

12-1-1920

Fourth Report of State Highway Engineer and State Engineer of New Mexico, for the Seventh and Eighth Fiscal Years, December 1, 1918 to November 30, 1920

Leslie A. Gillett

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FOURTH REPORT
of
STATE HIGHWAY ENGINEER
and
STATE ENGINEER
of NEW MEXICO



*For the Seventh and Eighth Fiscal Years
December 1, 1918 to November 30, 1920*

LESLIE A. GILLETT
STATE HIGHWAY ENGINEER
STATE ENGINEER

**NEW MEXICO STATE ENGINEER
LIBRARY**

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STATE LIBRARY

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PART TWO
STATE ENGINEER

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Plan

*E. No
the Seventh

December 1, 1920.

Sir:

Transmitted herewith is my biennial report as State En-
gineer for the biennium ending November 30, 1920.

Respectfully,

L. A. GILLETT,
State Engineer.

To His Excellency,
Octaviano A. Larrazolo,
Governor of New Mexico.

PERSONNEL

The principal officers of the State Engineer's Office at the close of the biennium were as follows:

Santa Fe Office:

State Engineer—Leslie A. Gillett.

*Assistant Engineer—Geo. M. Neel.

Chief Hydrographer—Eugene Griffin.

Law Clerk (Chief Clerk)—Bradley M. Thomas.

Stenographer-Clerk—Julia Holeman.

Field:

Hydrographer—Homer G. Neel.

Hydrographer—Mark Lambert.

Hydrographer—H. A. Hamill.

Planetableman—Hugo Marek.

*E. Norris Hobart held the position as Assistant Engineer until the close of the Seventh Fiscal Year (November 30, 1919).

En-

INTRODUCTION

The report covers the work directed by the Legislature of the State of New Mexico to be carried out under the State Engineer during the two fiscal years, December 1, 1918, to November 30, 1920, and the other work which was in progress before December 1, 1918, and to be continued.

There is quoted herewith for your information the authority granted by the various Legislatures, citing the several acts directing the work of the office.

Chapter 114, Codification of 1915, relating to the conservation of and to regulate the use and distribution of the waters of New Mexico; to create the office of State Engineer; creating a Board of Water Commissioners and prescribing their duties.

Chapter 102, Laws of 1909, creating the Carey Act Land Board. Approved March 18, 1909.

Chapter 80, Laws of 1913: An Act providing additional funds for Hydrographic Surveys under the irrigation laws of 1907. Approved March 17, 1913.

Chapter 71, Laws of 1917: An Act to appropriate money for surveys and investigations of lands in the Rio Grande valley. Approved March 13, 1917.

Chapter 102, Laws of 1917: An Act defining surveying and licensing surveyors. Approved March 13, 1917.

Chapter 107, Laws of 1917: An Act creating the Rio Grande Commission. Approved March 12, 1917.

Chapter 20, Laws of 1919: An Act relating to irrigation districts organized or to be organized for the purpose of co-operating with the Government of the United States under the terms of the Federal Reclamation Law and other Federal Laws, and repealing existing laws in conflict herewith. Approved March 5, 1919.

Chapter 23, Laws of 1919: An Act to provide for the settlement of disputes between residents of the State of New Mexico and residents of the State of Colorado, residents along the La Plata river in the said States, in regard to the right to the waters of said river. Approved March 6, 1919.

Chapter 81, Laws of 1919: An Act to provide for an appropriation for gauging the streams of the State of New Mexico, investigation for pumping or underground waters, and for encouraging irrigation as provided in Chapter 32, Laws of 1912. Approved March 15, 1919.

Chapter 124, Laws of 1919: An Act relating to the Hydrographic Surveys and other surveys made or accepted by the State Engineer. Approved March 17, 1919.

Chapter 131, Laws of 1919: An Act relating to Hydrographic Surveys and providing for the transfer of \$25,000.00 from the "Water Reservoirs for Irrigation Purposes Income Fund" to the "Hydrographic Survey Fund" and providing for co-operation between the State Engineer and the Federal Reclamation Service in the making of Hydrographic Surveys, and amending Section 5666 of the New Mexico Statutes Annotated, Codification 1915, and for other purposes. Approved March 17, 1919.

Chapter 139, Laws of 1919: An Act appropriating funds for the improvement of the Rio Grande. Approved March 17, 1919.

Chapter 166, Laws of 1919: An Act to appropriate money for surveys and investigations of land in the Rio Grande Valley. Approved March 17, 1919.



View of

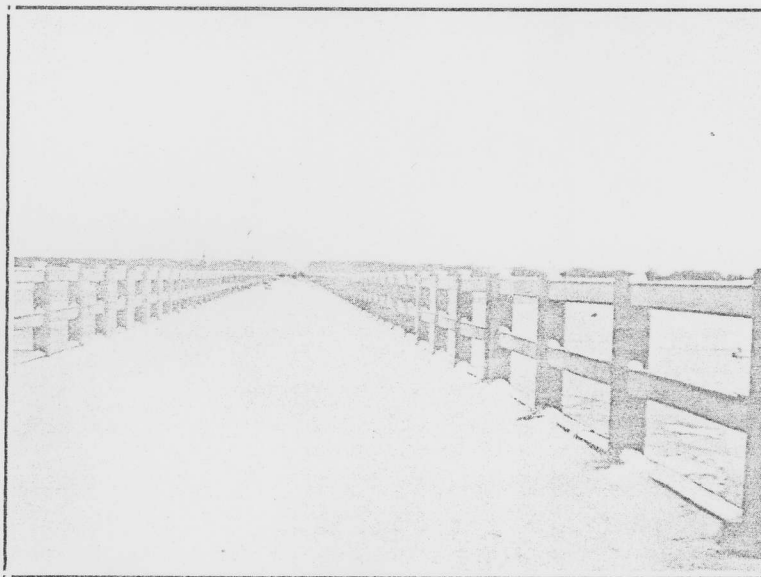


Same bridge



VALENCIA COUNTY

View of Los Lunas Bridge spanning Rio Grande. Reinforced concrete throughout.



VALENCIA COUNTY

Same bridge as above. Constructed with County funds. 30 Spans 31 feet each set on concrete piles.

IRRIGATION

Under the Irrigation Act, Chapter 49, Laws of 1907, and Supplementary Laws, applications for water permits and interests in irrigation generally in New Mexico, have increased enormously since the last report.

Filings:

The record of applications for permit to appropriate the public waters during the period December 1, 1918, to November 30, 1920, shows a total of 77 Notices of Intention to Make Formal Application for Permit covering 64 irrigation projects for a total of 141,488 acres; 13 power projects for a proposed development of 29,855 h. p. and three for mining and milling purposes. The total amount of water covered by these Notices of Intention is 1,499 cubic feet per second and 219,014 acre feet. Fifty-six of these Notices for a proposed irrigation of 129,670 acres have lapsed and been cancelled. Formal Applications to the number of 35, not preceded by a Notice of Intention, and 59 preceded by the Notice have been filed. These Formal Applications include 88 irrigation projects covering 120,105 acres; two power projects for the development of 230 h. p.; one stock watering project and three mining and milling projects; all for a total of 768.88 sec. ft. and 48,209.55 acre feet of water, and at a proposed construction cost of \$704,500.00. Five applications to irrigate 6,830 acres have been rejected; also four irrigation and two power projects previously filed have lapsed and been cancelled and include 1,594 acres and 410 sec. ft. of water. Forty new applications and forty previously filed have been approved. Three applications to change the Place of Use or the Point of Diversion have been filed and approved, and 151 Declarations of Old Water Rights certified for filing. Thirty Certificates of Construction and 29 Final Licenses have been issued granting water rights to 6,605.87 acre feet of water for the irrigation of 3,009.47 acres.

Protests and Hearings:

Twenty protests against the granting of applications have been filed, of which four have been withdrawn and eleven have gone to a hearing before the State Engineer, for the taking of testimony. Three decisions by the State Engineer

have been appealed to the Board of Water Commissioners. Eleven protests are pending to be called for hearing in the near future unless withdrawn or settled by stipulation.

Lapsed Filings:

The records are being cleared of lapsed filings, after due notice to interested parties of record, in order that prospective appropriators may not be discouraged or have placed on them the burden of clearing the record. Consequently many applications for extension of time have been filed and acted on.

Summary:

The records of the office show total filings to date number 1,436, and those now in good standing cover 1,224,943 acre feet of water for the irrigation of 439,412 acres. Licenses granted cover 250,958 acre feet of water for the irrigation of 74,486 acres, or an average duty of 3.36 acre feet of water for each acre irrigated on a basis of eight months' use per annum.

Miscellaneous:

The filing of Declarations of Old Rights initiated prior to March 19, 1907, is encouraged in order that there may be available a record of all appropriated waters, and also in order that testimony relating thereto may be perpetuated. The increase in the number of protests in proportion to the number of filings forecasts the necessity for a much more careful consideration of applications than has been necessary in the past, in order to determine whether there is unappropriated water available.

Owing to the many changes in the irrigation and drainage laws by various Legislatures since the last compilation of laws were made, it was deemed necessary and desirable to make a new compilation of these laws, which was accomplished in July, 1920, with fiscal co-operation from the Board of Water Commissioners. These compiled irrigation laws as mentioned have received very favorable comment from various members of the Bar and irrigationists from various parts of the United States. This work was accomplished by Mr. Bradley M. Thomas, Law Clerk (Chief Clerk) of this office.

Financial statement of the Irrigation Fees account and Hydrographic Survey Fund follows:

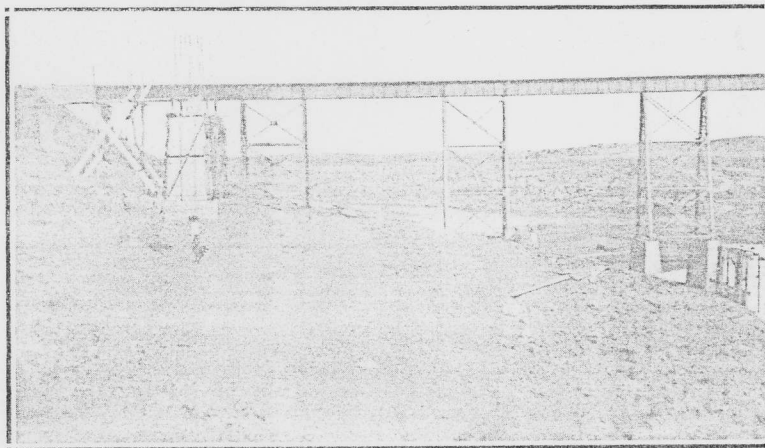
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QUAY COUNTY

Federal Aid Project No. 39. Concrete piers under construction for steel bridge at Logan across the Canadian River.



QUAY COUNTY

Another view of Federal Aid Project No. 39. Note steel bridge of E. P. & S. W. Railroad in the background, highway bridge to parallel same.

IRRIGATION FEES ACCOUNT

SEVENTH FISCAL YEAR:

Balance in First National Bank, Dec. 1, 1918.....	\$6,533.42
Receipts:	
Applications	\$3,258.44
Interest on Deposits	175.87
Total Balance and Receipts.....	3,434.31
Disbursements:	\$9,967.73
Refunds	
Earned Fees (State Treasury).....	\$ 801.16
2,910.87	3,712.03
Balance, November 30, 1919 (First National Bank).....	\$6,255.70

EIGHTH FISCAL YEAR:

Balance in First National Bank, Dec. 1, 1919.....	\$6,255.70
Receipts:	
Applications	\$5,761.62
Interest on Deposits	235.13
Total Balance and Receipts.....	5,996.75
Disbursements:	\$12,252.45
Refunds	
Earned Fees (State Treasury).....	\$1,279.74
3,021.10	4,300.84
Balance, November 30, 1920 (First National Bank).....	\$7,951.61

HYDROGRAPHIC SURVEY FUND

SEVENTH FISCAL YEAR:

Balance in State Treasury, December 1, 1918.....	\$ 4,555.95
Receipts (Earned Irrigation Fees).....	2,910.87
Total Balance and Receipts.....	\$ 7,466.82
*Disbursements	5,500.00
Balance November 30, 1919.....	\$ 1,966.82

EIGHTH FISCAL YEAR:

Balance in State Treasury, December 1, 1919.....	\$ 1,966.82
Receipts (Earned Fees).....	3,021.10
Receipts Transferred from Bank Fund (Santa Fe Proj.).....	326.41
Transfers to Fund.....	25,261.88
*Disbursements	\$30,576.21
11,911.36	
Balance in State Treasury, November 30, 1920.....	\$18,664.85

* Included in disbursements are funds shown disbursed in the several Projects:
Santa Fe, La Plata and Pecos Hydrographic Surveys.

STREAM GAGING

On November 30, 1918, the date of the last biennial report, there was a balance in the stream gaging fund of \$432.46. At that time the State maintained 62 gaging stations and had from two to three field hydrographers. During the Seventh and Eighth fiscal years, we have had an engineer in charge of the work, from one to three hydrographers and a stenographer and clerk. The office records or run-off have been kept up to within a month to six weeks at all times.

For 1918 we published run-off records for 71 gaging stations; through courtesy of the State Engineer of Colorado the records for the Rio Grande at Del Norte, Alamosa and Lobatos; through the U. S. Reclamation Service the records for the Pecos at Dayton and the Rio Grande at San Marcial and through the U. S. Geological Survey the records of the Pecos at Carlsbad.

The compilation of the run-off records for 1919 was delayed and report was made from January 1, 1919, up to and including September 30, 1920, and is now being printed and should be ready for distribution early in 1921. This report for the calendar year 1919, and for the period January 1, 1920, to September 30, 1920, and contains run-off records for 76 gaging stations. The reports published in the future will be for the climatic year, October 1 to September 30.

We have kept the hydrographers' traveling expenses as low as possible by using an automobile wherever practicable and thus saving a great deal of time in going from one station to another. By visiting the stations about once every six weeks we have been able to keep a clear relation between the gage heights and discharge and to account for any shift in the channel or change in the shape of curves.

The results of our stream gaging work have been satisfactory and we feel that the published records are reliable and can be depended upon as accurate to the degree such records can attain.

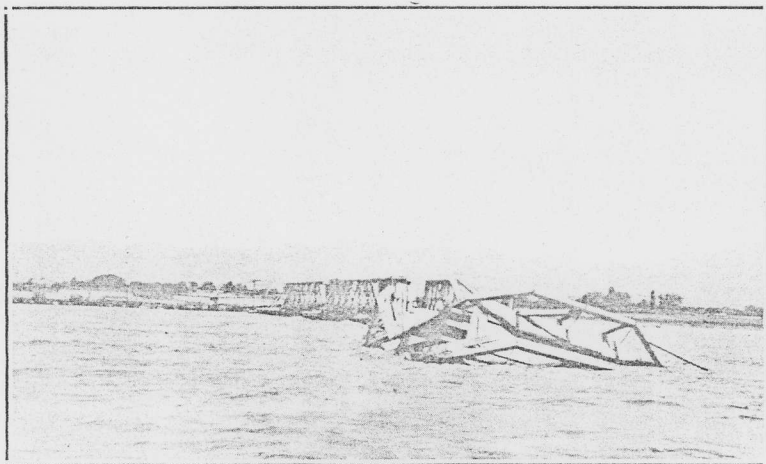
This work was in charge of Clyde Walters to May 26, 1919. From May 27, 1919, to August 10, 1920, it was in charge of Manuel A. Sanchez. On August 16, 1920, Eugene Griffin took charge of the department. Hydrographers employed during



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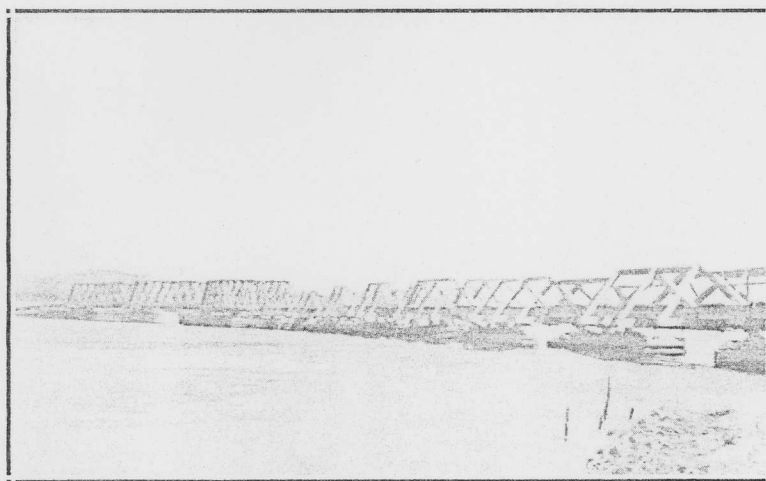


San
traffic.
replaced



RIO ARriba COUNTY

Espanola Bridge across Rio Grande wrecked by spring floods of 1920.
Old bridge practically rotted out, built on rock-filled cribs.



RIO ARriba COUNTY

Same bridge as above. Emergency repair work to accommodate traffic. Bridge replaced on rock-filled cribs. Entire bridge will be replaced by a concrete structure as a Federal Aid Project.

this period were Clyde Walters, J. D. Walker, J. E. Powers, E. C. Stout, Robert A. Smith, Wayne Laws, W. N. Evans, J. D. Bell, Manuel A. Sanchez, Howard Stech, Eugene Griffin and Mark Lambert. Miss Vivian Redding was employed as stenographer and clerk.

The following financial statement is for the Seventh and Eighth Fiscal years:

STREAM GAGING FUND

SEVENTH FISCAL YEAR:

Balance in Bank, December 1, 1918.....	\$	432.46
Annual Appropriation		15,000.00
Reimbursement by State Land Office.....		262.89
Refund on Hotel Bill.....		8.50
		<u>\$15,703.85</u>
Disbursement through American National Bank.....	\$5,613.11	
Through State Auditor's Office	9,610.33	15,223.44
		<u>\$</u>
Balance in American National Bank.....	82.24	480.41
Unexpended Balance in State Treasury.....	398.17	480.41

EIGHTH FISCAL YEAR:

Balance in American National Bank.....	\$	82.24
Annual Appropriation		15,000.00
		<u>\$15,082.24</u>
Disbursements:		
Through American National Bank.....	\$	82.24
Through State Auditor's Office.....	14,466.88	14,549.12
		<u>\$</u>
Unexpended Balance in State Treasury.....		533.12

NOTE: As soon as possible after assuming office, I discontinued the practice of drawing lump sums from the State Treasury and deposition of said sum in a bank and paying vouchers by check written by disbursing clerk. All vouchers are now paid through the State Auditor's office.

RIO GRANDE DRAINAGE INVESTIGATIONS

Under Chapter 166, Laws of 1919, there was appropriated the sum of \$5,000.00 for the purpose of continuing drainage investigations throughout the Middle Rio Grande Valley as begun in 1917 under Chapter 71, Laws of 1917. By a co-operative agreement, entered into on the second day of January, 1919, between the United States Reclamation Service and the State Engineer of New Mexico, The Service furnished the sum of \$4,000.00 to be expended by the State Engineer in extending and prosecuting those investigations, conditioned upon all data being worked up and a comprehensive engineering report made and furnished to the Reclamation Service by this office.

The State Engineer's Office further entered into an agreement with the Bureau of Public Roads of the United States Government whereby its agent at the State College would do certain field work on these investigations, under the stipulation that they be furnished with copies of all data gathered by the State in its work.

Under these agreements, the investigations have been greatly extended and a great deal of valuable information has been gathered. These data will be particularly valuable when any interests whatsoever shall approach the time of actual drainage of any of the districts, and valuable in pointing the way and encouraging this much needed improvement.

There have been installed over 600 additional test wells for the purpose of securing and recording the position and movements of the ground water table. As far as possible, these new test wells have been installed in lines across the valley at right angles to the thread of the valley, and notes taken for profiles on these lines. These data, together with the logs of the material penetrated by the wells, will permit of the platting and studying of the conditions, and, with the topography that has been previously mapped, will make possible the laying down of tentative plans and the preparation of estimates for the work.

Monthly readings and records on the ground water table have been kept and these data will be compiled and correlated in the final engineering report. In addition to these records,

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Carlsb



QUAY COUNTY

Montoya Bridge. Old wooden structure washed away and replaced by present concrete substructure with wooden deck on concrete sills.



EDDY COUNTY

Carlsbad-Roswell Road. Condition after being maintained with road maintainer.

there has been kept the best record possible, under the conditions, of the inflow into the river from the principal tributaries between White Rock canon and San Marcial. This, it is believed, will make possible an analysis of the losses or gains in the valley between these two points, and a forecast of the effects of drainage throughout the valley upon the water supply in the river.

With the funds that are yet available for this purpose, it is intended to continue the field work as long as possible, reserving only enough for compiling the data and making the final report and estimates.

RIO GRANDE DRAINAGE SURVEY FUND

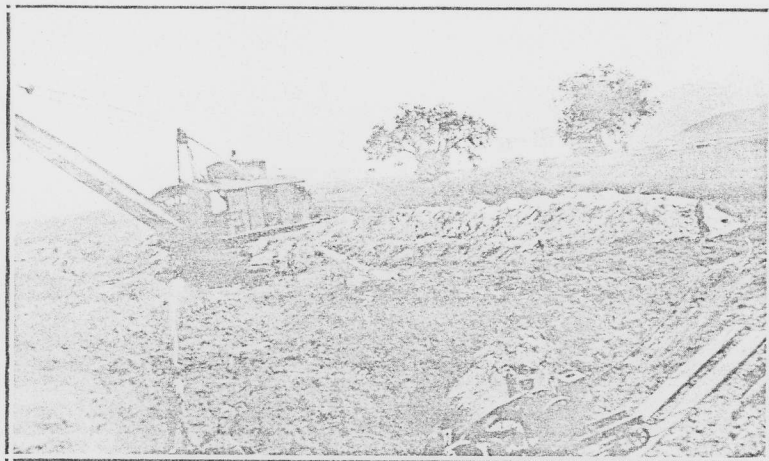
The financial statement of this fund is as follows:

SEVENTH FISCAL YEAR:

Balance in appropriation of 1917.....	\$2,075.72	
Interest on Deposits and Refund.....	3.36	
Appropriation, Chap. 166, Laws of 1919.....	5,000.00	
		<hr/>
		\$7,079.08
Disbursements:		
From First National Bank Fund.....	\$2,079.08	
From State Treasury	3,430.69	
		<hr/>
		5,509.77
Balance November 30, 1919.....		<hr/>
		\$1,569.31

EIGHTH FISCAL YEAR.

Balance in Appropriation Fund.....	\$1,569.31	
Donated by Reclamation Service under contract with State Engineer, deposited in First National Bank.....	4,000.00	
		<hr/>
		\$5,569.31
Disbursements:		
From First National Bank Fund.....	\$2,110.88	
From State Treasury	1,569.31	
		<hr/>
		3,680.19
Balance in First National Bank, Santa Fe, November 30, 1920		<hr/>
		\$1,889.12



Drag line excavator employed in constructing drainage canals in lower Rio Grande Valley.



Typical revetment at lower San Pedro constructed in connection with Rio Grande Improvement work.

PECOS HYDROGRAPHIC SURVEY

Under date of January 27, 1920, the State Engineer accepted service under a Court Order from the United States District Court, dated January 24, 1920, in the Case No. 712, United States of America, Plaintiff, vs. Hope Community Ditch et al., Defendants. This order directs the State Engineer "to make and furnish a complete hydrographic survey of the Pecos stream system insofar as the same lies within the State of New Mexico, except the Black River and that portion of the Rio Hondo and its tributaries lying above Hondo Reservoir."

Such a survey means the gathering of data in the field that will show, for the time of the survey, the ownership of all areas that are irrigated by the waters of this stream system under each ditch, and also the amount of water that is used by each ditch on those lands. In addition to this there must be gathered all possible data bearing on water rights, which, for any reason whatsoever, are not or cannot be used at that time, but which, there is reason to believe, can establish any legal right.

There should also be gathered data that will establish a reasonable duty of water in the different localities and under the different existing conditions, and studies must be made which will show the losses and gains in the different stretches of the river and its tributaries. On this may depend the decision of the court as to whether or not certain water shall be left in the channel for supplying certain prior rights below, or whether, to allow such water to remain would become an economic loss.

Immediately upon acceptance of this court order by the State Engineer, steps were taken for the purpose of planning and instituting these investigations. The ground was gone over and gaging stations established on the ditches and gage observers employed to take and record the gage heights. This phase of the work was started while meter outfits were being procured, and when these became available the ratings of the different stations were pushed forward as rapidly as possible.

At the same time parties were placed in the field for mapping the lands irrigated and the ditches serving those lands,

and gathering such other data as has a pertinent bearing on the questions to be determined. This phase of the work has been discontinued only when the more severe winter weather conditions have made the work too slow and expensive, and will be resumed as soon as the weather will permit from an economical point of view.

Now that all ditches have been sought out and stations established on them, it is believed that a very complete record of the hydrographic conditions will be procured during the coming season. In fact a complete and simultaneous record on all portions of the stream system during the same season is necessary for an adequate setting forth of the actual conditions.

The greatest value of this season's hydrographic records can only be realized in conjunction with next season's records. There is no doubt that the longer the period covered by these records, the better and more conclusive will be the results, but it is believed, with the records that will have been gotten by the next season, sufficient data will be on hand to determine, with a reasonable degree of accuracy, the rights on the stream.

There has been a total expended to date in connection with this survey of \$11,649.51.

LA PLATA HYDROGRAPHIC SURVEY

Section 6, Chapter 131, Laws of 1919, directs that \$5,000.00 out of the "Hydrographic Survey Fund" shall be set aside by the State Engineer for the purpose, and that he shall, under the direction of the Attorney General of the State of New Mexico, or of any special counsel appointed or employed pursuant to any act of the Legislature of the State of New Mexico, relative to the adjudication of water rights upon the La Plata River, make a hydrographic survey and such other investigations as may be necessary, either within or without the State of New Mexico, of the La Plata River stream system or water shed.

Chapter 23, Laws of 1919, authorizes and directs the Governor of the State of New Mexico to take such steps, file such suits and actions, with the advice and assistance of the Attorney General, and employ such special counsel to assist in the prosecution of such suits, as he may deem necessary to properly litigate the question of rights of the residents of the County of San Juan along the La Plata River in the State of New Mexico in connection with the use of waters of the La Plata River.

Under these acts, authorization for proceeding with this survey was received by the State Engineer from the Attorney General's office early in the month of May, 1919, and immediate steps were taken for starting the work. The ground was gone over and plans formulated and parties with equipment arrived on the ground before the end of that month.

A planetable topographic survey of the entire area under ditches in New Mexico on this stream system was made, and hydrographic data was gathered on the river and on the ditches deriving their supply of water from this stream system both in Colorado and New Mexico. Because of the lack of funds the hydrographic work was discontinued about the first of September before the irrigation season was entirely over.

An agreement was entered into with the State of Colorado whereby copies of our mapped areas in New Mexico were furnished to them in exchange for copies of their maps showing the mapped areas in that State. Also the two States exchanged copies of the court decrees that had been entered on the stream

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system in the two States and other data that were available only in the Engineering Departments of the two States.

Besides furnishing to the Attorney General's office of New Mexico, copies of the maps and all data received from the State of Colorado under this agreement, we have furnished it with a copy of the map showing the areas under ditches in New Mexico, copy of the court decree, and tabulations showing ownership and classified areas under each ditch on the stream in New Mexico. And we have also furnished certain hydrographic data pertaining to the uses and gains on the stream both in Colorado and in New Mexico.

An unsuccessful effort was made to have the land owners under the several ditches in this State to raise funds for the purpose of securing hydrographic records during another complete irrigation season, thus making our data more valuable and more conclusive. All original and detailed data are filed in form that it can be made available to the Attorney General's office for any uses they may want to make of it in the course of the proceedings in this matter.

Financial statement covering work on this survey to date, is as follows:

LA PLATA HYDROGRAPHIC SURVEY FUND

SEVENTH FISCAL YEAR:

Appropriation, Chap. 81, Laws 1919.....	\$5,000.00
Disbursements	4,656.32
Balance November 30, 1919.....	\$ 343.68

EIGHTH FISCAL YEAR:

Balance December 1, 1919.....	\$ 343.68
Disbursements	343.65
Balance November 30, 1920.....	\$.03

SANTA FE HYDROGRAPHIC SURVEY

As mentioned in the Third Report, Lee S. Miller completed the Santa Fe Hydrographic Survey report and same was submitted to the Attorney General for his use. The Santa Fe Hydrographic Survey expenditures to November 30, 1920, are as follows:

First Fiscal Year	\$ 1,748.43
Second Fiscal Year.....	5,782.13
Third Fiscal Year.....	1,391.67
Fourth Fiscal Year.....	592.79
Fifth Fiscal Year.....	414.78
Sixth Fiscal Year.....	303.99
Seventh Fiscal Year.....	487.28
Eighth Fiscal Year.....	.....
Total.....	\$10,721.07

CHICO RICO HYDROGRAPHIC SURVEY

As a matter of record, the following expenditures are listed for a basis of collection for this amount from the litigants in the adjudication of the Chico Rico drainage.

Chico Rico Hydrographic Survey expenditures to November 30, 1920:

First Fiscal Year.....	\$1,703.78
Second Fiscal Year.....	5,877.22
Third Fiscal Year.....	1,589.08
Fourth Fiscal Year.....	470.46
Fifth Fiscal Year.....	6.23
Sixth Fiscal Year.....
Seventh Fiscal Year.....
Eighth Fiscal Year.....
Total.....	\$9,646.77

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vember 30, 19

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Balance in First

Receipts:
Interest on
State Treas

Disbursement

Balance

EIGHTH FISCAL
Balance in F
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The Hydrographic survey working fund status as of November 30, 1920, is as follows:

HYDROGRAPHIC SURVEY WORKING FUNDS

SEVENTH FISCAL YEAR:

Balance in First National Bank, Santa Fe.....	\$ 303.46
Receipts:	
Interest on Deposits	10.23.
State Treasurer's Warrant	500.00
	<hr/>
	\$ 813.69
Disbursements	487.28
	<hr/>
Balance in Bank November 30, 1919.....	\$ 326.41

EIGHTH FISCAL YEAR:

Balance in First National Bank, December 1, 1919.....	\$ 326.41
Transfer of fund to State Treasury.....	326.41

ACCOUNT CLOSED

RIO GRANDE IMPROVEMENT

The work which has been accomplished during the past two fiscal years can be best outlined by a statement of the work and the amount of expenditures as is outlined by the following:

STATEMENT OF EXPENDITURES AND WORK ON RIO
GRANDE IMPROVEMENT
SEVENTH AND EIGHTH FISCAL YEARS

DECEMBER 1, 1918, TO NOVEMBER 30, 1920

RIO ARriba COUNTY

	State	Donated	Total
VELARDE—1919			
Construction of three rock jetties on east bank of river above Velarde to arrest erosion and protect irrigation ditch and county highway	\$ 409.01	\$ 396.66	\$ 805.67
VELARDE—1920			
Placing of rock riprap along east bank of river between jetties as above. About 1,000 loads of rock placed.....	502.95	502.95	1,005.90
VELARDE—1920			
Placing of brush and rock bank protection to stop erosion and protect irrigation canal just below protection above noted..	150.18	150.17	300.35
LA JOYA—1920			
Placing of brush and rock bank protection on east bank of river to stop cutting of irrigated land below Velarde Post Office..	150.00	150.00	300.00
LOWER LA JOYA—1920			
Placing of brush and rock bank protection on east bank of river to stop cutting of irrigated lands about one mile below La Joya	151.50	151.50	303.00
ALCALDE—1920			
Brush and rock bank protection to stop cutting of irrigated lands on east bank of river opposite Alcalde	148.50	148.50	297.00
ESPANOLA—1919			
Brush, rock and wire protection of bank at west end of Espanola bridge and repairs to old pile-and-brush bank protection north of bridge on west bank of river.....	795.21	1,095.20	1,890.41
ESPANOLA—1920			
Brush, rock and wire protection of west approach of Espanola bridge and diversion of channel of river opposite Mile Post 370 on D. & R. G. Ry., includes free hauling by railway company of 46 cars rock and 53 cars brush, estimated at \$600.00.....	1,403.20	2,100.00	3,503.20
SAN PEDRO—1919			
Rock filled timber box deflectors and brush-and-rock jetties on east bank of river below Espanola bridge to stop cutting of irrigated land.....	636.01	548.37	1,184.38



Rio Grande Improvement work at Espanola showing brush and rock
revetment on Rio Grande.



A portion of what is known as Socorro Dike in protection work on
Rio Grande.

SAN PEDRO—1920			
Rock filled log cribs and brush jetties on east bank of river below Espanola bridge to stop cutting of irrigated land.....	State 365.00	Donated 365.00	Total 730.00
Totals for Rio Arriba County.....	\$ 4,711.36	\$ 5,608.35	\$10,319.91
SANTA FE COUNTY			
LA MESILLA—1919			
Brush and rock bank protection on east bank of river at La Mesilla and also rock and brush filled cribs to deflect current..	State 146.64	Donated \$ 141.14	Total \$ 287.78
LA MESILLA—1920			
Four hundred feet of crib and rock deflector and 1,200 feet of rock filled cribs with intervening brush and rock bank protection, all on east bank of river at La Mesilla	1,002.65	996.25	1,998.90
ROUND MOUNTAIN—1920			
Eight hundred feet of brush, rock and wire bank protection on east bank of river, north of Round Mountain.....	393.37	393.38	786.77
Totals for Santa Fe County.....	\$ 1,542.66	\$ 1,530.77	\$ 3,073.45
SANDOVAL COUNTY			
ALGODONES—1919			
Brush bank protection on east bank of river for the deflection of current and protection of upper end of Algodones Ditch..	State 1,120.00	Donated	Total 1,120.00
CORRALES—1920			
Brush bank protection on west bank of river at Corrales	154.50	154.50	309.00
Totals for Sandoval County.....	\$ 1,274.50	\$ 154.50	\$ 1,429.00
BERNALILLO COUNTY			
ALAMEDA DIKE—1919			
Building of Alameda Dike on east side of river, north of Alameda, preventing overflow of area south of Albuquerque. Dike is one mile in length and contains approximately 16,500 cubic yards.....	State \$ 4,282.74	Donated	Totals 4,282.74
OTHER—1920			
Building of various jetties, dikes and bank protection works in the county and fighting the flood of 1920 to prevent flooding of areas in and around Albuquerque.....	670.60	(Approx) 19,000.00	19,670.60
Totals for Bernalillo County.....	\$ 4,953.34	\$19,000.00	\$23,953.34
VALENCIA COUNTY			
PERALTA DIKE—1919			
Building of Peralta Dike on east side of river	State \$ 2,238.38	Donated \$.....	Total \$ 2,238.38
PERALTA DIKE—1920			
Repairs to dike and fighting flood of 1920	76.00	904.00	980.00
PERALTA—1919			
Repairs of old work on east side of river.	291.70	.....	291.70
LOS LENTES—1919			
Construction of a fifty-pile brush filled Jetty on west side of river at Los Lentes	2,007.19	.....	2,007.19
LOS LUNAS—1919			
Construction of a sixty-pile brush filled jetty on west side of river above Los Lunas and emergency work during flood.....	2,260.26	500.00	2,760.26

LOS LUNAS—1920	State	Donated	Total
Bank protection and emergency work during flood to prevent cutting and overflow in and around the town of Los Lunas....	430.69	430.68	861.37
Totals for Valencia County.....	\$ 7,304.22	\$ 1,834.68	\$ 9,138.90

SOCORRO COUNTY

LIMITAR—1920	State	Donated	Total
Building of dike on west bank of river at Limitar and bank protection.....	\$ 597.00	\$ 705.00	\$ 1,302.00
SOCORRO DIKE—1920			
Building of dike 7,000 feet in length at Rincon, two miles north of Socorro on west bank of river and brush protection of same	3,000.00	3,166.50	6,166.50
SOCORRO DIKE—1920			
Repairs to Socorro Dike after flood and extension of same with brush protection..	1,290.00	1,306.42	2,596.42
SAN MARCIAL—1919			
Investigation and surveys for cutoff channel on east side of river north of San Marcial	97.00	.....	97.00
SAN MARCIAL—1920			
Brush protection of bank on east side of river north of San Marcial wagon bridge, protecting land areas and county road, also brush protection of west approach of wagon bridge at San Marcial..	443.82	816.63	1,260.45
Totals for Socorro County.....	\$ 5,427.82	\$ 5,994.55	\$ 11,422.37

GENERAL EXPENSE

Office expense, stationery, postage, printing, personal and travel expense of Engineer in charge. (Note: This item includes \$72.57 of unused scrip in Book U. S. S. 2 No. 14088)	\$ 1,402.64	1,402.64
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MATERIAL ON HAND

Stored in Jail Yard at Old Albuquerque, 87 piles 26 feet to 30 feet in length. Actual cost to date	\$ 507.50	\$ 507.50
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RECAPITULATION OF EXPENDITURES

County	State	Donated	Total
Rio Arriba	\$ 4,711.56	\$ 5,608.35	\$ 10,319.91
Santa Fe	1,542.66	1,530.77	3,073.43
Sandoval	1,274.50	154.50	1,429.00
Bernalillo	4,953.34	19,000.00	23,953.34
Valencia	7,304.22	1,834.68	9,138.90
Socorro	5,427.82	5,994.55	11,422.37
General Expense	1,402.64	.....	1,402.64
Material on Hand.....	507.50	.....	507.50
Totals.....	\$27,124.24	\$34,122.85	\$61,247.09

IMPROVEMENT RIO GRANDE

SEVENTH FISCAL YEAR:

Balance December 1, 1918:		
In Santa Fe Bank.....	\$ 621.78	
In Socorro State Bank.....	2.57	
Received Interest on Deposits.....	13.66	
Appropriation, Chap. 139, Laws 1919.....	33,699.00	
		<u>\$36,337.01</u>

Disbursements:

From Bank Fund	\$ 626.67	
From Appropriation Fund.....	14,678.75	15,305.42
Balance in Bank Fund.....	\$ 11.34	
Balance in Appropriation.....	21,020.25	

Balance November 30, 1919.....\$21,031.59

EIGHTH FISCAL YEAR:

Balance December 1, 1919:		
In Santa Fe Bank.....	\$ 11.34	
In Appropriation	21,020.25	
		<u>\$21,031.59</u>

Contributions:

By Socorro County.....	\$ 3,275.00	
By Town of Espanola.....	1,500.00	
By Individuals	430.68	5,205.68
		<u>\$26,237.27</u>

Refund to bank account from State Auditor (Amount
erroneously paid from bank account)..... 731.50

Total.....\$26,968.77

Disbursements:

From Santa Fe Bank Fund.....	\$ 11.34	
From First National Bank Fund.....	5,922.35	
From Appropriation	12,445.49	18,379.18

Balance in First National Bank.....\$ 14.83
Balance in Appropriation..... 8,574.76

Balance November 30, 1920.....\$ 8,589.59 \$ 8,589.59

SURVEYORS' LICENSE LAW

The same Board of Examining Surveyors was in force during this biennium as mentioned on page 174 of the Third Report. Licenses issued in addition to those listed in the above mentioned report are as follows:

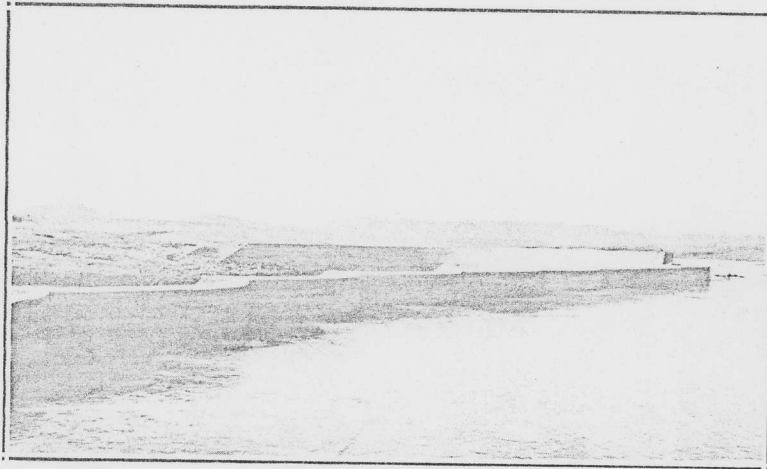
No. 109—C. A. Cunningham.....	Alamogordo
No. 110—Homer G. Neel.....	Santa Fe
No. 111—Leslie A. Gillett.....	Santa Fe
No. 112—J. R. Yates.....	Carlsbad
No. 113—J. E. Edgington.....	Alamogordo
No. 114—Thomas J. Leask.....	Alamogordo
No. 115—George R. Fryman.....	Flint, Michigan
No. 116—Robt. W. Woodwarth.....	Alamogordo
No. 117—L. N. Taylor.....	Magdalena
No. 118—Ellsworth H. Newton.....	Socorro
No. 119—J. E. Tiffany.....	Tiffany, Colorado
No. 120—B. H. Kinney.....	Tokay
No. 121—D. S. King.....	McIntosh
No. 122—Chas. M. Becker.....	Santa Fe
No. 123—J. M. Stark.....	Tucumcari
No. 124—J. H. Williamson.....	Sapulpa, Okla.
No. 125—F. L. Hancock.....	Raton
No. 126—Harry Tompkins.....	Dallas, Texas
No. 127—Harper Sproull	Magdalena
No. 128—Casper C. Rea.....	Hillsboro
No. 129—H. W. Brose.....	Gallup
No. 130—F. A. Naramore.....	Colmor
No. 131—R. R. Johnson.....	Silver City
No. 132—B. G. Randall.....	Taos
No. 133—Edward L. Bandy.....	Las Cruces
No. 134—Jno. E. Cameron.....	Folsom
No. 135—L. D. Stoddard.....	Trinidad, Colorado
No. 136—J. B. Markham.....	Santa Fe
No. 137—Victor Von Schoeler.....	Las Cruces
No. 138—D. S. King.....	Estancia
No. 139—Chas. F. Grey.....	Oscuro
No. 140—Ernest G. Miller.....	Lumberton
No. 141—Herbert W. Yeo.....	Las Cruces
No. 142—F. L. Hancock.....	Carlsbad
No. 143—Eugene Ferry Smith.....	Santa Fe



View t



Service Diversion



View taken from headgate along spillway towards main dam of Colmor Irrigation and Land Company Project.



Service Diversion and Headgates on Colmor Irrigation and Land Company Project

No. 144—T. S. Pickens.....	Carlsbad
No. 145—Lea Rowland	Roswell
No. 146—Norman W. McCluskey.....	Santa Fe
No. 147—Ty White	Las Cruces
No. 148—T. C. McPherson.....	San Acacio, Colo.
No. 149—Guy P. Harrington.....	Santa Fe
No. 150—Walter E. Stockwell.....	El Paso, Texas
No. 151—Oliver C. Payne.....	Carlsbad
No. 152—Chas. M. Johnson.....	Alamosa, Colo.
No. 153—Frank M. Burton.....	Santa Fe
No. 154—Wm. T. Collings.....	Las Cruces
No. 155—Arthur Bloch	Columbus
No. 156—John F. Nash.....	Thatcher, Arizona
No. 157—Alonzo E. Compton.....	Santa Fe
No. 158—Clarence Goddard	LaMadera
No. 159—C. A. Long.....	Albuquerque, New Mexico
No. 160—W. Howard Roby.....	Santa Fe
No. 161—H. H. Brown.....	La Plata
No. 162—C. B. Corey.....	Trinidad, Colo.
No. 163—Willoughby Methley	Trinchera, Colo.
No. 164—J. E. Tiffany.....	Tiffany, Colo.
No. 165—F. D. Abbott.....	Santa Fe
No. 166—G. D. Macy.....	Valley Ranch
No. 167—H. E. Wheelock.....	Mogollon
No. 168—Elmer A. Rose.....	Roswell
No. 169—M. H. Hunter.....	Roswell
No. 170—Curd Mitchell	Tularosa

The financial statement of the Surveyors' License Fund is as follows:

SURVEYORS' LICENSE FUND

SEVENTH AND EIGHTH FISCAL YEARS.

Balance December 1, 1918.....	\$216.61
Receipts	370.00
Total.....	\$586.61
Disbursements	335.75
Balance November 30, 1920.....	\$250.86

STREET PAVING AT SEAT OF GOVERNMENT

An Act by the Legislature of 1915, Chapter 87, Laws of 1915, to amend Sections 2 and 3 of Chapter 23 of the Laws of 1913, provided for a change in the petition of the former act, "by the Capitol Custodian Committee in behalf of the Capitol grounds and one private owner of abutting property on each, shall be deemed a petition in full compliance with Section 3 of Chapter 22 of the 1913 Laws."

As was stated in the Third Report, there appears to be no popular movement by the abutting property owners for this improvement, although an effort was made by the Santa Fe City authorities to take advantage of this Act in connection with their proposed paving program throughout the City of Santa Fe. The paving program as mentioned was not put through by the City authorities and, therefore, the funds remain as in the previous report, which is as follows:

Appropriated by State.....	\$13,000.00
Paid out by State.....	2,692.50
Balance in Fund.....	\$10,307.50

See pages 53-54, Second Biennial Report and page 141 Third Biennial Report of State Engineer.

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RECOMMENDATIONS

Fees:

Section 5662, Codification 1915, New Mexico Statutes Annotated, requires that all fees received by the State Engineer shall be covered into the Hydrographic Survey Fund of the State Treasurer. Section 5676 of same, stipulates that no funds in the Hydrographic Survey Fund can be spent by the State Engineer for other purposes than the defraying of expense of hydrographic surveys instituted by order of the Court under authority granted in Section 5674.

There are oftentimes expenses incurred by this office requiring the services of additional help outside the regular office force which is only sufficient to carry on the regular business of the office. The occasion for this expenditure arises when large orders for certified copies of filings on a whole stream system with blue print copies of office records, etc., are asked for. The making of these copies and blue prints is an expensive operation and no provision is made to pay said cost except out of the Contingent Fund, as the fee for said copies must go into the Hydrographic Survey Fund. Expenses involved in one order ran as high as \$450, and it is obvious that at any time sufficient orders might be received during a year to entirely absorb the contingent fund and leave nothing to run the Contingent expenses of the office.

I have to recommend that said Section 5662 be so amended that only the net proceeds from orders for copies of maps and file papers be required to be covered into the Hydrographic Survey Fund.

Chief Clerk's Salary:

Chapter 161, Session Laws of 1919, being the Appropriation Bill, allows for the employment of a Chief Clerk to the State Engineer at a salary of \$1,500 per annum, that lines with appropriations for said position for a number of years back. The Chief Clerk of the department has full direct charge of the water applications division and it becomes his duty to properly supervise the applications, permits and arrangements for hearing on contests and a vast amount of detail matter in connection with the whole procedure on water applications for this office. It is not generally realized the burden of actual work as well as responsibility involved in this position.

This position is far removed from a merely clerical position.

it requires a considerable knowledge of law and procedure both in connection with the regulations of this office and general court procedure of the State and to fill such position, the encumbent must have ability of a specialized nature considerably above the ordinary clerical ability. The present encumbent, Mr. Thomas, is admitted to the Bar and peculiarly fitted for the work involved and I have to earnestly recommend that his salary be raised from \$1,500 to \$1,800 per annum. Comparison of this biennial report of the filings and other matters before this office with previous reports, will show a heavy increase in the work of this department and consequent increase of responsibilities to the Chief Clerk and the outlook is for continuous increase of the work involved.

Rio Grande Drainage:

In the body of this report, the Rio Grande Survey as conducted by this office is discussed. Under the district drainage law of this State based on the information contained in the data furnished by this survey, one district has already been formed and another is in process of formation and the prospects at this date are that in the next few years a vast area of the land involved in the Middle Rio Grande Valley will be reclaimed by drainage. This whole movement is based upon the data made available to the citizens of this valley by reason of this survey and the ultimate completion of the drainage systems will add a vast amount to the assessed valuation to the State and the prosperity of its citizens.

The base work of this survey has been accomplished, but the well readings should be carried on for at least one more year and the data therefrom tabulated to support the main report. This data will be of exceedingly great value to each drainage district in planning and constructing the individual drainage systems.

I have to recommend, therefore, that an appropriation of \$4,000 be made to complete these well readings and prepare and publish the report thereon for the uses above indicated.

Rio Grande Improvement:

This office has from year to year, carried on protection work in the Rio Grande Valley due to the flood condition of this stream which prevails annually. I have to recommend that funds be made available to carry on this work after the exhaustion of the present funds, as provided in Chapter 139, Session Laws of 1919.

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Rio Grande Flood Control:

I recommend for your consideration the problem of the control of the Rio Grande by the installation of storage reservoirs in the upper regions of said stream above its entrance into the middle Rio Grande Valley at White Rock Canyon. To my mind, this is the only feasible permanent solution to the flood situation in the Rio Grande Valley.

Proper impoundage of these flood waters and reservoirs of sufficient capacity would have the following effect:

First: It would forever estop the annual financial loss to the counties involved in destruction by floods of bridges, highways, ditch intakes and seasonable crops as well as the annual depletion of the irrigatable lands which said floods each year erode away in large blocks.

Second: It would simplify and make far less expensive the future installation of bridges across the Rio Grande due to the complete control of the stream and the lowering of its maximum run-off.

Third: It would lower the water table over the entire valley by regulating the peak floods and thus be of material aid in solving the drainage problem in the middle Rio Grande Valley, reducing the cost per acre materially for such drainage system as would be required.

Fourth: It would almost entirely eliminate the annual necessity of considerable expenditures by the State and counties for flood protection by the control of the peak floods. This is a considerable item in the financial budget of the State and counties.

Fifth: It would eliminate to a great extent the wastage out of the headings of the several ditch systems now in existence for irrigation purposes, as the control of the peak floods would create such a condition that most of these headings could be made permanent. Under present conditions most of the ditch headings go out during the flood season and are subject to repair and installation until after the peak of floods has passed, in most cases for a period of 30 days or more, thus losing to the lands under each system the irrigation waters for that time which is the most important period of irrigation requirements. This loss to crops is perfectly apparent and the expense of yearly installation of headings.

to flood ravages reaches a considerable figure annually. Under flood control by reservoirs the problem of consolidation of the numerous canal systems would be simplified and made considerably less expensive, as proper permanent headings for consolidated canals in the different districts would be more economical of installation.

Sixth: It would so equalize the water supply of the Rio Grande during the irrigation season by storing the peak floods for later summer irrigation uses as to vastly increase the yield from the lands at present under irrigation and to allow of a vast increase in acreage of new land which could be properly irrigated. It is a well known fact that during dry years in the months of July and August the river is entirely dry as far north as Albuquerque, there being no water available for the summer and fall irrigation of the lands in these years with its attendant loss in product to a considerable irrigated acreage. Dry years could be provided against in these flood reservoirs by carrying over a sufficient amount of water from year to year to insure an adequate water supply at all times for all available irrigatable lands.

A study of this situation reveals the fact that the amount of money to be saved annually by such protection is of very great moment and vastly more than the layman would realize, and the increase in the value of irrigated land for crop production taken together with the above is such as to warrant the installation of such a system provided investigation of the physical facts prove the same to be feasible. I believe the flood control of this river by impounding reservoirs would add more to the assessed valuation of this State and the welfare of its citizens than any one large problem which could be accomplished in the State.

The expense of an investigation of available reservoirs for the above purpose as far as the field work only is concerned would probably reach \$10,000, and I have to recommend that this sum be made available for such purpose, either by direct appropriation or out of the Improvement of the Rio Grande Fund as above set out. Naturally the financing of the impounding reservoirs above suggested would be a problem for later consideration by the State officials after the data based upon the surveys suggested had been collected.