

Fifth Annual Report  
of the  
**RIO GRANDE COMPACT  
COMMISSION**

1943



TO THE GOVERNORS OF  
Colorado, New Mexico and Texas



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Ft. Quitman, Texas.

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## Rio Grande Compact Commission

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Governor of the State of Colorado

HIS EXCELLENCY, JOHN J. DEMPSEY  
Governor of the State of New Mexico

HIS EXCELLENCY, COKE R. STEVENSON  
Governor of the State of Texas

Sirs:

At the Fifth Annual meeting of the Rio Grande Compact Commission held in Santa Fe, New Mexico, February 24 and 25, 1944, the Commission reviewed and adopted schedules of deliveries and releases of water for the year 1943.

At the beginning of 1943 there were no credits or debits by virtue of actual spill from Elephant Butte Reservoir in 1942 pursuant to the provisions of Article VI of the Compact.

The records for 1943 show that Colorado incurred a debit of 28,700 acre feet at the end of 1943 and that New Mexico incurred a debit of 59,200 acre feet for the same period. The release of usable water from project storage during 1943 for use in part in Texas, aggregated 913,300 acre feet, which, after adjustment for evaporation losses was 115,900 acre feet in excess of the normal release provided for by the Compact.

The expenses for administration during the fiscal year ending June 30, 1943 were \$17,466.82 of which \$5,800.00 was borne by the United States under cooperative agreements. The balance \$11,666.82 was borne equally by the three states in the amounts of \$3,888.94, each.

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

Respectfully yours,

*M. C. Hinderlider*

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

*Thomas M. McClure*

THOMAS M. McCLURE  
Rio Grande Compact Commissioner  
for New Mexico

*J. E. Quaid*

J. E. QUAID  
Rio Grande Compact Commissioner  
for Texas

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## 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.

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(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:



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# 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

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Rio Grande at Del Norte (3)	Rio Grande at Lobatos less Conejos at Mouths (4)
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 at tion:

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 trans-mountain diversions into the Rio Grande between Lobatos and San Marcial.

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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.

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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 adminis-

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tration 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

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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.

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 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 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.

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## 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.

## TRANS-MOUNTAIN 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 allowance 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.

## SECRETARY

The Commission shall employ a secretary who shall be a registered professional engineer, or a Corporate Member of the American Society of Civil Engineers, experienced in irrigation, agricultural or hydraulic engineering. The period of employment of the secretary shall be at the pleasure of the Commission but not exceeding one year, at the end of which period his services shall automatically terminate; provided, how-

ever, that the Commission, upon unanimous agreement, may extend his employment for a period not exceeding one year following the year within which his employment has been automatically terminated, or may employ another individual under like conditions with respect to period of employment, it being the intent and purpose of the Commission to limit the term of employment of any such appointee so that any re-appointment, or the appointment of any successor, can be made for a period of but one year, and then only by the unanimous action of the Commission.

The salary of the secretary shall be determined by the Commission. He shall be reimbursed for his necessary traveling expenses incurred in performing his official duties, as may be determined by the Commission.

Each of the respective states, at its own expense, shall provide adequate office facilities for the use of the secretary of the Commission.

It shall be the duty of the secretary to collect and correlate all factual data and other records having a bearing upon the administration of the Compact, and to keep each Commissioner advised thereof. It shall be the further duty of the secretary to inspect all gaging stations maintained by the Commission, and to make recommendations to the Commission as to any changes or improvements to existing stations, and for the addition of new stations, to the end that reliable records may be had for the proper carrying out of the provisions of the Compact.

The secretary shall 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 at State Line;
- (b) Deliveries by New Mexico at San Marcial; and
- (c) Release and Spill from Project Storage.

He shall also compile a complete report covering his secretarial activities, and a summary of all factual data required by the Compact during the preceding calendar year, and submit the same to the Commission at its regular meeting in February, first following the calendar year covered by such report.

The secretary shall carry on such other duties as the Commission may assign to him from time to time, and shall devote his entire time to the duties of his office. He shall execute and deliver a surety bond satisfactory to the Commission, conditioned upon the faithful performance of the duties of his office.

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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 operation 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 each 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.

#### MEETINGS 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,

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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 24 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, exception only flood water entering Caballo Reservoir from tributaries below Elephant Butte Reservoir.

## RECORDS OF DELIVERIES AND RELEASES

Schedules of deliveries by Colorado and New Mexico are set forth in Articles III and IV of the Compact. Normal releases from project storage are fixed by the Compact at 790,000 acre-feet per year. In February of each year the Commission holds its annual meeting, at which time records of deliveries and releases for the previous calendar year are reviewed and adopted as official. The records adopted by the Commission for 1943 are shown on the following three pages.

Deliveries by Colorado at the Colorado-New Mexico state line produced an annual debit for 1943 of 28,700 acre-feet after adjustments provided for in the Compact were made. Since there were neither debits nor credits at the beginning of 1943 the accrued debit for Colorado is also 28,700 acre-feet.

Deliveries by New Mexico at San Marcial resulted in an annual debit of 59,200 acre-feet after adjustments provided for in the Compact were made. Since there were neither debits nor credits at the beginning of 1943 the accrued debit for New Mexico is also 59,200 acre-feet.

The annual departure from normal release of water from project storage for 1943 was in excess by 115,900 acre-feet after adjustments were made for evaporation. By virtue of the fact that there were neither accrued debits nor accrued credits at the beginning of 1943, the accrued departure from normal release is also 115,900 acre-feet in excess of the Compact limitation.

Cooperation in supplying data necessary to making required adjustments to the schedules of deliveries and releases has been received from:-

Soil Conservation Service	Agricultural Adjustment
New Mexico State Engineer	Administration
Colorado State Engineer	United Pueblos Agency
Weather Bureau	New Mexico Power Company
Grazing Service	Forest Service

This cooperation is herewith acknowledged.



# RIO GRANDE COMPACT DELIVERIES BY COLORADO AT STATE LINE

YEAR 1943

Quantities in Thousands of Acre Feet to Nearest Hundred

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 LOSATOS LESS CONEJOS RIVER	ACTUAL DELIVERY AT LOSATOS GAUGE	ADJUSTMENTS PER COMPACT										
CONEJOS RIVER AT MOGOTE	LOS PINOS RIVER NEAR ORTIZ	SAN ANTONIO RIVER AT ORTIZ	TOTAL MEASURED FLOW																						
M	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16										
JAN	2.7	—	—	2.7	—	2.7	13.4	—	13.4	—	—	2.9	16.2	19.1	—										
FEB	2.8	—	—	2.8	—	2.8	14.4	—	14.4	—	—	3.8	17.1	20.9	—										
MAR	4.0	—	—	4.0	—	4.0	13.1	—	13.1	—	—	3.4	16.6	20.0	—										
1ST QTR.	9.5	—	—	9.5	—	9.5	40.9	—	40.9	—	—	10.1	46.9	60.0	—										
APR	32.7	26.6	7.6	66.9	—	66.9	67.9	—	67.9	0	0.5 <sup>a</sup>	13.8	8.8	22.6	—										
MAY	59.4	26.0	3.3	88.7	—	88.7	115.2	—	115.2	0	0.5 <sup>a</sup>	24.8	9.4	34.2	—										
JUN	55.4	12.1	0.2	67.7	—	67.7	116.1	-0.1 <sup>a</sup>	116.0	0	0.5 <sup>a</sup>	10.3	9.5	19.8	—										
2ND QTR.	167.5	64.7	11.1	223.3	—	223.3	295.2	-0.1 <sup>a</sup>	295.1	0	—	18.9	27.7	76.6	—										
JUL	17.9	2.8	0.1	20.8	—	20.8	18.5	—	18.5	0	0.5 <sup>a</sup>	2.0	3.8	5.8	—										
AUG	8.2	1.9	0.6	10.7	—	10.7	13.1	—	13.1	0	0.5 <sup>a</sup>	1.1	3.5	4.6	—										
SEPT	4.0	1.0	0.1	5.1	—	5.1	26.3	-0.1 <sup>b</sup>	26.2	-0.1	0.2 <sup>c</sup>	1.4	3.1	4.5	—										
3RD QTR.	30.1	5.7	0.8	36.6	—	36.6	117.9	-0.1 <sup>b</sup>	117.8	-0.1	—	4.5	10.4	14.9	—										
OCT	4.0	1.2	0.2	5.4	—	5.4	19.6	—	19.6	0	0.2 <sup>c</sup>	1.9	3.8	5.7	—										
NOV	3.2	—	—	3.2	—	3.2	13.4	—	13.4	—	—	2.6	8.8	11.4	—										
DEC	2.4	—	—	2.4	—	2.4	11.4	—	11.4	—	—	3.0	11.9	14.9	—										
4TH QTR.	9.6	1.2	0.2	11.0	—	11.0	14.4	—	14.4	—	—	7.5	24.5	32.0	—										
YEAR	196.7	71.6	12.1	280.4	—	280.4	498.4	-0.2 <sup>ab</sup>	498.2	-0.1	—	71.0	112.5	183.5	—										
SUMMARY OF DEBITS AND CREDITS																									
ITEM																									
DEBIT																									
CREDIT																									
BALANCE																									
C1 Balance at Beginning of Year: — — — — — 0.0																									
C2 Scheduled Delivery from Conejos River — — — — — 95.7																									
C3 Scheduled Delivery from Rio Grande — — — — — 222.2																									
C4 Actual Delivery at Lobatos plus 10,000 acre feet — — — — — 126.5																									
C5 Adjustments per Compact - Item 16 — — — — — 193.5																									
C6 Reduction of Credits per Article VI — — — — — 28.7																									
C7 Reduction of Debits per Article VI — — — — — —																									
C8 Balance at End of Year — — — — — 28.7																									

REMARKS: Storage in reservoirs constructed after 1937 only.

a Adjustment for transmountain diversions.

b Adjustment for change in storage.

c Does not include water in Pueblo Reservoir which has a capacity of 211 acre feet in 1943.

REMARKS: Storage in reservoirs constructed after 1937 only.

<sup>a</sup> Adjustment for transmountain diversions.

<sup>b</sup> Adjustment for change in storage.

<sup>c</sup> Does not include water in Puche Reservoir which has a capacity of 211 acre feet in 1943.

## SUMMARY OF DEBITS AND CREDITS

ITEM		DEBIT		CREDIT		BALANCE	
C1	Balance at beginning of Year:	—	—	—	—	—	—
C2	Scheduled Delivery from Conejos River	—	—	95.7	—	95.7	0.0
C3	Scheduled Delivery from Rio Grande	—	—	—	—	—	—
C4	Actual Delivery of Lobatos plus 10,000 acre feet	—	126.5	—	—	—	—
C5	Adjustments per Compact - Item 16	—	—	193.5	—	—	—
C6	Reduction of Credits per Article VI	—	—	—	—	—	—
C7	Reduction of Debits per Article VI	—	—	—	—	—	—
C8	Balance at End of Year	—	—	—	—	—	28.7

# RIO GRANDE COMPACT DELIVERIES BY NEW MEXICO AT SAN MARCIAL

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YEAR 1913

Quantities in Thousands of Acre Feet to Nearest Hundred

STORAGE OF WATER IN RESERVOIRS										DELIVERIES AND CREDITS					
QUANTITIES IN RESERVOIRS OF ACTED TO REDUCED										QUANTITIES IN RESERVOIRS OF ACTED TO REDUCED					
M O N T H	RECORDED FLOW AT OTOWI BRIDGE	ADJUSTMENTS ACCOUNT STORAGE ABOVE OTOWI	OTHER ADJUSTMENTS PER COMPACT	EQUIVALENT FLOW AT OTOWI UNDER 1929 CONDITIONS	OTOWI INDEX SUPPLY	LOBATOS TO OTOWI		OTOWI TO SAN MARCIAL		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 TO OTOWI		OTHER ADJUSTMENTS PER COMPACT
						GAIN (+) OR LOSS (-)	TOTAL AT END OF MONTH	GAIN (+) OR LOSS (-)	TOTAL AT END OF MONTH				LOBATOS TO OTOWI	ADJUSTMENTS ACCOUNT DEPLETION DURING JULY, AUGUST, SEPTEMBER TO OTOWI	
JAN	11.6	+3.2	b	11.7	11.7	+3.1	15.5	+0.5	1.1	16.6	52.7	52.7	—	—	—
FEB	12.8	+1.7	b	17.6	17.6	+4.7	50.2	+0.3	1.4	51.6	13.8	13.8	—	—	—
MAR	18.1	+9.1	b	57.4	57.4	+9.1	59.3	+0.4	1.8	61.1	37.0	37.0	—	—	—
1ST QTR	132.5	+16.0	b	119.7	119.7	+16.9	—	+1.2	—	—	133.5	133.5	—	—	—
APR	100.0	+55.7	b	165.8	165.8	+65.7	125.0	-0.4	1.4	126.4	17.7	17.7	—	—	—
MAY	92.2	+16.3	b	139.3	139.3	+16.3	171.3	-0.1	1.3	172.6	54.3	54.3	—	—	—
JUN	87.6	+28.6	b	59.8	59.8	+28.6	112.7	+0.4	1.7	114.4	21.1	21.1	—	—	—
2ND QTR	279.8	+83.4	b	364.9	364.9	+83.4	—	-0.1	—	—	123.1	123.1	—	—	—
JUL	67.1	+10.1	b	27.9	—	+10.1	102.6	-0.6	1.1	103.7	35.8	—	—	—	—
AUG	61.8	+34.8	b	30.0	—	+34.8	67.8	+1.0	2.1	69.9	28.9	—	0.3	0.5	—
SEPT	51.1	+30.2	b	21.1	—	+30.2	37.6	-0.6	1.5	39.1	16.3	—	—	—	—
3RD QTR	183.0	+105.1	b	79.0	—	+105.1	—	-0.2	—	—	81.0	—	0.3	0.5	—
OCT	38.1	+11.5	b	26.6	26.6	+11.5	26.1	-0.2	1.3	27.4	17.0	17.0	—	—	—
NOV	32.6	+1.7	b	34.4	34.4	+1.7	27.8	0	1.3	29.1	19.3	19.3	—	—	—
DEC	36.0	+3.0	b	39.0	39.0	+3.0	30.8	+0.3	1.6	32.4	14.3	14.3	—	—	—
4TH QTR	106.7	+6.8	b	100.0	100.0	+6.8	—	+0.1	—	—	80.6	80.6	—	—	—
YEAR	702.0	+11.6	+3.2	693.6	611.6	+11.6	—	+1.0	—	—	118.2	337.2	0.3	0.5	—

REMARKS: Storage in reservoirs constructed after 1929 only.

a: Stock tank consideration.

b: Adjustment for evaporation from reservoirs, Lobatos to Otowi.

SUMMARY OF DEBITS AND CREDITS			
ITEM	DEBIT	CREDIT	BALANCE
WM1 Balance at Beginning of Year	—	—	0.0
WM2 Scheduled Delivery at San Marcial	395.6	—	395.6
WM3 Actual Delivery in Schedule Months	—	337.2	58.1
WM4 Adjustments Account Depletion in July, Aug., Sept.	0.8	—	59.2
WM5 Other Adjustments - Item 16	—	—	—
WM6 Reduction of Credits per Article VI.	—	—	—
WM7 Reduction of Debits per Article VI.	—	—	—
WM8 Balance at End of Year	—	—	59.2

REMARKS: Storage in reservoirs constructed after 1929 only.

a; Stock tank consideration.

b; Adjustment for evaporation from reservoirs, Lobatos to Otowi.

## SUMMARY OF DEBITS AND CREDITS

ITEM	DEBIT	CREDIT	BALANCE
WM1 Balance at Beginning of Year	—	—	0.0
WM2 Scheduled Delivery of San Marcial	395.6	—	Dr. 395.6
WM3 Actual Delivery in Schedule Months	—	337.2	Dr. 58.4
WM4 Adjustments Account Depletion in July, Aug, Sept.	0.8	—	Dr. 59.2
WM5 Other Adjustments - Item 16	—	—	—
WM6 Reduction of Credits per Article VI.	—	—	—
WM7 Reduction of Debits per Article VI.	—	—	—
WM8 Balance at End of Year	—	—	Dr. 59.2

# RIO GRANDE COMPACT RELEASE AND SPILL FROM PROJECT STORAGE

YEAR 1943

Quantities in Thousands of Acre Feet to Nearest Hundred

RELEASE AND SPILL									
RIO GRANDE BELOW CABALLO									
RECORDED FLOW OF RIO GRANDE BELOW ELEPHANT BUTTE									
TOTAL WATER IN PROJECT STORAGE AT END OF MONTH									
FLOOD WATER AND DEAD STORAGE AT END OF MONTH									
CREDIT WATER									
UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH									
USABLE WATER									
TOTAL PROJECT STORAGE AVAILABLE AT END OF MONTH									
STORING IN ELEPHANT BUTTE RESERVOIR									
STORING IN CABALLO RESERVOIR									
TOTAL IN STORAGE AT END OF MONTH									
NEW MEXICO CREDIT WATER IN STORAGE									
COLORADO CREDIT WATER IN STORAGE									
TOTAL IN STORAGE AT END OF MONTH									
TOTAL WATER IN PROJECT STORAGE AT END OF MONTH									
FLOOD WATER AND DEAD STORAGE AT END OF MONTH									
CREDIT WATER									
UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH									
USABLE WATER									
TOTAL PROJECT STORAGE AVAILABLE AT END OF MONTH									
STORING IN ELEPHANT BUTTE RESERVOIR									
STORING IN CABALLO RESERVOIR									
TOTAL IN STORAGE AT END OF MONTH									
NEW MEXICO CREDIT WATER IN STORAGE									
COLORADO CREDIT WATER IN STORAGE									
TOTAL IN STORAGE AT END OF MONTH									
TOTAL WATER IN PROJECT STORAGE AT END OF MONTH									
FLOOD WATER AND DEAD STORAGE AT END OF MONTH									
CREDIT WATER									
UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH									
USABLE WATER									
TOTAL PROJECT STORAGE AVAILABLE AT END OF MONTH									
STORING IN ELEPHANT BUTTE RESERVOIR									
STORING IN CABALLO RESERVOIR									
TOTAL IN STORAGE AT END OF MONTH									
NEW MEXICO CREDIT WATER IN STORAGE									
COLORADO CREDIT WATER IN STORAGE									
TOTAL IN STORAGE AT END OF MONTH									
TOTAL WATER IN PROJECT STORAGE AT END OF MONTH									
FLOOD WATER AND DEAD STORAGE AT END OF MONTH									
CREDIT WATER									
UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH									
USABLE WATER									
TOTAL PROJECT STORAGE AVAILABLE AT END OF MONTH									
STORING IN ELEPHANT BUTTE RESERVOIR									
STORING IN CABALLO RESERVOIR									
TOTAL IN STORAGE AT END OF MONTH									
NEW MEXICO CREDIT WATER IN STORAGE									
COLORADO CREDIT WATER IN STORAGE									
TOTAL IN STORAGE AT END OF MONTH									
TOTAL WATER IN PROJECT STORAGE AT END OF MONTH									
FLOOD WATER AND DEAD STORAGE AT END OF MONTH									
CREDIT WATER									
UNFILLED CAPACITY OF PROJECT STORAGE AT END OF MONTH									
USABLE WATER									
TOTAL PROJECT STORAGE AVAILABLE AT END OF MONTH									
STORING IN ELEPHANT BUTTE RESERVOIR									
STORING IN CABALLO RESERVOIR									
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NEW MEXICO CREDIT WATER IN STORAGE									
COLORADO CREDIT WATER IN STORAGE									
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REMARKS:

## WATER SUPPLY

The year 1943 was considerably more dry than the average. Precipitation at many of the weather stations in the Rio Grande Basin shows a marked deficiency. This and other factors contribute to the notable lack of runoff experienced at many of the Compact gaging stations.

### Accuracy of Records

The Rules and Regulations of the Compact 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.

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

### Acknowledgments

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 of 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 Reservoir 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.

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

- Discharge of Rio Grande at Otowi Bridge, New Mexico.
- Discharge of Rio Grande at San Acacia, New Mexico.
- Discharge of Rio Chama near Tierra Amarilla, New Mexico.

Storage in Carson Reservoir.  
Storage in San Mateo Reservoir.  
Storage in Nichols Reservoir.

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.

The New Mexico Power Company at Santa Fe, New Mexico furnished the record of storage in Granite Point Reservoir (enlargement).

The United Pueblos Agency furnished the records of storage in:

Acomita Reservoir.  
New Laguna Reservoir.  
Paguete Reservoir.

The United States Section of the International Boundary Commission furnished the discharge of Rio Grande at San Marcial.

The United States Bureau of Reclamation furnished the following records:

Discharge of Rio Grande below Elephant Butte Reservoir.  
Discharge of Rio Grande below Caballo Reservoir.  
Storage in Elephant Butte Reservoir.  
Storage in Caballo Reservoir.

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

RIO GRANDE COMPACT COMMISSION  
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 four 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, 1943.

Maximum discharge - during period 1889-1943; 18,000 second feet October 5, 1911, from rating curve extended above 6,000 second feet. Gage height 6.80 feet. Year 1943; 3,380 second feet June 1. Gage height 3.58.

Accuracy - Records considered excellent except those for periods of ice effect, January 1, 1943, March 1, 1943, March 2-12, 14, 16-22, 1943, which were computed on basis of four discharge measurements, weather records, and are fair.

Remarks - Diversions for irrigation above station. Flow regulated by three reservoirs above station, total capacity 117,600 acre feet, and by several smaller ones.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	205	228	200	398	2,820	2,820	1,760	754	905	356	260	165
2	205	245	170	458	3,000	3,250	1,390	746	754	338	220	172
3	209	230	190	603	2,990	2,810	1,220	666	682	338	235	180
4	210	227	195	722	2,990	2,240	1,140	626	626	326	270	190
5	210	238	180	738	2,910	1,800	993	634	575	308	302	210
6	208	230	160	894	2,720	1,660	927	596	533	308	314	210
7	211	230	190	850	2,340	1,710	916	589	498	302	225	208
8	217	238	215	714	1,810	1,830	872	568	464	302	205	203
9	221	240	200	682	1,620	2,000	894	554	458	302	270	196
10	239	222	194	596	1,520	2,110	842	626	452	302	320	165
11	249	230	193	498	1,320	2,370	802	610	428	296	302	160
12	251	238	200	452	1,290	2,240	754	642	410	320	285	188
13	256	248	210	446	1,270	2,060	682	650	398	320	285	180
14	261	267	203	519	1,240	1,860	666	674	434	308	260	172
15	260	265	190	603	1,190	1,700	722	642	428	314	215	165
16	260	269	180	714	1,140	1,670	754	690	410	308	205	160
17	245	272	192	674	1,070	1,660	642	666	398	308	205	210
18	180	274	190	714	1,060	1,730	589	754	410	302	210	215
19	160	275	175	938	1,050	1,770	554	927	392	332	200	219
20	190	272	185	1,090	1,120	1,800	599	927	362	356	200	220
21	220	280	189	1,210	1,250	1,840	642	1,020	344	302	190	215
22	238	285	188	1,450	1,260	1,830	674	842	328	302	200	208
23	230	315	186	1,780	1,260	1,800	674	738	302	320	220	195
24	215	310	186	1,980	1,410	1,760	658	642	296	302	200	182
25	185	310	186	1,950	1,920	1,690	634	626	296	302	162	168
26	170	295	195	2,050	2,240	1,700	582	642	302	308	162	164
27	180	280	235	1,970	2,160	1,640	540	642	320	308	122	164
28	205	250	290	1,970	2,160	1,560	554	642	350	314	174	172
29	212	350	350	2,160	2,610	1,640	540	674	356	410	178	165
30	228	404	2,410	2,640	1,970	568	762	362	380	162	155	155
31	222	398	2,720	2,720	2,720	698	960	314	314	162	180	180
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	6,742					261	160	217	13,370			
February.....	7,253					315	222	259	14,390			
March.....	6,619					404	160	214	13,130			
April.....	32,233					2,410	398	1,074	63,930			
May.....	58,100					3,000	1,050	1,874	115,200			
June.....	58,520					3,250	1,560	1,951	116,100			
July.....	24,472					1,760	540	789	48,540			
August.....	21,731					1,020	554	701	43,100			
September.....	13,271					905	296	442	26,320			
October.....	9,908					410	296	320	19,650			
November.....	6,758					320	122	225	13,400			
December.....	5,756					220	155	186	11,420			
Year.....	251,093					3,250	122	688	498,550			

RIO GRANDE COMPACT COMMISSION  
RIO GRANDE NEAR LOBATOS, COLORADO

Location - Water stage recorder in Sec. 2P, 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 28, 1899 to December 31, 1943.

Maximum discharge - During period 1899-1943; 13,100 second feet June 8, 1905, from rating curve extended above 8,000 second feet. Year 1943; 1,400 second feet May 4. Gage height 2.94.

Accuracy - Records considered excellent except those for periods of ice effect, January 1 to February 20, 1943, which were computed on basis of three discharge measurements, weather records, and are fair.

Remarks - Diversions for irrigation above station. Flow regulated by many reservoirs on headwaters.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	320	350	454	186	848	814	143	44	110	68	123	123
2	340	360	440	181	919	730	395	49	82	88	123	168
3	330	330	414	172	1,170	955	335	46	82	74	116	143
4	320	290	408	159	1,280	831	276	49	96	76	113	218
5	310	300	440	147	1,260	580	218	85	93	76	110	247
6	320	310	434	138	1,010	414	177	88	93	79	110	256
7	308	340	414	164	866	335	147	99	93	79	143	247
8	295	335	414	232	814	292	113	66	88	76	155	261
9	310	316	408	276	650	266	95	66	82	74	164	242
10	324	300	408	266	573	242	79	76	82	74	138	164
11	330	310	421	228	494	282	66	71	82	76	168	297
12	340	325	382	190	414	447	54	71	79	76	271	256
13	340	330	330	164	364	530	44	71	71	76	318	261
14	340	350	292	138	308	508	39	82	71	76	335	266
15	340	360	318	123	261	427	49	76	71	68	335	275
16	345	380	292	120	232	330	51	71	66	90	341	282
17	320	390	302	123	218	282	39	68	66	99	330	290
18	270	400	313	151	200	242	39	74	63	103	287	270
19	230	400	302	159	200	209	38	71	66	116	261	255
20	240	400	297	195	181	190	36	58	66	120	256	260
21	300	408	276	335	186	190	44	71	66	99	237	270
22	340	454	276	544	209	172	54	76	66	96	218	280
23	330	467	292	642	223	147	46	76	66	106	190	270
24	300	454	266	840	209	127	42	82	66	116	172	265
25	280	474	237	973	228	106	42	79	63	106	165	260
26	270	481	223	1,010	324	82	44	71	66	106	138	242
27	280	467	218	1,040	467	74	42	74	66	103	134	230
28	300	447	209	901	573	56	44	82	66	113	99	220
29	310		209	780	797	56	46	85	71	120	110	224
30	325		209	806	892	74	44	99	74	130	116	228
31	340		200		892		38	130		123		230
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January	9,647					345	230	311	19,130			
February	10,527					481	290	376	20,880			
March	10,098					454	200	326	20,030			
April	11,382					1,040	120	379	22,580			
May	17,262					1,280	181	557	34,240			
June	9,990					955	56	333	19,810			
July	2,917					395	36	94.1	5,790			
August	2,306					130	44	74.4	4,570			
September	2,272					1,280	36	258	4,510			
October	2,882					130	68	93.0	5,720			
November	5,766					341	99	192	11,440			
December	7,500					297	123	242	14,880			
Year	92,549					1,280	36	254	183,580			

# RIO GRANDE COMPACT COMMISSION

## RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, NEW MEXICO

Location.- Water-stage recorder, Lat. 35°52'25", N., Long. 106°08'35", W., in San Ildefonso Pueblo Grant, 100 feet downstream from highway bridge, 1 3/4 miles southwest of San Ildefonso Pueblo, 2 1/2 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 1914, October 1930 to September 1943 in reports of Geological Survey. February 1895 to December 1905, June 1909 to December 1931 in reports of State engineer. January 1941 to December 1943 in reports of Rio Grande Compact Commission.

Average discharge.- 16 years (1927-43), 1,624 second-feet.

Extremes.- Maximum discharge during year, 7,100 second-feet Aug. 18 (gage height, 7.04 feet); minimum daily, 399 second-feet Nov. 9 and Dec. 12.  
1930-43: 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 partially regulated by operation of El Vado Reservoir on upper Rio Chama which stores water for irrigation. Diversions above station for irrigation.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	705	680	915	975	2,020	1,710	1,180	1,070	880	725	640	422
2	705	705	860	1,040	2,120	1,620	975	1,290	815	695	629	500
3	680	705	860	1,360	2,180	1,580	915	1,400	785	725	607	505
4	680	680	860	1,490	2,360	1,620	1,400	1,450	725	725	618	480
5	680	632	888	1,620	2,680	1,760	1,360	1,490	725	695	618	510
6	680	632	888	1,710	2,550	1,580	1,290	1,450	695	695	550	585
7	680	632	915	1,810	2,360	1,360	1,210	1,320	725	725	485	640
8	610	655	915	1,760	2,180	1,210	1,180	832	725	725	435	646
9	592	705	888	1,660	2,360	1,180	1,180	755	972	695	399	690
10	606	680	888	1,710	1,860	1,140	1,140	730	1,280	575	404	629
11	632	680	1,010	1,660	1,530	1,210	1,100	860	1,200	550	412	525
12	632	680	1,010	1,580	1,360	1,180	1,070	780	1,160	555	440	399
13	632	705	915	1,490	1,250	1,140	1,040	730	1,120	550	475	575
14	655	755	805	1,490	1,100	1,250	1,040	705	1,200	550	575	590
15	655	755	730	1,620	1,040	1,250	1,180	730	1,120	550	629	580
16	610	780	680	1,660	1,010	1,210	1,100	730	1,120	545	646	565
17	680	805	655	1,250	945	1,140	1,140	805	1,050	550	640	560
18	705	832	655	1,140	805	1,400	1,360	3,040	945	555	646	596
19	610	832	680	1,210	805	1,360	1,580	1,360	725	596	629	678
20	583	860	655	1,360	755	1,360	1,660	1,050	695	629	590	662
21	655	860	655	1,530	780	1,320	1,490	945	684	602	580	640
22	730	888	655	1,530	1,100	1,290	1,190	945	695	585	570	640
23	755	888	632	1,810	1,180	1,510	1,010	912	690	570	570	656
24	755	915	632	2,180	1,100	1,960	888	880	540	565	596	678
25	780	915	632	2,300	1,100	1,910	832	848	570	575	580	634
26	755	915	610	2,480	1,070	1,860	780	785	678	580	560	607
27	705	915	601	2,360	1,100	1,860	730	815	690	575	535	662
28	730	915	606	2,300	1,180	1,760	680	880	947	565	500	651
29	705		680	2,240	1,360	1,900	680	1,080	848	602	440	555
30	705		915	2,070	1,580	1,530	655	912	755	684	430	560
31	680		975	1,660	1,660		787	1,080		684		555
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	20,967					780	583	676	41,590			
February.....	21,601					915	632	771	42,840			
March.....	24,265					1,010	601	783	48,130			
April.....	50,395					2,480	975	1,680	99,960			
May.....	46,480					2,680	755	1,499	92,190			
June.....	44,160					1,960	1,140	1,472	87,590			
July.....	33,822					1,660	655	1,091	67,080			
August.....	32,659					3,040	705	1,054	64,780			
September.....	25,759					1,280	540	859	51,090			
October.....	19,197					725	545	641	38,080			
November.....	16,428					646	399	548	32,580			
December.....	18,175					690	399	586	36,050			
Year.....	353,908					3,040	399	970	701,960			



## RIO GRANDE COMPACT COMMISSION

## RIO GRANDE AT SAN ACACIA, NEW MEXICO

**Location.**- Water-stage recorder, Lat.  $34^{\circ}15'20''$  N., Long.  $106^{\circ}53'30''$  W., in NE $\frac{1}{4}$  Sec. 1, T. 1 S., R. 1 W., 0.2 miles downstream from San Acacia diversion dam, half a mile east of San Acacia, and 2 miles downstream from Rio Salado. Datum of right bank gage is 4,662.56, left bank gage 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, Colo.)

**Records available.**- April 1936 to September 1943 in reports of Geological Survey. February to December 1925, January 1926 to September 1927 (gage heights and discharge measurements only) in reports of State engineer. January 1941 to December 1943 in reports of Rio Grande Compact Commission.

**Extremes.**- Maximum discharge during year, 9,660 second-feet June 29 (gage height 6.10 feet); minimum daily, 14 second-feet Aug. 2.

1936-43: Maximum discharge, 27,400 second-feet Aug. 5, 1936 (gage height, 8.35 feet, datum of gage was 4,662.56 feet), from rating curve extended above 18,000 second-feet by logarithmic plotting; minimum daily, 1 second-foot June 23, 1939.

**Remarks.**- Records fair except those for periods of ice effect or no gage height record, which are poor. Socorro main canal north diverts 0.2 miles above gage. Diversions above station for irrigation.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	837	775	700	52	1,170	392	1,780	20	730	328	290	566
2	922	790	790	67	1,150	290	1,500	14	430	364	392	553
3	973	760	745	260	1,520	305	1,120	22	320	382	344	420
4	854	775	657	218	1,270	344	685	41	254	320	312	540
5	837	871	715	315	1,030	364	605	160	190	344	248	452
6	956	854	685	715	1,190	354	335	481	155	373	190	518
7	888	730	760	618	1,590	373	312	830	122	312	290	553
8	922	657	730	922	1,610	668	328	644	103	305	312	579
9	820	760	657	922	2,020	354	290	507	490	320	312	685
10	775	715	605	1,350	2,580	290	242	566	299	275	305	805
11	775	745	644	1,190	2,200	592	230	298	272	373	242	871
12	790	790	700	1,330	1,250	364	230	118	224	402	180	888
13	715	730	745	1,270	1,060	305	260	114	224	344	180	922
14	700	745	745	888	888	312	254	122	290	354	146	837
15	790	685	805	685	685	364	138	66	242	248	185	760
16	820	657	905	566	618	306	150	146	190	218	195	730
17	760	670	644	579	463	195	130	86	230	200	260	700
18	760	715	507	618	373	185	160	667	335	190	200	775
19	760	715	474	905	275	155	175	1,680	354	218	206	715
20	990	730	344	760	206	122	546	1,930	354	275	230	700
21	1,010	775	420	507	785	203	837	400	392	175	275	745
22	805	775	411	463	401	398	1,190	354	224	275	260	760
23	670	775	474	566	452	162	1,030	402	170	268	248	837
24	805	837	275	888	320	106	990	411	138	320	402	888
25	820	760	96	1,100	411	110	605	805	206	305	463	854
26	805	730	75	1,780	430	48	373	364	236	275	485	854
27	905	790	58	1,500	312	256	392	452	268	268	566	854
28	973	760	58	1,540	242	373	218	1,450	335	190	745	837
29	905		72	1,390	195	3,840	68	1,250	328	230	657	854
30	837		55	1,370	254	3,460	27	1,770	275	218	618	922
31	837		160		260		24	1,040		254		760
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	26,016					1,010	670	839	51,600			
February.....	21,071					871	657	753	41,790			
March.....	15,651					905	55	505	31,040			
April.....	25,334					1,780	52	844	50,250			
May.....	27,210					2,580	195	878	53,970			
June.....	15,590					3,840	48	520	30,920			
July.....	15,224					1,780	24	491	30,200			
August.....	17,210					1,930	14	555	34,140			
September.....	8,380					730	103	279	16,620			
October.....	8,923					402	175	288	17,700			
November.....	9,738					745	146	325	19,320			
December.....	22,734					922	420	733	45,090			
Year.....	213,081					3,840	14	584	422,640			

# RIO GRANDE COMPACT COMMISSION

## RIO GRANDE AT SAN MARCIAL, NEW MEXICO

**DESCRIPTION:** Water-stage recorder and cable with sit-down cable car and winch located at railroad bridge about one mile below San Marcial, New Mexico, and 177.1 miles above the American Dam at El Paso, Texas. The recorder is on the upstream end of the first bridge pier from the south abutment of the bridge and the zero of its gage is 4,455.38 feet, United States Coast and Geodetic Survey sea level datum. On February 17, 1943 while the deck of the railroad bridge was being raised about 12 feet, the recorder was moved to the downstream side of the Val Verde highway bridge 1.8 miles upstream from the railroad bridge. Elevation of zero of the gage at the highway bridge was not determined. The recorder was returned to the original location on the railroad bridge on June 25, 1943.

**RECORDS:** Based upon 125 meter measurements by wading and from cable about 1,000 feet above railroad bridge. Computations by shifting channel methods. 1943 records good. Records available: January 1895 to December 1943.

**REMARKS:** For gage history 1895 to 1938 see International Boundary Commission Water Bulletins Nos. 4, 7 and 8. El Vado and smaller reservoirs and many irrigation diversions and drainage returns above this station in Colorado and New Mexico modify the river flow.

**COMPARATIVE FLOWS FROM RECORDS:** Momentary Peak: Max., Oct. 11, 1904, 50,000 sec. ft. with water surface level of 4,459.5 ft. on U.S.C. & G.S. datum about .25 mile above the present station gage. This is the greatest flood peak flow in at least the past 115 years or since 1828. Min., sometimes dry. See International Boundary Commission Water Bulletin No. 6, page 79, for large peak flows since 1828 and their average frequency. Daily: Max., Oct. 11, 1904, 33,000 sec. ft. average. Min., sometimes dry. Monthly: Max., May 1941, 16,159 sec. ft. average. Min., sometimes dry. Yearly: Max., 1941, 5,911 sec. ft. average. Min., 1902, 277 sec. ft. average. Two Successive Years: Max., 1941 and 1942, 3,300 sec. ft. average. Min., 1899 and 1900, 487 sec. ft. average. Three Successive Years: Max., 1905 to 1907, 2,830 sec. ft. average. Min., 1900 to 1902, 609 sec. ft. average. Four Successive years: Max., 1905 to 1908, 2,390 sec. ft. average. Min., 1899 to 1902, 539 sec. ft. average. Five Successive Years: Max., 1905 to 1909, 2,260 sec. ft. average. Min., 1898 to 1902, 697 sec. ft. average. Ten Successive Years: 1903 to 1912, 1,980 sec. ft. average. Min., 1931 to 1940, 1,140 sec. ft. average. Forty-nine Year Average: 1,560 sec. ft.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	973	935	612	124	1,240	220	2,680	27.0	752	201	242	680
2	879	838	658	134	1,200	192	1,920	31.3	669	305	263	608
3	890	826	764	102	1,140	269	1,460	36.0	528	390	308	530
4	838	872	820	122	1,380	184	1,050	35.7	341	379	379	450
5	874	863	818	197	1,080	199	731	16.8	284	306	351	482
6	845	914	819	192	1,050	231	590	58.8	211	294	279	461
7	922	939	841	550	1,200	247	374	492	147	352	268	514
8	965	843	804	509	1,450	273	296	734	117	298	289	639
9	933	543	742	828	1,360	540	310	509	98.2	284	330	730
10	912	572	680	964	1,870	367	302	444	203	271	347	956
11	869	660	672	1,160	2,900	363	258	733	205	319	375	928
12	836	834	619	1,060	2,060	441	221	346	182	300	290	895
13	817	849	576	1,340	1,270	425	224	158	182	336	238	844
14	801	778	532	1,290	1,140	256	193	108	219	352	210	803
15	786	718	629	1,060	913	232	285	120	254	303	198	699
16	761	661	746	776	709	211	240	127	201	238	166	632
17	698	678	816	677	624	291	148	141	155	234	172	656
18	712	736	1,040	633	438	144	150	162	184	200	240	716
19	462	725	867	744	364	101	173	366	282	172	253	700
20	502	712	722	968	209	142	174	1,650	273	167	202	667
21	938	761	651	799	386	144	453	1,330	255	255	235	652
22	1,110	817	628	577	553	82.9	1,260	618	329	234	233	659
23	1,020	870	587	492	440	59.0	1,310	417	279	223	287	688
24	913	859	566	591	490	206	931	315	240	265	327	713
25	799	892	441	780	303	93.2	806	384	209	305	363	798
26	793	835	236	1,170	320	54.0	570	671	226	303	470	858
27	860	842	189	1,890	387	43.5	303	313	262	271	476	935
28	999	701	164	1,400	261	41.0	246	520	335	312	566	954
29	968		141	1,500	247	756	228	1,460	317	247	708	882
30	951		135	1,410	214	3,830	122	756	276	260	697	779
31	869		129		178		65.8	1,430		231		815

Month	Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet
January.....	26,593	1,110	462	858	52,700
February.....	22,071	939	543	788	43,800
March.....	18,642	1,040	129	601	37,000
April.....	24,039	1,890	102	801	47,700
May.....	27,376	2,900	178	883	54,300
June.....	10,637.6	3,830	41.0	355	21,100
July.....	18,063.8	2,680	55.8	583	35,800
August.....	14,569.6	1,650	16.8	470	28,900
September.....	8,215.2	752	98.2	274	16,300
October.....	8,587	390	167	277	17,000
November.....	9,740	706	166	325	19,300
December.....	22,322	956	450	720	44,300
Year.....	210,856.2	3,830	16.8	578	418,200

## RIO GRANDE COMPACT COMMISSION

## RIO GRANDE BELOW ELEPHANT BUTTE DAM, NEW MEXICO

Location.- SW $\frac{1}{4}$ , Sec. 25, T. 13 S., R. 4 W., (map projection of land survey into Pedro Armendariz Grant) approximately 5500 feet downstream from Elephant Butte Dam outlets.

Metering Equipment.- 3/4" diameter tramway cable - approximately 177 feet between wooden "A" frames equipped with sit-down car and reel.

River Section.- Section under cable regular gravel-sand bottom. Flow approaches cable at right angle at all stages. Channel dredged winter of 1938-39 connection power plant construction.

Control.- Control is slight river section constriction about 1150 feet below gage occasioned by bridge, and confinement of River channel between hill and road grade. Flood discharge into river from Mescal Canyon and Cuchillo Creek, about one mile below gage, would cause backwater conditions at gage. Accuracy not affected as time of such conditions always known and compensated for by additional meter measurements as needed.

No appreciable inflow occurs between location abandoned April 23, 1942 and new gage 0.7 mile downstream. Several small arroyos enter river above present gage and the one abandoned, but inflow occurs only once or twice during rainy season for periods of only 1/4 to 1/2 hour at time. This volume is small and can always be accurately eliminated from record at times of occurrence.

Regulation.- Flow is completely regulated by storage in Elephant Butte Reservoir. Varying river flow depending entirely upon flow thru power plant, or gate control at the dam.

Accuracy.- Records excellent.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,010	1,260	1,040	1,060	1,140	1,230	1,070	1,130	1,260	1,180	1,010	1,150
2	1,020	1,270	1,040	1,040	959	1,140	1,130	1,200	1,200	1,130	1,030	1,160
3	958	1,170	958	1,040	1,100	1,170	1,180	1,270	1,240	998	1,070	1,090
4	1,020	1,200	1,020	1,012	1,120	1,120	1,090	1,300	1,230	1,080	1,030	1,150
5	990	1,070	965	1,060	1,140	1,160	1,130	1,350	1,100	1,160	1,020	1,040
6	1,050	918	966	1,170	1,140	934	1,200	1,310	1,180	1,200	1,100	1,050
7	1,300	835	903	1,160	1,160	1,090	1,240	1,280	1,220	1,180	942	1,130
8	1,480	887	995	1,170	1,150	1,130	1,340	1,120	1,250	1,190	1,090	1,160
9	983	911	1,020	1,150	1,030	1,140	1,280	1,210	1,250	1,150	1,120	1,130
10	931	893	1,040	1,190	1,120	1,130	1,280	1,220	1,240	1,150	1,140	1,150
11	939	891	1,020	1,050	1,180	1,100	1,170	1,200	1,230	1,150	1,160	1,160
12	990	896	1,010	1,170	1,180	1,100	1,170	1,210	1,110	1,220	1,140	1,120
13	1,010	977	1,040	1,240	1,120	939	1,250	1,220	1,160	1,300	1,140	1,050
14	990	922	898	1,180	1,210	1,040	1,260	1,190	1,170	1,290	984	1,130
15	1,030	1,010	980	1,210	1,130	1,110	1,170	1,140	1,210	1,250	1,130	1,160
16	1,000	1,000	998	1,200	1,020	1,120	1,240	1,130	1,220	1,190	1,160	1,130
17	953	980	991	1,150	1,120	1,110	1,300	1,190	1,230	985	1,180	1,150
18	968	1,010	1,050	1,050	1,130	1,070	1,160	1,200	1,190	1,130	1,300	1,160
19	987	1,020	1,060	1,140	1,120	1,040	1,150	1,220	1,130	1,220	1,300	1,120
20	965	1,020	1,080	1,200	1,080	891	1,210	1,250	1,120	1,220	1,190	1,120
21	921	1,020	984	1,160	1,090	989	1,160	1,220	1,180	1,170	1,080	1,170
22	947	1,030	1,080	1,130	1,090	1,110	1,160	1,110	1,210	1,210	1,180	1,250
23	934	1,070	1,150	1,110	978	1,110	1,160	1,160	1,170	1,210	1,200	1,250
24	842	1,070	1,150	1,090	1,030	1,120	1,170	1,190	1,160	1,150	1,160	1,220
25	922	1,070	1,130	979	1,130	1,110	1,040	1,260	1,130	1,210	1,140	949
26	1,050	1,070	1,150	1,060	1,100	1,100	1,190	1,290	914	1,140	1,170	933
27	1,040	1,070	1,180	1,060	1,150	957	1,150	1,270	1,160	1,190	1,160	1,130
28	1,050	987	1,090	1,060	1,120	1,020	1,300	1,300	1,130	1,140	953	1,420
29	1,050		1,060	1,070	1,100	1,090	1,290	1,170	1,170	1,130	1,120	1,500
30	1,040		1,100	1,090	989	1,110	1,330	1,190	1,240	1,110	1,090	1,250
31	958		1,060		1,050		1,280	1,140		939		1,130
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	31,328					1,480	842	1,011	62,140			
February.....	28,527					1,270	835	1,019	56,580			
March.....	32,208					1,180	898	1,039	63,880			
April.....	33,451					1,240	979	1,115	66,350			
May.....	34,176					1,210	959	1,102	67,790			
June.....	32,480					1,230	891	1,083	64,420			
July.....	37,250					1,340	1,040	1,202	73,880			
August.....	37,640					1,350	1,110	1,214	74,660			
September.....	35,404					1,260	914	1,180	70,220			
October.....	36,012					1,300	985	1,162	71,430			
November.....	33,489					1,300	942	1,116	66,420			
December.....	35,732					1,500	933	1,153	70,870			
Year.....	407,697					1,500	835	1,117	808,640			

# RIO GRANDE COMPACT COMMISSION

## RIO GRANDE BELOW CABALLO DAM, NEW MEXICO

**Location.**- In the NE1/4 Sec. 30, T. 16 S., R. 4 W., N.M.P.M., approximately 4200 feet below Caballo Dam in Sierra County, N. Mex.; and about 20 miles south of Hot Springs, N. Mex., and approximately 102 miles northwest of El Paso, Texas.

**Control.**- No permanent control exists in the immediate vicinity of gage. A long range control is located 7000 ft. below the gage. This control is Percha Diversion Dam. In the immediate vicinity of the gage the Bojorquez bridge, 600 ft. below the gage, and an old semi-permanent delta of Percha Arroyo below the highway bridge acts as partial control. Moving sand causes discharge-gage relationship to be of a shifting nature. Shifts, however, are moderate. Sensitivity is good.

**Discharge measurements.**- Discharge measurements are made from a cable with a sit-down car equipped with reel. Measuring section is good, but was subject to considerable scour during spill from Caballo Dam April, May, June and July, 1942 during which period maximum mean daily discharge was 7650 sec.ft. Infrequently during summer months in past years check measurements were made from a cable located about 3/4 mile below Percha Dam and approximately 2 miles below the Caballo station. To this was added a measurement of the flow of the Arrey Canal; the sum representing a check on the Caballo station. As a result of spill from Caballo Dam water began flowing around the west end of the Caballo cable station April 26, 1942. Current meter measurements were made on April 28 and April 29, 1942 at the cable below Percha Dam and on the Arrey Canal. A sudden change in the river flow direction washed out the cable below Percha Dam on May 1, 1942. A new cable site was located and a measuring cable was installed about 7 miles downstream from the Caballo station. The first measurement at this, the Derry cable station, was made May 14, 1942. The section was regular, approach at right angles, bottom sand, results very satisfactory. Measurements were made at Derry until May 23, 1942. The highest discharge from Caballo during the period was therefore measured. Beginning May 24, 1942 measurements were again possible at the Caballo station. During this entire period of high discharge from Caballo reservoir an auxiliary gage was maintained at Percha Dam in order to check against the Caballo gage. The records during this flood period were considered excellent as a result of the checks made. Consequently all records during the period continue to be referred to the regular Caballo station gage.

**Regulation.**- The flow is regulated by storage in the Caballo Dam 4200 ft. upstream from the station. A small arroyo enters the river from the east side approximately 1500 ft. above the gage. This arroyo contributes momentary flood peaks 100-300 c.f.s. once or twice a year during the rainy season. However, this volume of water is relatively small and it is always possible to properly account for it.

**Records available.**- Records began at station February 8, 1938 but prior to this date discharge records are available for the Rio Grande at Percha Dam since 1922. Percha Dam is a diversion weir located about 2 miles below Caballo Dam.

**Accuracy.**- Excellent.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	293	113	967	2,530	2,110	2,150	1,360	2,690	2,020	371	29.1	5.1
2	49.2	114	967	2,520	2,290	1,950	1,280	2,700	1,880	737	28.8	4.2
3	48	113	1,030	2,710	2,290	1,880	1,660	2,700	1,800	718	28.8	4.2
4	43.2	112	1,060	2,680	2,290	1,870	1,780	2,690	1,760	560	28.8	4.2
5	47.9	270	1,040	2,590	2,080	1,950	1,780	2,730	1,740	480	28.8	3.9
6	53.7	701	989	2,710	1,330	2,000	1,680	2,920	1,710	360	28.8	3.9
7	58.4	651	961	2,710	1,110	1,990	1,690	2,810	1,710	122	28.8	3.9
8	59.5	665	965	2,670	2,000	2,020	1,620	2,730	1,660	125	18.2	4.2
9	59.4	483	982	2,580	2,300	2,130	1,800	2,710	1,470	126	3.5	4.5
10	55.7	133	1,030	2,430	2,300	2,160	2,200	2,610	1,470	127	2.5	3.2
11	55.6	96.4	1,070	2,430	2,290	2,140	2,250	2,560	1,580	93.3	2.5	3.6
12	65	89.2	1,070	2,340	2,210	2,250	2,240	2,500	1,590	9.7	2.5	3.9
13	67.3	231	1,210	2,260	1,970	2,250	2,280	2,460	1,560	3.3	2.5	3.9
14	67.2	836	1,360	2,200	1,970	2,230	2,610	2,650	1,570	3.3	2.5	3.9
15	70.7	836	1,380	2,210	1,970	2,230	2,430	2,620	1,470	280	52.4	3.9
16	73	834	1,400	2,250	1,960	2,200	2,330	2,570	1,380	999	1,090	3.9
17	74	828	1,510	2,340	1,940	2,030	2,180	2,510	1,360	999	1,070	4.5
18	71.5	830	1,610	2,400	1,930	2,030	2,150	2,470	1,320	930	1,010	4.8
19	69.2	824	1,680	2,400	2,010	2,200	2,110	2,390	1,320	721	868	5.1
20	73.2	817	1,880	2,340	2,150	2,250	2,020	2,340	1,320	574	591	5.1
21	73.4	816	1,870	2,210	2,050	2,250	1,930	2,380	1,270	478	187	5.4
22	73.4	785	1,880	2,030	1,960	2,240	1,930	2,530	1,040	267	157	5.1
23	76.7	780	1,920	1,990	1,960	2,290	1,930	2,420	517	114	157	3.9
24	76.7	785	1,960	1,990	1,960	2,400	2,080	2,290	138	113	138	331
25	77.9	790	2,030	1,980	1,960	2,730	2,180	2,280	110	113	12.2	620
26	90.8	838	2,130	2,000	1,900	2,820	2,170	2,170	109	76.1	5.4	589
27	93.8	923	2,310	2,120	1,870	2,670	2,150	2,150	105	28.4	5.1	446
28	95.4	959	2,320	2,170	1,860	2,650	2,140	2,180	137	27.8	5.1	408
29	107		2,320	2,080	2,030	2,460	2,160	2,230	188	29.1	5.1	280
30	112		2,470	2,070	2,090	1,800	2,450	2,240	200	28.4	5.1	148
31	113		2,580	2,090	2,090		2,640	2,170		29.1		9.9

Month	Bonita Ditch Requirements	Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet
January.....		2,444.8	293	43.2	78.9	4,850
February.....		16,252.6	959	89.2	580	32,240
March.....	124	47,951	2,580	961	1,547	95,110
April.....	195	69,940	2,710	1,980	2,331	138,720
May.....	222	62,260	2,300	1,110	2,008	123,490
June.....	212	66,220	2,820	1,800	2,207	131,340
July.....	185	63,170	2,640	1,280	2,038	125,300
August.....	385	77,380	2,920	2,130	2,496	153,480
September.....	111	35,504	2,020	105	1,183	70,420
October.....	16	9,642.5	999	3.3	311	19,130
November.....	72	6,066.1	1,090	2.5	202	12,030
December.....		2,930.2	620	3.2	94.5	5,810
Year.....	1,529	459,761.2	2,920	2.5	1,260	911,920

RIO GRANDE COMPACT COMMISSION  
CONEJOS RIVER NEAR MOGOTE, COLORADO

Location - Water stage recorder in SE $\frac{1}{4}$  Sec. 34, T. 33 N., R. 7 E.,  $\frac{3}{4}$  mile downstream from Fox Creek,  $5\frac{1}{2}$  miles northwest of Mogote at Broyles Bridge 12 miles west of Antonito.

Drainage area - 282 square miles. Altitude 8,300 feet above mean sea level.

Records available - September 1, 1899 to March 31, 1900; April 17, 1903 to October 31, 1905, at a point one mile downstream from present site, from March 21, 1907 to October 5, 1911, at site three miles upstream, from January 1, 1912 to December 31, 1943, at present site.

Maximum discharge - during period 1899-1900, 1903-1905, 1907-1943; 9,000 second feet (revised) October 5, 1911, from rating curve extended above 3,500 second feet. Gage height 8.50 feet, site and datum then in use. Year 1943, 1,830 second feet June 3. Gage height 4.13.

Accuracy - Records considered good except those during periods of ice effect from January 5 to February 4, 1943 which were computed on basis of discharge measurements, and weather records, and are fair.

Remarks - No diversions or regulations above station.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	43	51	54	163	1,480	1,320	810	139	145	75	75	38
2	44	48	53	197	1,670	1,710	649	121	120	65	70	42
3	45	46	54	240	1,720	1,240	555	120	111	63	70	37
4	41	43	59	294	1,740	900	477	137	130	60	72	48
5	40	45	58	334	1,340	760	412	163	92	57	73	46
6	39	41	45	401	1,030	760	372	137	84	55	68	44
7	38	44	51	395	966	850	350	133	78	54	53	41
8	38	46	52	339	810	944	350	114	74	54	48	40
9	38	49	61	344	666	1,110	339	114	69	53	61	28
10	39	42	52	273	585	1,190	350	129	68	52	63	21
11	39	42	50	220	582	1,280	313	127	64	53	58	45
12	39	49	51	200	640	1,130	294	107	59	72	55	44
13	41	50	54	203	608	955	281	102	57	69	55	50
14	42	52	57	252	585	830	273	112	57	64	52	46
15	43	53	50	344	512	870	298	149	55	64	50	49
16	44	55	39	412	484	870	268	149	55	63	51	50
17	43	55	53	366	512	850	224	118	55	63	51	46
18	40	54	52	328	570	890	203	214	52	60	53	46
19	38	53	44	378	600	890	186	211	49	72	51	46
20	39	57	52	562	692	890	184	167	46	70	50	41
21	44	55	53	683	730	900	169	145	44	63	50	36
22	51	59	55	780	649	840	179	133	44	68	53	36
23	51	60	55	922	632	800	214	123	44	68	55	32
24	50	57	52	1,030	890	750	194	112	46	66	54	33
25	48	57	52	1,080	1,190	692	191	111	45	65	49	34
26	45	52	60	1,100	1,280	683	172	112	46	65	49	34
27	45	53	61	1,030	1,220	649	152	116	52	65	34	35
28	46	61	94	1,060	1,490	750	152	118	58	69	28	28
29	48		131	1,200	1,450	700	139	133	68	96	34	31
30	49		167	1,350	1,310	955	141	127	73	95	37	32
31	50		154		1,320		156	163		82		32
Month						Second-foot-days	Maximum	Minimum	Mean		Run-off in acre-feet	
January.....						1,340	51	38	43.2		2,660	
February.....						1,428	61	41	51.0		2,830	
March.....						1,995	167	39	64.4		3,960	
April.....						16,480	1,350	163	549		32,690	
May.....						29,953	1,740	484	966		59,410	
June.....						27,958	1,710	649	932		55,450	
July.....						9,047	810	139	292		17,940	
August.....						4,158	214	102	134		8,250	
September.....						2,010	145	44	67.0		3,990	
October.....						2,040	96	52	65.8		4,060	
November.....						1,622	75	28	54.1		3,220	
December.....						1,211	50	21	39.1		2,400	
Year.....						99,242	1,740	21	272		196,850	

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RIO GRANDE COMPACT COMMISSION

CONEJOS RIVER NEAR LOS SAUCES, COLORADO

Location - Water stage recorders on two channels in Sec. 2, T. 35 N., R. 11 E.,  $\frac{1}{2}$  mile upstream from mouth, and 2 miles north of Los (Las, La) Sauces. Stream enters Rio Grande River through two channels and published record is combined flow.

Drainage area - 887 square miles. Zero of gage (North Channel) is 7,495.02 feet above mean sea level.

Records available - March 29, 1921 to December 31, 1943.

Maximum discharge - during period 1921-1943; 3,890 second feet on May 15, 1941. Year 1943; 1,270 second feet May 3, 1943.

Accuracy - Records considered good.

Remarks - Diversions for irrigation above station.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	48	56	80	35	721	498	234	12	26	24	42	50
2	46	56	78	35	874	504	224	12	27	23	43	49
3	46	56	76	31	1,080	702	122	13	27	23	43	49
4	48	60	73	23	1,080	461	53	14	26	23	42	49
5	45	56	73	20	1,000	285	35	14	26	26	42	49
6	43	55	70	20	691	196	23	13	24	26	42	49
7	42	55	64	28	586	170	15	14	23	28	42	47
8	43	59	61	40	525	128	12	14	22	28	41	47
9	42	60	59	32	413	110	9.6	14	21	27	41	45
10	44	59	60	27	357	114	9.1	15	21	25	43	43
11	43	63	58	24	297	211	7.8	16	21	25	43	44
12	43	64	55	20	261	322	7.6	15	20	25	42	47
13	43	63	54	15	232	323	6.8	15	20	26	43	51
14	43	63	54	15	201	285	7.2	14	20	33	44	55
15	43	69	54	14	169	199	11	13	21	33	45	52
16	43	76	54	15	135	150	11	14	21	34	45	52
17	42	80	54	31	116	119	12	14	21	34	46	52
18	40	80	54	35	104	79	12	16	21	34	46	51
19	38	79	52	43	95	51	14	16	21	35	46	52
20	43	77	50	127	84	39	16	20	21	36	46	52
21	47	77	49	325	92	34	15	22	23	35	46	52
22	53	77	48	443	121	33	15	22	22	36	46	52
23	53	78	47	551	117	31	15	21	24	38	45	54
24	54	79	46	728	118	26	15	21	24	37	45	52
25	54	79	44	769	165	25	15	20	24	35	45	52
26	55	79	43	833	301	22	15	22	24	35	45	51
27	55	79	43	755	367	17	15	23	23	36	46	51
28	55	78	43	641	451	18	15	23	23	37	50	49
29	55		40	628	593	18	15	23	23	38	50	48
30	54		37	669	617	22	14	23	24	40	50	46
31	55		35		566		13	25		41		48
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	1,458					55	38	47.0	2,890			
February.....	1,912					80	55	68.3	3,790			
March.....	1,708					80	35	55.1	3,390			
April.....	6,972					833	14	232	13,830			
May.....	12,529					1,080	84	404	24,850			
June.....	5,192					702	17	167	10,300			
July.....	1,004.1					234	6.8	32.4	1,990			
August.....	533					25	12	17.2	1,060			
September.....	684					27	20	22.8	1,360			
October.....	976					41	23	31.5	1,940			
November.....	1,335					50	41	44.5	2,650			
December.....	1,540					55	43	49.7	3,050			
Year.....	35,843.1					1,080	6.8	98.2	71,100			

RIO GRANDE COMPACT COMMISSION  
SAN ANTONIO RIVER AT ORTIZ, COLORADO

Location - Water stage recorder in New Mexico, in Sec. 19, T. 32 N., R. 9 E.,  $\frac{1}{4}$  mile south of Colorado - New Mexico State line,  $\frac{1}{4}$  mile south of Ortiz, and  $\frac{1}{2}$  mile upstream from Los Pinos Creek.

Drainage area - 110 square miles.

Records available - January 1 to October 31, 1915; May 1, 1919 to October 31, 1920; October 1, 1924 to December 31, 1943.

Maximum discharge - during period 1915, 1919-1920, 1924-1943; 1,750 second feet April 15, 1937, from rating curve extended above 1,100 second feet. Gage height 5.38 feet. Year 1943, 399 second feet April 24, 1943. Gage height 2.87.

Accuracy - Records considered good except those estimated during winter periods, January 1 to April 2, 1943, which are poor.

Remarks - Small diversions for irrigation above station.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				52	178	9.7	5.9	17	6.9	2.6	5.1	
2				56	171	7.4	4.2	5.9	3.8	2.0	5.5	
3				59	150	10	1.6	1.9	2.8	1.9	4.7	
4				65	130	9.2	0.6	1.1	1.7	1.9	6.3	
5				69	120	6.9	0.4	19	1.1	1.9	3.0	
6				91	95	5.5	0.2	26	0.8	2.0	2.6	
7				91	96	4.2	0.1	14	0.4	1.9	1.9	
8				70	80	3.0	0.1	3.8	0.4	2.0	1.6	
9				67	85	2.0	0.1	3.8	0.3	2.2	3.0	
10				51	59	1.9	0.2	6.0	0.4	2.6	2.6	
11				40	49	5.1	0.5	5.5	0.6	1.6	3.0	
12				35	42	6.9	0.9	3.0	0.4	2.2	5.1	
13				35	36	4.2	0.4	2.6	0.4	8.6	6.3	
14				59	36	3.8	0.2	22	0.6	4.7	7.4	
15				100	33	3.0	0.4	24	4.2	3.4	6.9	
16				139	29	2.2	0.5	10	2.6	2.6	8.0	
17				107	26	2.2	0.5	32	2.2	2.2	6.9	
18				120	22	1.9	0.4	31	2.0	2.2	6.9	
19				152	22	1.9	0.2	14	2.0	2.2	5.9	
20				212	21	1.6	0.1	5.5	1.9	6.9	5.9	
21				205	25	1.6	2.0	2.2	1.7	6.3	5.9	
22				215	25	1.2	2.2	1.4	1.4	6.9	6.9	
23				254	23	1.1	1.4	1.1	1.2	6.3	3.8	
24				258	22	.6	1.6	0.8	1.4	5.5	4.2	
25				235	17	.4	1.1	0.6	1.6	4.7	7.4	
26				233	15	.4	0.6	0.9	1.6	4.7	6.3	
27				195	16	.4	0.4	25	1.6	4.2	2.6	
28				190	13	.4	0.2	14	2.0	4.2	2.0	
29				193	13	6.9	0.2	8.6	4.7	5.9	2.2	
30				188	13	6.3	3.0	6.3	3.0	11	2.5	
31					12		6.3	5.9		7.4		
Month						Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet		
January.....						108.5			3.5	215		
February.....						112			4.0	222		
March.....						232.5			7.5	461		
April.....						3,834	256	35	128	7,600		
May.....						1,656	178	12	53.4	3,290		
June.....						111.9	10	0.4	3.73	222		
July.....						37.5	6.9	0.1	1.21	74		
August.....						318.9	32	0.6	10.2	629		
September.....						55.5	6.9	0.3	1.85	110		
October.....						124.7	11	1.6	4.02	247		
November.....						142.4	8.0	1.6	4.76	282		
December.....						68.2			2.2	135		
Year.....						6,800.1			18.6	13,480		

RIO GRANDE COMPACT COMMISSION  
LOS PINOS RIVER NEAR ORTIZ, COLORADO

Location - Water stage recorder in New Mexico in N $\frac{1}{2}$  Sec. 34, T. 32 N., R. 8 E., 1 mile south of Colorado - New Mexico State line, 2 miles southwest of Ortiz and 2 $\frac{1}{2}$  miles upstream from mouth.

Drainage area - 167 square miles. Altitude 8,100 feet above mean sea leve.

Records available - January 1, 1914 to November 30, 1920; October 1, 1924 to December 31, 1943.

Maximum discharge - during period 1914-1920, 1924-1943, 5,160 second feet on May 12, 1941. Year 1943, 1,570 second feet May 2, 1943. Gage height 4.28.

Accuracy - Records considered good except those for period of ice effect, January 1 to March 16, 1943, which were computed on basis of discharge measurements and weather records, and are fair. Discharges were estimated during period of missing gage heights, May 18 to 23, 1943.

Remarks - Diversions for irrigation above station.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			22	81	932	329	144	28	29	25	24	
2			22	98	938	387	111	22	22	22	21	
3			23	126	890	325	92	22	20	21	22	
4			24	170	842	264	76	32	18	20	26	
5			24	227	652	240	65	44	17	17	23	
6			22	338	576	240	60	28	16	17	20	
7			20	339	580	237	54	24	15	17	18	
8			22	305	458	234	55	21	14	16	20	
9			24	288	383	237	54	20	14	16	21	
10			25	223	339	244	65	23	16	16	32	
11			24	170	370	305	48	22	14	16	23	
12			24	147	378	257	43	20	13	25	22	
13			25	152	332	244	39	18	12	21	20	
14			27	207	322	204	38	20	15	18	21	
15			27	302	281	186	43	32	15	17	22	
16			27	359	271	176	37	52	15	16	20	
17			28	339	254	161	32	45	15	16	18	
18			20	319	245	161	30	68	15	14	20	
19			28	424	245	155	28	43	14	17	19	
20			21	567	241	147	28	32	13	19	18	
21			22	643	255	136	26	27	12	17	18	
22			20	705	262	128	28	25	12	22	17	
23			19	814	294	123	32	24	12	21	19	
24			20	866	308	113	29	22	16	20	17	
25			21	878	342	113	27	23	15	21	16	
26			24	878	353	102	25	32	14	21	22	
27			28	786	356	116	23	47	15	21	14	
28			32	836	376	167	22	32	24	23	10	
29			40	890	368	152	21	41	20	36	12	
30			54	914	349	220	25	28	25	32	8	
31			73		356		33	40		26		
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	434							14.0	861			
February.....	476							17.0	944			
March.....	632					75	19	26.8	1,650			
April.....	13,388					914	81	448	26,850			
May.....	13,119					938	241	423	26,020			
June.....	6,102					387	102	203	12,100			
July.....	1,432					144	21	46.2	2,840			
August.....	957					68	18	30.9	1,900			
September.....	486					29	12	16.2	964			
October.....	627					38	14	20.2	1,240			
November.....	582					32	8	19.4	1,150			
December.....	418.5							13.5	830			
Year.....	38,853.5							106	77,050			



## RIO GRANDE COMPACT COMMISSION

## RIO CHAMA NEAR TIERRA AMARILLA, NEW MEXICO

Location.- Water-stage recorder, Lat.  $36^{\circ}34'50''$  N., Long.  $106^{\circ}43'30''$  W., in NW $\frac{1}{4}$  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 September 1943; October 1913 to November 1916, unregulated records at site 1.5 miles upstream and to independent datum, published as Rio Chama near El Vado and near Tierra Amarilla, all in reports of Geological Survey. October 1913 to September 1916, February 1920 to December 1924 in reports of the State engineer. January 1941 to December 1943 in reports of the Rio Grande Compact Commission.

Extremes.- Maximum discharge during year, 1,580 second-feet June 22 (gage height, 4.11 feet); minimum daily, 1.4 second-feet Nov. 6, Dec. 11, 12, 16, 17, 27-31.  
1935-43 (regulated): 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, 1.2 second-feet Dec. 3, 1939.

Remarks.- Records good. Diversions above station for irrigation. Flow regulated by storage in El Vado Reservoir (capacity 200,342 acre-feet at gage height of 6,902.0 feet which is top of spillway gate).

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10	10	10	442	64	580	457	1,200	467	371	183	2.3
2	9.3	10	10	647	67	580	496	1,210	467	371	183	2.3
3	9.3	10	10	641	73	580	864	1,200	467	366	183	2.3
4	9.3	10	11	641	113	580	864	1,200	462	366	100	1.8
5	9.3	9.3	11	647	186	580	857	1,190	462	366	2.3	1.8
6	9.3	9.3	11	641	390	580	857	1,060	462	361	1.4	1.8
7	9.3	9.3	11	647	425	580	857	500	467	366	1.8	1.8
8	9.3	10	11	641	336	580	857	494	629	260	1.8	1.8
9	8.4	10	11	654	87	580	849	489	842	193	2.3	1.8
10	8.4	10	11	654	82	580	849	489	842	190	3.3	1.8
11	8.4	10	11	647	78	580	849	489	835	190	3.3	1.4
12	8.4	10	10	647	75	580	849	484	828	186	3.3	1.4
13	8.4	10	10	647	75	580	849	484	821	186	3.3	1.8
14	8.4	10	10	647	122	580	849	484	814	186	3.3	1.8
15	8.4	12	10	392	154	580	849	478	814	186	3.3	1.8
16	8.4	12	9.3	49	154	624	872	478	814	186	2.8	1.4
17	8.4	12	9.3	41	157	886	1,230	478	642	186	2.3	1.4
18	8.4	11	10	53	157	886	1,220	478	431	186	2.3	1.8
19	9.3	12	9.3	53	157	886	1,220	478	431	186	2.3	1.8
20	9.3	11	9.3	53	338	886	1,040	472	425	186	2.3	1.8
21	9.3	11	9.3	55	586	989	462	472	425	183	2.3	1.8
22	9.3	11	9.3	56	586	1,120	562	472	356	183	2.8	1.8
23	12	11	9.3	56	580	1,520	462	472	182	183	2.8	1.8
24	12	11	9.3	58	586	1,520	462	472	376	183	2.8	1.8
25	10	11	9.3	58	586	1,520	462	472	371	183	2 2.8	1.8
26	10	11	10	58	586	1,520	457	472	371	183	2.8	1.8
27	9.3	11	122	60	580	1,440	451	472	371	186	2.3	1.4
28	9.3	11	294	62	586	860	451	478	371	186	2.3	1.4
29	9.3		294	62	586	764	451	472	371	186	2.3	1.4
30	10		294	62	580	462	466	464	371	183	2.3	1.4
31	10		294		586		1,210	472		183		1.4
Month						Second-foot-days	Maximum	Minimum	Mean	Run-off in acre-feet		
January.....						288.2	12	8.4	9.30	572		
February.....						295.9	12	9.3	10.6	587		
March.....						1,559.7	294	9.3	50.3	3,090		
April.....						10,081	654	49	336	20,000		
May.....						9,718	586	64	313	19,280		
June.....						24,472	1,520	462	816	48,540		
July.....						23,510	1,230	451	758	46,630		
August.....						19,045	1,210	472	614	37,780		
September.....						15,987	842	182	533	31,710		
October.....						7,096	371	183	229	14,070		
November.....						715.9	183	1.4	23.8	1,420		
December.....						53.7	2.3	1.4	1.73	107		
Year.....						112,822.4	1,520	1.4	309	223,786		

# RIO GRANDE COMPACT COMMISSION

## SANTA FE CREEK NEAR SANTA FE, NEW MEXICO

Location.- Water-stage recorder and sharp-crested concrete control, Lat. 35°41'15" N., Long. 105°50'10" W., in NW<sup>1</sup><sub>4</sub>SW<sup>1</sup><sub>4</sub> sec. 24, T. 17 N., R. 10 E., 300 feet downstream from upper storage reservoir of New Mexico Power Co., and 6 miles east of Santa Fe.

Records available.- May to June 1910 (at site 3 miles downstream), April 1913 to December 1914 (at site 2 miles downstream) and October 1930 to December 1943 in reports of Geological Survey. January 1913 to November 1930 (at site 2 miles downstream) and November 1930 to December 1931 in reports of State Engineer.

Extremes.- Maximum discharge during year, 55 second-feet April 8 (gage height, 1.35 feet); minimum daily, 0.2 second-foot, Dec. 3-14, 16-29.

1930-43: Maximum discharge, 418 second-feet April 23, 1942 (gage height, 3.51 feet); minimum daily those of December 1943.

Remarks.- Records good, except those for period Dec. 22-27, which are fair. No diversions above gage.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.8	2.2	0.9	12	23	8.6	7.4	4.5	2.7	2.7	1.5	1.5
2	3.4	1.7	.9	12	27	8.6	7.4	4.5	2.7	2.7	1.5	.6
3	.8	1.0	.9	12	31	8.3	7.1	4.3	2.7	2.7	1.5	.2
4	.8	1.0	.9	12	32	8.3	6.8	4.3	2.7	2.7	1.5	.2
5	2.9	.9	.8	14	33	8.6	6.8	5.5	2.7	2.7	1.5	.2
6	6.6	.9	.8	21	32	8.6	6.8	5.8	2.7	2.5	1.5	.2
7	6.3	.9	.8	21	32	8.6	6.6	5.0	2.7	2.5	1.5	.2
8	6.3	.9	1.7	36	31	8.6	6.3	4.5	2.7	2.5	1.5	.2
9	6.3	.9	2.7	41	24	8.9	6.0	5.3	2.7	2.5	1.5	.2
10	6.3	.9	2.7	24	19	8.9	5.8	5.3	2.7	2.5	1.5	.2
11	6.0	.9	2.5	24	12	8.9	5.5	7.5	2.7	2.5	1.5	.2
12	6.0	.9	1.4	20	7.7	8.9	5.5	13	2.7	2.5	1.5	.2
13	6.0	.9	.7	16	7.7	8.9	5.5	12	2.7	2.5	1.5	.2
14	6.0	.9	.7	11	9.5	8.9	5.3	12	2.7	2.5	1.5	.2
15	6.0	.9	.7	8.0	12	8.9	5.5	12	2.7	2.5	1.5	.3
16	6.0	.9	.9	9.5	12	8.9	5.3	11	2.7	2.5	1.5	.2
17	3.6	.9	1.2	12	12	8.6	5.5	11	2.7	2.5	1.5	.2
18	2.2	.9	1.0	12	12	8.6	5.5	10	2.7	2.5	1.5	.2
19	2.2	.9	1.0	12	12	8.6	5.3	9.5	2.7	2.5	1.5	.2
20	2.2	.9	1.0	12	12	8.3	5.3	7.2	2.7	2.5	1.5	.2
21	2.2	.9	1.0	12	12	8.3	5.0	1.7	2.7	2.2	1.5	.2
22	2.2	.9	7.4	12	12	8.3	4.8	1.7	2.7	1.5	1.5	.2
23	2.2	.9	13	12	12	8.0	4.3	2.0	2.7	1.5	1.5	.2
24	2.2	.9	12	13	12	8.0	4.8	2.5	2.7	1.5	1.5	.2
25	2.2	.9	12	13	8.9	8.0	5.0	2.5	2.7	1.5	1.5	.2
26	2.2	.9	12	17	8.0	8.0	5.0	2.5	2.7	1.5	1.5	.2
27	2.2	.9	12	20	8.3	7.7	5.0	2.5	2.7	1.5	1.5	.2
28	2.2	.9	12	21	8.9	7.7	4.8	2.5	2.7	1.5	1.5	.2
29	2.2	.9	11	23	8.9	7.4	4.8	2.5	2.7	1.5	1.5	.2
30	2.2	.9	11	23	8.6	7.4	4.8	2.7	2.7	1.5	1.5	.4
31	2.2	.9	11		8.6		4.8	2.7		1.5		.7
Month	Second-foot-days					Maximum	Minimum	Mean	Run-off in acre-feet			
January.....	118.9					6.6	.8	3.74	230			
February.....	27.5					2.2	.9	.98	55			
March.....	138.6					13	.7	4.47	275			
April.....	507.5					41	8.0	16.3	1,010			
May.....	501.7					33	7.7	16.2	995			
June.....	252.3					8.9	7.4	8.41	500			
July.....	174.8					7.4	4.8	5.64	347			
August.....	180.0					13	1.7	5.81	357			
September.....	81.0					2.7	2.7	2.70	161			
October.....	68.2					2.7	1.5	2.20	135			
November.....	45.0					1.5	1.5	1.50	89			
December.....	8.7					1.5	.2	.26	17			
Year.....	2,101.2					41	.2	5.75	4,171			

RIO GRANDE COMPACT COMMISSION

## RESERVOIRS IN COLORADO

SQUAW LAKE RESERVOIR. Dam and adjacent staff gage located in approximate Sec. 12, T. 39 N., R. 4 W., on Squaw Lake. Total capacity of reservoir, 122 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., 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 in Secs. 2 and 11, T. 37 N., R. 4 E., on Pinos Creek. Total capacity of reservoir, 211 acre-feet as determined by original survey. Water used for irrigation of lands adjacent to Pinos Creek.

Last Day of	SQUAW LAKE			TROUTVALE NO. 2			FUCHS		
	GAGE HEIGHT Feet	CONTENTS Acres-feet	CHANGE Acres-feet	GAGE HEIGHT Feet	CONTENTS Acres-feet	CHANGE Acres-feet	GAGE HEIGHT Feet	CONTENTS Acres-feet	CHANGE Acres-feet
Jan.									
Feb.									
Mar.									
Apr.	7.0	122	0	6.1	168	0	16.0	211	+166
May	7.0	122	0	6.1	168	0	16.0	211	0
June	7.0	122	0	6.1	168	0	14.7	183	-28
July	5.8	100	-22	6.1	168	0	13.2	161	-32
Aug.	1.4	24	-76	6.1	168	0	4.6	25	-126
Sep.	1.4	24	0	6.1	168	0	4.6	25	0
Oct.	1.4	24	0	6.1	168	0	4.6	25	0
Nov.									
Dec.									
Year			-98			0			-20

[illegible]

# RIO GRANDE COMPACT COMMISSION

## RESERVOIRS IN NEW MEXICO

CARSON RESERVOIR. Dam and water-stage recorder located in NW $\frac{1}{4}$  Sec. 12, T. 25 N., R. 10 E., on Agua de la Petaca. Total capacity of reservoir, 5,684 acre-feet as determined by survey in 1941. Water for use on lands in the Carson Reclamation District.

EL VADO RESERVOIR. Dam and water-stage recorder (staff gage used below elevation 6878.0) located in SW $\frac{1}{4}$  Sec. 4, T. 27 N., R. 2 E., on Rio Chama. Total capacity of reservoir, 200,340 acre-feet as determined by original survey in 1927. Water is used for irrigation of lands in Middle Rio Grande Conservancy District.

GRANITE POINT RESERVOIR (Enlargement) Dam and staff gage located in Santiago Ramirez Grant and SW $\frac{1}{4}$  Sec. 24, T. 17 N., R. 10 E., on Santa Fe creek. Total capacity of reservoir, 650 acre-feet, determined by survey about 1935, of which only the top 174 acre-feet are Compact water. Water is for municipal use in the City of Santa Fe, New Mexico.

Last Day of	CARSON			EL VADO			GRANITE POINT (Enlarg.)		
	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet
Jan.	8.0	0	0	6,829.2	45,540	+ 3,110		0	0
Feb.	8.0	0	0	6,832.9	50,190	+ 4,650	220.2	5	+ 5
Mar.	8.0	0	0	6,839.7	59,260	+ 9,070	223.9	112	+107
Apr.	8.0	0	0	6,875.6	125,000	+ 65,740	224.8	140	+ 28
May	8.0	0	0	6,892.8	171,300	+ 46,300	225.4	158	+ 18
June	8.0	0	0	6,882.7	142,700	- 28,600		0	-158
July	8.0	0	0	6,865.3	102,600	- 40,100		0	0
Aug.	8.0	0	0	6,845.4	67,780	- 34,820		0	0
Sep.	8.0	0	0	6,822.3	37,570	- 30,210		0	0
Oct.	8.0	0	0	6,810.6	26,050	- 11,520		0	0
Nov.	8.0	0	0	6,812.5	27,780	+ 1,730		0	0
Dec.	8.0	0	0	6,815.7	30,810	+ 3,030		0	0
Year			0			- 11,620			0

NICHOLS RESERVOIR. Dam, staff gage and water-stage recorder located in NE $\frac{1}{4}$  Sec. 21, T. 17 N., R. 10 E., on Santa Fe Creek. Total capacity of reservoir, 776 acre-feet, as determined by original survey in 1942. Water is for municipal use in the City of Santa Fe, New Mexico.

SAN MATEO RESERVOIR. Dam, staff gage and water-stage recorder located in NE $\frac{1}{4}$  Sec. 25, T. 13 N., R. 8 W., on Rio San Mateo. Total capacity of reservoir 55 acre-feet; capacity reduced to 49.8 acre-feet by storm in latter part of August, 1943. Water used for irrigation of lands in the vicinity of San Mateo, New Mexico.

ACOMITA RESERVOIR. Dam and staff gage located in SE $\frac{1}{4}$  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.

Last Day of	NICHOLS			SAN MATEO			ACOMITA		
	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet
Jan.	110.0	0		33.7	51	+ 15	134.2	751	+ 109
Feb.	110.0	0	0	34.6	57	+ 6	135.6	828	+ 77
Mar.	131.6	63	+ 63	34.6	57	0	135.0	795	- 33
Apr.	147.5	240	+ 77	34.6	57	0	131.8	615	- 180
May	150.2	283	+ 43	32.6	45	- 12	130.0	522	- 93
June	153.0	336	+ 53	27.3	8	- 37	123.1	250	- 272
July	154.3	362	+ 26	17.1	1	- 7	117.4	124	- 126
Aug.	155.3	382	+ 20	34.6	55	+ 54	111.2	37	- 87
Sep.	147.0	233	-149	34.6	50	- 5	105.0	0	- 37
Oct.	144.6	197	- 36		* 20	- 30	105.0	0	0
Nov.	143.7	185	- 12		* 13	- 7	114.8	82	+ 82
Dec.	122.1	17	-168		* 14	+ 1	124.4	293	+ 211
Year			+ 17		* Estimated	- 22			- 349

# RIO GRANDE COMPACT COMMISSION

## RESERVOIRS IN NEW MEXICO

NEW LAGUNA RESERVOIR. Dam and staff gage located in 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.

PAGUATE RESERVOIR. Dam and staff gage located in NE $\frac{1}{4}$  Sec. 26, T. 10 N., R. 5 W., on Paguete Creek. Total capacity of reservoir, 976 acre-feet as determined by original survey. Water used for irrigation of lands on Laguna Indian Reservation.

Last Day of	NEW LAGUNA			PAGUATE					
	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet
Jan.	5,859.5	199	+ 164	83.9	80	+ 80			
Feb.	5,861.0	449	+ 240	85.1	132	+ 52			
Mar.	5,862.0	683	+ 234	84.5	106	- 26			
Apr.	5,860.4	339	- 344	83.3	62	- 44			
May	5,859.4	186	- 153	83.0	52	- 10			
June	5,862.0	683	+ 497	89.1	467	+ 415			
July	5,861.0	449	- 234	86.2	197	- 270			
Aug.	5,862.0	683	+ 234	92.3	965	+ 768			
Sep.	5,861.1	472	- 211	90.7	705	- 260			
Oct.	5,861.1	472	0	90.3	637	- 68			
Nov.	5,861.0	445	- 27	89.9	585	- 52			
Dec.	5,861.8	637	+ 192	90.5	669	+ 84			
Year			+ 602			+ 669			

ELEPHANT BUTTE RESERVOIR. Dam and gages located in NW $\frac{1}{4}$  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 SW $\frac{1}{4}$  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 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 Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet	GAGE HEIGHT Feet	CONTENTS Acre-feet	CHANGE Acre-feet
Jan.	4,393.65	1,755,100	- 25,400	4,179.19	314,210	+ 49,470		2,069,310	+ 24,070
Feb.	4,392.89	1,731,900	- 23,200	4,181.10	335,640	+ 21,430		2,067,540	- 1,770
Mar.	4,391.65	1,693,500	- 38,400	4,178.34	304,840	- 30,800		1,998,340	- 69,200
Apr.	4,390.32	1,653,100	- 40,400	4,171.75	239,750	- 65,090		1,892,850	-105,490
May	4,389.32	1,623,900	- 29,200	4,165.59	187,900	- 51,850		1,811,800	- 81,050
June	4,387.26	1,565,400	- 58,500	4,157.30	127,250	- 60,650		1,692,650	-119,150
July	4,385.76	1,523,700	- 41,700	4,149.49	83,010	- 44,240		1,606,710	- 85,940
Aug.	4,383.15	1,454,400	- 69,300	4,127.72	15,570	- 67,440		1,469,970	-136,740
Sep.	4,380.82	1,394,300	- 60,100	4,130.03	20,210	+ 4,640		1,414,510	- 55,460
Oct.	4,378.16	1,329,300	- 65,000	4,146.62	70,440	+ 50,230		1,399,740	- 14,770
Nov.	4,375.89	1,276,700	- 52,600	4,156.39	121,520	+ 51,080		1,398,220	- 1,520
Dec.	4,374.73	1,250,600	- 26,100	4,164.63	180,450	+ 58,930		1,431,050	+ 32,830
Year			-529,900			- 84,290			-614,190

## EVAPORATION AND PRECIPITATION

Evaporation records from seven stations, two in Colorado and five in New Mexico, and precipitation records from nine stations, three in Colorado and six in New Mexico are shown on the following page.

In each case the unit of measure is the inch.

Measurements of evaporation are made in accordance with standard practice for the various pans in use.

Precipitation measurements are made in standard 8-inch rain gages and, in some places, with recording rain gages.

The evaporation and precipitation stations at Elephant Butte Dam and El Vado Dam and the precipitation stations at Caballo Dam, Pankey Ranch and San Marcial were in operation prior to the effective date of the Compact. The stations near Wagon Wheel Gap, near Conejos (Lower Damsite) and at Summitville were installed by the U. S. Weather Bureau at the request of the Compact Commission. The evaporimeter at San Marcial was installed by the United States Section of the International Boundary Commission.

The Rio Grande Compact Commission wishes to acknowledge the co-operation of the Weather Bureau and the United States Section of the International Boundary Commission in furnishing the records of evaporation and precipitation contained in this report.

## RIO GRANDE COMPACT COMMISSION

## EVAPORATION AND PRECIPITATION, RIO GRANDE BASIN

## COLORADO

WAGON WHEEL GAP (near). In Mineral county, elevation 8,500 feet, Lat. 37°46' N., Long. 106°49' W., near Wagon Wheel Gap, Colorado. Standard land pan, anemometer, maximum and minimum thermometers, standard 8-inch rain gage and recording rain gage.

CONEJOS (near). In Conejos county, elevation 7,800 feet, Lat. 37°08' N., Long. 106°02' W., three miles northwest of Conejos, Colorado, Standard land pan, anemometer, maximum and minimum thermometers and standard 8-inch rain gage.

SUMMITVILLE. In Rio Grande county, elevation 11,330 feet, Lat. 37°26' N., Long. 106°36' W., at Summitville, Colorado. Cylindrical evaporation pan, maximum and minimum thermometers, standard 8-inch rain gage and recording rain gage.

PLACE	EVAPORATION												PRECIPITATION													
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Wagon Wheel Gap (near)	---	---	---	---	7.45	8.62	7.97	4.35	5.00	---	---	---	---	0.84	0.59	0.86	0.24	1.27	1.25	3.50	2.86	1.07	1.55	0.83	0.75	15.61
Conejos Dam (near)	---	---	---	9.04	10.36	11.50	7.58	6.70	6.90	4.58	---	---	---	0.14	0.30	0.11	0.23	0.22	0.72	2.80	2.02	0.55	0.87	0.61	0.19	8.76
Summitville														6.72	2.71	4.12	0.94	2.27	3.27	1.47	5.93	1.63	3.99	1.86	2.03	36.84

\* 1 day missing; adjusted to full month.

## NEW MEXICO

EL VADO DAM. In Rio Arriba County, elevation 6,796 feet, Lat. 36°36' N., Long. 106°44' W., at El Vado Dam near Tierra Amarilla, New Mexico. Standard land pan, anemometer, maximum and minimum thermometers, standard 8-inch rain gage and recording rain gage.

SAN MARCIAL. Precipitation: In Socorro county, elevation 4,430 feet, Lat. 33°42' N., Long. 106°59' W., at railroad station San Marcial, New Mexico. Standard 8-inch rain gage and maximum and minimum thermometers. Evaporation: International Boundary Commission evaporimeter near post office approximately one half mile west of railroad station, San Marcial, New Mexico.

PANKEY RANCH. In Sierra county, elevation 5,000 feet, Lat. 33°28' N., Long. 107°15' W., at Pankey Ranch near Hot Springs, New Mexico. Standard 8-inch rain gage.

ELEPHANT BUTTE DAM. In Sierra county, elevation 4,576 feet, Lat. 33°09' N., Long. 107°11' W., at Elephant Butte, New Mexico. Standard land pan, anemometer, maximum and minimum thermometers and standard 8-inch rain gage.

CABALLO DAM. In Sierra county, elevation 4,190 feet, Lat. 32°54' N., Long. 107°18' W., at Caballo Dam near Caballo, New Mexico. Standard land pan, anemometer, maximum and minimum thermometers and standard 8-inch rain gage.

FARMINGTON. In San Juan county, elevation 5,300 feet, Lat. 36°43' N., Long. 108°12' W., in San Juan Basin at Farmington, New Mexico. Floating pan, anemometer, and standard 8-inch rain gage.

PLACE	EVAPORATION												PRECIPITATION												Incomplete	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
El Vado Dam	---	---	---	---	8.99	9.88	9.83	7.65	7.19	---	---	---	---	0.78	---	1.41	0.32	1.11	1.74	0.68	3.24	0.99	1.09	0.70	2.57	---
San Marcial	3.19	5.24	8.23	10.56	14.49	12.74	9.24	9.43	7.63	5.86	3.48	1.82	91.80	0.10	0.00	0.00	0.00	0.00	2.30	1.51	1.48	0.97	0.00	---	---	---
Pankey Ranch														0.14	0.00	0.18	0.00	0.38	1.62	0.81	0.30	0.85	0.00	0.19	1.91	6.41
Elephant Butte Dam	3.84	5.84	8.73	13.23	15.96	17.05	13.14	13.96	10.61	8.54	5.64	2.74	119.28	0.02	0.00	0.20	0.00	0.68	1.75	1.09	0.35	1.09	0.24	0.16	1.71	8.26
Caballo Dam	3.58	5.70	8.44	11.84	15.66	15.82	12.38	13.98	9.72	7.71	4.47	2.22	111.52	0.28	T	0.07	T	0.09	1.66	1.30	1.34	1.59	0.30	0.33	1.16	8.12
Farmington	0.77	1.54	3.33	7.16	7.99	6.89	6.77	6.02	5.51	3.52	1.90	0.54	51.54	0.26	0.61	1.36	0.11	0.90	0.53	0.40	0.78	0.39	0.40	0.18	1.31	7.23

## RIO GRANDE COMPACT COMMISSION

## TRANSMOUNTAIN DIVERSIONS

SQUAW PASS				TREASURE PASS				PIEDRA 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 the Rio Grande below the Del Norte gaging station.				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., N.M.P.M. (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 the San Juan River; empties into Middle Creek, a tributary to South Fork in the Rio Grande Basin. Diversion is from the Rio Grande below the Del Norte gaging station.				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., N.M.P.M. (projected survey), 20 miles south of Creede, Colorado. Diversion originates on the right bank of 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.			
Day		June	July			June	July			June	
1			1.9				3.2				
2			1.9				3.3				
3			1.8				1.6				
4		0.4	1.5				1.6				
5		1.1	1.2				1.6				
6		1.8	1.2				1.5				
7		2.8	1.0				1.6				
8		3.9	0.9			1.7	1.6			0.2	
9		3.9	0.7			1.7	1.6			1.7	
10		4.1	0.7			1.7	1.6			4.0	
11		4.2	0.7			1.7	1.6			6.2	
12		2.8	0.4			1.7	1.5			6.2	
13		2.4	0.3			1.7	1.6			5.8	
14		2.6	0.3			1.7	1.6			5.4	
15		2.6	0.4			1.7	1.6			6.4	
16		3.5	0.4			1.7	1.6			6.0	
17		4.2	0.3			1.7	0.8			5.4	
18		3.8	0.2			1.7	0.8			5.3	
19		3.7	0.1			1.7	0.8			5.9	
20		3.8				1.7	0.8			5.7	
21		3.9				5.0	0.8			5.3	
22		3.3				5.0	0.8			5.2	
23		3.1				5.0	0.8			4.1	
24		3.1				5.0				3.1	
25		3.1				5.0				2.2	
26		2.7				5.0				1.4	
27		2.2				5.0				2.0	
28		2.1				3.3				2.9	
29		2.5				3.2				1.2	
30		2.3				3.3					
31											
Total		79.9	15.9			66.9	34.3			91.6	
Max.		4.2	1.9			5.0	3.3			6.4	
Min.		1.1	0.2			1.7	0.8			1.4	
Mean		3.0	0.8			2.9	1.5			4.2	
Ac. Ft.		158.5	31.5			132.7	68.0			181.7	
Season's Summary				Season's Summary				Season's Summary			
Total cfs		95.8		Total cfs		101.2		Total cfs		91.6	
Max.		4.2		Max.		5.0		Max.		6.4	
Min.		0.2		Min.		0.8		Min.		1.4	
Mean		2.1		Mean		2.2		Mean		4.2	
Ac. Ft.		190.0		Ac. Ft.		200.7		Ac. Ft.		181.7	



RIO GRANDE COMPACT COMMISSION  
TRANSMOUNTAIN DIVERSIONS

WEMINUCHE PASS (East Ditch) FUCHS						WEMINUCHE PASS (West Ditch) RABER-LOHR					TABOR			
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., N.M.P.M. (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.						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., N.M.P.M. (projected survey), 25 miles southwest of Creede, Colorado. Diversion originates on left bank of Rincon La Vaca Creek, a tributary to the Rio de los Pinos in the San Juan River Basin; empties into Weminuche Creek, a tributary of the Rio Grande. Diversion is from Rio Grande above the Del Norte gaging station.					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., N.M.P.M. (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.			
Day	May	June	July	Aug.	Sept.	May	June	July	Aug.	Sept.	May	June	July	
1		7.5	5.8	2.3	1.8		12.2	18.5	3.2	6.0		3.9	2.0	
2		7.5	5.5	2.3	1.6		12.2	18.6	3.2	6.0		3.9	1.8	
3		7.6	5.5	2.4	1.6		12.2	16.4	3.2	6.3		3.9		
4		7.5	2.5	2.3	1.7		12.2	16.4	3.2	6.0		3.9		
5		7.5	2.5	2.3	1.7		12.2	16.4	3.2	6.0		3.9		
6		7.4	2.6	2.4	1.6		12.2	16.4	3.2	6.0		3.9		
7		7.5	2.5	2.3	1.6		11.8	16.4	3.2	6.0		3.9		
8		7.5	2.5	2.0	1.6		11.8	16.4	2.5	6.0		3.9		
9		7.5	2.5	2.0	1.6		11.8	16.4	2.5	6.0		3.9		
10		7.5	2.6	2.0	1.6		11.8	16.4	2.5	6.0		3.8		
11		6.7	2.5	2.0	1.7		11.8	7.3	2.5	6.0		2.7		
12		6.7	1.6	2.0	1.7		11.8	7.3	2.5	6.0		3.4		
13	6.4	6.7	1.7	2.0	0.8		11.8	7.4	2.5	5.1		2.9		
14	6.4	6.7	1.6	2.7	0.8		10.5	7.3	6.0	5.2		2.8		
15	6.4	6.7	1.7	2.8	0.8		10.5	7.3	6.0	5.1		2.8		
16	6.4	6.7	1.5	2.7	0.8		10.5	7.4	6.0	5.1		2.7		
17	6.4	6.7	1.7	2.8	0.8		10.5	7.3	6.0	5.1		2.7		
18	6.5	6.7	1.6	2.7	0.8		10.5	6.9	6.0	5.1		2.6		
19	6.4	6.7	1.3	2.8	0.8		10.5	6.9	6.0	5.1		2.5		
20	6.4	5.8	1.3	2.7	0.8		10.5	6.8	6.0	5.1		2.3		
21	6.4	5.8	1.3	2.8	0.9		11.1	6.9	6.0	5.1		2.2		
22	6.4	5.8	1.2	2.7	0.9	8.3	11.1	6.9	6.0	5.1		2.1		
23	6.4	5.9	1.3	2.8	0.8	8.3	11.1	8.1	6.0	5.1		1.9		
24	6.4	5.8	1.3	1.7		8.3	11.1	8.1	6.0		1.2	2.5		
25	6.5	5.8	1.3	1.7		8.3	11.1	8.2	6.0		3.6	2.2		
26	6.4	5.5	1.3	1.8		8.3	11.1	8.1	6.0		3.8	2.3		
27	6.4	5.5	1.2	1.7		8.3	18.5	8.1	6.0		3.9	2.2		
28	6.4	5.6	1.3	1.7		8.3	18.6	8.2	6.0		3.9	2.0		
29	6.4	5.5	1.3	1.8		8.3	18.5	8.1	6.0		3.9	2.2		
30	6.4	5.5	1.3	1.7		8.3	18.6	8.1	6.0		3.9	2.1		
31	7.5		1.2	1.6		12.2		3.2	6.0		3.9			
Total	122.9	197.7	64.9	69.5	28.6	86.9	370.1	322.2	145.4	128.5	28.1	87.8	3.8	
Max.	7.5	7.5	5.6	2.8	1.7	12.2	18.6	18.6	6.0	6.3	3.9	3.9	2.0	
Min.	6.4	5.5	1.2	1.6	0.8	8.3	10.5	3.2	2.5	5.1	3.8	1.9	1.8	
Mean	6.5	6.6	2.1	2.2	1.2	8.7	12.3	10.4	4.7	5.6	3.5	2.9	1.9	
Ac. Ft.	243.7	392.1	128.7	137.9	56.7	172.4	734.1	639.1	288.4	254.9	55.7	174.1	7.5	
Season's Summary Total cfs. 483.6 Max. 7.5 Min. 0.8 Mean 3.6 Ac. Ft. 959.1						Season's Summary Total cfs. 1053.1 Max. 18.6 Min. 2.5 Mean 8.4 Ac. Ft. 2088.9					Season's Summary Total cfs. 119.7 Max. 3.9 Min. 1.8 Mean 3.0 Ac. Ft. 237.3			

# RIO GRANDE COMPACT COMMISSION

## BUDGET

At the Fourth Annual (Thirteenth) Meeting of the Rio Grande Compact Commission held in Denver, Colorado on February 24 and 25, 1943 the following budget for the operation of gaging stations and administration of the Compact was adopted for the fiscal year ending June 30, 1944.

Item	Total Cost	Borne by United States		Borne by Compacting States		
		U. S. G. S.	L. R. C.	Colorado	New Mexico	Texas
GAGING STATIONS:						
In Colorado	\$ 3,500.00	\$ 1,700.00		\$ 1,800.00		
In New Mexico above Elephant Butte	7,100.00	2,900.00	\$ 1,200.00		\$ 3,000.00	
Below San Marcial	2,500.00					\$ 2,500.00
Subtotal	\$13,100.00	\$ 4,600.00	\$ 1,200.00	\$ 1,800.00	\$ 3,000.00	\$ 2,500.00
Administration	6,500.00			2,166.00	2,167.00	2,167.00
Total Cost	\$19,600.00	\$ 4,600.00	\$ 1,200.00	\$ 3,966.00	\$ 5,167.00	\$ 4,667.00
Net to States	\$13,800.00			\$ 3,966.00	\$ 5,167.00	\$ 4,667.00
Cash adjustment				Dr. 554.00	Cr. 567.00	Cr. 67.00
Adjusted net to States	\$13,800.00			\$ 4,600.00	\$ 4,600.00	\$ 4,600.00

At the Fifth Annual (Fourteenth) Meeting of the Rio Grande Compact Commission held in Santa Fe, New Mexico on February 24 and 25, 1944 an identical budget for the operation of gaging stations and administration of the Compact was adopted for the fiscal year ending June 30, 1945.

## COST OF OPERATION

FOR FISCAL YEAR ENDING JUNE 30, 1943

The cost of operation borne by the states for the fiscal year was \$11,666.82; a cost to each state of \$3,888.94. This latter amount was \$889.28 less than the budget. The cost of operation is shown in the following table:

Item	Total Cost	Borne by United States		Borne by Compacting States		
		U. S. G. S.	L. R. C.	Colorado	New Mexico	Texas
GAGING STATIONS:						
In Colorado	\$ 3,500.00	\$ 1,700.00		\$ 1,800.00		
In New Mexico above Elephant Butte	7,100.00	2,900.00	\$ 1,200.00		\$ 3,000.00	
Below San Marcial	2,500.00					\$ 2,500.00
Subtotal	\$13,100.00	\$ 4,600.00	\$ 1,200.00	\$ 1,800.00	\$ 3,000.00	\$ 2,500.00
ADMINISTRATION:						
Sec'y's salary & expense	\$ 4,202.83			\$ 1,400.94	\$ 1,400.95	\$ 1,400.94
4th Annual Report (2/3 cost)	130.66			65.33	65.33	
Deficit in salary, made up.	33.33			33.33		
Subtotal	\$ 4,366.82			\$ 1,499.60	\$ 1,466.28	\$ 1,400.94
Total	\$17,466.82	\$ 4,600.00	\$ 1,200.00	\$ 3,299.60	\$ 4,466.28	\$ 3,900.94
Borne by States	\$11,666.82			\$ 3,299.60	\$ 4,466.28	\$ 3,900.94
Share of each	\$11,666.82			\$ 3,888.94	\$ 3,888.94	\$ 3,888.94
Cash Adjustment				Dr. \$ 589.34	Cr. \$ 577.34	Cr. \$ 12.00