survey which shall provide that said survey shall:

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

(b) Inspect all gaging stations maintained by the Commission, the several states, or others required in administration of the Compact, and make recommendations to the Commission as to any changes or improvements to such stations and for the addition of new stations to the end that reliable records may be had for the purpose of carrying out the provisions of the Compact.

(c) 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 (1) deliveries by Colorado, (2) deliveries by New Mexico, and (3) release and spill from Project storage.

(d) Compile a complete report covering the operations of the Geological Survey under its agreement with the Commission and submit it to the Commission at its regular meeting in February of each year, together with a summary of all factual data pertaining to the preceding calendar year required by the Commissioners in administration of the provisions of the Compact.

(e) Perform such other services for the Commission as may be reasonably requested from time to time in connection with administration of the Compact.

Said agreement between the U. S. Geological Survey and the Rio Grande Compact Commission shall provide for the payment of a predetermined amount which shall be borne equally by the three states, and for payment thereof in quarterly installments at times consistent with the fiscal periods of the several states.

a/ The substitution of this paragraph for former paragraph titled "Secretary" adopted at Annual Meeting, February 1947.

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 expenst, 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 arrange 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 preceding, 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.

In accordance with Par. 14, Minutes of the Fourth Annual (Thirteenth) Meeting of the Rio Grande Compact Commission, held in Denver, Colorado, February 25 and 25, 1943, the following was made a part of the Rules and Regulations.

ACTUAL SPILL

(a) Water released 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 gates i.e.-1,830,000 acre feet in 1942.

(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.

RECORDS OF DELIVERIES AND RELEASES

In February of each year the Commission meets for the consideration and adoption of the annual report for the preceding calendar year and at this meeting the records of deliveries and releases are examined and approved.

These records as adopted are reproduced on pages 21, 22 and 23. Listed in these tables are the actual flows at the index and delivery points, the scheduled deliveries as computed from the relationships set forth in Articles III and IV of the Compact, the storage in reservoirs, the several adjustments provided for evaporation from reservoirs, transmountain diversions and other applicable factors. Each table also gives a summary of the items entering into the calculation of accrued debits and credits.

In the 1947 calendar year, deliveries by Colorado at the Colorado-New Mexico State line were 56,100 acre-feet less than the scheduled delivery, thereby changing the accrued credit of 37,300 acre-feet to a debit of 18,800 acre-feet.

New Mexico also failed to deliver the amount of water scheduled by the Compact and as a result the accrued debit increased from 105,400 to 176,800 acre-feet.

Releases from Project storage for irrigation was again below the normal release of 790,000 acre-feet at the end of 1946 the accrued departure from normal release was 200,900 acre-feet; at the end of 1947 the accrued departure was reduced to 121,000 acre-feet.

RIO GRANDE COMPACT

DELIVERIES BY COLORADO AT STATE LINE

YEAR 1947

Quantities in Thousands of Acre Feet to Nearest Hundred

MONTH	CONEJOS INDEX SUPPLY						RIO GRANDE SUPPLY			STORED WATER		DELIVERIES AND CREDITS			
	MEASURED STREAM FLOW				ADJUSTMENTS PER COMPACT	CONEJOS INDEX SUPPLY	RECORDED FLOW NEAR DEL NORTE	ADJUSTMENTS PER COMPACT	RIO GRANDE INDEX SUPPLY	GAIN (+) OR LOSS (-) IN STORAGE	TOTAL QUANTITY IN STORAGE AT END OF MONTH	CONEJOS RIVER AT MOUTHS NEAR LOS SAUCES	TOTAL FLOW AT LOBATOS LESS CONEJOS RIVER	ACTUAL DELIVERY AT LOBATOS GAGE	ADJUSTMENTS PER COMPACT
	CONEJOS RIVER AT MOGOTE	LOS PINOS RIVER NEAR ORTIZ	SAN ANTONIO RIVER AT ORTIZ	TOTAL MEASURED FLOW											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	3.0	—	—	3.0	---	3.0	9.4	0	9.4	0	0.2	3.2	11.6	14.8	
FEB	3.3	—	—	3.3	---	3.3	9.7	0	9.7	0	.2	3.9	14.0	17.9	
MAR	5.6	—	—	5.6	---	5.6	14.7	0	14.7	0	.2	3.7	11.9	15.6	
1ST QTR.	11.9	—	—	11.9	---	11.9	33.8	0	33.8	0	—	10.8	37.5	48.3	
APR	17.0	6.7	14.8	38.5	---	38.5	31.4	[a] + .2	31.6	+ .2	.4	7.1	5.8	12.9	
MAY	74.1	8.2	36.3	118.6	---	118.6	155.9	0	155.9	0	.4	43.8	22.6	66.4	
JUN	61.5	.3	10.6	72.4	---	72.4	168.9	0	168.9	0	.4	11.0	12.0	23.0	
2ND QTR.	152.6	15.2	61.7	229.5	---	229.5	356.2	+ .2	356.4	+ .2	—	61.9	40.4	102.3	
JUL	17.5	.1	2.2	19.8	---	19.8	87.7	[b] - .1	87.6	0	.4	.4	10.9	11.3	
AUG	10.5	.2	2.0	12.7	---	12.7	49.2	[a] - .1	49.1	- .1	.3	.7	5.6	6.3	
SEPT	10.6	.1	2.4	13.1	---	13.1	44.4	0	44.4	0	.2	2.4	10.0	12.4	
3RD QTR.	38.6	.4	6.6	45.6	---	45.6	181.3	- .2	181.1	- .1	—	3.5	26.5	30.0	
OCT	8.4	.2	2.5	11.1	---	11.1	35.3	0	35.3	0	.2	2.0	8.0	10.0	
NOV	4.4	—	—	4.4	---	4.4	18.1	0	18.1	0	.2	2.9	17.6	20.5	
DEC	3.5	—	—	3.5	---	3.5	15.1	0	15.1	0	.2	3.7	15.5	19.2	
4TH QTR.	16.3	.2	2.5	19.0	---	19.0	68.5	0	68.5	0	—	8.6	41.1	49.7	
YEAR	219.4	15.8	70.8	306.0	---	306.0	639.8	0	639.8	+ .1	—	84.8	145.5	230.3	

REMARKS: Storage in reservoirs constructed after 1937 only.

a - Adjustments for operation of Squaw Lake and Troutvale No. 2 Reservoirs

b - Adjustment for Squaw Pass Transmountain Diversion

SUMMARY OF DEBITS AND CREDITS

	ITEM	DEBIT	CREDIT	BALANCE	
C1	Balance at Beginning of Year	—	—	Cr	37.3
C2	Scheduled Delivery from Conejos River	113.6	—	Dr	76.3
C3	Scheduled Delivery from Rio Grande	177.9	—	Dr	254.2
C4	Actual Delivery at Lobatos plus 10000 acre feet	—	240.3	Dr	13.9
C5	Adjustments per Compact - Item 16	0	0	Dr	13.9
C6	Reduction of Credits per Article VI.	4.9	—	Dr	18.8
C7	Reduction of Debits per Article VI.	—	0		18.8
C8	Balance at End of Year.	—	—	Dr	18.8

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RIO GRANDE COMPACT
DELIVERIES BY NEW MEXICO AT SAN MARCIAL

YEAR 1947

Quantities in Thousands of Acre Feet to Nearest Hundred

MONTH	OTOWI INDEX SUPPLY					STORAGE OF WATER IN RESERVOIRS					DELIVERIES AND CREDITS				
						LOBATOS TO OTOWI		OTOWI TO SAN MARCIAL							
	RECORDED FLOW AT OTOWI BRIDGE	ADJUSTMENTS ACCOUNT STORAGE ABOVE OTOWI	OTHER ADJUSTMENTS PER COMPACT	EQUIVALENT FLOW AT OTOWI UNDER 1929 CONDITIONS	OTOWI INDEX SUPPLY	GAIN (+) OR LOSS (-)	TOTAL AT END OF MONTH a, 20.0	GAIN (+) OR LOSS (-)	TOTAL AT END OF MONTH 1.9	TOTAL IN STORAGE AT END OF MONTH	RECORDED FLOW AT SAN MARCIAL GAGE	ACTUAL DELIVERY DURING SCHEDULE MONTHS	ADJUSTMENTS ACCOUNT DEPLETION DURING JULY, AUGUST, SEPTEMBER: LOBATOS TO OTOWI	ADJUSTMENTS ACCOUNT DEPLETION DURING JULY, AUGUST, SEPTEMBER: TRIBUTARIES BELOW OTOWI	OTHER ADJUSTMENTS PER COMPACT
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	35.4	+ 4.6	e 0	40.0	40.0	+ 4.6	24.6 a,b	+0.2	2.1	26.7	36.4	36.4	—	—	
FEB	38.8	+ 5.5	+ .1	44.4	44.4	+ 5.5	30.1	0	2.1	32.2	33.1	33.1	—	—	
MAR	41.0	+ 12.0	+ .1	53.1	53.1	+ 12.0	42.1	0	2.1	44.2	20.1	20.1	—	—	
1ST QTR.	115.2	+ 22.1	+ .2	137.5	137.5	+ 22.1	—	+ .2	—	—	98.6	89.6	—	—	
APR	50.3	+ 37.4	+ .3	88.0	88.0	+ 37.4	79.5	- .2	1.9	81.4	4.9	4.9	—	—	
MAY	151.1	+ 97.4	+ .7	249.2	249.2	+ 97.4	176.9	- .2	1.7	178.6	94.7	94.7	—	—	
JUN	68.6	- 8.3	+1.8	62.1	62.1	- 8.3	168.6	- .7	1.0	169.6	8.1	8.1	—	—	
2ND QTR.	270.0	+ 126.5	+2.8	399.3	399.3	+ 126.5	—	-1.1	—	—	107.7	107.7	—	—	
JUL	63.2	- 38.3	+1.3	26.2	—	- 38.3	130.3	- .2	.8	131.1	4.6	—		0.1	
AUG	59.9	- 21.8	+ .4	38.2	—	- 21.8	108.5	+ .2	1.0	109.5	57.7	—		0.6	
SEPT	29.2	+ 6.8	+ .3	36.3	—	+ 6.8	115.3	+ .2	1.2	116.5	10.0	—	f 6.8	0.2	
3RD QTR.	152.3	- 53.3	+1.7	100.7	—	- 53.3	—	+ .2	—	—	72.3	—	6.8	c 0.9	d .2
OCT	42.2	- 10.1	+ .4	32.5	32.5	- 10.1	105.2	+ .4	1.6	106.8	6.5	6.5	—	—	
NOV	109.9	- 68.9	+ .1	41.1	41.1	- 68.9	36.3	- .4	1.2	37.5	83.0	83.0	—	—	
DEC	74.1	- 30.8	0	43.3	43.3	- 30.8	5.5	+ .3	1.5	7.0	74.6	74.6	—	—	
4TH QTR.	226.2	- 109.8	+ .5	116.9	116.9	- 109.8	—	+ .3	—	—	164.1	164.1	—	—	
YEAR	763.7	- 14.5	+5.2	754.4	653.7	- 14.5	—	- .4	—	—	433.7	361.4	f 6.8	c 0.9	d 0.2

REMARKS: Storage in reservoirs constructed after 1929 only.
a - New rating tablr for El Vado Reservoir based on resurvey; contents 20,000 A.F. Dec.31,1946
b - No storage Carson Reservoir during year
c - Storage in Nichols and Paguate Reservoirs during July - September
d - Depletion by stock tanks
e - Net evaporation El Vado Reservoir
f - Gain in El Vado Reservoir

SUMMARY OF DEBITS AND CREDITS

	ITEM	DEBIT	CREDIT	BALANCE	
NM1	Balance of Beginning of Year	—	—	Dr	105.4
NM2	Scheduled Delivery at San Marcial	429.2	—	Dr	534.6
NM3	Actual Delivery in Schedule Months	—	361.4	Dr	173.2
NM4	Adjustments Account Depletion in July, Aug., Sept.	7.7	—	Dr	180.9
NM5	Other Adjustments - Item 16	0.2		Dr	181.1
NM6	Reduction of Credits per Article VI.	0	—	Dr	181.1
NM7	Reduction of Debits per Article VI.	—	4.3	Dr	176.8
NM8	Balance of End of Year	—	—	Dr	176.8

RIO GRANDE COMPACT
RELEASE AND SPILL FROM PROJECT STORAGE

YEAR 1947

Quantities in Thousands of Acre Feet to Nearest Hundred

MONTH	TOTAL PROJECT STORAGE CAPACITY AVAILABLE AT END OF MONTH	USABLE WATER			UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH	CREDIT WATER			FLOOD WATER IN STORAGE AND DEAD STORAGE AT END OF MONTH	TOTAL WATER IN PROJECT STORAGE AT END OF MONTH	RELEASE AND SPILL				
		STORED IN ELEPHANT BUTTE RESERVOIR	STORED IN CABALLO RESERVOIR	TOTAL IN STORAGE AT END OF MONTH		COLORADO CREDIT WATER IN STORAGE	NEW MEXICO CREDIT WATER IN STORAGE	TOTAL IN STORAGE AT END OF MONTH			RECORDED FLOW OF RIO GRANDE BELOW ELEPHANT BUTTE	RIO GRANDE BELOW CABALLO			
												RELEASE OF USABLE WATER	SPILL OF FLOOD OR CREDIT WATER	ACTUAL SPILL OF USABLE WATER	TOTAL RECORDED FLOW
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	2,543.5	520.0	255.0	775.0	1,768.5	37.3	0	37.3	0	812.3	59.1	0.6	0	0	0.6
FEB	2,543.5	500.3	288.7	789.0	1,754.5	37.3	0	37.3	0	826.3	55.3	12.0	0	0	12.0
MAR	2,543.5	470.1	266.6	736.7	1,806.8	37.3	0	37.3	0	774.0	58.4	79.1	0	0	79.1
1ST QTR.	———	———	———	———	———	———	———	———	———	———	172.8	91.7	0	0	91.7
APR	2,543.5	408.8	208.4	617.2	1,926.3	37.3	0	37.3	0	654.5	69.1	123.7	0	0	123.7
MAY	2,543.5	424.0	188.6	612.6	1,930.9	37.3	0	37.3	0	649.9	65.7	86.5	0	0	86.5
JUN	2,543.5	368.3	144.4	512.7	2,030.8	37.3	0	37.3	0	550.0	66.9	113.1	0	0	113.1
2ND QTR.	———	———	———	———	———	———	———	———	———	———	374.5	415.0	0	0	415.0
JUL	2,543.5	303.8	70.6	374.4	2,169.1	37.3	0	37.3	0	411.7	68.7	149.2	0	0	149.2
AUG	2,543.5	287.6	35.7	323.3	2,220.2	37.3	0	37.3	0	360.6	62.4	115.0	0	0	115.0
SEPT	2,543.5	279.6	13.0	292.6	2,250.9	37.3	0	37.3	0	329.9	22.6	48.8	0	0	48.8
3RD QTR.	———	———	———	———	———	———	———	———	———	———	528.2	728.0	0	0	728.0
OCT	2,543.5	272.6	28.8	301.4	2,242.1	37.3	0	37.3	0	338.7	12.4	.1	0	0	.1
NOV	2,543.5	329.1	40.3	369.4	2,174.1	37.3	0	37.3	0	406.7	8.4	.1	0	0	.1
DEC	2,543.5	435.5	51.4	449.6	2,056.6	37.3	0	37.3	0	486.9	9.1	.1	0	0	.1
4TH QTR.	———	———	———	———	———	———	———	———	———	———		728.3	0	0	728.3
YEAR	———	———	———	———	———	———	———	———	———	———	558.1	728.3	0	0	728.3

REMARKS: Dec. 31, 1946

	OLD SURVEY ADJUSTED	NEW 1947 SURVEY
TOTAL PROJECT CAPACITY	2,488.0	2,543.5
Usable Water-Elephant Butte	514.9	577.3
Caballo	204.5	204.5
Total	719.4	781.8
Unfilled Capacity	1,768.6	1,761.7
Total Stored	788.8	851.2

ACCRUED DEPARTURE FROM NORMAL RELEASE

	ITEM	DEBIT	CREDIT	BALANCE	
P1	Accrued Departure at Beginning of Year	———	———	Dr	200.9
P2	Actual Release during Year	728.3	———	Dr	929.2
P3	Normal Release for Year	———	790.0	Dr	139.2
P4	Actual Net Evaporation Loss in Year	130.5	———	Dr	269.7
P5	Evaporation Loss if No Departures	———	147.0	Dr	122.7
P6	Accrued Departure at End of Year	———	———	Dr	122.7

TIME OF HYPOTHETICAL SPILL Did not occur

WATER SUPPLY IN 1947

In 1947 the water supply was about a third less than average. Over much of the water producing areas of the basin it was the sixth successive year of subnormal precipitation. Much of the deficiency occurred during the winter season; at the end of April the water content of the accumulated snow storage was 70 per cent of average. The ensuing spring run-off, even though deficient, was considerably greater than that of 1946.

Accuracy of Records

The Rules and Regulations of the Commission provide 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 limitations imposed by the physical conditions existing at the various sites the Agencies obtaining records at the Compact gaging stations have complied with those regulations.

Acknowledgements

The water supply data published herein have been obtained from various sources.

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 Squaw Lake, Troutvale No. 2 and Fuchs Reservoirs were also furnished by the office of the Colorado State Engineer as well as the records of the several transmountain diversions.

The following discharge records were furnished by the U. S. Geological Survey in cooperation with the New Mexico Interstate Stream Commission:

Rio Grande at Otowi Bridge near San Ildefonso, New Mexico
Rio Grande at San Acacia, New Mexico
Rio Grande at San Marcial, 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 Streams Commission and the Middle Rio Grande Conservancy District, also furnished the record of storage in El Vado Reservoir near Tierra Amarilla, New Mexico.

The New Mexico Power Company at Santa Fe, New Mexico furnished the record of storage in 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
Discharge of Bonita Ditch below Caballo Dam
Storage in Elephant Butte Reservoir
Storage in Caballo Reservoir

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

RIO GRANDE COMPACT COMMISSION

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, 1947.

Extremes - Maximum discharge during year, 4,390 second-feet June 8; minimum daily discharge 120 second-foot January 16.
1889-1947: Maximum discharge 18,000 second-feet October 5, 1911 (from rating curve extended above 6000 second-feet); minimum daily, 88 second-feet Dec. 20, 1945.

Remarks - Records considered excellent except those for period of ice effect, January 1 to March 10, December 6-31, 1947, which were computed on basis of six 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	4,731	175	120	153	9,380
February	4,886	214	140	174	9,690
March	7,433	416	130	240	14,740
April	15,847	883	296	528	31,430
May	78,576	3,640	786	2,535	156,900
June	85,150	3,970	2,190	2,838	168,900
July	44,218	2,270	642	1,426	87,710
August	24,786	1,600	582	800	49,160
September	22,364	1,840	533	745	44,360
October	17,800	1,000	440	574	35,310
November	9,137	410	240	305	18,120
December	7,622	270	200	246	15,120
Year 1947	322,550	3,970	120	884	639,800

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 1947 in reports of Geological Survey. June 1899 to December 1947 in reports of State Engineer.

Extremes - Maximum discharge during year 1,960 second-feet May 11, (gage height 3.43 feet); minimum daily discharge 31 second-feet August 11.
1889-1947: 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 Aug. 4, 1940.

Remarks - Records considered excellent except those for period of ice effect, January 1 to February 21, November 15, 16, November 20 to December 31, 1947, which were computed on basis of six 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	7,473	265	210	241	14,820
February	9,024	410	270	322	17,900
March	7,884	444	138	254	15,640
April	6,503	583	86	217	12,900
May	33,497	1,910	323	1,081	66,440
June	11,579	679	116	386	22,970
July	5,671	363	74	183	11,250
August	3,160	323	31	102	6,270
September	6,247	711	127	208	12,390
October	5,021	281	98	162	9,960
November	10,343	472	156	345	20,520
December	9,680	350	270	312	19,200
Year 1947	116,082	1,910	31	318	230,260

RIO GRANDE COMPACT COMMISSION

MONTHLY SUMMARY OF DISCHARGE

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, 100 feet downstream from highway bridge, 1-3/4 miles southwest 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 Luis Valley, Colorado).

Records available.- February 1895 to December 1905, June 1909 to December 1947.

Extremes.- Maximum discharge during year, 5,750 second-feet May 10 (gage height 669 feet); minimum daily discharge 270 second-feet October 1.
1930-45: 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. Flow partly regulated by El Vado Reservoir on upper Rio Chama which stores water for irrigation. Diversions above station for irrigation.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet
January	17,831	840	472	575	35,370
February	19,593	817	585	700	38,860
March	20,675	778	590	667	41,010
April	25,389	1,440	472	846	50,320
May	76,200	4,970	1,260	2,458	151,100
June	34,567	1,680	858	1,152	68,560
July	31,853	1,440	651	1,028	63,180
August	30,196	1,930	454	974	59,890
September	14,722	893	356	491	29,200
October	21,286	1,550	316	687	42,220
November	55,400	2,060	810	1,847	109,900
December	37,371	2,060	601	1,206	74,120
Year 1947	385,062	4,970	316	1,055	763,700

RIO GRANDE AT SAN ACACIA, NEW MEXICO

Location.- Water-stage recorder, lat. 34°15'20", long. 106°53'30", in NE¼, Sec. 1, T. 1 S., R. 1 W., 0.2 mile downstream from San Acacia diversion dam, half a mile east of San Acacia and 2 miles downstream from Rio Salado. Datum of gage is 4,660.16 feet above mean sea level, datum of 1929.

Drainage area.- 26,770 square miles (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colorado).

Records available.- April 1936 to December 1947.

Extremes.- Maximum discharge during year, 6,170 second-feet Aug. 18 (gage height 6.78 feet); minimum daily, 2 second-feet April 19.
1936-47: Maximum discharge 27,400 second-feet Aug. 5, 1936 (gage height 8.35 feet; datum of gage 4,662.56 feet), from rating curve extended above 18,000 second-feet by logarithmic plotting; no flow June 22 to July 7, 1946.

Remarks.- Records good. January and February, others fair. Diversions above station for irrigation.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet
January	20,918	860	440	675	41,490
February	17,900	747	536	639	35,500
March	8,046	716	32	260	15,960
April	3,462	674	2	115	6,870
May	53,400	4,830	282	1,723	105,900
June	5,789	804	3	193	11,480
July	5,842	509	10	188	11,590
August	38,666	4,540	7	1,247	76,690
September	4,878	812	6	162	9,670
October	5,486	177	1,320	4	10,880
November	49,785	1,660	2,020	180	98,760
December	38,952	1,257	1,960	684	77,260
Year 1947	253,119	4,830	2	693	502,000

RIO GRANDE COMPACT COMMISSION

MONTHLY SUMMARY OF DISCHARGE

RIO GRANDE AT SAN MARCIAL, NEW MEXICO

Location.- Water-stage recorder, lat. 33°40'50", long. 106°59'15", in Pedro Armendaris Grant 33, at Atchison, Topeka and Santa Fe Railway bridge, 1.1 miles downstream from San Marcial, Socorro County. Datum of gage is 4,465.38 feet above mean sea level (levels by International Boundary Commission).

Drainage area.- 27,700 square miles (including 2,940 square miles in closed basin in northern part of San Luis Valley, Colorado).

Records available.- January 1895 to December 1947.

Extremes.- Maximum discharge during year, 5,680 second-feet May 14 (gage height 14.57 feet); maximum gage height 14.93 feet August 24; no flow August 8-10, October 8-10.
1895-47: Maximum discharge about 50,000 second-feet Oct. 1, 1904; no flow at times.

Remarks.- Records good except those for periods of ice effect or no gage height record, which are poor. Diversions above station for irrigation.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet
January	18,370	1,120	230	593	36,440
February	16,688	685	455	596	33,100
March	10,131	685	99	327	20,090
April	2,493	250	35	83.1	4,940
May	47,752	5,170	265	1,540	94,710
June	4,062	611	18	135	8,060
July	2,294	213	17	74.0	4,550
August	29,098	4,450	0	939	57,720
September	5,033	519	22	168	9,960
October	3,282	652	0	106	6,510
November	41,829	1,950	57	1,394	82,970
December	37,606	1,900	602	1,213	74,590
Year 1947	218,637	5,170	0	599	433,660

RIO GRANDE BELOW ELEPHANT BUTTE DAM, NEW MEXICO

Location.- Water-stage recorder, lat. 33°09'05", long. 107°12'10", in NE¼ Sec. 26, T. 15 S., R. 4 W., (projected), 5,800 feet downstream from Elephant Butte Dam in Pedro Armendaris Grant.

Records available.- October 1916 to December 1947.

Extremes.- Maximum daily discharge during year, 1,370 second-feet April 30, June 12; minimum daily discharge 81 second-feet November 9.
1916-47: Maximum daily discharge, 8,220 second-feet May 22, 1942; no flow at times.

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

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet
January	29,801	1,240	644	961	59,110
February	27,877	1,300	642	996	55,290
March	29,438	1,220	447	950	58,390
April	34,854	1,370	796	1,162	69,130
May	33,091	1,280	798	1,067	65,640
June	33,720	1,370	797	1,124	66,880
July	34,628	1,270	867	1,117	68,680
August	31,478	1,570	199	1,015	62,440
September	11,400	937	175	380	22,610
October	6,257	571	112	202	12,410
November	4,248	401	81	141	8,430
December	4,597	259	86	148	9,120
Year 1947	281,589	1,370	81	772	558,100

RIO GRANDE COMPACT COMMISSION

MONTHLY SUMMARY OF DISCHARGE

RIO GRANDE BELOW CABALLO, NEW MEXICO

Location.- Water-stage recorder, Lat. 32°55'05", Long. 107°17'30", in NE¼ SW¼ Sec. 30, T. 16 S., R. 4 W., 600 feet upstream from Bojarquez 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 4,145.9 feet above mean sea level.

Records available.- January 1938 to December 1947.

Extremes.- Maximum daily discharge during year, 2,810 second-feet July 10; minimum daily discharge 1.6 second-feet October 3, 20, 25, November 13, 17.
1938-47: Maximum daily discharge 7,650 second-feet May 20, 1942; minimum daily 1.3 second-feet Nov. 16-21, Dec. 12-27, 1940.

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

Note.- The total release from Project Storage is the sum of the discharge at this station and the discharge in Bonita ditch which diverts directly from the reservoir.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	318.0	16.3	7.9	10.3	630
February	6,077	1,080	17	217	12,050
March	39,657	2,780	42	1,279	78,660
April	62,100	2,770	1,360	2,070	123,170
May	43,440	1,680	1,010	1,401	86,160
June	56,660	2,190	1,260	1,889	112,380
July	74,750	2,810	2,080	2,411	148,260
August	57,752	2,660	828	1,863	114,550
September	24,559	2,340	1.8	819	48,710
October	55.9	2.0	1.6	1.8	110
November	54.1	2.0	1.6	1.8	110
December	58.4	2.1	1.8	1.9	120
Year 1947	365,481.4	2,810	1.6	997	724,910

BONITA DITCH BELOW CABALLO DAM, NEW MEXICO

Location.- The ditch diverts directly from the reservoir to irrigate lands on the right bank of the river. The total release from Project Storage, as used on 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	-	-	-	-	202
April	-	-	-	-	289
May	-	-	-	-	162
June	-	-	-	-	373
July	-	-	-	-	457
August	-	-	-	-	202
September	-	-	-	-	32
October	-	-	-	-	0
November	-	-	-	-	0
December	-	-	-	-	0
Year 1947	-	-	-	-	1,717

RIO GRANDE COMPACT COMMISSION

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 1947 at present site.

Extremes.- Maximum discharge during year, 2,140 second-feet May 9 (gage height 4.37 feet); minimum daily discharge 41 second-feet January 16.
1899-1900, 1903-05, 1907-47: Maximum discharge 9,000 second-feet Oct. 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) Dec. 19, 1939.

Remarks.- Records considered good. No diversions or regulation above station.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	1,526	58	41	49.2	3,030
February	1,665	69	53	59.1	3,280
March	2,839	190	48	91.6	5,630
April	8,598	656	113	287	17,050
May	37,347	1,940	565	1,205	74,080
June	30,985	1,730	558	1,033	61,460
July	8,822	542	94	285	17,500
August	5,274	321	81	170	10,460
September	5,328	728	64	178	10,570
October	4,249	215	83	137	8,430
November	2,243	110	47	74.8	4,450
December	1,767	77	47	57.0	3,500
Year 1947	110,633	1,940	41	303	219,400

CONEJOS RIVER NEAR LOS 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 Los Sauces. Datum of gage (north channel) is 7,495.02 feet above mean sea level (Colorado State Highway Department bench mark.)

Drainage.- 887 square miles.

Records available.- March 1921 to December 1947.

Extremes.- Maximum discharge during year, 1610 second-feet May 6; minimum daily discharge 1.5 second-feet July 31.
1921-47: Maximum discharge 3,890 second-feet May 15, 1941; no flow July 21 to Sept. 8, 1934.

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

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	1,626	64	42	52.5	3,230
February	1,955	89	60	69.8	3,880
March	1,870	85	45	60.3	3,710
April	3,593	411	22	120	7,130
May	22,070	1,440	314	712	43,780
June	5,548	454	19	185	11,000
July	222.0	17	1.5	7.16	440
August	340.6	54	1.6	11.0	676
September	1,184	214	19	39.5	2,350
October	1,031	48	20	33.3	2,040
November	1,471	54	42	49.0	2,920
December	1,854	73	53	59.8	3,680
Year 1947	42,764.6	1,440	1.5	117	84,840

RIO GRANDE COMPACT COMMISSION

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 are.- 110 square miles.

Records available.- January to October 1915, May to October 1920, October 1924 to December, 1947.

Extremes.- Maximum discharge during year, 475 second-feet May 3 (gage height 3.07 feet); no flow at times.
1915, 1919-20, 1924-47: Maximum discharge, 1,750 second-feet Apr. 15, 1937 (gage height 5.38 feet), from rating curve extended above 1,100 second-feet, no flow at times.

Remarks.- Records fair. A few small diversions above station for irrigation.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	27.9	-	-	0.9	55
February	56.0	-	-	2.0	111
March	217	-	-	7	430
April	3,591	256	30	113	6,750
May	4,144	333	18	134	8,220
June	154.4	16	0	5.15	306
July	27.6	8.8	0	.89	55
August	106.0	15	0	3.42	210
September	54.0	8.8	.1	1.80	107
October	90.8	15	0	2.93	180
November	84.0	-	-	2.8	167
December	68.2	-	-	2.2	135
Year 1947	8,420.9	333	0	23.1	16,710

LOS PINOS RIVER NEAR ORTIZ, COLORADO

Location.- Water-stage recorder, lat. 36°58', long. 106°03', in New Mexico, in NE¼ 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, 1,740 second-feet May 3 (gage height 4.83 feet); minimum daily 15 second-feet January 16.
1914-20, 1924-47: Maximum discharge 3,160 second-feet May 12, 1941; minimum 6 second-feet August 11, September 19, 1934.

Remarks.- Records considered excellent except those for period of ice effect, Jan. 1 to March 9, Nov. 6 to Dec. 31, which were computed on basis of 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	482	19	15	15.5	956
February	704	37	18	25.1	1,400
March	1,419	115	25	45.8	2,810
April	7,436	599	68	248	14,750
May	18,314	1,140	310	591	36,330
June	5,362	320	64	179	10,640
July	1,104	83	16	35.6	2,190
August	1,016	84	14	32.8	2,080
September	1,231	178	15	41.0	2,440
October	1,268	77	22	40.9	2,520
November	617	-	-	20.6	1,220
December	620	-	-	20.0	1,230
Year 1947	39,573	1,140	15	108	78,610

RIO GRANDE COMPACT COMMISSION

MONTHLY SUMMARY OF DISCHARGE

RIO CHAMA BELOW EL VADO DAM, NEW MEXICO
(Formerly Known as Near Tierra Amarilla)

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, 2.7 miles upstream from Rio Nutrias, and 13 miles southwest of Tierra Amarilla.

Records available.- October 1935 to December 1947.

Extremes.- Maximum daily discharge during year, 1400 second-feet November 6, 8; minimum daily discharge 1.2 second-feet January 3.
1935-47: Maximum discharge, 6,010 second-feet May 17, 1941 (gage height 6.89 feet); maximum gage height 9.63 feet May 30, 1937, site and datum then in use; minimum daily discharge, 0.9 second-foot December 30, 1946.

Remarks.- Records excellent. Diversions above station for irrigation. Flow regulated by El Vado Reservoir.

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in Acre-feet
January	57.2	2.2	1.2	1.85	113
February	84.7	4.8	2.2	3.02	168
March	85.0	3.8	2.0	2.74	169
April	119.6	5.6	3.6	3.99	237
May	486.8	20	5.6	15.7	966
June	14,384	1,060	18	479	28,530
July	21,254	1,110	502	686	42,160
August	14,713	1,330	36	475	29,180
September	524	38	15	17.5	1,040
October	8,207	612	13	265	16,280
November	37,231	1,400	435	1,241	73,860
December	14,549.4	1,140	4.4	469	28,860
Year 1947	111,695.7	1,140	1.2	306	221,600

SANTA FE CREEK NEAR SANTA FE, NEW MEXICO

Location.- Water-stage recorder and sharp crested concrete control, lat. 35°41'15", long. 105°50'10", in NW¼ SW¼ Sec. 24, T. 17 N., R. 10E., 300 feet downstream from McClure Dam and 6 miles east of Santa Fe.

Records available.- May to June 1910 at site 3 miles downstream, January 1913 to December 1947.

Extremes.- Mean daily discharge during year, 42 second-feet May 11, minimum daily discharge 0.7 second-foot July 16-18.
1930-47: Maximum discharge 418 second-feet April 23, 1942 (gage height 8.51 feet) from rating curve extended above 150 second-feet; minimum daily discharge 0.2 second-feet December 3-14, 16-29, 1943.

Remarks.- Records good except those for periods of ice effect, 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	55.5	2.2	1.4	1.79	110
February	44.2	1.8	1.3	1.58	88
March	90.7	4.9	1.6	2.93	180
April	161.4	7.6	3.4	5.38	320
May	426.5	42	1.8	13.8	846
June	247.9	32	7.0	8.26	492
July	122.0	13	.7	3.94	242
August	27.9	1.1	.8	.90	55
September	163.5	8.8	.8	5.45	324
October	106.5	14	.3	3.44	211
November	12.0	.4	.4	.40	24
December	20.1	1.3	.4	.65	40
Year 1947	1,478.2	42	.3	4.06	2,930

RIO GRANDE COMPACT COMMISSION

STORAGE IN RESERVOIRS

1947

SQUAW LAKE RESERVOIR.- Dam and adjacent staff gage located in approximate Sec. 12, T. 39 N., R. 4 W., N.M.P.M., on Squaw Lake. Total capacity of reservoir, 156 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 adjacent 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 adjacent 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.			
Jan.	-	-		-	-		-	-				
Feb.	-	-		-	-		-	-				
Mar.	-	-		-	-		17.1	237	+222			
Apr.	8.0	140	+140	7.0	219	0	11.0	110	-127			
May	8.0	140	0	7.0	219	0	-	-				
June	8.0	140	0	7.6	257	+38	17.1	237	+127			
July	5.6	97	- 43	7.6	257	0	11.6	121	-116			
Aug.	0	0	- 97	7.6	257	0	7.2	54	- 67			
Sept.	-	-		7.6	257	0	7.2	54	0			
Oct.	-	-		-	-		7.2	54	0			
Nov.	-	-		-	-		-	-				
Dec.	-	-		-	-		-	-				
Year			0			+ 38			+ 39			

RESERVOIRS IN NEW MEXICO

CARSON RESERVOIR.- Dam and water-stage recorder located in NW¼ Sec. 12, T. 25 N., R. 10 E., N.M.P.M., 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. Construction completed in 1940.

EL VADO RESERVOIR.- Dam and water-stage recorder (staff gage used below elevation 6,878.0) location in SE¼ Sec. 4, T. 27 N., R. 2 E., N.M.P.M., on Rio Chama. Total capacity of reservoir, 200,340 acre-feet as determined by original survey in 1927. Water used for irrigation of lands in Middle Rio Grande Conservancy District. Construction completed in 1935.

McCLURE RESERVOIR (Formerly named Granite Point Reservoir).- Dam, staff gage and water-stage recorder located in SW¼ Sec. 24, T. 17 N., R. 10 E., N.M.P.M., in Santiago Ramirez Grant, on Santa Fe Creek. Capacity of original reservoir, completed in 1926, 561 acre-feet. In 1935 the spillway was raised increasing the capacity 89 acre-feet and in 1947 there was a second enlargement increasing the total capacity to 2,908 acre-feet. Only the capacity due to enlargements, 2,347 acre-feet is subject to Compact administration.

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

Last Day of	CARSON			EL VADO			McCLURE (Enlargement)			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.	Gage Height Ft.	Contents Ac-Ft.	Change Ac-Ft.
Jan.				6808.4	24,650	+4,650		0		164.5	612	- 61
Feb.				14.6	30,080	+5,430		0		162.1	547	- 65
Mar.				26.2	42,090	+12,010		0		163.2	577	+ 30
April				53.0	79,470	+37,380		0		166.7	676	+ 99
May				95.4	176,900	+97,430		0		171.6	830	+154
June				92.6	168,600	- 8,300		0		168.1	719	-111
July				78.4	130,300	-38,300		0		162.2	550	-169
Aug.	NO STORAGE DURING YEAR			68.7	108,500	-21,800		0		148.0	248	-302
Sept.				71.9	115,300	+ 6,800		0		147.5	240	- 8
Oct.				67.1	105,200	-10,100		0		143.9	188	- 52
Nov.				20.9	36,290	-68,910		0		-	54	-134
Dec.				6777.5	5,480	-30,810		0		123.9	22	- 32
Year						-14,520						-651

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RIO GRANDE COMPACT COMMISSION

STORAGE IN RESERVOIRS

1947

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 original survey in 1937. Water is used for irrigation of lands on the Acoma and Laguna Indian Reservations. 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 the Laguna Indian Reservation. Completed 1934.

PAGUATE RESERVIOR.- 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.			
Jan.	133.7	710	+280	62.0	230	0		760	0			
Feb.	135.6	840	+130	62.0	230	0		750	-10			
Mar.	134.4	780	- 60	62.0	230	0		740	-10			
Apr.	133.8	720	- 60		100	-130		540	-200			
May.	129.3	480	-240		70	- 30		380	-160			
June	124.2	280	-200	59.0	20	- 50		0	-380			
July	118.0	130	-150	00	10	- 10		80	+ 80			
Aug.		0	-130	00	0	- 10		740	+660			
Sept.	112.3	80	+ 80		0	0		860	+120			
Oct.	121.4	650	+570		100	+100		770	- 90			
Nov.	128.3	420	-230		130	+ 30		690	- 80			
Dec.		800	+380	62.0	230	+100		700	+ 10			
Year			+370			0			- 60			

ELEPHANT BUTTE RESERVOIR.- Dam and gages located in NW¼ Sec. 30, T. 13 S., R. 3 W., on Rio Grande. Total capacity of reservoir, 2,219,000 acre-feet as determined by partial survey and estimate in 1940. 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, 345,872 acre-feet as determined by original survey. Water is used to irrigate lands in New Mexico and Texas.

PROJECT STORAGE.- The combined storage in Elephant Butte and Caballo Reservoirs. Total Project Storage capacity, 2,564,872 acre-feet of which 100,000 acre-feet in Caballo 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.			
Jan.	4334.99	557,300	- 26,900	4173.33	255,000	+ 47,900		812,300	+ 21,000			
Feb.	33.48	537,600	- 19,700	76.79	288,700	+ 33,700		826,300	+ 14,000			
Mar.	31.10	507,400	- 30,200	74.51	266,600	- 22,100		774,000	- 52,300			
April	26.03	446,100	- 61,300	68.19	208,400	- 58,200		654,500	-119,500			
May	27.32	461,300	+15,200	65.68	188,600	- 19,800		649,900	- 4,600			
June	22.46	405,600	- 55,700	59.85	144,400	- 44,200		550,000	- 99,900			
July	16.33	341,100	- 64,500	46.65	70,600	- 73,800		411,700	-138,300			
August	14.68	324,900	- 16,200	36.36	35,700	- 34,900		360,600	- 51,100			
Sept.	13.85	316,900	- 8,000	26.28	13,000	- 22,700		329,900	- 30,700			
Oct.	13.12	312,500	- 4,400	33.58	28,400	+ 15,400		340,900	+ 11,000			
Nov.	18.81	366,400	+ 53,900	37.99	40,300	+ 11,900		378,300	+ 37,400			
Dec.	25.11	435,500	+ 69,100	41.58	51,400	+ 11,100		486,900	+108,600			
Year			-148,700			-155,700		304,400	-304,400			

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RIO GRANDE COMPACT COMMISSION

TRANSMOUNTAIN DIVERSIONS

1947

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.

Period of record June 1 to Aug. 30

	May	June	July	Aug.	Sept.
Sec.Ft.Days		97.1	95.7	75.2	
Mean		3.24	3.09	2.43	
Acre-feet		193	190	149	
Maximum		7.9	5.8	5.3	
Minimum		0	1.4	0	

SUMMARY

Sec. Ft. Days	268.0
Mean	2.91
Acre-feet	532
Maximum	7.9
Minimum	0

WEMINUCHE PASS (WEST DITCH) RABER-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 Creek, a tributary to the Rio de los Pinos in the SanJuan River Basin; empties into Weminuche Creek, a tributary of the Rio Grande. Diversion is from Rio Grande above the Del Norte gaging station.

Period of record June 1 to Aug. 30

	May	June	July	Aug.	Sept.
Sec.Ft.Days		253.2	313.2	89.1	
Mean		8.44	10.1	2.87	
Acre-feet		502	621	177	
Maximum		14.9	14.7	5.9	
Minimum		0	5.9	0	

SUMMARY

Sec. Ft. Days	655.5
Mean	7.12
Acre-feet	1,300
Maximum	14.9
Minimum	0

TABOR

Bristol 8-day recorder and 2-foot wooden Parshall flume. Ditch crosses Continental Divide at Lat. 37°56' N., Long. 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.

Period of record June 1 to Aug. 30

	May	June	July	Aug.	Sept.
Sec.Ft.Days		116.6	121.4	44.0	
Mean		3.89	3.92	1.42	
Acre-feet		231	241	87	
Maximum		6.2	5.8	2.6	
Minimum		0	2.5	0	

SUMMARY

	282.0
Mean	3.07
Acre-feet	559
Maximum	6.2
Minimum	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.

Period of record July 1 to 31

	May	June	July	Aug.	Sept.
Sec.Ft.Days			44.4		
Mean			1.43		
Acre-feet			88		
Maximum			2.3		
Minimum			0		

SUMMARY

Sec.Ft.Days	44.4
Mean	1.43
Acre-feet	88
Maximum	2.3
Minimum	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 South Fork, Colorado. Diversion originates on Wolf Creek, a tributary to the San Juan River; empties into Middle Creek, a tributary of South For in the Rio Grande Basin. Diversion is from the Rio Grande below the Del Norte gaging station.

Period of record June 1 to July 30

	May	June	July	Aug.	Sept.
Sec.Ft.Days		73.8	20.4		
Mean		2.46	.66		
Acre-feet		146	40		
Maximum		4.3	1.7		
Minimum		0	0		

SUMMARY

Sec.Ft.Days	94.2
Mean	1.54
Acre-feet	186
Maximum	4.3
Minimum	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 SanJuan 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.

	May	June	July	Aug.	Sept.

No diversions during year

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 in 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. At some of the stations it was not possible to obtain continuous evaporation records throughout the winter period.

Evaporation and precipitation records from stations in Colorado and New Mexico are tabulated on the following page.

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.

The records of evaporation and precipitation at Elephant Butte Dam and El Vado Dam, and the records of precipitation at Caballo Dam, Pankey Ranch, Farmington and Santa Fe antedate the effective date of the Compact. The stations near Wagon Wheel Gap, near Conejos and at Summitville and the evaporation station at Caballo Dam were established by the U. S. Weather Bureau at the request of the Commission. The Evaporometer at San Marcial was discontinued by the International Boundary Commission, U. S. Section.

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

RIO GRANDE COMPACT COMMISSION

EVAPORATION AND PRECIPITATION RECORDS

1947

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

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

ELEPHANT BUTTE DAM, NEW MEXICO - In Sierra County, elevation 4,576 feet, lat. 33°09', long. 107°11', at Elephant Butte, N. Mex. 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 near Caballo, N. Mex. Standard Class "A" pan, anemometer, maximum and minimum thermometers, standard 8-inch rain gage, and recording rain gage.

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

FARMINGTON, NEW MEXICO - In San Juan county, elevation 5,300 feet, lat 36°43', long. 108°12', near Animas River Bridge near Farmington. Floating pan, anemometer and 8-inch rain gage.

	EVAPORATION IN INCHES												
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
WAGON WHEEL GAP, COLO.	-	-	-	-	-	7.81	7.08	5.12	4.76	-	-	-	
CONEJOS DAM, "	-	-	-	-	8.16	9.21	6.92	7.08	6.51	5.52	-	-	
SAN LUIS LAKES, "	-	-	-	5.01	8.11	10.57	9.63	7.85	6.06	4.58	-	-	
EL VADO DAM, N. MEX.	-	-	-	-	-	12.14	-	6.69	6.28	4.83	-	-	
ELEPHANT BUTTE DAM, N.M.	3.43	5.59	8.81	13.22	15.13	17.38	16.37	12.18	12.23	9.46	5.42	3.05	122.27
CABALLO DAM, N. MEX.	3.56	5.10	8.37	12.94	14.49	17.16	15.85	10.73	11.20	9.19	4.76	2.57	116.61
AGRICULTURAL COLLEGE,"	2.86	4.61	7.41	10.11	12.42	13.13	13.48	10.34	9.58	7.62	3.84	2.54	97.94
FARMINGTON, "	-	2.11	4.35	6.07	6.15	6.21	5.85	3.96	3.78	2.56	1.51	-	

	PRECIPITATION IN INCHES												
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
WAGON WHEEL GAP, COLO.	0.24	0.16	0.15	1.13	1.08	1.78	1.95	2.59	1.66	2.02	0.39	0.98	13.14
CONEJOS DAM, "	.32	T	.13	1.32	1.05	.50	1.39	2.85	.96	.84	.04	.27	9.67
SAN LUIS LAKES, "	.05	T	.08	1.07	.81	.73	.85	2.84	1.27	.79	.11	.31	8.31
EL VADO DAM, N. MEX.	.77	.59	.75	.20	2.01	.31		3.57	2.16	1.12	.65	.08	
ELEPHANT BUTTE DAM, N.M.	.27	0.00	.34	.04	.20	1.20	.51	3.69	.23	.14	.18	.24	7.04
CABALLO DAM, N. MEX.	.14	0.00	.11	.02	.06	.74	.43	2.64	.18	.08	.33	.15	4.88
AGRICULTURAL COLLEGE,"	1.11	.05	.18	T	.19	.19	.28	2.38	0.00	0.00	.60	.50	6.08
FARMINGTON, "	.22	.20	.26	.08	1.37	T	.10	2.56	.39	1.94	.14	.11	8.35

RIO GRANDE COMPACT COMMISSION

BUDGET

FOR FISCAL YEAR ENDING JUNE 30, 1948

ADOPTED AT THE EIGHTH ANNUAL (EIGHTEENTH) MEETING OF THE COMMISSION

AT SANTA FE, NEW MEXICO, FEBRUARY 20, 21, 1947

ITEM	TOTAL COST	BORNE BY UNITED STATES	BORNE BY COMPACTING STATES		
			COLORADO	NEW MEXICO	TEXAS
GAGING STATIONS					
In Colorado	$3,500	$1,700	$1,800		
In New Mexico above Elephant Butte	9,000	6,000		$3,000	
below San Marcial	2,500				$2,500
SUB-TOTAL	15,000	7,700	1,800	3,000	2,500
ADMINISTRATION	4,500		1,500	1,500	1,500
TOTAL COST	19,500	$7,700	3,300	4,500	4,000
NET TO STATES	11,800		3,300	4,500	4,000
CASH ADJUSTMENT			Dr 633	Cr 567	Cr 66
ADJUSTED NET TO STATES	$11,800		$3,933	$3,933	$3,934

COST OF OPERATION

FOR FISCAL YEAR ENDING JUNE 30, 1947

ITEM	TOTAL COST	BORNE BY UNITED STATES	BORNE BY COMPACTING STATES		
			COLORADO	NEW MEXICO	TEXAS
GAGING STATIONS					
In Colorado	$3,500	$1,700	$1,800		
In New Mexico above Elephant Butte	$11,300	7,700		$3,600	
below San Marcial	$2,500				$2,500
SUB-TOTAL	$17,300	$9,400	$1,800	$3,600	$2,500
ADMINISTRATION	1,100		100	950	50
TOTAL COST	18,400	9,400	1,900	4,550	2,550
BORNE BY UNITED STATES	$9,400	$ 9,400			
NET TO STATES			1,900	4,550	2,550
SHARE OF EACH STATE			3,000	3,000	3,000
CASH ADJUSTMENT			Dr $1,000	Cr $1,550	Dr $450