LOWER TWIN LAKE, SITE OF PROPOSED RESERVOIR.

COMPLIMENTS OF

JOHN E. FIELD

STATE ENGINEER

NINTH BIENNIAL REPORT

OF THE

STATE ENGINEER

TO THE

GOVERNOR OF COLORADO

FOR THE YEARS 1897 AND 1898

DENVER, COLORADO
THE SMITH-BROOKS PRINTING CO., STATE PRINTERS
1899

LETTER OF TRANSMITTAL.

Denver, Colorado, December 1, 1898.

SIR:

I have the honor to transmit herewith the ninth biennial report of this office for the two fiscal years ending November 30, 1898.

In making this report of the transactions of this department I have endeavored to exclude all superfluous matter and make such recommendations as will increase the efficiency of the department and benefit the general public.

Yours very respectfully,

JOHN E. FIELD,
State Engineer.

TO HIS EXCELLENCY,
ALVA ADAMS,
GOVERNOR OF COLORADO.

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IN CHARGE OF IRRIGATION IN COLORADO.

JOHN E. FIELD, State Engineer ..... Denver, Colo.
A. L. FELLOWS, Deputy State Engineer ..... Denver, Colo.

WATER SUPERINTENDENTS.

Name	Division	Appointed	Residence
Clarence J. Chapman	No. 1	Mar. 25, 1897	Denver, Colo.
E. R. Chew	No. 2	Mar. 11, 1897	Pueblo, Colo.
Wesley Staley	No. 3	Mar. 16, 1897	Hooper, Colo.
David R. Crosby	No. 5	June 7, 1895	Grand Junction, Colo.
C. S. Roberts	No. 6	Sept. 21, 1897	Hayden, Colo.

NOTE.—No superintendent was appointed for Division No. 4.

WATER COMMISSIONERS.

Div. No.	Dist. No.	Name	Appointed	Residence
1	1	James Hurley	June 12, 1897	Orchard
1	2	Joseph H. Hodgson	Apr. 14, 1897	Denver
1	3	John L. Armstrong	Mar. 25, 1897	La Porte
1	4	Jacob Wolaver	Mar. 25, 1897	Greeley
1	5	L. H. Dickson	Mar. 25, 1897	Longmont
1	6	A. C. Stilwell	Apr. 14, 1897	Boulder
1	7	W. N. Palmer	May 8, 1897	Golden
1	8	Cole Briscoe	Mar. 25, 1897	Castle Rock
1	9	J. A. Van Gordon	Mar. 27, 1897	Morrison
2	10	T. B. Pyles	May 14, 1897	Colorado Springs
2	11	Richard Devereux	June 18, 1894	Salida
2	12	J. A. Trulove	June 11, 1897	Canon City
2	13	Emil Valdick	May 13, 1897	West Cliff
2	14	C. W. Reece	May 13, 1897	Pueblo
2	15	Geo. D. Scott	July 11, 1897	Pueblo
2	16	Thos. E. Griffin	Mar. 25, 1897	Pueblo
2	17	S. W. Cressy	Mar. 25, 1897	Rocky Ford
2	18	Manuel A. Archuleta	Apr. 25, 1898	Aguilar
2	19	Geo. L. Spencer and Felix Cordova	Apr. 28, 1897	Trinidad
3	20	J. M. Blakey	Apr. 22, 1897	Alamosa
3	21	David Martinez	Apr. 21, 1897	Capulin
3	22	John C. Dalton	Apr. 21, 1897	Manassa
1	23	Lent Hall	May 13, 1897	Fairplay
3	24	J. C. L. Valdez	May 11, 1898	San Luis
3	25	Geo. Neiderhardt	Feb. 15, 1898	Mirage

WATER COMMISSIONERS—Continued.

Div. No.	Dist. No.	Name	Appointed	Residence
3	26	Argo Taylor	Feb. 15, 1898	Saguache
3	27	Mark Biedell	Feb. 15, 1898	Saguache
5	28	Thos. P. Goodman	Feb. 25, 1898	Sargents
4	29	No commissioner		
4	30	T. P. Sheretz	July 7, 1894	Durango
4	31	No commissioner		
4	32	No commissioner		
4	33	Henry Meyer	May 18, 1898	Dix
4	34	H. M. Barber	June 14, 1897	Mancos
3	35	No commissioner		
5	36	No commissioner		
5	37	Andrew Kallquist	July 22, 1895	Gypsum
5	38	Geo. W. Hall	June 11, 1897	Emma
5	39	Daniel F. Webster	May 18, 1898	Rifle
5	40	J. C. Hart	May 24, 1895	Eckert
5	41	H. W. Christopher	Apr. 8, 1897	Montrose
5	42	W. H. Long	June 7, 1897	Grand Junction
6	43	J. D. Moog	Apr. 25, 1895	Meeker
6	44	Wm. S. Taylor	May 28, 1895	Axail
5	45	William Chadwick	Apr. 28, 1895	Rifle
1	46	Frank Staples	May 11, 1889	Hebron
1	47	W. D. Beckwith	May 13, 1897	Rand
1	48	A. J. Hance	July 19, 1895	Woods, Wyo.
2	49	No commissioner		
5	50	No commissioner		
5	51	No commissioner		
5	52	No commissioner		
5	53	No commissioner		
6	54	No commissioner		
6	55	No commissioner		
6	56	No commissioner		
6	57	No commissioner		
6	58	No commissioner		
5	59	No commissioner		
5	60	No commissioner		
5	61	Geo. E. Blake	Apr. 8, 1897	Montrose

WATER COMMISSIONERS—Concluded.

Div. No.	Dist. No.	Name	Appointed	Residence
5	62	No commissioner		
5	63	No commissioner		
1	64	John W. Landrum	Apr. 14, 1897	Sterling
1	65	Edmund J. Picard	Mar. 25, 1897	Yuma
2	66	No commissioner		
2	67	J. B. Traxler	Mar. 25, 1897	Lamar
5	68	P. H Shue	Apr. 22, 1896	Ouray
5	69	No commissioner		

EXPENDITURES FROM THE STATE ENGINEER'S ASSISTANTS FUND FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

Appropriation for salaries of assistants for fiscal years of 1897 and 1898...$5,000 00

PAID.

H. A. Sumner's administration	$1,024 00	
Fillmore Cogswell, deputy state engineer, salary and expenses	1,408 85	
A. L. Fellows, deputy state engineer, salary and expenses	1,998 00	
Laura Odholm, stenographer	34 70	
J. F. Juneman, clerk	115 00	
R. S. Sumner, gauger	60 00	
Observers	61 00	
L. R. Hope, gauger	4 00	
A. Scharendorf, clerk	145 00	
Humphrey Jones, assistant gauger	20 00	
Frank Beach, gauger	24 00	
Lillian Ransom, stenographer	23 50	
D. M. Wilhelm, stenographer	68 90	
Gauge rod at Pueblo	12 60	$4,999 55
Unexpended balance		$ 45

Two hundred dollars ($200) was allowed this office out of general incidental fund by the auditing board, for the taking of seepage measurements on the South Platte river.

Allowed		$200 00
A. L. Fellows, expenses, November, 1897	$89 75	
F. Cogswell, expenses, November, 1898	37 15	
One Price current meter	73 10	$200 00

INTRODUCTION.

In presenting the ninth biennial report of the State Engineer to the public, it is well to state by way of introduction and explanation, that this department has had to do almost exclusively with matters of irrigation.

The eleventh general assembly saw fit to not appropriate funds for any public improvement whatever; thus enabling this department to devote its entire time to matters of irrigation and to such business as had been left unfinished. It has been our effort to continue taking statistics as heretofore, and at the same time to so index and tabulate that already gathered as to make it available; and to this end much time has been expended in looking over old papers and records of the office; and it is but just at this point to state that I found that my immediate predecessor had done a vast amount of work in this direction, and that, considering the condition in which he found these valuable records, the office when turned over to me was in excellent shape.

The stream measurements have been made in connection with the hydrographic branch of the United States geological survey, to whose aid we are much indebted, as a great amount has been accomplished, which, with the meagre appropriation allowed this office, must needs have gone undone, and vitiated to a large extent a great amount of valuable data already gathered.

Two county boundaries have been surveyed, and matters long in dispute settled, or are in such form as to be properly brought before the courts.

During the two years there have been filed in this office statements for six hundred and twenty (620) ditches, with a total claimed capacity of 18,297.79 cubic feet of water per second. The number of reservoir statements filed was two hundred and forty-nine (249), with a total estimated capacity of 60,833,611,471 cubic feet. These filings are divided among the several water divisions as follows:

DIVISION No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
1	156	7,860.82	72	13,155 823,794
2	102	1,939.22	82	31,959,777,128
3	10	111.20	1	307,971,000
4	25	79.15	1	2,025,000
5	271	7,669 03	86	3,377,941,178
6	56	638.37	7	119,628,085
Total	620	18,297 79	249	48,923,166,185

Many questions have been submitted to this office relative to the interpretation of the laws and methods of procedure in obtaining water rights; in many cases the able advice of the honorable attorney general has been invaluable; and the decisions and advice of this office have in the main been satisfactory, and most of the disputes amicably settled.

CHAPTER I.

RECOMMENDATIONS.

The irrigation interests of the state are developing rapidly and becoming more valuable, and in even greater proportion becoming more complicated each year. In order to avoid these complications, some provision must be made to stop the evils already among us and to prevent their increase in the future. I therefore submit the following recommendations, dictated by the experience of the last two years, some of which have been urged in all previous reports, showing that each one who has had the execution of our irrigation laws entrusted to him has been hampered by the same old difficulties and has suggested the same remedies.

DITCH MEASUREMENTS AND RATINGS ON OLD DITCHES.

To prevent a constantly growing evil, and that we may not go from bad to worse; in order to come to a stop, as it were, the first thing to be done is to ascertain where we stand at the present moment, determine what the right of each appropriator is now, without regard to what his claimed or even decreed rights may have been or what they may be in the future. Many of the older decrees were rendered on insufficient evidence, water was supposed to be plentiful, and the courts were generous to a fault in rendering a decree. A very much larger amount was often decreed than had ever been or could be used by the applicant, this mistake arose from ignorance as to the duty of water, what constituted a foot, and the desire to be on the safe side by claiming at least enough and a little more, and reminds one strongly of the old darky, who, being promised whatever he wanted, said he wanted all the peach brandy he could drink, and being asked what else he wanted, said, "Ef its all de same to you, massa, I'd like just a little mo' peach brandy."

History fails to say whether he received the second request or not, but it does show that in the case of the applicant for water he did get more than he could use or even wanted, the consequence being that he has found that building better than he knew, he has now a valuable, transferable right and a ready market; the transfer is made, or the ditch enlarged and extended until the entire decree is diverted from the public use, and later appropriators awake too late to the realization that their rights, once as good as any, are now worthless in a short season.

The capacity of every ditch should be determined now, and enlargements under the old decree stopped and an appropriation should be made by the legislature to carry on this work.

In addition, each ditch should be rated at intervals as the requirements of each demand it. With the very limited appropriation allowed this office, and with the vast amount of work required by statute in gauging streams, gathering statistics, etc., this work has for more than four years been almost entirely neglected. In cases where the owners were willing to pay for the extra deputy the ratings have been made, but this mode results in very little being done and acts exactly contrary to what is desired. No one will have a ditch rated when it is carrying a greater amount than it should, nor does the owner of a ditch which will not carry the full decree care to have that fact made a matter of record, as it might prevent future enlargements. On June 10, 1897, this office sent a circular letter to the superintendents of irrigation, as follows:

> Sir—Hereafter when parties make application for a transfer of a decree from one ditch to another, or to have the point at which the water is diverted changed, you will notify this office, and at the same time notify the parties in interest that it is necessary to first have their ditches gauged to determine the amount of water which has actually been diverted at the old point of diversion.
>
> You will also notify them that they should send a request to this office to have the capacity of their ditches determined, and that the cost ($6 per day and expenses) must be borne by them.

This was considered necessary as a precaution against the transfer of a greater amount of water than had previously been diverted, or, in case of a transfer of a part of the decree, that an amount equal to the amount transferred might be deducted, not from the amount recorded in the decree, but from the amount which had been diverted heretofore. This requirement is still in force.

ON NEW DITCHES.

This evil, as stated, lay originally in the decrees as granted, and while such mistakes are at this time more rare and of less amount, yet our system of obtaining decrees subjects the public to grave dangers. It is my opinion, therefore, that whenever a decree is sought the applicant should be required to show a certificate of the State Engineer, which certificate should set forth the capacity of the ditch, the amount and kind of land to be irrigated therefrom, the probable amount of water necessary to the proper cultivation of the soil, together with a map of the ditch and lands covered.

This would be evidence on which the court could base its opinion, would be both disinterested and expert testimony and the state, the most interested party, would be represented; the interests of the public and of settlers, yet to come, would be protected, to say nothing of the value of such records from a statistician's point of view.

A supplementary evil has developed on account of these excessive decrees, and that is the excessive use of water resulting in the destruction of much good arable land from seepage and waste waters. The land is converted into swamps on the low ground and into alkali beds on the higher ground. In some cases these swamps have had to be drained at considerable expense, and an idea of the enormous loss of water may be seen from the fact that the sale of this reclaimed water pays for expense of drainage, which expense is by no means a small amount.

DAMS AND RESERVOIRS.

The present law, requiring that plans be approved by this office, should be amended, giving this office the power to reject unsatisfactory plans and, if deemed necessary, have a representative on the work, also have conferred upon it the power to condemn a reservoir when found to be unsafe and the public endangered.

RATING WEIRS AND HEADGATES.

A penalty should be provided in case of the refusal of the owners of a ditch refusing to properly repair or supply their ditch with headgates and rating flumes or weirs.

DEFENSE OF THE OFFICIALS.

Provision should be made for the proper defense of the official acts of the officers of this department either by the dis-

trict attorney or the attorney general, and no court costs or damages should be assessed against them except for malfeasance or willful oppression.

In cases where the officers are made defendants, parties beneficially interested in the defense of the suit should be made parties thereto as well, to the end that the case be brought before the court in all its phases. This would be especially desirable in injunction suits—the most common form of these contests—in order that the plaintiff may be responsible on his bond not only to the officials of this department, but to those parties injuriously affected by the injunction. Without making these people parties to the suit they can not recover on the injunction bond, and the officials, whom it is impossible to injure in a material way, have no cause of complaint. This would, I believe, tend to discourage the promiscuous application for injunctions, a consummation devoutly to be wished.

GREATER DISCRETION TO OFFICIALS.

No law or set of laws can meet with the requirements of the innumerable phases of the subject of irrigation and the administration of water. Each case is individual in its circumstances and requires especial treatment, and, with laws treating only the broadest principles, it is necessary to vest a very large discretion in the administrative department, subject to review in the courts only after having passed regularly from the water commissioner through the superintendent to the State Engineer.

The vesting of so large discretion may seem dangerous, but I have yet to find an official who has not the good of his district at heart. What complaints have come to me have been almost entirely a difference of opinion as to the interpretation of the law or from some one who has claimed and not received his "pound of flesh."

WATER FOR DOMESTIC USE.

The matter of water for domestic use should be attended to. This department should be given the power, when in its judgment the public health demands it, to divert water from agricultural to domestic use. In very short seasons many communities suffer for water for their homes and stock, sickness and distress resulting. Unfortunate in the fact that they have settled under one of the newer ditches, which in normal seasons would supply their wants, they are made to abandon their homes

because once in a number of years water fails. At the same time, however, an old ditch may be receiving an abundance of water for all purposes, and it is but just that they should be made to relinquish a part for a few days at a time to the dry ditches for domestic use. The same might be said for orchards and small fruits, but I would not recommend that they be included at first.

SEEPAGE MEASUREMENTS.

These measurements should be continued and extended to other streams. They are a necessity in the determination of the right to a transfer of water, and are by far the most interesting and important investigation undertaken by the state, and often solve problems otherwise veiled in mystery.

GAUGING STREAMS.

Our records are becoming more complete each year and more valuable. They should be extended to the smaller streams. In times of scarcity, when it is desirable to take advantage of every rise in the river, from storms or cloudbursts, numerous gauging stations along the river, at dams and other convenient places, are invaluable, as it enables the commissioner to quickly and accurately raise and adjust the headgates of the canals, the height of the water on the gauge indicating to him just how many ditches can be supplied both above and below the point of entrance of the flood into the main streams.

GOOD ROADS.

It is desirable at this time to take up the matter of state thoroughfares in a systematic matter. Heretofore much money and energy have been expended at random and without beneficial returns commensurate therewith. I think it advisable to have a general plan of state roads, embracing every section of the state, so that when completed it will form a complete and connected whole, giving communication for distant and remote districts with each other and with the more thickly settled portions and the principal cities. Many tourists for pleasure and many home-seekers prefer traveling by wagon through the state in summer. Such a mode of travel is vastly superior to traveling by rail, where one gets a fleeting glimpse at best and is confined to very narrow limits, and generally misses the more picturesque spots and those most desirable and available for settlement. Great benefit would accrue to the state in the

increase of tourist travel and in the more rapid settlement of our mountain valleys. Whenever an appropriation is made for a road it should be made along the lines previously determined, as suggested above; feeders would be made by the counties to these main thoroughfares, and in building a road the state should build such as were best adapted for that locality and after the latest and best methods, making it a sample road and an object lesson to the community on road building.

BUREAU OF STATISTICS.

During the last two years this office has been called upon for data and information on seemingly every subject connected with the natural features, industries, resources, products and possibilities of the state. It seems in desperation they have sought this office hoping to find something official and definite. It was with great regret that, except in a comparatively limited range, this office was unable to furnish the required information. Some provision should be made for gathering statistics of the state. If necessary, an office established for that purpose, which, acting in conjunction with the already established departments, could collect and systematize a vast amount of valuable information.

This office collects some data as to crops and area cultivated in the different districts, but this is incomplete and not as reliable and full as desirable. The statute provides that it shall be the duty of the water commissioners to do this work, but fixes no method of compensation. Presumably it should be included in the regular bill of the commissioner against the counties, but most counties object to this additional burden and refuse to issue warrants therefor; the consequence being that the work is done hurriedly and in a spirit of protest, sometimes entirely neglected.

PAY OF SUPERINTENDENTS AND COMMISSIONERS.

In the eighth biennial report my predecessor urged, in brief, the following, and which I again call to the attention of the legislature:

"The State Engineer should be made the head of the department in fact as well as name, and the superintendents and commissioners act as his deputies. Superintendents and commissioners should be appointed by the governor without recommendation from the counties and be paid by the state, thus removing them from local influence and rendering them more independent in the exercise of their duties.

"All ditches, through their management, should be directly responsible for violation of the laws regarding tampering with headgates or interfering with the orders of the water commissioners.

"Plats and statements of ditches or reservoirs appropriating water, before being placed on file in the State Engineer's office, should be examined by him to ascertain if the requirements of the law have been complied with."

FEES AND INCREASED APPROPRIATIONS.

A law should be enacted to allow the collection of a small recording fee on each ditch or reservoir filing. This source, even at one dollar for each filing, would yield a revenue of something over five hundred dollars per year, and could be applied to the gauging of ditches, as above recommended. Either this or a considerable increase in the appropriation for this office is necessary to its effective and proper maintenance. A law for the collection of fees has proven a great benefit in Wyoming.

A very moderate increase in the force of the office would greatly increase its efficiency and the amount of work done. A clerk to attend to the recording of filings and much of the correspondence, and act as stenographer, would be of little additional expense, but would permit both the State Engineer and his deputy to be in the field at the same time and attending to strictly engineering matters. As it is now, much of their time is, of necessity, spent in purely clerical work. The State Engineer should be free to go where he is needed and put himself in closer touch with the water commissioners and the consumers, and investigate personally the controversies between them or between the different districts. A few days each week in his office would suffice to attend to such matters as could not be properly taken up by the clerk.

REPORTS.

The report of the State Engineer is one which is in constant demand and the number of copies should be increased. Five hundred copies of the eighth biennial report were printed and scarcely a dozen remain in the office, notwithstanding all applications from outside the state have been refused for the past year, many of them from public libraries, municipal and state engineers. During the same period many applications inside of the state have been refused. These coming mostly from attorneys, ditch companies, engineers and people actually engaged in irrigation, it was with regret that they could not be supplied. The copies that remain are reserved for use of the water superintendents and commissioners.

FOREST FIRES.

I can not leave these recommendations without calling attention to the forest fires which, during the last year, have been more than ever destructive and numerous, and I would urge that some law be passed to prevent, if possible, these conflagrations, even to the extent of discouraging hunters and campers from entering the timber reserve or thickly wooded portions of our mountains when there has been a long spell of dry weather. I would then urge that some effective measure be adopted for fighting the fires when first discovered. The entire irrigation section is dependent on the preservation of our forests, which, I believe, can never be replaced, no matter what the necessity and regardless of expense; for, with the forests, the soil alike disappears, is washed off by rains and rapidly melting snows, land slides, lend their aid, and we have in prospect bare, rocky ranges without trees, grass or soil. I would recommend that instead of building reservoirs to hold our flood waters that the forests, those great natural reservoirs, be preserved, to the end that our floods be not increased and, as a consequence, our summer flow decreased.

PLATS FOR RECORDS.

There are in this office many ditch plats which, though not more than ten years old, are in a very badly preserved condition. The quality of the paper used was poor, and, added to the dry heat of the vaults, they have become so brittle that they can scarcely be handled. The same might be said of the statements attached. Tracing cloth seems to be little better and has the added fault of not being the original document. I would therefore suggest that all plats be made on a good quality of drawing paper, mounted on muslin. That these plats be of uniform size, say eighteen by twenty-four inches, which would be convenient for binding into book form, and on a scale not to exceed one thousand feet to the inch, a number of sheets to be used if necessary. The statement also should appear on the plat. These plats should be examined by this office and, if necessary, returned for correction. I anticipate that before long considerable confusion will arise unless these documents are properly preserved. The value of such a system is easily seen in records so kept by the United States Surveyors General. The law, I believe, should be extended also to cover town plats and such others as are intended to be matters of record.

In the chapters on "Seepage Measurements," "Rating of Ditches," and "Gauging of Streams," the deputy state engineer has taken up those subjects with their needs and difficulties more in detail, and his recommendations are worthy of careful study, as the great majority of such work has been done by him.

SURVEYS OF STATE LANDS.

The following were the only surveys made under the direction of this office of school sections during the last two years, and were made for the state land board:

School section 36, T. 10 S., R. 73 W., Park county, July 17, 1897, J. B. Balcomb, civil engineer.

School section 16, T. 11 S., R. 72 W., Park county, June 29, 1897, J. B. Balcomb, civil engineer.

CHAPTER II.

INTERNAL IMPROVEMENTS.

No new work was begun during the years 1897 and 1898 for the reason that no appropriations were made, and as all the work under former appropriations had been either completed or abandoned, this office had only to attend to a little unfinished business, as follows:

PHILLIPS COUNTY ARTESIAN WELL.

By the statement in the eighth biennial report an unexpended balance of $4,814.29 remained of the $5,000 appropriated. In full settlement of all claims, the contractor was paid $2,008.00 under the former State Engineer, this being on a pro rata basis for the work actually done.

CONEJOS COUNTY ARTESIAN WELL.

The unexpended balance remaining in this fund, according to the last report, was $2,422.17. The contractors having found it impossible to complete the work, applied to the board of construction for pay on a pro rata basis. This was denied, on the advice of the attorney general, and a resolution adopted stating that the board believed the contractors entitled to some compensation as they had expended a great amount of time and money in an endeavor to sink the well; that the state and the people of Antonito were gainers thereby, and that while the board was unable to pay the contractors under the contract, yet they recommended the legislature to extend some relief to the contractors.

STATEMENT OF EXPENDITURES.

Balance unexpended		$2,422 17
M. B. Colt, expenses of trip to Denver	$12 00	
John E. Field, expenses of trip to Antonita	5 50	17 50
Unexpended balance		$2,404 67

MONUMENT RESERVOIR.

The reservoir at Monument has been visited a number of times and found to be in need of repairs, the valves, valve house, and dam having suffered from neglect and vandalism. On October 1, 1897, Messrs. Smith and Bell, of Denver, applied to the land board for a lease on the lake, which was granted, the water for irrigation being reserved, and the lessees agreeing to repair and keep in repair the dam, valves, etc.

OTHER RESERVOIRS.

Of the other state reservoirs the Boss Lake reservoir, by an act of the eleventh general assembly, was transferred to Chaffee county, the county commissioners to have charge thereof, assume all liability from damages or other causes, and to distribute the water in accordance with the decreed priorities. The county refused to assume the responsibility.

The Saguache and Apishapa reservoirs have been reported in such a condition that they will not hold water, and are at present not available for storage.

TWIN LAKES RESERVOIR AND STATE CANAL NO. 1.

During the last two years nothing has been done on state canal No. 1, as no appropriation was made for the work. In the meantime, numerous filings have been made on Twin Lakes reservoir site, and the board of construction of canal No. 1 deemed it not advisable to interfere in any way with the company now at work increasing the capacity and building an outlet from the lakes; believing as they did that state canal No. 1 was not a feasible project, and that the Twin Lakes reservoir, when completed, would not be able to supply so large a canal. This, with the fact that the state had no early priority or appropriation of water from the Arkansas, and the probable great cost and questionable utility of the work when completed, determined them in their course of allowing private enterprise to construct the reservoir.

ARTESIAN WELLS.

Contractors and owners of artesian wells seem not to be aware that there is a law requiring them to file in this office a record showing the strata, flow and other matters regarding their wells, and it has been impossible for this office to reach every one who has dug a well during the last two years. Only three sets of filings have been received, which are appended below:

Record of artesian well of James McNeen, at brick yard, La Junta, Colorado:

From surface to 18 feet, clay;
From 18 feet to 120 feet, gray shale;
From 120 feet to 380 feet, black shale;
From 380 feet to 390 feet, black shale and talc;
From 390 feet to 410 feet, Dakota sand;
From 410 feet to 412 feet, gumbo.

First water at about 395 feet, and increased to eight gallons per minute at 405 feet.

Regular flow, eight gallons.

Temperature, 68 degrees Fahrenheit.

Well cased with 4¼-inch casing from top to bottom.

The following three artesian wells were drilled by the Atchison, Topeka and Santa Fe Railway Company at La Junta, Otero county, Colorado:

From surface to 40 feet, adobes and clay;
The next 300 feet, shale and clay, also slate;
The next 80 feet, water-bearing sand with thin strata of clay, called Dakota sandstone.

Casing, 8 inches in diameter.

The next well was drilled 439 feet deep, with 6-inch casing.

Stratas same as in well No. 1, as wells were within seven hundred feet of each other.

The third well was drilled half way between the other two.

The stratas were the same, excepting that this well was drilled 1,150 feet deep, but some tools being lost in the bottom and it being impossible to recover them, the well was filled up 450 feet, leaving it now open 700 feet.

The stratas were the same down to 420 feet;
The next 130 feet, slates and shales;
The next 120 feet, water-bearing sandstone;
The next 250 feet, slates and shales;
The next 200 feet, sand rock.

But, as the last 450 feet were allowed to fill up, the water supply it taken from the water-bearing sandstone in the strata between 340 and 420 feet, and between 550 and 700 feet.

None of these wells are what is called flowing wells, the water having to be forced out by air jets. These air jets are generally put down about 350 feet; as the water rises in the well to within about 150 feet of the surface, there is a "plug flow" of water over this air pressure of about 200 feet.

There is a flow of about 125,000 gallons of water from the three wells every twenty-four hours.

Artesian well near depot, Lamar, Prowers county, Colorado, sunk by Atchison, Topeka and Santa Fe Railway Company:

From surface to 31 feet, loam, sand and gravel;
From 31 feet to 67 feet, shale;
From 67 feet to 70 feet, talc;
From 70 feet to 195 feet, shale;
From 195 feet to 255 feet, water-bearing sandstone;
From 255 feet to 260 feet, shale;
Another strata of water-bearing sandstone nearly 100 feet thick;
Next 125 feet, shale;
Next 10 feet, mixed clay and sand;
Third strata of water-bearing sandstone, 40 feet in thickness.

First 250 feet of casing is ten inches in diameter and the balance eight inches.

This well is pumped with a Knowles Deep Well pump and the working barrel and bottom valve are down 210 feet.

The water stands usually about fifty feet from the surface.

All of the water from these artesian wells is comparatively soft, very good boiler water with the exception that it contains considerable soda and magnesia, and this causes more or less foaming. Very good for domestic purposes.

Record of the strata of The Wyckoff Park Artesian Well Company. Located in section 11, township 23 south, range 57 west, Otero county:

Depth of well, 845 feet;
First 36 feet, surface soil;
251 feet, gray shale;
74 feet, lime;
384 feet, shale;
100 feet, first Dakota sandstone.

Flow not given.

COUNTY BOUNDARIES.

On July 9, 1897, the county commissioners of Summit county, with the approval of the commissioners of Eagle county, and pursuant with the statutory requirements, petitioned this office for the survey of a portion of the boundary between Eagle and Summit counties, being about eight miles of the northerly end. The territory in dispute was a small park or valley on what was known as the Sheephorn or Quaking Aspen creek, an area in all of some twenty-five square miles and containing a few farms and stock ranches. A study of the statutes defining the boundaries of the counties, disclosed that the one describing the boundaries of Eagle county was ambiguous, i. e., that portion which reads, "The dividing ridge between the Piney and Blue rivers," there being in fact two "divides" which separate from the main range in the vicinity of Hayden's peak, and between which lies the valley of the Sheephorn. An examination of the two divides revealed the fact that the main Park range continued along the more easterly divide and was the main divide between the Piney and Blue rivers. I therefore established the disputed boundary upon the more easterly range, giving the disputed territory to Eagle county. In confirmation of my opinion I found that Mr. Hayden, in his Geological Survey of Colorado, speaking of the Park range, it being the easterly range above referred to, said: "There is only one ridge of a secondary order detached from the range four miles northwest of Mt. Powell, and which separates Piney river from Quaking Aspen creek, in a parallel direction with the Park range." Thus, in running northerly along the main range we must keep to the east and not cross to the secondary ridge mentioned, especially as this ridge does not cross the Grand river, as does the more easterly. The line was surveyed by Mr. H. A. Sumner, ex-State Engineer, in company with the county surveyors of both Eagle and Summit counties, and monuments established at each mile and half mile, and also at each angle. While Summit county did not acquiesce in the decision, they have failed to bring suit within the time required by statute to set aside my decision, and the boundary therefore as established, stands.

The second boundary established was that between Fremont and Chaffee counties, there being in this case also an ambiguity in the description of the boundary. The greater part of the survey was made by Mr. E. J. Hall under my direction, the county surveyors of Chaffee and Fremont counties not participating—Chaffee county not recognizing my authority to make the survey, and Fremont county considering it unnecessary to have a representative upon the ground. Within the six months

allowed by statute Chaffee county brought suit to set aside my decision and the matter is still pending.

The following is a part of my report of the survey, including everything except the field notes, and sets forth fully the position taken by this office:

DESCRIPTION OF BOUNDARY LINE

Between Fremont and Chaffee counties, Colorado, as established by John E. Field, State Engineer, and E. J. Hall, deputy. Date of survey, September 7 to October 23, 1897.

Said survey was made in compliance with the petition of the county commissioners of Fremont county, filed in this office May 13, 1897, and pursuant to the requirements of an act of the general assembly of the state of Colorado, entitled "An act to provide for the settlement of disputed county boundaries in this state." Approved April 4, 1887.

The county commissioners of Chaffee county, through their county clerk, were notified of the petition from Fremont county, and after considerable correspondence, informed this office that no action would be taken, and that they were satisfied with and relied upon the Brewster-Day survey made in 1883.

The first question was whether the State Engineer was thus legally relieved of the necessity of making a survey, one having already been made by Mr. Brewster, county surveyor of Fremont county, and Mr. Day, county surveyor of Chaffee county; that is, whether the Brewster-Day survey was mutually binding on each county.

The following facts were found to exist:

The field notes and plats had been duly filed with the county clerk of Chaffee county, and all necessary steps taken, but in Fremont county there appeared to be no record of the survey whatever except the payment of the surveyor.

One county claiming this survey to be binding, and the other not, I considered it not in my jurisdiction to decide the matter, but a matter for legal procedure.

The next question was: Was I required by law to make the survey?

The act of April 4, 1887, above referred to, says that "Whenever the boundary lines of any county in this state shall be so indefinite that a portion of territory, by reason of such indefinite description, is claimed by two counties, and such fact shall appear by petition of the board of county commissioners of either county, to the State Engineer, it shall be the duty of such State Engineer in connection with the county surveyor of each such

counties to run out and establish such lines as nearly as may be in accordance with such defective description."

Under this section, having been petitioned in accordance therewith by the county commissioners of Fremont county, I believe I was compelled to make the survey, notwithstanding the previous survey or any matter relative thereto in dispute.

Accordingly I proceeded on August 15 to Salida to make a preliminary examination. The act approved February 9, 1872, defining the boundaries of Chaffee county, was found to be the one relating more directly to the question than any other, though the laws defining Saguache, Fremont and Park counties were carefully examined.

In the case of Park county, however, the real key to the controversy, inasmuch as "the summit of the range which divides correction line) to the summit of the Snowy range east of the Arkansas river," as will be seen later on.

That part of the description of the boundary of Chaffee county which reads "Thence easterly (from a point three miles below the mouth of the South Arkansas river) to the summit of the range which divides the waters of the Platte and Arkansas rivers" was the vague and incomplete clause causing the controversy, insomuch as "the summit of the range which divides the waters of the Platte and Arkansas rivers" was interpreted to mean: First, the actual watershed between the two streams; and second, the range which divides the waters of the said rivers and its continuation, be that continuation the actual watershed or not.

The objections to the first interpretation were that running in an "easterly" direction from the three-mile point, would not lead to the watershed, and (referring to the description of the southerly boundary of Park county) a line running westerly along the third correction line, would pass some five miles south of the watershed; and also (see description of Chaffee county), it is impossible, having arrived at the summit of the watershed (which would be north of Black mountain), to "run along the summit of the range and western boundaries of the counties of Fremont and Park in a northwesterly direction," for the reason that you would have already passed beyond the boundary of Fremont county, and lastly, it is impossible to run in a northwesterly direction along the western boundary of Fremont county under this interpretation.

The reasons in favor of the second interpretation are: The Park range divides the headwaters of the Platte and Arkansas, a fact not disputed; following along this range in a southerly direction, we find that the watershed leaves the range in the

vicinity of Marmot park, swinging to the east in a curve around the south end of the South park, and continuing easterly is seen at Palmer lake, and thence even to the Mississippi river, as the watershed of the Platte and Missouri and the Arkansas rivers. The range itself, however, following the same general course as heretofore, crosses the third correction line in section 35, township 15 south, range 77 west, and becomes a little below this point the watershed between the Arkansas river and Badger creek, practically terminating within a few miles of their junction. Hayden, in his report, however, goes still further and says that the Sangre de Christo is the continuation of the Park range beyond the Arkansas river.

In support of my opinion that the range indicated above, and not the watershed mentioned, is the true continuation of the Park range, I quote the following from Hayden's report, page 379:

"At the point where the old historic California trail de-"scends from the Park range down into the Arkansas valley, a "split takes place in the Park range. The eastern branch which "leads to Trout Creek pass, and which forms the dividing bar-"rier (though not the principal one), between the South Park "basin and the Arkansas valley, disappears or flattens out as "it approaches the extreme southwest corner of the South Park "basin, while the main Park range continues on for twenty-five "miles in a straight southward course, across the Trout Creek "cañon, and it again increases in elevation as it approaches "nearer to the Arkansas river at a point where the great Ar-"kansas cañon has its commencement. South of the Arkansas "river the Park range continues as the same upheaval, but "with the name changed into Sangre de Christo range."

Accepting, then, the second interpretation, Where would it lead? How would it conform to the description in the statutes? "Begin at the top of the range at Poncha pass, run thence northeasterly along the summit of the range, crossing the Arkansas river at a point three miles below the mouth of the South Arkansas," here we have a positive and definite point, whatever may have been meant by what precedes (and indeed there has been considerable controversy as to the meaning of the above description; i. e., what was meant by top of the range at Pancho pass, and what by "thence along the summit of the range," of which more hereafter.

From this three-mile point, the description says "thence easterly," not northeasterly as heretofore; indicating a considerable change of course, in fact, something more easterly than even "northeasterly;" that is, a course at least 67° 30′ east of

north to the summit of the range. I found that a course of north 84° 25′ east would intersect the south end of the range we are to follow. Thence running in a "*northwesterly direction* along the western boundary of the counties of Fremont and Park." I have thus followed literally, and believe in spirit also, the statute defining Chaffee county, and it agrees also with the description of Park county, indicating that the southwest corner of Park and the northwest corner of Fremont county are identical, and that the easterly boundary of Chaffee county is a continuous line. And it seems reasonable also that in dividing the counties the Arkansas valley above the three-mile point, and the country immediately tributary to it, should be given to one county, while the valleys and tributaries of the Arkansas below the three-mile point should be given to the other county. I consider the Badger creek country by nature more nearly tributary to Cañon City than to Buena Vista, or even to Salida.

Having thus determined to my own satisfaction this much of the line in dispute, I was gratified when my attention was called to a decision of the supreme court in the case of Hollenbeck vs. Sykes (17 Colorado, page 317), to find that that court, sustaining the lower court, had settled the matter in the following clear and concise language:

"That the Mosquito spur of the Snowy range, the Park range, is a distinct and continuous range or chain of mountains next and immediately east of the Arkansas river, extending from the Snowy range at and between the sources of the Arkansas and Platte rivers *southward beyond said correction line;* that the summit of this range is the natural boundary between Chaffee and Park counties."

Returning now to the "top of the range at the Pancho pass," which point, as determined by the supreme court of Colorado in the case of the Board of County Commissioners of Saguache County vs. The Board of County Commissioners of Gunnison County, October 11, 1889, is located at the lowest point on the Poncha pass, a point between the more westerly wagon road and the Denver and Rio Grande tracks.

The mountain where the Sangre de Christo range practically has its end is found also to be near the point where the Poncha pass ridge joins the Sangre de Christo range. Taking the highest point, therefore, of this mountain as the initial point, I began the survey by running almost due northeast to the point three miles below the mouth of the South Arkansas which point I found by meandering the Arkansas river and checking very closely with the same point as determined in the Brewster-Day survey, I took that as correct, and proceeded, as stated above, easterly to the summit of the Park range.

CHAPTER III.

SUPREME COURT DECISIONS.

BRUENING VS. DORR ET AL.

Colorado Reports, volume 23, page 195.

This case dealt with the right of an owner of land to such water from springs, or otherwise, as rose upon his land, and it was decided that the owner of such land was the possessor of the water as part of the realty and could be used and controlled by him, but that he had no right to divert or use water from such springs to the prejudice of a prior appropriator lower down on the stream. This decision precluded the possibility of a subsequent settler locating at the head of a stream, thereby procuring water which had previously been used by an earlier settler lower down on the stream.

THE MONTROSE CANAL COMPANY ET AL. VS. THE LOUTSENHIZER DITCH COMPANY ET AL.

Colorado Reports, volume 23, page 233.

The decision of the court in this case sets forth that the company may maintain an action to protect the rights of its stockholders and consumers of water under its ditch; also that a decree can not be attacked after the four years prescribed by law has expired, except by those not parties to the proceeding, or if parties thereto, where the action grows out of matters subsequent to the decree. The most important part embraced in the decision is that in reference to the water for domestic purposes; water for domestic use can not be diverted by means of large canals; and the preference given to water for domestic use is such as a riparian owner has at common law to take water for himself, his family or his stock. Water for domestic use may be obtained by condemnation proceedings, just compensation being given to those possessing rights for agricultural and manufacturing purposes.

THE LARIMER AND WELD IRRIGATION COMPANY ET AL. VS. WYATT ET AL.

Colorado Reports, volume 23, page 480.

In this case it was held that the estimated capacity of the company's canal to furnish water meant the capacity of the canal and the stream from which water was taken to furnish water during the irrigation season; that conditional decrees were not authorized by the statutes and that the pro rating of water among consumers having priorities the same or nearly the same dates could be enforced, but that it could not interfere with the constitutional rights of prior appropriators; also, the fact that the consumers of water have been allowed to take more water from a ditch than they were entitled to take, does not prevent them from maintaining their right to such as they are in fact entitled.

WATER SUPPLY AND STORAGE COMPANY VS. LARIMER AND WELD IRRIGATION COMPANY ET AL.

Colorado Reports, volume 24, page 322.

1. Water Rights—Priorities—Reservoir.

Where reasonable diligence is used in prosecuting the construction of a reservoir, priority to the use of water should date from the time of beginning, and not from the completion, of the work.

2. Priorities—Decree.

In a proceeding to adjudicate the priorities of right to the use of water, a decree was entered determining the carrying capacity of an enlargement of a ditch without the fact that actual appropriation of water had been made of increased quantity intended to be carried by the enlargement, and providing that if the appropriation intended to be made should in fact be made with due diligence, then the priority of such enlargement should date from the time of beginning work on the enlargement. Afterwards a supplemental decree was entered reciting that the work referred to in the former decree had been completed, and that by reason thereof said ditch was entitled to the priority dating from the time of commencing work on the enlargement. *Held*, that the latter decree supplemented the former, and that the two taken together constituted the decree in the case.

3. Carrying Capacity—Res Judicata.

In a proceeding to adjudicate the priorities to the use of water for irrigating purposes, the determination by the court

of the carrying capacity of a ditch is *res judicata* and can not be attacked in a collateral proceeding after the statutory time for reformation or review in the court of original jurisdiction has expired and the time for appeal has elapsed. A mistake of the court in computing the carrying capacity can not be corrected in such proceeding.

4. Filing Plat—Statute.

Section 2265, Mills' Annotated Statutes, requiring a map showing certain things to be filed within ninety days after the construction or enlargement of any ditch, canal, or feeder for any ditch or reservoir taking water directly from any natural stream for irrigation, applies only to ditches, canals or feeders for reservoirs of the *designated* capacity, taking water *directly* from a natural stream. Ditches, etc., taking water from a natural stream *indirectly* through some previously constructed conduit, or ditches of *other* capacities, or those taking water from an *artificial* stream do not come within the provisions of the statute.

5. Headgate Tapping Other Canal—Appropriation from Natural Stream.

The fact that the headgate of the feeder of a reservoir taps another canal and not the stream itself, is not conclusive evidence, if in fact it is any evidence, of an intention not to make an appropriation of the water of the natural stream. If a company can make arrangement with the owner of a canal whereby it may put in the canal a headgate and use the canal itself as a conduit for carrying the water directly from the stream to such headgate and thence by its own feeder carry the water of the stream to its reservoir for storage purposes, that is a matter of contract between the two. Such a right might be acquired by condemnation in a proper case (Mills' Annotated Statutes, section 2263; General Statutes, section 1718) and, of course, by contract.

WATER SUPPLY AND STORAGE COMPANY VS. TENNEY ET AL.

Colorado Reports, volume 24, page 344.

Decree—Interpretation.

In a proceeding adjudicating the priorities of water rights, a decree was entered containing this clause: "When said ditch and reservoirs are fully completed, if there shall be a scarcity of water so that they can not be filled, then the right to the full use of said priority in said ditch and reservoirs shall date from the time of their completion." *Held*, that the limitation of the

priority to the completion of the work applied to the ditch as well as to the reservoirs.

Decree—Authority of Court.

In a proceeding to adjudicate priorities to use of water under our irrigation statutes, the district court has no authority to give any definite decree in favor of a ditch not then complete. Same.

A decree limiting the priorities of a ditch to the completion of the work, pronounced by a court having jurisdiction of the subject matter, of the person, and to enter the particular judgment, and not appealed from, can not collaterally be attacked and set aside, even though an erroneous conclusion was reached.

GELWICKS VS. TODD.

Colorado Reports, volume 24, page 494.

Water Right—Conveyance.

A water right is a distinct subject of grant, and may be conveyed either with or without the land. Whether a deed to land conveys the water right depends upon the intention of the grantor, to be gathered from the express terms of the deed; or, when the deed is silent as to the water right, from the presumption that arises from the circumstances, and whether such right is or is not necessary to the beneficial enjoyment of the land.

THE BROADMOOR DAIRY AND LIVE-STOCK COMPANY ET AL. VS. THE BROOKSIDE WATER AND IMPROVEMENT COMPANY ET AL.

Colorado Reports, volume 24, page 541.

1. Water Rights—Jurisdiction of District Court.

Under section 11, article 6 of the Constitution, the district courts of the state had full and complete jurisdiction to hear and determine water priorities, prior to the irrigation acts of 1879 and 1881. These acts were passed for the purpose of establishing a system of procedure whereby the appropriators of water on any particular stream could have their priorities and rights determined in one proceeding; and they do not attempt to limit or extend the jurisdiction of the district court as to such rights. The evident purpose of section 2 of the act of 1881 (Mills' Annotated Statutes, section 2401) in regard to the publication of section 1 of said act (Mills' Annotated Statutes, section 2400) was to advise parties of its enactment, that they

might protect their right to the use of water by filing a statement of claim as therein provided; but failure to file such claim in no way prejudices their rights, or precludes them from thereafter filing the same in any proceeding that might be instituted under section 4 of the act. (Mills' Annotated Statutes, section 2403.) The fact that section 1 was not published as directed in section 2 does not affect the jurisdiction of the district court to hear and determine such priorities.

2. Same—Domestic Use.

The preference right to the use of water for domestic purposes incident to riparian ownership can not be conveyed separate and apart from the land, nor diverted for such use by a company through a pipe line.

3. Same—Decree.

To constitute a valid appropriation of water within the meaning of the Constitution and statute, the water diverted must be applied to a beneficial use, and the referee must, from the evidence, ascertain the existence of such fact before he can award any priority to a ditch. But it is not necessary that a decree shall state upon its face that the water appropriated was applied to a beneficial use.

4. Same—Validity of Decree.

A decree which describes the ditch by width, depth and length and by specifying the number of acres of land to be irrigated, is sufficiently certain as to the amount of water intended as the capacity of the ditch, to uphold the decree, especially after the time for reargument, review or appeal has expired. While it fails to state the amount of water appropriated by cubic feet per second of time, or the grade of the ditch, the amount of water required to irrigate a given number of acres can easily be ascertained.

5. Same—Estoppel.

The conduct of defendant's grantors in standing by while third parties expended money in the acquisition of valuable rights upon the strength of this decree, estops defendant from assailing its validity.

CACHE LA POUDRE IRRIGATION COMPANY VS. LARIMER AND WELD IRRIGATION COMPANY.

Pacific Reporter, volume 53, page 318.

Irrigation—Transfer of Water Rights—Junior Appropriators—Evidence.

1. Where water rights, and the ditch through which they are enjoyed, are owned by tenants in common, who form a cor-

poration, which issues shares of stock representing both the water rights and the ditch, a transfer of its shares operates as a transfer of both the water rights and the ditch.

2. A sale of a water right separate from the land, whereby the water is applied to other lands, may be made, if the rights of others are not infringed.

3. The owner of a water right did not use the full quantity of water to which his shares entitled him, but his co-tenants and lessees used all the excess. *Held*, that there was no abandonment of his rights.

4. Junior appropriators can not complain of the method of distribution adopted by those entitled to water rights, if the latter actually use the water, and do not divert more than the decreed priority to which they are entitled.

5. Evidence showed that after the transfer of shares of water rights there was an increased acreage irrigated, but no more water was diverted from the ditch than before the transfer. *Held* insufficient to establish that an enlarged use of the water had been occasioned by the transfer.

CACHE LA POUDRE RESERVOIR COMPANY VS. WATER SUPPLY AND STORAGE COMPANY ET AL.

Pacific Reporter, volume 53, page 331.

Water Courses—Appropriation—Abandonment.

A milling company had for some years taken a stated quantity of the water of a river continuously for power purposes alone, returning the water unimpaired in volume to the stream below. Junior to its right, defendant water company had constructed up the stream headgates and facilities for storing water for irrigation; and afterwards plaintiff reservoir company constructed headgates, etc., below the milling company's discharge, and during the winter months, from November to April, it appropriated all the water, including that used by the latter. The water company then began to appropriate the quantity belonging to the milling company, by agreement with the latter, when the latter was not operating the mill. *Held*, that the construction of facilities for storage and use without an act of appropriation would not give the water company title to such water, and, as to the quantity of water actually appropriated from November to April by it, the reservoir company was senior appropriator.

PLATTE VALLEY IRRIGATION COMPANY VS. BUCKERS IRRIGATION, MILLING AND IMPROVEMENT COMPANY ET AL.

Pacific Reporter, volume 53, page 334.

Diversion of Water Course—Prior Appropriation—Abatement of Ditch.

1. An action for the diversion of water from a stream can not be maintained unless plaintiff has a right to the waters of the stream of which it is being deprived by defendant, or the ditches which it seeks to have abated are interfering with rights which it would otherwise enjoy.

2. Water flowing in a natural channel, which reaches the bank of a stream, and there disappears in the sands of the bed, will be presumed to augment the flow in the main stream by percolation until the contrary is shown; and the burden of proving the contrary is upon the party diverting the water.

3. Where the flow of a tributary has been increased by the efforts of one having a right to the use of the waters of a stream, he has a prior right to such increase; but his rights to the natural flow of the tributary are subordinate to the rights of those having prior rights to the waters of the stream, although the prior appropriator takes above the point where the tributary enters the stream.

4. One who has a right to the waters of a stream for irrigating purposes may maintain an action against a junior appropriator to abate a ditch so constructed along the stream as to withdraw water by seepage from the stream.

WATER SUPPLY AND STORAGE COMPANY VS. LARIMER AND WELD RESERVOIR COMPANY ET AL.

Pacific Reporter, volume 53, page 386.

Irrigation—Priority of Water Privileges—Harmless Error—Stipulation—Res Judicata—Waste Waters.

A senior appropriator from an irrigating stream may require a junior from a tributary which joins such stream below the point of the intake of the former's ditch to surrender, before the senior does, his use of the water, in favor of appropriators from the main stream, senior to each, below the point where the tributary joins such stream.

Waste waters of an irrigating stream, which are returned to the main stream or its tributaries, become a part of the waters of the main stream and tributaries, as though never di-

verted, and inure to the benefit of the appropriators, in the order of their appropriations.

McLURE ET AL. VS. KOEN.

Pacific Reporter, volume 53, page 1058.

Statute of Frauds—Irrigation—Bona Fide Purchaser.

A complaint alleging right to water for irrigation is not indefinite as to amount, because pleading a contract providing right to take sufficient water for permanent irrigation of a certain 160 acres of land, instead of a certain number of feet and inches of water.

Open and notorious and continuous user of water from an irrigation canal by an owner of adjacent land, through lateral ditches, is possession, giving constructive notice of his rights to a purchaser of the canal from the company.

PEOPLE EX REL. STANDART VS. FARMERS' HIGH-LINE CANAL AND RESERVOIR COMPANY.

Pacific Reporter, volume 54, page 626.

A perpetual right reserved in a contract to have carried by a ditch and furnished to the grantor sufficient water to irrigate his lands therein described constitutes an easement in the ditch, which can not be lost by non-user short of the period for the limitation of actions to recover realty.

COMPLAINTS AND APPEALS.

On June 17, 1898, complaint was made by citizens of Douglas county relative to the insecurity of the Castlewood dam, at the head of Cherry creek. Upon investigation the complaint was found to be well founded, and this office requested the manager of the reservoir company to not allow the water in the reservoir to rise higher than forty feet below the spillway. This request was complied with, and when the two floods of August, 1897, occurred they found the reservoir practically empty and did not raise the water within several feet of the spillway. The work of repairing the dam was begun in the spring of 1898, this office having Mr. Filmore Cogswell, as its representative, constantly on the ground. The repairs when completed were examined and approved, and I am pleased to state the reservoir is now safe and promises to be a success in every way.

Representatives of The Farmers' Independent Ditch Company, on the Platte river, made application to this office to have the water of Clear creek turned into the Platte river for their benefit, and that the waters of Clear creek be considered as tributary to the Platte river and that the priorities of Division No. 7 (Clear creek) be subject to priorities in District No. 2 (Platte river). This matter had been in contention through a long series of years, had been to the supreme court and referred back, injunctions obtained and made permanent; in short, was in that condition where only the courts could determine what was the status of the case. I therefore refused the petition, deciding to continue the distribution of the waters as it had been for a number of years previously. The case at present remains unsettled.

In an appeal of Samuel Moore from the decision of C. J. Chapman, superintendent of Division No. 1, declining to transfer a part of the waters of the Farmers' ditch to The Consolidated Home-Supply and Reservoir Company's ditch, this office decided that the transfer of the water, as shown by the evidence, would result injuriously to the remaining owners in the Farmers' ditch for the reason that they had heretofore been in the habit for a number of years of using the portion sought to be transferred. The petition was therefore denied.

In the case of The Platte Valley Irrigation Company vs. The Buckers Irrigation, Milling and General Improvement Company, the supreme court rendered a decision which was differently interpreted by the parties to the suit. The point in contest being whether the Buckers ditch had any right whatever to certain seepage waters from Beaver lake; the one claiming it had not, the other claiming it had a right to the water reclaimed by reason of their work. This office decided the Beaver Lake ditch was entitled to the increase as claimed.

The Lower Latham Ditch Company appealed, June 19, 1897, from the decision of Water Superintendent Chapman. This case is similar to that of the Farmers' Independent ditch above, and was similarly decided.

The Handy Ditch Company appealed from the ruling of Superintendent Chapman, in allowing them to transfer only forty of seventy-eight cubic feet decreed the Big Thompson No. 5 ditch, and which The Handy Ditch Company had purchased. This office sent Mr. H. A. Sumner to examine, measure and report on the Big Thompson No. 5 ditch; upon this report Mr. Chapman was reversed and ordered to transfer the full amount, as it was found that the full appropriation could have

been diverted by the Big Thompson No. 5 ditch, which, when the transfer was made, was abandoned.

The following decision was rendered by the State Engineer on December 30, 1897:

In the matter of the appeal of Henry Van Kleeck from the decision of Francis T. Anderson, superintendent of Water Division No. 3.

From the evidence submitted, the facts are about as follows: Henry Van Kleeck owning a one-sixth interest in the Rough and Ready ditch, seeks, under sections 27-30, pages 24 and 25, Irrigation Laws of 1894, to change the point of diversion of the said one-sixth interest and applied to Mr. Anderson, the then superintendent of the division in which the headgate was located, to make such change. Mr. Anderson allowed the change to be made, but deducted one-third of the amount, assigning reasons for the deduction.

Mr. Van Kleeck thereupon makes this appeal and submits therewith the reasons assigned by Mr. Anderson for making the said deduction, and sets forth reasons why such deduction should not be made and claiming at the same time an increased, rather than a less amount, of water at the new point of diversion.

It does not appear from the evidence that any vested and legal rights are infringed upon and therefore, Mr. Van Kleeck is entitled to the change sought for.

As to the deduction of one-third for seepage, which may have possibly returned to Rock creek before the point of diversion was changed and which does not now return for the reason that the water is conducted to another water shed, it does not appear that this seepage water, if any, has ever been filed upon and put to a beneficial use or had not been at the time the change was sought to be made. I can see no reason, therefore, for such deduction as (see section 27) it is allowable to carry water from one water shed to another and the right of priority is not thereby affected, unless it be that the remaining five-sixths are injuriously affected by having this one-sixth removed. But this brings in the claim of Mr. Van Kleeck for an increased amount of water, he claiming an amount at the new point of diversion sufficient to yield the full one-sixth at the lower point, the increase being the amount lost by the said one-sixth by seepage and evaporation between the two points of diversion.

It is my opinion that the amount of a decree can under no conditions be increased and that the decree fixes the maximum amount, but that as in the case of stored water in reservoirs,

etc. (see section 2271, page 86), the amount lost by any change made should be sustained solely by the party making that change; however, in the absence of any statute relating to this matter, it is well and indeed necessary, in order to avoid endless complications, to divert the "same amount."

In the case before us this seems just and practicable, for while the one-sixth may lose something between the two points of diversion, the remaining five-sixths will lose practically as much as would the whole amount between the two points, and the damage sustained by the five-sixths is made good by allowing whatever the one-sixth would lose to remain in the stream for the benefit of the five-sixths.

It is my opinion, therefore, that the full one-sixth of the Rough and Ready appropriation, and no more, should be diverted in accordance with the request and claim of the owner thereof.

But three protests against water commissioners have been filed in this office.

The first was a petition for the removal of W. N. Palmer, commissioner of District No. 7, neglect, wilful oppression and incompetency being alleged. Upon investigation it was found that Commissioner Palmer had a very hard district to control, and that while there had been mistakes made, Mr. Palmer had done his best. The season being about over before the investigation was ended, this office recommended that Mr. Palmer be not removed, as the service would not be bettered by the installation of a new man at that time.

In July citizens of District No. 37 petitioned the governor to remove Commissioner Kalquist, and the county commissioners recommended the appointment of F. W. Nubauer in his place.

Upon investigation the charges against Mr. Kalquist were deemed not well founded, and his removal not recommended.

E. R. Chew, superintendent of Division No. 2, applied to the governor for the removal of Richard Devereux, commissioner of District No. 11, alleging insubordination and neglect of duty, Mr. Devereux refusing to file his reports as required by law, and neglecting to attend to his official duties, throwing the work upon the superintendent. The county commissioners of Chaffee county refused to recommend Mr. Devereux's removal or to nominate a successor. The season being about over no action was taken by the governor.

CHAPTER IV.

REPORTS OF SUPERINTENDENTS OF IRRIGATION AND WATER COMMISSIONERS.

During the two years last past I think I have cause to congratulate myself upon having very efficient officers in charge of the various divisions, and I wish, first of all, to thank these officials for the excellent manner in which they have conducted the affairs entrusted to them, for their cheerful compliance with all requests from this office, even when the same were not in the direct line of their duty, and to commend them for the good judgment displayed in dealing with the numerous difficulties arising in their divisions, thus materially lightening the duties of this office.

The reports submitted by the superintendents and commissioners are, I believe, more reliable than any heretofore published; in many instances the reports are exceptionally good and contain much valuable information and are the only authoritative reports obtained in the state relative to crops and irrigation matters. The year 1897 had a normal supply of water and the crops were exceptionally fine in almost every section of the state; and I received during that time no report of even a partial failure. Considering the fact that many of the commissioners had never acted in that capacity before, the results obtained were most satisfactory. The year 1898 was very deficient in snow and rainfall, and all streams were unusually low, many having an average of not over fifty per cent. of their normal flow during the irrigating season. The acreage was increased, especially in wheat and alfalfa; and while the per acre yield was not as good as that of 1897, the amount harvested was greater. Notwithstanding the shortage of the water supply and this increased acreage, few localities suffered for want of water for their crops; this was due in part to a succession of very opportune rains on both the Arkansas and Platte rivers, but more especially to the prompt action and constant attention of the

water superintendents and commissioners in taking advantage of every rise in the streams, however slight; these officers succeeded also in several localities in inducing the consumers to permit rotation of water, thereby greatly increasing its efficiency. The officers were exceptionally fortunate in being able to introduce an era of more neighborly feeling among the water users than ever before, and I believe the time is rapidly approaching when rotation of water will be generally practiced by mutual consent, notwithstanding the fact that the law and decisions of the courts give the water officials no right to enforce rotation of water among the different ditches. I congratulate the state in general and irrigators in particular, on having passed beyond the shot gun stage.

In several districts headgates and rating flumes have been placed in the ditches in accordance with the requests of the commissioners, where heretofore they have been unable to induce the ditch companies to construct these very necessary improvements; in such districts it is now considered that they are a benefit to every one, whether their priorities are among the first or among the last, and makes it more nearly possible to give to each claimant his rights; a few districts still remain without proper headgates and rating flumes, but I believe that in a short time these will also be supplied.

I append below a summary of the water commissioners' reports regarding crops statistics.

In estimating the cultivated area in the districts not reporting I have had recourse to the estimates in the last biennial report and have attempted to make my estimates in the same manner, which estimate is the same for each year for the same districts, and shows a slight increase in the total acreage over the two preceding years and also shows a slight increase of 1898 over 1897. Mention has been made in my recommendations as to the value and necessity of these statistics and of the difficulty under which the department labors in obtaining them. It is with great regret that I submit them in this incomplete form, but so long as the work of gathering these statistics is gratuitous on the part of the commissioners, just so long will it be impossible to have them complete or thoroughly reliable, although, as I have stated before, I believe them to be the most correct obtained as yet from this or any other source.

COMPARATIVE TABLE OF CROPS.

	1897.	1898.
Alfalfa	341,672	333,235
Seeded grasses	41,096	55,257
Natural grasses	426,021	356,855
Fruit	47,723	55,718
Other crops	685,809	653,976
Cultivated from seepage	18,884	14,516
	1,561,205	1,469,557
Added for districts not reporting	605,000	709,500
Total	2,166,205	2,179,057

Note.—The apparent decrease in alfalfa, natural grasses, "other crops" and seepage area, is due to the incompleteness of some of the reports for 1898; as a matter of fact, all of these crops—especially alfalfa—have increased. Adding the per cent. of probable increase of 1898 over that of 1897 would give at least 400,000 acres of alfalfa for the districts reporting, or 500,000 acres for the state. The "natural grasses" should remain practically unchanged for any two successive years.

Denver, Colorado, January 10, 1898.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado.

Dear Sir—I have the honor to submit to you my report as superintendent of irrigation for Division No. 1, together with the reports of water commissioners of said division. I was appointed March 25, 1897, and took possession of the office and assumed its duties April 1, 1897.

The irrigation season opened with a fair supply of snow in the mountains, which continued to increase daily during the months of April and May, the supply being ample to furnish water in abundance for the irrigation of all early crops, such as alfalfa, wheat, oats and barley and fill reservoirs for the irrigation of later crops, such as corn, potatoes, second and third crops of alfalfa. No scarcity of water occurred during the irrigating season, with the exception of a few days, caused by cold, nights, which temporarily interfered with the melting of the snow in the mountains. During the brief period of scarcity of water in the streams, the rainfall was sufficient to keep all crops growing, hence no material losses were suffered. Taking it as a whole, I think I am safe in saying that the irrigation season of 1897 has been the most favorable and satisfactory one enjoyed for several years.

Very little damage to ditches has occurred by reason of cloud-bursts or floods. The damage to crops by grasshoppers, hail or heavy rains has been so slight that no account has been taken of it by the water commissioners of the several districts.

Very satisfactory progress has been made during the past year in the irrigating districts of my division, and of the whole state, in the way of preparing to store the surplus water, and a large amount of important work has been laid out for the future.

The water consumers and capitalists are appreciating more and more the value of water, hence they are realizing the necessity of its storage in reservoirs. This is clearly proven by the daily increasing inquiries for reservoir sites, and the large number interested in obtaining information as to the successful operation of the limited number of reservoirs already in use. I have made some effort to get sufficient information in the way of the necessary figures, as to the number of established reservoirs, their capacity in cubic feet, the number of acres of tillable land located under them (severally), the name of each and a detailed outline of the successful or unsuccessful operation, as the case might be, of each reservoir in my division, to enable me to submit an official report of the reservoirs in use in Division No. 1, but have failed in this effort to an extent rendering it impossible to submit a satisfactory or intelligent report at this time. I trust that I may be more successful in my endeavors along this line during the next year, and that I may be able to submit in my final report of 1898, a comprehensive review of the operation of reservoirs in Division No. 1. I wish, however, to state in this connection, that the reservoirs of the district are a very important factor and have performed very important duties in every locality where they are situated. One encouraging and important feature in this connection is that a large amount of water is already accumulated in reservoirs, to be used early or late as the conditions may demand, during the irrigation season of 1898. This, when taken in connection with the fact that a liberal amount of snow is already deposited in the mountains, warrants the assertion that the outlook for a successful irrigating season in 1898 is very flattering.

I had intended to make some suggestions or recommendations, in fact, I had some prepared, but after due consideration as to the advisability of embodying them in my report at this time, I have decided that to submit them at a later date would better serve the purpose and perhaps be more productive of beneficial results.

Never in the history of northern Colorado, since farming has been practiced to any considerable extent, have the farmers

been blessed with such favorable conditions and their efforts so productive of good results, as during the season of 1897. The yield of crops of all kinds has been far in excess of prior years. Whether the farmers of northern Colorado are indebted for the years of prosperity to the management of the water department, or to the national administration, the international bi-metallic commission or the interposition of divine providence, I leave it to them to decide. The fact exists, however, that a very favorable year has been enjoyed.

The work of the water department in general has been somewhat circumscribed by the very meager allowance made by the legislature for its operation. For this reason the demands and necessities for ditches and weir ratings have had to go unnoticed, except in such cases as individuals or ditch companies expressed a willingness to defray the expenses of taking measurements and making estimates. This is always productive of dissatisfaction, for reasons very apparent to those who are familiar with this mode of procedure.

In some instances, water commissioners have failed to make anything like a complete crop report, owing to the little interest taken in it by the people of their district, and owing to the fact, also, of the county commissioners failing to comprehend the importance of it, they in some instances refusing to pay anything towards the gathering of statistics as to crop reports. In my opinion, an agricultural community or district can find no better or more substantial way of advertising itself, than that of showing in actual figures just what its resources are in the way of agricultural products, and there is no more commendable way of furnishing this information than through the water commissioners of the various agricultural districts of the state, as their reports are more accurate and reliable than the reports of any special agent, for the reason that they come in contact with the thing itself, that is, they see every man's orchard and every man's wheat and alfalfa fields, so that they are competent to judge and estimate the number of acres planted to fruit, wheat, alfalfa, oats, barley, potatoes and corn and the yield of each per acre.

When we take into consideration the beneficial results sure to come to a county by the reliable crop reports which the water commissioner would make if he were treated decently, it is difficult to understand the position taken by one or two boards of county commissioners in northern Colorado.

All decrees of ditches and reservoirs received by me have been duly recorded.

The utmost harmony and satisfaction seem to have prevailed throughout the division in regard to the transfer and distribution of water. This is very pleasing to me, as I had been led to believe that water consumers and ditch companies were difficult parties to satisfy in the distribution of water and the adjustment of water rights, but it affords me great pleasure to announce that the impression which I had formed was entirely wrong and did injustice to the ditch companies and water consumers of division No. 1.

Attention is respectfully called to the following summary, which is only approximately correct:

The number of acres that can be irrigated in the division is 887,691. Number of acres reported as actually irrigated, 685,557. Full reports would have shown about 980,000 acres subject to irrigation and 800,000 as having been actually irrigated.

The reports show the number of acres of alfalfa to be 192,535. Number of acres in seeded grasses other than alfalfa, 31,299. Number of acres in natural grasses, 109,518; in fruits, 21,653. Number of acres of all other crops, mostly wheat and potatoes, 330,552. Number of acres irrigated from seepage, 10,968.

The running expenses of the ditches vary greatly, probably averaging about twenty-five cents per acre. The duty of water also varies greatly, according to nature of soil, the average being about one hundred and fifty acres per second-foot.

A large amount of water has gone to waste at different and at long periods during 1897. Especially is this true of the South Platte; the average flow up to this date from November first has been in round numbers four hundred cubic feet, only a small amount of which has been stored in reservoirs.

The precipitation in this division is sufficient to furnish an abundance of water for all the land in the district subject to irrigation; that is, enough water flows into division No. 1 from its watersheds each and every year, if properly stored, if systematically and judiciously distributed, practically and energetically applied, to irrigate every foot of land in the district subject to irrigation.

It should be the emphatic and vigorous policy of Colorado to store and preserve all water, both from snow and rainfall, within the boundaries of the state.

The monthly reports from this office, the annual and weekly reports of the water commissioners, will explain the work of irrigation more in detail.

The water commissioners of this division have been faithful, energetic and efficient in the discharge of their duty. The people of division No. 1 are to be congratulated on having such an able and efficient corps of water commissioners.

In conclusion, it affords me pleasure to express gratitude to you, sir, and to all with whom I have had official relations, for friendly and pleasant associations, prompt attention and assistance.

Very respectfully submitted,

CLARENCE J. CHAPMAN,
Superintendent of Irrigation, Division No. 1.

REMARKS BY COMMISSIONERS, 1897.

Commissioner Armstrong, of district No. 3, reports having had a fair supply of water early in the season but a scarcity after June 17, but that with the reserve in the numerous reservoirs in the district and that obtained from the Laramie river, the crops were easily matured and very satisfactory.

Commissioner Wolaver, of district No. 4, reports a good supply of water for the season, $294^{67}/_{100}$ cubic feet per second for 215 days. By the employment of a deputy for 108 days, at the upper end of the district, Mr. Wolaver was able to take advantage of every rise in the river. Good crops were secured, but numerous ditches needed rating.

L. H. Dickson, of District No. 5, was called out April 19, 1897, and continued at work until November 24, 1897. He reports that all ditches carried more water than ever before and that "the flow was like clockwork," resulting in a splendid crop. Mr. Dickson states that numerous ditches need rating.

Cole Briscoe, of District No. 8, reports that the greater part of his district grew crops without irrigation, and that they were much more abundant than for many years.

WATER DIVISION NO. 1—SOUTH PLATTE DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1897 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
1	137.25	334.50	51,980	20,300	185	----------	225	20,095	1,520	----------	----------
2	256.25	867.00	106,420	17,719	10	7,870	373	31,291	2,785	$ 5,680	$ 6,585
3	----------	----------	195,800	40,000	5,300	20,000	1,200	100,000	----------	----------	----------
4	223.00	----------	65,000	13 400	2,000	1,700	1,500	35,000	2,000	7,000	3,000
5	262 00	464.00	92,020	7,525	2,600	20,210	1,450	60,235	----------	----------	----------
6	362.51	323.00	79,575	12,762	3,523	15,160	1,103	33,378	1,080	1,715	4,594
7	258.75	389 00	131,401	51,461	14,609	3,177	12,572	40,681	2,590	----------	----------
8	271.75	391.00	33,230	8,907	2,416	3,025	1,958	4,063	130	3,300	----------
9	68.25	96.00	5,857	2,336	666	367	112	1,258	863	1,645	1,020
23	577.40	331.40	81,430	----------	----------	79,006	----------	105	----------	----------	----------
*46	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
*47	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
48	56.20	----------	4,370	----------	----------	3,890	----------	----------	----------	----------	----------
64	167.00	421.00	141,400	12 125	----------	24,090	74	4,440	----------	1,850	8,135

*No Report.

COMMISSIONERS' ANNUAL REPORTS, A. D. 1897.

(CONCLUDED.)

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1896 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
*65											
Totals	2,640.36	3,616 90	988,483	186,535	31,309	178,495	20,567	330,546	10,968	$ 21,270	$ 23,334

*No report.

Denver, Colorado, November 28, 1898.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado:

Dear Sir—I have the honor to present the following report as superintendent of irrigation of Water Division No. 1, for the year 1898. Reports from water commissioners are also herewith submitted.

The irrigation season opened with a very light and inadequate supply of snow in the mountains. The deficiency was not fully made up by rains, although heavy rains in the mountains during the summer season greatly increased the flow of water in the principal sources of water supply in my division, especially is this true of the South Platte. Heavy and frequent showers in Platte cañon and the country drained by the Platte river furnished a large amount of flood water and rendered valuable assistance in the irrigation of crops in the several water districts of the Platte valley.

The damage to ditches has been very light; in fact no damage of any consequence has been reported to this office by any of the water commissioners of Division No. 1.

Very little loss has occurred to crops by hail, wind or heavy rain storms. Hail storms visited Boulder, Weld and Larimer counties, but the area of territory covered and seriously damaged was very small, and no total losses to crops were reported from any locality.

The yield of wheat, oats, barley and all small grain crops has been good and in advance of the average for the last ten years. Later crops, such as corn and potatoes, have been cut short in yield to some extent, partly on account of shortage of water, but more on account of the unfitness of the season to such crops. This conclusion is arrived at by comparison of such crops located under reservoirs which furnished ample water for the proper irrigation of corn and potatoes with those situated under ditches where the supply of water was inadequate to the sufficient irrigation of such crops. When it is taken into consideration that the water supply has been less the past season than ever before since any records of the water supply were kept, it is a matter of great surprise that so little loss to crops

of any kind has occurred. Had it not been for the diligence of farmers and superintendents of ditches and greatly facilitated by the painstaking, energetic and experienced corps of water commissioners in this division, the losses to crops would have been enormous. The extreme shortage of water has made it necessarily the duty of this office to permit the liberal exchange of water between ditches; that is, the temporary transfer of water from one ditch to another by the general consent of interested parties.

During the latter part of the season it was found necessary and expedient to alternate the water of the different streams between ditches in order to avoid the waste of water and prevent the loss of gardens and orchards, also to furnish water for cisterns and small ponds for domestic use.

By the above methods of operation, no one was injured and great and irreparable losses prevented. The result must, therefore, be satisfactory to all fair-minded men.

The following order, issued to the water commissioners of District No. 7, or the Clear Creek district, is explanatory of the above idea:

Denver, Colorado, September 28, 1898.

MR. W. N. PALMER,
Water Commissioner District No. 7, Golden, Colorado.

Dear Sir—Having been creditably informed that the orchards and gardens situated under a number of the ditches in your district are being seriously damaged for want of water, I have taken the pains to personally see a number of the officers and stockholders of ditches having senior rights to water from Clear creek, with the idea in view of obtaining their consent to a plan of alternating the water of said streams between the ditches of your district for the purpose of irrigating orchards the gardens dependent upon the various ditches of your district for water for irrigation. All of the parties interested in the distribution of water in your district whom I have been able to see, agree that my plan is a feasible one and the only way to operate that interests of all concerned may be best served. You are therefore respectfully instructed to turn the water of Clear creek at once into the ditch which in your judgment is the most in need of water for orchards and gardens, permitting it to flow therein a sufficient length of time only to allow water consumers to irrigate orchards and gardens, in no case permitting or allowing the water to be used for any other purpose than the irrigation of orchards and gardens or the filling of cisterns for domestic use. You will continue to change the water from one ditch to another agreeable to the plan suggested above until all the ditches have been served with water for purposes above named. In each instance before turning the water into any ditch you are instructed to notify the superintendent of ditch of your intention to so turn the water into his ditch, having a perfect understand-

ing with him as to dates and also the purposes for which the water is to be turned into said ditch. You are further instructed to give your personal and careful supervision to the delivery of water on the above suggested plan. As to the length of time that the water is to remain in each ditch, you will be governed, of course, by the length of ditch and the necessities and general conditions. Please observe carefully the above instructions until further orders from this office. I understand that there is at this date only about fifty cubic feet of water in Clear creek, hence the necessity of keeping the water in one body to avoid waste, is very apparent. I hope by operating it in this manner that you will be able to save all of the orchards and gardens in your district, and I believe that no complaint will come from any source, certainly no fair-minded man will raise any objection to this plan.

Yours respectfully,

C. J. CHAPMAN.

In years of scarcity, quarrels and disputes usually arise between water consumers, ditch superintendents and managers, but serious trouble has not occurred this year, which is a source of credit and satisfaction to all concerned. Some litigation has resulted from methods resorted to by this office on account of shortage of water this year. Said litigation was instituted by parties who objected to the transfer of water from one ditch to another that its duty might be increased without injury to any one concerned. Said parties have never heard of the golden rule, judging by the spirit manifested. They not only want the earth and the fulness thereof, but they want all the water found on the earth's surface, and probably having gained the earth and the water on its surface, they would insist that the air should also be theirs to be dealt out to those who wished to live at so much per breath, in advance. It is due this department to say that its rulings have in every instance been sustained by the State Engineer and by the courts.

Dissatisfaction arises frequently because of unreliable and unofficial rating of flume and measuring weirs in streams and ditches. The appropriation by the legislature for the State Engineer's department has heretofore been entirely inadequate to its needs and demands, and its usefulness and beneficial results correspondingly obstructed. The conditions which effect the flow of water through flumes, weirs, streams and ditches, are continually changing, hence the frequent rating is indispensable to the accurate and satisfactory distribution of water according to priorities and decrees of court.

Better service would be rendered by this office to the people of the division and the interests of all best conserved, and the duty of water in many instances largely increased by placing a larger discretion in the hands of superintendents of irrigation

to be exercised judiciously and carefully in extreme cases and emergencies.

The superintendent should receive a salary commensurate with the work of the office. The salary should be paid by the state instead of by the counties of the several water divisions, thus avoiding uncertainties and annoyances to county officials. Under the present law regulating the salary of superintendents of irrigation, each county of a division is required to pay its pro rata amount of per diem and expenses without reference to services rendered. This situation causes dissatisfaction in counties where very little, and in some instances no services at all are really needed or rendered. Such counties complain, and justly, too, that it is unfair to them to be compelled to pay for services they neither need or get. Of course, under the proposed change, these localities would still come in for a share of the burden, but the same would be regulated by the amount of taxable property in each county, and no cause for complaint would then exist.

I have been unable to get any detailed reports such as I hoped to get, with reference to the operation of reservoirs, hence I can not give any extensive review, in detail, as I hoped to be able to do. The reservoirs of northern Colorado are an important factor to the irrigation system, and have furnished a large per cent. of the water spread on crops during the last season. Fortunately, the conditions were such that reservoirs were generally well filled. Owing to the abundance of water last year, a large amount of water was held over in reservoirs for use in 1898. The early rains and early melting snows were sufficient to enable reservoir companies, in most instances, to fill their reservoirs to their fullest capacity. Had it not been for the duty performed by reservoirs, many thousands of acres of crops would have been almost a total loss, whereas, very little loss of crops on account of insufficient irrigation has occurred in northern Colorado.

I wish here to reiterate, with emphasis, the statement made in my last year's report to the effect that precipitation in this division is sufficient to furnish an abundance of water for all the land situated therein subject to irrigation, that is, enough water flows into Division No. 1, each and every year, if properly stored, if systematically and judiciously distributed, practically and energetically applied, to irrigate every foot of land in this division.

Attention is respectfully called to the following summary, which is only approximately correct:

The number of acres that can be irrigated in this division is 900,000 acres; number of acres irrigated, 680,500. Full reports would have shown about 1,000,000 acres subject to irrigation and 850,000 acres as having been actually irrigated.

Number of acres of alfalfa, 200,000; number of acres in seeded grasses other than alfalfa, 33,000; number of acres in natural grasses, 100,500; number of acres in fruits, 22,000; number of acres in all other crops, mostly wheat and potatoes, 325,000; number of acres irrigated from seepage, 12,000.

The running expenses of ditches and reservoirs vary greatly, probably averaging about twenty cents per acre. The duty of water also varies greatly, depending largely on its economic distribution and its practical and intelligent application. The nature of the soil must also be considered. The average is probably about two hundred acres per second-foot.

All new adjudications of water rights by courts received by me have been duly recorded, a tabulated statement of which will be submitted herewith.

In conclusion I wish to say that each water commissioner and deputy deserves commendation for the efficient and impartial manner in which they have discharged their duties. I desire also to express my gratitude and appreciation of the kindness and assistance extended to me officially by both yourself and Mr. Fellows. It affords me pleasure to express gratitude to all with whom I have had official relations, for prompt attention and pleasant associations.

Very respectfully submitted,

CLARENCE J. CHAPMAN,
Superintendent Division No. 1.

REMARKS BY COMMISSIONERS FOR THE YEAR 1898.

J. L. Armstrong, of District No. 3, ceased to act as commissioner on December 1 for the reason he was not needed. He reports that of the 2,300 cubic feet per second necessary to fill the priorities of his district, he had only 1,658 cubic feet as the maximum for any one day, and 1,400 for eight days. In September he had only 100 feet, and in October only 35 feet. He reports that the reservoirs helped materially, as they were well filled at the beginning of the season. He reports no failure in crops, which I consider remarkable.

J. M. Wolaver, of District No. 4, reports that he was unable to obtain statistics from the ditch superintendents and recommends that a law be passed requiring them to file a report. He reports water scarce; that no crops were lost, but that it required careful handling of the water to accomplish this result.

A. C. Stilwell, of District No. 6, reports that he was able to make what water he had answer all purposes by the people of his district allowing an interchange of water.

W. N. Palmer, of District No. 7, reports a marked shortage of water, fairly good crops, but that some orchards and fruit lands have suffered greatly. He recommends better headgates. Rotation was practiced some in this district and saved considerable fruit.

W. D. Beckwith, of District No. 47, reports scarcity of water but hay crops were saved; he worked eighty-eight days.

E. J. Picard, of District No. 65, a "rain-belt" district, reports that for the year 1897 and 1898 his district has been blessed in the matter of rainfall, and therefore little canal extension or building has been done. He reports also that windmills and reservoirs for the irrigation of small tracts are much in favor, as is also the cultivation of sugar beets. He reports 6,500 acres as irrigated; alfalfa, 1,200 acres; grains, 4,500 acres, and grasses, 1,300 acres.

WATER DIVISION NO. 1—SOUTH PLATTE DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
1	265.00	363.00	36,880	11,265	200	11,880	----------	24,205	800	----------	----------
2	259.00	970.00	*14,681	17,822	80	7,978	378	29,577	30	----------	----------
3	364.16	----------	----------	37,480	----------	13,140	1,258	102,122	4,720	----------	----------
† 4	192.50	302.86	39,700	10,561	2,400	2,710	512	12,111	----------	----------	----------
5	235.00	457.00	9,200	7,525	2,600	2,210	1,450	60,235	----------	----------	----------
6	363.00	222.50	79,575	12,562	3,503	15,110	1,103	33,646	1 080	$ 1,815	$ 4,194
7	259.25	602.00	39,224	20,726	3,675	3,575	6,977	83,046	1,510	----------	----------
8	263.00	253.00	35,994	9,456	2,844	3,071	1,583	4,962	1,085	----------	325
9	137.75	201.00	29,970	7,737	2,965	1,207	3,029	5,118	1,848	3,315	2,090
23	332.75	----------	70,488	----------	----------	67,930	----------	----------	----------	----------	----------
a 46	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
47	194.40	540.00	61,060	----------	990	28,823	----------	91	----------	----------	465

a No report.

† The acreage reported is for only one-half of the ditches of the district.

* Wheat only.

COMMISSIONERS' ANNUAL REPORTS, A. D. 1898.

(CONCLUDED.)

No. of District	Ditches—Length thereof in miles.	Average amount of water carried during season of 1896 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
a 48											
64	125.50	599.00	109,850	14,801		21,041	87	4,889	110		
a 65											
Totals	2,991.31	4,510.36	419,622	139,935	19,257	180,675	16,378	360,102	11,183	$ 4 130	$ 7,074

a No report.

Pueblo, Colorado, February 9, 1898.

HON. JOHN E. FIELD, ESQ.,
State Engineer, Denver, Colorado:

Dear Sir—I submit herewith my report, as superintendent of irrigation of Water Division No. 2, known as "The Arkansas Division," together with reports from various water commissioners comprising this division; three water districts defined by statute, to wit, Nos. 18, 66 and 49, have no water commissioners, and so far as this office is advised, no water decrees, hence I am not in position to give you any information concerning those districts.

This office has experienced much difficulty in obtaining data necessary to make a report, as it was necessary to rely exclusively upon water commissioners in the various districts, and inasmuch as no provision is made for the payment of services of water commissioners rendered in preparing these reports, many of them have hesitated in giving me full information, and such data as they have given me therefore has been gratis. Many of the ditches have declined to give this office information as to the cost of maintaining and operating the ditches; there have been no ratings in any of the districts of this division in 1897 aside from Districts Nos. 14 and 16. The priorities in Water District No. 16 have been readjudicated and new decrees will be entered.

The water supply during the preceding season has been about the same as in former years, but grossly inadequate to supply the demands in any of the districts. The shortage of water was felt more keenly in Districts Nos. 14 and 17, but this was due to the fact that the acreage was much larger in those districts.

The system of reservoirs has been provided along some of the largest canals traversing Districts Nos. 17 and 67, whereby immense quantities of water will be imprisoned, and it is hoped and believed that this reservoir system will, to a great degree, relieve the suffering that has heretofore been experienced by the ranchmen in that locality; and other canals in Districts Nos. 17 and 67 are preparing to construct reservoirs for the storage of water.

Extensive improvements have been made in ditches in this district during the present season; one canal, in particular, having been widened to a width of from sixty to seventy-five feet on the bottom for a distance of forty miles, and giving to it a carrying capacity of six hundred cubic feet of water per second of time.

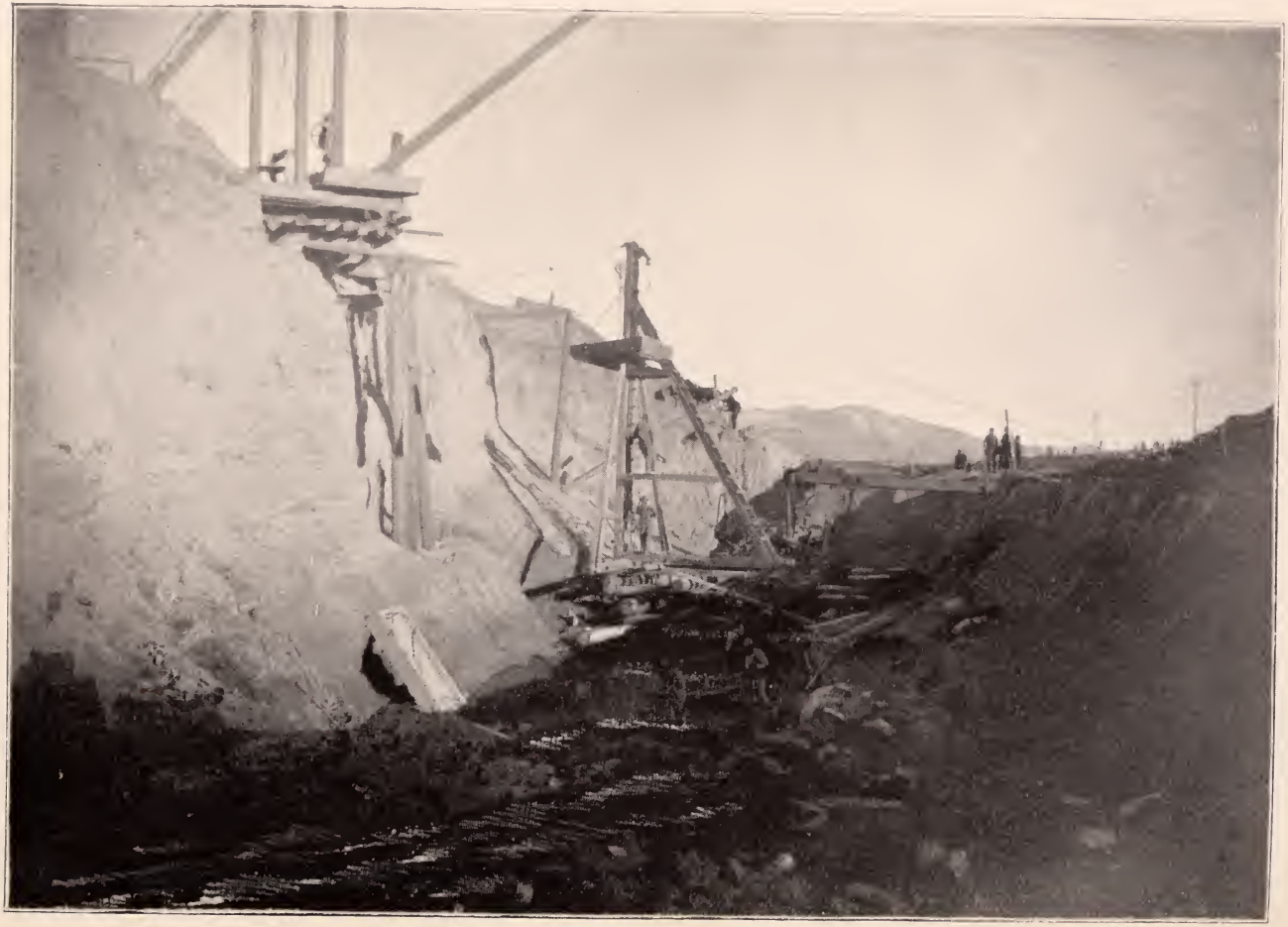
During former seasons, officers having in charge the distribution of water in this division have experienced much difficulty on account of farmers stealing water during dry seasons. This fact caused a great deal of bitterness and fear was entertained that serious trouble would result therefrom. I am glad to say, however, that during the last season we have been practically free from attempts of that nature.

I respectfully call your attention to the following summary, which is only approximately correct: The number of acres actually irrigated in this division is 308,528 acres. Of this acreage, 95,602 acres are alfalfa; 4,169 acres in seeded grass; 65,937 acres in natural grass; 14,981 acres in fruits, and 127,839 acres in miscellaneous crops, consisting chiefly of grain, potatoes, melons, etc.

There are in this division, lying under ditches now in existence, and capable of being irrigated therefrom, about 500,000 acres of land.

Respectfully submitted,

E. R. CHEW.



SITE OF HEADGATE OF PROPOSED TWIN LAKES RESERVOIR OUTLET.

WATER DIVISION NO. 2—ARKANSAS DIVISION.

No. of District	Ditches—Length thereof in miles	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
10	.....	36,250	3,999	463	4,221	180	2,418	.....	.....	.....
11	216.00	18,600	1,140	943	1,726	62	5,940	95	$ 700	.....
12	332.25	12,982	4,201	254	1,265	3,697	5,821	164	1,920	$ 5,019 00
13	25.25	2,289	15	205	1,162	.....	907	130	.....	230 00
14	1,301 50	143,717	29,739	348	10,162	4,606	45,343	1,245	9,871	19,896 00
15	188.50	8,800	3,094	522	1,853	245	2,888	50	.....	1,707 25
16	538.00	32,167	5,957	463	3,785	86	6,000	12	2,600	4,741 50
17	331.50	156,010	19,579	111	8,363	2,340	36,536	.....	8,807	14,847 50
*18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	160.50	37,115	8,508	860	10,080	289	8,690	145	9,850	9,043 00
*49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
67	246.00	138,120	18,380	.....	23,180	1,474	11,455	.....	8,200	13 550 00
Totals	3,317.00	487,050	95,602	4,169	65,937	14,981	125,998	1,841	$41,948 00	$ 69,033 25

* No report.

Pueblo, Colorado, December —, 1898.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado:

Dear Sir—I have the honor, as superintendent or Water Division No. 2, to submit the following official biennial report for the year 1898, together with the reports of the several water commissioners in the following districts, to wit, Nos. 10, 12, 13, 14, 15, 16, 17, 19 and 67. The water division under my superintendency was created by an act of the general assembly of Colorado, approved April 17, 1889. (See acts of that year, page 472.) It embraces "all lands irrigated by water taken from the Arkansas river, the south fork of the Republican river, the Smoky Hill river, and the Dry Cimaron river and the streams draining into said river," and is designated by law as the Arkansas division. It is the largest and most important division of the state, affecting the following counties: Lake, Chaffee, Fremont, Custer, Park, El Paso, Pueblo, Huerfano, Las Animas, Otero, Bent, Prowers, with portions of other counties without adjudicated rights, and is the most resourceful, agricultural and horticultural region of the entire state, embracing in general terms a stretch of country about two hundred and fifty by three hundred miles, of which the rich Arkansas valley is the centre, and embracing within the drainage area, unsurpassed stock ranges and feeding grounds, and containing partially developed stock, farming, gardening, fruit, and melon resources, destined to make this division the most fruitful of the state. It can readily be seen how important such a division is to the material development of the country, and what care and attention to details is required to conduct the irrigating systems therein.

In the course of my official duties, I have come in contact with many conditions which could be bettered by further rules and legislation, relating to various matters connected with the water system of the state, and beg leave to submit the following suggestions:

First—The power conferred by law upon the water superintendent is not sufficient. In the many controversies which necessarily arise, especially in times when water is scarce and in great demand, the superintendent who is conversant with

the whole irrigating system of his division and with its details should be clothed with full power to settle all controversies and disputes relating to the immediate distribution of water, and should be given legal authority, in a summary way, to compel obedience to his decision when made, at least as to all questions relating to temporary water supply and distribution. As to those relating to permanent rights, other tribunals having more time and opportunity to investigate should control. The headgate keepers should especially be compelled to regard the directions of the division superintendent. Greater authority should be given by law at the next session of the legislature, over headgate keepers.

Second—The superintendents should be paid directly by the state, thereby saving the different county officers much uncertainty and annoyance in providing for payment.

Third—It is of the utmost importance that the division superintendents should have access at all times, free of charge to them, to the advice and services of the best legal talent of the state, as these division superintendents constantly have to deal with legal questions of the utmost delicacy and importance, and it is recommended that the attorney general be made the legal adviser for all superintendents of division, the cost thereof to be paid by the state. It is further recommended that the attorney general be required, at the expense of the state, to furnish the several division superintendents with a manual of legal instructions. Such a book would create uniformity in the various divisions, furnish the superintendents ready means of quickly determining rights and often avoid trouble and delay and litigation.

Fourth—When water is scarce there is much trouble and confusion, owing to the shortage of supply and the constant demand, and hence a great temptation on the part of water consumers to procure their supply by unlawful means. At such times the headgate keeper should be required to exercise more diligence and to give bond with sufficient sureties to the superintendent, conditioned for a careful discharge of duty and for the maintenance of a strict guard at all times over headgates.

Fifth—Where water is taken unlawfully, under existing laws and conditions, it is difficult to precisely locate the responsibility so as to hold the person so taking water, liable. I earnestly recommend that it be provided by statute, that in all cases where water has been excluded from any ditch or canal by order of the superintendent of division, and water is thereafter found in such canal or ditch, that the finding of water in the

canal or ditch under such circumstances shall be prima facie evidence that it is there unlawfully and has been unlawfully taken, unless the headgate keeper or owner or manager of such canal or ditch, is able to prove that such water is there by order of the division superintendent, and that under such circumstances, both the canal or ditch owner and the headgate keeper, shall be held liable on such evidence alone, and that penalties for taking water illegally, shall be made sufficiently high to prevent the surreptitious and unlawful taking of water. This evil of disregarding the division superintendent's directions and taking water contrary thereto, is one that should be thoroughly guarded against to ensure a legal, fair and just supply of water at dry times, according to priority. It is useless for the superintendent to direct, unless he is clothed with power to compel immediate obedience to his directions. In dry times crops may be ruined while waiting the slow process of the courts. If the penalties for illegal taking were high, and the presence of water in ditches or canals from which it had been excluded by order of the division superintendent, was made prima facie evidence of unlawful taking, it would, to a large extent, obviate the evil now existing.

Sixth—The authority of water commissioners is often questioned, and this denial of authority frequently leads to serious trouble. To correct this difficulty, I recommend that all water commissioners while on duty should be required to wear some bade of authority to be defined by statute, and that severe penalties be provided for by law against those who unlawfully interfere with such commissioners while engaged in the proper exercise of their official duties.

Seventh—One source of water supply easily within the reach of most farmers has in the past been to a great extent overlooked. I refer to small storage reservoirs constructed by private individuals on their own premises, consisting of a few acres, for irrigation in times of great need. On almost every farm a location can be found upon which to construct a small reservoir, which will hold sufficient water for at least one or two irrigations. Such a source of supply would often save a crop and is within easy reach. In a climate like that of Colorado, where outdoor labor can be done every day in the year, small farmers can, by devoting their spare time to the construction of these small reservoirs, largely increase their annual production. A man, team and scraper, during the spare hours of a single year, can do much in the direction named, and from year to year enlarge the capacity of the reservoir by additional labor. Water can be stored in these reservoirs at flood times,

without any detriment to the general water supply. For the encouragement of such work, it is recommended that laws be enacted specifically exempting from all taxation such improvements.

Eighth—How to make the very best use of all the water of the state, enlarge the area of irrigable lands, and ensure a more perfect and continuous supply for those already under irrigation, is a question worthy of the most careful study of the progressive men of the state, and the expression from time to time of the result of their observation and experience. The vast reservoir systems of the state, and the information gleaned from time to time, from their operations, is doing much to solve this question. The agricultural interests of the state, rapidly developing and keeping pace with the great industries, rests almost entirely on irrigation, and whatever tends to perfect our irrigation system and conserve our water supply, is equal at least in importance with any other enterprise for the development of our resources. Destroy or seriously impair this system, and a deadly blow is given to the prosperity of Colorado; double or quadruple the efficiency of the system, and the productive value of our lands is increased in that proportion. This is a matter of such importance that I earnestly recommend that the legislature create by law either a department of irrigation, or a state board of irrigation, to meet at least semi-annually for the purpose of discussing irrigation problems, and recommending measures to improve the practical workings of the system. Such a department might be composed of the division water superintendents, with reports required from each embodying the results of their observation and experience. By this means the combined experience of practical men could be made public and utilized with great benefit.

Ninth—The State Storage Reservoir at Monument—This is a work of large importance and the benefits derived from it during the past season prove the necessity of others of like kind. At one time during the season this reservoir was about three-fourths full, when the necessity arose for its use. At that stage it was found amply sufficient to supply all the ditch in El Paso county, tributary thereto, for four days' irrigation. After using the supply for that period in a dry time, there yet remained unused about one-fourth of the water. At critical periods even a day's irrigation is often sufficient to save a crop. I recommend the construction by the state of similar reservoirs, from time to time, as rapidly as can be done, until a complete line of state storage reservoirs are established in favorable locations. Funds for such work might be raised by the levy of a slight

irrigation tax on the lands under such reservoir. This tax would very soon be repaid to the taxpayer by the increased certainty the reservoir would afford for crops and the increased production; besides, the existence of such a reservoir would in the district to be irrigated therefrom, at once add to the land, the value of its cost, and it would become a permanent continuous source of annual benefit. This work the state can well afford to continue. Additional state reservoirs should be constructed.

Tenth—The reservoirs completed and being constructed by private enterprise are worthy of mention. Among these are the Twin Lakes reservoir, which is rapidly nearing completion by The Colorado Canal Company. It will become when finished among the most valuable and important improvements. The Great Plains system of storage reservoirs is a splendid work. The available capacity is estimated at 264,827.60 acre feet, or 11,525,702,948 cubic feet, and the unavailable capacity is 82,192 acre feet, or 3,570,283,520 cubic feet. These enormous reservoirs are fed by the "Kicking Bird" canal, having a capacity of one thousand cubic feet per second of time. The system is probably the largest in the world, and when fully completed there will be a chain of inland seas, holding in reserve immense bodies of water beneficial not only for direct irrigation, but necessarily tending by evaporation to increase moisture and induce rain fall. These reservoirs and the ditch system connected therewith also furnish an increased supply of water for stock. The water seepage along the ditches is ample for the maintenance of lines of fruit or ornamental trees along the laterals and around the reservoirs, and when this is done it will add not only additionally to production but as well to the beauty of the country. The value and importance of such systems, adding as they must so much to the wealth, production, and beauty of the state, can not be over estimated. I submit that such works should be especially favored in legislation and fostered by the state.

Eleventh—Water supply by means of artesian wells has not yet received the attention which its importance demands. Such wells as far as tested afford an abundant supply of perfectly pure water for domestic uses, and in many places along the valleys and plains could be utilized not only for domestic and stock supply, but as well for small gardening and horticultural purposes. Wells of this character are found at Florence, Fowler, La Junta, Rocky Ford, Lamar and other places along the Arkansas valley. Many of these wells are highly medicinal. At one, Clark's magnetic, Pueblo, a large hotel has been constructed and the water used extensively for baths, and patients

by the hundred receive successful treatment. At the Grand hotel, same city, there is a fine flowing well of lithia water. It has a depth of 1,400 feet. At the Faris house water is reached at about the same depth, and flows continuously, a transparent stream, slightly iron, of palatable quality. As these wells are found at widely different localities in Pueblo, it is believed that underlying the entire city and the region adjoining is a body of water which may be reached at from one thousand four hundred to two thousand feet. There is every reason to conclude that about the whole of the Arkansas valley, and especially from Cañon City down, and the surrounding plains country, will yield a full supply of artesian water at an accessible depth. On the Senator Teller property, a few miles from Pueblo, is a flowing well carrying a very large body of water. These conditions indicate the presence of a water supply, so far but little known generally, and only slightly utilized, which by improved methods might be made valuable additions to the water wealth of this division. I deem the subject of sufficient importance to direct your attention to it, hoping that the region which might be benefited by such conditions may be aroused to make some special effort, in some practical way, to develop this subterranean source of supply.

Twelfth—Approximately stated, we have in this division a total of 553,461 acres of land, which either are or can be easily placed under irrigation, and in alfalfa 119,781 acres. Estimating the alfalfa crop at an average of five tons per acre, there would be 598,905 tons, and at an average price of $2.50 per ton, we have the enormous value of $1,497,266 in this product alone in this water division. In addition, there is in this division 20,713 acres in fruit of various kinds and 118,454 acres of grain land. I have not the data to enable me to give the value of these products, but it is very large. When the enormous value of the combined product of this district is considered, the importance of irrigation is more apparent, and when it is remembered that all this great result is worked out through thousands of ditches running in all directions, with hundreds of conflicting interests arising, the amount, importance and delicacy of the labor of the division superintendent and his assistants can be more easily appreciated. Such a vast, intricate and important work calls for the very best service and perfect harmony and coöperation among officials, from the highest to the lowest.

Thirteenth—Closely connected with the work entrusted to me is the stock interests of my division. I am not able to give details on this subject. As the years pass there is a steady

increase in the number of sheep and cattle brought into the Arkansas valley to be fed and fattened in the winter and shipped out in spring and early summer. The valley is rapidly becoming one of the largest and most important breeding grounds on the continent, and the continuance, success and profit of this large and growing industry is largely dependent on a well maintained and wisely managed irrigation system. From Pueblo to Holly is especially an important feeding ground, and every department of the state should lend its utmost aid in behalf of increased and better irrigation. It should be the particular care of the legislature to so amend and add to the irrigation laws as to make a perfect system.

Fourteenth—Winter Irrigation—This is comparatively a new project, but the success so far attending it shows its importance. The fact that winter irrigation drains heavily upon the resources of our supply systems proves that it is growing in favor.

Fifteenth—Over-Irrigation—Too much can not be said on this subject. It is quite as easy to have too much as too little water. The habit, too often practiced, of inundating land continuously is a bad one. It is ruinous to the soil as well as to crops. Our farmers are learning, and many to their sorrow have ascertained that land can be ruined by too much irrigation. All farmers and irrigators are cautioned to be careful on this point.

Sixteenth—Irrigation Associations—I feel compelled to earnestly recommend some means whereby we may all profit by the observation and experience of others. How can it be best done? In many of the older states, county agricultural societies, by means of annual exhibits, bring the people together, where they can for several days renew acquaintance, exchange experiences and interchange views and opinions, and thus all profit by the knowledge of each. Irrigation is comparatively a new subject. Crops and lands and water effects are to be studied, mistakes avoided, and successful experiments followed. Such an interchange of opinion each year would not only stimulate inquiry and a study of better methods, but be intensely valuable. I know of no better way to do this than by the formation of county or neighborhood irrigation associations, and through you I recommend some effort in that direction.

Seventeenth—District No. Eleven—It is a matter of great regret that district number eleven is represented by an official who takes so little interest in his duties as to omit his report. I regret to say the incumbent in that district is entirely insubordinate.

Eighteenth—The Melon Product—No report would be complete that did not mention the melon crop. Although the extreme heat did great damage, yet, over $200,000 was distributed in the Arkansas valley amongst the melon growers. This industry has of late years increased with great rapidity, attracting the attention of the great eastern seaboard cities, where a large portion of the crop is marketed. The attention of the country was first attracted to this product by enterprising citizens of the valley at and near Rocky Ford, prominent among whom is Senator Swink. The producers there organized the melon-growers association for the better handling of the immense crop, and it promises good results. There is no reason why melons may not be produced in profitable quantities elsewhere in the Arkansas valley, and the small storage reservoirs elsewhere recommended would be a great assistance to this industry.

Nineteenth—Sugar Beets—This subject is recently attracting wide attention. The close relations existing between all water officials and producers requires that not only the superintendents but as well all subordinate officers should keep well informed of the needs of the producer, and the extent of new industries, so as to provide the best possible water service. The culture of beets for sugar is likely to become an important industry. The consumption of sugar has increased from 28.9 pounds per capita in 1867 to 62.7 per capita in 1896. When the annual increase of population is considered, it shows what an enormous sugar consumption is required in the United States, and how important it is to this state and especially to the Arkansas division that the best possible water supply and distribution should be maintained to encourage this production. It is estimated that lands under the Bessemer ditch alone can easily supply a factory of five hundred tons per day, and at least a dozen of such plants could be well supported along the Arkansas before reaching Kansas. A comparison of tests as to the quality for sugar has proven that sugar beets from near Pueblo, under the Bessemer ditch, are the highest, as compared with Nebraska, Utah, New Mexico, Wisconsin, Michigan, Illinois, Indiana and Ohio. Beets of equal quality can be raised any place in the valley. As sugar production is a source of large profit to producers, it is reasonable to believe that in the very near future large sugar factories will be established in this division and perhaps elsewhere in the state.

Twentieth—Statistics—I have experienced great difficulty in gathering statistics. Many producers seem to fear that statistical information is in some way to be used as a basis for taxa-

tion and decline to give the results of their operations. In the development of a state, statistics are important as indicating resources, progress and improvement, and I suggest that some means be devised to make this branch more efficient. Perhaps it could be well done by means of the department of irrigation elsewhere suggested. The water forces, if well systematized and handled, might become a very valuable adjunct of the state government, in gathering statistics. If these officers were furnished with blanks by the state, and required to visit in person a certain number of producers in their respective divisions and gather information to be preserved on such blanks, as to the source of water supply, its quantity, the best means of increasing it, crops, rainfall and such matters, such reports would furnish very valuable information annually not otherwise obtainable. This work needs to be systematized and directed from headquarters.

Twenty-first—General Conditions—The wheat crop in Districts Nos. 17 and 67 was this year exceptionally good, the yield in some instances reaching fifty-six bushels per acre. Fruit of all kinds made a fair crop. Otero county is entitled to special mention for the quality and value of her prune crops. That county as a prune producer is entitled to first rank. Many new prune orchards are being planted throughout the valley. During the fall, the state horticultural society made an exhibit at the Mineral palace, Pueblo, which in every respect was a great credit to the entire state and especially to the counties of this division. The quality and variety of the fruit exhibited, demonstrates that fruit culture in the Arkansas valley may be carried on with profit. Apples, pears, peaches, prunes and all varieties of small fruits do well. The orchards near Cañon City are worthy of particular consideration. Much attention in that locality has been devoted to fruit, especially apples. Along the entire valley the horticulturists are looking anxiously for improved methods in irrigation and requiring the best that can be done.

The canning business is assuming proportions. At Pueblo, The Meeker Pickling and Canning Company in the busy season employs about fifty to seventy-five hands, caring for the product handled in their business. They do a general pickling and canning business, using cucumbers, tomatoes, cauliflower, beans, onions and cabbage. They expended last year, the first in business, some fifteen thousand dollars, and expect next year to more than double it, and increase as rapidly as products can be had. This institution is ready to handle every pound of vegetables of the kind which can be brought to the factory, especially

tomatoes. Tomato raising is destined to become an important and profitable industry in this division. The proprietors of The Meeker Pickling and Canning Company estimate the value of an average tomato crop at $80 to $90 per acre, gross, and cucumbers and cabbage equally as large. It is well known that Colorado imports more than half the tomatoes used in the state. When this supply is raised at home, it will become an immense production. The Cañon City Cider and Pickling Company is located at Cañon City and is doing an immense business, even larger than the Pueblo Company and is making for itself an enviable reputation. There are large canning factories at La Junta and Rocky Ford, of a capacity of twenty thousand cans each per day and in the canning season are kept busy. With all the foregoing increasing productions, the water supply will be taxed to its utmost capacity. In view of these conditions, the duty of the utmost exertion to increase and improve our water system can not be too strongly urged.

Owing to extreme heat, the season from July 4 was the most trying in the history of this valley, and many crops seriously suffered. In the absence of exact data, it is safe to say that the crops of this division this year will be approximately within these figures:

Wheat, 20 to 40 bushels per acre.
Oats, 25 to 50 bushels per acre.
Corn, 20 to 50 bushels per acre.
Melons, 120 crates per acre.
Onions, 20,000 pounds per acre.
Sugar beets, 20 to 40 tons per acre.
Cow beets, 20 to 40 tons per acre.

This office is supplied with only two copies of the biennial report of the State Engineer. Such a condition is to be regretted. Coming into service with that general knowledge which many years of close observation of our irrigation conditions would afford, I yet needed sources of accurate information and data of the conditions of the division and of other localities to enable me to better discharge my duties. You, better than those who have given less thought to the subject, know how important it is that the division superintendent should be thoroughly informed, not only on the general subject of irrigation, but on the conditions of his particular district. The biennial reports of the State Engineer embracing observations throughout the state should be in the hands of every superintendent and the property of the office. A new superintendent

coming into office often without information as to the ditches, headgates, source and quantity of water supply, must spend at least half of his first term in learning conditions. It is therefore necessary that provision be made either by rules from your office, or by law, for a more full and complete history of the various ditches, the priority of rights, the flow of water, location of headgates, plots of ditches, and other like information, to be the property of the state and kept in his office and open to public inspection. The office of division superintendent in its relation to the people, and the importance of the interests involved, is the equal of that of the most important county official. The law should be so made as to require the county which the superintendent selects as his headquarters, to furnish him not only with an office, but one properly equipped with furniture, maps, etc., to enable him to discharge his duties. This office, wherever practical, should be at the court house, its records and files public property. In this manner a system will gradually develop which will afford every citizen an opportunity for information relating to one of the most important systems in county and state administration. Any citizen can visit the office of the county recorder and ascertain everything relating to titles and liens and priorities, the clerk's office and become informed about judgments, executions, etc.; why not give the division superintendent the same opportunity as to ditches and acequias with an office, maps, records, plats, and office facilities equal to any other? I earnestly suggest that you call the attention of the executive to this subject.

I gratefully acknowledge the courtesy and faithful coöperation of all the subordinate officers of this division, except in district eleven. Among these there has been continuous harmony, good feeling and coöperation throughout the year. I tender to your office my highest appreciation for numerous courtesies and attentions.

The officers who have been on duty during the past year in the various districts are as follows:

District No. 10. T. B. Pyles, Colorado Springs.
District No. 11. R. Deveroux, Salida.
District No. 12. J. A. Truelove, Salida.
District No. 13. Emil Vahldick, Silver Cliff.
District No. 14. C. W. Reece, Pueblo.
District No. 15. George D. Scott, Pueblo.
District No. 16. T. E. Griffen, Walsenburg.

District No. 17. S. W. Cressy, Rocky Ford.
District No. 19. Felix Cordova, Hoehne.
District No. 67. J. B. Traxler, Lamar.

Wishing for the water divisions within which my duties have been performed, future prosperity, and with highest respect for yourself, I respectfully submit this my annual report.

E. R. CHEW,
Superintendent, Division No. 2.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
10	129.00	201.00	34,200	4,368	528	4,701	205	2,746			$ 1,550 00
*11											
12	213.37	395 00	9,301	4,051	189	1,758	4,481	4,076	84	$ 3,975 00	6,900 00
13	154.50	278.50	17,044	503	1,244	8,817		6,480			629 00
14	298.50	806.00	133,727	29,843	313	8,282	4,879	45,359	1,125	9,145 50	18,263 50
15	182.00		11,230	3,245	531	1,556	211	2,375		520 00	2,648 00
16	430.50	758.30	35,287	7,564	954	128	6,232				5,563 00
17	351.50	1,076.00	135,810	42,614	161	3,197	2,533	34,487		8,140 00	8,620 50
*18											
19	215.34	306.30	36,966	6,873	254	2,638	392	8,267	255	350 00	11,559 00
*66											
67	251.00	416.00	139,895	19,720		22,460	1,984	14,665	40	11,675 00	11,620 00
Totals	2,226.00	4,237.00	553,461	119,781	4,174	53,537	20,713	118,454	1,504	$33,805 50	$ 55,733 00

*No report.

Hooper, Colorado, January 23, 1898.

HON. J. E. FIELD,

State Engineer, Denver, Colorado:

My Dear Sir—I have the honor to submit the following report from Water Division No. 3 for season of 1897:

Water Division No. 3 includes all the water districts watered from the Rio Grande river and its tributaries. The division embraces Water Districts Nos. 20, 21, 22, 24, 25, 26, 27 and 35, in the counties of Costilla, Saguache, Rio Grande, Mineral and Conejos.

Water District No. 20, M. D. Blakey, commissioner, Monte Vista, Colorado.

This is the largest district in Division No. 3, embracing all the land irrigated from the head waters of the Rio Grande river to the mouth of the Conejos, also Rock creek and San Francisco creek. It is from the Rio Grande river that all the large and principal canals of the famous San Luis valley get their supply of water.

The lands in this district are mostly sub-irrigating, which makes a great saving of water as compared with lands which must be flooded. There are hundreds of artesian wells in the district, which help, in a measure, to hold the sub-irrigation up after its having been brought up by the ditches. Will say, however, that we are not believers in artesian water irrigation, as our experience here is that artesian water makes the land hard and takes all the substance out of it.

A great deal of credit is due Mr. Blakey for the able way in which he has handled this district. While the water supply was above the average this season, there was only a small portion of the irrigating season that the water in the streams would supply the appropriations, Mr. Blakey did the work without the aid of deputies, irrigated the most land and raised the largest crops ever raised in the district.

District No. 21, David Martinez, commissioner, Capulin, Colorado.

This district consists of all lands irrigated from ditches or canals taking water from the Alamosa and La Jara creeks and

their tributaries. This district is better adapted for raising alfalfa and different grasses than No. 20; however, there is a large amount of grain, peas and potatoes raised. Mr. Martinez reports as having sufficient water during the season of 1897, and little, if any, difficulty with water consumers.

District No. 22, John C. Dalton, commissioner, Manassa, Colorado.

District No. 22 consists of all lands irrigated from the Conejos river and its tributaries. Mr. Dalton has run an average of eight hundred and fifty-nine cubic feet of water per second of time, which was sufficient to supply the demand. However, the crop acreage is increasing very fast in this district, and unless some provisions are made for storing water the time will soon come when it will be impossible to supply the demand.

District No. 24, J. P. Sachez, commissioner, San Luis, Colorado.

Mr. Sanchez reports there being more water in his district than any season since 1893. His services were required only twenty-one days during the entire season.

District No. 25, George Neidthardt, commissioner, Mirage, Colorado.

While there is not so much crop irrigated in this district, it is one of the most tedious to handle in Division No. 3. The water is taken from San Luis creek and its several little tributaries for miles along the foot hills. There was more than the usual amount of water in the little creeks this season, but at no time in any of the streams was there enough water to supply the appropriation, with more water than usual. Mr. Neidthardt reports more trouble with consumers than usual. Early in the spring these little streams have an over abundance of water, which, if held back by reservoirs, would irrigate three times the land they now do.

District No. 26, C. A. Potts, commissioner, Saguache, Colorado.

This district consists of all lands irrigated from Saguache creek and its tributaries. No. 26 has one hundred and seventy-five miles of ditch. There is at no time water enough in this district to supply the appropriation or demand. The state reservoir, located in this district, is absolutely of no benefit to the consumers, while if properly located, would save thousands of acres of crops each year. It is to the credit of Mr. Potts to say that he handled the entire district without help. He has held his present position five years, and while it is impossible to sat-

isfy water consumers without water, he has done remarkably well.

District No. 27, Mark Biedell, commissioner, Del Norte, Colorado.

District No. 27 consists of lands watered by Canero and La Garita creeks. This is principally a hay country, and by running water almost the year round we have very little trouble in this district.

District No. 35.

No water commissioner has been appointed, no priorities have been adjudicated, and we have had no occasion to visit this district.

I was called out on the twenty-ninth day of March and was employed two hundred and fifteen days in field and office. Having more than the usual amount of water during the season, I had comparatively little trouble. The only thing of importance was the transferring of water rights from one point of diversion to another, the question being as to whether or not the rights of others were injured by the change. This is a very difficult thing to determine in most cases. While I have no particular recommendations to make, it seems that there should be a law defining more clearly what should be considered an injury in such cases.

I would recommend that the legislature, in their experiments in promoting the system of irrigation, should pay more particular attention to reservoirs. It is my opinion that had the money spent for artesian well experiments in Division No. 3, been spent on reservoirs, our irrigation system would be far in advance of the present one. I am, sir,

Yours very truly,

WESLEY STALEY,
Superintendent Water Division No. 3.

COMMISSIONERS' REPORTS, A. D. 1898.

WATER DIVISION NO. 3 RIO GRANDE DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
20	305.50	1,423.30	366,084	2,828	792	88,710		162,229	2,250		
21	172.65	493.50	52 058	7,760	380	18,273		13,516	835		
22	330.75	859.00	106,000	1,225		14 590		15 975			
24	34.75	146.00	6,511	61	15	952		5,173			
25	237.55	900.37	44,998	240	14	43,231		1,923			
26	29.50	253.50	10,650	1,260		7,520		3,380			
27	44.00	8.00	7 700	200		4,140	6	240	2,000		
*35											
Totals	654.70	4,093.00	594,081	13,574	1,201	177,416	6	202,433	5,085		

* No report.

November 9.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado.

Dear Sir—I have the honor herewith to hand you my report as superintendent of irrigation of Water Division No. 3, known as the Rio Grande division.

I qualified as superintendent of irrigation of this district of the water divisions of the state, and received from my predecessor the books and records of the office on March 20, 1897. I was immediately called into service by the water consumers of my division and have answered all calls up to the present time. The water supply in the larger portion of the district has been unexcelled in abundance and extent during the last two years past.

Copious rains have at numerous times fallen, which, with plenty of snow in the surrounding mountains, have given a superabundance of water to most of the rivers and streams, which supply the ditches.

The increase in the average rainfall throughout the district greatly assisted the growth of crops, and lessened somewhat at times the necessity of irrigation. The natural tendency of the soil to sub-irrigate, its adaptability to hold moisture, has enabled us to extend our ditches over a much larger area, and the acreage of crops grown is thereby largely increased, with remarkable advancement in the yield per acre.

Occasionally, in certain sections, during the dry seasons I would have complaint of the scarcity of water, but in the main the supply was adequate for agricultural purposes, and for the successful growth of natural hay.

At the commencement of my administration I noticed that there was an apparent effort to increase and improve ditches and the acquirements for facilitating in the apportionment of the water. Since that time ditches have been extended, improved and repaired very extensively throughout the entire division, and at the present time much work is being done along this line, in preparation for the coming season of irrigation.

During my administration, we have also had headgates put in all the ditches, and in most of them measuring boxes. These

acquisitions, we find, have an indispensable value, both for convenience and the economic use of water. These measuring boxes are secured by lock and key, and the keys are under the control of the respective commissioners of the various districts in the division, who are then able to ascertain the exact amount of water used by the consumers from each ditch in their district.

Since the commencement of my administration we have had considerable discussion as to the value of rating flumes. We have, at this time, secured these rating flumes for most of the large ditches of the division, and arrangements have been made for their more extensive use, as we are convinced that their use can not be over-estimated, and the expense of erection is nominal.

In talking with the various water commissioners of the division, they strongly urge the continued use, the advancement and improvement now manifested in the headgate, measuring box, and rating flume, by the ditch owners, in each district, until we have each ditch in the division supplied with these essential acquisitions for their perfection in the successful apportionment, distribution and use of water.

In this division there are eight districts, as follows:

Water District No. 20, Richard Blakey, commissioner, Alamosa, Colorado.

Water District No. 21, David Martinez, commissioner, Capulin, Colorado.

Water District No. 22, John C. Dalton, commissioner, Manassa, Colorado,

Water District No. 24, Pablo Sanchez, commissioner, San Pablo, Colorado.

Water District No. 25, George Neidhart, commissioner, Mirage, Colorado,

Water District No. 26, Argo Taylor, commissioner, Saguache, Colorado.

Water District No. 27, Mark Biedell, commissioner, Del Norte, Colorado.

Water District No. 35 (without a commissioner).

It affords me pleasure to say that each of these commissioners have performed their duties in an impartial and fair manner, satisfactory to the water consumers in their respective districts, and it is gratifying to me to know that no complaint has been made by the users of water against the methods followed by these commissioners in the discharge of their duties.

And in none of my visits to their respective districts could I find anything to indicate that theirs had not been an administration of ability and fairness, worthy of my highest praise. I wish to thank these gentlemen for the prompt compliance with which they met my every request, and for the excellent judgment manifested in the performance of the difficult and arduous duties which devolved upon them.

In former years when it was feared that the supply of water given by the rivers and streams would not be sufficient to meet the increasing demands of irrigation, needed for the increase in cultivation, five reservoirs were constructed in the division, to be used for the storage of water in case of shortage in the accessible supply obtainable from the rivers and streams.

These reservoirs I have never had occasion to visit in my official capacity, as I am glad to report the natural supply has been, so far, adequate, and there has been no necessity for these reservoirs to be utilized during my administration.

One of these, the Saguache reservoir, is the property of the state, and upon two occasions I had the water turned into this reservoir, and found that it was absolutely a failure, and in a short time the water had entirely leaked out. Now, while this reservoir proved a futile and expensive failure in the way of an experiment, I do not want to discourage by impression, or opinion, a further attempt in this line, as there is no doubt but what a place could be secured where reservoirs could be built and water stored with success in ample quantity to meet the shortage, caused by dry seasons or more extensive use.

In conclusion, I, indeed, should deem this report incomplete, were I not to state that in our division many people are making homes, the acreage under cultivation is increasing rapidly from year to year, and the enlargement and extension of the ditches is being accomplished, and it is our intention in the future to have a better, more adequate and extensive system of irrigation.

I desire to thank you for the many kind favors that you officially have extended to me, and beg to remain,

Yours respectfully,

WESLEY STALEY,
Superintendent of Irrigation, Water Division No. 3.

COMMISSIONERS' ANNUAL REPORTS, A. D. 1898.

WATER DIVISION NO. 3—RIO GRANDE DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated there from	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
20	279 50	1,083.50	259,780	3,135	180	15,809	54	115,657			
21	168 00	971.50	53,301	1,145		19,009		8,450	530		
*22											
*24											
25	237 55	1,046.74	53,778	342	20	50,826	5	1,830			
26	132 25	243.50	23,741	1,419		16,905		1,533			
*27											
*35											
Totals	917.30	12,345.24	390,600	6,041	200	102,549	59	127,470	530		

*No report.

Mancos, Colorado, January 30, 1898.

HON. JOHN E. FIELD,

State Engineer, Denver, Colorado.

Dear Sir—I mail you report for 1897, which is necessarily incomplete. First, because my services were not required on the Dolores or lands irrigated from its tributaries, and second, because I was never before requested by engineer to make report, and having no superintendent of irrigation in this division I was having a "soft" thing so far as reports were concerned. I will prepare for it this year, however, if I hold my position.

You will see by report that some of the numbers are omitted, but that is unavoidable as they are only lateral owners and owners of extensions of ditches named.

You will also see, that this report is approximate, but being well acquainted with ditches and land over which they flow in Mancos district—having served three years as water commissioner—I think I am not very far wrong.

Hoping that this will be satisfactory, I remain,

Very truly yours,

H. M. BARBER.

COMMISSIONERS' REPORTS, A. D. 1897 AND 1898.

WATER DIVISION NO. 4—SOUTHWESTERN DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1897-8 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
34	85.00	56.00	7,180	2,127	.....	780	83	3,053	189	.....	$ 815
33	72.50	153.50	5,800	501	728	127	¼	3,026	.....	.....	1,148
31	157.00	121.50	14,704	2,992	733	262	84	2,116	178	.....	1,720

NOTE—But one report was received from Division No 4 in 1897, there being no superintendent for the division. (See letter of commissioner ante.)

Grand Junction, Colorado, December 16, 1897.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado.

Dear Sir—I have the honor to submit herewith the report of the water commissioners, together with my report, for the year 1897.

In this division there are nineteen water districts; of these there are ten districts, namely, Nos. 28, 37, 38, 39, 40, 41, 42, 43, 61 and 68, having water commissioners in active service during the irrigation season.

District No. 28, C. E. McAllister, water commissioner, is using the rotation system of distributing water with considerable success. There are but few rating flumes or weirs in this district, the ditches, nearly all of them, being quite small. He was called out on May 1 and was off duty for the season on July 15. There are no reservoirs of any magnitude in this district. No tabulated report received to this date.

District No. 37, Andrew Kallquist, commissioner, reports being on duty six days from fourteenth to twentieth of May. There are no reservoirs completed for irrigation purposes in this district. The best location for one is at the head of Gypsum creek, where a dam ten feet high and one hundred feet long will hold one hundred and seventy-five acre feet of water. Snow water from adjacent extensive water sheds would, each spring, fill it many times over. The site is claimed by R. E. Chatfield and Frank Hand. Smaller reservoirs are located and partly constructed on Milk, Muddy, Alkali, and Castle creeks. Mr. Kallquist, in his opinion regarding the impounding of water in the mountain regions, writes as follows: "The best way to store water in the high mountains in this locality, would be to turn the head springs of streams into ditches with steep grades and from them let it spread and freeze in the timber and on the high mesa lands. Here opportunities exist for covering hundreds of acres of wooded lands with several feet of ice during the fall and winter and with very small outlay. In the irrigating season the streams, from this source, would produce a steady flow." There are but few rating flumes and many of the ditches are wanting in this respect. No tabulated report received.

G. W. Hull, water commissioner of No. 38, reports few rating flumes in that district and those not in good repair, but reports that the users of water in that district are now demanding better headgates and rating flumes, and very soon the work of putting in suitable measuring devices will begin. Some difficulty arose in the district over the rights of Priority No. 93, in West Sopris creek. Appeal was made from a decision and action of the water commissioner to this office. After visiting the locality and examining into the matter carefully, the trouble was settled amicably. I would suggest, that there issue from the office of the irrigation department a pamphlet, addressed to the water commissioners. Have it in the light of the late court decisions, contain general instructions for their information. Under date of September 29, he says: "I inclose to you under separate cover my report for 1897, as near correct as possible, with ditches itemized. There are in this district, also, about eight hundred acres of alfalfa, three hundred of timothy, and six hundred acres of other crops. I could not obtain the names of the ditches under which these crops grow, as they are not adjudicated and appear to have no names. There has been no trouble of note in this district this season except on Cattle creek. Crops are extra good in all localities."

F. D. Webster, commissioner of No. 39, reports that the irrigation season opened June 6 and closed October 1, having been on duty forty-five days. (The tabulated report will probably reach you some time in January. Mr. Webster is sick and in Denver for treatment. I think this a good cause for delay.) The measurements of water in the ditches are made by means of rating flumes and many of these are not in good repair.

J. C. Hart, commissioner, District No. 40, reports that he was called out on June 25, and that though he did duty later, the season practically closed on October 1. No. 40 is one of the largest and most important districts in this division, there being sixty-seven reservoirs and a large surface of country, which, being drained by numerous creeks and streams, furnish irrigation for a large and growing population. His instructive letter, dated November 23, will in a measure explain the great difficulty in properly regulating headgates when interests represented by impounded water and natural flow are to be subserved. He says: "The report includes but a few over one-half of the ditches in the district. Upon those where my services were not called for to distribute water, I have not reported. They are principally the ditches taking their supply of water from the North Fork river, and for which there has not yet been any adjudication of water rights, except for three ditches.

The new canals, viz., the Fire Mountain, the Overland, the Stewart, now under construction, that will take their supply of water from the North river, will necessitate the adjudication of rights and the services of a water commissioner next season. In regard to the reservoirs, the location is high up in the mountains. The dams are built directly across the streams in which the natural flow of water was long ago appropriated by the ditches in the valley below. Every lake, park and little depression through which any water passes is being dammed up and converted into a storage reservoir. You can not imagine their complication and the amount of work that is required of a water commissioner to turn out and distribute, to the owners, this stored water and at all times and under all conditions to keep them adjusted through the irrigation season, so that the natural flow of water will pass through them without the loss of a drop of the stored water and at the same time do justice to the appropriators of the natural flow. The season opened on June 17 by a call from McNeil ditch, on McNeil creek, in the eastern part of the district, about thirty-five miles from Eckert, in the center of the district where I live. Upon my return from McNeil creek, on the twenty-fifth of June, I found the following very urgent calls awaiting me. Calls from Peterson, Carr and Barrow ditch priority Nos. 1, 3 and 6 for services on Leroux creek. Notice from Currant Creek Ditch Company, priority No. 2, on Leroux creek, to adjust all reservoirs on Leroux creek for the natural flow of water to pass through them. Call from Big Fall, Stillwater and Fogg ditches on Surface creek. Call from Sandstone Bluff ditch on Ward creek. Notice from priorities Nos. 8, 9 and 14, on Tongue creek system, to adjust the reservoirs of The Surface Creek Ditch and Reservoir Company, situate on Ward, Kiser and Cottonwood creeks, to allow the natural flow of water out of them, the same to be distributed according to decretal order to ditches on Tongue creek. Notice from The Surface Creek Ditch and Reservoir Company to turn out of their reservoir, on the twenty-ninth of June, 38.50 feet of water, the same to be turned past the ditches taking water from Ward and Kiser creeks and delivered through the company's ditch into Surface creek, thence distributed to ditches according to the amount of shares owned by each. Notice from priorities Nos, 1, 2, 3, 4, 5, 6 and 9, on Surface creek, to adjust the headgates of all reservoirs on the tributaries of Surface creek, to allow the natural flow of water to pass out, and down the creek for the use of prior appropriators. The next day was about a repetition from different parties in different localities. For instance, on July 17, I was notified to turn out of Park reservoir four feet of water of the Settle and

Cook ditches subject to order. Two feet out of Park reservoir for Horseshoe ditch for seven days. Two and sixty-five hundredths feet out of Park reservoir for Alfalfa ditch for three days. Three and fifty hundredths feet out of Twin Lake reservoir for Shepherd ditch for five days. Two feet out of same reservoir for Alfala ditch for three days. One and five-tenths feet out of Upper Twin Lake reservoir for Shepherd ditch. Seventy-five hundredths feet out of Weir Park reservoir for Gumrey ditch for three days. One and thirty-two hundredths feet out of Greenback reservoir for Butte ditch subject to order. Two and sixty-five hundredths feet out of Military Park reservoir, the same to pass through the Park reservoir, thence to the Forest ditch. One and fifty hundredths feet out of Trout Lake reservoir for Giddings ditch, one day run. This was on Surface creek. There were numerous other calls and demands for water upon my assistance in different parts of the district. The Surface Creek Ditch and Reservoir Company on the same day were running 29.74 feet out of their reservoirs on Ward and Kiser creeks. I kept three trained assistants through June, July and August and three specials, besides a lot of work donated by water users themselves. Our greatest trouble was with the loss, by evaporation and seepage, from the stored water, from the reservoirs to the point of diversion, ranging in distance of from fifteen to thirty-five miles. In this matter we were very closely watched and followed up by the appropriators of the natural flow of the streams, as well as by the owners of the stored water, and the matter became a very serious one indeed. Hot discussions were very frequent between all parties. The conditions of the weather and the amount of water being conveyed had so much effect upon the matter of shrinkage that we could arrive at no established rule and abandoned that proposition, especially on Leroux creek, where there was often only three feet of stored water and never more than six feet turned into the creek at one time. On Surface and Tongue creek we had a very well established rule, and which gave very good satisfaction, of twenty to twenty-five per cent. loss to lower Cedar line, and from thence down the creeks a loss of from one to 3.5 per cent. per mile. For several days prior to July 7, there was such a great shortage of water in the Butte and Fogg ditches on lower Surface creek, we went to work to find out where the loss was, and by very painstaking measurements found we had a total flow of 75.38 feet at lower Cedar line, out of which we were only able to realize in ditches 63.25 feet, a loss of 12.13 feet of water per second of time in a distance of 8.25 miles. The loss to Leroux creek water users is equally as great, and in such cases, as it is practicable, I should con-

sider it advisable to dig a ditch, commencing at upper Cedar line, in which to convey the waters of Grand Mesa to the ranches below and abandon the old creek beds entirely. The loss by evaporation and seepage in a ditch on an even grade, and with straight, smooth walls, uniform width and smooth bottom, would be nothing compared to the loss in the creeks, which are a mass of boulders and of all widths from ten to fifty feet. The season closed, practically, on October 1."

H. W. Christopher, water commissioner of No. 41, reports plenty of water for all purposes this year. Was called out on April 9 and went out of service September 22. In a letter dated September 28, enclosing his report he says: "We have not been on the river (Uncompahgre) since September 22, there having been plenty of water since that time, making the water commissioner's services unnecessary. There is now, and has been since about the twenty-seventh of September, very nearly as much water in the river as in the spring. All the complaints this season have been made through force of habit. This I have learned since we came off the river."

In No. 42, W. H. Long, water commissioner, reported but four reservoirs, Grove Creek, Big Creek, Cottonwood and Mesa Lakes, though there are others. The Grove Creek reservoir furnished water for irrigation, an average of thirty-nine days, 2.9 second-feet. The Big Creek reservoir furnished, for thirty-six days, 12.3 second-feet of water. The value of reservoirs for the impounding of water, for irrigation purposes, may be appreciated when it is known that this reservoir adds to the cultivated areas thirteen hundred acres of otherwise dry and unproductive land. Mesa Lakes reservoir furnished, for eighteen days, 10.84 second-feet of water, and Cottonwood reservoir furnished, for eighty-five days, an average of 11.4 second-feet. This last being equal to 19,243 acre feet. There was some difficulty among irrigators in No. 42 growing out of the fact that parties having certain adjudicated rights were using a part of the appropriation on other lands than that contemplated in the adjudication proceedings. The question of the right of an owner of an early priority to rent or give the use of the water, when not in need of it, to the latest priority in that stream, to the detriment and damage of immediately following priorities, should be met and settled by the courts in a way that all may understand. In this district, in measuring the flow of water, the Cippoletti weir is used in the smaller ditches and the rating flume in the large ones. These measuring devices are, generally, in good order.

William Chadwick, water commissioner of No. 45, reports a successful season in his district, and abundant crops of all kinds. Trouble arose in this district over the rights of parties holding late priorities, to carry domestic water through ditches, during a time of scarcity. The cases came up from the water commissioner to this office. I decided that in time of scarcity, the legally adjudicated priority of water right, where the water was needed and used for irrigation, took precedence over the right to use water for domestic purposes, when to be used as such it must be carried through ditches one mile in length.

George E. Blake, water commissioner of No. 61, in his report has this to say: "The curtailing of the district by the last legislature made it possible for me to perform the duties without the aid of a deputy, as all operations have been confined to Paradox valley. Notwithstanding the severity of the spring freshets, which did considerable damage, demolishing all dams, bridges and headgates in the valley, the season, so far as crops are concerned, has been an unusually favorable one, yet many consumers are unable to make use of the high water until a much later date than usual. The two private ditches from the La Sal mountains have continued to furnish about six cubic feet of water, and as the priorities are at the head of the valley the benefits derived from the same by those on the creek below has materially aided in furnishing, to all, water in plenty. No word of complaint or controversy over the distribution of water has reached me during the season. Were all seasons like the one just past the duties of commissioner in No. 61 would be light indeed as compared with former years. As no new complications or questions have arisen I call to mind no suggestions that I could make."

P. H. Shue, water commissioner of District No. 68, Ouray county, makes a very instructive report on the climatic conditions and peculiarities of the soil in that district. If his deductions are true, as obtained by him from close observation and experiment, it would appear that that district should be allowed all the irrigation water it can use, irrespective of the priority right of No. 41. It is confidently believed that a systematic examination of these conditions, covering a term of years, will prove the theory of Mr. Shue to be correct. He says in his letter, dated October 1: "The topography of Water District No. 68 is such that it is impossible for water to be wasted. The peculiar character of the soil also serves as a vast reservoir, holding back surplus water for from one to three months in a marked manner. These characteristics, added to the cli-

matic conditions, make the usual irrigation laws and regulations hardly applicable to the district."

The explanation of the first statement is found in the absence of large tracts of irrigated lands lying comparatively level and distant from the stream. All irrigable lands lie on or immediately adjacent to the principal streams or some affluent and all have considerable slope, so that all water not absolutely absorbed for use is returned to the stream. There are very few exceptions to this general statement. Ridgway ditch No. 101 may be. Here the water is carried through a ditch in which it loses very little, and much of it is allowed to flow into Hartwell lake. This is properly not a reservoir, but was originally designed as a pleasure resort for the town of Ridgway. This lake, however, manifests itself in forming innumerable springs, which make considerable flow into Cottonwood and Happy Hollow creeks, which were formerly dry.

A peculiarity of soil and climatic conditions are perhaps solely characteristics of Water District No. 68. I desire to explain the climatic conditions first. The months of May and June require very profuse and constant irrigation. July very little. August about half that of June, and September practically none at all. This makes the greatest appropriation during high water, and the subsequent lack of necessity does not depend wholly on rainfalls, which will appear in the next illustration. In explaining the peculiarity of the soil and drainage, I will endeavor to be specific as to the section between Ridgway and Portland. The same conditions prevail on Dallas and Cow creek valleys, but are not so apparent, or wanting, in the section immediately adjoining Water District No. 41.

This section, between Ridgway and Portland, containing about 2,300 acres under irrigation, seems like a vast subterranean lake. During the fall and winter, the water sinks from eight to twelve feet; springs and seepage cease flowing altogether about March. After the irrigation of May and June, the surface of the lake seems to rise, the soil remains damp; springs and seepage again flow in profusion and obtain the greatest volume in July and August. The amount of this flow returned to the river is two to four times the amount taken from it, at the same time.

Irrigation is usually necessary again about the first part of August, and after that no general watering for the season.

Amount of water required during May and June is enormous. My theory is, that it forms a capillary connection through the soil to the subterranean lake and sinks instead of

flowing over the surface, and is returned by springs and seepage a few weeks later.

During the last week of July and first week of August, I carefully measured, as far as conditions would permit, the amount of water coming into the district, exclusive of seepage. The amount actually appropriated at the time and the amount flowing to Water District No. 41, and found that more water was flowing to No. 41 than was appropriated by and coming into No. 68. There may be a time during August when the laws of priority may apply, for the time being, but on the whole I am thoroughly convinced that an abundant use of water in No. 68 according to prevailing conditions is of inestimable advantage to No. 41. Careful measurement covering the whole field for a season would determine the real conditions; estimates are not to be relied upon, and I earnestly desire that some definite tabulations may be made.

The decretal order awarding priorities in Water District No. 68 was not entered until the May term of court; consequently the rights and duties of ditch owners were not defined until the season was practically over, consequently the average flow of water for the season can not be known.

The district contains a large number (109) of ditches, with 144 priorities. All ditches are wholly private or private partnership affairs; are usually small and operated without any defined rules and regulations. I have found owners ready and willing to comply with the law, and next spring can have placed in nearly every ditch a proper and legal headgate and Cippoletti weirs.

The amount of water awarded is deceptive in several cases, because of the unavailability of water, as shown by the following instances:

Ditch No. 38 can not receive one-fourth of the award.

Ditch No. 50 did not carry over three second-feet in 1897.

Ditch No. 51 can not receive over two-second feet.

Ditches Nos. 48, 65, 58, 72 and 82 altogether do not receive to exceed four second-feet, as they recover seepage waters from themselves.

Ditch No. 80 did not at any time flow to exceed thirteen second-feet.

Ditch No. 84 received practically none at all.

Ditch No. 101 receives not to exceed six second-feet.

Ditches Nos. 104 and 107 receive none at all.

Another season I will keep accurate data of the flow in each ditch, as there is little more land in this district which can be

brought under irrigation; the amount of water consumed will be practically a constant quantity.

I will also endeavor to gauge the amount coming into the district above seepage, if no more definite plan is ordered, and the result in connection with the gaugings at Fort Crawford should either prove or disprove the claim that Water District No. 68 is entitled to water irrespective of priority.

As stated above, owing to the lateness of the decretal orders being entered by the court, you will appreciate how impossible it has been and is for me to make the complete report as required by your office.

RESERVOIRS.

I would respectfully suggest that the department get up a blank for the use of water commissioners in making reports on reservoirs and their uses, containing such data as will be of interest and benefit to the department and for the information of the public in general. Containing among other things, which in your judgment may be deemed necessary, the following headings:

REPORTS ON RESERVOIRS.

Division No. .....
District No. .....
Name, ... Owner, ...
Location, ... Size in acres, ... Height of dam, ... Cubic feet of water contained.....
Water, where obtained..... Days in service, ...
Second-feet per day..... Loss per cent. in seepage and evaporation per mile, ... Cost of construction.....
Cost of maintenance, ...

In closing I wish to state that in this division crops, both agricultural and horticultural, have been excellent, and the increased intelligence obtained by experience in applying irrigation water is the cause for much of this year's success.

Yours respectfully,

DAVID R. CROSBY,
Superintendent of Irrigation, Grand River Division.

COMMISSIONERS' ANNUAL REPORTS, A. D. 1897.

WATER DIVISION NO. 5—GRAND RIVER DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1897 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
38	104.25	1,573.10	17,256	5,104	2,768	235	124.00	3,897	25	$ 150	$ 2,215
39	112.80	154.30	18,775	4,125	210	475	1,351.00	1,949	----------	----------	----------
40	217.85	204.50	40,200	9,898	1,144	755	4,826.00	2,820	590	267	1,060
41	276.50	320.00	50,255	12,969	97	1,024	4,465.00	10,294	----------	----------	----------
42	199.25	164.00	18,363	6,790	75	337	729.00	2,578	146	----------	----------
45	124.75	80.00	15,339	3,531	123	369	559.25	2,120	----------	----------	----------
61	17.75	15 90	1,425	397	----------	198	34.50	121	----------	----------	----------
Totals	1,053.15	2,511.80	161,613	42,814	4,417	3,393	12,086.75	23 779	761	$ 417	$ 3,355

NOTE—Districts Nos. 28, 36, 37, 43, 51, 52, 53, 59, 60, 61, 62, 63 and 68 failed to report.

Grand Junction, Colorado, November 1, 1898.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado.

Herewith I hand you a condensed tabulated statement based upon the reports of the several water commissioners of the districts of the Grand river division for the irrigation season of 1898.

It has been a fair average season for crops in this division, although water has been scarcer than in any season before. Reports from every part of the division indicate good crops and usual prosperity among the several farming and fruit-raising communities.

Shortage in water supply this season has brought to the attention of irrigators the necessity of alternating its use. The experiment has been tried and satisfactory results have been reported. A stream supplying a small head of water to several appropriators, if united, and turned into ditches alternately with periods of about three days each, will do better service and properly irrigate one-half more ground than otherwise. In No. 42 are three ranch men who repeatedly failed in raising crops on account of a lack of sufficient water supply, until an agreement was entered into by them to alternate the use of the water in the stream; since which time large and valuable ranches, consisting of grain, alfalfa and fruit, have been opened and all are in a prosperous condition. There has been no addition to the quantity of water in this stream during these years. The water of No. 61 has been alternated in its use for some time past, and with satisfaction to the community.

There are in this division 1,494 adjudicated water rights and five hundred which are non-adjudicated. The decreed water rights amount to 10,264 cubic feet per second of time, and of this there has been used, this year, 2,417. There are eighty reservoirs, with less than a dozen that have an adjudicated standing in the division.

The oldest water right by reason of use in the division is the "Old Agency Ditch," whose headgate is in No. 68, Ouray county, and the country was improved so far as the beginning

of the use of water for growing crops is concerned in the following order:

No.	No.		Date of Appropriation.
1	68	Ouray county	August 1, 1875
2	28	Gunnison and Saguache counties	September 30, 1876
3	61	West Montrose county	June 30, 1878
4	38	Pitkin county	June 18, 1880
5	41	Delta and Montrose counties	July 1, 1880
6	37	Eagle county	February 1, 1881
7	40	Delta county	December 17, 1881
8	39	Garfield and Mesa counties	May 10, 1882
9	53	Eagle, Grand, Garfield and Routt counties	August 15, 1882
10	45	Garfield and Mesa counties	March 1, 1883
11	52	Eagle and Grand counties	May 1, 1883
12	42	Garfield and Mesa counties	September 15, 1883

The last district to begin appropriation of water now uses thirty per cent. of the water used in the division for irrigation purposes. No report has been obtained from the commissioner of No. 28. C. E. McAllister claims to have resigned as water commissioner. He refuses to make report for that district.

The report is meager owing to a long term of illness. Mr. Kallquist, in his written report, has the following to say regarding his district:

"The supply of snow in this district was considerably less this spring than in the spring of 1896. In the latter part of March I posted notices calling ditch owners' and especially late appropriators' attention to the possible scarcity of water and advised them to repair ditches and turn in water as soon as they could make beneficial use of it. This season opened up very late, but in middle of April all the water in Gypsum creek was utilized. The twenty-eighth of April I was called on by parties interested in lower ditches on Gypsum creek. I found about forty cubic feet per second and evened it out between parties ready to use it. On May 9 and 10, owners of early rights commenced to use their amounts and late numbers were shut off up to No. 49. Until May 17, supply in Gypsum creek did not exceed forty-two second-feet, and on May 28, actual high water commenced so as to be sufficient for all cultivated ground. First part of June I pro rated surplus to late appropriations to allow them to make up for lost time; but, on June 9, the surplus being considerable, I pro rated it to all cultivated ground. High water lasted longer than expected and was well taken care of. Heavy rains, July 11 and 13, lessened the demand. August 1, supply in Gypsum creek being insufficient for cultivated ground, latest appropriations were shut off until August 8. Since last mentioned date no shortage in Gypsum creek. Among other streams in District No. 37 shortage has been reported only

from Berry, Talmadge and Brush creeks. I went to Berry creek, June 24, and found 2.70 cubic feet per second, but most of the ground with decreed water right also covered by ditch from Eagle river. I advised compromise and helped the parties with making dividing weir in the river ditch. Talmadge creek had, July 3, only 0.30 cubic feet per second and no decree, but one recorded ditch. Very little ground was depending on said creek; main part is irrigated from Grouse creek. I advised alternating the water. Up to August 14 there was no complaint from Brush Creek valley. I found lower ditches almost dry, but more than sufficient surplus in the upper to even out for cultivated grounds, at the rate of one cubic foot per second for each fifty acres.

The crops are about average in the whole district. The yield seems less on the ground irrigated from Eagle river than in side valleys with limited water supply.

Notices not to interfere with headgates and dams have been more efficient in this district than locks in others. Nobody here takes chances on stealing water from a public stream when a headgate has to be lowered or shut down, but parties in ditches often have controversies about dividing between themselves. When any one gets more than his share, when water is allowed for all cultivated grounds under a ditch he usually wastes some. According to an act by the general assembly of the state of Colorado, approved April 13, 1895, the amount wasted should be taken away from the ditch, but when ground under same ditch is suffering from shortage, I have tried to distribute it where it lawfully belongs. Main cause for trouble has been the lack of proper dividing weirs. Where the drop board or Cippoletti weir is used, some had settled out of level, others did not have a full drop in the main ditch. I corrected as many as possible, and appointed a competent deputy to look after the rest. Later part of the season all seemed to be agreeable.

No reservoirs of importance are constructed in this district and but few are located. The cheapest and safest way to store water would be, in the fall, divert the heading of streams from their channel and have it spread and freeze on high ridges and flats, in this way thousands of acre-feet of ice could be stored. Different locations would furnish a supply at different times in the season.

In this district no water was appropriated for speculative purposes. All decrees were for a certain tract of land at the rate of one second-foot for each fifty acres improved land, but it was provided that it should be brought under actual cultivation with reasonable diligence. Double decrees (two or more priorities for same piece of land) are only to be allowed at single rate. From Gypsum creek and its tributaries more than 105 second-feet are decreed and only about 65 actually appropriated. When supply is less than 55 second-feet some ground that has been under cultivation ten or twelve years has to be without water, while other ground seeded for the first time is entitled to water. A majority of ditch owners have now applied to the district court to decide what should be considered a reasonable time for actually appropriating the water and expect to have some decrees or parts of them declared forfeited. I have been employed in actual field work during this season, fifty-four days and a deputy nine days."

Mr. G. W. Hull, water commissioner of No. 38, submits his annual report in tabulated form, and with it says:

"I have made as accurate a report as I possibly could. As there are so many ditches in this district that are not used and also a large number that have been decreed that was never constructed. When one compares the report to the decree book he finds that they do not correspond very well on that account. I have had a deputy twenty-seven days this year and have myself worked sixty-eight days. There has been a great shortage of water and numerous complaints all over the district, and when there is a shortage there is sure to be trouble. If we could make the people believe that it would be to their interest to put in weirs, it would be more satisfactory all around. I will try to impress the necessity of weirs on all of the users of water in the district and see if we can get them put in."

No. 38 is yet having some difficulty in the adjustment of the adjudication of that district, but this year, with the assistance of the superintendent of irrigation, the water commissioner has been able to distribute the water into the ditches in a more satisfactory manner than heretofore. Headgates and rating flumes are a necessity in the district.

I hand you report of No. 39 for year of 1897 and 1898. Water has been scarce in the streams, but so well and judiciously applied by the water commissioner, that no difficulty of any note was experienced. Crops are good.

J. C. Hart, water commissioner for No. 40, reports an average of 137 days that water was carried; with an average flow throughout the district of 201 cubic feet per second of time. There are fifty-one reservoirs reported, forty-one of which show a capacity of 247,190,480 cubic feet of water. This water was distributed in an average time of fifteen days and amounted to 191 cubic feet per second. This fact, without comment, demonstrates the great value of reservoir service, when made to supplement the flowing streams in times of scarcity.

In that district was used 1.36 second-feet per hundred acres of irrigated lands, and is .45 second-feet per hundred acres more than the streams and reservoirs supplied in 1896. In a letter dated October 31, 1898, he says:

"The year has been one of dissatisfaction and disappointment all along the line and never before during my six years' experience in the water business, have I found so many difficulties in the way of distributing water or the duties of the office as water commissioner harder to decipher and live up to. All of our decrees are in dispute and a great many of them in litigation and under such circumstances there is a very decided inclination on the part of ditch owners to "gobble up" what water they can regardless of the orders of the water commissioner.

New and substantial headgates are an absolute necessity in such cases and in connection with good and uniform weirs, for measuring the water in every ditch and at every reservoir, will at once break up this practice and place the responsibility where it belongs; on the water commissioner.

At the opening of the season I found all reservoirs filled to their utmost capacity and reported this fact to their owners, who consequently anticipated a good and sufficient amount of water for their crops. But hardly a drop of rain has fallen this year on Grand Mesa nor in the valley below and on account of so little moisture we were only able to realize about seventy-eight per cent. of our actual storage capacity, measured at the reservoir and only about fifty-eight per cent. in the ditches. Fully twenty-five per cent. was swallowed up by evaporation on account of the long distance the water had to come before it reached the weirs where it was finally measured out to its owner.

I took charge of the reservoirs this year by placing a deputy in the vicinity of a system of reservoirs, whose business it was to maintain the natural flow of water at all times through such reservoir and in addition to this measure out the stored water in such quantities as were demanded of him, by the owners of such stored water and report to my deputy below, on the creek, the amount turned out and into what ditch the water was to be turned, to whom it belonged and the length of time it was to run. The owner of the stored water was made the carrier of such orders, thus saving a great expense to the county on account of the long distance to be traveled. By this method one deputy was able to manipulate the whole Surface creek system of reservoirs—about thirty in all—at an expense to the county of $45 for the entire season. The reservoirs of the Surface creek and Reservoir company, situated on Ward, Cottonwood and Kiser creeks, were operated in the same manner. The company, however, paid all expenses except six days of my time, taken up in adjusting for natural flow of water. Over on the Potomac (Leroux creek), as usual, everything resulted in uproar, confusion and defeat, and until the majority of the people there can see the necessity of putting in good headgates with locks and good weirs, and leave the distribution of their water to the water commissioner, will a better state of affairs exist. Hoping for your approval, I am, yours truly,

J. C. HART."

W. H. Christopher, water commissioner, No. 41, says:

"Yours of third instant received and noted. Replying will say that I don't know that it is necessary to say anything more concerning the matter of our experiment than that Mr. Shue, water commissioner of No. 68, released 114 second-feet of water from the Ouray county ditches for the purpose of benefiting the people at the lower end of the river, by wetting up their crops and orchards. There was, before Mr. Shue closed his headgates, about fifty-four second-feet of water coming under the bridge at the Post. When his gates were all closed and the full head coming down, there was about 150 feet coming under the Post bridge. With everything closed to No. 15 (19, 11 and 15 being below Colorow),

the entire body was kept in the river until turned into the gates below. As to the amount of water appropriated, the Montrose canal was taking 10 feet, early priorities; Loutsenhizer No. 9 taking 18 feet. Measuring the water at the Montrose bridge I found about 100 feet, a little less. Into No. 7 we turned 6 feet; into No. 8, 8 feet; into No. 4, 7½ feet; into No. 15, 5 feet; into No. 10, 10 feet; into Garnett, 15 feet; into No. 1½, 6 feet; No. 12 at Montrose shut down—a total of 85½ second-feet appropriated out of 150 at the Post bridge.

The night man did excellent work. There was no trouble during the day of the trial to get water below Colorow. Just received a letter from the president of The Garnett Ditch Company, asking for more water. I have written him that it is simply out of the question to do any more for him than we are doing, there being only about forty feet coming under the bridge at the Post and yet we are pushing a little water as far down as Colorow with most of the gates below No. 9, which is getting about fifteen feet, taking domestic water."

Irrigation water from the lesser streams in District No. 42 has been quite short, but great care having been taken in its distribution no loss of crops has been suffered.

Wm. Chadwick, water commissioner of No. 45, reports water for irrigation this season as very short. A letter dated September 1, 1898, says:

"It seems the drouth has been broken which has lasted for nearly fifty days. No. 45 had plenty of water until the first day of July. Since the latter part of the month some of the streams have gone entirely dry. Ditch owners are learning to get along without water running in their ditches for domestic use. They are building cisterns and finding them satisfactory. With but one or two exceptions I got along very agreeably with ditch owners. Crops are very good. My services will extend over a period of sixty days."

Geo. E. Blake, water commissioner, No. 61, Paradox valley, in Montrose county, in sending in his tabulated statement concerning ditches, on October 2, makes the following report:

"It is difficult to reply satisfactorily to some of your questions for the reason as I have stated in my annual report. The two private ditches entering the Paradox valley (now my entire district) mingle their waters with those of the valley proper, amount being very irregular as the promotors use and turn down the natural channels at pleasure. They have never established weirs or other devices for measuring, and it is impossible to get at an accurate measurement of the amount used. In this case I have been compelled to estimate amounts so used. As all parties are benefited by the water so turned in, I have thought best to 'let well enough alone.' It is my aim to observe the prior rights of ditches; yet, there are circumstances, when if confined strictly to them, later priorities would unnecessarily suffer. To illustrate: No. 13 with sixty acres and No. 14 with twenty acres, each entitled to cubic foot

per second. No. 14 gets his crops first irrigated by spring flood, consequently cuts first crop earlier and is ready to use water while No. 13 is harvesting his first crop. By closely watching these things I keep the limited amount of water doing duty night and day. Had I waited for No. 13 to use first, No. 14 would unnecessarily have suffered.

It is my opinion, from experience had, that to adhere strictly to either system would do injustice to certain cases, and a commissioner must rely upon his judgment as circumstances require. The best evidence that my course has proven satisfactory is that no complaint has been made. Yet if the question was submitted to the people of my district, priority or pro rate, I think they would favor the former. It is a fact that double the amount of water on half time is more beneficial than the judicial priorities, and when possible, I resort to it. If confined to priority, the moment I find water is not being beneficially used, I take it up and issue to next, if ready to use it, or otherwise, to the next who is. In my last report I grouped together priorities belonging to one company or individual (several of them having been recently purchased), which differs slightly from former reports. It is my opinion that pro rating, intelligently applied, will irrigate at least one-third more land successfully than the present system of priority. I would also add, that the water brought in by these private ditches is used upon the lands before reaching the creek, hence you may understand the impossibility of accurately estimating the amount used. It being outside my jurisdiction to require measuring devices put in by them, I have accepted of the situation without a protest.

While the report differs but little from that of former years, yet with the discovery of minerals in this vicinity, has come an increased population which has proportionately increased the demand for the already limited amount of water, but the two private ditches from the mountains (concerning which mention has been made in former reports) have continued to furnish a good supply of water which mingle with that of the creek. Thus I have been able to meet all requirements and notwithstanding the fact that no rain has visited the valley for three months the season's crops surpass those of any previous year. The third crop of hay now harvested excels the second; fruit, however, is a trifle short, but as a whole the season has been a prosperous one."

The districts which have taken most attention this year are Nos. 68 and 41. These districts, being on the same watershed, have caused much discussion in regard to their legal rights as to the use of water. The Uncompahgre and its tributaries, in Ouray county, comprise No. 68. No. 41 is on the Uncompahgre river in Montrose and Delta counties. The water rights were adjudicated in No. 41 on November 14, 1888, and those in No. 68 in November, 1896; but the water was appropriated to growing crops much earlier in Ouray county than in No. 41, and if in comparing the date of the use, for a beneficial purpose, of the water in these districts is considered, then but twenty-eight per cent. of the water used in No. 68 could be shut

off and carried to No. 41. If the court should hold that the date of adjudication is the proper limit, then No. 41 would in times of scarcity be entitled to the entire flow of the river. We have held in the matter for the priority of use.

Mr. Shue, water commissioner of No. 68, makes the following supplementary report:

"Supplementary report of ditches in Water District No. 68, which by reason of lack of water supply and other causes have no defined status:

No. 101A. Thompson ditch, priority No. 78A, conveys water from Burro creek to Billy creek. The combined water supplying the following ditches. The total flow has not exceeded 3.5 second-feet for sixty days and 1.5 second-feet for next sixty days. These ditches are consecutive on the stream and cover the waste and seepage waters.

No. 68. Brown, priority No. 75.

No. 48. Climax, priority No. 52.

No. 61. Rocky No. 1, priority No. 67.

No. 65. Rocky No. 2, priority No. 71.

No. 72. Rocky No. 3, priority No. 80.

No. 82. Reservoir, priority No. 93.

No. 51. Springfield and Corrie, priority No. 55, draws water from Onion creek, which ceased flowing about June 15.

No. 54. Private, priority No. 59, covers some narrow bottom land on upper Cow creek.

No. 55. Private, priority No. 60, same as No. 54.

These ditches use a big head about one day per week and are almost equivalent to the stream itself. They do not use a constant flow and have not covered to exceed sixty-five acres in 1898.

No. 58. Babb, priority No. 64, from Willow creek, has had no supply since about June 20.

No. 62. Lew creek, priority No. 68, from Lew creek, has had no water since about July 1.

No. 66. Sibert, priority No. 72, from Beaver creek, has had no water at all.

No. 69. Cottonwood, priority No. 76, Cottonwood creek.

No. 97. Jones, priority No. 122, Cottonwood creek.

No. 100. Tidwell, priority No. 127, Cottonwood creek.

All draw supply from seepage water from Hartwell lake and Dallas ditch and have only a limited amount. The total source does not exceed 1.5 feet after June 1.

No. 71A. Taft, priority No. 78, has had no supply at all.

No. 75. Lower Pleasant valley and Von Hagen appropriation, priority No. 84, draws supply from seepage and was not used in 1898.

No. 75A. White, priority No. 84A, has no supply at all.

No. 78. Boulevard, priority No. 89, Beaver creek, has used no water since about July 1.

No. 79. Johnson, priority No. 90, Beaver creek, has used no water since about July 1.

No. 84. Vance, priority No. 98, McKinsey creek, is on Uncompahgre plateau, and after about June 15 has only a supply from some springs, which are never sufficient to reach the Uncompahgre river.

No. 85. Cassedy, priority Nos. 56 and 99, draws supply from seepage or springs on Onion creek, and after about June 1 have very little water.

No. 87. Nate, No. 2, priority No. 102, does not have supply after about July 1.

No. 89. Cronenberg, priority No. 106, is on extreme Upper Dallas and does not use water more than from June 20 to July 10.

No. 90. Rosebud, priority No. 107, Willow creek, has only a very small supply after June 20 to July 1.

No. 90A. Jolly, priority No. 107A, Deer creek, receives no water after July 1, and was not used at all in 1898.

No. 91. Jackson, priority No. 112, Cutler creek, receives no supply after June 1.

No. 93. Chipeta, priority No. 114, Cutler creek, receives no supply after June 1.

No. 98. Smith, priority No. 123, Dexter creek, used only water enough for a very small garden in 1898.

No. 104. Island Farm, priority No. 136, Cow creek, used no water at all in 1898.

No. 105. Private, priority No. 136, Dallas, covers the bottom land and needs drainage rather than irrigation after June 1.

No. 106. P. J. Nash, priority No. 137, Dallas, covers a narrow strip along the river bank and flows about one day per week.

No. 107. Cannon, priority No. 143, Coal creek, used no water at all in 1898.

No. 108. Private, priority No. 144, Cow creek, used no water at all in 1898.

McDonald ditch (not decreed) uses about ten second-feet in Montrose county."

On August 31, he writes as follows:

"I was not expecting to make this report before about October 1, and was not quite prepared for it. I have made October 1 as a possible day for the closing of the season unless I know the water will not be used, and in a few ditches have had to estimate the acreage in crops and kind. I thought it was best to do this way so as not to delay you, and it can not be far off.

I shall be prepared to make you a concise and intelligent report on the special subject of the Uncompahgre as an irrigation agency, as I have kept accurate tab on the flow of the river during the period that

we had it all turned off. It has several surprises and must convince any one of the wrong in applying the law of priority to the stream as a whole. My idea now is that the law should apply to about the Uncompahgre canal and then should, in the judgment of the superintendent of irrigation, be diverted into side ditches and distributed by rotation or time division. Legislation to this end would, I believe, cover the whole valley as well as solve the present problem of attending to that which is in cultivation.

I want time to prepare this report, and will endeavor to have it accurate and intelligent."

Following this letter came a special report, which I add, believing it to be of much interest to the department of irrigation. It is as follows:

THE UNCOMPAHGRE AS AN IRRIGATION AGENCY.

"During the season of 1898, I made a special study of the condition prevailing in Water District No. 68, while in the later part of August, an opportunity was offered for a complete analysis of the availability and the possibilities of the capacity of the Uncompahgre as an irrigation agency. I eagerly took advantage of this opportunity and hope my investigations may be of assistance to your office.

The drainage basins invite first consideration. The Uncompahgre proper, drains the Sneffels, Red Mountain and Engineer basins, which are of great extent and high altitude; as well as an extensive area on Portland, Dexter, Corbett, Cutler and Coal creeks.

There exists, therefore, many conditions favorable to a supply of water.

There are, ordinarily, immense snow slides in deep gulches, extensive tracts of forests, north and south slopes, on an altitude varying from 7,000 to over 14,000 feet. This produces an average supply almost during the irrigation season.

The Dallas drainage covers only the north slope of the Sneffels range, quite extensive, and of high altitude and covered with extensive forest. For this reason the waters of the Dallas become available during the later part of the season while the flow covers a considerable period of time.

Cow creek drains a single gulch which, though quite extensive, has generally east or west slopes so that the large flow of water is of rather short duration as well as being early in the season.

The availability of the Uncompahgre supply is consequently well averaged over the time from April 1 to August or September, being highest in June or July, and then in excess of needs.

The peculiar condition of the agricultural lands in this district serves admirably to increase the late supply of water. Much that is used in the earlier part of the season is returned as seepage in from two weeks to two months. This seepage is not constant but greatest in July, August and September and nearly ceases in March.

The narrowness of the valleys makes waste of diversions almost impossible, while much is returned immediately as waste or overflow, thus diversions from a stream appear deceptive, owing to the re-diversion of the same waters.

During the season of 1898, I made careful measurements of the seepage flow as far as could be done.

Dallas valley presents some remarkable results. The flow of water was not sufficient for local needs before June 10, and the effect and time of seepage could be carefully studied. Ditch No. 25 covers about three hundred acres, sloping gently to the stream and extending along it for about three-quarters of a mile. Previous to June 10, this ditch was receiving about 1 second-foot of waste from East Dallas and 5.7 second-feet, nearly the entire flow from West Dallas.

There was diverted into ditch No. 8, one-half mile below the headgate of No. 25, about 2.5 second-feet, mostly from seepage and waste, yet on June 2, West Dallas was flowing 10.8 feet at its mouth—an amount at least four second-feet greater than the entire flow above seepage. This is accounted for by reason of both waste and seepage returning so quickly. East Dallas was all diverted but 4.4 second-feet on the same date, yet there was actually diverted from the junction of the branches to the mouth of the stream over twenty-eight second-feet, with two or three yet left to join the Uncompahgre. This seeming impossibility is explained by the application being made on narrow strips of land, from which the waste or overflow of water returns very quickly to the stream. Thus the same water, with seepage added, may have been diverted several times.

After June 10, the quantity of water was greatly increased. I made no further measurements until July 24, when the discharge exceeded the inflow above the seepage point by nine second-feet, notwithstanding that over fifty second-feet were diverted at the same time.

The Uncompahgre valley above Ridgeway shows about the same conditions as appear on Dallas, except that the return flow of both waste and seepage is more tardy and constant. During the early season no opportunity was offered for a satisfactory study. On most of the lands the first irrigation requires an immense quantity of water, and generally there is no visible return of waste or overflow.

On the farm of John Mehrling, three miles above Ridgeway, is shown an illustration of the characteristics of this section. A copious irrigation of adjoining lands will raise the water in his well six to eight feet in twenty-four hours, while it requires sixteen to twenty days for water to sink to its normal standing.

About August 1 of this year the entire apparent flow of the river was diverted into ditch No. 3, and amounted to less than 3.5 second-feet. One-half mile further down the entire flow was again diverted into ditches Nos. 24 and 43, amounting to about six second-feet. One half mile still further down almost the entire flow was again diverted into ditch No. 32, amounting to 10.5 second-feet, yet at Ridgeway, three miles further down, on the same day, the flow was nearly thirty per cent. greater than the inflow above the seepage point.

Cow creek does not follow this rule, but shows an apparent loss, though it is in part accounted for by a measurement of the Uncompahgre.

The great seepage or reservoir basins are the Dallas valley, the Uncompahgre valley above Dallas, and also adjacent to the mouth of Cow creek. It is presumed also that there is considerable seepage in the section adjoining and extending into Water District No. 41, but to what extent I have been unable to make satisfactory measurements.

On August 20, in lieu of an order from the superintendent of irrigation to enforce the statute of priority on the whole Uncompahgre, I offered, on behalf of my district, to relinquish ninety per cent. of all water diverted in No. 68 from August 23 to 27, and was fully supported by the ditch owners. This proposition was accepted by the superintendent of irrigation.

I carefully measured the amount of water coming into No. 68 above seepage; the amount diverted August 22 and 23 and the amount discharged into No. 41, as well as a careful study of reservoir capacity of the upper Uncompahgre, Dallas and Cow creek.

The subjoined table shows the findings by actual and careful measurements, except the one marked with a star, which was 129.7 second-feet, caused by rains on August 22; 98 second-feet was found by deducting the rise from known marks before the rains, and may be slightly in error.

TABLE

SHOWING FLOW OF THE UNCOMPAHGRE IN WATER DISTRICT NO. 68, AUGUST 22 TO 30. ON AUGUST 23, AT 6 O'CLOCK P. M., ALL WATER IN NO. 68 WAS TURNED OUT OF THE DITCHES AND REMAINED SO UNTIL AUGUST 27 AT 8 O'CLOCK A. M. MEASUREMENTS IN FEET PER SECOND.

Stream or Division	Above seepage area	At Ridgway, mouth of Dallas or Cow creek		Measurements above and below mouth of Cow creek Aug. 25			Discharge into Water District No. 41 or flowing in the stream			Diversion into ditches with priority before and after Feb. 24, 1883	
	Aug 22 1898	Aug 22 or 23	Aug. 25 to 29	1½ miles above	¾ mile below	Seepage increase	Aug. 23	Aug 25 to 29	Aug 30	Before	After
Upper Uncompahgre	36 80	51.90	79.50	----------	----------	----------	----------	----------	61.00	35.35	None
Dallas	31.60	29.50	47.20	----------	----------	----------	----------	----------	39.00	24.75	9.85
Owl Creek Cow Creek	5.00 16.50	3.00	8.70	----------	----------	----------	----------	----------	5.00	8.75	12.90
Lower Uncompahgre	----------	----------	----------	127.00	140.80	6.10	*98.00	142.50	105.00	25.35	14 50
Uncompahgre river	89.90	----------	----------	127.00	140 80	6.10	*98.00	142.50	114.00	94 35	37.25
Totals	89.90	84.70	125.40	127.00	140.80	6.10	*98.00	142.50	114.00	94.35	37.25

*Actual measurement was 129.70 second-feet, caused by heavy rains on August 22nd. 98.00 second-feet is possibly too small.

The conclusions deduced from this table are:

First—That a large per cent. of the water in the upper valleys, in addition to the regular seepage flow, may be diverted several times.

Second—That there is an increase in flow of the river from seepage entirely through Water District No. 68.

Third—That in Cow creek a large per cent. of the flow sinks and reappears as seepage in the Uncompahgre. Note.—On August 23, the last three miles of this stream showed no noticeable difference of flow, although ditches Nos. 42 and 59 diverted all the water at two points, two and five-tenths and two second-feet respectively.

Fourth—That notwithstanding diversions in No. 68 during August, exclusive of seepage, less water is received by it than is discharged into No. 41.

Fifth—That only twenty-eight per cent. of the entire diversion in No. 68 during August could be cut off by the statute of priority.

Sixth—That the actual increase of water discharged into No. 41, when No. 68 is using practically none, is less than forty-five second-feet, or only thirty-four per cent. of the entire diversion at the same time.

Seventh—That a conservation of the diversions in the upper valleys would have but little effect. Carrying through ditches, especially on Cow creek, might increase the flow temporarily by adding the apparent and seepage flow.

The best information I have of the river conditions in No. 41 is that at about the mouth of the Uncompahgre canal, the nature of the bed is such that the apparent flow sinks rapidly, and the next twenty miles, even one hundred second-feet would be absolutely lost by seepage alone.

It was at least demonstrated in the first part of August that fifty-nine second-feet taken from this point under a strict guard reached only about seven miles below Montrose, and only to the beginning of the worst part of the river bed.

On August 23 to 29, when No. 68 was discharging over 140 second-feet, it was found necessary to close all headgates in No. 41 above Montrose in order to reach Olathe with a small head. Conditions were favorable also at this time. For a week previous quite a percentage of the ditches in No. 68 had been wholly or partially shut off; besides, there had been heavy rains in the mountains, especially on August 22 and 23, which had increased the normal flow of the river.

At 2:30 p. m., August 24, there was far more than 180 second-feet going to No. 41. This quickly dropped to 142.5 second-feet and remained stationary until August 29, falling 1.2 inches by noon of this day, representing thirteen second-feet. From this statement of facts we may deduce two general conclusions: First—That the statute of priority applied to the Uncompahgre river as a whole is wrong, because it would result in the absolute loss or destruction of fifty to one hundred second-feet of water. Second—That a remedy by legislation is required; diverting the water into ditches to prevent leakage, which should then, in the judgment of the superintendent of irrigation, be subjected to a rotation or time division among the several ditches heading below the Uncompahgre canal,

or the point at which it was found desirable to divert the water from the river channel.

With this condition existing, it is clearly impracticable to attempt to enforce the priority law or to build reservoirs on the headwaters. The logical course would be to conserve and save the flow by diversion from the river bed into ditches built on a grade that would permit silting and prevent leakage. State aid might with propriety be given, as I am satisfied that a scientific revision of the system of ditches and irrigation laws, as applied to the Uncompahgre, would reclaim to agriculture every available acre of the lower valley.

The general lines of such revision would seem to be: The present law to apply to all that section adjacent to where the flow of the river is increased by a seepage during the later part of the season, so that the seepage flow might remain constant; diversion from the river bed and a time or rotation division of the water under the general supervision of the superintendent of irrigation, with a modification of the manner of application by consumers to all that section below the point where the seepage loss becomes noticeable.

The injustice of attempting to enforce the existing law is apparent when it is considered that to partly supply the priority of a few second-feet dated February 24, 1883, required the entire water supply of the river in August of this year. And since a large per cent. of the appropriation, especially in 68, antedates this priority, such enforcement is almost equivalent to confiscation of all lands watered by post-dated ditches, and absolute destruction of the water itself, contrary to the spirit and intent of our irrigation laws.

The thought might arise, how could I guarantee ninety per cent. of all waters used in No. 68 to be relinquished to No. 41 for half a week? Legally I could not, but I assumed that I was acquainted with the ditch owners and consumers of my district, and knew that they would waive the legal rights for humanitarian purposes. I was not mistaken. There was not a single instance of refusal. The ditch owners themselves shut off the water at about 6 p. m. on Tuesday, August 23, and turned it on again at their option after 8 a. m., Saturday, August 27.

I appointed deputies sufficient to assure compliance with the regulation, though they had little to do but report this fact:

Almost all—more than ninety per cent.—of the water was relinquished to No. 41 during that time, while many ditches did not open the headgates before Monday, August 29.

My further observations showed no disturbances of the seepage flow of the upper Uncompahgre, and a probable slight one of Dallas.

It is found that the loss by seepage in the bed of the Uncompahgre river, extending from a point four miles above Montrose to the city of Delta, is enormous. It is impossible, without a head of water in the bed of the stream amounting from 100 to 125 cubic feet per second at Montrose, to get thirty-five second-feet to Delta, or even to Olathe, the loss by seepage is so great. It is a serious problem which must be met and solved. Law requires that priorities on streams must first be served in times of scarcity, but when crops in an entire district are burning, it takes nerve

on the part of a water commissioner to order seventy second-feet of water (enough to save and mature 5,000 acres of crops) destroyed, for this is what occurs, in order to irrigate and save 6,500 acres, and it is said with some appearance of equity in it, that such a proceeding is not right, if indeed it be law. I recommend that the waters of the Uncompahgre be alternated and pro rated in sections on the river, in its use between points above designated. In the spring of this year all ditch companies in District No. 41 agreed to this arrangement except one, which refused to comply, and the experiment was not made.

I think a better plan than the above would be to take the water out of the bed of the stream into large canals on either side of the river, constructed with a grade of one foot to the mile. With this grade it is believed silt would form and there would, after the first year, be practically no seepage. Construct laterals to the several surface ditches in the lower valley at the nearest point, and in this manner save a great loss, to irrigation, of water which now each season occurs."

An examination of the special report of Mr. Shue will show that the water of the river to a certain point below Cow creek is augmented by underground currents and seepage from lands above. Passing on down the bed of the stream, it is true that the water sinks and a portion of it, twenty-two per cent., finds surface at the bed of the stream just before reaching Montrose. After passing Montrose there is a loss of head by reason of the water falling through the river bottom all the way to Delta, and but a very slight portion of it appears again in the bed of the stream at any point.

While the irrigation problem in these two districts has taken considerable attention and great concern has been felt on account of the shortage of irrigation water, yet we find five districts in the division using less water to the one hundred acres of irrigated land than does No. 41, and from but one of these do we hear complaint of any serious nature regarding shortage, and its average falls one-third of a second-foot to the one hundred acres of irrigated land below that of No. 41, and also the average of No. 41 falls but sixteen hundredths second-foot for each one hundred acres of irrigated land below that of the division. Taking these facts into consideration, and the further fact that there is no irrigation district on the western slope, and I have seen them all, which bears the stamp of sure prosperity equal to No. 41, I am convinced that if the distribution of the water in that district, and of No. 68, was placed entirely in the hands of the two water commissioners, the water duty would be nearly doubled and many more acres, now dry, could be brought under the control of the husbandman and made to furnish homes for the homeless.

Before closing I desire to call your attention to the uniform courtesy shown the department by the people of this division. The fact that the often present shotgun, at the headgate, has disappeared, we believe forever, and the desire expressed everywhere that law shall govern, presages good things for this division, and the day is here when water rights, as land rights, are generally respected.

Very respectfully,

DAVID R. CROSBY,
Superintendent of Irrigation, Division No. 5.

COMMISSIONERS' ANNUAL REPORTS, A. D. 1898.

WATER DIVISION NO. 5—GRAND RIVER DIVISION.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
37	64	164	8,460	2,365	1,315	685	----------	2,935	----------	$ 120	$ 850
38	240	301	19,490	7,667	4,181	430	255	5,576	695	----------	----------
39	118	134	20,725	4,252	175	490	1,368	1,821	----------	----------	----------
40	194	201	30,460	8,460	900	710	2,521	2,101	125	270	866
41	248	488	51,153	12,389	139	908	4,517	10,876	----------	----------	1,091
42	306	728	71,874	14,923	59	386	9,705	8,974	96	2,265	7,902
45	125	101	15,406	4,077	127	401	545	1,933	----------	----------	965
61	19	10	1,275	408	6	196	46	124	----------	----------	----------
68	147	290	17 041	3,413	2,639	1,407	105	3,208	80	45	2,611
Totals	1,461	2,417	225,884	57,954	9,541	5,613	18,462	37,548	996	$ 2,690	$ 14,285

NOTE—Districts 28, 36, 50, 51, 52, 53, 59, 60, 62, 63 and 69 failed to report.

Hayden, Routt County, Colorado, December 13, 1897.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado.

Dear Sir—As the irrigating season had closed for the season, before I qualified for superintendent of Irrigation Division No. 6, therefore, I have no report to submit at this time. As to any duties being done the past season by my predecessor, I have as yet no information from him.

The inclosed you will find a copy of decrees, as received by the district clerk. As I have no copies to make report, I submit one of my own; if there are any errors, please return, and will try and rectify the same.

I would like here to give a few remarks of my own, as to some of the crude methods used in most of the ditches. Some of them have headgates, others none, and very few are rated.

As a rule, there is plenty of water in the large streams, but a scarcity in the small streams, as they usually go dry early in the season. The most trouble with ditch owners being, not in stealing water from the stream, but from each other. For instance, there are six owners in one certain ditch. The ones nearest the headgate take all the water they want, more than they are entitled to, while the others at the lower end of the ditch have none. How can this be remedied so that there will be an equal share to each owner, and whose duty is it to divide the same, there being no superintendent or ditch walker appointed by the owners thereof?

There is considerable land open yet to the homestead law, where a small amount of labor would build a reservoir, sufficient to irrigate a quarter section, as I know of one instance where one party raised over three thousand bushels of wheat from less than one hundred acres, and irrigated from one small reservoir, built for an experiment, which turned out a grand success.

There is considerable amount of water running to waste every year in the Bear river.

There are no large canals which sell or rent water to private parties in this county. All the ditches for irrigating pur-

poses are owned by private companies, to use for their own benefit.

In conclusion, if there is any information that I can give, will gladly do so. I desire also to express my appreciation of your kindness so far, and may it continue in the future, is my earnest desire.

Very respectfully submitted,

C. S. ROBERTS,
Superintendent of Division No. 6.

Hayden, Routt County, Colorado, November 14, 1898.

HON. JOHN E. FIELD,
State Engineer, Denver, Colorado.

Dear Sir—I have the honor to present the following report as superintendent of irrigation of Water Division No. 6, together with the report of Water Commissioner J. D. Moog, District No. 43, for the year of 1898.

The irrigation season of this year opened with a very light supply of snow in the mountains, but, unlike last year, the deficiency was not made up by any rains from May 10 until August, there being scarcely any rains, not sufficient to lay even the dust, with one exception; the latter part of July there were a few local showers in parts of District 58.

In April the weather turned warm, and the Yampa river continued to rise until it raised beyond fording, to a height of about five feet above low water line. It continued to rise until May 8, when colder weather came, and the snow did not go off so fast, and the streams ran again lower until about the twentieth of May, when the Yampa commenced again to rise, and by June 2 the Yama was at its highest point for the season, but considerably lower than at any time that I have known it to have been at high water time for the past eighteen years.

A great many of the smaller streams ran scarcely any water and went dry early in the season.

The Yampa, Elk, White and Snake rivers had plenty of water, while those on Fortifications creek, Milk, Good Springs, Fish creek, Oak creek, Four Mile creek, Trout creek, Deep creek, Flag creek, Piceance creek, Coal creek, Miller creek, and a number of smaller creeks, were short of water, or had no water at all. As early as June 15 a large number of ditches were dry.

July 10, and even before that date, a great many ditches even on the Yampa river, from which the supply of water comes, were short of water, and a great many dry. For what reason? Simply because the owners of said ditches neglect to have their ditches in good repair. I have considerable difficulty in getting ditch owners to repair their ditches and headgates, unless some one with authority gets after them. As long as some water runs they don't seem to care if they have any or no water for the coming season, and then there is a howl, that some one is getting more than his share of water. It does seem strange that men will steal water, while in every other way are honest in their dealings with one another.

There being no water commissioners in Districts Nos. 44, 54, 55, 56, 57 and 58, the duties fell on the superintendent of irrigation, which embraces a very large territory, and then to be handicapped with county commissioners who do not wish for the superintendent of irrigation to even try to do his duty as the law directs, and after he does so the least as possible they refuse him small pay, which they have cut down two-fifths per diem for services. It places one in a strait, as the county commissioners say I shall do so much and leave the balance undone, contrary to all law, which by my oath and bond I am bound to do to the best of my ability. No one cares to work for no pay, and in this county there has always been a fight for the superintendent to get his legal rights, and it is hard for one in that position to do justice to the office or himself, with so much work, and very little pay for what he does.

June 3, snowed in the mountains a few inches in depth, and by June 20 the Yampa commenced to fall rapidly, when by July 25 it was low; August and September it was very low.

It will be only a few years hence when the supply of water, even in the Yampa at low water time, will not be sufficient to fill all the ditches unless the reservoir system is used for storing the water during high water.

The fires, this fall, destroyed considerable timber in the Flat tops, or White River plateau timber reserve, from which source a great many of the streams get their supply of water. I should think that congress, now that the land has been set aside for a purpose which is very beneficial to all the irrigators of this section, would enforce a law not to allow any one to build a fire on the aforesaid reserve, under a penalty and fine. For as soon as all the timber is destroyed on this land, irrigation will cease to a very large extent in acreage; every fire that destroys even a few trees there is that much less water than formerly.

I do not know of any rating flumes in the following districts: Nos. 44, 54, 55, 56, 57 and 58. There are some in No. 43. One-half of the ditches have no headgate.

There is plenty of vacant land and reservoir sites that could still be taken up and used to a profit, as there is plenty of water when the snow goes off. As a rule, there is entirely too much water used and run to waste, rather than less water. In most of the districts in this division there is too much water used in irrigating grain crops, causing the same to run to straw and diminishing the grain yield by so doing.

This season the grain crops were very short, about one-half of a crop on an average; the alfalfa and other hay crops, one-third; all other crops short, owing to the dry season and cold weather during May.

While gathering crop reports there was one thing I found out: that some parties were reluctant to give amount of land cultivated under their ditches, and gave a far different account of the acreage than they gave when they were getting their decrees. In a great many cases they did not have near the amount of land under their ditch as claimed in the decree.

I desire to commend the water commissioner of District 43 for the able way he has filled the office.

There are a number of large ditches now building that will open up other large tracts of land to cultivation. All this county needs is more money to make it one of the most beautiful on earth.

By early irrigation in the season, I would recommend especially on the streams that are liable to go dry or will be short of water later on in the season, much benefit would be derived thereby if the users of water would only see this point, and put it into practice, especially those who are at the head of the streams and those who have not the priority of right. This season I noticed on one creek five different parties using the same amount of water, and taking about all the water in the creek out at each place.

On the majority of the streams where water supply was short, the parties adjusted their differences among themselves.

In conclusion, it is a pleasure to express my thanks to all who have had official relations with this office, by their friendly and prompt attention and advice in many questions pertaining to the irrigation laws.

Respectfully submitted,

C. S. ROBERTS,
Superintendent of Irrigation, Division No. 6.

Meeker, Colorado, November 8, 1898.

Hon. C. S. Roberts, Superintendent of Irrigation, Division No. 6:

Dear Sir—The following is a report for the season of 1898 of my work as water commissioner of District No. 43.

This season was an exceptionally dry one. The snowfall last winter was very light, and on this account the water supply of the streams and springs in this district ran short the past summer. White river was lower than ever before since settled by white people. The rainfall last summer was very light also. Usually we have considerable rain after July 4 here, but this year, with the exception of a few local showers, it did not rain any. Lower Coal creek, Meeker and lower Flag creek received a few light showers, but in some sections on lower White and on Piceance creek it did not rain for three months. The range, in consequence, was all burned up, and feed very scarce. The hay and grain crop is below the average. Flag creek, Coal creek and Miller creek ran very low.

On June 20 I shut down all the ditches on Flag creek but the Nichols B. A. and B., Melvin and Rooney ditches. On July 1, I shut down the Rooney ditch. There was but very little water coming down East Flag for the Nichols ditch. After August 1, there being only enough water for the Melvin and B. A. and B. ditches (one and one-half cubic feet), I gave it all to the Melvin ditch for three days, and the B. A. and B. ditch for six days, alternately, and when they got through using it I turned it to the Rooney ditch, August 24.

On Coal creek I shut down all ditches but Coal Creek No. 1, Coal Creek Mesa, Martin, Little Beaver, on June 4. Coal Creek Mesa received one and one-half feet then. The Martin ditch, being situated below the mouth of Little Beaver creek, catches plenty of waste water from the Oak Ridge Park and Old Agency ditches going down Little Beaver creek. This leaves water for the Little Beaver ditch from Little Beaver creek above the Oak Ridge Park ditch. June 21 I shut down the Coal Creek Mesa ditch, and from that time on the Coal Creek No. 1 received all the water coming down Coal creek, which got as low as one cubic foot.

On Piceance creek the water sinks below Morgan's ranch, rises again above Mikkelson's ranch, sinks below Schutte ranch, comes to the surface again on Wallace ranch just above Spaulding ditch. From there on down there is a continuous stream. Above Mikkelson's I had no trouble at all this year, as the parties interested divided the water among themselves without me, but from Mikkelson's down I always had lots of trouble. Thos. Hanrahan, who has a spring arising on his land running one and one-half cubic feet of water, has always been trying to hold all the water from this spring on his ranch, and the water coming down the creek from above besides. Last winter he ran the water out on his land and let it freeze there, in order to keep his neighbors from having any water for their stock. Two years ago I had him arrested and fined, he having threatened

to kill me if I did not get off his ranch, and having pulled his headgate in my presence twice after I set it. This spring he started again to give trouble, only being more careful not to get caught, when I told him that I would prosecute him if he did not quit. I then measured his land, as he claimed eighty-five acres under ditch. I found that he had but thirty-eight acres, and I gave him water accordingly. After a while I persuaded him to take turnabout with his neighbors in irrigating, and I let them have all the water for a week alternately for the rest of the season.

On June 29 I shut down the Rye Grass, Leonard's Spring ditch, Robt. McKee's ditch and the German ditch; June 30, Boise ditch, Janes ditch (Black Eagle 1 and 2 not using water, neither D. W. Taylor ditch), and Schweizer ditch; on June 30, Hutchinson Spring, Fawn Creek, O. I. See, No Name, to get water for McKee ditch. On July 10 I turned the water into Rye Grass, Leonard's Spring ditch and the other ditches again, the people on lower Piceance having got through with the water.

On Dry fork of Piceance, on May 3, I turned the water to Hughes No. 1 ditch, there being between one-half and three-quarters of a foot. The water of this creek in the summer sinks and rises to the surface in places, there being no connection with Piceance creek.

Put in measuring weirs in B. A. and B., in Hughes No. 1, Niblock, Meeker Townsite and Rooney ditches.

I made a survey to find location of spring claimed by the Hayes Brothers on Dry Piceance.

Very respectfully,

J. D. MOOG,
Water Commissioner District No. 43.

WATER DIVISION NO. 6.

No. of District	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage	Cost of superintendence	Cost of repairs for year
43	76.54	148.20	8,442	2,145	1,017	2,699	9.50	1,427	50	$ 145	$ 1,309
44	55.25	71.58	8,230	935	1,247	2,340	.25	255	75		495
54	20.25	38.00	3,745	167	1,375	725		191			465
*55											
*56											
57	129.25	195.00	16,501	1,697	5,761	2,808	11.50	1,980			2,975
58	192.00	292.00	27,868	87	12,124	5,820	.25	1,407	10		1,628
Totals	473.29	744.78	64,786	5,031	20,524	14,392	21.50	5,260	125	$ 145	$ 6,872

* No report.

RECAPITULATION OF CROP REPORTS FOR 1897.

No. of Division	Ditches—Length thereof in miles.	Average amount of water carried during season of 1897 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage
1	2,640.36	3,616.90	988,483	186,555	31,309	178,495	20,567	330,546	10,968
2	3,317.00	.....	487,050	96,602	4,169	65,937	14,981	125,998	1,841
3	654 70	4,093.00	594,081	13,574	1,201	177,416	6	202,433	5,085
4	85.00	56.00	7,180	2,127	.....	780	83	3,053	189
5	1,053.15	2,511.80	161,613	42,814	4,417	3,393	12,086	23,779	761
*6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	7,750 21	10,276.70	2,238,407	341,672	41,096	426,021	47,723	685,809	18,844

* No report.

RECAPITULATION OF CROP REPORTS FOR 1898.

No. of Division	Ditches—Length thereof in miles	Average amount of water carried during season of 1898 in second-feet	Number of acres that can be irrigated therefrom	Number of acres of alfalfa irrigated therefrom	Number of acres of seeded grasses other than alfalfa irrigated therefrom	Number of acres of natural grasses irrigated therefrom	Number of acres of fruits irrigated therefrom	Number of acres of other crops irrigated therefrom	Number of acres irrigated from seepage
1	2,991.31	4,510.36	491,622	139,935	19,257	180,675	16,378	360,102	11,183
2	2,226.00	4,237.00	553,461	119,781	4,174	53,537	20,713	118,454	1,504
3	917.30	12 345.24	390,600	6,041	200	102,549	59	127,470	530
4	229.50	275.00	20,504	3,493	1,561	389	84	5,142	178
5	1,461.00	2,417.00	225,884	57,954	9,541	5,313	18,462	37,548	996
6	473.29	744.78	64,786	5,031	20,524	14,392	21	5,260	125
Totals	8,298.40	24,529.38	1,746,857	333,235	55,257	356,855	55,718	653,976	14,516

CHAPTER V.

TABLES RELATIVE TO FILINGS OF DITCHES AND RESERVOIRS.

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 1, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
J. E. Craig Ditch	J. E. Craig	Underflow Middle Bijou creek, Sec. 3, T. 6 S., R. 60 W	4.00	Dec. 26, 1896	Mar. 18, 1897
The (2) Curry Flood Ditches	James P. Curry	Sand Arroya creek	Each 120.00	Aug. 1, 1893	Apr. 14, 1897
Meadow Spring Ditches	R. Sherman	Springs in Sec. 6, T. 3 S., R. 60 W Springs in Sec. 1, T. 3 S., R. 61 W	4.00	June 5, 1897	July 17, 1897
Baker Reservoir and Canal System Canal	Abner S. Baker	South Platte river	562.50	Aug. 25, 1897	Aug. 26, 1897
The Lone Tree Extension Ditch	R. P. Fowler	Lone Tree creek	70.00	Aug. 21, 1897	Aug. 26, 1897
Decker and Pearce Supply Ditch	Scott Decker John Pearce	Seepage, flood, etc., Secs. 4 and 5, T. 10 N., R. 67 W	200.00	Sept. 17, 1897	Oct. 7, 1897
The Fort Morgan Reservoir and Irrigation Co.'s Canal Extension	Fort Morgan Reservoir and Irrigation Co	South Platte river	323.00	Aug. 24, 1897	Oct. 8, 1897
A. J. Eaton Flood Water No. 1 Ditch	Aaron J. Eaton	Lone Tree creek	190.00	May 1, 1896	Dec. 24, 1897
A. J. Eaton Flood Water No. 2 Ditch	Aaron J. Eaton	Lone Tree creek	70.00	Nov. 13, 1897	Dec. 24, 1897
Beaver Creek School Land Ditch Co. Ditch	Beaver Creek School Land Ditch Co	Big Beaver creek	50.00	April 25, 1898	May 31, 1898
Pooler Reservoir and (2) Ditches	Nancy A. Pooler	Rattlesnake creek	Each 15.00	Sept. 12, 1898	Sept. 19, 1898

HOME SUPPLY DAM ACROSS BIG THOMPSON CREEK, NEAR ARKINS, COLORADO.

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 1, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
The Fowler Reservoir	R. P. Fowler	Flood waters of a natural water way; also Larimer county ditch and Lone Tree creek	The Lone Tree extension ditch	2,200,000	Aug. 21, 1897	Aug. 26, 1897
The Sterling Reservoir	Asa Sterling	South Platte river	The Lower Latham ditch	75,533 040	Sept. 1, 1898	Nov. 26, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 2, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Gutheil	Gutheil Park Inv. Co	Seepage in sloughs, Sec. 31, T. 3 S., R. 66 W., T. 2 S., R. 68 W	12.72	Dec. 11, 1896	Dec. 15, 1896
Bramkamp Seepage Ditch (two branches)	Joel F. Vaile	Seepage and waste water from Vaile residence and from Burlington ditch, Sec. 32, T. 1 S., R. 66 W	N. branch 4 50 S. branch 4 50	Prior to Feb. 1, 1897	Mar. 9, 1897
Bramkamp Seepage Ditch, amended	Joel F. Vaile	Seepage and waste water from Vaile residence and from Burlington ditch, Sec. 32, T. 1 S., R. 66 W	Main line 12.00	Prior to Feb. 1, 1897	Mar 26, 1897
Morrison Seepage Ditch	Olive P. Morrison	Beebe draw and Secs 2, 11 and 14, T. 4 N., R. 65 W	10.00	Apr. 6, 1897	May 22, 1897
Gilheany No. 1	Thos. Gilheany	Seepage in swamp, Sec 30, T. 1 N, R. 66 W.	12.00	May 12, 1897	May 24, 1897
Gilheany No. 2	Thos Gilheany	Seepage in swamp, Secs. 25 and 26, T. 1 N., R. 67 W	13 00	May 13, 1897	May 24, 1897
Oscar Jones	Oscar Jones	O Jones, reservoir	2.25	1895	July 7, 1897
Craig Seepage	Alex R. Craig	Seepage, Sec. 14, T. 5 N., R. 67 W	4 00	June 10, 1897	July 25, 1897
Carlsbad	Oscar Reuter	Dubois draw and seepage, Sec. 10, T. 4 S., R. 67 W	12 00	Sept 10, 1897	Sept. 13, 1897
Gilheany No. 3	Thos. Gilheany	Sloughs and seepage, Secs. 2 and 3, T. 2 S., R 67 W	8.00	Sept. 22, 1897	Sept. 23, 1897
Gilheany No. 3, amended	Thos. Gilheany	Sloughs and seepage, Sec. 34, T. 1 S., and Sec. 3, T. 2 S., R 67 W	8 00	Sept. 23, 1897	Sept. 29, 1897

Gilheany No. 4	Thos. Gilheany	Swamp and seepage, Secs. 3 and 4, T. 2 S., R. 67 W.	8.00	Sept 27, 1897	Sept. 29, 1897
Henderson Seepage	Geo. Rucker, et al	Seepage, Sec. 3, T. 2 S., R. 67 W	8.00	Feb. 11, 1896	Jan. 24, 1898
Sansom	Sam Sansom	Seepage, Sec. 8, T. 3 N., R. 66 W	8.00	Feb. 5, 1898	Feb. 11, 1898
Mayfield	Mrs. A. W. Mayfield	Dry creek	8.00	Apr. 15, 1895	May 28, 1898
Johnson	Benj. A. Johnson	Lee draw	8.00	Apr. 19, 1898	June 2, 1898
Meek Seepage	Leonard B. Meek	Seepage, etc., Secs. 13 and 14, T. 1 S., R. 66 W	20.00	Apr. 15, 1898	June 4, 1898
Boller	B. H. Boller	First creek	25.00	June 15, 1898	July 6, 1898
Jay Thomas, extension	James E. Kirk	South Platte river	54 00	June 1, 1865	July 22, 1898
Painter	Jos. E. Painter	South Platte river	22.00	Aug. 25, 1898	Sept. 6, 1898
The Western, second enlargement	Western Ditch and Land Co.	South Platte river, via Hook & Hughes ditch and seepage	185 00	Nov. 29, 1893	Oct. 4, 1898
The Great Bend Ditch, extension	Great Bend Farming, Stock, Land, Ditch and Mer. Co.	South Platte river and seepage, from Western Ditch and Land Co.'s canal	110.00	Nov. 18, 1894	Oct. 27, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 2, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
John W. Scott's	John W. Scott	Waste waters, Sec. 26, T. 2, R 68 W			1892	Jan. 13, 1897
Bramkamp Seepage	Joel F. Vaile	Seepage or waste water	Bramkamp	82,500	Prior to Feb., 1897	Mar. 26, 1897
Oscar Jones	Oscar Jones	Walnut creek	Oscar Jones	1,300,000	1895	July 7, 1897
Ashcroft Draw	C. F. Reeves	Ashcroft draw seepage and flood waters		1,200,000	Oct. 6, 1897	Oct. 8, 1897
Great Bend No. 1	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte river	Great Bend ditch	276,000	July 23, 1897	Jan. 7, 1898
Great Bend No. 2	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte river	Great Bend ditch	35,000,000	July 23, 1897	Jan. 7, 1898
Great Bend No. 3	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte river	Great Bend ditch	11,000,000	July 23, 1897	Jan. 7, 1898
Sansom	Samuel Sansom & Co	Seepage, Sec. 8, T. 3 N., R. 66 W	Sansom	1,700,000	Feb. 5, 1898	Feb 11, 1898
Maul	Max O. Maul	First creek and seepage		432,241	Mar. 1, 1897	Apr. 5, 1898
Great Bend No. 7	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte river	Feeders	10,000,000	June 4, 1898	June 10, 1898

Johnson	Benj. A. Johnson	Johnson ditch	Johnson		Apr. 21, 1898	June 2, 1898
John Lee	John Lee	Platteville ditch			June 14, 1898	July 1, 1898
Painter	Joseph E. Painter	South Platte river	Painter	4,500,000	Aug. 25, 1898	Sept. 6, 1898
Lower Latham	Lower Latham Reservoir Co.	South Platte river		188,400,000	June 23, 1898	Sept. 20, 1898
Platteville	Platte Reservoir Co	South Platte		500,000,000	June 12, 1898	Sept. 21, 1898
Great Bend No. 4	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte	Western	13,503,000	Mar. 10, 1898	Oct. 6, 1898
Great Bend No. 5	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte	Western	16,988,400	Mar. 16, 1898	Oct. 6, 1898
Great Bend No. 6	Great Bend Farming, Stock, Land, Ditch and Mercantile Co	South Platte	Farmers' Independent	14,156,000	Mar. 10, 1898	Oct. 6, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 3, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second feet	Date of appropriation	Date of filing in office of State Engineer
W. C. Evan's Seepage	W. C. Evans	Seepage in Spring creek, Sec. 22, T. 7 N., R. 69 W.	1 00	Nov. 14, 1896	Dec 18, 1896
Box Elder Reservoir System, new inlet	Box Elder Ditch and Reservoir Co	Box Elder creek	18.00	Sept 21, 1896	Dec. 19, 1896
Box Elder Flood Canal	National Land and Irrigating Co	Box Elder creek	525.00	Dec. 7, 1896	Mar. 8, 1897
Cummings	R. E. Cummings	Oklahoma gulch, Sec. 4, T. 5 N., R. 67 W.	5.00	May 4, 1897	May 6, 1897
Black Hollow Seepage	Bruce Eaton	Seepage from Secs 28, 29 33, T. 7 N., R. 66 W., and Secs. 4 and 9, T. 6 N., R. 66 W.	15.00	June 1, 1896	May 12, 1897
Barlow Stonewall	J. C. Barlow	Stonewall creek	.....	Mar. 3, 1891	Aug. 16, 1897
Robert's Seepage	G. D. Roberts	Sheep draw, seepage, etc., Secs. 4 and 9, T. 5 N., R. 66 W.	11.60	Aug. 13, 1897	Oct. 11, 1897
Thompson Drain, Seepage and Waste	Edward A. Thompson	Seepage, etc., Secs. 3 and 10, T. 5 N., R. 66 W.	4.00	Dec. 19, 1897	Jan. 3, 1898
Perry No. 1	S. J. Perry	Lone Pine creek, south branch	3.50	Apr. 1, 1887	Mar. 10, 1898
Perry No. 2	S. J. Perry	Lone Pine creek, south branch	3.50	Apr. 1, 1894	Mar. 10, 1898
New Black Hollow	M. H. Laybourn	Black Hollow draw	5.60	Mar. 7, 1898	Mar. 24, 1898
Maxwell No. 1	Wm. Maxwell	East Ten-Mile creek	5.37	Jan. 1, 1898	Mar. 24, 1898
Maxwell No. 2	Wm. Maxwell	East Ten-Mile creek	5 to 10	Jan. 1, 1898	Mar. 24, 1898

Maxwell No. 3	Wm. Maxwell	East Ten-Mile creek	5 to 10	Jan. 1, 1898	Mar. 24, 1898
Riddle Seepage	Jno. M. Riddle	Slough, Sec. 29, T. 8 N., R. 68 W	5.00	Jan. 1, 1898	Mar. 30, 1898
Lagrange	John Gladstone	Coal bank draw	6.00	Apr. 12, 1898	Apr 21, 1898
Butler-Howard Ditch and Drainage System	Stillman K. Thompson Albert Howard Albert D. Butler	Cache La Poudre and seepage	26.00	Apr. 16, 1898	May 6, 1898
Rabbit Creek	Wm. Stewart	South Rabbit creek	4.85	Oct. 28, 1897	May 21, 1898
Jas. A. Brown, Seepage	Jas. A. Brown	Seepage and springs, Secs. 25, 26 and 30, T. 7 N., R. 69 W	9.50	June 20, 1898	July 29, 1898
The Camp Sub-Irrigating and Irrigating Sloughs and Ditch	Chas. Camp	High Bank slough, Secs. 4 and 5, T. 5 N., R. 65 W	10.00	Aug. 9, 1898	Nov. 2, 1898
The Dry Creek Ditch	B. D. Sanborn	Dry creek	37.80	Oct. 26, 1898	Nov. 2, 1898
The Spring Creek Ditch	Mary A. Stewart	Branch of Rabbit creek	3.65	Nov. 4, 1898	Nov. 21, 1898
The Prairie Divide Ditch	M. A. Stewart	Branch of the N. Lone Pine creek	2.96	Nov. 2, 1898	Nov. 21, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 3, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
John E. Law Reservoir	John E. Law	Seepage and flood waters, Black Hollow draw, Sec. 2, T. 6 N., R. 67 W.		2,788,262	Nov. 25, 1896	Jan. 25, 1896
Eaton Reservoir	Aaron J. Eaton	Cache La Poudre	Larimer and Weld canal	23,000,000	Jan 18, 1897	Jan. 25, 1897
National Land and Irrigating Co.'s Reservoir No. 5	National Land and Irrgiating Co	Cache La Poudre	North Poudre Canal	229,430,000	Oct. 31, 1891	Feb. 22, 1897
Lake Roscobie	Bruce Eaton	Cache La Poudre	Larimer and Weld canal	9,426,384	May 5, 1897	May 12, 1897
Morse	A. K. Morse	Box Elder creek	Feeder	2,900,000	May 20, 1897	Aug. 17, 1897
Neece	William M. Neece	Ravine in Sec. 20, T. 9 N., R. 69 W		4,257,000	Apr. 10, 1897	Sept. 20, 1897
Dowdy Lake	Noah W. Gower	Lone Pine creek south branch		15,445,000	Dec. 6, 1897	Mar. 7, 1898
Twin Lakes	Noah W. Gower	Lone Pine creek, south branch		1,708,000	Dec. 6, 1897	Mar. 7, 1898
Laybourn	M. H. Laybourn	Black Hollow draw		10,454,400	Mar. 7, 1898	Mar. 23, 1898
Upper Lake No. 1	Coal Creek Reservoir Co	Box Elder creek flood waters	Box Elder flood canal	117,612,000	Mar. 20, 1898	Apr. 6, 1898
Upper Lake No 2	Coal Creek Reservoir Co	Box Elder creek flood waters	Box Elder flood canal	78,388,000	Mar. 20, 1898	Apr. 6, 1898

Packard	E. K. Packard	Cache La Poudre	Larimer and Weld canal and Forfar lateral	2,178,000	Apr. 27, 1898	May 14, 1898
Williams	Sam'l T. Welch	Larimer and Weld canal and seepage		5,302,121	June 10, 1895	June 10, 1898
Colony	B. D. Sanborn	Fossil creek and Cache La Poudre	Feeder	116,000,000	Sept. 5, 1898	Oct. 3, 1898
Beadle Reservoir	Marcus Beadle	Coal Bank draw			Oct. 17, 1898	Oct. 29, 1898
Cache La Poudre Reservoir No. 2	New Cache La Poudre Reservoir Co	Cache La Poudre	Inlet canal	56,628,000	Oct. 10, 1898	Oct. 30, 1898
Cache La Poudre Reservoir No. 3	New Cache La Poudre Reservoir Co	Cache La Poudre	Outlet from No. 2	46,173,600	Oct. 11, 1898	Oct. 30, 1898
Colony Reservoir No. 2	B. D. Sanborn	Dry creek, Big Thompson, Cache La Poudre, Fossil creek	Dry Creek ditch; Louden ditch; Larimer, No. 2, canal, New Mercer ditch and Fossil creek and Inlet canal.	50,694,000	Oct. 25, 1898	Nov. 2, 1898
Colony Reservoir No. 3	B. D. Sanborn	Dry creek, Big Thompson	Dry Creek ditch, Louden ditch	61,112,800	Oct. 25, 1898	Nov. 2, 1898
McClenahan Reservoir	A. M. McClenahan	Seepage, etc., Sec 11, T. 5 N., R. 66 W		1,045,000	Oct. 29, 1898	Nov. 30, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 4, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Hautum Seepage	Geo. Hautum	Seepage, Secs. 20 and 29, T. 5 N., R. 66 W	5.00	Dec. 26, 1896	Dec. 29, 1896
Sauter Seepage	Joseph Sauter	Seepage, Sec. 9, T. 4 N., R. 67 W	6.00	June 1, 1897	June 11, 1897
Perkins, extension	James R. Mason	Buckhorn creek	22.00	May 25, 1897	Aug. 23, 1897
Dry Creek	Edwin D. Clark	Dry creek	16.00	July 20, 1897	Oct. 19, 1897
Buffum	Elijah J. Thompson	Buckhorn creek	4.50	Apr. 1, 1895	Nov. 19, 1897
Kee Pumping Plant	G. W. Kee	Seepage, etc, in ravines, Sec. 21, T. 5 N., R. 67 W	1.50	Nov. 8, 1897	Jan. 10, 1898
Kibby Seepage and Waste	T. A. Kibby	Seepage and waste, Secs. 7 and 8, T 4 N., R 67 W	7.50	Apr. 7, 1898	Apr. 15, 1898
Cummings Seepage	R. E. L. Allred	Seepage, etc., Sec. 4, T. 5 N., R. 67 W	4.00	Apr. 1, 1898	Apr. 15, 1898
Munson Seepage	John Y. Munson	Seepage, etc., Sec. 11, T. 4 N., R. 69 W	4.65	Apr. 25, 1898	Apr. 29, 1898
Cross, enlargement	Geo. W. Wilson	Dry creek	4.00	Oct. 15, 1897	May 3, 1898
Neville High Line	L. A. and F. A. Neville	Buckhorn creek	12.85	May 4, 1898	May 24, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 4, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Horse Shoe Park Reservoir and Fishing Co.'s Reservoir No. 1	Horse Shoe Park Reservoir and Fishing Co	Natural drainage, T. 5 N., R. 73 and 74 W		13,111,560	Sept. 24, 1896	Dec. 22, 1896
Horse Shoe Park Reservoir and Fishing Co.'s Reservoir No. 2	Horse Shoe Park Reservoir and Fishing Co	Natural drainage, T. 5 N., R. 73 and 74 W		9,625,060	Sept. 24, 1896	Dec. 22, 1896
Horse Shoe Park Reservoir and Fishing Co.'s Reservoir No. 3	Horse Shoe Park Reservoir and Fishing Co	Natural drainage, T. 5 N., R. 73 and 74 W		24,484,480	Sept. 24, 1896	Dec 22, 1896
Horse Shoe Park Reservoir and Fishing Co 's Reservoir No. 4	Horse Shoe Park Reservoir and Fishing Co	Natural drainage, T. 5 N., R. 73 and 74 W		16,661,700	Sept. 24, 1896	Dec. 22, 1896
Horse Shoe Park Reservoir and Fishing Co.'s Reservoir No. 5	Horse Shoe Park Reservoir and Fishing Co	Natural drainage T. 5 N., R. 73 and 74 W		216,068,000	Sept. 24, 1896	Dec. 22, 1896
Little Thompson Reservoir	Little Thompson Reservoir and Water Supply Co	Big Thompson and Little Thompson	Hillsboro canal, Miner and Longan	42,469,120	Oct 20, 1896	Jan. 19, 1897
White-Butler	Eben White Thomas Butler	St. Vrain	High Line ditch and surface	8,145,720	Feb. 3, 1897	Apr. 23, 1897
Allen	A. J. Allen	Big Thompson river and seepage	Home Supply canal	3,500,000	June 17, 1898	June 23, 1898
Hour Glass	Hour Glass Resort and Reservoir Co	Beaver creek and Secs. 12 and 13 T. 7 N., R. 74 W and Secs. 7 and 18, T. 7 N., R. 73 W		66,625,000	Aug. 9, 1898	Aug. 31, 1898
Steele and Phillips	Robt. Steele Jas. B. Phillips	Big Thompson river	Boomerang lateral	1,089,000	Sept. 26, 1896	Sept. 20, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 5, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Kiteley and Preston Seepage	W. J. Kiteley A. M. Preston	Seepage, etc., Secs. 20 and 29, T. 3 N., R. 68 W	5.74	 1878	Jan. 11, 1897
Sanborn Reservoir Ditch	Wm. Longan et al	Kiteley Gulch creek	16.25	Jan. 5, 1897	Mar. 23, 1897
Kiteley and Preston Seepage No 2	W. J. Kiteley Fred Spencer	Kiteley Gulch creek	7.70	Apr. 25, 1878	May 15, 1897
Mulvaney, Private, No. 1	Wm. A. Mulvaney	Kiteley Gulch creek	4.00	Apr. 1, 1877	May 15, 1897
Mulvaney, Private, No. 2	Wm. A. Mulvaney	Kiteley Gulch creek	4.00	Apr. 1, 1877	May 15, 1897
Hensley	F. A. Hensley	Bowles gulch and Miantenoma reservoir	10.00	May 13, 1897	May 25. 1897
Oard	Wm. Oard	Godding Hollow creek	2.75	Apr. 1, 1893	Dec. 4. 1897

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 5, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Craig	Alex R. Craig	Bowles gulch		450,000	May 13, 1897	June 9, 1897
Long's Peak Reservoir and Irrigation Company's Reservoir No. 1	Long's Peak Reservoir and Irrigation Co.	Waters flowing from Long's peak into north fork of St. Vrain		10,198,702	Sept. 21, 1897	Oct. 16 1897
Long's Peak Reservoir and Irrigation Company's Reservoir No 2	Long's Peak Reservoir and Irrigation Co	Waters flowing from Long's peak into north fork of St. Vrain		7,518,456	Sept 21, 1897	Oct 16, 1897
Moeller's Reservoir No. 1	Henry Moeller	Springs and seepage, Sec. 33, T. 4 N., R 67 W.		500,000	Feb. 10, 1898	Feb. 18, 1898
Moeller's Reservoir No. 2	Henry Moeller	Springs and seepage, Sec. 3, T 3 N, R 67 W.		3,000,000	Feb. 10, 1898	Feb. 18, 1898
Reese-Doyle	John Reese Thomas Doyle	Highland ditch		4,900,500		
Elliott	A. J. Elliott	Seepage, Elliott gulch		26,567,658	Spring, 1879	June 17, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 6, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
The Tomblin	A. L. Tomblin et al	Middle Boulder creek	500.00	Feb. 22, 1897	Feb. 25, 1897
Yankee Creek	Chas E. Hall	Yankee creek	8.33	Dec. 11, 1897	Dec. 30, 1897
Wissahickon	Chas. E. Hall	Jennie creek	8.33	Dec. 11, 1897	Dec. 30, 1897
Spruce Creek Ditch	Spruce Creek Ditch Co.	Spruce Creek	1.00	1886	Feb. 28, 1898
The Tomblin Ditch, western extension	A. L. Tomblin M. B. Tomblin	Headwaters of Middle Boulder creek	100.00	Jan. 19, 1898	Mar. 14, 1898
Gregory Canon Creek Ditch No. 1	Lucy N Rea	Gregory Canon creek		1884	Mar. 21, 1898
Gregory Canon Creek Ditch No. 2	Lucy N. Rea	Gregory Canon creek		Mar 14, 1898	Mar. 21, 1898
Ward Reservoir Feeder	Town of Ward	California Gulch springs, Sec. 1, T. 1 N., R. 73 W	8.00	May 28, 1898	June 6, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 6, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Harper	Jno. J Harper	South Boulder and Coal Creek ditch	Louisville reservoir lateral ditch and feeder	2,713,450	July 15, 1889	Nov. 5, 1897
Spruce Creek	Spruce Creek Ditch Co	Spruce creek	Spruce Creek ditch	190,575	1886	Feb. 28, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 7, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Cooper	Geo. C. Cooper Jno. H. Cooper	Dry creek	1 00	Apr. 16, 1894	Dec. 15, 1896
Dry Creek Feeder, enlargement	Geo. Rust et al	Dry creek, seepage, etc , Sec. 27, T. 2 S., R. 69 W	13.00	Feb. 22, 1897	Mar. 1, 1897
Golden-Ralston and Church Ditch, enlargement	Golden-Ralston and Church Ditch Co., and Golden City and Ralston Creek Ditch Co	Clear creek	299.27	Mar. 16, 1886	Aug. 5, 1897
Schultz Ditch	Catherine Schultz	Seepage and waste, Sec. 2, T. 3 S., R. 69 W.	2 85	Prior to Oct. 1, 1895	Jan. 17, 1898
Loveland Drainage	Miranda Loveland	Seepage, Sec. 13, T. 3 S., R. 70 W	1.37	Mar. 10, 1898	Apr. 19, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 7, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Parfet Reservoir	Caleb E. Parfet Norton H. Parfet	Golden Ditch and Flume Co.'s ditch; also seepage, Sec. 25, T. 3 S., R. 70 W		385,000	Dec. 18, 1896	Jan. 4, 1897
Swan Reservoir No. 3	Sarah L. Swan	Clear creek	Swan and Miller ditch, Dry creek and Valley ditch	4,324,045	Dec. 6, 1896	Feb. 24, 1897
Johnson and Hunt Reservoir	W. L. Johnson A. C. Hunt	South branch Farmers' High Line canal and Reservoir ditch	Johnson and Hunt	2,683,560		June 21, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 8, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Kisthard	Jacob Kisthard	Little Dry creek	1.50	Jan. 4, 1897	Jan. 7, 1897
Columbine	Joseph B. Wight	Dry gulch, Sec. 3, T. 4 S., R. 69 W	3.00	July 1, 1876	Jan. 13, 1897
Legere	Isaac C. Legere	Cherry creek	4.00	Feb. 11, 1897	Mar. 4, 1897
Spring Gulch	Elizabeth H. Millsap	Spring gulch	12.23	May 1, 1887	Apr. 1, 1897
Morgan	Geo. L. Hooper	Mill creek	6.00	Prior 1872	June 17, 1897
Hercules	Hercules Powder Co	Unnamed stream, Sec. 29, T. 4 S., R. 68 W.	5.00	June 11, 1897	June 17, 1897
Newsom	Eli Newsom	Lewis gulch and seep., S. 23, T. 6 S., R. 66 W.	4.00	Aug. 17, 1897	Nov. 1, 1897
Buntain	Wm. T. Buntain	Jarre creek	3.00	Spring, 1872	Dec. 31, 1897
Clark	Georgiana E. Clark	Mill creek	6.00	Mar. 17, 1898	Mar. 22, 1898
Morgan Draw	Georgiana E. Clark	Morgan draw	1.50	May 15, 1895	Mar. 22, 1898
Stallard	Loella S. Newsom	Wilson gulch	5 20	Jan. 20, 1898	Apr. 19, 1898
Hooper	Geo. L. Hooper	Hooper gulch	-----	Sept. 30, 1897	May 20, 1898
Williamson	William Williamson	Plum creek	21.00	Mar. 7, 1898	June 4, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 8, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Williamson	Wm. Williamson	Plum creek	Williamson		June 1, 1898	June 4, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 9, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Altevogt Waste and Seepage	Setta Altevogt	Seepage and waste, Secs. 2 and 3, T. 5 S., R. 69	1.50	1888	June 29, 1897
Brooks	John H. Brooks	Weaver creek	27.00	Mar. 15, 1898	Mar. 17, 1898
Altevogt Waste and Seepage	John Altevogt	Seepage along railroad to Morrison, T. 4 S., R. 69 W	4.00	Aug. 23, 1898	Aug. 29, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 10, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Carlton	J. W. Carlton	Rock creek	3.00	May 19, 1897	Aug. 4, 1897
Donavan No. 1	Susie W. Donavan	Fountain river	3.50	Aug. 5, 1897	Nov. 19, 1897
Hall	Frank Hall	Dry creek	2.50	April 3, 1897	Jan. 4, 1898
Watson	Wm. Gesford	Watson reservoir	3.60	April 8, 1895	Feb. 15, 1898
Roby Feeder	W. H. Roby F. F. Roby	Little Fountain creek	11.70	 1891	June 2, 1898
Broadmoor Land Co. Pipe Line	The Broadmoor Land Co	Cheyenne creek	6.35	May 10, 1898	July 5, 1898
John Wolf Ditch, enlargement	L. J. Voss	North Fork Cheyenne creek	1.20	July 28, 1898	Oct. 24, 1898
Wolf Ditch, enlargement	Robert Davis	Cheyenne creek	1.50	July 28, 1898	Oct. 24, 1898
Spring Branch Ditch	Alvin Ames	Spring branch	$3\frac{6}{10}$	 1878	Nov. 23, 1898
Glen Eyrie Pipe Line	Wm. J. Palmer	Camp creek	4.31	Sept. 22, 1898	Nov. 30, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 10, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Watson	Wm. Gesford	Underground springs		13,000	Apr. 8, 1895	Feb. 15, 1898
Glen Eyrie Water Works System, Reservoir No. 4	Wm. J. Palmer	Camp creek		2,047.320	Sept. 13. 1898	Nov. 30, 1898
Glen Eyrie Water Works System, Reservoir No. 5	Wm. J. Palmer	Camp creek		4,091,640	Sept. 13, 1898	Nov. 30, 1898
Mesa Reservoir No. 1	Wm. J. Palmer	Camp creek		2,526,480	Sept. 10, 1898	Nov. 30, 1898
Mesa Reservoir No. 2	Wm. J. Palmer	Camp creek		2,000,000	Sept. 12, 1898	Nov. 30, 1898
Mesa Reservoir No. 3	Wm. J. Palmer	Camp creek		2,439.360	Sept. 10, 1898	Nov. 30, 1898
Echo Rock Reservoir	Wm. J. Palmer	Camp creek, via Glen Eyrie pipe line		130.680	Sept. 23, 1898	Nov. 30, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 11, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Hollenbeck	L. A. Hollenbeck	Spring and seepage, Secs. 1 and 2, T. 49 N., R. 8 E	2.00	Feb. 1, 1897	Feb. 8, 1897
Bray Ditch, enlargement and extension	J. H. Burgwald G. A. Benkelman	Arkansas river	32.00	Mar. 31, 1897	July 3, 1897
Bray Ditch, enlarged and extended	O. O. Morrison	Arkansas river	107.00		July 30, 1897
H. H. Blake	Henry H. Blake	Big Union gulch	13.50	June 24, 1897	Nov. 18, 1897
Crippen Spring	J. J. Crippen, trustee	Spring and slough, Sec. 4, T. 49, R. 9 E	2.00	Dec. 20, 1897	Jan. 18, 1898
Bell	R. Bell	Waste from Loetsenheiser ditch	4.00	Apr. 1, 1898	Apr. 29, 1898
John Lindquist	John Lindquist	Big Union creek	4.00	Jan. 10, 1898	July 26, 1898
Martin H. Holen	Martin H. Holen	Arkansas river, Tennessee fork	8.00	June 10, 1898	Sept. 30, 1898
Morrison No. 1	L. A. Morrison	Springs and seepage, Secs. 5-6, T. 49, R. 9 E.	2.30	June 18, 1898	Oct. 12, 1898
Morrison No. 2	L. A. Morrison	Seepage, Sec. 6, T. 49 N., R. 9 E	2.30	June 18, 1898	Oct. 12, 1898
Old Hunt	L. A. Morrison	Seepage, Sec. 5, T. 49 N., R. 9 E	2.30	1896	Oct. 12, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 11, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Twin Lake Reservoir	H. Koons Jas. A. Roberts	Lake creek		899,309,268	Dec. 15, 1896	Jan. 8, 1897
Lower Twin Lake Sub-Surface Reservoir	J. S. Greene J. E. Rizer	Lake creek		653,400	May 15, 1897	May 20, 1897
Upper Twin Lake Sub-Surface Reservoir	J. S. Greene J. E. Rizer	Lake creek		217,800	May 15, 1897	May 20, 1897
Twin Lake Reservoir, first enlargement	H. Koons Jas. A. Roberts	Lake creek and Twin lakes		2,123,432,388	Mar. 29, 1897	June 26, 1897
Twin Lake Reservoir, second enlargement	H. Koons Jas. A. Roberts	Lake creek and Twin lakes		3,008,521,484	Mar. 29, 1897	June 26, 1897
Twin Lake Reservoir	Mackintosh & Co	Arkansas river, Lake creek and Twin lakes	Hayden canal	5,305,608,000	June 21, 1897	Aug. 6, 1897
Upper Twin Lake Reservoir	C. H. McHarg	Lake creek		288,323,640	May 15, 1897	Aug. 12, 1897
Lower Twin Lake Sub-Surface Reservoir	J. S. Greene J. E. Rizer	Lake creek		653,400,000	May 15, 1897	Aug. 12, 1897
Upper Twin Lake Sub-Surface Reservoir	J. S. Greene J. E. Rizer	Lake creek		217,800,000	May 15, 1897	Aug. 12, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 12, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Redpath	Wm. H. Redpath	High creek	2.00	Apr. 1, 1894	Dec. 1, 1896
Hunt and Higdon	D. P. Hunt J. M. Higdon	Dewese and Dye ditches and seepage, Sec. 5, T. 19 S., R. 70 W	5.00	April 17, 1897	Apr. 21, 1897
Cooper	Geo. W. Cooper	Big Cottonwood creek	4.50	June 9, 1897	June 10, 1897
The Park Center Land and Water Co	The Park Center Land and Water Co	Oil creek and waste water from numerous mines	65.00		July 13, 1897
Dorcas Water Right	Dorcas Mining and Milling Co	East fork West Beaver creek	13.00	Sept. 8, 1897	Sept. 17, 1897
Big Creek	A. L. Hatley	Big creek	4.00	July 27, 1897	Nov. 5, 1897
The Park Center Land and Water Co., enlargement	The Park Center Land and Water Co	Oil creek and seepage and waste waters	58.00	Oct. 8, 1897	Nov. 30, 1897
Garden Park, enlargement	A. Ripley et al	Four-Mile creek	13.00	Mar. 2, 1896	Mar. 3, 1898
Beaver Park Canal	A. A. MacLean H. H. Dunham	Beaver creek	200.00	July, 1898	July 22, 1898
Eight Mile Park	James Fox	Beaver creek	38.30	May 29, 1898	Aug. 29, 1898
Adams Ditch, enlargement	Albert Adams	Oak creek	1.50	Aug. 20, 1898	Nov. 18, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 12, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
The Park Center Land and Water Co.'s No. 1	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	240,000	Jan. 13, 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No 2	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	960,000	Jan. 13, 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No. 3	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	100,000	Jan. 13, 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No 4	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	360,000	Jan. 13, 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No. 5	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	1,440,000	Jan. 13. 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No. 6	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	1,440,000	Jan. 13, 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No. 7	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	150,000	Jan. 13, 1897	Feb. 12, 1897
The Park Center Land and Water Co.'s No. 8	The Park Center Land and Water Co	Oil creek	P. C. L. & W. Co.'s ditch	1,920,000	Jan. 13, 1897	Feb. 12, 1897
The Cripple Creek Reservoir Water and Power Supply Co.'s Reservoir No. 1	The Cripple Creek Reservoir, Water and Power Supply Co	West fork of West Beaver creek		21,500,000	Dec. 11, 1896	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co 's Reservoir No. 2	The Cripple Creek Reservoir, Water and Power Supply Co.	West fork of West Beaver creek		9,000,000	Jan. 7, 1897	Feb. 13, 1897

The Cripple Creek Reservoir, Water and Power Supply Co 's Reservoir No. 3	The Cripple Creek Reservoir, Water and Power Supply Co	East fork of West Beaver creek		10,000,000	Dec. 15, 1896	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co.'s Reservoir No. 4	The Cripple Creek Reservoir, Water and Power Supply Co	East fork of West Beaver creek		11,100,000	Dec. 16, 1896	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co.'s Reservoir No. 5	The Cripple Creek Reservoir, Water and Power Supply Co	East fork of West Beaver creek		6,400,000	Jan 14, 1897	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co.'s Reservoir A	The Cripple Creek Reservoir, Water and Power Supply Co	Reservoir D and Middle Beaver creek		98,500.000	Dec. 12, 1896	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co.'s Reservoir B	The Cripple Creek Reservoir, Water and Power Supply Co	Reservoir C and Middle Beaver creek		22,000,000	Dec. 21, 1896	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co.'s Reservoir C	The Cripple Creek Reservoir, Water and Power Supply Co	Spring, Sec. 4., T. 15 S., R. 68 W		18,500,000	Dec. 29, 1896	Feb. 13, 1897
The Cripple Creek Reservoir, Water and Power Supply Co.'s Reservoir D	The Cripple Creek Reservoir, Water and Power Supply Co	Sackett creek		6,500,000	Dec. 17, 1896	Feb. 13, 1897
The Excelsior Reservoir	J. A. Huntington et al	Spring, Secs. 27-34, T. 14 S., R. 69 W., and West fork of West Beaver ck.		4,718,550	Feb. 16, 1897	Feb. 17, 1897
Rocky Mountain	W. E. Pedrick	Newlan creek	Pipe line	2,712,960	July 16, 1897	July 20, 1897
Gillette	Town of Gillette	Oil creek	Feeder	426,670	Mar. 1, 1897	Aug. 26, 1897
Kelly	Kelly Ditch Co	Beaver creek	Kelly ditch	10,890,000	Dec. 8, 1897	Mar. 7, 1898
Oak Creek	John Bunks J. T. Locke	Oak creek	Oak Creek reservoir	150,000	Mar. 20, 1898	June 17, 1898
Eight Mile Park	James Fox	Beaver creek	Eight-Mile park	66,771,840	May 29, 1898	July 16, 1898
Beaver Park	A. A. MacLean H. H Dunham	West Beaver creek		800,000,000	July, 1898	July 22, 1898
Beaver Park No. 2	A. A MacLean H. H. Dunham	Beaver creek		53,196,800	July, 1898	July 22, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 12, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
West Beaver	James Fox	West Beaver creek		42,079,000	May 16, 1897	July 27, 1898
Beaver Park, amended statement	A. A. MacLean H. H. Dunham	Beaver creek and West Beaver creek		800,000,000	July, 1898	Aug. 20, 1898
Beaver Park Reservoir No. 3	A. A. MacLean H. H. Dunham	Eight-Mile and Sand creeks		300,000,000	July, 1898	Aug. 20, 1898
Oak Creek Reservoir No 2	Albert Adams	Oak creek		960,000	Aug. 20, 1898	Nov. 18, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 13, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
J. Henry Ditch No. 1	John A. Henrich	J. Henry Spring creek	1.20	Oct. 15, 1878	Dec. 10, 1896
J. Henry Ditch No 2	John A. Henrich	J. Henry Spring creek	1.20	May 15, 1879	Dec. 10, 1896
J. Henry Ditch No. 3	John A. Henrich	J. Henry Spring creek	1.20	June 6, 1881	Dec. 10, 1896
J. Henry Ditch No. 4	John A. Henrich	J Henry Spring creek	1.80	Sept. 1, 1887	Dec. 10, 1896
J. Henry Ditch No. 5	John A. Henrich	J. Henry Spring creek	1.20	May 5, 1888	Dec. 10, 1896
The H. G. Reed North Brush Creek Reservoir Supply	H. G. Reed	North Brush creek	2.50	June 5, 1895	May 14, 1897

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 13, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Grape Creek	Geo. E. Ross-Lewin H R. Holbrook	Grape creek		5,610.528,000	Apr. 20, 1897	June 5, 1897
Balman	Thos. G. Balman	Lake creek		1,707,552	June 11, 1897	Mar. 17, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 14, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Rogers	James Livesey	Arkansas river	3.00	Mar. 1, 1866	Mar. 29, 1898
Sutherland Spring and Underflow Ditch	Morris S. Sutherland	Fountain Qui Bouille	2.44	Feb. 1, 1898	Apr. 29, 1898
Little Arroya	B. F. Edwards J. S. Greene	Little Arroya	2.00	Spring of 1893 or 1894	May 2, 1898
Ayer	Richard Ayer	Squirrel creek	4.60	June 21, 1898	July 26, 1898
Ayer No. 2	Richard Ayer	Squirrel creek	4.60	June 22, 1898	July 26, 1898

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GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 14, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Manzanola Reservoir No. 1	Manzanola Reservoir and Canal Co	Flood waters of Arkansas river	Manzanola canal	236,244,664	Sept. 21, 1896	Dec. 19, 189
Manzanola Reservoir No. 2	Manzanola Reservoir and Canal Co	Flood waters of Arkansas river	Manzanola canal	178,343,778	Sept. 21, 1896	Dec. 19, 1896
Manzanola Reservoir No. 3	Manzanola Reservoir and Canal Co	Flood waters of Arkansas river	Manzanola canal	114,674,996	Sept. 21, 1896	Dec. 19, 1896
Manzanola Reservoir No. 4	Manzanola Reservoir and Canal Co	Flood waters of Arkansas river	Manzanola canal	324,454,164	Sept. 21, 1896	Dec. 19, 1896
Manzanola Reservoir No. 5	Manzanola Reservoir and Canal Co	Flood waters of Arkansas river	Manzanola canal	65,099,322	Sept. 21, 1896	Dec. 19, 1896

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 16, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Ben Butler Ditch	Ben Butler Finch	Aspen creek	1.00	Mar. 15, 1887	Dec. 1, 1896
Wilson No. 2 Ditch	J. A. J. Wilson	Huerfano river	1.00	Mar. 1, 1885	Dec. 2, 1896
Faulkner No. 1 Ditch	Alex Peddie	Bear Canon creek	3.00	Apr. 15, 1889	Dec. 3, 1896
Faulkner No. 2 Ditch	Alex Peddie	Bear Canon creek	2.00	Apr. 23, 1896	Dec. 3, 1896
Oak Creek Springs Ditch	Wm. S. Kinsey	North and South Fork Oak creek	2.00	 1888	Dec. 3, 1896
Tiger Ditch	F. L. Martin and W. E. Smith	Cuchara creek	1.00	 1873	Dec. 3, 1896
Smith Ditch	Alex Peddie and J. W. Smith	Cuchara creek	2.00	June, 1873	Dec. 3, 1896
Desert Claim Ditch	Wm. N. Erwin	Hayes branch	1.00	Nov. 21, 1895	Dec. 3, 1896
John George Ditch	John George	Cuchara river	11.70	Mar. 10, 1881	Dec. 10, 1896
Epifanio Ditch	Epifano Martinez et al	Pass creek	4.00	Feb. 15, 1889	Jan. 2, 1897
Autobes Ditch	M. Autobes	Middle Turkey creek	2.00	Apr. 5, 1885	Jan. 7, 1897
O. J. O. Ditch	J. B. Aragon	Springs, Sec. 4, T. 26 S., R. 67 W	2.00	Spring, 1892	Jan. 7, 1897
Lake Miriam Ditch	W. N. Coler, Jr	Cuchara river	55.00	Mar. 1, 1884	Jan. 20, 1897
Dogtown No. 2 Ditch	F. E. McMillan et al	Huerfano river	28.80	Feb., 1894	Feb. 11, 1897
New Ditch	James Martin et al	Cuchara river	5.00	Apr. 1, 1896	May 10, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 16, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Badito Ditch and Storage Reservoir, ditch enlargement	Chas. O. Richardson	Huerfano river	400.00	May 19, 1897	May 26, 1897
Butte Ditch	Louis Goemmer	Cuchara river	13.00	Apr. 15, 1887	July 8, 1897
Thos. Grantham Canal	Thos. Grantham	Huerfano river	175.00	July 9, 1897	July 10, 1897
Teodoro Ditch, amended statement	Jose B Maes	North Abeyta creek	3.00	April 1, 1877	Jan. 10, 1898
Montes Ditch	J. D. Montes et al	Huerfano river	5 00	April 9, 1870	Jan. 12, 1898
Branch Underflow Ditch	R. A. Hayes	Hayes branch	2.00	April, 1895	Jan. 28, 1898
Nellie Bly Ditch	H. L. Stickler	Apache creek	2.00	July 1, 1897	Jan. 28, 1898
Nellie Bly Underflow Ditch	H. L. Stickler	Apache creek	2.00	July 1, 1897	Jan. 28, 1898
Abercrombie Ditch	J. G. Abercrombie	Springs, Sec. 35, T. 26 S., R. 65 W	3.00	Nov. 27, 1897	Feb. 16, 1898
Creager Ditch	Wm. J. Millsap	Bluff creek	2.50	Mar. 1, 1888	May 9, 1898
Millsap Underflow Ditch	Wm. J. Millsap	Swamp, Sec. 23, T. 26 S., R. 70 W	2.00	Apr. 16, 1898	May 9, 1898
Rouse Arroya Ditch	Edward Farr Jefferson B. Farr	C. C. & I. Co.'s mines, Sec. 36, T. 28 S., R. 66 W	6.00	Apr. 1, 1898	Sept. 30, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 16, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Kinsey Reservoir	L. A. Williams Wm. S. Kinsey	Oak creek	Oak Creek Springs ditch	1,012,500		Dec. 3, 1896
Sharp's Orchard Reservoir	C. B. Sharp Louis Sporleder	Cuchara river	La Joza ditch and Underflow ditch No. 1	3,696,000	Dec. 22, 1896	Jan. 1, 1897
Thos. Grantham Reservoir No. 1	Thos. Grantham	Huerfano river	Thos. Grantham canal	1,670,797,333	Apr 10, 1897	July 9, 1897
Thos. Grantham Reservoir No. 2	Thos. Grantham	Huerfano river	Thos. Grantham canal	67,953,600	Apr. 10, 1897	July 9, 1897
Thos. Grantham Reservoir No 3	Thos. Grantham	Huerfano river	Thos. Grantham canal	52,707,600	Apr. 10, 1897	July 9, 1897
Hayes Reservoir	R. A Hayes	Hayes branch	Branch Underflow ditch	1,909,650	Summer, 1885	Jan. 28, 1898
Oehm Reservoir	W. M. Coler	Cuchara river	Lake Miriam ditch	180,000,000	Mar. 1, 1884	Mar. 15, 1898
Creager Reservoir	Wm. J. Millsap	Bluff creek	Creager ditch	3,133,000	Mar. 1, 1888	May 9, 1898
Creager Reservoir, enlargement	Wm. J. Millsap	Bluff creek	Creager ditch	5,574,500	Apr 12, 1898	May 9, 1898
J. M Murry Reservoir	Wm. J. Millsap	Muddy creek		1,086,250	1893	June 21, 1898
Creager Reservoir	Wm. J. Millsap	Muddy creek		6,737,500	Mar. 1, 1888	June 21, 1898
Casias Reservoir	Reyes Casias	Huerfano river		770,656	Feb 1, 1897	June 23, 1897
Ute Reservoir	W. Francisco	Indian creek		29,635,200	1884	Aug. 30, 1898
Francisco Reservoir	W. Francisco	Indian creek		30,314,575	1884	Aug 30, 1898
Vigil-Valdes Reservoir	M. A. Vigil A. D. Valdes	Surface and storm waters, Sec 36, T. 28 S., R. 66 W		94,956	June 19, 1898	Sept. 16, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 17, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Herman Klinkerman Ditch	Herman Klinkerman	Horse creek	12 50	Jan. 22, 1897	Feb 25, 1897
Haight Irrigation Ditch	M. D. L. Haight	Drainage Patterson hollow, seepage and waste water from Rocky Ford canal and other sources, Secs 17-18, T. 23 S., R. 57 W	55 68	July 8, 1895	May 12, 1897
Crooked Arroya, extension and enlargement	Estate W. H. Robinson	Crooked Arroya creek	8.00	Mar. 26, 1897	June 18, 1897
Perry Kirk Ditch	Perry T. Kirk	Wild Horse creek	3.00	April 1, 1896	May 11, 1898
Gaches Ditch	Wm. H. Gaches	Crooked Arroya creek	10.00		June 17, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 17, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
a Neesopah	Great Plains Water Storage Co	Arkansas river	Supply canal	1,497,266,100	Oct. 5, 1896	Dec. 29, 1896
a Neegronda	Great Plains Water Storage Co	Arkansas river	Supply canal	1,426,852,736	Oct. 5, 1896	Dec. 29, 1896
a Neenoshe	Great Plains Water Storage Co	Arkansas river	Supply canal	3,577,212,540	Oct. 5, 1896	Dec. 29, 1896
a Neeskah	Great Plains Water Storage Co	Arkansas river	Supply canal	1,426,852,736	Oct 5, 1896	Dec. 29, 1896
a King Reservoir, enlarged	Great Plains Water Storage Co	Arkansas river	Supply canal	796,263,732	Oct. 5, 1896	Dec 29, 1896
Vogan Reservoir No. 1	Charles E. Vogan	Ordway lateral	Feeder	2,000,000	Dec 7, 1896	Mar 3, 1897
Lolita Reservoir	Lolita Land and Town and Irrigation Co	Horse creek	Lolita canal	55,223,417	July 8, 1895	May 12, 1897
Masters	Holmer Masters	Timpas creek	Masters ditch	11,020,680	June 24, 1897	July 17, 1897

a Supply canal located in District No. 17 and reservoirs in District No. 67.

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 18, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
The Omer Ditch	C. A. Watson J. J. Watson	Apishapa river	69.00	Aug. 16, 1898	Nov. 11, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 18, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Apishapa Reservoir	Rocky Ford Canal, Reservoir, Land, Loan and Trust Co.	Apishapa river	---------- ----------	34,071,825.20	Jan. 10, 1898	Jan 31, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 19, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
East Side Irrigating Ditch	John S. Hart et al	Trinchera creek	38.00	Sept. 18, 1890	Dec. 18, 1897
San Pedro Irrigating Ditch	John S. Hart	Rito Azul	5.30	Mar. 18. 1897	Jan. 5, 1898
Blue Creek Ditch and Feeder to Little Reservoir	John S. Hart	Rito Azul	126.00	Dec. 1, 1897	May 4, 1898
Hart Ditch	John S. Hart	Rito Azul and Hart reservoir	18.90	Dec. 7, 1897	May 4, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 19, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Roberts Reservoir No. 1	Allan Roberts	Arroya, Sec. 1, T. 33 S., R. 63 W	Roberts ditch No. 1	65,000	Feb. 4, 1898	May 2, 1898
Roberts Reservoir No. 2	Allan Roberts	Arroya, Sec. 1, T. 33 S., R. 63 W	Roberts ditch No. 2	30,000	Feb. 4, 1898	May 2, 1898
Roberts Reservoir No. 3	Allan Roberts	Arroya, Sec. 36, T. 32 S., R. 63 W		30,000	Feb. 7, 1898	May 2, 1898
Little Reservoir	John S. Hart	Trinchera creek	East Side ditch	389,509	Dec. 10, 1897	May 4, 1898
Hart Reservoir	John S. Hart	Rito Azul	Blue Creek ditch	5,854,464	Dec. 1, 1897	May 4, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 20, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Southey Ditch	Marina Southey	Seepage of Rio Grande in arroya in Sec. 32, T. 39 N., R. 8 E	5.00	May 1, 1890	Apr. 5, 1897
Rio Grande Ditch No. 4, enlargement	August J. Weiss	Rio Grande river	13.00	Apr. 9, 1896	May 5, 1898
Fornwald Ditch	Peter Fornwald	Cat creek	4 00	May 1, 1898	May 18, 1898
Scherer Ditch	Henry Scherer	Cat creek	4.00	Apr. 20, 1896	May 31, 1898
Zinser Ditch	J. F. Zinser	Arroya, on Rio Grande river, Sec. 32, T. 39 N., R. 8 E	5.00	Mar. 4, 1896	Aug. 26, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 20, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Regan Reservoir	John S. Regan	Crooked creek	Regan ditch	307,971,100	Sept. 21, 1896	Dec. 21, 1896

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 23, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Davis No. 1, enlargement	Wm. C. Davis Francis M. Davis	Elk creek	5.50	----- 1884	Dec. 1, 1896
Davis No. 2, enlargement	Wm. C. Davis Francis M. Davis	Black Mountain creek	4.50	----- 1888	Dec. 1, 1896
Davis No. 3	Wm. C. Davis Francis M. Davis	Spring branch of Elk creek	2.50	Nov. 11, 1896	Dec. 1, 1896
Weaver	F. A. Weaver	North fork of South Platte river	200.00	June 10, 1897	June 23, 1897
Frisco	D. A. Bowersock	Rock creek	20.00	June 28, 1897	July 1, 1897
Night-Hawk	The Night-Hawk Town, Mining and Improvement Co.	Pine creek	35.00	July 24, 1897	Aug. 6, 1897
Templeton	Andrew J. Templeton, Jr.	Trout creek	20.00	July 21, 1897	Oct. 16, 1897
Schattinger Waste	Samuel Lasell	Seepage, etc., Sec. 10, T. 8 S., R. 76 W	7.00	Oct., 1895	Mar. 9, 1898
Ball	C. W. Ball et al	-----	5.00	Mar. 15, 1898	Apr. 18, 1898
Abbott	Z. J. Abbott	Spring creek	5.00	Feb. 14, 1898	June 1, 1898
The Denver Power and Irrigation Co.'s Pipe Line, amended	The Denver Power and Irrigation Co	South Platte	Same as original	Aug. 31, 1898	Nov. 12, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 23, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
South Park	High Line Reservoir Co.	South fork, South Platte river		2,214,000,000	Feb. 21, 1891	May 14, 1897
Lost Park	High Line Reservoir Co.	Lost Park creek		2,000,000,000	Jan. 1, 1891	May 14, 1897
Rampart	Peter J. O'Reilly	Tarryall creek		4,110,678,896	Jan. 22, 1898	Feb. 23, 1898
The Denver Power and Irrigation Co.'s Reservoir, enlargement	The Denver Power and Irrigation Co	North and south fork of South Platte river		808,000,000	June 23, 1897	Aug. 4, 1898
Tarryall Reservoir	Franklin F. Noxon	Tarryall creek		1,679,090,000	Oct. 22, 1898	Jan. 15, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 25, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Bancroft Ditch	T. D. Bancroft	Steele creek	5.00	Dec 7, 1896	Dec. 10, 1896
Clark's Ditch No. 1	E. P. Clark	San Luis creek	18.00	Fall, 1884	June 1, 1898
Clark's Arroya Ditch	E. P. Clark	San Luis creek	18.00	Fall, 1884	June 1, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 26, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Quartette Ditch	Wm. T. Ashley et al	Saguache creek	9.20	1871	Dec 22, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 28, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Granite Mountain Ditch	Granite Mountain Gold Mining Co	Tomichi creek	14.85	Aug. 3, 1897	Aug. 17, 1897
The Norman Ditch	Edward Norman	Cochitopa creek	17.88	Apr. 18, 1898	Apr. 21, 1898
The Rausis Ditch	M. Turnay H Rausis	Cochitopa creek	3.00	Apr. 18, 1898	Apr. 21, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 29, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Oak Hill Reservoir	Morris O. Brown	Little Blanco creek		2,025,000	Aug. 1, 1895	Feb. 23, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 30, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Waterfall Ditch	Mrs. A. C. D. Wigglesworth	Waterfall creek	2.00	 1874	Feb. 23, 1897
Wilson Ditch	Jos. E. Wilson	Lightner creek	1.00	June 25, 1892	Mar 8, 1897
Logan Ditch Feeder No. 1	U. S. Stone et al	Animas river	10.00	Aug. 20, 1895	June 23, 1897
Logan Ditch Feeder No. 2	U. S. Stone et al	Animas river	10.00	Aug. 20, 1895	June 23, 1897
Waterfall Creek	Mrs. R. P. Graves	Waterfall creek	.25	Oct. 15, 1880	Feb. 28, 1898
Naeglin Ditch, extension	Charles Quinn William Naeglin	Junction creek	2.50	May 15, 1877	May 9, 1898
Underhill Ditch No. 1	Owen F. Boyle	Junction creek	1.00	June, 1878	July 27, 1898
Underhill Ditch No. 2	Owen F. Boyle	Junction creek	1.00	June, 1883	July 27, 1898
Dwyer New Ditch	Robert Dwyer	Junction creek	1.50	Mar. 10, 1888	Aug. 9, 1898
Pingrey and Dwyer Ditch	Nancy J. Pingrey Robert Dwyer	Junction creek	9.50	June 3, 1889	Aug. 9, 1898
Pingrey Ditch	Nancy J. Pingrey	Junction creek	1.50	July 1, 1880	Aug. 9, 1898
Shields Ditch No. 1	Mary Perung	Lightner creek	$\frac{5}{12}$ or .41	May 1, 1886	Sept. 1, 1898
Shields Ditch No. 2	Mary Perung	Lightner creek	1.08	May 1, 1886	Sept. 1, 1898
Mason and Shields Ditch	Thomas Mason Mary Perung	Lightner creek	1.00	May 20, 1886	Sept. 1, 1898
Animas City Ditch	Town of Animas City	Junction creek	9.49	Mar 13, 1883	Oct. 21, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 32, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Blum Irrigating Ditch	Josephine Carlile	Hartman draw, Sec. 2, T. 36 N., R. 16 W	2.00	Apr. 2, 1888	Jan. 14, 1897
The G. M. Longenbaugh Ditch	G. M. Longenbaugh	McElmo creek, Sec. 9, T. 36 N., R. 16 W	3.00	Dec. 9, 1896	Jan. 18, 1897
Richards Ditch	Bertha A. Parker J. W. Richards	Seepage and waste, Alkali gulch, Secs. 7 and 18, T. 36 N., R. 16 W	2.00	May 15, 1891	May 10, 1897
Boid Ditch	G. M. Longenbaugh	Hartman gulch, Sec. 15, T. 36 N., R. 16 W	3.00	Mar. 27, 1897	June 16, 1897
Luxton Ditch No. 2	Francis Luxton	West Naragonot gulch	1.50	June 15, 1897	July 16, 1897
Mann Ditch	Chas. Mann	Seepage, etc., Sec. 26, T. 37 N, R. 16 W	3 00	Jan. 3, 1898	Jan. 17, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 33, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
The Keller Ditch	S. Keller	La Plata river	2.00	May 10, 1890	Dec. 24, 1896
Chedal Ditch	A. Chedal	Cherry creek	5 00	Apr. 1, 1888	Dec. 26, 1896
Enterprise Irrigating Ditch	David P. Dale John R. Pond	La Plata river	3.00	1880	Apr. 2, 1897
Waster Water Ditch	Casper Moss	Seepage and waste, Sec. 4, T. 35 N., R. 12 W.	Two branches each 1.00	Aug. 15, 1885	June 4, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 35, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Badger State Ditch	Badger State Placer Mining Co	Placer, Middle and South Middle creeks	30 00	July 12, 1897	July 20, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 36, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Kern Ditch and Pipe Line	M. H. Kern	Blue river	320 00	Aug. 7, 1897	Aug 16, 1897
Kern Ditch and Pipe Line	M H. Kern	Blue river	320.00	Aug. 18, 1897	Aug. 25, 1897
New England Ditch	D. J. C. Arnold	Sonard creek	13.60	Aug. 21, 1897	Aug. 25 1897
Kern Ditch and Pipe Line	M. H. Kern	Blue river	320 00	Aug. 7, 1897	Oct. 18, 1897
Keystone Ditch	J. G. Fiero	Keystone river	49.00	July 2, 1896	Dec. 1, 1897
Bellevue Ditch	Bellevue Min. and Milling Co	Little Illinois creek	13.33	----------	Mar. 5, 1898
Benson's Ditch	Jno. Benson	Boulder creek	5.20	July 14, 1896	July 21, 1898
Cow Camp Ditch	Mary Thompson	Pierce creek	5.65	Apr. 12, 1897	July 21, 1898
Emmet's Brush Creek Ditch No. 1	John H. Emmet	Brush creek	1.88	July, 1895	Aug. 30, 1898
Emmet's Brush Creek Ditch No. 2	John H. Emmet	Brush creek	2.58	Apr., 1883	Aug. 30, 1898
Cataract Falls Ditch	Howard W. Hill Geo. W. Vandyke	Cataract creek	--------	Oct. 17, 1898	Nov. 29, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 37, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second feet	Date of appropriation	Date of filing in office of State Engineer
Eagle Ditch	C. W. Smith Chas. Miller	Eagle river	5.00	July 3, 1896	Dec. 17, 1896
O'Neil Ditch	John J. O'Neil et al	Eagle river	7.00	June 8, 1897	July 9, 1897
Kern Ditch and Pipe Line	Mason H. Kern	Fall creek	20.00	Sept. 27, 1897	Sept. 30, 1897
Kern Ditch and Pipe Line	Mason H. Kern	Eagle river	110.00	Sept. 25, 1897	Sept 30, 1897
Allen Ditch	Frank W. Allen	Ike's creek	2.95	May 24, 1898	June 8, 1898
Barrier Ditch	Frank W. Allen	Ike's creek	1.60	About 1887	June 8, 1898
McHatton Ditch	James McHatton	Creek, Sec. 14, T. 5 S., R. 85 W.	1.80	Aug. 3, 1898	Aug. 12, 1898
Spruce Creek Ditch	Elizabeth Sprague	Spruce creek	2.00	July 25 1892	Aug. 22, 1898
Spruce Creek Ditch No. 2	Elizabeth Sprague	Spruce creek	2.46	Sept. 1, 1892	Aug. 22, 1898
Schliff Ditch, enlargement	W. A. Schliff	Eagle river	6.00	July, 1897	Sept. 7, 1898
Pete's Ditch	Peter E. Nelson	Grouse cleek	4.00	Sept. 21, 1898	Oct. 3, 1898
Howard, enlargement	Martha Wellington et al	Eagle river	7.00	June 13, 1898	Oct. 14, 1898
Hurd Ditch	Ernest V. Hurd	Ernest creek	1.50	Oct. 1, 1898	Oct. 17, 1898
The Sutton Ditch	Sarah M. White	Brush creek	5.00	May 1, 1882	Nov. 18, 1898
The Mathews Ditch, first enlargement of	Sarah M. White et al	Brush creek	1.40	July 30, 1889	Nov. 18, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 37, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Name of Appropriation	Capacity claimed in second feet	Date of Appropriation	Date of filing in office of State Engineer
The Matthews Ditch, third enlargement of	Sarah M. White et al	Brush creek	1.00	Apr. 10, 1896	Nov. 18, 1898
The Hernage Ditch	Sarah M. White	Brush creek	4.00	May 1, 1882	Nov. 18, 1898
The Hernage Ditch, enlarged	Sarah M. White John A. Ewing	Brush creek	1.60	Mar. 31, 1887	Nov. 18, 1898
No. 1	John A. Ewing	Brush creek	2.50	Apr. 1, 1887	Nov. 18, 1898
No. 2, enlargement	John A. Ewing	Brush creek	3.00	May 1, 1884	Nov. 18, 1898
No. 4, first enlargement	John A. Ewing	Brush creek	1.00	Apr. 15, 1897	Nov. 18, 1898
White Ditch	Sarah M. White John A. Ewing	Brush creek	2.40	May 1, 1882	Nov. 18, 1898
White Ditch, first enlargement	Sarah M. White John A. Ewing	Brush creek	1.00	Oct. 3, 1889	Nov. 18, 1898
White Ditch, second enlargement	Sarah M. White John A. Ewing	Brush creek	1.20	Oct. 3, 1889	Nov. 18, 1898
Neilson South Irrigation	Emilie W. Squire	Brush creek	2.50	Apr. 10, 1884	Nov. 22, 1898
The Keyes Ditch	C. H. Keyes	Eagle river	4.00	June 3, 1894	Nov. 23, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 37, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
McHatton Reservoir	James McHatton	Springs in Secs. 14 and 23, of T. 5 S., R. 85 W. 6 P. M		294,000	Aug. 12, 1898	Nov. 10, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 38, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Chandler Ditch No. 1	John Chandler	Toner creek	2.46	Nov. 19, 1896	Dec. 5, 1896
Chandler Ditch No. 2	John Chandler	Toner creek	2.46	Nov. 19, 1896	Dec. 5, 1896
Smith Ditch	Wm. M. Smith	Smith creek	6 00	May 15, 1893	Dec. 22, 1896
Smith's Eldridge Creek Ditch	Wm M. Smith	Eldridge creek	6.50	July 8, 1894	Dec. 22, 1896
C. & L. High Line Ditch, enlarged	W. E. Lewis	Cattle creek	9.00	Apr. 1, 1894	Mar. 18, 1897
Alcorn Gulch Waste Water Ditch	Samuel Bowles John Mahukin	Alcorn gulch and waste waters, Sec. 3, T. 8 S., R. 88 W	10.00	Apr. 12, 1897	Apr. 19, 1897
The Fisk Ditch	Stephen W. Fisk	Dry gulch, Sec. 15, T. 8 S., R. 88 W	2.00	July 10, 1895	Apr 28, 1897
The Sharp Ditch	V. R. Sharp	Roaring Fork river	9.25	Mar. 15, 1895	June 8, 1897
The Bennett Ditch	Francis V. Bennett	Waste waters, Sec. 12, T. 8 S., R. 88 W	3.00	Oct. 9, 1897	Oct. 14, 1897
Bailor Irrigating Ditch	Lewis Bailor E. D. Wilson	Roaring Fork river	6.00	Nov. 1, 1896	Nov. 1, 1897
Peterson Ditch	Carlos Peterson	Lucksinger lake and creek	3.20	Oct. 19, 1897	Nov. 17, 1897
Paterson Waste Water Ditch	John Paterson	Blue creek waste water	2.60	Nov. 1, 1888	Dec. 4, 1897
Alexis Arbaney Ditch	Alexis Arbaney	Snow Mass creek	34.43	May 15, 1894	Feb. 2, 1898
Kester and Cramer Ditch, enlargement	Samuel Cramer	Roaring Fork river	31.41	Apr. 15, 1891	Feb. 2, 1898

Oscar Lewis Ditch	Oscar Lewis	Mesa creek	32.00	Mar. 9, 1893	Mar. 22, 1898
Williams Ditch Nos. 1 and 2	J. J. Williams	Roaring Fork creek	.75	May 1, 1890	June 11, 1898
Nurnburg Waste Water Ditch	John F. Nurnburg	Blue creek waste water	2 88	Apr. 20, 1893	June 16, 1898
Monarch Ditch, Hoty enlargement	Martin Hoty	South Cattle creek	17.00	June 27, 1898	July 1, 1898
Red Mountain Ditch, Peck enlargement	Pauline M. Peck	Hunter creek	1.50	Apr. 19, 1897	July 6, 1898
Patterson and Cummings Ditch	John Patterson et al	Roaring Fork creek	12.00	Nov. 15, 1893	July 5, 1898
Cummings Ditch	John Cummings	Patterson and Cummings ditch	4.00	Nov. 20, 1893	July 5, 1898
Patterson Ditch	John Patterson	Patterson and Cummings ditch	3.75	Nov., 1894	July 5, 1898
Forker Ditch	J. T. Hough G. G. Grace	Roaring Fork creek	3.00	June 1, 1896	Oct 10, 1898
Anthony Pings, enlargement of Kelso Ditch	Anthony Pings	Roaring Fork river	13.20	Apr. 15, 1885	Nov. 2, 1898

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GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 38, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Consolidated Ditch and Reservoir.	Amos Ralston J. L. Miller R. P. Coulter	Coulter creek	Consolidated ditch	18,703,800	Sept. 23, 1898	Sept. 10, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 39, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Vieweg Ditch	Jennie Vieweg	Parachute creek	3.00	May 1, 1893	Dec. 28, 1896
Nelson, enlargement and extension of Oak Grove Ditch	John H. Nelson	East fork of Elk creek	2.00	Feb. 20, 1890	Dec. 28, 1896
Roan Creek Ditch, first enlargement	Alfons Myers	Roan creek	20.78	Feb. 28, 1884	Apr. 23, 1897
Riley Irrigating Ditch	Mary A. Riley	Riley gulch, Sec 33, T. 6 S., R. 97 W	3.20	Mar. 2, 1896	Aug. 5, 1897
Breuss Irrigation Ditch	John Breuss	East fork, East Elk creek	5.00	Aug. 6, 1897	Aug. 9, 1897
Red Canon Ditch	C G. Harris	East fork of Elk creek	.50	Apr. 10, 1891	Aug. 25, 1897
H, V. C. and S. Ditch	C. C Happel H. M. Van Cleave	Roan creek	7.50	June 15, 1888	Nov. 12, 1897
H., V. C. and S. Ditch, Chadwick enlargement No. 1	C. A. Chadwick C. A. Sherves	Roan creek	4.50	Oct. 1, 1890	Nov. 12, 1897
H., V. C. and S. Ditch, Longseth enlargement No. 2	M. N. Longseth	Roan creek	3.00	Apr. 1, 1894	Nov. 12, 1897
Spencer Ditch	John D. Spencer	Grand river	3.00	Aug., 1896	Jan. 10, 1898
Sugar Ditch	James Johnson John G. Sugar	Roan creek	4.00	Mar. 7, 1892	Feb. 14, 1898
Davenport Ditch	Emily Davenport	Middle fork, Parachute creek	4.00	May 1, 1889	Apr. 6, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 39, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Harris Ditch No. 1	S. H. Harris	Fork of Elk creek	2.00	May 1, 1892	May 10, 1898
Harris Ditch No. 2	S. H. Harris	Fork of Elk creek	2.00	May 1, 1893	May 10, 1898
Harris Ditch No. 3	S. H. Harris	Fork of Elk creek	2.00	Apr. 5, 1898	May 10, 1898
Granlee Ditch	Milton E. Granlee	Parachute creek	2.00	Apr. 1, 1898	June 11, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Bona Fide Ditch, amended statement	Bona Fide Ditch Co	Gunnison river	65.00	Dec. 10, 1881	Dec. 5, 1896
The Fire Mountain Canal	The Fire Mountain Canal Co.	North fork, Gunnison river	100 00	Sept. 14, 1896	Dec. 12, 1896
North Side Waste Ditch	Wm. J. Sawyer	Waste water, Sec. 14, T. 14 S., R. 92 W	1.75	Apr. 10, 1892	Dec. 19, 1896
Cottolene Ditch	B. F. Middleton	Seepage, etc., Sec 30, T. 13 S, R. 94 W., and Carbonate Camp drain	5.00	---------- 1895	Dec. 24, 1896
Budd Ditch	B. F. Middleton	Seepage, etc., Cottolene ditch, Sec. 30, T. 13 S., R. 94 W	1.00	---------- 1895	Dec. 24, 1896
Hartland Ditch, amended	Hartland Ditch and Irrigating Water Co	Gunnison river	52.50	Jan. 8, 1882	Jan. 18, 1897
The Deer Run Ditch	Otto A. Peterson	Carbonate Camp ditch	2 00	Nov. 1, 1896	Jan. 23, 1897
Stewart Ditch, first enlargement	Geo. Stewart	North fork of Gunnison river	91.95	Aug. 11, 1894	Mar. 29, 1897
Ringwood Ditch	Henry M. Gray	Seepage and waste in Ringwood gulch and Buttermilk gulch, Secs. 17, 18 and 20, T. 15 S., R. 96 W	4.00	Mar. 23, 1897	Mar. 29, 1897
Chosen Valley Ditch	I. O. Maddox James F. Kent	Gunnison river and reservoirs	5 00	Aug. 19, 1896	April 5, 1897
The Japan Ditch	E. H. Finch F. W. Butt	Kiser creek	24.00	Nov. 8, 1896	April 12, 1897
Wild Cat Ditch	John Lingren	Seepage and natural waters, Secs. 18 and 19, T. 13 S., R. 94 W., Secs 13 and 24, T. 13 S., R. 95 W	4.00	Mar. 18, 1897	April 13, 1897

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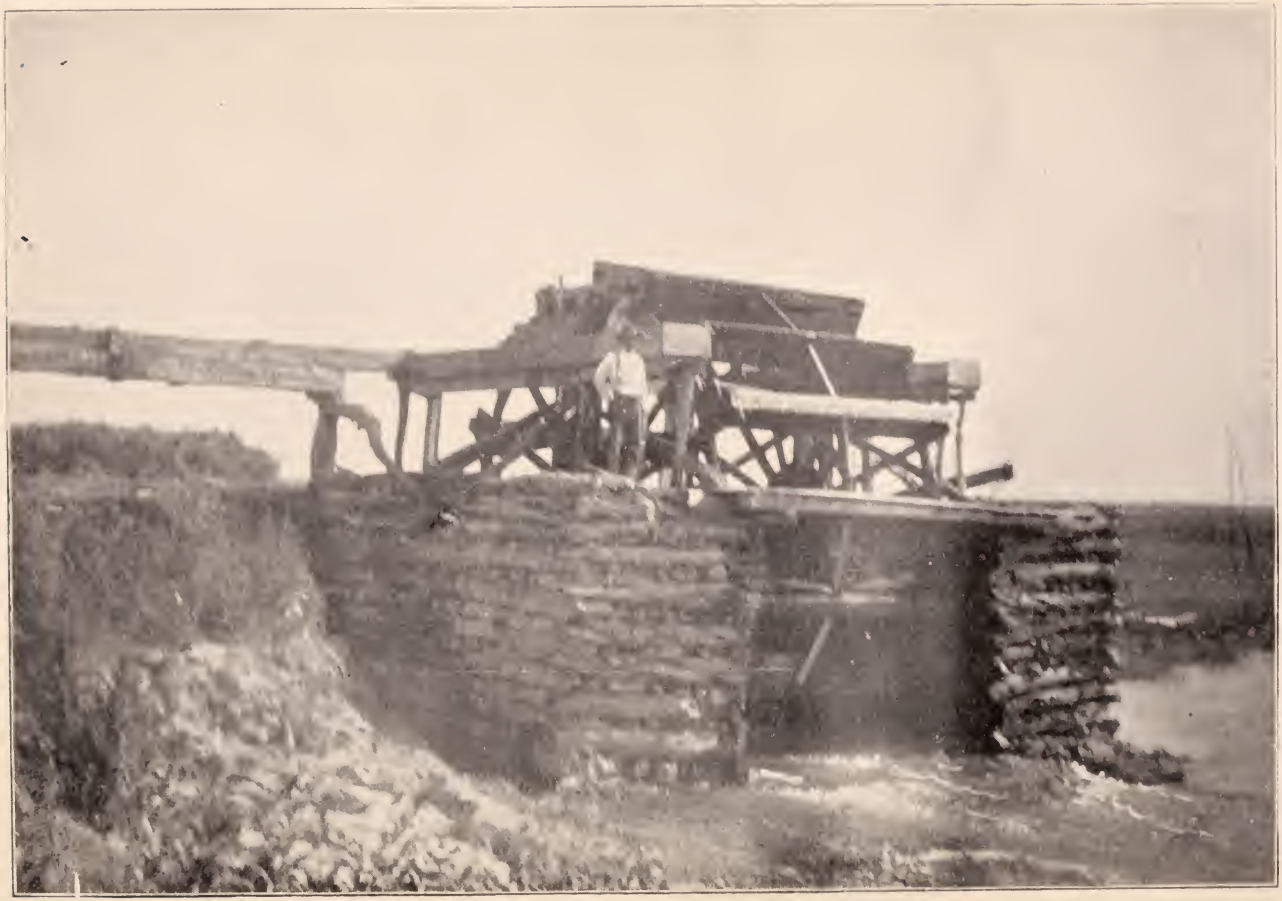
GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Delta Pipe Line	Town of Delta	Reservoirs Nos. 1 and 2 and Dough Spoon creek	1.00	July 9, 1897	July 26, 1897
Trial Ditch, first enlargement	Robert C. Hutchison J. F. Cole	Gunnison river	24.00	Mar., 1894	Aug. 6, 1897
Lake Fork Ditch, amended statement	Lake Fork Ditch Co	Ward creek and Kiser creek	35.00	May 7, 1891	Aug. 6, 1897
The Carbon Ditch, first enlargement	Oscar Edgar	Ward creek via Granby ditch	2.00	July 19, 1897	Sept. 7, 1897
Jersey Creek	Wm Kennedy Henry Gayleu	Muddy creek, branch of Smith's fork	3.00	Aug. 31, 1897	Oct. 16, 1897
Right Hand Ditch	O. C. Hand Emma Hand	Lake Fork ditch, Slaughter draw, Child's draw, seepage, etc., Sec. 25, T. 13 S., R 95 W	3.00	Oct. 21, 1897	Nov. 8, 1897
The O. K. Ditch	Dan'l S. Baldwin M. O'Rourke	Buttermilk gulch	10.00	Nov. 5, 1897	Nov. 15, 1897
The Lenox Ditch	E. P. Balch	North fork of Gunnison river	7.00	 1885	Nov. 19, 1897
Kruemling Ditch	Theo. Kruemling	Crystal creek	3.14	May 7, 1885	Nov. 24, 1897
Gallant Ditch	John W. Gallant O. P. Brookbank	Currant creek, seepage, waste, etc	8.00	Dec. 15, 1897	Jan. 17, 1898
Celestial Ditch	Leung Chung	Peach Valley gulch	3.20	Feb. 11, 1898	Feb. 15, 1898
Cold Water Ditch	Wm. M. Sackett	Surface creek	1.00	Apr. 15, 1893	Feb. 26, 1898
Mountain View Ditch	Harry Bopp I. D. McFadden	Smith fork of Gunnison river	133.00	Feb. 17, 1898	Feb. 28, 1898



WHEEL FOR RAISING WATER FOR IRRIGATION, AT HENRY TEMPLETON'S RANCH, ON YAMPA RIVER.

Rose Ditch	Ernst Stolte et al	Surface creek	5.00	Apr. 1 1895	Mar. 2, 1898
Gregg Ditch	C. I. Gregg	Surface creek	4 00	Dec. 15, 1897	Mar. 19, 1898
Crain Ditch	Thos. A. Crain	David Friend gulch	2.00	Feb. 25, 1898	Apr. 11, 1898
Granby Ditch	The Granby Ditch and Reservoir Co	Dirty, Ward and George creeks	30.00	Apr. 9, 1898	Apr. 11, 1898
The Lookout Ditch	James R. McGruder	Young creek	4 00	Apr. 14, 1898	Apr. 22, 1898
Davenport Ditch	J. M. Davenport	Quackenbush and Bull creeks	2.33	Mar. 17, 1888	Apr. 29, 1898
P. J. Ditch	P. J. Billstrom	Waste and seepage, Sec. 11, T. 15 S., R. 95 W.	2.00	Apr. 20, 1898	May 2, 1898
Alta Ditch	Wm. J. Sawyer	Minnesota creek	33.00	May 1, 1898	May 24, 1898
North Fork Farmer's Ditch	J. H. Reich et al	North fork of Gunnison river	2.25	Apr. 14, 1898	May 28, 1898
Y. and F. Ditch	J. F. Jenter John J. Frank	Surface creek	4.00	Mar. 1, 1898	June 3, 1898
E. P. Creighton No. 1 Ditch	E. P. Creighton	Savage gulch	1.00	June 1, 1898	June 9, 1898
E. P. Creighton No. 2 Ditch	E. P. Creighton	Savage gulch	1.00	June 1, 1898	June 9, 1898
Weil and Johnson, enlargement	J. W. Brookbank	Surface creek	-------	May 5, 1890	July 5, 1898
Antelope Ditch	Jno. Ashworth et al	Waste and seepage, Alfalfa run	5.00	July 6, 1898	July 18, 1898
Smith and McKnight Ditch	John R. Smith et al	North fork, Gunnison river	12.00	June 1, 1896	July 18, 1898
John Cole Ditch	John C. Cole	Waste, seepage, etc., Sec. 4, T. 13 S., R. 94 W.	2.00	Apr., 1896	July 29, 1898
Trial Ditch, second enlargement	Rob't C. Hutchinson John F. Cole	Gunnison river and seepage and waste waters	8.00	Aug. 29, 1898	Aug. 31, 1898
Orchard Home Canal	Ira D. McFadden	North fork, Gunnison river	133.00	June 15, 1898	Sept. 14, 1898
Harkleroad Ditch	Wm Harkleroad W. A. Hanzey	Coon creek and seepage and waste	1.20	Sept. 27, 1898	Oct. 1, 1898
Wm. Parks Ditch No. 1	Wm. Parks	Smith fork, Gunnison river	1.00	July 20, 1898	Oct. 19, 1898
Wm. Parks Ditch No. 2	Wm. Parks	Smith fork, Gunnison river	1.00	July 20, 1898	Oct. 19, 1898
Lenox Ditch, enlargement	James D. Cross	North fork, Gunnison river	1.00	Apr. 1, 1898	Oct. 26, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Cole Reservoir No. 1	John E. Cole	Surface creek		1,750,241	Sept. 10, 1894	Dec. 22, 1896
Cole Reservoir No. 2	John E Cole	Surface creek		3,596 313	Sept. 10, 1894	Dec 22, 1896
Cole Reservoir No. 3	John E. Cole	Surface creek		2,988,216	Sept 10, 1894	Dec. 22, 1896
Pannell Reservoir	Wm. B. Pannell	Kiser creek	Via Feeder	1,513,710	Sept. 23, 1896	Dec. 31, 1896
Kehmeier Reservoir	W. F. Kehmeier	Natural drainage of branch of Surface creek, Sec. 31, T. 11 S, R. 93 W		1,959,310	July 10, 1895	Dec. 31, 1896
Doughty Reservoir No. 1	Frank Doughty	Headwaters Surface creek, Sec. 56, T. 11 S., R. 93 W		914,760	June 10, 1896	Dec. 31, 1896
Doughty Reservoir No. 2	Frank Doughty	Headwaters Surface creek, Sec. 56, T. 12 S., R. 93 W		980,100	June 10, 1896	Dec. 31, 1896
Park Reservoir, amended	Park Reservoir Co.	Natural drainage of a branch of Surface creek, T. 11 and 12 S, R. 94 W		3,484,800	Aug. 1, 1888	Jan. 6, 1897
Young Creek Reservoir No. 1	Wm. Colvin et al	Natural drainage, headwaters of Young creek, Secs. 4 and 5, T. 12 S, R. 94 W		3,506 580	Sept. 9, 1894	Jan. 7, 1897

Young Creek Reservoir No. 2	Wm. Colvin et al	Natural drainage, headwaters of Young creek, Secs. 4 and 5, T. 12 S., R. 94 W		3,506,580	Sept. 9, 1894	Jan. 7, 1897
Young Creek Reservoir No. 3	Wm. Colvin et al	Natural drainage, headwaters of Young creek, Secs. 4 and 5, T. 12 S., R. 94 W		1,916,640	Sept. 9, 1894	Jan. 7, 1897
Addie Reservoir	Andrew C. Bailey et al	Natural drainage West branch of Leroux creek, Sec. 2, T. 12 S., R. 93 W		4,390,000	July 25, 1896	Jan. 11, 1897
Carbonate Camp Reservoirs (7)	Otto A. Peterson	Milk creek	Via Carbonate Camp ditch extension	Total 15,643,703	Oct. 26, 1896	Jan. 23, 1897
The Surface Creek Ditch and Reservoir Co.'s Reservoirs, A to K, inclusive	The Surface Creek Ditch and Reservoir Co	Headwaters of Ward and Kiser creeks and natural drainage, Secs. 1, 2, 11, 12, T. 12 S., R. 95 W		Total 13,268,188	Sept. 2, 1896	Jan. 25, 1897
The Skim Milk Reservoir	Wm. H. Burnett	Natural drainage of Leroux creek, Sec. 7, T. 12 S., R. 92 W		914,760	Aug. 25, 1895	Mar. 9, 1897
Alfalfa Reservoir	Jesse C. Hart	Surface creek	Alfalfa ditch	653,400	June 2, 1896	May 27, 1897
Norton and Wilson Reservoir	Bert H. Norton Harry Wilson	Seepage etc., Secs 14, 21, 22, T. 14 S., R. 94 W	Norton and Wilson ditches A, B, C and D	Total 1,742,400	June 10, 1897	June 29, 1897
Delta Reservoir No. 1	Town of Delta	Dough Spoon creek		2,600,000	July 9, 1897	July 26, 1897
Delta Reservoir No. 2	Town of Delta	Dough Spoon creek		1,090,000	July 9, 1897	July 26, 1897
Minneapolis Reservoir	A. L. Meddock	Storm waters shed from surrounding hills. Sec. 10, T. 12 S., R. 95 W	Supply ditch	5,488,560	July 25, 1897	Sept. 24, 1897
Olive Reservoir	J. B. Fisher W. W. Cook	Leroux creek		10,560,000		Oct. 20, 1897
Adobe Basin Reservoir	Wm. C. May	Secs. 27, 33, 34, T. 14 S., R. 94 W., seepage, etc., natural flow	Supply ditch	65,340,000	July 27, 1896	Dec. 4, 1897

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GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Continued.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
San Luis Reservoir	N. U. Buffington James January	Flood and storm waters head of tributary of Ward creek		6,394,608	Nov., 1897	Dec. 6, 1897
Hale Reservoir	Chas. A. Hale P. T. Lambert	Natural drainage at head of Surface creek		1,219,680	July 25, 1895	Dec. 29, 1897
Crater Reservoir, first enlargement	Crater Reservoir Co.	Natural drainage, Sec. 5, T. 12 S., R. 92 W.		85,638,960	Aug. 20, 1896	Dec. 29, 1897
McKoon Reservoir	John McKoon	Natural drainage branch Young's creek		1,306,800	Sept. 16, 1895	Jan. 10, 1898
Mount Lamborn Reservoir	Theo. Roeber	Left fork, Reynold's creek		3,659,040	June 10, 1891	Apr. 7, 1898
Granby Reservoir No. 1	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		7,503,645	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 2	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20 21, 29, 30, all in T. 12 S., R. 95 W.		6,534,000	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 3	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		348,480	Aug 5, 1894	Apr. 11, 1898

Granby Reservoir No. 4	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		141,570	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 5	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		27,878,400	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 6	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S , R. 95 W.		919,116	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 7	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		1,646,376	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 8	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		435,600	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 9	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S., R. 95 W.		4,856,940	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 10	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30, all in T. 12 S , R. 95 W.		4,791,600	Aug. 5, 1894	Apr. 11, 1898
Granby Reservoir No. 11	The Granby Ditch and Reservoir Co.	Storm waters from adjacent watershed, Secs. 16, 19, 20, 21, 29, 30 all in T. 12 S., R. 95 W.		348,480	Aug. 5, 1894	Apr. 11, 1898
Goodenough Reservoir	Wm. Kiser	Young creek		3,136,320	June, 1895	Apr. 11, 1898
Shenandoah Irrigation and Land Co.'s Reservoir A	Shenandoah Irrigation and Land Co	Beaver creek, Naturita creek		12,812 500		Apr. 29, 1898
Shenandoah Irrigation and Land Co.'s Reservoir B	Shenandoah Irrigation and Land Co	Beaver creek, Naturita creek		6,105,500		Apr. 29, 1898

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GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 40, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Shenandoah Irrigation and Land Co.'s Reservoir C	Shenandoah Irrigation and Land Co	Beaver creek, Naturita creek		4,972,500		Apr. 29, 1898
Halfway Reservoir	W. S Kirkpatrick G. F. Zaum	Waste and seepage, Secs. 26 and 27, T. 14 S., R. 94 W.	Halfway ditch Nos. 1 and 2	66 340,000	May 19, 1898	May 21, 1898
Lower Reservoir No. 1	Wm. H. Lower D. S. Heckman	Dough Spoon creek		2.600,000	June 6, 1898	June 10, 1898
Lower Reservoir No. 2	Wm. H. Lower D. S. Heckman	Dough Spoon creek		1,090,000	June 6, 1898	June 10, 1898
Lost Lake Reservoir	W. A. Thomas N. A. Thomas	Cottonwood creek and floods		5.924.160	Aug. 29, 1898	Oct 6, 1898
Tiny Reservoir No. 1	Chas. W. Wayman Henry F. Ryan	Spring and storm waters Sec. 17, T. 12 S., R. 94 W		87,120	Sept. 1896	Oct 8, 1898
Tiny Reservoir No. 2	Chas. W. Wayman Henry F. Ryan	Spring and storm waters, Sec. 8, T. 12 S., R. 94 W		130,680	Sept., 1896	Oct. 8, 1898
Ryan Reservoir	Chas. W. Wayman Henry F. Ryan	Spring and storm waters, Sec. 8, T. 12 S., R. 94 W.		2,003,760	Sept., 1894	Oct. 8, 1898
Swartz Reservoir No. 1	M. Swartz	Leroux creek	Feeder	2,534,400	Sept. 17, 1898	Oct. 11, 1898

Bonita Reservoir	William C. Strong	Surface creek		17,424,000		Nov. 8, 1898
The Womack Reservoir No. 1	William A. Womack	Ward creek		185.6 acre ft.	Aug. 26, 1898	Nov. 25, 1898
The Womack Reservoir No. 2	William A. Womack	Ward creek		79.2 acre ft.	Aug. 26, 1898	Nov. 25, 1898
The Womack Reservoir No 3	William A. Womack	Kiser creek		107.8 acre ft.	Aug. 26, 1898	Nov. 25, 1898
The Womack Reservoir No. 4	William A. Womack	Kiser creek		12. acre ft.	Aug. 26, 1898	Nov. 25, 1898
The Womack Reservoir No 5	William A. Womack	Kiser creek		7.2 acre ft.	Aug. 26, 1898	Nov. 25, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 41, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Never Fail Ditch	R. D. Willis	Uncompahgre river; also seepage, etc., Sec. 9, T. 48 N., R. 9 W	5 00	Dec. 11, 1896	Dec. 17, 1896
Sampson and Frasier Ditch	Robt. Sampson E. E. Frasier	Seepage, etc., gulch, Sec. 29, T. 49 N., R. 9 W	2.00		Jan. 16, 1897
O. H. Horton Seepage Ditch	O. H. Horton	Springs, etc., old river bed, Secs. 15 and 16, T. 50 N., R. 10 W	2 50	Feb. 13, 1897	Feb. 22, 1897
The Dawson Ditch	J. W. Owens J. N. Wilson	Uncompahgre river	30.00	Oct. 9, 1890	May 1, 1897
Oat Meal Ditch	Thomas Vickers	Gulches, Sec. 24, T. 15 S., R. 96 W	1.00	May 1, 1895	May 26, 1897
Keystone Ditch Feeder No. 1	J. F. Wilson et al	Spring creek underflow, Sec. 12, T. 48 N., R. 10 W	14 58	May 27, 1897	May 31, 1897
Stalder Ditch	Samuel Stalder	Seepage, etc., Crystal gulch, Sec. 13, T. 51 N., R. 11 W	1.00	June 4, 1897	June 10, 1897
Cuba Ditch	W. W. Hoisington W. O. Redding	Cedar creek; also seepage, Sec. 27, T. 49 N., R. 9 W	9.28	Apr. 10, 1897	July 8, 1897
George L. Price Ditch	George L. Price	Springs, Sec. 6, T. 48 N., R. 9 W	.75	Apr. 20, 1897	July 16, 1897
Roubideau Ditch, extension	J. H. Halley	Wise draw or gulch	5.00	Apr. 20, 1897	Sept. 4, 1897
Gessert Extension Ditch	George P. Gessert	Seepage and waste, Secs. 22, 27, and 34, T. 15 S., R 96 W	4.00	June 29, 1897	Oct. 1, 1897

Stanford Ditch	Leroy S. Stanford	Seepage and waste, Sec. 19, T. 15 S., R. 94 W.	3 00	Apr. 2, 1898	Apr. 8, 1898
Czar Ditch	Chas. F. Read	Ward gulch seepage, Secs. 17, 18, 19, 20, T. 15 S., R. 94 W	2.00	Apr. 4, 1898	Apr. 9, 1898
J. A. Fenton Ditch No. 4	J. A. Fenton	Seepage and waste, Sec. 1, T. 47, R. 9 W.	15 00	Mar. 21, 1898	Apr. 13, 1898
Bien Ditch	Geo. P. Gessert	Seepage, Sec. 25, T. 15 S., R. 96 W	4 00	June 30, 1898	July 5, 1898
Tilletson Ditch	A. S. Tilletson	Springs, seepage, etc., Sec. 30, T. 15 S., R. 94 W	1 00	July 18, 1898	Aug. 1, 1898
George W. Moody Ditch	Geo. W. Moody G. F. Green	Uncompahgre river	3 00	Spring, 1895	Oct. 21, 1898
The Maverick Ditch	Martin A. Daniels	Loutsenhizer ditch	20.00	Mar. 1, 1892	Oct. 28, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 42, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Seegar and Bedford Ditch, Laurent enlargement	Jos. A. Laurent	North fork of Kahnah creek	35.76	May 4, 1885	Jan. 22, 1897
Kahnah Creek Extension, amended claim	W. H. Coffman	Seepage, springs, etc., Secs. 23 and 24, T. 2 S., R. 1 E	1.95	Apr. 15, 1884	Feb. 15, 1897
The James F. Duffy Ditch, Fairall enlargement	H. L. Fairall	Cottonwood creek	1.50	Apr. 1, 1897	May 17, 1897
Bacon Mesa Springs Ditch	Geo. W. Bacon	Seepage and waste, Secs. 24, 25 and 26, T. 10 S., R. 97 W., and 19, 30, 31, T. 10 S., R. 96 W.	3.00	May 10, 1897	June 1, 1897
F. M. Snyder Waste Ditch	F. M. Snyder	Seepage and waste, Sec. 16, T. 1 N, R 2 W.	.50	June 12, 1897	June 22, 1897
Plateau Grand Canal	Alex Struthers	Grand river, Plateau creek, Rapid creek, etc	1217.00	Apr. 3, 1897	July 1, 1897
Coon Hollow Ditch	B. P. Blair	Coon hollow or gulch	1.00	Apr. 5, 1897	July 3, 1897
Hawxhurst Ditch, first enlargement	Hannah Hawxhurst	Buzzard creek	10.80	May 1, 1896	Aug. 11, 1897
Coyle Ranch Ditch	W. A. Turner J. D. Turner R. E. Fletcher	Salt creek	10.00	June 15, 1897	Aug. 26, 1897
Fischer Ditch	M. B. Fischer	Hay canon	8.00	May 28, 1897	Sept. 23, 1897
Boyle Creek Ditch	Chas. T. Jenkins	Boyle creek	.50	May 1896	Nov. 19, 1897
Jenkins Lateral Ditch	Chas. T. Jenkins	Park View ditch	2.00	July 1, 1897	Nov. 6, 1897
Oldham Bros.' Cottonwood Ditch	E. S. and Wm. Oldham	Cottonwood creek	5.00	July 1, 1897	Dec. 4, 1897
Superior Ditch	J. S. Griffith Chas. Ayre	Buzzard creek	5.21	Apr. 12, 1895	Jan. 14, 1898

East Creek Ditch, Starr enlargement	Geo. R. Starr	East creek	3.90	Jan. 20, 1898	Feb. 12, 1898
Burg No. 4 Ditch	Chas. Burg	Fish creek	2.50	June 10, 1897	Mar. 11, 1898
Eachus Ditch	David Eachus	Biezer creek	5.00	Mar. 14, 1898	Mar. 21, 1898
Westwater Irrigating Ditch	Darrow Bros	Grand river	30.00	Aug. 18, 1896	June 29, 1898
Fisher No. 2 Ditch	A. J. Fisher	Hay creek	100.00	May 16, 1898	Aug. 9, 1898
Harkleroad Ditch	Wm. Harkleroad W. A. Manzey	Coon creek and seepage	1.20	Sept. 27, 1898	Oct. 1, 1898
H. L. Fairall Waste Water Ditch	H. L. Fairall	Cottonwood creek	3.00	Apr. 1, 1897	Oct. 31, 1898
Brownfield Extension Ditch	J. C. Brownfield W. A. Powell	Cottonwood branch, Rapid creek	3.00	Oct. 19, 1898	Oct. 31, 1898
Salisbury and Kiggins Ditch	Geo. W. Salisbury E. Ollie Kiggins	Salt creek	10.00	Aug. 12, 1895	Nov. 11, 1898
Jordon Ditch	W. P. Jordon	Rapid creek	1.00	June 10, 1898	Nov. 26, 1898
Jordan Enlargement of Smith & Struthers Ditch	W. P. Jordon	Rapid creek	1.00	Mar. 5, 1898	Nov. 26, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 42, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Mesa Creek Reservoir No. 1	The Mesa Creek Reservoir and Canal Co	Mesa creek		10,757,577		Jan. 6, 1897
Mesa Creek Reservoir No. 2	The Mesa Creek Reservoir and Canal Co.	Mesa creek		4,066,761		Jan. 6, 1897
Mesa Creek Reservoir No. 3	The Mesa Creek Reservoir and Canal Co	Mesa creek		14,374,800	Sept. 8, 1890	Jan. 6, 1897
Mesa Creek Reservoir No. 4	The Mesa Creek Reservoir and Canal Co	Mesa creek		11,965,060		Jan. 6, 1897
Bonham and Wells Reservoir	David Bonham Ed. L. Wells	Big creek		40,970,000	Sept. 2, 1897	Sept. 8, 1897
Lulu Reservoir No. 3	E. G. Angell E. B. Angell	Headwaters of Indian creek		8,712,000	June 20, 1897	Mar. 12, 1898
Lulu Reservoir No. 4	E. G. Angell E. B. Angell	Headwaters of Indian creek		1,742,400	June 20, 1897	Mar. 12, 1898
Lulu Reservoir No. 5	E. G. Angell E. B. Angell	Headwaters of Indian creek		1,742,400	June 20, 1897	Mar. 12, 1898
Lulu Reservoir No. 6	E. G Angell E. B. Angell	Headwaters of Indian creek		1,742,400	June 20, 1897	Mar. 12, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 43, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Parker Ditch	John L. Parker	White river	3.60	May 3, 1897	May 24, 1897
Dreyfuss Ditch	J. E. Crook	Miller creek	3.63	Spring, 1886	June 1, 1897
Wise Ditch	Wm. Wise et al	Springs at headwaters of West Evacuation creek	30.00	Sept. 18, 1894	June 8, 1897
Powell Park Ditch, amended statement	Powell Park Ditch Co	White river	51.24	May 1, 1880	July 20, 1897
E. Chandler Ditch	E. R. Chandler	Flag creek	4.48	Juue 27, 1897	July 24, 1897
Collins Ditch	H. J. Chandler E. R. Chandler	Miller creek	2.50	May 1, 1895	July 24, 1897
Chandler Ditch	H. J. Chandler	Flag creek	2.94	Oct. 13, 1895	July 24, 1897
Big Beaver Ditch, enlargement and extension	Peter Eklund et al	Big Beaver creek	5.23	Nov. 2, 1896	July 28, 1897
Fairfield, extension of Meeker Townsite Ditch	W. A. Fairfield	White river	5.70	Apr. 15, 1886	Dec. 1, 1897
Van Cleave No. 1 and 2 Ditch	L. F. Van Cleave	White river	.86	Nov. 15, 1897	Jan. 13, 1898
Sulphur No. 1 Ditch	Alonzo Cure	Sulphur creek	30.42	Aug. 1, 1895	Apr. 11, 1898
Sulphur No. 2 Ditch	Alonzo Cure	Sulphur creek	7.10	Apr. 1, 1897	Apr. 11, 1898
Sulphur No. 3 Ditch	Alonzo Cure	Sulphur creek	7.10	Apr. 1, 1897	Apr. 11, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 43, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Sulphur No. 4 Ditch	Alonzo Cure	Sulphur creek	7.10	Apr. 1, 1897	Apr. 11, 1898
Gonterman No. 1 Ditch	Geo. Gonterman	Bear creek	3.63	Aug 15, 1898	Aug. 31, 1898
Gonterman No. 2 Ditch	Geo. Gonterman	Bear creek	3.63	Aug. 15, 1898	Aug. 31, 1898
The Keystone Ditch	Ben Price	Deep Channel creek	4.50	Sept. 8, 1898	Nov. 29, 1898

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GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 43, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Critchlow Reservoir	Arthur B. Critchlow	Ryan gulch	Critchlow ditch	9,487,200		Apr. 22, 1898
Eureka Reservoir	J. W. Bainbrich	Eureka creek	Eureka ditches Nos. 1 and 2	162,073	Sept. 22, 1897	June 11, 1898
The Keystone Reservoir	Ben Price	Deep Channel creek	Keystone ditch	8,979,565	Sept. 8, 1898	Nov. 29, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 44, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
James Kelly Irrigating Ditch	James Kelly	Big Gulch creek	6.00	Oct. 1, 1896	Feb. 2, 1897
Hall and Harrison Irrigating Ditch	Hall and Harrison	Big Gulch creek	15.00	June 17, 1897	Sept. 11, 1897
Joseph Collom Desert Land Ditch	Joseph Collom	Good Spring creek	1.70	Sept. 15, 1894	Nov. 1, 1897
Air Line Irrigation Ditch	Robert M. Richardson, Jr	Bear river	10.00	Sept. 3, 1898	Sept. 18, 1898
Dry Lake Irrigation Ditch	Ben Price A. J. Saunders	Dry Lake Gulch creek	10.00	Sept. 1, 1898	Nov. 28, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 44, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Hall and Harrison Reservoir	Hall and Harrison	Big Gulch creek		3,500,000	June 17, 1897	Sept. 11, 1897
William Richardson Reservoir	William Richardson	Big Gulch creek				July 6, 1898
Dry Lake Reservoir	Ben Price A. J. Saunders	Dry Lake Gulch creek		32,670,000	Sept. 1, 1898	Nov. 28, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 45, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Hunter and Gant Ditch, A. and B. Job enlargement	Alexander Job Barbara Job	Mamm creek	28.05	Apr. 4, 1884	Jan. 13, 1897
The Sliding Ditch, amended	J. W. A. Ellis	Middle Mamm creek	4 50	Apr. 15, 1887	Feb. 2, 1897
The Waldorf Ditch	Ada Lackler	Cash creek	3.68	Sept. 14, 1893	Aug. 31, 1897
The Revel Spring and Waste Water Ditch	James Revell	Springs, Sec. 5, T. 7 S., R. 95 W. and waste water from Howitt and Milburn ditch	3.00	June 1, 1891	Sept. 1, 1897
McLean Pipe Line	Edwin McLean	Springs, Thayer gulch, Sec. 23, T. 6 S., R. 93 W		Aug. 31, 1897	Sept. 15, 1897
Springs Ditches Nos. 1, 2, 3 and 4	Sebastian Keller	Springs, Sec. 31, T. 6 S., R. 94 W	Each 1 30	Apr. 20, 1896	Sept. 16, 1897
Maxfield Irrigation and Waste Water Ditch	F. C. Maxfield	Battlement creek	1.44	Oct. 12, 1894	Nov. 11, 1897
Spring Creek, enlargement	Peter Churchfield	Spring creek	185.00	May, 1886	Apr. 7, 1898
Iva Spring and Waste Water Ditch	Wm. J. Felch	Springs, Sec. 36, T. 6 S., R. 95 W	100 00	Mar. 4, 1898	Apr. 7, 1898
Depler Ditch	Belle Depler	Spring or swamp, Sec. 27, T. 7 S., R. 92 W	6.34	Apr. 10, 1898	June 15, 1898
Conley Waste Water Ditch	J. D. Conley	Sharp gulch, Sec. 6, T. 7 S., R. 94 W	2.96	Apr., 1897	June 26, 1898
McCary Waste Water Ditch	J. T. McCary	Spring, waste water, etc., Sec. 31, T. 6 S., R. 94 W	2 00	Apr. 7, 1898	July 14, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 46, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Haworth No. 1	Samuel H. Haworth	Bear creek	12.00	May 1, 1892	Jan. 6, 1897
Haworth No. 2	Samuel H. Haworth	Bear creek	8.00	May 15, 1893	Jan. 6, 1897
Staples Ditch No. 2	C. F. Staples James Marr	Little Grizzly river	21.00	June 1, 1890	Feb. 8, 1897
Ellen	Andrew Norell	North Platte river	18.00	June 15, 1888	Mar. 24, 1897
Lillie	Andrew Norell	Lone Pine creek	About 40.00	June 1, 1892	Mar. 24, 1897
Dam	Andrew Norell Wm. Norell	North Platte river	About 24 00	June 15, 1887	Mar. 24, 1897
Hillside	Andrew Norell et al	Lone Pine creek	About 24 00	June 15, 1892	Mar. 24, 1897
Lone Pine Ditch No. 2	Andrew Norell	Lone Pine creek	About 18.00	May 15, 1896	Mar. 24, 1897
Erika	Andrew Norell	Lone Pine creek	About 24.00	May 1, 1890	Mar. 24, 1897
Manville	Geo. Manville	North Platte river	8.00	June 15, 1892	Mar. 24, 1897
Cochrane Reservoir Ditch	Thomas R. Cochrane	Harrison lake	12.00	June 15, 1891	Mar. 24, 1897
Lena	August Anderson	North fork of Little Grizzly creek	4 00	May 1, 1896	Mar. 24, 1897

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 46, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Cochrane Lake Reservoir	Thos. R. Cochrane	Harrison lake	Feeder	2,600,000		Mar. 24, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 47, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Independence Ditch, amended	Wm. Marr Chas. Boettcher	Big creek	95.00	Nov. 10, 1895	Dec. 24, 1896
Hubbard Ditch No. 2, enlargement	Edward R. Hubbard Mamie M. Hubbard	Illinois creek	50.00	June 1, 1888	Mar. 15, 1897
Caribou	John Price	Camp creek	14.00	Sept. 16, 1891	Sept. 27, 1897
Hubbard Ditch No. 3, enlargement	Edward R. Hubbard Mamie M. Hubbard	Illinois creek	45.00	Oct 5, 1897	Feb. 4, 1898
Boston Ditch	Henry C. Bottom et al	Illinois creek	23 00	Nov. 25, 1898	June 16, 1898
Cumberland Ditch, enlargement and extension	Moore and Blevins	Michigan river	19.00	June 15, 1898	Sept. 16, 1898
The Queen	Sam'l S. Brownlee	Michigan river	20.00	Oct. 11, 1898	Oct. 18, 1898
The Phealan Ditch	William Kerr	McKenzie creek	10.00	June 1, 1898	Nov. 16, 1898
The Enlargement of the Maggie Ditch	William Kerr	Allen or Willow creek	6.00	May 15, 1893	Nov. 16, 1898
The Enlargement of the Peabody Ditch	John L. Ish	Big Willow creek	14.00	June 1, 1894	Nov. 16, 1898
The Enlargement of the Overland Ditch	Michael Connors et al	Michigan river	24.00	May 15, 1892	Nov. 22, 1898

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GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 47, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Big Creek Reservoir, enlarged	Wm. Marr	Big creek		318,088,000	Aug. 25, 1896	Dec. 24, 189

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 48, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Wilson Supply	Philip Wilson	Dead Man creek, Sand creek, and from water shed by Big Laramie	345.00	June 11, 1897	July 23, 1897
Columbine	Rollin Q. Tenney Philip Wilson	Dead Man creek, Columbine creek and Big Laramie	25.00	Sept. 7, 1897	Dec. 6, 1897
Bob Creek	Philip Wilson	Bob creek	50.00	Sept. 24, 1897	Dec 24, 1897
Pete Creek	Thomas H. Davy, Jr	Pete creek and Big Laramie	2.50	Nov. 10, 1897	Mar. 23, 1898
Ward No. 3	M. C. Ward	Johnson and La Card creeks	35.00	Oct. 10, 1898	Oct. 12, 1898
Bob Creek, extension	Philip Wilson A. L. Clark	Bob creek	50.00		Oct. 15, 1898
Tom Davy Ditch	Thomas H. Davy, Jr	Big Laramie river	14.00	June 1, 1896	Nov. 30, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 49, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Hollowell	Wm. M. Hollowell	South fork, Republican river	20.00	Jan. 8, 1897	Apr. 3, 1897
Austin	Frank L. Austin	South fork, Republican river	12.00	May, 1897	Aug. 20, 1897
Rose	George Rose John Rose	South fork, Republican river	14.00	June 30, 1898	Sept. 7, 1898

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 50, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Burk's Spring Ditch	Edward O. Pinney	Spring creek	10.00	Oct. 1, 1892	Dec. 3, 1896
Mrs. A. King Ditch	Mrs. A. King	Troublesome creek	4.00	Fall, 1878	Feb. 20, 1897
The Kurtz Ditch No. 1	Henry M. Kurtz	Troublesome creek	7.00	June 10, 1890	Mar. 5, 1897
The Kurtz Ditch No. 2	Henry M. Kurtz	Troublesome creek	9.00	June 2, 1892	Mar 5, 1897
The Kurtz Ditch No. 3	Henry M. Kurtz	Troublesome creek	15.00	June 17, 1892	Mar. 5, 1897
Herde Ditch	Peter Herde D. F. Peterson	Red Dirt creek, Sec. 4, T. 2 N., R. 81 W	12.00	Oct. 26, 1885	May 6, 1897
Becker No. 1 Ditch	Edmund Becker	Troublesome creek	10.00	June 15, 1883	May 20 1897
Becker No. 2 Ditch	Edmund Becker	Troublesome creek	7.00	June, 1887	May 20, 1897
The East Fork Ditch	Edmund Becker	East fork, Troublesome creek	6.00	July, 1891	May 20, 1897
The Becker and Heini Ditch	Edmund Becker Anton Heini	Muddy creek	5.00	Fall, 1887	May 20, 1897
Pinto Creek Ditch	Anton Heini	Pinto creek	5.00	Dec. 1, 1896	May 20, 1897
Sulphur Gulch Ditch	Hulda M Maider	Sulphur Gulch creek	2 54	[illegible]	May 22, 1897
Crazy Man's Ditch	Edward O. Pinney	Crazy Man's creek	8.80	May 18, 1897	June 9, 1897
Tom Ennis Ditch	Thomas Ennis	Troublesome creek	18.64	May 1, 1883	June 16, 1897

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GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 50, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second feet	Date of appropriation	Date of filing in office of State Engineer
The Pass Creek Ditch	Emil Berger	Pass creek	5.80	1884	July 7, 1897
Maider Ditch	Hulda M. Maider	Grand river	16.00	Apr. 30, 1898	May 14, 1898
Anton Heine Ditch	Anton Heine	Muddy creek	4.00	Spring, 1880	May 24, 1898
Bruner Ditch	James W. Bruner	Rock creek	2.00	June 4, 1898	June 13, 1898
Hardscrabble Ditch	R. Levine	Red Dirt creek	About 15.00	Feb. 15, 1886	June 28, 1898
Binco Ditch	Jos. Binco	Albert creek	9.00	June 15, 1898	July 22, 1898
Buck Deer Ditch	Jos. Binco	Milk creek	8.00	July 15, 1892	July 22, 1898
John Oaks Ditch	John Oaks	Muddy creek	6.00	June 24 1887	Oct. 25, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 51, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Curtis No. 1 Ditch	Roy L. Curtis G. P. Curtis	Corrall creek	3.96	Nov. 11, 1897	Dec. 1, 1897
Cairns No. 1 Ditch	James Cairns	North fork, Grand river	2.84	Sept. 15, 1888	Dec. 15, 1897
Cairns No. 2 Ditch	James Cairns	North fork, Grand river	2.84	June 1, 1892	Dec. 15, 1897
Cairns No. 3 Ditch	James Cairns	North fork, Grand river	1.64	Sept. 1, 1885	Dec. 15, 1897
Terrell No. 1 Ditch	J. G. Terrell	Trail creek	2.96	May 1, 1889	June 4, 1898
Terrell No. 2 Ditch	J. G. Terrell	Trail creek	1.14	Aug. 1, 1889	June 4, 1898
Eight Mile No. 1 Ditch	Annie Wilkins	Eight Mile creek	3.00	1880	June 9, 1898
Button No. 1 Ditch	S. J. Button	Middle fork, Eight Mile creek	1.34	June 10, 1888	June 9, 1898
Hershey Ditch	Emil Linke	Eight Mile creek	3.41	July 13, 1883	June 16, 1898
Linke No. 2 Ditch	Emil Linke	Nine Mile creek	1.82	June 1, 1895	June 16, 1898
Centre Ditch	Emil Linke	Eight Mile creek	1.82	June 1, 1889	June 16, 1898
Garden Ditch	Roy L. Curtis G. P. Curtis	Rock creek	1.50	June 13, 1898	June 20 1898
Linke No. 1 Ditch	Emil Linke	Nine Mile creek	1.82	June 1, 1894	June 23, 1898
Kinsey No. 1 Ditch	Carrie Rohen	Trail creek	1.84	May 1, 1891	July 2, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 51, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Kinsey No. 2 Ditch	Carrie Rohen	Trail creek	1.84	May 1 1891	July 2, 1898
Harbison Ditch	H. M Harbison Kate Harbison	West inlet to North inlet to Grand lake	40.00	July 15, 1894	Aug. 2, 1898
Bunte Ditch	Geo. Bunte Henry Bunte	Willow creek	240.00	June 15, 1889	Sept. 24, 1898
Craig No. 1 Ditch	Wm. B. Craig Emma P. Craig	Carleton lake	1.86	Sept. 19, 1898	Oct. 10, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 52, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Bennett Ditch	George Bennett	Bennett reservoir and springs and seepage	3.20	May 9, 1898	May 26, 1898
Mather Ditch, enlarged	John Mather	Sheephorn creek	3.00	July 1, 1890	July 6, 1898
Castle Creek Ditch	Nicholas Bucholz	Castle creek	10.86	Nov. 19, 1884	July 13, 1898
Shadigee Ditch	P. McNulty	Castle Wood creek	3.00	July 1, 1898	Aug. 11, 1898
Henschkel Ditch	Frank L. Henschkel	Cottonwood creek	3.44	June 10, 1898	Sept. 7, 1898
A. A. P. Ditch	A. A. Philliber	Rock creek	5.00	Sept. 12, 1898	Oct. 27, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRIST NO. 53, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Middle Derby Ditch	John M. Tippett Frank McMillan	Derby creek	12.50	Oct. 3, 1890	Jan. 30, 1897
Brown-Monroe Ditch, enlargement	W. H. Trumber	No Name creek	2.46	Dec. 8, 1897	Mar. 15, 1898
West Yarmany Ditch	J. P. Quinlan	West Yarmany creek	4.00	July, 1892	July 2, 1898
Quinlan Ditch	J. P. Quinlan	Yarmany creek	2.00	Nov., 1895	July 2, 1898
McPhee Ditch	James C. McPhee	Sheep creek	3.50	July 1, 1898	July 13, 1898
Sheephorn Ditch	David R. McPhee	Sheephorn creek	2.50	July 7, 1898	July 13, 1898
Dietrich Ditch No. 1	John U. Dietrich	Carter creek	6.00	June 1, 1892	Oct. 12, 1898
Dietrich Ditch No. 2	John U. Dietrich	Carter creek	8.00	Sept. 1, 1892	Oct. 12, 1898
Carter Creek Ditch	John U. Dietrich	Carter creek	6.00	May 23, 1896	Oct. 12, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 53, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
The Jones Reservoir No. 1	The Jones Cattle Co	Sheep creek			June 29, 1898	July 5, 1898
The Homestead Reservoir	Walter J. Cock	Spring creek		693,804	June 21, 1898	Nov. 28, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 54, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Sixteen to One Ditch	G. G. Smith et al	Willow creek	68.00	June 23, 1896	Dec. 5, 1896
Summit Creek Ditch	Thos. C. Gardner	Summit creek	9.00	July 6, 1894	Dec. 15, 1896
Anderson Ditch	Baxter Anderson	Snake river	4.00	Apr. 27, 1896	Dec. 21, 1896
Willow Creek Ditch	Frank Potts	Willow creek	6.00	Apr. 15, 1890	Mar. 15, 1897
Lambert Ditch	G. L. Lambert	Spring, Sec. 19, T. 11 N., R. 85 W	3.00	June 15, 1896	Apr. 7, 1897
Sand Springs Ditch	Thos. Booth	Timberlake creek	4.00	June 15, 1894	June 8, 1897
Independent Ditch, extension	C. E. Ayer	Willow creek	28.40	Nov. 18, 1893	June 17, 1897
Ayer's Ditch	C. E. Ayer	Willow Creek ditch	2.33	May 29, 1889	June 17, 1897
Hay Queen Ditch	Frank A. Michael	Four Mile creek	10.00	May 15, 1893	June 29, 1897
Perkins Irrigation Ditch	Chas. F. Perkins	Willow creek	20.00	June 16, 1897	June 29, 1897
Timberlake Underflow Ditch	Rob't J. Nicholson	Timberlake creek	24.00	Sept. 6, 1897	Dec. 8, 1897
Gold Valley Ditch	B. W. Law	Branches of Little Snake river	17.40	Aug. 9, 1897	Mar. 3, 1898
Heeley Ditch	Jos. Heeley	Snake river	39.00	Apr. 15, 1898	May 31, 1898
Slater Park Ditch	A. M. McCargar D. L. Houston	Slater Park ditch	10.40	Sept. 22, 1898	Oct. 10, 1898
Turner Ditch	W. D. Turner	Two branches, Little Snake river, in Sec. 14, T. 12 N., R. 87 W	2.66	Oct. 19, 1898	Oct. 25, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 54, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Timberlake Reservoir	B. W. Law	Little Snake river	Gold Valley ditch	48,787,000	Oct. 11, 1897	Mar. 3, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 57, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Clapp Irrigating Ditch	Chas. L. Clapp	Dry fork of Fortification creek	5.00	May 1, 1893	May 13, 1897
Middle Creek Ditch	Dennis Connell	Middle creek	3 00	July 1, 1890	June 10, 1897
The Bates Ditch	Lloyd F. Bates	Sage creek	3 00	June 19, 1897	July 6, 1897
Carlin Ditch	Wm. Carlin	Dry creek	2.00	May 1, 1898	June 28, 1898
"M" Irrigating Ditch	A. McLachlan et al	Bear river	10.00	June 1, 1898	July 22, 1898
Little Cottonwood High Line Ditch	C. E. Baker	Little Cottonwood	9.00	Aug. 12, 1898	Sept. 12, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 57, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Elmer Reservoir	M. Elmer	Elmer creek			June 22, 1898	July 6, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 58, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Rich Ditch	Eben Rich	Trout creek	21.00	Oct. 7, 1896	Jan. 2, 1897
Alfa Ditch	M. F. Hughes et al	Oak creek	37.00	Sept., 1890	May 14, 1897
Trull No. 3 Ditch	John M. Trull	Trull creek	7.00	Sept. 1, 1892	Aug. 30, 1897
Pine Grove Ditch	Wm. C. T. Male	Trout creek	10.00	May 1, 1889	Sept. 25, 1897
Slough Ditch	Wm. C. T. Male	Trout creek	5.00	May 1, 1890	Sept. 25, 1897
Winkleman Ditch	August Winkleman	Elk river	5.00	July 1, 1895	Dec. 27, 1897
Snow Creek Ditch	M. J. Carpenter	Snow creek	6.00	July 16, 1896	Mar. 17, 1898
Helm Ditch	Edwin Helm	Antelope creek	5.00	May 15, 1893	Mar. 26, 1898
Cottonwood Ditch	C. W. Burnham	Bruce creek	6.00	May 21, 1898	Aug. 18, 1898
McPhee enlargement of Sand Creek Ditch	Mrs. Henry McPhee	Sand creek	2.66	Oct. 3, 1898	Oct. 21, 1898
Greer Ditch	A. B. Greer	Sand creek	3.00	Oct. 12, 1898	Oct. 28, 1898
Maddox Ditch	Wallace Maddox	Deep creek	3.00	------ 1898	Oct. 28, 1898
Simpson Ditch	Geo. Simpson	Greenville creek	1.50	Oct. 13, 1898	Oct. 28, 1889

Myers Ditch	Louis Myers	Coleman creek	3.00	Oct. 23, 1898	Nov. 3, 1898
The Finley Ditch	F. B. Finley	Mattox fork of Deep creek	.....	Oct. 7, 1898	Nov. 5, 1898
The Murphy Ditch	Owen Murphy	Cottonwood creek	2.66	Oct. 31, 1898	Nov. 9, 1898
The South Side Ditch	W. O. Cook	Oak creek	5.00	Oct. 23, 1898	Nov. 14, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 59, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
The Taylor Park Mining Co.'s Taylor River No. 1 Ditch	The Taylor Park Mining Co.	Taylor river Tibits creek Trail creek Red Mountain creek	114 92 6 04 5.79 34 72	June 1, 1896 June 1, 1896 June 1, 1896 June 1, 1896	Feb. 9, 1897 Feb. 9, 1897 Feb. 9, 1897 Feb. 9, 1897
Louis Ditch, enlarged	C. Rouviere	Gunnison river	16.00	May 8, 1897	May 11, 1897
Imobersteg Ditch, first enlargement	M. Morlock	East river	8 00	Oct. 1, 1896	June 17, 1897
Berry Gulch Ditch	V. Zeilinger	Berry gulch	2.00	July 13, 1897	July 28, 1897
The Acme Ditch	D. L. La Plant et al	West fork of Sun creek	25.50	June 22, 1897	July 30, 1897
The Pass Creek Ditch	Wm. Webber et al	Pass creek	16.10	Apr. 10, 1883	July 30, 1897
The Castle Creek No. 1 Ditch	Wm. Webber	Castle creek	23 60	Apr., 1883	July 30, 1897
The Castle Creek No. 2 Ditch	Wm. Webber	Castle creek	4.10	Apr., 1883	July 30, 1897
The Bieble No. 1 Ditch	Louisa Bieble	Ohio creek	8.80	Apr. 10, 1880	Apr. 14, 1898
McKee Ditch	Joseph McKee	Wilson creek	2.20	Apr. 10, 1893	Apr. 18, 1898
McKee No. 1 Ditch	Joseph McKee	Wilson creek	2.50	Apr. 5, 1890	Apr. 18, 1898
Howe and Sherwood Ditch	Chas. Ball et al	East river	20.00	July, 1892	June 8, 1898
The Elk Home Ditch, amended	Cyprian Rouvier	West fork of Sun creek	12.00	July 21, 1897	Nov. 17, 1898
The Karl Schaefer Ditch	Karl Schaefer	Hanson creek	30.40	June 10, 1898	Nov. 22, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 59, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Nutmeg Reservoir	W. J. Sawyer	Dry creek		56,835,800	Aug. 7, 1896	July 14, 1897
Elk Home Reservoir	C. Rouviere Thos. C. Brown	West fork, Sun creek	Elk Home ditch		July 21, 1897	July 28, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 60, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Blessing Ditch, enlarged	James N. Blessing James L. Mahaffey	San Miguel river	6.00	May 1, 1894	Dec. 28, 1896
B., C., D. Ditch	Walter R. Cooper et al	San Miguel river	10.00	Mar. 30, 1895	Jan. 2, 1897
San Miguel and Paradox Ditch	Wm. W. Knight	San Miguel river	495.00	Oct. 28, 1896	Jan. 30, 1897
Manley Ditch, enlarged	J. T. Manley L. J. Gray	Edwards or Stink Hole draw	6.00	Jan., 1896	Mar. 29, 1897
Maverick Ditch	W. P. Brown et al.	Maverick draw or Anderson creek	18.00	May 18, 1897	May 31, 1897
Leopard Creek Ditch	D. B. Mackey S. K. Nesbitt	Leopard creek, two headgates	21.60	June 20, 1887	July 9, 1897
Beaver Mesa Ditch, amended	W. T. Dennison	Soltado creek	24.20	Aug. 17, 1891	Oct. 20, 1897
Williams Ditch	Josiah Williams	Williams and Trail creeks	4.00	Oct. 2, 1897	Nov. 10, 1897
Farmer's Ditch	John H. Frazer et al	Fall creek	66.00	Sept. 7, 1897	Feb. 3, 1898
Farmer's Co-operative No. 2 Ditch	John H. Adams	*Fall creek, Trail creek, Williams, Hunt, Painter, Specie, Spring, Saltado and Beaver creeks	80.00	June 4, 1898	Aug. 5, 1898

Shenandoah Canal and Reservoir System Canal No. 1	The Shenandoah Irrigation and Land Co	Naturita and Beaver creeks	800.00		Sept. 23, 1898
Shenandoah Canal and Reservoir System Canal No. 2	The Shenandoah Irrigation and Land Co	Naturita and Beaver creeks	600.00		Sept. 23, 1898
Ritchmond Ditch	J. A. Lawson	Little Prospect creek	2.00		Oct. 20, 1898

*Sixteen headgates; all creeks tributaries of San Miguel.

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 60, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Frazer Reservoir	Roy Frazer	Naturita Canal and Reservoir Co.'s ditch and Beaver ditch		4 225,320	Jan. 24, 1898	Mar. 7, 1898
Shenandoah Canal and Reservoir System, Reservoir No. 1	Shenandoah Irrigation and Land Co	Naturita and Beaver creeks		1,119,492,000		Sept. 23, 1898
Shenandoah Canal and Reservoir System, Reservoir No. 2	Shenandoah Irrigation and Land Co	Naturita and Beaver creeks		1,135,803,200		Sept. 23, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 61, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
McKenna North Side Ditch	P. A. McKenna	Slough, Sec. 6, T. 42 N., R 16 W	10.00	Aug. 10, 1896	Feb. 10, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 62, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Moore No. 1 Ditch	Wm. B. Moore	Beaver creek	25.00	May 1, 1893	Dec. 14, 1896
Moore No. 2 Ditch	Wm. B. Moore	Beaver creek	38.00	June 10. 1893	Dec. 14, 1896
Moore No. 3 Ditch	Wm. B. Moore	Beaver creek	45.00	June 1, 1896	Dec. 14, 1896
McKinley Ditch, extension	Peter Fitzpatrick	McKinley ditch, Sec. 36, T. 48 N., R. 6 W.	5.50	June 1, 1893	June 21, 1897
Stumpy Ditch, amended	Peter Fitzpatrick	Stumpy creek	4.00	May 20, 1884	June 21, 1897
Standard Ditch	H. L. Hayes	Cimmaron creek	45.00	Oct. 26, 1897	Jan. 19, 1898
Bismarck Ditch	V. Ehret	Willow creek	4.00	May 15, 1898	June 8, 1898
Vulcan Pipe Line Ditch	J. A. Himebaugh J. E. Davidson	Springs, Secs. 17 and 18, T. 47 N., R. 1 W.	2.00	Aug., 1896	July 17, 1898
Campbell Creek Ditch	Catherine E. Dwyer	Campbell creek	3.00	Nov. 10, 1882	Sept. 28, 1898
Dwyer Creek Ditch	Catherine E. Dwyer	Dwyer creek	3.00	May 15, 1898	Sept. 28, 1898
The Lake City Power Co.'s Pipe Line	The Lake City Power Co.	Lake fork of Gunnison river	200.00	Aug. 23, 1898	Nov. 12, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 62, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Lake San Cristobal Reservoir	A. E. Reynolds	Lake fork of Gunnison river		426,278,160	Aug. 3, 1898	Nov. 1, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 64, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Merry Bell Ditch	C. C. Bell et al	South Platte river	207.00	Dec. 12, 1896	Jan. 18, 1897
The J. F. Ditch	Johann Freiberg	South Platte river	15.00	Oct. 21, 1896	Jan. 22, 1897
Long Island Ditch	C. C. Bell	South Platte river	72 00	July 1, 1896	Mar. 9, 1897
South Platte, extension	J. S. Brown et al	South Platte river	179.72	July 1, 1896	Mar. 22, 1897
Two Mile	Robert N. Biggs	Springs, Secs. 21 and 16, T. 11 N , R. 57 W	1.00	Mar. 20, 1897	Apr. 7, 1897
Hemminghouse	J. F. Hemminghouse	South Platte river	10.00	Jan. 22, 1897	Apr. 20, 1897
Harmony No. 2	J. K. Mulien C. D. McPhee	South Platte river	138.00	May 3, 1897	June 10, 1897
Riordan	John Riordan	South Platte river	22 00	May 19, 1897	Nov. 23, 1897
Settlers	Fred Greve et al	South Platte river	125.00	Nov. 27, 1897	Dec. 1, 1897
Cedar Valley	Henry Lingelbach Jacob Lingelbach	Cedar creek	5.00	Jan. 13, 1898	Jan. 17, 1898
John I. Filer	John I. Filer	Two-Mile creek	3 00	Nov. 15, 1897	Jan. 17, 1898
Thompson	Irwin C. Thompson	South Platte river	132.00	Feb. 1, 1898	Feb. 14, 1898
Settlers	Fred Greve et al	South Platte river	89 98	Dec. 13, 1897	Feb. 18, 1898
Peterson Canal, first enlargement	Peterson Canal and Reservoir Co	South Platte river	514.70	Oct. 11, 1897	Mar. 16, 1898

George Creek Ditch	Arthur E. Buchanan	George creek	105.00	Mar. 28, 1898	Apr. 2, 1898
Knowles Spring Ditch No. 1	C. D. McPhee J. K. Mullen	Springs	60.00	Jan. 1, 1885	May 6, 1898
Knowles Spring Ditch No. 2	C. D. McPhee J. K. Mullen	Springs	60.00	Apr. 22, 1898	May 6, 1898
Harmony No. 1	C. D. McPhee J. K. Mullen	South Platte river and seepage	252 00	Apr. 22, 1894	May 6, 1898
Harmony No. 2	C. D. McPhee J K. Mullen	South Platte river and seepage	138.00	May 3, 1897	May 6, 1898
Fisher	S. H. Fisher	Two-Mile creek	6.00	Feb. 1, 1898	Sept. 7, 1898
J. B. Ditch, extension	G. C. Huston	South Platte river	85.00	June 13, 1898	Sept. 7, 1898
Pawnee Ditch, extension	W. E. King et al	South Platte river	25 00	May 26, 1898	Sept. 10, 1898
Hadfield Ditch	Charity A. Hadfield	Louis creek	69 00	Sept. 26, 1898	Oct. 12, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 65, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Thompson No. 1	Wm. Thompson	Arickaree river	15.00	Jan. 8, 1896	Mar. 30, 1897
The W. H. Gerdts	W. H. Gerdts	Underflow of Arickaree river, Sec. 15, T. 4 S., R. 48 W	12.10	Mar. 11, 1897	May 19, 1897
Rush Creek Ditch No. 1	The Laird Land and Ditch Co	Rush creek	6.00	Oct. 13, 1898	Nov. 29, 1898
Rush Creek Ditch No. 2	The Laird Land and Ditch Co	Rush creek	6.00	Oct. 13, 1898	Nov. 29, 1898
Olive Creek Ditch	The Laird Land and Ditch Co	Olive creek	6.00	Oct. 12, 1898	Nov. 29, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 65, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Black Wolfe	Louis F. Parker	Arickaree river	Black Wolfe	1,080,000	Jan , 1896	Dec. 31, 1897
Rush Creek Reservoir No. 1	The Laird Land and Ditch Co	Rush creek		2,500,000	Oct. 13, 1898	Nov. 29, 1898
Rush Creek Reservoir No. 2	The Laird Land and Ditch Co	Rush creek		1,750,000	Oct. 13, 1898	Nov. 29, 1898
Olive Creek Reservoir	The Laird Land and Ditch Co	Olive creek		2,000,000	Oct. 12, 1898	Nov. 29, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 66, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Darling Ditch	Jonathan Darling	Causo creek	5.00	July 25, 1898	Sept. 26, 1898

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 67, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
State Line Ditch	James Kendall	Cheyenne creek	4.00	Sept. 1, 1896	Dec. 28, 1896
Lamar Canal, Feeder No. 2	Colorado and Arkansas River Ditch Co	Arkansas river	11.70		Jan. 24, 1897
Paradox Valley Irrigating Ditch	Chas. G. Myers	Seepage, etc., Sec. 34, T. 21 S., R. 46 W	10.00	Dec. 7, 1896	Jan. 30, 1897
Gammon Ditch No. 1	Lemnel Gammon Julien Gammon	Big Sandy creek	9 00	Dec. 17, 1896	Mar. 12, 1897
Gammon Ditch No. 2	Julien Gammon	Big Sandy creek	7.00	Dec 19, 1896	Mar. 12, 1897
Cameron Ditch No 2	John Cameron	Big Sandy creek	15.00	Mar. 1, 1897	Mar. 23, 1897
Matheson Ditch	Duncan Matheson	Big Sandy creek	10.00	Mar. 4, 1897	Apr. 8, 1897
F. B. Jenney Pipe Line	F. B. Jenney	Ravine and springs, Sec. 3, T. 10 S., R. 57 W	4 gals. per min.	Oct. 26, 1896	Oct. 6, 1897
The Garrity Ditch	Michael Garrity	Cheyenne creek and seepage. Sec. 17, T. 23 S., R. 41 W	4.00	Oct. 23, 1897	Nov. 1, 1897
The M. Bivans Ditch	Mrs. M. Bivans	Seepage and spring waters, Sec. 5, T 23 S., R. 41 W., and along Cheyenne creek	6.00	Nov. 3, 1897	Nov 17, 1897
The Mitchell Ditch	Edward F Mitchell James A. Mitchell John H. Mitchell	Seepage and spring water, Secs. 31 and 32, T. 22 S., R. 41 W., and along Cheyenne creek	6.00	Nov 20, 1897	Dec. 4, 1897

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 67, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898—Concluded.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second feet	Date of appropriation	Date of filing in office of State Engineer
The Mitchell Ditch, amended statement	Edward F. Mitchell James A. Mitchell John H. Mitchell	Seepage and spring water, Secs. 31 and 32, T. 22 S., R. 41 W., and along Cheyenne creek	6.00	Nov. 20, 1897	April 11, 1898
Wampler Ditch	A J. Wampler	Wild Horse creek	1.44	Mar. 29, 1898	May 9, 1898
Cheyenne Creek Ditch	John Hess & Co	Cheyenne creek	4.00	Aug. 26, 1896	May 16, 1898
Sleepy Eye Ditch	Chas. M. Hall	Seepage, Sec. 17, T. 22 S., R. 45 W	24.00	Mar. 6, 1898	May 23, 1898
Caledonia Ditch	Louise M. Laurie	South Rush creek	27.00	Apr. 1, 1897	July 23, 1898
C. D. Baldwin Ditch	C. D. Baldwin	Seepage and spring waters, Sec. 10, T. 22 S., R. 47 W	9.00	Sept., 1895	Oct. 17, 1898

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 67, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
The Morse Irrigating Ditches and Reservoir	Joseph W. Morse	Big Sandy and seepage.	Feeders Nos. 1 and 2	500,000	Apr., 1893	Dec. 19, 1896

TABLE

GIVING DITCH AND CANAL APPROPRIATIONS IN WATER DISTRICT NO. 68, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF DITCH OR CANAL	Name of Appropriator	Source of Appropriation	Capacity claimed in second-feet	Date of appropriation	Date of filing in office of State Engineer
Camp Bird Ditch	Thos. F. Walsh	Imogene creek	20 00	Sept. 10, 1897	Oct. 4, 1897

TABLE

GIVING RESERVOIR APPROPRIATIONS IN WATER DISTRICT NO. 68, RELATIVE TO WHICH STATEMENTS AND PLATS HAVE BEEN FILED IN THE OFFICE OF THE STATE ENGINEER, FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

NAME OF RESERVOIR	Name of Appropriator	Source of Appropriation	Name of Ditch conveying water thereto	Capacity claimed in cubic feet	Date of appropriation	Date of filing in office of State Engineer
Lake Como Reservoir	Aaron W Hovey Lionel R. Wigram	Lake Como	Poughkeepsie creek	91,911,600	Aug 8, 1898	Oct. 17, 1898

SUMMARY OF DITCH AND RESERVOIR FILINGS

FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

DIVISION NO. 1.

District No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
1	11	1,608.50	2	77,733,040
2	7	558.97	18	833,548,141
3	23	723.33	18	732,736,769
4	11	88.00	10	335,154,640
5	7	50.44	7	26 567,658
6	7	624.66	2	2,904,025
7	5	317.49	3	7,392,625
8	13	72.43	1	Not given
23	11	304.50	5	10,811,768,896
9	3	32.50	None	----------
46	12	213.00	1	2,600,000
47	11	390.00	1	318,088,000
48	7	517.50	None	----------
64	23	2,314.40	None	----------
65	5	45.10	4	7,330,000
Total	156	7,860.82	72	13,155,823,794

SUMMARY OF DITCH AND RESERVOIR FILINGS

FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

DIVISION NO. 2.

District No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
10	10	41.26	7	13,251,480
11	11	179.40	9	12,497,266,080
12	11	404.30	29	2,293,015,820
13	6	9.10	2	5,612,335,552
14	5	16.64	5	918,816,924
15	None		None	
16	28	737.00	15	1,791,458,533
17	5	89.18	8	8,792,691,941
18	1	69.00	1	34,071,825
19	4	188.20	5	6,368,973
49	3	46.00	None	
66	1	5.00	None	
67	17	154.14	1	500,000
Total	102	1,939.22	82	31,959,777,128

SUMMARY OF DITCH AND RESERVOIR FILINGS

FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

DIVISION NO. 3.

District No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
20	5	31.00	1	307,971,000
21	None		None	
22	None		None	
24	None		None	
25	3	41.00	None	
26	1	9.20	None	
27	None		None	
35	1	30 00	None	
Totals	10	111.20	1	307,971,000

SUMMARY OF DITCH AND RESERVOIR FILINGS

FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

DIVISION NO. 4.

District No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
29	None		1	2,025,000
30	15	52.65	None	
31	None		None	
32	6	14.50	None	
33	4	12.00	None	
34	None		None	
Total	25	79.15	1	2,025,000

SUMMARY OF DITCH AND RESERVOIR FILINGS

FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

DIVISION NO. 5.

District No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
28	3	35.73	None	
36	11	1,051.41	None	
37	22	197.31	1	294.000
38	23	218.41	1	18,703,800
39	15	87.98	None	
40	47	718.65	66	427,630.096
41	18	132.61	None	
42	24	1.461.82	9	96,073,398
45	12	318.27	None	
50	22	185.78	None	
51	18	315.63	None	
52	6	28.50	None	
53	9	46.96	2	693,804
59	14	332.67	2	56,835,800
60	14	2,132.80	3	2,259.520,520
61	1	10.00	None	
62	11	374.50	1	426,278,160
63	None		None	
68	1	20.00	1	91,911,600
Totals	271	7,669.03	86	3,377,941,178

SUMMARY OF DITCH AND RESERVOIR FILINGS

FROM DECEMBER 1, 1896, TO DECEMBER 1, 1898.

DIVISION NO. 6.

District No.	Number of Ditches	Capacity	Number of Reservoirs	Capacity
43	17	173.66	3	34,671,085
44	5	42.70	3	36,170,000
54	15	268.19	1	48,787,000
55	None		None	
56	None		None	
57	6	32 00	None	
58	13	121.82	None	
Totals	56	638.37	7	119,628,085

CHAPTER VI.

TABLES RELATING TO DECREES TO DITCHES AND RESERVOIRS.

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 7, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FOURTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 1, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district per decree	Order of priority by date
Big Dry Creek Ditch	Big Dry creek	Dec. 15, 1889	5.00			1	88
Bowles Ditch	Big Dry creek	Apr., 1893	5.00			1	89
Westminster Waste Water Ditch	Big Dry creek	July 15, 1893	5.00			2	90
Colfax Waste Water Ditch	Dry creek tributary to Platte river	July 19, 1893	5.00			1	91
Slough Drainage Ditch	Slough	Aug. 11, 1893	5.00			1	92
Farmers' Highline Canal and Reservoir Co.'s Ditch	Clear creek	Apr. 1, 1886	191.00			68	87
Farmers' Highline Canal and Reservoir Co.'s Ditch	Clear creek	Apr. 23, 1895	335.86			69	93
Boyles Ditch, amended decree	Clear creek	May 15, 1863	1.50			93	32a

THE MONTEZUMA VALLEY IRRIGATION CO., NEAR DOLORES, COLORADO.

TABLE

GIVING RESERVOIR DECREES IN WATER DISTRICT NO 7, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FOURTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 1, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF RESERVOIR	Source of Appropriation	Date of Appropriation	Amount in cubic feet decreed to each priority	Order of priority for seepage
a Hyatt Lake Reservoir	Clear creek	1863		
a Pardee Reservoir No. 1	Clear creek	July, 1883	71,000	
a Broad Lake Reservoir	Clear creek	1887		
a Thos. O. Brown Reservoir No. 4	Clear creek	Apr. 1, 1887	2,088,900	1
a Pardee Reservoir No. 6	Clear creek	Apr. 1, 1890	97,500	
a Mayham Reservoir	Clear creek and seepage		52,659,000	1

a No priorities were granted for these reservoirs for water from Clear creek.

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Hardscrabble Ditch	Hardscrabble creek	May 1, 1860	.93			1
Conley Ditch	Beaver creek	Mar., 1861	1.80		.93	2
Burdock Ditch	Beaver creek	Mar., 1861	1.00		2.73	2
Green Ditch	Four-Mile creek	Apr. 1, 1861	1.60		3.73	3
Glendale Ditch	Beaver creek	Apr. 1, 1861	3.40		5.33	4
Stephen Frazier Ditch	Beaver creek	Apr. 20, 1861	1.60		8.73	5
Porter Ditch	Arkansas river	May 1, 1861	1.05		10.33	6
Peggy Ditch	Beaver creek	May 20, 1861	2.52		11.38	7
Callen Ditch	Beaver creek	May 30, 1861	3.40		14.90	8
Bates Ditch	Beaver creek	May 31, 1861	1.00		18.30	9
Titsworth Ditch	Four-Mile creek	May 31, 1861	3.64		19.30	9
Union Ditch	Arkansas river	Nov. 30, 1861	48.00		22.94	10
Fremont County Ditch	Arkansas river	May 31, 1862	17.00		70.94	11
Craig Beckham Ditch	Four-Mile creek	May 31, 1862	4.32		87.94	12

Henderson Hardscrabble Ditch	Hardscrabble creek	Aug. 31, 1862	.50		92.26	13
Hannenkrott Ditch	Arkansas river	Aug. 31, 1863	2.16		92.76	16
Cañon City Hydraulic and Irrigating Co.'s Ditch	Arkansas river	Dec. 30, 1863	96.00		94.92	17
Baltiff Ditch	Beaver creek	May 31, 1864	1.60		190.92	18
Johnson Ditch	Beaver creek	May 20, 1864	1.60		192.52	19
Cañon City Oil Creek Ditch	Arkansas river	May 31, 1864	33.60		193.52	20
Craig Beckhorn Ditch	Beaver creek	Feb. 10, 1865		87.94	227.12	21
Wafford Ditch	Four-Mile creek	Mar. 1, 1865	4.44			21
Titsworth Ditch	Beaver creek	Mar. 31, 1865	1.00		231.56	23
Toof No. 1 Ditch	Beaver creek	Mar. 31, 1865	1.00		232.56	23
Johnson Merrit Ditch	Beaver creek	Apr. 15, 1865	1.00		233.56	25
Morey Ditch	Beaver creek	May 24, 1865	3.80		234.56	27
Buroughs Ditch	Hardscrabble creek	May 25, 1865	1.00		238.36	28
Oberion Ditch	Four-Mile creek and Grape creek	Dec. 10, 1865	2.50		239.36	29
South Cañon Ditch	Arkansas river, also Four-Mile creek	Feb. 28, 1866	34.40		241.86	30
Cottage Rock Ranch Ditch	Arkansas river	Feb. 28, 1866	3.00		276.26	30
Adam Studt Ditch	Eight-Mile creek	Apr. 1, 1866	1.00		279.26	31
Banks Ditch	Mineral and Adobe creeks	May 31, 1866	1.00		280.26	33
Davis & McCumber Ditch	Arkansas river	May 31, 1866	2.53		281.26	33
Pauls Ditch	Adobe and Mineral creeks	May 31, 1867	.50		283.79	34
May Ditch	Oak creek, incorporated city Rockvale	May 31, 1867	4.50		284.29	34
Garden Park Ditch	Four-Mile creek	Sept. 10, 1867	4.62		288.85	35
Coleman Ditch	Hardscrabble creek	Sept. 10, 1867	3.25		293.47	36
Terry Ditch	Four-Mile creek	Nov. 30, 1867	1.00		296.72	37
Tenazzi Ditch	Hardscrabble creek	Nov. 31, 1867	1.00		297.72	38

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Aaron Ripley Ditch	Hardscrabble creek	Feb. 28, 1868	1 00	.....	298.72	39
Harington Ditch	Hardscrabble creek	Mar. 4, 1868	5.26	.....	299.72	40
Monteville Ditch	Hardscrabble creek	May 31, 1868	1.80	.....	304.98	41
Craig-Beckhorn Ditch	Four-Mile creek	May 31, 1868	.....	87.94	306.78	41
Burnett Ditch	Eight-Mile creek	May 31, 1868	1.00	.....	.....	41
Adams Ditch	Four-Mile creek	Apr. 30, 1869	1 00	.....	307.78	42
1869 Ditch	Hardscrabble creek	Apr. 30, 1869	1.00	.....	308.78	42
Reece Ditch	Hardscrabble creek	May 1, 1869	3.24	.....	309.78	43
Thomas Johnson Ditch	Beaver creek	May 31, 1869	2.00	.....	313.02	44
Howard Ditch	West Four-Mile creek	June 1, 1869	1.00	.....	315.02	45
Hill No. 1 Ditch	Howard creek	Aug. 31, 1869	1.06	.....	316.02	46
Hill No. 2 Ditch	Howard creek	Aug. 31, 1869	1.06	.....	317.08	46
Adam Stust No. 1 Ditch	Eight-Mile creek	Dec. 31, 1869	1.60	.....	318.14	47
Adam Stust No. 2 Ditch	Eight-Mile creek	Dec. 31, 1869	1.60	.....	319.74	47

Tenazzi Ditch	Hardscrabble creek	Mar. 31, 1870	1.00	2.00		48
Mascot Ditch	Hardscrabble creek	Apr. 30, 1870	1.00		320.74	49
Hoyden Ditch	Hoyden creek	May 10, 1870	1.60		321.74	50
Banks Ditch	Arkansas river	May 31, 1870	1.00		323.34	51
George Ditch	Four-Mile creek	June 1, 1870	2.80		324.34	52
Davis Ditch	Four-Mile creek	June 7, 1870	2.40		327.14	53
Cascade Ditch	Hardscrabble creek	Aug. 1, 1870	7.11		329.54	54
Kittridge Ditch	Four-Mile creek	Aug. 31, 1870	2.00		336.65	55
Barker Ditch	Adobe and Mineral creeks	Sept. 30, 1870	1.50		338.65	56
Hodges No. 1 Ditch	Cottonwood creek	Nov. 15, 1870	2 50		340.15	57
Corporan Ditch	Hardscrabble creek	Nov. 30, 1870	1.00		342.65	58
Hodges No. 2 Ditch	Cottonwood creek	Dec. 1, 1870	2.00		343.65	59
Breece North Side Ditch	Four-Mile creek	Dec. 25, 1870	1.46		345.65	60
Knowles Ditch	Hardscrabble creek	Mar. 30, 1871	.50		347.11	61
Thomas Patton, 1 and 2	Beaver creek	Apr. 15, 1871	1.28		347.61	62
Lobach Ditch	Hardscrabble creek	Apr. 15, 1871	.50		348.89	62
Ritter Ditch	Texas creek	Apr. 30. 1871	2.58		349.39	64
Hulbert Ditch	Beaver creek	May 1, 1871	1.00		351.97	65
Tremoyne Bros. Ditch	Four-Mile creek	May 10, 1871	2.00		352.97	66
McIntire Ditch	Four-Mile creek	May 30, 1871	2.00		354.97	67
Hilton Ditch	Barnard creek	May 31, 1871	.73		356.97	68
Toof Ditch, extension	Beaver creek	Oct. 1, 1871	1.00	2.00	357.70	69
Draper Ditch	Hardscrabble creek	Oct. 1, 1871	1.25		358.70	69
Uteley Ditch	Hardscrabble creek	Oct. 1, 1871	.50		359.95	69
Melrose Ditch	Hardscrabble creek	Oct. 31, 1871	1.00		360.45	70

TABLE

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NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Vaughn Ditch	Hardscrabble creek	Dec. 1, 1871	2.58		361.45	71
Winburn Ditch	Beaver creek	Dec. 20, 1871	1.00		364.03	72
Murphy Ditch	Four-Mile creek	Jan. 1, 1872	1.60		365.03	73
McClure Ditch	Beaver creek	Jan. 2, 1872	2.88		366.03	74
Cottonwood Ditch	Cottonwood creek	Feb. 29, 1872			368.91	75
Garden Park Ditch	Four-Mile creek	Mar. 15, 1872		4.62		76
Potato Ditch	Tallahassee creek	Apr. 1, 1872	1.00			77
Gomer Ditch	Howard creek	Apr. 1, 1872	2.12		369.91	77
Witcher Ditch	Four-Mile creek	Apr. 14, 1872	1.60		372.03	78
Thomas Patton No. 1	Beaver creek	Apr. 15, 1872	1.00		373.63	79
Pioneer Ditch	Tallahassee creek	Apr. 15, 1872			374.63	79
Croft Reed Ditch	Cottonwood creek	Apr. 30, 1872				80
Drury Ditch	Four-Mile creek	Apr. 30, 1872	1.20			80
Watson Ditch	Hardscrabble creek	May 1, 1872	1.60		375.83	81

Ritter Ditch	Hardscrabble creek	May 1, 1872	1 36		377.43	81
Bernard Ditch	Bernard creek	May 31, 1872	1.00		378.79	82
Reece Ditch	Hardscrabble creek	June 1, 1872		3 24	379.79	83
Gardner Ditch	Tallahassee creek	June 15, 1872	2.00			84
Paul's or Frazier Ditch	West Four-Mile creek	June 20, 1872			381.79	85
Tremyne Ditch	Four-Mile creek	June 30, 1872				86
Harington Ditch	Four-Mile creek	July 1, 1872				87
Home Ditch	Mineral creek	Sept. 17, 1872	.50			88
Camblin Ditch	Hayden creek	Dec. 30, 1872	1.00		382 29	89
Banta Ditch	Beaver creek	June 2, 1873	1.56		383.29	90
Upper Perry Ditch	Beaver creek	June 3, 1873	1.00		384 85	91
Pleasant Valley Ditch	Hayden creek	Feb. 10, 1873	1 00		385 85	92
Hoagg Ditch	Hayden creek	Feb. 28, 1873	1.60		386 85	93
Stout No. 1 Ditch	Stout creek	Mar. 1, 1873	3 00		388 45	94
Witcher No. 2 Ditch	Four-Mile creek	Mar. 31, 1873	1.00		391 45	95
Breece South Side Ditch	Four-Mile creek	Apr. 1, 1873	.50		392 45	96
Hayden Ditch	Hayden creek	Apr. 1, 1873	2 60	4 20	392 95	96
Cradock Ditch	Howard creek	Apr. 10, 1873	2 80		395 55	97
Gibs Ditch	Hardscrabble creek	Apr. 15, 1873	69		398 35	98
Seth Wright No. 1 Ditch	Newland creek	Apr. 29, 1873	.50		399.04	99
Cottonwood South Side Ditch	Cottonwood creek	Apr. 30, 1873			399 54	100
Gardner No. 2 Ditch	Tallahassee creek	Apr. 30, 1873	1 50			100
John Watson Ditch	Hardscrabble creek	May 1, 1873	.50		401 54	101
Gorman No. 1 Ditch	Tallahassee creek	May 12, 1873	1.50		401 54	102
Hayden No. 2 Ditch	Hayden creek	May 31, 1873	1.00		403.04	103

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Oak Mat Ditch	West creek	May 31, 1873	1.50		404.09	103
R. D. Williams No. 1 Ditch	Beaver creek	May 31, 1873	.50		405.59	103
Seth Wright No. 2 Ditch	Newland creek	June 1, 1873	.50		406.09	104
Kittridge Ditch	Four-Mile creek	June 15, 1873	2.33	4.33	406.59	105
Hill Ditch	Howard creek	Aug. 31, 1873	1.00		408.92	106
Kelso No. 1 Ditch	Arkansas river	Oct. 31, 1873	1.00		409.92	107
Stonehocker Ditch	Eight-Mile creek	Dec. 31, 1873	1.00		410.92	108
Burnett No. 2 Ditch	Eight-Mile creek	Dec. 31, 1873	1.00		411.92	108
John Baker Ditch	Cottonwood creek	Apr. 1, 1874	1.00		412.92	109
Stout Ditch	Stout creek	Apr. 1, 1874	1.00		413.92	109
Fickes Ditch	Hayden creek	Apr. 29, 1874	1.20		414.92	110
Rigs Ditch	Four-Mile creek	Apr. 30, 1874	1.40		416.12	111
Gorman Ditch	Tallahassee creek	May 20, 1874	1.50		417.52	112
Riggs No. 1 Ditch	Four-Mile creek	May 31, 1874	2.00		419.02	113

Watson No. 2 Ditch	Four-Mile creek	May 31, 1874	4.00		421.02	113
Willson	No stream given in decrees	June 1, 1874			425.02	114
The 1874 Ditch	Stout creek	June 3, 1874	2.80			115
First Leon	Four-Mile creek	June 13, 1874	1.40		427.82	116
Second Leon	Four-Mile creek	June 14, 1874	1.00		429.22	117
First Bearnard	Four-Mile creek	June 15, 1874	1.00		430.22	118
Westheffer Ditch	Lewis creek	July 15, 1874	.50		431.22	119
Stout No. 3 Ditch	Stout creek	Aug. 31, 1874	1.00		431.72	120
Amy Ditch	Howard creek	Nov. 30, 1874	1.00		432.72	121
Hunt Ditch	Four-Mile creek	Mar. 1, 1875	1.00		433 72	122
West Side Ditch	Stout creek	Apr. 1, 1875	3.80		434.72	123
Kestler Ditch	West Four-Mile creek	Apr 30, 1875	1.00		438.52	124
Meadow Ditch	Tallahassee creek	May 1, 1875	cu. feet not given		439.52	125
Second Perry Ditch	Beaver creek	May 1, 1875	1.00			125
Tremoyne Ditch	West Four-Mile creek	May 10, 1875	1.00		440.52	126
Jim Creek Ditch	Tallahassee creek	May 15, 1875	1.50		441.52	127
Chivvis Ditch	Tallahassee creek	May 15, 1875	1.50		443.02	127
Cox Ditch	Tallahassee creek	May 31, 1875	1.50		444.52	128
Mermod No. 1 Ditch	Cottonwood creek	June 1, 1875	.50		446.02	129
Westall Ditch	Four-Mile creek	June 30, 1875	1.00		446 52	130
Lester & Attebury	Arkansas river	June 30, 1875	2.00		447 52	130
South Ditch	West Four-Mile creek	July 1, 1875	1 00		449.52	131
Gertie B. Vest Ditch	Cottonwood creek	July 31, 1875	1		450 52	132
Haggart Ditch	Cottonwood creek	July 31, 1875	1.00		452 02	132
Minton Ditch	Beaver creek	Jan. 3, 1876	1.00		453.02	133

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Stout No. 4 Ditch	Stout creek	Mar. 31, 1876	2.80		454.02	134
Seth Brown Ditch	Stout creek	Apr. 1, 1876	1.60		456.82	135
Lower Ditch	Four Mile creek	Apr. 15, 1876	2.00		458.42	136
Cottonwood Ditch	West creek	Apr. 29, 1876	1.60		460.42	137
Jack Ditch	Tallahassee creek	Apr. 30, 1876			462.02	138
Morning Star Ditch	Tallahassee creek	May 12, 1876	1.50		462.02	139
Mermod Ditch	Cottonwood creek	May 15, 1876	3.00		463.52	140
Spring Ditch	Tallahassee creek	May 15, 1876	1.50		466.52	140
Coffman Ditch	Beaver creek	May 15, 1876	1.60		468.02	140
North Spring Ditch	Tallahassee creek	May 31, 1876			469.62	141
Arch Ditch	Tallahassee creek	May 31, 1876				141
Davis Ditch	Hardscrabble creek	May 31, 1876	2.72			141
Spring Ditch	Four-Mile creek	June 1, 1876	1.00		472.34	142
Black No. 1 Ditch	Squaw creek	June 1, 1876	1.00		473.34	142

Mermod No. 3 Ditch	Cottonwood creek	Aug. 10, 1876	4.00		474.34	143
Cox Ditch	Tallahassee creek	Nov. 20, 1876	1.25	2.75	478.34	144
Sikes Cypert Ditch	Hardscrabble creek	Dec. 31, 1876	2.73		479.59	145
Allen Ditch	Hardscrabble creek	Mar. 16, 1877	1.81		482.32	146
Hight Ditch	Beaver creek	Apr. 16, 1877	1.00		484.13	147
Kelley Ditch	Beaver creek	Apr. 18, 1877	1.00		485.13	148
West Ditch	Four-Mile creek	Apr. 30, 1877	1.32		486.13	149
Gross & Witcher Ditch	Barnard creek	May 31, 1877	1.00		487.45	150
Meadow Ditch	Tallahassee creek	May 31, 1877			488.45	150
Arch South Ditch	Tallahassee creek	May 31, 1877				150
Dick Creek Ditch	Tallahassee creek	May 31, 1877				150
Mineral Creek Ditch	Mineral creek	June 5, 1877	.62			151
Nicholas Extension Ditch	Hardscrabble creek	July 31, 1877			489.07	152
Griffin Ditch	Oak creek	Oct. 1, 1877	1.00			153
Witcher Ditch	Four-Mile creek	Mar. 31, 1878	1.00	2.60	490.07	154
Island No. 1 Ditch	Beaver creek	May 6, 1878	1.00		491.07	155
Gorman No. 3 Ditch	Tallahassee creek	May 10, 1878	2.00		492.07	156
Garden Ditch	Tallahassee creek	May 31, 1878			494.07	157
Chivvis No. 1 Ditch	Tallahassee creek	May 31, 1878	2.00			158
John Stultz Ditch	Oak creek	May 31, 1878			496.07	159
Lewis Lower Ditch	Hardscrabble creek	May 31, 1878	1.00			160
Tremoyne Bros. Ditch	West Four-Mile creek	June 1, 1878	1.40		497.07	161
Marmaduke Ditch	Stout creek	Nov. 30, 1878	1.00		498.47	162
Mosier Ditch	Mosier creek	Dec. 30, 1878	1.00		499.47	163
Howard No. 3 Ditch	Howard creek	Apr. 30, 1879	1.00		500.47	164

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GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Pioneer South Side Ditch	Tallahassee creek	May 10, 1879	1.00		501.47	165
Gardner No. 3 Ditch	Tallahassee creek	May 31, 1879	.75		502.47	166
Graham Ditch	Arkansas river	Mar. 31, 1880	1.00		503.22	167
John Spaulding Ditch	Oak creek	Apr. 20, 1880	.41		504.23	168
Lucas Ditch	Four-Mile creek	Apr. 30, 1880				169
Waggoner Ditch	Stout creek	May 1, 1880	1.40		504.63	170
Pioneer Ditch, North	Tallahassee creek	May 10, 1880	2.00		506.03	171
Little Cottonwood Ditch	Cottonwood creek	May 14, 1880	1.00		508.03	172
Harry Ditch	Four-Mile creek	Aug 1, 1880	1.00		509.03	173
Sumerville Ditch	Main Tallahassee creek	Sept. 30 1880	1.00		510.03	174
Nathen Bragg Ditch	Oak creek	Dec. 1, 1880	.75		511.03	175
Orange White Ditch	Arkansas river	Jan. 1, 1881	1.00		511.78	176
Amy North Ditch	Howard creek	Feb. 9, 1881	2.00		512.78	177
West Hughes Ditch	Beaver creek	Feb. 28, 1881	1.00		514.78	178

Curtis Ditch	Beaver creek	Mar. 14, 1881	1.00		515.78	179
Herrick Ditch	Oak creek	Apr. 1, 1881	1.00		516.78	180
Grose's Extension	West Four-Mile creek	Apr. 1, 1881	1.00		517.78	180
Sumerville No. 1	Tallahassee creek	Apr. 10, 1881	2.00		518.78	181
Crain Ditch	Oak creek	Apr. 15, 1881	1.00		520.78	182
Smith Ditch	Oak creek	May 1, 1881	1.00		521.78	183
Jones Ditch	Howard creek	May 31, 1881	1.00		522.78	184
Baker Ditch	Stout creek	June 1, 1881	1.00		523.78	185
Heath Ditch	Hardscrabble creek	June 20, 1881	.50		524.78	186
Griffin No. 2 Ditch	Oak creek	July 1, 1881	1.00		525.28	187
Griffin No. 3 Ditch	Oak creek	July 31, 1881	1.00		526.28	188
Amy South Ditch	Howard creek	Sept. 17, 1881	2.00		527.28	189
Park Creek Ditch	Beaver creek	Jan. 19, 1882	6.20		529.28	190
Extension of Hill Ditch	Howard creek	Mar. 31, 1882	1.00	2.00	535.48	191
East Hughs Ditch	Beaver creek	Apr. 29, 1882	1.00		536.48	192
Fanshuer Ditch	Beaver creek	May 1, 1882	1.00		537.48	193
Oak Creek Ditch	Oak creek	May 3, 1882	1.52		538.48	194
Dick Steel Ditch	Mineral creek	May 31, 1882	1.00		540.00	195
Woods Pastur Ditch	Stout creek	May 31, 1882	1.26		541.00	195
Phelps Ditch	Arkansas river	May 31, 1882	1.00		542.26	195
Cuddy Ditch	Howard creek	Sept. 24, 1882	2.00		543.26	196
Black No. 2 Ditch	Cottonwood creek	Nov. 1, 1882	1.00		545.26	197
Neely Ditch	Hardscrabble creek	Dec. 31, 1882	1.00		546.26	198
Bragg Ditch	Oak creek	Dec. 31, 1882	1.00		547.26	198
Sampson No. 2 Ditch	Cottonwood creek	Dec. 31, 1882			548.26	198

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GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
R. D. Williams No. 2 Ditch	Beaver creek	Apr. 2, 1883	1 00			199
Cristy Ditch	Chandler creek	Apr. 20, 1883	1 00		549.26	200
Griffin No. 5 Ditch	Oak creek	May 1, 1883	1 00		550.26	201
Boyer Ditch	Hayden creek	May 10, 1883	1 00		551.26	202
Pleasant Valley Ditch	Arkansas river	May 31, 1883	8.00		552.26	203
Bridge Valley Ditch	Arkansas river	June 30, 1883	1 00		560.26	204
Stout Ditch	Stout creek	Mar. 3, 1884	2.12	3.12	561.26	205
Bernard Ditch	Beaver creek	Apr. 1, 1884	.50		563.38	206
Riggs No. 3 Ditch	Bernard creek	Apr. 15, 1884	1.00		563.88	207
Sanders Ditch	Hardscrabble creek	Apr. 30, 1884	50		564.88	208
John Spalding No. 2 Ditch	Oak creek	May 30, 1884	54		565.38	209
Gardner No. 4 Ditch	Tallahassee creek	May 31, 1884	.75		565.92	210
Bowman Ditch	Mineral creek	June 12, 1884	50		566.67	211
Mains No. 1 Ditch	Howard creek	Aug. 11, 1884	1.00		567.17	212

Woodriff-Lells Ditch	Arkansas river	Dec. 18, 1884	2.26		568.17	213
Thomas Patton No. 3 Ditch	Beaver creek	Dec. 29, 1884	1.00		570.43	214
McCandlass Ditch	Arkansas river	Apr. 1, 1885	1.00		571.43	215
Greenwood Ditch	Hardscrabble creek	Apr. 1, 1885	.50		572 43	215
Island Ditch	Beaver creek	Apr. 1, 1885	1.60		572 93	216
Reece Ditch, extension	Hardscrabble creek	Apr. 15, 1885	.50	3.74	573.93	217
Griffin No. 4 Ditch	Oak creek	Apr. 30, 1885	1.00		574.43	218
Wilson Ditch	Four-Mile creek	May 15, 1885	1.00		575.43	219
Rhodes & Tennant Ditch	Mineral creek	June 19, 1885	.75		576.43	220
Hillside Ditch	West creek	June 30, 1885	1.00		577.18	221
Freemont Water Supply Co., Con., Ditch	Beaver creek	July 15, 1885			578.18	221
John Spalding No. 4 Ditch	Oak creek	Oct. 30, 1885	.51			222
Lanone Ditch	Hayden creek	May 31, 1886	.40		578.69	223
David Ditch	Currant creek	May 31, 1886	1 00		579.09	224
Felch's West Side Ditch	Four-Mile creek	June 1, 1886	.96		580.09	225
O'Brien Ditch	Four-Mile creek	Aug. 5, 1886	1.00		581.05	226
McGregor Ditch	Oak creek	May 1, 1887	1 00		582.05	227
North Squaw Ditch	Cottonwood creek	May 30, 1887			583 05	228
South Squaw Ditch	Cottonwood creek	May 30, 1887				228
Ute Park Ditch and Reservoir			Incomplete			229
Smith Ditch	Brush creek	Feb. 28, 1888	1.20		583.05	230
Second Barnard Ditch	Four-Mile creek	May 31, 1888	1 00		584.25	231
Eight-Mile Ditch	Eight-Mile creek	May 31, 1888	1 00		585 25	232
King Ditch	Cottonwood creek	Apr. 10, 1888	1 50		586 25	233
Dunham Ditch	Spring creek	Apr. 29, 1888	1 00		587.75	234

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GIVING DITCH DECREES IN WATER DISTRICT NO. 12, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "FIFTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Concluded.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount of second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Chavers Ditch	Howard creek	June 1, 1888	1.00		588.75	235
Veal Ditch	Stout creek	Aug. 31, 1888	1.00		589.75	236
Extension of Corporan Ditch	Hardscrabble creek	Dec. 1, 1888	1.06	2.06	590.75	237
Specher Ditch	Howard creek	Feb. 28, 1889	.50		591.81	238
Star Ditch No. 1	Oak creek	May 1, 1889	1.00		592.31	239
Star Ditch No. 2	Oak creek	May 1, 1889	1.00		593.31	239
J. M. Parker Ditch	Hayden creek	Feb. 20, 1890	.50		594.31	240
Wesley Ditch	Chandler creek	Apr. 15, 1890	1.00		594.81	241
Frank Ditch	Chandler creek	May 1, 1890	1.00		595.81	242
Marmaduke Ditch	Stout creek	May 1, 1890	1.00		596.81	242
John Hyssong Ditch	Cottonwood creek	June 1, 1890	2.00		597.81	243
				Total	599.81	

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 13, PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
South Cañon Ditch	Arkansas river and Grape creek	Feb. 28, 1866	3 feet on 2 feet	bottom, 6 deep, grade	feet on top, 3 feet per	1 mile.
Wm Courats No. 1 Ditch	Macey creek	July 1, 1869	1.09	1.61	15.3	2
Smith Ditch	Taylor creek	Sept. 1, 1869	1.07	9.39	16.39	3
Wm. Conradts No. 2 Ditch	Macey creek	Sept. 1, 1869	----------	----------	17.46	3
Schuler Ditch	Greenlief creek	Apr. 15, 1870	----------	----------	* 17.46	5
Fred Kuehn No. 2 Ditch	Seepage and overflow	July 1, 1870	1.45	----------	17.46	6
Smith Ditch	----------	July 31, 1870	1.07	2.14	18.91	7
F. Caldwell Ditch	Antelope creek	Aug. 1, 1870	.44	----------	19.98	8
Eldrich & Shields Ditch	----------	May 1, 1871	.20	----------	20.42	9
West Perry Ditch	Texas creek	May 1, 1871	1.00	----------	20.62	10
Jarvis Ditch	Homes creek	May 10, 1871	.63	1 25	21.62	11
F. Ackebein No. 1 Ditch	Macey creek	May 10, 1871	.93	----------	22.25	11
Brown & Willson Ditch	Antelope creek	May 30, 1871	.38	----------	23 18	12

*Where amount of decree is not given nothing is added to the total amount previously decreed, and the total amounts as given in this column are too small by whatever amount these omissions may be.

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 13, PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Rogers Ditch	Lake creek	May 31 1871	1.00	.....	23.56	13
Belknap Ditch	Lake creek	May 31, 1871	2.10	.....	24.56	13
Hayden Ditch	Lake creek	May 31, 1871	2.49	.....	26 66	13
Taylor & Luten Ditch	Texas creek	June 1, 1871	1.80	.....	29.15	14
Dikley & McCormic Ditch	Texas creek	June 11, 1871	1.32	.....	30.95	15
Mill Ditch No. 1	Texas creek	June 12, 1871	1.00	.....	32.27	16
Kitzman & Tod Ditch	Boston creek	July 1, 1871	.90	.....	33.27	.....
E. P. Smith Ditch	Cottonwood creek	Aug. 1, 1871	6.05	.....	34.17	17
Darman Ditch	Antelope creek	Apr. 8, 1872	2.00	.....	40.22	18
Middle Ditch	Antelope creek	May 1, 1872	1.35	1.70	42.22	19
Dickett No. 1 Ditch	Texas creek	May 10, 1872	1.00	.....	43 57	20
Voldick Ditch	Texas creek	May 15, 1872	2 30	.....	44.57	21
Keeling No. 1 Ditch	Colony creek	May 15, 1872	1.00	.....	46.87	.....
Belknap Ditch	Texas creek	May 31, 1872	2.76	.....	47.87	.....
Thomas Belman Ditch	Brush creek	May 31, 1872	1 57	.....	50 63	22

Lockhart No. 1 Ditch	Brush creek	May 31, 1872	1.00		52.20	
Sharp & Foster Ditch	Brush creek	June 1, 1872	1.57		53.20	23
Alfred Ketzenstine Ditch	West Taylor creek	June 1, 1872	.86		54.77	
Hendrick & Densmore Ditch	North Brush creek	June 10, 1872	4.60		55.63	24
Fred Kuehn No. ½ Ditch	Cottonwood creek	July 1, 1872	.82	2.27	60 23	25
Lockhart No. 2 Ditch	North Brush creek	July 1, 1872	1.31		61.05	25
Eldridge & Shield's Ditch		July 1, 1872	5 38	5.58	62 36	25
Densmore No. 2 Ditch	Texas creek	July 24, 1872	.50		67.74	26
McClurkin Ditch	Texas creek	July 30, 1872	.50		68.24	27
Hug Ditch	Texas creek	Nov. 30, 1872	2.05		68.74	28
Alfred Ketzenstine Ditch	West Taylor creek	Mar. 30, 1873	.86	1.72	70.79	28
Ula Ditch	Taylor creek	Apr. 17, 1873	.50		71.65	29
Jake Wells Ditch	Spruce creek	May 1, 1873	1.00		72 15	30
F. Ackelebein No. 2 Ditch	Macey creek	May 20, 1873	1.25		73 15	31
Duckett Ditch	Texas creek	May 20, 1873	1.31		74.40	31
Belknap Ditch	Texas creek	May 31, 1873	1.00	3.76	75 71	32
John Howard Ditch	South Brush creek	May 31, 1873	3.15		76.71	32
Dissmore Ditch	Dissmore creek	June 1, 1873	1.05		79.86	33
Albert Ditch	North Colony creek	June 1, 1873	1.13	1.13	80.91	33
Kelling Ditch	Colony creek	June 1, 1873	1.00	2.00	82.04	
Wm. Conradt's Ditch	Macey creek	June 1, 1873	.24	1.33	83.04	34
Klose No. 2 Ditch	Macey creek	June 1, 1873	.50		83.28	
Fred Kahol No. 1 Ditch	Goodwell creek	June 1, 1873	1.10	1 44	83 78	
Houle No. 1 Ditch	Brush creek	June 14, 1873	2.10		84 88	35
Davis No. 1 Ditch	Homes creek	June 23, 1873	.62		86.98	36

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NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Sharp & Hendrickson Ditch	South Brush creek	June 30, 1873			87.60	37
Kitzman & Tod No. 3 Ditch	Boston creek	Aug. 31, 1873	.30	1.20	87.60	38
Myers Ditch	Texas creek	May 1, 1874	1.00		87.90	39
Vahldick Ditch	Greenlief creek	May 20, 1874	1.71		88.90	40
Hamelton Ditch	Hamelton creek	May 31, 1874	1 60		90.61	
Joseph Ditch	Texas creek	May 31, 1874	3 50		91.61	
Thomas Balmon Ditch	Brush creek	May 31, 1874	2 44	3 81	95.11	41
Dissmore Ditch	Spruce creek	May 31, 1874	1.00		97.55	
Prengle Ditch	Spruce creek	May 31, 1874	1.31		98.55	
Joseph Georg No. 2 Ditch	Macey creek	June 1, 1874	.40		99.86	42
Gagnier Ditch	Horn creek	June 1, 1874	1.20		100.26	42
Davis No. 2 Ditch	Homes creek	June 10, 1874	.42	1.84	101.46	43
Davis No. 3 Ditch	Homes creek	June 12, 1874	.66		101.88	44
Davis No. 4 Ditch	Homes creek	June 13, 1874	.66		102 54	45
Wm. Conradt's Ditch	Macey creek	July 5, 1874	1.19	2.52	103.20	46

Burgman No. 1 Ditch	Lake creek	Aug. 30, 1874	1.00		104.39	47
C. S. Cox Short Creek Ditch	Short creek	Oct. 1, 1874	.50		105.39	48
Davis No. 5 Ditch	Homes creek	Nov. 30, 1874	.10		105.89	49
John Cox Ditch	South Brush creek	Apr. 30, 1875	1.00		105.99	50
Burgman No. 2 Ditch	Texas creek	Apr. 30, 1875	1.00		106.99	51
Abbot Ditch	Lake creek	May 1, 1875	4 20		107.99	51
Elze No. 1 Ditch	Hudson creek	May 31, 1875	1.25		112.19	52
Baker No. 1 Ditch	Antelope creek	May 31, 1875	.80		113.44	52
A. Menzel No. 1 Ditch	Piroth creek	June 1, 1875	1.70		114.24	53
Vanner Ditch	Macey creek	June 10, 1875	.75		115.94	54
Wm. Acklbein Ditch	Homes creek	June 15, 1875	.70		116.69	55
Frink & Co. Ditch	Cottonwood creek	June 15, 1875	1.10		117.39	55
A. F. Kuhen No. 2 Ditch	Cottonwood creek	July 1, 1875	.80		118.49	56
Ferdinand Voss No. 3 Ditch	Homes creek	July 1, 1875	1.50		119.29	57
Allen Swift Creek Ditch	Swift creek	Aug. 1, 1875	2.10		120.79	58
Pasture Ditch	Cottonwood creek	Mar. 15, 1876	.66		122.89	59
West Branch Ditch	Hudson creek	May 18, 1876	.61		123.55	60
Wm. Conradt's No. 5 Ditch	Hudson creek	June 1, 1876	.31		124.16	61
Olrich No. 2 Ditch	Colony creek	June 1, 1876	.85		124 47	61
Yonch Ditch	Cottonwood creek	June 10, 1876	.83		125 32	62
Frink & Co. Ditch	Cottonwood creek	June 15, 1876	1.03	2.13	126.15	63
Baker No. 2 Ditch	Antelope creek	June 30, 1876	.52		127.18	63
A Menzel No. 1 Ditch	Piroth creek	June 1, 1877	1.67	3.37	127.70	64
Jacob Beck Ditch	Piroth creek	June 24, 1877	.26		129.37	65
A. F. Kuhn No 3 Ditch	Piroth creek	Jul'y 1, 1878	1.80		129.63	66

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 13, PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
A. Katzenstine Ditch	Hudson creek	July 1, 1878	.80		131.43	67
Ernest Roll No. 1 Ditch	Grape creek	Oct. 1, 1878	.53		132.23	68
Ernest Roll No. 2 Ditch	Grape creek	Oct. 1, 1878	.75		132.76	68
Ernest Roll No. 3 Ditch	Grape creek	May 1, 1879	.40		133.51	69
Ernest Roll No. 4 Ditch	Grape creek	May 5, 1879	.80		133.91	70
Jacob Beck No. 4 Ditch	Hudson creek	May 15, 1879	.44		134.71	71
Jacob Beck No. 5 Ditch	Hudson creek	May 15, 1879	.27		135.15	71
Dickerman No. 6 Ditch	Macey creek	May 31, 1879	.20		135.42	72
Jarvis Batton Ditch	Grape creek	June 10, 1879	2.00		135.62	73
Jacob Beck Ditch	Hudson creek	June 15, 1879	.16		137.62	74
Leopold Frank No. 1 Ditch	Cottonwood creek	June 15, 1879	1.20	1.95	137.78	74
Leopold Frank No. 2 Ditch	Cottonwood creek	June 15, 1879	.75		138.98	75
Leopold Frank No. 3 Ditch	Henequin creek	June 17, 1879	.30		139.73	80
F. Kuhn No. 2 Ditch	Cottonwood creek	July 1, 1879	.80	3 07	139 03	81
C. P. Cox Ditch	Swift creek	July 1, 1879	1.20		140.83	81
Taylor & Luten Creek Ditch	Taylor creek	Sept. 1, 1879	1.50	3.30	141.03	82

Ferdinand Voss No. 1 Ditch	Homes creek	May 1, 1880	.50		142.53	83
Ferdinand Voss No. 2 Ditch	Homes creek	May 10, 1880	1.50	2.00	143.03	84
Joseph George No. 1 Ditch	Spring creek	May 15, 1880	.40		144 53	85
F. Kuhen No. 3 Ditch		May 25, 1880	.83		144 93	86
Wm. A. Brewer Ditch	Cottonwood creek	May 25, 1880	1.00		145.76	86
Fred Acklebin No. 3 Ditch	Macey creek	May 31, 1880	.93		146 76	87
Krouse Ditch	Grape creek	June 1, 1880	.27		147.69	88
Jarvis No. 2 Ditch		June 1, 1880	.63		147.96	
The 76 Ditch	Spring creek	June 1, 1880	.53		148.59	88
Menzel No. 2 Extension Ditch	Piroth creek	Jan. 30, 1880	1.32		149.12	89
South Cannon Ditch	Grape creek	Oct. 1, 1880	.75		150.44	90
Alford Katzenstine Ditch	Taylor creek	Mar. 31, 1881	1.20		151.19	91
Century Ditch	Piroth creek	Mar. 31, 1881	.87		152 39	92
John L. Schwab Ditch	Cottonwood creek	M y 10, 1881	2.13		153 26	93
Gottfried Etzel Stanton No. 1 Ditch	Cottonwood creek	May 15, 1881	.40		155.39	94
Gottfried Etzel Stanton No. 2 Ditch	Stanton creek	May 15, 1881	.40		155.79	95
C. J. L. Schwab Ditch	Cottonwood creek	May 15, 1881	4.00		156.19	95
Charles Blei No. 1 Ditch	Homes creek	May 25, 1881	.40		160.19	96
Charles Blei No. 2 Ditch	Homes creek	May 25, 1881	.40		160.59	96
Extension Ditch	Grape creek	June 1, 1881	.99		160 99	97
Schopp Bros. Ditch	Warrick creek	June 1, 1881	2.00		161 98	97
Davis No. 6 Ditch	North Homes creek	June 5, 1881	.62		163 98	98
Neerman No. 5 Ditch	Hudson creek	June 15, 1881	.10		164 60	98
Henry Neerman No. 6 Ditch	Hudson creek	June 15, 1881	.11		164 70	99
Davis No. 7 Ditch	South Homes creek	June 15, 1881	.62		164 81	99

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 13, PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Concluded.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Marx Leuch Ditch	Colony creek	Apr. 15, 1882	1.00		165.43	100
Elize Enlargement Ditch	Colony creek	May 31, 1882	.66		166.43	100
Century Ditch	Peroth creek	May 31, 1882	.87	1.74	167.09	101
South Cañon Extension Ditch	Grape creek	May 31, 1882	.86	1.75	167.96	101
McIssac Aldrich Ditch		May 31, 1882	1.32		168.82	101
Fred Kohol Extension Ditch	Goodwell creek	June 15, 1882	.84		170.14	102
Wm. Conradt's Enlargement Ditch	Macey creek	June 15, 1882	.50	3.01	170.98	102
Thomas Abt No. 1 Ditch	Froze creek	May 10, 1883	.90		171.48	103
Prestly & Robins Ditch	South Taylor creek	June 10, 1883	2.33		172.38	104
Puls No. 1 Ditch	Froze creek	Aug. 1, 1884	.50		174.71	105
Puls No. 2 Ditch	Froze creek	Aug. 1, 1884	.75		175.21	105
Schapp Bros. No. 1 Ditch	Homes creek	May 18, 1885	1.34		175.96	106
Alfred Katzenstine Ditch	West Taylor creek	July 31, 1885	.40	2.12	177.30	107
Smith Enlargement Ditch	Taylor creek	Mar. 31, 1886	1.20	3.34	177.70	108
Gottfried Etzil No. 2 Ditch	Macey creek	June 1, 1886	.80	1.20	178.90	109
Thomas Abt No. 2 Ditch	Froze creek	June 1, 1886	1.25		179.70	109

J. Schmidt & Duckman Ditch	Homes creek	July 15, 1886	2.52		180.95	110
J. L. Schwab No 4 Ditch	Cottonwood creek	May 5, 1887	.40		183.47	111
J. L. Schwab No. 5 Ditch	Cottonwood creek	May 5, 1887	.40		183.87	111
Extension No. 2 Ditch	Vorris Brothers creek	June 15, 1888	.46		184.27	112
Brush Ditch	Middle Colony creek	June 16, 1888	.83		184.73	113
Gottfried Etzel No. 3 Ditch	Stanton creek	June 30, 1888	.40		185.56	114
Thomas Abt No. 3 Ditch	Froze creek	Apr. 20, 1889	1.23		185.96	115
F. Caldwell Spring Creek Ditch	Spring creek	May 1, 1889	1.00		187.19	116
Extension No. 3 Ditch	Vorris creek	June 1, 1889	.54		188.19	117
Rocky Point Ditch	North branch, Colony creek	June 7, 1889	.93		188.73	118
F. Caldwell Antelope Ditch	Antelope creek	May 31, 1890	.44	.88	189.66	119
Extension No. 4 Ditch	Grape creek	June 1, 1890	1.00		190.10	120
Olrich No. 2 Ditch	Colony creek	July 1, 1890	.85	1.70	191.10	121
Ernest Roll No. 1 Enlargement Ditch	Grape creek	July 1, 1890	.60	1.13	191.95	121
Kitzman & Tod Ditch	Barton creek	Aug. 31, 1890	.60	1.80	192 55	122
Rocky Point Ditch	Colony creek	Oct., 1890	.93	1.86	193.15	123
				Total	194.08	

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 15, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Eagle Ditch	St. Charles river	1865	.4	1.1	18.65	19½
Eagle Ditch	St. Charles river	1887	.6	1.7	192.10	177½

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 34, IN WATER DIVISION NO. 4, AS THEY HAVE BEEN ESTABLISHED BY THE DISTRICT COURT OF THE SIXTH JUDICIAL DISTRICT, PREPARED FROM THE ORIGINAL RECORDS.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Giles Ditch	East and Middle Mancos creeks	July 1, 1874		3.75		1
Root & Ratliff Ditch	West Mancos creek	May 15, 1875		31.25	3.75	2
Willis Ditch	Mancos creek	May 15, 1876		4 25	35 00	3
Viets Ditch	Mancos creek	May 15, 1879		1.00	39 25	4
Lee & Burke Ditch	West Mancos creek	May 15, 1877		4.17	40.25	5
Henry Bolen Ditch	Mancos creek	May 15, 1878		7.33	44.42	6
No. 6 Ditch	Mancos creek	Jnly 15, 1877		7.25	51.75	7
Beaver Ditch	Mancos creek	May 15, 1878		6.61	59 00	8
Glasgow & Brewer Ditch	Mancos creek	May 15, 1878		3.42	65 61	9
Smith Ditch	Mancos creek	May 15 1876		2 50	69 03	10
Frank Ditch	Mancos creek	May 15, 1878		4 17	71 53	11
McGrew No. 1 Ditch	Chicken creek	May 15, 1880		.50	75 70	12
Sheek Ditch	Mancos creek	May 15, 1880		7 83	76 20	13
Davenport Ditch	Middle Mancos creek	May 1, 1881		1.33	84 03	14
Boss Ditch	Mancos creek	May 21, 1881		8.17	85 36	15

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 34, IN WATER DIVISION NO. 4, AS THEY HAVE BEEN ESTABLISHED BY THE DISTRICT COURT OF THE SIXTH JUDICIAL DISTRICT, PREPARED FROM THE ORIGINAL RECORDS—Concluded.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Seabury Extension of Root & Ratliff Ditch	West Mancos creek	May 21, 1881	.....	2.75	93.53	16
Lee Ditch	Mancos creek	June 15, 1881	.....	8.13	96.28	17
Webber Ditch	Middle Mancos and Mancos creeks	May 15, 1882	.....	21.17	104.41	18
Carpenter & Mitchell Ditch	Chicken creek	May 15, 1882	.....	4.25	125.58	19
O. C. Roberts Ditch	Mancos creek	May 15, 1883	.....	10.42	129.83	20
Exon Ditch	Mancos creek	Apr. 25, 1883	.....	1.83	140.25	21
Jensen & Bianchi Ditch	West Mancos creek	May 23, 1883	.....	.67	142.08	22
Field Ditch	West Mancos creek	May 15, 1883	.....	.42	142.75	23
Samson Ditch	East Mancos creek	June 1, 1884	.....	2.33	143.17	24
Frink & Glasgow Ditch	Mancos creek	June 1, 1884	.....	2.92	145.50	25
Morefield Ditch	Mancos creek	May 15, 1885	.....	.33	148.42	26
Graybeal Ditch	East and Middle Mancos creeks	July 15, 1885	.....	1.00	148.75	27
Cramer Extension of Sheek Ditch	Mancos creek	May 15, 1884	.....	2.50	149.75	28
Olds Extension of Root & Ratliff Ditch	West Mancos creek	June 15, 1886	.....	5.71	152.25	29
East Mancos High Line Ditch	East Mancos creek	Aug. 15, 1886	.....	5.58	157.96	30

McGrew No. 2 Ditch	Chicken creek	May 15, 1886		.50	163.54	31
Exon Extension of Beaver Ditch	Mancos creek	May 15, 1887		1.17	164.04	32
Crystal Creek Ditch	Crystal creek	May 15, 1888		8.67	165.21	33
Wilden & Brinkerhoff Ditch	Webber Canon creek	June 12, 1888		3.92	173.88	34
Sheek Lateral of Sheek Ditch	Mancos creek	May 15, 1889		3.33	177.80	35
Long Park Ditch	Middle Mancos creek	June 29, 1889		5.00	181.13	36
J. A. Frink Extension of Beaver Ditch	Mancos creek	May 15, 1891		.50	186.13	37
Webber No. 2 Ditch	West Mancos creek	June 15, 1889		16.92	186.63	38
Wattles Extension of Bolen Ditch	Mancos creek	May 10, 1890		1.33	203.55	39
Halls & Briscoe Extension of Carpenter & Mitchell Ditch	Chicken creek	May 15, 1891		6.75	204.88	40
Hadden & Brinkerhoff Ditch	East Canon creek	May 14, 1892		2.58	211.63	41
Mancos Canon Ditch	Mancos and Mud creek	June 12, 1892		3.75	214.21	42
Reservoir Ditch	West Mancos creek	June 12, 1892		3.33	217.96	43
			Totals	221.29	221.29	

TABLE

GIVING RESERVOIR DECREES IN WATER DISTRICT NO. 34, AS ESTABLISHED BY THE DISTRICT COURT OF THE SIXTH JUDICIAL DISTRICT, PREPARED FROM THE ORIGINAL RECORDS.

NAME OF RESERVOIR	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Order of priority in district
Wetherill No. 1 Reservoir	Mancos	June 12, 1892	----------	1

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 42, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 5, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Order of priority on stream
Coon Creek Ditch	Coon creek	May 15, 1886	.72	1
Welsh Ditch	Coon creek	Apr., 1884	1.30	2
McGeoch Ditch	Coon creek	July, 1888	.52	3
Atwill Ditch	Coon creek	Aug., 1888	.59	4
Welch Ditch	Coon creek	June, 1891	.33	5
Coon Creek X No. 1 Ditch	Coon creek	May, 1893	.52	6
Atwill Ditch	Coon creek	June, 1896	.78	7

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 44, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 6, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed on stream	Order of priority in district
D. D. Ferguson No. 1 Ditch	Milk creek	June 28, 1890	3.50		19.39	35A
D. D. Ferguson No. 2 Ditch	Milk creek	Feb. 1, 1892	4.00		42.28	35B
				Total	46.28	
Robert M. Richardson Ditch	Yampa or Bear river	Sept. 3, 1898	6.00		53.37	37
				Total	59.37	

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 54, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 6, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet previously decreed on stream	Order of priority in district
Independent Ditch	Willow creek	Nov. 18, 1893	2.17	.....	18
Joseph Noland Ditch	Willow creek	May 12, 1889	1.30	2.17	12a
T. H. Perkins Ditch	Willow creek	June 13, 1891	1.04	3.47	14a
Willow Creek Ditch	Willow creek	Aug. 15, 1884	43.33	4 51	1a
Sixteen to One Ditch	Willow creek	June 23, 1896	68.00	47.94	19
			Total	115.84	
Four Mile Mining Ditch	Four-Mile creek	Nov. 11, 1892	25.00	2.33	15a
Hay Queen Ditch	Four-Mile creek	May 15, 1893	9.00	27 33	17a
			Total	36.33	

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 57, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 6, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH, CANAL OR RESERVOIR	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second feet decreed to each ditch or canal	Total amount in second-feet previously decreed on stream	Order of priority in district
Wolf Creek Ditch	Wolf creek	Sept. 15, 1886				20½
Highline Ditch	Fortification creek	Nov. 18, 1889	5.00		61.63	44 A
Lamb Irrigating Ditch	Fortification creek	May 1, 1891	2.00		66.63	50
Mesa Irrigating Ditch	Fortification creek	Aug. 4, 1891	9.00		68.63	51
Clapp Irrigating Ditch	Fortification creek	May 1, 1893	2.66		77.63	52
				Total	80.29	
Pine Grove Ditch	Trout creek	May 1, 1889	1.58		12.98	41
Slough Ditch	Trout creek	May 1, 1890	.60		20.15	46
				Total	20.75	
Bates Ditch	Sage creek	June 19, 1897	2.00		50.30	53
				Total	70.30	
Baker Reservoir	N. E. ¼, Sec. 12, T. 9 N., R. 91 W.	Nov. 18, 1889	54 acre ft.			1

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 58, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 6, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed on stream	Order of priority in district
Alpha Ditch	Oak creek	Sept. 17, 1890	7.20		13.80	92½
				Total	21 00	
Bonner & Johnson Ditch	Walton creek	Nov. 12, 1892	2.66		34 00	105
				Total	36.66	
Dome Creek Ditch	Dome creek	July 23, 1893	5.00			106

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 64, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 1, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
South Platte Ditch Co.'s Ditch	South Platte river	May 1, 1872	90.00	----------	----------	1
Henry Schneider Ditch	South Platte river	Apr. 10, 1873	9.00	----------	90.00	2
Henry Schneider No 2 Ditch	South Platte river	Apr. 10, 1873	2 00	----------	99.00	3
Sterling Irrigating Co.'s Dit h	South Platte river	July 15, 1873	175.00	----------	101.00	4
Pawnee Ditch	South Platte river	Sept. 17, 1873	67.00	----------	276.00	5
Davis Bros. Ditch Co.'s Ditch	South Platte river	Apr. 10, 1874	2.00	----------	343.00	6
Schneider Ditch Co.'s Ditch	South Platte river	Aug. 15, 1875	37.50	----------	345 00	7
Schneider Ditch Co.'s Ditch	South Platte river	Oct. 20, 1880	75.00	112.50	382.50	8
Henderson & Smith Ditch	South Platte river	Nov. 30, 1880	12.50	----------	457.50	9
Pawnee Ditch	South Platte river	June 22, 1882	150.00	217.00	470 00	10
Low Line Ditch	South Platte river	Oct. 14, 1882	39.90	----------	620 00	11
Iliff and Platte Valley Ditch	South Platte river	Oct. 1, 1883	150.00	----------	659.90	12
Sterling No. 2 Ditch	South Platte river	June 17, 1884	50.00	----------	809.90	13
Springdale Ditch	South Platte river	July 19, 1886	62.50	----------	859.90	14

a Iliff and Platte Valley Reservoir Ditch	South Platte river	Nov. 15, 1888	379.00		922.40	15
Davis Bros. Ditch Co.'s Ditch	South Platte river	Dec. 1, 1890	3.00	5.00	1301.40	15
South Reservation Co.'s Ditch	South Platte river	Sept. 14, 1892	25.00		1304.40	16
Bravo Ditch	South Platte river	Feb 21, 1893	40.00		1329.40	17
Powell & Dillon Ditch	South Platte river	Dec. 12, 1893	45.00		1369.40	18
Huston Ditch	South Platte river	Sept. 17, 1894	10.00		1414.40	19
Harmony Ditch	South Platte river	Sept. 20, 1894	20.00	25.00	1424.40	20
Lone Tree Ditch	South Platte river	Apr. 28, 1895	252.00		1441.40	21
		July 15, 1895	82.00		1696.40	22
				Total	1778.40	

a Capacity of reservoir, 12,458,643 cubic feet.

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 67, AS THEY HAVE BEEN ESTABLISHED SINCE THE STATEMENT PUBLISHED IN THE "EIGHTH BIENNIAL REPORT" PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 2, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in cubic feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
The Sisson Irrigating Ditch No. 1	Arkansas river	Jan. 1, 1876	10.37			4
a The Sisson Irrigating Ditch No. 1	Arkansas river	Dec. 20, 1889	5.37			
a The Sisson Irrigating Ditch No. 2	Arkansas river	Dec. 20, 1889	6.85			13

a 10 per cent. to be added for loss by seepage, if necessary.

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 68, PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 5, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Old Agency	Uncompahgre river	Aug. 1, 1875	7.50			1
Portland	Cutler creek	May 1, 1876	.62		7 50	2
Morrison	Uncompahgre river	May 5, 1876	.62		8.12	3
Morrison	Uncompahgre river	June 1, 1876	1.25	1.87	8.74	4
Hosner-Bromward	Uncompahgre river	June 1, 1876	2 50		9.99	5
McDonald-Cuddingdon	West Arm Uncompahgre river	June 10, 1876	.62		12.49	6
Charles Logan	Uncompahgre river	June 1, 1876	8 00		13.11	7
Hockley Lateral	Dallas	Apr. 1, 1877	4 50		21.11	8
Mayol-Sisson	West Fork Dallas	Apr 15, 1877	2 50		25 61	9
Bigbee	Uncompahgre	May 1, 1877	.75		28 11	10
Doc Wade	Dallas	May 1, 1877	9 25		28 86	11
G. W. Haney	Uncompahgre	May 1, 1877	.50		38 11	12
Strayer	Uncompahgre	May 1, 1877	.25		38.61	13
Miller Branch	West Arm Uncompahgre	May 1, 1877	1.00		38 86	14

TABLE

GIVING DITCH DECREES IN WATER DISTRICT NO. 68, PREPARED BY THE SUPERINTENDENT OF IRRIGATION OF WATER DIVISION NO. 5, FROM THE CERTIFIED COPY OF THE DECREES GOVERNING APPROPRIATIONS IN THIS DISTRICT, FURNISHED HIM BY THE CLERK OF THE DISTRICT COURT ISSUING SUCH DECREES—Continued.

NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second feet previously decreed in district	Order of priority in district
Middle Miller	West Arm Uncompahgre	May 5, 1877	.38		39.86	15
West Miller	West Arm Uncompahgre	May 5, 1877	.38		40.24	16
Trenchard	East Dallas	May 1, 1877	6.25		40.62	17
G. W. Haney No. 2	West Arm Uncompahgre	May 10, 1877	.50		46.87	18
Slough	West Arm Uncompahgre	June 1, 1877	3 50		47.37	19
Johnson	West Arm Uncompahgre	Aug 1, 1877	3 00		50.87	20
Leopard Creek	Leopard creek	Oct. 1, 1877	21.00		53.87	21
Haney	Uncompahgre	Apr. 1, 1878	2.50		74.87	22
Brownyard No 1	West Arm Uncompahgre	May 1. 1878	.25		77.37	23
Hyde	From springs	May 1, 1878	1.00		77.62	24
Independence	Uncompahgre	May 1, 1878	2 50		78.62	25
Reed Overman	Dallas	May 1, 1878	7.75		81 12	26
Brownyard No. 2	West Arm Uncompahgre	May 1, 1878	.63		88.87	27
Phillips	West Arm Uncompahgre	May 13, 1878	2 00		89.50	28

Brownyard No. 3	West Arm Uncompahgre	May 15, 1878	.37		91.50	29
Moody No. 1, Burtch appropriation	West Arm Uncompahgre	May 15, 1878	1.25		91.87	30
Coal Creek	Coal creek	June 1, 1878	3.50		93 12	31
McDonald	West Arm Uncompahgre	Oct. 1, 1878	2.22		96 62	32
Von Hagan Lateral	Lobard creek	Apr. 4, 1878	13.50		98 84	33
a Moody No. 1	Uncompahgre	Apr. 1, 1879	13.50	14 75	112.34	34
a Moody No. 1 and Moody, Murling appropriation	Uncompahgre	Apr. 4, 1879	.50	15 25	125 84	35
Barker	West Fork Dallas	May 1, 1879	.50		126.34	36
Rewalt	Uncompahgre	May 1, 1879	.25		126.84	37
Sherbino	Through Mayole Sisson	May 1, 1879	1.25	3.75	127 19	38
Mike Cuddigan	Dallas river	June 1, 1879	6.50		128 34	39
Call	Uncompahgre	Apr. 1, 1880	1.00		134 84	40
Berkhart & Eddy	West Fork Dallas	Nov. 15, 1880	13.00		135.84	41
Hyde Sneva	Dallas	Oct. 1, 1880	9.00		148.84	42
Van Hagan-Dallas	West Dallas	Dec. 18, 1880	11.00	15.50	157.84	43
Nate Creek No. 1	Nate creek	Mar. 1, 1880	2.25		168.84	44
Chaffee	Cow creek	Mar. 10, 1881	2.75		171.09	45
Moody	Uncompahgre	Apr. 1, 1881	2.12		173.84	46
Coal Creek	McKee appropriation	Apr. 1, 1881	.75	4.25	175.96	47
Park	West Arm Uncompahgre	May 1, 1881	6.00		176.71	48
Henry Trenchard	Dallas river	June 1, 1881	4.87		182 71	49
Upper Uncompahgre	Uncompahgre	Sept. 10, 1881	7.25		187 58	50
Roswell Hotchkiss	Uncompahgre	Sept. 15, 1881	3.75		194 83	51
Climax	Billy creek	Oct. 1, 1881	1.25		198.58	52

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NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Homestretch	Uncompahgre	Oct. 1, 1881	9.00		199.83	53
Sneva	Cow creek	Oct. 15, 1881	21.00		208.83	54
Springfield & Corrie	Onion creek	Apr. 1, 1882	6 25		229.83	55
Cassedy	Ute No. 3 appropriation	Apr. 1, 1882	.50		236.00	56
Hosmer-Rowell	Dallas creek	Apr. 1, 1882	5 00		236.58	57
Oakes-Jerome	Dallas river	May 1, 1882	3.00		241.58	58
Private	Cow creek	Apr. 30, 1882	2.50		244.58	59
Private	Cow creek	May 1. 1882	.50		247.08	60
Mayo-Sisson, first enlargement	West Fork Dallas	May 1, 1882	1.00	4.75	247.58	61
Oaks-Woodruff and Extension	Dallas river	Apr. 1, 1882	2.25		248.58	62
Evans	Dallas river	May 1, 1882	4.50		250.83	63
Babb	Willow creek	May 1, 1882	4 00		255.33	64
Sol Teague	Cow creek	May 1, 1882	4.00		259.33	65
Wood-Perry	Dallas	May 10, 1882	4 12		263 33	66

Rocky Nos. 1 and 5 Ditches	Billy creek	May 20, 1882	2.00		267.45	67
Lew Creek	Lew creek	June 1, 1882	3.13		269.45	68
Stanton	Uncompahgre	June 1, 1882	1.25		272.58	69
Keystone	Uncompahgre	June 1, 1882	1.50		273.83	70
Rocky No. 2	Billy creek	June 1, 1882	2.00		275.33	71
Siebert	Beaver	June 1, 1882	3.00		277.33	72
Alkali No. 2	Cow creek	Aug. 1, 1882	4.00		278.33	73
Brown	Billy	Nov. 1, 1882	2.00		284.33	74
Cottonwood	Cottonwood	Apr. 1, 1883	.26		286.33	75
Mayo Lateral	West Dallas	May 1, 1883	2.00		286.59	76
West Side	Cow creek	May 1, 1883	2.00		287.59	77
Hosmer-Rowell, first extension	Dallas	May 10, 1883	7.50	12.50	289.59	78
Thompson	Burnes		1.00		297.09	78 *a*
Taft	Burrow	May 1, 1883	.62		298.09	78 *b*
Moody, first enlargement	Uncompahgre	June 1, 1883	1.25	3.37	298.81	79
Rocky No. 3	Billy creek	June 1, 1883	2.00		300.06	80
Flora	Cole	Oct. 1, 1883	.50		302.06	81
Hieland	Uncompahgre	Feb. 26, 1884	9.00		302.56	82
Roswell-Hotchkiss, first extension	Uncompahgre	Mar. 20, 1884	1.63	5.38	311.56	83
Lower Pleasant Valley	Pleasant Valley creek	May 1, 1884	2 00		313.19	84
White	Burrow creek	May 16, 1884	1.00		315.19	84 *a*
Oakes-Jerome, first extension	Dallas river	May 1, 1884	2 00	5 00	316.19	85
Owl Creek	Owl creek	May 20, 1884	8 13		318 19	86
Keystone, first enlargement	Uncompahgre	June 1, 1884	1 00	2 50	326 32	87
East Side	Cow creek	June 1, 1884	2.00		328.32	88

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NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Boulevard	Beaver	June 1, 1884	.63	.....	330.32	89
Johnson	Beaver	June 1, 1884	2.00	.....	330.95	90
Alkali	Cow creek	Oct. 15, 1884	6.60	.....	332.95	91
Cobb-Swanson Lateral	Cow creek	Oct. 15, 1884	6.38	.....	339.55	.....
Scott-McNeal	East Dallas	Oct. 15, 1884	2.92	.....	345.93	92
Reservoir	Billy creek	Dec. 12, 1884	3.00	.....	348.85	93
Charlie Logan, first enlargement	West Arm Uncompahgre	Apr. 1, 1885	2.00	10.00	351.85	94
Mayol-Sisson, second enlargement	Cow creek	May 1, 1885	.75	5.00	353.85	95
Dallas	East Fork Dallas	May 1, 1885	11.63	.....	354.10	96
Oaks, W. & E., first enlargement	East Fork Dallas	May 1, 1885	1.63	3.88	365.73	97
Vance Ditch	Wm. Kinsey creek	Aug. 1, 1885	12.13	.....	367.36	98
Cassedy	Onion	Apr. 2, 1886	1.00	1.50	379.49	99
Hyde-Sneve, first enlargement	Dallas river	May 1 1886	8.50	17.50	380.49	100
Martin	Cow creek	June 25, 1886	5.00	.....	388.99	101

Nate Creek No. 2	Nate creek	Feb. 1, 1887	4.50	.....	393.99	102
Highline	Uncompahgre	Apr. 1, 1887	2.25	.....	398.49	103
Rosnerl-Rowell	Dallas creek	May 1, 1887	.38	12.87	400.74	105
Alkali, first enlargement	Cow creek	Apr. 1, 1887	6.40	19 38	401.12	104
Cronenferg	West Fork Dallas	May 1, 1887	2.25	.....	407.52	106
Rosebud	Willow creek	May 1, 1887	3.63	.....	409.77	107
Jolly	Deer creek	May 1, 1887	4.00	.....	413.40	107 *a*
Strayer, first enlargement	Uncompahgre river	May 1, 1887	4.00	4.25	417.40	108
Homestretch K, enlargement	Uncompahgre river	May 1. 1887	.25	.78	421.40	109
Mayol Lateral, first enlargement	West Dallas	May 1, 1887	3.75	5.75	421.65	110
Von Hagan-Dallas, first enlargement	West Dallas	May 10, 1887	.....	.....	425.40	111
Jackson	Cutler creek	June 1, 1887	.25	.....	.....	112
Pinion	Uncompahgre	Oct. 15, 1887	12.50	14 50	425 65	113
Chipeta-Cutler	Cutler creek	May 1, 1888	.50	.....	438.15	114
James Stewart	Cutler creek	May 1, 1888	.50	.....	438.65	115
Short Line	Uncompahgre	May 1, 1888	.50	.....	439.15	116
Scott-McNeal, first enlargement	East Dallas	May 1, 1888	2 00	4.00	439 65	117
Alkali No. 2	Cow creek	Apr 1, 1889	11.00	15 00	441 65	118
Keystone	Uncompahgre	June 1, 1889	.25	2.75	452.65	119
Old Agency	Uncompahgre	Apr. 1, 1889	.25	7 75	452.90	120
Short Line	Cow creek	Apr. 2, 1889	4.00	.....	453.15	121
Jones	Cottonwood	May 1, 1889	.50	.....	457.15	122
Smith	Dexter creek	May 20, 1889	2.50	.....	457.65	123
Taylor	Blue creek	June 1, 1889	4 00	.....	460.15	124
Alkali, second enlargement	Cow creek	Oct. 15, 1889	19.00	.....	464.15	125

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NAME OF DITCH OR CANAL	Source of Appropriation	Date of Appropriation	Amount in second-feet decreed to each priority	Total amount in second-feet decreed to each ditch or canal	Total amount in second-feet previously decreed in district	Order of priority in district
Dallas, first enlargement	East Fork Dallas river	Apr. 1, 1890	9.50	21.13	483.15	126
Tittell	Cottonwood	Apr. 15, 1890	.38	.....	492.65	127
Park	West Arm Uncompahgre	May 1, 1890	.75	6.75	493.03	127 *a*
Parker	West Dallas	May 1, 1890	.75	.....	493.78	128
a Moody No. 1	Uncompahgre	June 1, 1890	.38	15.38	494.53	129
Moody	Uncompahgre	June 1, 1890	.25	3.62	494.91	130
Ridgeway	Beaver and Coal	June 1, 1890	25.00	.....	495.16	131
Thompson	Middle Fork Burrow	July 15, 1891	7.00	.....	520.16	132
Dallas Placer	Dallas river	Apr. 2, 1892	1.50	.....	527.16	133
Armlin	Alkali	May 13, 1893	2.50	.....	528.66	134
Island Farm	Cow	Jan. 10, 1893	7.50	.....	531.16	135
Private	Dallas river	Apr. 1, 1893	.25	.....	538.66	136
P. J. Nash	West Branch Dallas	Nov. 29, 1893	.50	.....	538.91	137
Moody	Uncompahgre	May 15, 1894	.75	4.37	539.41	138

	Uncompahgre	May 15, 1894			540.16	139
a Moody No. 1, Dugan appropriation	Uncompahgre	June 1, 1894	.25	3.62	540.16	140
Moody ,Marlow appropriation	Uncompahgre	June 1, 1894	.25	16.13	540 41	141
a Moody No. 1	Dallas river	Apr. 1, 1896	.25	1 75	540.66	142
Dallas Placer	West Branch Coal creek	June 1, 1896	4.25		540.91	143
Cannon	Cow creek	Oct. 10, 1896	1.00		545.16	144
Private				Total	546.16	

a All in Moody No. 1 Ditch.

CHAPTER VII.

SEEPAGE MEASUREMENTS.

HON. JOHN E. FIELD,

State Engineer, Denver, Colorado.

Dear Sir—I have the honor herewith to submit a report of the seepage measurements made in this state during the years 1897 and 1898.

RETURN OR SEEPAGE WATER OF THE SOUTH PLATTE RIVER.

Measurements were made of the seepage or return waters of the South Platte river in the fall of each year, 1897 and 1898. In each year this work was done entirely by a deputy from this office, assisted by the water commissioners of the various districts passed through. Measurements were taken at the mouth of the cañon and then in regular order down the river, the water commissioners furnishing transportation and acting as guides for the deputy. Particular attention is called to a comparative table at the end of this chapter. It will be observed that the increase due to seepage in 1898 exceeded that of any year previous, excepting the years 1894 and 1895; this fact, taken into consideration with the fact that the year 1898 was an extremely dry one, is interesting and encouraging, as the return waters are of the greatest value to the lower part of the stream.

These measurements are of the greatest importance to the state and should be carried on with even greater thoroughness in the future than in the past, and the measurements should be extended to as many streams as possible.

If an assistant were allowed to the office in addition to its present force, this work could be taken up much more extensively than has been possible in the past, as well as the work of rating ditches and gaging streams. This will be considered more fully in another place.

1897.

In 1897 the heavy snow fall of October rendered it impossible to take up the seepage measurements at the usual time, as so much water was flowing back into the river from the melting snow that results were entirely untrustworthy as seepage measurements; the work was put off as long as possible, but was taken up on November 19, a measurement being made at the cañon upon that date. These measurements were continued as far as Greeley, the last measurement being taken upon November 25; upon that day a very heavy snow fall compelled the abandonment of the work. Upon computing the discharge and inflow from all sources, it was found that the results were of comparatively so little value, on account of the melting snows, that they have not been incorporated in the following tables; the seepage measurements of 1897 are therefore omitted.

1898.

In 1898 it again became necessary to put off the commencement of the seepage measurements until a late date, the first measurement at the cañon being made October 27.

These two years demonstrate the desirability of beginning this work at an earlier time than has been done in the past, although it would be rather difficult to compare results taken in an earlier month with such as have in the past been taken in October and November.

The measurements were continued as far as Snyder, the last one being taken upon November 19; here again the work had to be abandoned on account of a snow fall and severe cold.

The results of this work, which was done by Mr. F. Cogswell, will be found below, together with a comparative table of the results obtained since 1889.

OTHER SEEPAGE MEASUREMENTS.

Seepage measurements have been made upon the Big Thompson, the Cache la Poudre, the Arkansas and the Rio Grande by Prof. L. G. Carpenter, of the State Agricultural College; the results of these measurements will be published by him in due course in the regular bulletins of the college, but are also included in this report.

The following at my request was furnished for publication by Prof. Carpenter, of the Agricultural College, and as this report will reach many who will probably not see Prof. Carpenter's own bulletins, I think it proper to publish here:

"In the continuation of the investigations relating to the water supply of the state, as it pertains to irrigation, and in the determination of some of the questions involved in the flow of underground waters, I have continued to carry on measurements of the return waters on various streams of the state. These measurements have been planned to include more than a mere determination of the amount of the increase and have been made with the object of determining the laws of increase and the laws of the flow of the underground water as far as may be. They have therefore included other inquiries, such as the amount of loss from ditches, the amount of loss from reservoirs and the amount of water which passes from irrigated fields to the sub-soil, and thus serves to feed the streams. In these respects the inquiries have been sufficiently fruitful of results to make them satisfactory. They need to be continued longer and the results examined in connection with various other data relating to the use of water. Some of this data has already been collected for some of the valleys investigated. Investigations relating to the velocity with which the water travels have been begun, and these have direct bearing on the questions of pumping and general questions of underground supply, as well as on the increase of streams.

The general conclusions given in Bulletin 33 do not need to be changed, except it should be remarked that the ratio of the increase from seepage to the irrigated land, or to the amount of water that is used, seems to be materially different on the different streams. The reasons for this are not as yet apparent in all cases, but the benefit of the seepage return to irrigated Colorado is beyond dispute. It forms an increase to the water supply that is real, is fairly constant throughout the year and with a constant tendency to increase. The source of this seepage increase is almost entirely from the water taken out in the ditches and applied in irrigation. The measurements detailed in Bulletin 33 of the Agricultural Experiment Station give reason to conclude that the so-called underflow from the side channels is of little or no consequence. The subsequent measures on the Arkansas as well as on the Platte confirm this conclusion. The measurements made to determine the losses from ditches, and certain other measurements made under unfavorable circumstances, indicate that, approximately speaking, one-half of the seepage increase comes from the water used on the land, the other half from the losses from the ditches. This is to be taken with allowance, and is subject to the results of more careful and continued investigation. Of these sources of supply, the losses from the ditches can be to a great extent lessened. The time is coming when more attention must and will

be given to the losses of this nature. The measurements made on about one hundred miles of canals during this season bear out the general statements of Bulletin 48, which was prepared without so much data as we now possess. Undoubtedly many canals which suffer from scanty water supply would be in much better shape, could they lessen the loss from leakage.

The measurements made this season to determine the loss or gain from the various streams from seepage have been as follows:

The Cache la Poudre, from the mountains to its mouth.

The Rio Grande river, through the San Luis valley, from Del Norte to the cañon near the state line.

The Arkansas river, from Cañon City to the Kansas line.

The Big and Little Thompson, from the mountains to the mouth.

St. Vrain creek, from the mountains to its mouth.

The whole distance thus measured has been about 450 miles, involving driving of much greater extent. These measurements form the thirteenth measurement in the case of the Poudre, two of which were made by your office; the third measurement of the Rio Grande; the second of the Arkansas and the Thompson creeks, and the first of the St. Vrain.

THE ARKANSAS RIVER.

A table below shows the results of the measurements on the Arkansas river for the two years, 1897 and 1898. In 1897 the measurement was made late in November, the first attempt having been stopped by a storm in October. Freezing weather was encountered and the last part of the measurement was unsuccessful in consequence of ice. In 1898 the measurement was made earlier in the season, most of it during the month of September. The weather was as fine as could be expected, and as nearly all the water was required for irrigation, the measurement was much simplified. I gave personally more attention in this measurement to the stratigraphy of the valley as it relates to the gain or loss of the river. The folds in the layers have a material effect on the gain or loss from seepage.

The fact that the strata dip to the north away from the river has been a source of uneasiness to many people in the valley for fear that it might indicate a leakage from the river and thus deplete the water supply. The investigations of the latter point are not as yet so far completed as to make it possible to speak with certainty, but it seems probable that the amount of water thus lost is not great.

The following shows the seepage gains and losses that are found on the Arkansas river in 1897 and 1898. The measurements being given in cubic feet per second:

Place	Distance Miles	1897		1898	
		Gain	Loss	Gain	Loss
Canon City to Bessemer ditch	33	54.40	.....	55.17	.....
Bessemer to Pueblo	10	.....	42.18	.....	15.96
Pueblo to Orchard Grove	8	.....	9.40	19.41	.....
Orchard Grove to Boone	16	*103.47	.....	20.30	.....
Boone to Nepesta	10	40.44	.....	.....	17.65
Nepesta to Otero canal	8	.....	5.78	.....	11.00
Otero canal to Apishapa creek	7	16.90	.....	18.15	.....
Apishapa creek to Rocky Ford	16½	30.55	.....	21.21	.....
Rocky Ford to Fort Lyon canal	9	35.59	.....	22 39	.....
Fort Lyon canal to La Junta	3	13.04	.....	8.20	.....
La Junta to Jones ditch	11	10.85	.....	14.76	.....
Jones ditch to Las Animas	9	28.51	.....	20.08	.....
Las Animas to Fort Lyon	6	38.14	.....	13.26	.....
Fort Lyon to Caddoa	11	3.63	.....	.....	.16
Caddoa to Amity canal	10	.....	.....	.....	6.64
Amity to Lamar	11	.....	.....	6.68	.....
Lamar to Holly	30	13.21	.....	14.20	.....
Holly to Coolidge, Kansas	7	.....	.....	0	.....
Total	215	387.43	57.36	243.81	51.41
*Unreliable	.....	57.36	.....	51.41	.....
Gain	.....	330.07	.....	192.40	.....

NOTE—Counting the unreliable measurement to gain as in 1898, the gain in 1897 would be 250.

SEEPAGE MEASUREMENTS ON THE BIG THOMPSON.

Where Measured	1897	1898
Handy to the Home Supply Ditch		
Home Supply to the Barnes Ditch	15.78	8.13
Barnes Ditch to the Loveland & Greeley Ditch	4.62	3.50
Loveland & Greeley to the Big Thompson Ditch	12.38	13.31
Big Thompson Ditch to the Hill & Brush Ditch	4.52	6.62
Hill & Brush Ditch to the Big Thompson & Platte Ditch	12.42	9.59
Big Thompson & Platte to the Evanston Ditch	14.36	11.59
Total for Big Thompson	64.08	52.74

ON THE LITTLE THOMPSON.

Where Measured	1897	1898
From Eagle Ditch to Dry Creek	1.35	3.16
Dry Creek to Rockwell Ditch	2.77	1.52
Rockwell Ditch to Miner Ditch	2.43	1.32
Miner Ditch to the mouth	4.08	2.89
Total for Little Thompson	10.63	8.89
Total for both Big and Little Thompson	74.71	61.63

NOTE—The measurements of 1897 were made November 5th to 8th, and in 1898, November 2d to 4th.

Regarding the Rio Grande river, of which measurements have been made in 1896, 1897 and 1898, the results all practically confirm each other. For the first portion of the river from the gaging station above Del Norte to Monte Vista, the river loses, then for the remainder of the distance to the cañon at the lower end of the valley below Los Sauses, the river gains, but the gain is scarcely equal to the loss in the first few miles of the river.

As considerable attention has been given to the occasion for this loss and investigation of the lower end of the valley, with a view to determine whether this loss again reaches the river, which seems very probable. The fact that the field work could not be begun this last season until late in the summer, and the organization of some new work, resulted in preventing another trip through the San Luis valley to make a thorough investigation of this question.

It is evidently an important one to the interests of this state, and immediate importance to the interests of the San Luis valley, to determine the extent and cause of such conditions."

The above extract is taken verbatim from a letter of Prof. Carpenter, and our thanks are due to him for permission to reprint the same.

Respectfully submitted,

A. L. FELLOWS,
Deputy State Engineer.

TABLE OF MEASUREMENTS OF SEEPAGE WATER.

IN THE SOUTH PLATTE RIVER, COLORADO, OCTOBER 27 TO NOVEMBER 19, 1898.

Names of Streams and Ditches where Measurements were taken	Amount of water in river	Amount of water diverted from river by canals	Amount of inflow from natural tributaries	Amount of water in river at points measured + that diverted by canals and − the inflow from natural tributaries	Increase in volume of river between points measured	Decrease in volume of river between points measured	Increase in volume of river from the gaging station, at Cañon, to point where last measured	Increase in volume per mile between points measured	Remarks
	Second-feet	Second-feet	Second-feet	Second-feet	Second-feet	Second-feet	Second-feet	Second-feet	
South Platte River	227.50								At the Cañon, October 27.
Union Water Co.'s Pipe Line		31.85							October 27
Platte Canon Ditch		53.40							October 27
Last Chance Ditch		15.10							October 27
City Ditch		22.06							October 28
South Platte River	106.30			228.71	1.21		1.21	6 M. = 0.20	Below City ditch, October 28.
Plum Creek			14.80						October 28
Deer Creek			15.23						By a diversion channel, October 28.
Nevada Ditch		4.37							October 28
Clark Gulch			(4.21)						October 28
Lee Gulch		/	(2.07)						October 28
South Platte River	158.40			255.15	26.44		27.65	6 M. = 4.41	At Littleton, October 29.
Bear Creek			14.07						October 29
Cherry Creek			(3.17)						October 29

South Platte River	234.10			316.78	61.63		89.28	10 M.=6.16	At Fifteenth st., Denver, October 29.
Farmer's and Gardener's Ditch		4.84							October 29
Burlington Ditch		98.97							October 31
Clear Creek			1.11						October 31
South Platte River	154 90			340.28	23.50		112.78	11 M.=2 14	Above Fulton ditch, November 1.
Fulton Ditch		62.20							November 1
Brantner Ditch		40 25							November 1
Brighton Ditch		16.57							November 1
South Platte River	62.04			366.44	26.16		138.94	7 M.=3.74	At Brighton, November 1.
McCann Seepage Ditch			(15.11)						November 2
Dry Creek			(16.66)						November 2
Platteville Ditch		16.20							November 2
Fulton Ditch			0.32						Wasting back to river, November 2.
South Platte River	135.14			455.42	88.98		227.92	9 M.=9 89	Below Evans ditch No. 2, November 2
Side Hill Ditch		17.45							November 2
Bucker's Ditch		15.65							November 2
Farmer's Independent Ditch		60.77							November 2
South Platte River	64.64			478.79	23 37		251.29	7 M.=3.34	At Platteville, November 2.
Western Drainage Co.'s Ditch		5.89							November 3
St. Vrain Creek			39.44						November 3
South Platte River	175.34			555.94	77.15		328.44	9 M.=8.57	Below Union ditch, November 3.
Big Thompson Creek			16.09						November 3
Latham Seepage Ditch			(39.30)						November 3
South Platte River	229.25			589 76	33.82		362.26	7½ M.=4.51	At Evans, November 3

TABLE OF MEASUREMENTS OF SEEPAGE WATER—Concluded.

IN THE SOUTH PLATTE RIVER, COLORADO, OCTOBER 27 TO NOVEMBER 19, 1898.

Names of Streams and Ditches where Measurements were taken	Amount of water in river	Amount of water diverted from river by canals	Amount of inflow from natural tributaries	Amount of water in river at points measured + that diverted by canals and — the inflow from natural tributaries	Increase in volume of river between points measured	Decrease in volume of river between points measured	Increase in volume of river from the gaging station, at Canon, to point where last measured	Increase in volume per mile between points measured	Remarks
	Second-feet	Second-feet	Second-feet	Second-feet	Second-feet	Second-feet	Second feet	Second-feet	
Lower Latham Ditch		101.59							November 4
Cache La Poudre River			74.10						At mouth, November 4
South Platte River	301.81			693 81	104.05		466.31	6 M.=17.34	Bel. mouth of Cache La Poudre river, Nov. 4
Hoover Ditch		15.96							November 5
South Platte River	302.01			709.97	16.16		482.47	3½ M.=4 62	Below Hoover ditch, November 5.
Sterling Seepage Ditch			(3.22)						November 5
Box Elder Creek			2.20						Waste from Lower Latham ditch. Nov 5
South Platte River	319.12			724 88	14.91		497.38	4½ M.=3.31	Above Hardin ditch, November 5.
Hardin Ditch		9.40							November 5
South Platte River	334.73			749.89	25.01		522.39	12¼ M =2.04	Above Putnam ditch, November 6.
Putnam Ditch		22.85							November 6
Weldon Valley Ditch		40.70							November 6
South Platte River	302.20			780.91	31.02		553.41	8¼ M.=3.76	At Orchard, Nov. 6
South Platte River	490.96			969.67					At Orchard, Nov. 17

Weldon Valley Seepage Ditch			(3.15)						November 17
South Platte River	505.87			984.58	14.91		568.32	9 M.=1.66	At Shaffer's ford, November 17.
South Platte River	531.95			1,010.66	26.08		594 40	5¾ M.=4.54	Above Bijou creek, November 18.
Bijou Creek			(1.80)						November 18
South Platte River	554.56			1,033.27	22.61		617.01	4¼ M.=5.32	At Fort Morgan, November 18.
Platte and Beaver Supply Ditch		58.18							November 19
South Platte River	533.51			1,070.40	37.13		654.14	11 M.=3.38	At Snyder, November 19.

NOTE—Quantities enclosed in parenthesis are considered as seepage and only recorded as a matter of record. None of these gulches and creeks thus considered show any surface water above the ditches, and were formerly dry, until the water from irrigation began to return. In some instances these quantities thus given may include some waste water, but the amount is insignificant and would be difficult to eliminate. The measurements were stopped at Snyder, by the freezing over of the river.

COMPARATIVE TABLE.

SHOWING THE INCREASE IN VOLUME OF THE SOUTH PLATTE RIVER, FROM THE CANON TO POINTS MEASURED, DUE TO THE RETURN OF WASTE OR SEEPAGE WATER.

Places where Measurements were taken	October 1889	October 1890	October 1891	March 1892	October 1893	October 1894	October and November 1895	October and November 1896	October and November 1898
River below head of City Ditch	----------	----------	27.57	25.32	18.41	49.23	20.21	10.18	1.21
River at Littleton	49.91	11.73	80.18	69.95	41.91	74.82	75.44	24.94	27.65
River at Denver	50.91	55.61	96.38	129.56	83.18	193.74	193.24	58.89	89.28
River at Fulton Ditch	----------	94.41	138.85	141.51	127.03	228.06	174.05	74.61	112.78
River at Brighton	77.07	98.91	175.19	116.17	152.91	278.04	207.13	126.18	138.94
River at Evans No. 2 Ditch	----------	----------	----------	----------	208.74	314.72	276.76	171.24	227.92
River at Elwood & Wheeler Ditch	119 10	172 35	218.69	136.33	----------	----------	----------	----------	----------
River at Platteville	133 38	----------	226 93	180.54	218.82	343 05	341.57	219.05	251.29
River above St. Vrain Creek	----------	155.80	233 32	----------	----------	----------	----------	----------	----------
River at Union Ditch	----------	----------	----------	----------	252 81	398.70	362.28	228.78	328.44
River at Evans, at Lower Latham Ditch	197.00	176.91	299.21	192.86	279.93	450 51	385.85	256.64	362.26
River at Cache La Poudre River	----------	215 20	326.13	216.17	318.20	474.86	443 05	276.88	466.31
River at Hoover Ditch	277.10	351 66	392.66	285.25	----------	549.75	557.58	309.71	482.47
River at Hardin Ditch	----------	----------	----------	----------	387.23	498.70	522.31	325.33	497.38
River at Putnam Ditch	----------	333.60	418.80	330.61	365.78	549.12	565.26	344.63	522.39
River at Orchard	----------	----------	----------	----------	----------	----------	671.86	344.99	553.41
River at Fort Morgan Canal	305.92	360.58	434.05	360.09	414 33	----------	----------	----------	----------
River at Shaffer's Ford	----------	----------	----------	----------	----------	617.43	717.78	375.38	568.32

River above Bijou Creek						676.88	800.92	392.85	594.40
River at Platte and Beaver Canal	307.03	367.09	472.14	431.74	464.64	631.45			
River at Fort Morgan							799.37	425.24	617.01
River at Snyder		384.18	470.60		479.67	707.64	814.19	478.03	654.14
River below Big Beaver Creek						714 90	879.57	499 41	
River at Merino	385.58	405.71	550.33		514.39	766.31	959.45	541.24	
River at Sterling	418 33	435.16	583 69		548.15		1,006.25	576.84	
River two miles above Iliff	422.77	449.21	611.76		572.99		1,023.24	598.20	
River two miles above Crook			598 69			810.11			
River at Crook							975.19	629 28	
River at Pole Creek							989.93		
River at State Line			602 00			775.94	942.30		

CHAPTER VIII.

RATING OF DITCHES.

HON. JOHN E. FIELD,

State Engineer, Denver, Colorado.

Dear Sir—I have the honor herewith to submit a report of the ditches rated in this state during the years 1897 and 1898.

During these two years, owing to a lack of funds available for properly carrying on this work, it has been possible to have only such ditches rated as there was reason to believe could and would pay the cost of time and labor consumed in making the necessary measurements. Even then the owners of some of the ditches rated have refused to pay for the work, thus demonstrating the urgent necessity that this work should be done and paid for directely by this office whenever it is believed that a ditch needs rating. It is certain that ditch owners will not call for measurements when they think that it may be to their disadvantage either in cutting down their water supply or disclosing the fact that their ditches will not carry the amounts adjudicated to them, nor will they be likely to call for ratings of ditches other than their own excepting in isolated cases.

For these reasons, superintendents and commissioners throughout the state agree with me that there should be an officer of this department, whose salary should be paid by the state, who should have entire charge of the rating of ditches, spending a considerable part of each irrigating season in the field testing old and making new ratings, wherever it seems necessary or desirable. It is believed, further, that this work should be done directly by the deputy state engineer, leaving much of the routine work of gaging rivers, equally necessary, but which for the past four years has consumed by far the largest portion of his time, to an assistant working under his directions. This matter I expect to treat more fully in my report on the "Gaging of Streams."

I wish, further, to call attention at this point to the necessity for a law making it compulsory upon ditch owners to see that suitable headgates and rating flumes are placed in their ditches upon due notice from the respective water commissioners, who should have the power to enforce reasonable demands in that line. As the law stands at present, it is difficult of enforcement, for although a water commissioner is authorized to erect headgates and rating flumes and collect for the same from the owners, it is very often practically impossible for him to do so. It is some times difficult to locate actual owners, and as most ditches are coöperative affairs, disputes as to the proportionate liabilities of the various owners are frequent, and as a result commissioners are seldom justified in instituting proceedings to recover the cost of the work done. In place of saying that the commissioners may collect, the law should specify that the work done should be made a lien upon the ditch, or, better still, that the commissioner may refuse to allow water to be turned into a ditch not properly provided with headgates and rating flumes after due and reasonable notice from him.

It has, however, been the intention of this office to see that ratings were made wherever called for, at the least possible expense to ditch owners, and a large number have been rated especially during the last year, 1898, tables of which will be found below. Rating tables have, in each case, been furnished to the owners of the ditches interested, as well as to the water commissioners, the originals being placed on file in this office. It should be remembered, however, that a ditch once rated is not rated for eternity, hardly for time even, as erosion or sedimentation will often make such changes in ditches in a few weeks, or even days, that new measurements are needed. For this reason, too, there should be a qualified officer, who could make frequent tests of ratings, as well as extend this most important branch of this department as the exigencies require. If the changes suggested were made, there could be no question but that much greater economy could be secured in the use of water, and, further, that the commissioners would be able to perform their duties with far greater ease and fairness.

FLY ACROSS ARKANSAS RIVER AT CANON CITY, COLORADO.

DITCHES RATED IN 1897.

WATER DIVISION NO. 1 (SOUTH PLATTE DIVISION).

Name of Ditch	No. of District	Hydrographer	Date of Rating
Farmer's Independent Ditch	2	L. R. Hope	June 21
Barnes Ditch	4	L. R. Hope	July 2
Bucker Ditch	2	L. R. Hope	July 22

DITCHES RATED IN 1898.

WATER DIVISION NO. 1 (SOUTH PLATTE DIVISION).

Name of Ditch	No. of District	Hydrographer	Date of Rating
Lower Latham Ditch	2	John E. Field	May 13
Union Ditch	2	John E. Field	May 13
Farmer's Independent Ditch	2	John E. Field	May 13
Home Supply Ditch	4	Frank Beach	May 26
Handy Ditch	4	Frank Beach	May 27
Louden Ditch	4	Frank Beach	May 28
Barnes Ditch	4	Frank Beach	May 30
Rist Ditch	4	Frank Beach	May 30
Big Thompson and Platte River Ditch	4	Frank Beach	May 31
Big Thompson Ditch and Manufacturing Co.'s Ditch	4	Frank Beach	June 1
Highland Ditch	5	Frank Beach	June 7
Cache La Poudre Canal	3	Frank Beach	June 14
Lake Canal Ditch	3	Frank Beach	June 15
New Mercer Ditch	3	Frank Beach	June 16
Dry Creek Ditch	3	Frank Beach	June 16
Larimer and Weld Ditch	3	Frank Beach	June 17
Fort Collins Canal	3	Frank Beach	June 17
Marianna Lake Outlet Ditch	3	Frank Beach	June 18
Loveland and Greeley	3	Frank Beach	June 18
Pioneer Ditch	3	Frank Beach	June 20
Sky Line Ditch	3	Frank Beach	June 27
Cache La Poudre Irrigating Ditch	3	Frank Beach	June 29
Supply Ditch	5	A. L. Fellows	July 12
Golden City and Ralston Creek Ditch	7	John E. Field	July 18
Golden Canal and Farmer's High Line	7	John E. Field	Aug. 13

WATER DIVISION NO. 2 (ARKANSAS DIVISION).

Name of Ditch	No. of District	Hydrographer	Date of Rating
Rocky Ford Highline Ditch	14	A. L. Fellows	Mar. 15
Fort Lyons Canal	17	A. L. Fellows	Mar. 16
Bessemer Ditch	14	A. L. Fellows	June 8
Excelsior Ditch	14	A. L. Fellows	June 10
Arkansas Valley Ditch	14	A. L. Fellows	June 11
Las Animas Town Ditch	17	A. L. Fellows	July 15
Las Animas Consolidated Canal	17	A. L. Fellows	July 15
Fort Lyons Canal	17	A. L. Fellows	July 16
Hyde Ditch	67	A. L. Fellows	July 18
Lamar Canal	67	A. L. Fellows	July 18
Buffalo Canal	67	A. L. Fellows	July 19
Lake Canal	17	A. L. Fellows	July 20

It will be observed that these ratings were made in a very few of the water districts, and I would call attention to the fact that even in these districts there are many ditches that could not be measured on account of the lack both of rating flumes and of funds to pursue the work. In justice to those that did have the work done, all others should be put into the same condition, as it is evidently unfair for a few to comply with a law which all others are able to evade.

Respectfully submitted,

A. L. FELLOWS,
Deputy.

CHAPTER IX.

GAGING OF STREAMS.

HON. JOHN E. FIELD,

State Engineer, Denver, Colorado.

Dear Sir—I have the honor herewith to submit a report of stream gagings during the years 1897 and 1898. During these two years, as in the two immediately preceding them, this office has been working conjointly with the hydrographic branch of the United States geological survey, under the direction of Mr. F. H. Newell, hydrographer. It this way it has been possible to accomplish much more than could have been done by each working separately. In fact, it would have been impossible for this department to have undertaken any systematic stream measurements with the limited means at its disposal but for the financial assistance of the geological survey.

We are under especial obligations, also, to the officials of the Denver and Rio Grande, Union Pacific, the Union Pacific, Denver and Gulf, the Colorado Midland, the Atchison, Topeka and Santa Fe, and the Rio Grande Southern railroads for furnishing the officials of this office with transportation, without which it would have been impossible to have carried on the work of gaging to any such extent as has been done. The cash value of this assistance probably exceeds one thousand dollars per annum, as the number of miles traveled by the deputy alone, in the performance of his duties in 1898, exceeds twenty thousand.

It has also been an especial aim of this department to coöperate with ditch companies, water commissioners and others interested in the flow of water in various localities, and much valuable information has been gained through the courteous assistance of several of these parties. Among these, especial thanks are due to The Great Plains Water Storage Company, The Amity Canal Company, The Buffalo Creek Canal Company,

and to Messrs. Reece and Cressy, water commissioners upon the Arkansas river, to the Denver Water Company, and to Mr. John E. Rhoads and Mr. J. H. Hodgson, of Denver, and Mr. J. M. Wolaver, of Greeley, upon the South Platte river, and to Mr. David R. Crosby, superintendent of Water Division No. 5, upon the Grand river. Thanks are also due to all gage observers throughout the state for their uniform courtesy and assistance with merely nominal remuneration.

Though the coöperation of the Great Plains Water Storage and other companies upon the Arkansas, a system of gagings has been inaugurated upon that river and its tributaries, which should be of the utmost value to the state in eventually furnishing to the superintendent of the Arkansas water division a definite basis to work upon in properly distributing the water in this, the most difficult division to regulate in the state. Gaging stations have been operated through parts of the past two years at the following points upon the Arkansas and its tributaries: At Granite, Salida, Cañon City, Pueblo, Nepista, Manzanola, Rocky Ford, Las Animas, Lamar and Granada, upon the Arkansas; at Trinidad, J. J. ranch and Las Animas, upon the Purgatoire, and at the Supply Canal flume across Horse creek. It is hoped that many of these stations may be made permanent, in which case the results obtained can not fail to be of great value in the distribution and economical use of water.

A somewhat similar system is in operation in the South Platte division, a number of stations being maintained upon the South Platte and its tributaries. It is hoped here, too, that permanent stations may be kept up at several of the weirs on the South Platte river. This is particularly desirable on the lower part, both of this river and of the Arkansas, in order that some definite and reliable information concerning the increase from seepage and the winter flow of these streams may be ascertained.

Single stations have been maintained also upon the Rio Grande, San Juan, Poudra, Animas, Mancos, Dolores, San Miguel, Uncompahgre, Grand and Gunnison rivers, while special measurements have been made upon a number of other streams, which will be more specifically mentioned below. These measurements are already being proved to be of great value to homeseekers and to parties contemplating the construction of ditches and reservoirs, as well as to water superintendents and commissioners and others already interested in the distribution of water, and we believe that this work should be extended so far as may be possible.

An effort has been made in this connection to keep the superintendents and commissioners of many localities informed so far as possible as to the flow of water. Cards have been prepared for mailing to them, giving the gage height, discharge, rise or fall and other items of interest. It is recommended, too, that this information might advantageously be furnished to newspapers of the localities interested for general publication, with a view to interesting the people of the state generally in the distribution and economical use of water.

In compiling tables of discharge of streams for publication, a somewhat different plan has been adopted from that followed in past years. It is believed that comparative tables of the maximum, mean and minimum discharge for the various streams, for all years in which measurements have been taken, will be of greater general interest than the daily discharge tables as heretofore published. The results of daily observations, showing daily discharge and meteorological data connected therewith, are on file in this office and may be seen and used by parties desiring them. The tables given below are compiled generally from the earlier state engineers' reports, which in turn were indebted to the courtesy of Mr. F. H. Newell, hydrographer of the United States geological survey, and from the measurements taken by this office, working in coöperation with the survey. In cases where reports are compiled from other sources, due credit is given.

To avoid a repetition of what was so ably covered in the state engineer's report of Mr. H. A. Sumner, for 1895 and 1896, the descriptions of river stations and drainage area measurements there given are omitted, excepting where important changes have been made or new stations have been added. For convenience of reference, however, a new list of gaging stations, covering all places where observations were continued for any considerable time, is given below. Descriptions of all stations not given here will be found in the eighth biennial report just mentioned.

The meters principally used in rating the ditches have been Colorado meter No. 21, and small Price meter No. 13, both belonging to this office, while those used in gaging streams have generally been small Price meters Nos. 13 and 133, and large Price meters Nos. 60 and 63, the three latter instruments being furnished by the United States geological survey. All of these meters have given very satisfactory results, but perhaps the best results have been given by No. 133. No. 21 is self-registering. Nos. 13, 133 and 63 have been furnished with buzzers, while No. 60 was provided with an electric register. No. 63 was used

upon the Arkansas and its tributaries in 1898 by Mr. C. W. Beach.

It should be remembered that there are in this office rating tables, giving the discharge in cubic feet per second for each tenth of a foot in depth of water shown upon the gage rods at the various stations, and copies can be furnished to parties interested in the amount of discharge, with instructions as to their use when necessary. These rating tables are computed from gagings made at each station at as many different stages of flow as may be possible in each year. The necessity for taking so many and continuing them for several years is apparent when it is considered that the river channels are constantly changing, so that the table for one year is not applicable to the next. If rating flumes were put into some of the streams, as well as into the ditches, they would be of very great value, particularly upon such streams as the tributaries of the South Platte, where it is necessary for the water commissioners to regulate the distribution of water with the greatest care. Could this be done, the value of measurements would be greatly enhanced both in accuracy and in rendering unnecessary the continuance of gagings through a number of years.

In the compilation of the following tables, the stations are taken in the order of the water divisions in which they are situated, and in each division begin with the stations highest upon the main stream, first following the main channel, afterwards taking those upon the tributaries in the same manner, the tables being introduced, however, by an alphabetically arranged list of all the regular gaging stations.

LOCATION OF GAGING STATIONS.

Animas river, at Durango.
Arkansas river, at Cañon City.
Arkansas river, at Granada.
Arkansas river, at Granite.
Arkansas river, at La Junta.
Arkansas river, at Lamar.
Arkansas river, at Las Animas.
Arkansas river, at Manzanola.
Arkansas river, at Nepesta.
Arkansas river, at Pueblo.
Arkansas river, at Rocky Ford.
Arkansas river, at Salida.
Bear creek, at Morrison.
Big Thompson creek, at Home Supply dam.
Boulder creek, at Boulder.
Cache la Poudre, at Fort Collins.
Dolores river, at Dolores.
Grand river, at Grand Junction.
Grand river, at Shoshone.
Gunnison river, at Grand Junction.
Gunnison river, at Roubideau.
Gunnison river, at Whitewater.
Horse creek, at Las Animas.
Mancos river, at Mancos.
Piedra river, at Arboles.
Purgatoire river, at J. J. ranch.
Purgatoire, river, at Las Animas.
Purgatoire river, at Trinidad.
Rio Grande river, at Del Norte.
San Juan river, at Arboles.
San Miguel river, at Fall Creek.
South Boulder creek, at Marshall.
South Platte river, at Deansbury.
South Platte river, at Denver.
South Platte river, at Orchard.
St. Vrain creek, near Lyons.
Uncompahgre river, at Fort Crawford.

GAGING STATIONS IN WATER DIVISION NO. 1.

DEANSBURY STATION ON THE SOUTH PLATTE RIVER.

MONTH	Stage of Water	1887	1888	1889	1890	1891	1892	1895	1896	1897	1898
January	Maximum								138	120	
	Mean								97	78	
	Minimum								88	50	
February	Maximum								138	187	
	Mean								115	73	
	Minimum								92	55	
March	Maximum								561	236	
	Mean								207	108	
	Minimum								100	62	
April	Maximum	395		193		121			473	620	
	Mean	295		172		142			983	376	
	Minimum	175		168		165			197	210	
May	Maximum	740		788	610	1,483	637		830	1,458	
	Mean	470		477	391	1,117	630		502	966	
	Minimum	325		183	323	890	620		350	610	
June	Maximum	785		750	536	1,483	962		601	1,481	
	Mean	535		460	403	1,243	628		281	1,006	
	Minimum	400		300	270	857	376		168	758	

July	Maximum	575	670	643	780	2,195	973		430		
	Mean	310	545	323	520	645	847		233		
	Minimum	210	450	121	387	328	717		118		
August	Maximum	425	625	577	652	562	830		291		
	Mean	265	550	210	561	373	535		189		
	Minimum	145	510	102	360	263	297		118		
September	Maximum	300	485	230	300	324	764		310		
	Mean	165	410	129	196	219	328		250		
	Minimum	95	320	92	128	146	280		198		
October	Maximum	250	410	168	260		492		198		
	Mean	185	300	180	172		292		230		
	Minimum	135	210	100	112		280		217		
November	Maximum							311	213		
	Mean							241	169		
	Minimum							190	132		
December	Maximum							224	132		
	Mean							145	127		
	Minimum							92	118		

DENVER STATION ON THE SOUTH PLATTE RIVER.

The station, maintained during the past two years, has been at the Fifteenth street bridge, and is described at page 240 of the eighth biennial report. Considerable difficulty has been experienced with the short gage rods owing to the shifting nature of the channel, while owing to the Cherry creek freshet of August 4, 1897, the inclined gage rod was left high and dry.

A new inclined rod was therefore placed on the left side of the river, August 12, 1898. The new rod consists of a four-inch by four-inch, twelve feet long, painted white, with a scale painted white and with black marking in lettering in spaces each equal to one-tenth of a foot vertical.

Owing to the shifting character of the river at this point, gagings should be taken as frequently as possible, the station being of great importance in properly regulating the use of water upon the entire stream.

Gage heights have been taken throughout the two years, both winter and summer, by Mr. J. H. Hodgson, commissioner of Water District No. 2.

LIST OF DISCHARGE MEASUREMENTS

MADE ON THE SOUTH PLATTE RIVER AT DENVER, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
16	Jan. 15	P. J. Preston	21	4.70	51.80	1.89	98
17	Apr. 15	F. Cogswell	63	5.35	100.00	3.85	385
18	May 1	F. Cogswell	63	5.70	194.00	3.07	595
19	May 25	F. Cogswell	63	5.85	244.00	3.19	778
20	June 4	F. Cogswell	63	6.45	364.00	3.60	1,311
21	June 15	F. Cogswell	63	6.75	404.00	3.48	1,406
22	July 13	F. Cogswell	63	5.60	224.00	3.07	687
23	Aug. 5	F. Cogswell	63	7.45	366.00	5.05	*a* 1,849
24	Aug. 20	F. Cogswell	63	5.55	147.00	3.22	473
25	Sept. 6	F. Cogswell	63	4.95	72.00	1.61	116
26	Oct. 11	F. Cogswell	63	5.70	145.00	2.85	113
	1898						
27	Apr. 21	A. L. Fellows	60	5.90	172.00	3.29	564
28	July 6	A. L. Fellows	60	6.10	176.00	2.52	443
29	Sept. 2	A. L. Fellows	13	5.50	85.00	2.29	*b* 195
30	Oct. 8	A. L. Fellows	133	5.00	50.00	1.81	90
31	Oct. 29	F. Cogswell	13	5.32	87.00	2.70	*c* 234

a Right channel filled in with sand by flood from Cherry Creek of the night of August 4, 1897.

b New inclined gage rod left bank.

c Taken during seepage measurements of South Platte in October and November, 1898.

COMPARATIVE TABLE OF DISCHARGE.

SOUTH PLATTE RIVER AT DENVER.

Month	Stage of Water	1895	1896	1897	1898
January	Maximum		202	134	334
	Mean		182	92	164
	Minimum		163	57	69
February	Maximum		229	118	201
	Mean		198	66	154
	Minimum		172	16	90
March	Maximum		289	438	185
	Mean		225	201	122
	Minimum		198	67	50
April	Maximum		444	867	759
	Mean		301	482	377
	Minimum		239	251	50
May	Maximum		408	1,443	2,308
	Mean		291	750	1,444
	Minimum		229	403	525
June	Maximum		364	1,478	2,020
	Mean		200	1,048	1,552
	Minimum		53	509	309
July	Maximum	1,490	758	1,222	1,732
	Mean	854	164	409	653
	Minimum	262	42	67	168
August	Maximum	1,945	187	2,458	844
	Mean	743	115	574	328
	Minimum	227	42	141	185
September	Maximum	1,215	180	421	309
	Mean	426	145	183	187
	Minimum	194	108	43	139
October	Maximum	1,092	180	656	239
	Mean	698	111	305	146
	Minimum	468	27	194	69
November	Maximum	870	126	775	239
	Mean	455	101	454	131
	Minimum	163	83	68	69
December	Maximum	350	126	352	
	Mean	204	103	246	
	Minimum	108	75	157	

ORCHARD STATION ON THE SOUTH PLATTE RIVER.

This station is described on page 426 of the eighth annual report and was continued as there given throughout the year 1897. On April, 1898, however, a new vertical rod was placed on one of the down stream piers at about the middle of the wagon bridge crossing the South Platte, about one thousand feet east of the old gage rod, and readings have been taken at that point since that time.

It is found desirable to keep up a continuous record of the flow of water throughout the year at some points on the lower part of the South Platte river; hence daily observations have been kept up at this station throughout the past two years. In some respects, however, this station is an unsatisfactory one, the channel being very sandy and shifting and slush ice giving much trouble in the winter. It is believed, therefore, that a change in the location of this station to some point where an over-flow dam can be used to obtain the flow of the river would be an advantage.

Observations have been made during the past two years by Messrs. W. N. Batchelder and H. W. Servis and by Mrs. U. E. Foley, all of Orchard, Colorado.

LIST OF DISCHARGE MEASUREMENTS

MADE ON THE SOUTH PLATTE RIVER AT ORCHARD.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
6	Jan. 18	P. J. Preston	21	4.14	231.00	1.63	377
7	May 28	L. R. Hope	20	5.00	686.00	2.80	*a* 1,921
8	June 20	R. S. Sumner	21	4.60	790.00	2.44	*a* 1,926
9	June 27	R. S. Sumner	21	3.20	262.00	1.92	*a* 504
10	July 25	R. S. Sumner	21	3.60	261.00	2.01	*a* 524
11	Sept. 13	F. Cogswell	63	2.50	50.00	1.72	*b* 86
12	Nov. 9	F. Cogswell	63	4.40	520.00	2.50	*a* 1,299
	1898						
13	Apr. 24	A. L. Fellows	60	2.20	49.00	1.46	*c* 71
14	May 30	A. L. Fellows	60	4.60	946.00	3.39	*d* 3,214
15	July 9	A. L. Fellows	60	2.25	22.00	1.46	*e* 32
16	Aug. 9	A. L. Fellows	60	2.25	62.00	0.58	*e* 36
17	Nov. 6	F. Cogswell	133	2.80	136.00	2.22	*d* 302
18	Nov. 17	F. Cogswell	133	3.15	204.00	2.41	*d* 491

a Gaged at bridge below rod.
b By wading.
c New rod put in gage by wading.
d Gage from bridge.
e Gage by wading.

COMPARATIVE TABLE OF DISCHARGE.

SOUTH PLATTE RIVER AT ORCHARD.

Month	Stage of Water	*1895	*1896	1897	1898
January	Maximum	----------	960	1,116	1,392
	Mean	----------	804	625	1068
	Minimum	----------	604	228	523
February	Maximum	----------	1,031	1,116	1,147
	Mean	----------	638	557	475
	Minimum	----------	530	228	811
March	Maximum	----------	698	262	715
	Mean	----------	583	231	574
	Minimum	----------	530	218	523
April	Maximum	----------	818	847	619
	Mean	----------	611	527	380
	Minimum	----------	530	250	10
May	Maximum	----------	----------	3,630	3,214
	Mean	----------	----------	895	1,946
	Minimum	----------	----------	81	10
June	Maximum	----------	----------	5,160	2,090
	Mean	----------	----------	2,657	776
	Minimum	----------	----------	555	0
July	Maximum	----------	----------	1,320	781
	Mean	----------	----------	347	173
	Minimum	----------	----------	39	40
August	Maximum	----------	----------	2,274	40
	Mean	----------	----------	807	40
	Minimum	----------	----------	147	40
September	Maximum	----------	----------	147	113
	Mean	----------	----------	92	69
	Minimum	----------	----------	61	40
October	Maximum	----------	----------	1,294	408
	Mean	----------	----------	303	215
	Minimum	----------	----------	86	113
November	Maximum	1,031	----------	1,392	3,026
	Mean	944	----------	1,110	811
	Minimum	818	----------	715	288
December	Maximum	1,031	824	1,930	----------
	Mean	786	430	1,232	----------
	Minimum	604	213	475	----------

* Approximate only.

MORRISON STATION ON BEAR CREEK.

This station, as described on page 454 of the eighth biennial report, was maintained throughout the irrigating season of 1897, but in the spring of 1898, owing to a change in the headgate of the Denver Union Water Company's ditch, the station had to be given up. The discharge for 1898 was kindly furnished, however, by Mr. C. P. Allen, engineer of the water company, so that the change was a gain rather than a loss to this department.

During the year 1897 observations were made by Mr. Harry Hines, of Morrison. No observations have been taken during winter seasons.

LIST OF DISCHARGE MEASUREMENTS

MADE ON BEAR CREEK AT MORRISON, COLO.

No.	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
9	May 20	L. R. Hope	20	3.60	30.00	5.97	*a* 179
10	June 13	R. S. Sumner	21	3.70	47.00	4.44	*b* 209
11	June 26	R. S. Sumner	21	3.50	43.00	3.75	*b* 162
12	July 24	R. S. Sumner	21	3.45	40.00	3.27	*b* 131
13	Sept. 11	F. Cogswell	63	3.05	29.00	1.90	*c* 55
14	Oct. 12	F. Cogswell	63	3.00	28.00	1.86	*c* 52

a Gaged at bridge 33 ft. above rod.

b Gaged by wading 25 ft. below rod.

c Gaged by wading 50 ft. below rod.

COMPARATIVE TABLE OF DISCHARGE.

BEAR CREEK AT MORRISON.

Month	Stage of Water	1888	1889	1890	1891	1892	1895	1896	1897	1898
January	Maximum									
	Mean									
	Minimum									
February	Maximum									
	Mean									
	Minimum									
March	Maximum									
	Mean									
	Minimum									
April	Maximum	45			107			86		
	Mean	31			50			49		
	Minimum	25			12			23		
May	Maximum	130	195	68	622		102	71	250	143
	Mean	95	101	63	195		69	51	152	117
	Minimum	35	18	53	68		41	34	92	60
June	Maximum	130	137	60	605		274	58	327	182
	Mean	100	85	31	289		183	32	178	143
	Minimum	68	53	33	230		122	23	124	117

July	Maximum	95	72	57	204		249	58	307	208
	Mean	65	49	34	90		136	33	115	150
	Minimum	50	28	21	41		73	9	74	91
August	Maximum	140	76	33	68		238	71	737	117
	Mean	55	58	24	32		122	53	199	67
	Minimum	25	36	18	20		58	38	83	47
September	Maximum	42		26	52		93	71	113	78
	Mean	30		20	25		69	50	66	46
	Minimum	28		18	12		46	38	49	31
October	Maximum			26			82	41	74	31
	Mean			21			61	35	55	29
	Minimum			18			48	26	49	26
November	Maximum			19					49	29
	Mean			17					34	23
	Minimum			15					5	20
December	Maximum									
	Mean									
	Minimum									

CLEAR CREEK.

Attempts have been made to reopen a station upon Clear creek, but owing to the changeable nature of the bed of the stream and the great amount of sediment carried in the water, the maintenance of any station has been found impracticable.

The following figures are furnished by Mr. W. N. Palmer, water commissioner of the Clear creek water district, as being average amounts of the discharge of the creek during the past two years. These figures are based on measurements made by himself.

TABLE OF DISCHARGE

OF CLEAR CREEK AT GOLDEN, COLO.

YEAR	MONTH						
	May	June	July	Aug.	Sept.	Oct.	Nov.
1897	621	793	516	304	181	130	-------
1898	285	650	420	120	75	70	57

MARSHALL STATION ON SOUTH BOULDER CREEK.

During the past two years this station has been maintained as described on page 448 of the eighth biennial report.

The discharge of South Boulder and Coal creek and Community ditches are also given in separate tables, it being necessary to add the flow in these ditches to that of the South Boulder in order to secure the total discharge at this point.

Observations have been carried on by Mr. C. E. Barber, of Langford, through the irrigating seasons, none being taken in the winter.

LIST OF DISCHARGE MEASUREMENTS

MADE ON SOUTH BOULDER CREEK NEAR MARSHALL, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
8	May 22	L. R. Hope	20	2.45	81	4.31	*a* 348
9	June 19	R. S. Sumner	21	2.60	85	4.29	*b* 363
10	June 25	R. S. Sumner	21	2.50	85	4.35	*b* 370
11	July 27	R. S. Sumner	21	1.65	40	3.03	*b* 122
12	Aug. 13	F. Cogswell	63	1.55	43	2.70	*b* 116
13	Oct. 14	F. Cogswell	63	0.82	14	1.00	*b* 14
	1898						
14	Apr. 23	A. L. Fellows	60	1.35	29	2.47	*b* 72
15	May 29	A. L. Fellows	60	2.29	62	4.44	*a* 274
16	July 11	A. L. Fellows	60	1.70	46	2.86	*a* 130
17	Aug. 6	A. L. Fellows	60	1.15	23	2.04	*b* 47
18	Oct. 10	A. L. Fellows	133	0.55	12	1.41	*b* 2

a Gaged from bridge, 21 feet above rod.

b Gaged by wading at rod.

COMPARATIVE TABLE OF DISCHARGE.

SOUTH BOULDER CREEK AT MARSHALL.

Month	Stage of Stream	1888	1889	1890	1891	1892	1895	1896	1897	1898
January	Maximum									
	Mean									
	Minimum									
February	Maximum									
	Mean									
	Minimum									
March	Maximum									
	Mean									
	Minimum									
April	Maximum	100			165			167		
	Mean	175			58	237		72		
	Minimum	40			15			18		
May	Maximum	170	560	476	565	391	445	603	527	276
	Mean	135	475	313	366	237	238	219	297	194
	Minimum	90	402	175	141	39	148	97	120	36
June	Maximum	225	534	503	464	561	1,090	358	595	365
	Mean	185	335	349	356	374	531	204	401	285
	Miuimum	140	220	270	238	244	261	105	303	226

July	Maximum	150	323	264	256	480	314	105	435	238
	Mean	130	151	143	140	232	205	75	234	137
	Minimum	105	49	68	76	111	130	52	120	64
August	Maximum	205	74	106	74	107	166	167	290	78
	Mean	98	38	64	45	62	99	43	129	42
	Minimum	58	23	43	24	31	62	27	65	18
September	Maximum	60	26	67	28	30	77	46	65	52
	Mean	40	21	39	20	21	37	37	43	22
	Minimum	30	19	19	15	15	20	31	22	12
October	Maximum		61	38	21	30	84	31	65	31
	Mean		20	31	19	18	36	23	39	20
	Minimum		15	28	18	16	14	18	18	9
November	Maximum								52	26
	Mean								35	18
	Minimum								18	9
December	Maximum									
	Mean									
	Minimum									

TABLE OF DISCHARGE

OF THE "COMMUNITY" AND "SOUTH BOULDER AND COAL CREEK" DITCHES.

	May	June	July
Total Discharge of Community Ditch, 1897	621	616	.....
Total Discharge of Community Ditch, 1898	268	360	.....
Total Discharge of South Boulder and Coal Creek Ditches, 1897	383	1,093	.....
Total Discharge of South Boulder and Coal Creek Ditches, 1898	160	846	42

BOULDER STATION ON BOULDER CREEK.

The maintenance of this station, described on page 442 of the eighth biennial report, has been continued for the past two years. The channel at this very point is very rocky, but the location could hardly be improved upon.

Observations were taken by Mrs. C. Osgood, of Boulder.

LIST OF DISCHARGE MEASUREMENTS

MADE ON BOULDER CREEK AT BOULDER, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second	
	1897							
7	May 21..	L. R. Hope.....	20	2.15	----------	----------	*a*	442
8	July 26..	R. S. Sumner.....	21	1.75	87.00	3.41	*b*	298
9	Aug. 12..	F. Cogswell	63	1.55	83.00	2.70	*b*	224
10	Oct. 13..	F. Cogswell	63	0.55	33.00	1.45	*c*	48
	1898							
11	Apr. 17..	A. L. Fellows.....	60	0.78	36.00	1.91	*c*	69
12	May 28..	A. L. Fellows.....	60	1.85	100.00	3.69	*d*	367
13	July 16..	J. E. Field.....	60	1.50	79.00	3.35	*d*	266
14	Aug. 3..	A. L. Fellows.....	60	0.86	35.00	1.77	*c*	62
15	Oct. 11..	A. L. Fellows.....	133	0.28	11.00	1.14	*c*	12

a Gaged at foot bridge 1,000 feet below gage rod. Two ditches included.
b Gaged by wading 500 feet below gage rod.
c Gaged by wading at gage rod.
d Gaged at wagon bridge 40 feet above gage rod.

COMPARATIVE TABLE OF DISCHARGE

OF BOULDER CREEK AT BOULDER.

Month	Stage of Stream	1888	1889	1890	1891	1892	1895	1896	1897	1898
January	Maximum									
	Mean									
	Minimum									
February	Maximum									
	Mean									
	Minimum									
March	Maximum									
	Mean									
	Minimum									
April	Maximum	170						292		
	Mean	81						80		
	Minimum	25						7		
May	Maximum	215	785	425	435	373	421	809	615	392
	Mean	164	676	287	327	336	316	240	357	233
	Minimum	125	90	125	224	300	229	87	164	75
June	Maximum	350	770	453	467	646	750	466	979	550
	Mean	261	565	341	427	447	502	264	552	388
	Minimum	200	417	218	332	292	382	141	351	225

July	Maximum	255	599	319	373	529	550	250	697	350
	Mean	210	277	258	240	372	355	150	378	211
	Minimum	180	114	142	146	224	261	101	224	75
August	Maximum	270	169	1,200	177	224	345	218	460	184
	Mean	157	97	173	116	148	205	88	215	61
	Minimum	115	55	75	69	69	132	46	103	29
September	Maximum	120	72	131	81	64	145	108	148	93
	Mean	80	34	56	61	47	86	73	83	30
	Minimum	55	16	33	54	41	58	46	53	5
October	Maximum	100	58	45	----------	50	114	51	92	20
	Mean	60	36	33	----------	43	44	33	52	6
	Minimum	55	28	26	----------	27	5	20	32	4
November	Maximum	----------	----------	30	----------	----------	----------	----------	95	138
	Mean	----------	----------	26	----------	----------	----------	----------	42	41
	Minimum	----------	----------	24	----------	----------	----------	----------	25	3

LYONS STATION ON ST. VRAIN CREEK.

This station has been kept as described on page 436 of the eighth biennial report. Observations were taken on the Supply ditch, also, and the discharge of this ditch is given by itself. To obtain the total discharge of the St. Vrain, at Lyons, it is necessary to add together the discharges given for the stream and that given for the ditch.

The observer is Miss Bessie Sites, of Lyons, who has acted in that capacity during the entire two years excepting during the winter months, during which time no observations were taken.

LIST OF DISCHARGE MEASUREMENTS

MADE ON ST. VRAIN CREEK AT LYONS, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
8	May 25	L. R. Hope	20	4 15	105.00	6.27	*a* 659
9	June 17	R. S. Sumner	21	4.40	136.00	5.23	*a* 713
10	June 28	R. S. Sumner	21	3.70	111.00	4.97	*a* 551
11	July 20	R. S. Sumner	21	3.10	98.00	3.87	*a* 379
12	Sept. 15	F. Cogswell	63	2.10	54.00	2.13	*b* 115
13	Nov. 10	F. Cogswell	63	1.75	35.00	1.54	*b* 54
	1898						
14	May 27	A. L. Fellows	60	2.80	78.00	3.30	*b* 256
15	July 12	A. L. Fellows	60	3.10	85.00	3.65	*b* 308
16	Aug. 5	A. L. Fellows	60	2.20	26.00	2.82	*b* 73
17	Oct. 12	A. L. Fellows	133	1.85	18.40	1.08	*b* 20

a Gaged from wagon bridge 800 feet below rod.
b Gaged by wading 150 feet below rod.

COMPARATIVE TABLE OF DISCHARGE

OF ST. VRAIN CREEK AT LYONS, COLO.

Month	Stage of Stream	1888	1889	1890	1891	1892	1895	1896	1897	1898
January	Maximum									
	Mean									
	Minimum									
February	Maximum									
	Mean									
	Minimum									
March	Maximum									
	Mean									
	Minimum									
April	Maximum	115						247		
	Mean	72						74		
	Minimum	30						5		
May	Maximum	240	493	590		321		573	786	333
	Mean	156	465	376		303		229	494	212
	Minimum	87	390	29		190		103	345	31
June	Maximum	485	500	675	433	620	1,040	417	980	551
	Mean	320	371	436	165	382	711	320	668	431
	Minimum	210	286	291	31	166	430	195	447	269

July	Maximum	280	301	410	1,397	540	680	417	860	372
	Mean	208	197	292	629	313	410	212	460	227
	Minimum	150	90	177	355	156	259	116	294	64
August	Maximum	270	175	252	1,297	167	488	529	548	154
	Mean	133	102	199	1,046	95	229	154	274	102
	Minimum	85	64	93	740	59	134	47	143	40
September	Maximum	97	64	158	988	87	125	373	180	128
	Mean	56	44	66	516	59	93	129	123	60
	Minimum	45	33	37	230	33	72	67	75	11
October	Maximum	70	67	63	220	87	230	90	75	22
	Mean	50	39	45	151	40	189	55	48	15
	Minimum	30	26	37	75	33	80	5	28	11
November	Maximum			37	164				54	22
	Mean			30	96				35	13
	Minimum			18	50				28	6

TABLE OF DISCHARGE

OF THE SUPPLY DITCH AT LYONS, COLO.

	May	June	July	Aug.	Sept.	Oct.	Nov.
Total discharge in 1897	1,764	2,945	1,521	904	120	91	55
Total discharge in 1898	999	1,574	963	289	212	223	240

ARKINS STATION AT HOME SUPPLY DAM ON BIG THOMPSON CREEK.

This station has been kept up as described on page 430 of the eighth annual report. Observations have also been taken at the rating flumes of the Handy and Home Supply ditches, it being necessary to add their discharges to that given for the stream to obtain total.

The observer has been Mr. E. Chasteen, of Arkins, who has served throughout the two years excepting the winter months, when no readings were taken. We are indebted to Mr. J. M. Wolaver, of Greeley, for reports upon the Home Supply and Handy ditches. Tables of the total discharges of these ditches are given below.

LIST OF DISCHARGE MEASUREMENTS

MADE ON BIG THOMPSON CREEK NEAR ARKINS, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
7	May 26..	L. R. Hope.....	20	2.45	164	4.91	804
8	June 18..	R. S. Sumner.....	21	1.60	128	3.12	400
9	June 29..	R. S. Sumner.....	21	1.50	134	3.05	409
10	July 21..	R. S. Sumner.....	21	1.20	96	2.23	214
11	Sept. 16..	F. Cogswell	63	0.60	66	0.92	61
12	Nov. 11..	F. Cogswell	63	0.65	75	1.05	79
	1898						
13	May 26..	A. L. Fellows	60	1.25	103	2.55	263
14	July 13..	A. L. Fellows	60	1.60	120	3.70	444
15	Aug. 4..	A. L. Fellows	60	0.70	78	1.11	87
16	Oct. 14..	A. L. Fellows	133	0.40	56	0.53	30

NOTE—All gagings were made from the wagon bridge.

COMPARATIVE TABLE OF DISCHARGE

OF BIG THOMPSON CREEK AT ARKINS.

Month		1888	1889	1890	1891	1892	1895	1896	1897	1898
January	Maximum									
	Mean									
	Minimum									
February	Maximum									
	Mean									
	Minimum									
March	Maximum									
	Mean									
	Minimum									
April	Maximum	110						74		
	Mean	62						37		
	Minimum	10						5		
May	Maximum	2[illegible]0	546	707		482	420	911	666	341
	Mean	132	359	436		312	318	218	420	164
	Minimum	50	130	225		195	217	5	64	13
June	Maximum	760	527	712	1,182	1,195	823	483	850	605
	Mean	458	382	530	817	704	570	285	465	377
	Minimum	200	208	365	523	329	344	180	36	85

July	Maximum	410	370	1,603	634	864	778	403	459	517
	Mean	275	200	454	383	498	465	225	267	238
	Minimum	160	108	255	219	279	293	152	146	85
August	Maximum	580	137	643	235	247	696	443	390	177
	Mean	190	89	393	159	150	319	144	133	79
	Minimum	100	53	185	105	81	174	38	36	45
September	Maximum	180	59	235	137	90	217	195	85	98
	Mean	75	49	151	95	49	146	119	37	36
	Minimum	60	40	65	69	39	32	74	15	8
October	Maximum	100	50	97			132	138	48	24
	Mean	46	46	67			79	66	17	13
	Minimum	40	28	51			20	20	5	4
November	Maximum			100					64	24
	Mean			83					27	8
	Minimum			60					5	4

TABLE OF TOTAL DISCHARGE

OF THE HANDY AND HOME SUPPLY DITCHES.

	May	June	July	Aug.	Sept.	Oct.	Nov.
Handy Ditch.....1897	2,691	3,272	2,194	1,304	600	817	294
Handy Ditch.....1898	679	2,613	1,210	472	299	295	114
Home Supply Ditch.....1897	1,982	3,147	1,239	651	421	321	.....
Home Supply Ditch.....1898	860	1,036	1,227	550	269	.....	.....

FORT COLLINS STATION ON THE CACHE LA POUDRE RIVER.

Gagings have been maintained at this station by the State Agricultural College, and through the courtesy of Prof. L. G. Carpenter, of that institution, we are enabled to print the last weekly bulletin for 1898 of the discharge of the Cache la Poudre. This bulletin, with its introductory remarks, is of especial value owing to the fact that the same conditions that prevailed upon this river existed upon nearly all of the streams of the state.

Below will be found the complete bulletin.

THE CACHE LA POUDRE RIVER. WEEKLY BULLETIN NO. 28, 1898.

The Cache la Poudre river is typical of the irrigation streams of the eastern slope of the Rocky mountains, and its record, which has been maintained longer and more continuously than any other in Colorado or the West, applies, in its general features, to the other streams of the eastern slope and, therefore, its record is of more than local importance.

The conditions which cause years of high or low, early or late water, are usually widespread, and give common features to the streams of a large area. So much are the conditions of snowfall and of melting alike that the highest water of the year is often on the same day for a couple of hundred miles along the range.

The year 1898 has been exceptionally low in its water supply. The small amount of snowfall in the mountains last winter gave indication of this and the little which fell early in the season gave reason to expect that the late water would be unusually low, unless maintained by storms. These indicated general features of the year, and while the rains of May were abundant the dry ground absorbed a large proportion

of the rainfall, and a relatively small amount reached the river. Fortunately, storms have helped out the year to some extent on the Poudre, but not so much as on the Arkansas; nevertheless the year has been abnormally low.

Since the early settlement the areas of forest have become much less from fires and by denudation for mining and railroad purposes. The amount used for domestic purposes is of small importance, except as careless and irresponsible cutting gives conditions favoring the spread of the devastating forest fires. From the standpoint of the water supply, on which our agriculture depends, the protecting influence of the forests on the snow cover is of the greatest importance. The letting in of the sun and wind melts and evaporates the snow without sensible formation of water, dries the springs and lessens the amount of water available for use. It is safe to say that with the former forest cover, even with the small snowfall and little rainfall, the low stage of the river would not have fallen to thirty-four feet as it did this year. It would have been several times more, for the innumerable small springs would have continued their supply. If the forest cover continues to be removed, autumns of low water like the present will cease to be exceptional, but become the rule, the river will be lower than it has been this year, and may become as dry as some of the tributaries.

During the current year, starting with an average of 184 second-feet for the week ending April 26, the river rapidly rose after the middle of May. The highest of the year was the week of June 21, which averaged 1,543 feet. Then the river rapidly dropped the next week to 1,200 feet, and the week following to 744 feet. By August 1 there was only 220 feet. Early in September there was only 100 feet, and by October 1 it had reached the unprecedented low stage of 34 cubic feet per second. After a couple of weeks the early snows in the mountains had the effect of raising the river.

In comparing with previous years it is instructive to compare the high water and the averages for the whole season.

Taking the record by years, the closing dates of the weeks of high water and the average for the week have been given as below. The periods of high water are the resultant of the amount of snow, the periods of warm weather, and effects of rains, and no attempt to discriminate is made.

Year.	Week Ending.	Average for Week.
1884	June 14	5071
——	June 28	5075
1885	June 7	3330
1886	May 31	2439
——	June 14	2420
1887	June 7	2400
1888	June 14	1240
1889	June 7	1545
1890	May 31	1592
1891	June 14	2692
1892	June 28	2057

Year	Week Ending	Average for Week
1893	June 14	2445
1894	June 7	3196
1895	June 14	2914
1896	May 31	1736
1897	June 14	2220
1898	June 21	1543

The average for the twenty-seven weeks of 1898, from April 26 to November 1, has been 451 cubic feet per second, an amount less than for any other year of which we have record except 1888, when the average fell to 400 cubic feet per second. In 1898 the river fell lower than in 1888 after the middle of July, when the effect of the early compact snow and of the small springs would influence the stream, the higher average being largely due to the higher water in May and June.

For the period of twenty-seven weeks the record in the different years has been as follows:

Year.	April 26 to November 1.
1884	1761
1885	1196
1886	747
1887	720
1888	400
1889	482
1890	567
1891	671
1892 (May 17 to September 6 only)	753
1893 (May 10 to September 6 only)	815
1894	804
1895	914
1896	520
1897	793
1898	451

The year 1898 has thus averaged but little over one-fourth of the amount received in 1884 for the corresponding time, and if deduction be made of the water received from other watersheds it would be less than one-fourth.

The river water of 1898, during this twenty-seven weeks, if applied to the whole of the irrigated area of the valley, which may be called 130,000 acres, would cover it to a depth of about sixteen inches. The rainfall during the same time has been about eight inches, or the total moisture has amounted to about twenty-four inches. This would be increased by the amount stored in the various reservoirs during the winter and spring.

In preparing this last river bulletin of the year, acknowledgment is due the Fort Collins *Courier* for their interest and aid in furnishing weekly slips to distribute to those receiving them.

L. G. CARPENTER,
The Agricultural Experiment Station, Fort Collins, Colorado.

GAGING STATIONS IN WATER DIVISION NO. 2.

GRANITE STATION ON ARKANSAS RIVER.

This station has been kept up as described on page 484 of the eighth biennial report during parts of the irrigating seasons of 1897 and 1898. Considerable difficulty was experienced in 1898 in getting reports, so that only the months of August and September are recorded.

During the summer of 1897 the gage readings were furnished by Mr. H. D. Marquis, while those of 1898 were taken by Mr. W. R. Reed, both of Granite, Colorado. No observations were taken in the winter.

As the data of 1895 and 1896 were too incomplete to calculate the discharge of those years, only that of 1897 and 1898 is given below.

LIST OF DISCHARGE MEASUREMENTS

MADE ON ARKANSAS RIVER AT GRANITE, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
3	Apr. 17	C. C. Babb	70	3.20	83	1.45	120
4	May 8	F. Cogswell	63	4.20	186	5.05	940
5	May 18	F Cogswell	63	4.90	238	5.57	1,326
6	June 29	F. Cogswell	63	4.60	244	4.72	1,151
7	July 27	F. Cogswell	63	3.75	135	3.07	415
8	Aug. 31	F. Cogswell	63	3.20	89	2.31	206
9	Sept. 27	F. Cogswell	63	3.10	90	2.25	203
10	Nov. 6	F. Cogswell	63	3.00	66	2.32	153
	1898						
11	July 30	A. L. Fellows	60	3.50	64	2.36	151
12	Aug. 26	A. L. Fellows	13	3.40	57	1.96	112
13	Oct. 26	A. L. Fellows	133	3.30	45	1.66	75

COMPARATIVE TABLE OF DISCHARGE

OF THE ARKANSAS RIVER AT GRANITE, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month					
		May	June	July	Aug.	Sept.	Oct.
1897	Maximum	2,058	2,240	1,096	546	358	114
	Mean	1,114	1,464	719	350	169	114
	Minimum	268	923	442	176	114	114
1898	Maximum	.....	.....	.....	151	93	.....
	Mean	.....	.....	.....	113	45	.....
	Minimum	.....	.....	.....	75	8	.....

SALIDA STATION ON ARKANSAS RIVER.

This station was maintained as described on page 480 of the eighth biennial report throughout parts of 1897 and 1898. The Denver and Rio Grande Railroad company taking the observations in the irrigating seasons of 1897, and Mr. Wm. Furniss, of Salida, acting as observer in 1898.

No observations have been made in the winter.

LIST OF DISCHARGE MEASUREMENTS

MADE ON THE ARKANSAS RIVER AT SALIDA, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
5	Apr. 17..	C. C. Babb.....	70	0.69	103	2.12	219
6	Apr. 27..	F. Cogswell	63	1.55	196	3.62	709
7	May 8..	F. Cogswell	63	2.20	252	4.67	1,178
8	May 30..	F. Cogswell	63	4.05	444	6.35	2,821
9	June 29..	F. Cogswell	63	2.50	304	4.91	1,492
10	July 27..	F. Cogswell	63	1.35	192	3.16	606
11	Aug. 31..	F. Cogswell	63	0.85	141	2.63	371
12	Sept. 27..	F. Cogswell	63	1.00	149	2.72	405
13	Nov. 6..	F. Cogswell	63	0.90	140	2.70	378
	1898						
14	Apr. 27..	A. L. Fellows.....	60	1.10	155	3.09	480
15	May 20..	A. L. Fellows.....	60	*a* 3.10	164	2.72	445
16	June 25..	A. L. Fellows.....	60	*b* 3.10	349	6.74	2,352
17	July 29..	A. L. Fellows.....	60	1.25	164	3.46	568
18	Aug. 26..	A. L. Fellows.....	13	0.90	124	2.92	360
19	Oct. 26..	A. L. Fellows.....	133	0.80	95	2.35	222

a New gage rod, gaging not used in making rating table.

b Old gage rod, approximated from reading on new gage.

COMPARATIVE TABLE OF DISCHARGE

OF THE ARKANSAS RIVER AT SALIDA, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month							
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1895	Maximum	1,846	2,462	2,242	1,626	1,285	819	402	----
	Mean	1,117	1,545	1,599	1,159	860	537	402	----
	Minimum	495	968	1,244	819	708	429	402	----
1896	Maximum	No record kept in 1896							
	Mean								
	Minimum								
1897	Maximum	----	2,910	2,878	1,453	748	436	370	----
	Mean	----	1,610	1,835	995	532	414	322	----
	Minimum	----	412	1,170	530	416	384	320	----
1898	Maximum	----	----	----	----	423	314	314	314
	Mean	----	----	----	----	280	199	225	267
	Minimum	----	----	----	----	169	169	100	205

CANON CITY STATION ON ARKANSAS RIVER.

Observations have been kept up at this station as described on page 474 of the eighth biennial report throughout the two years. The gage rod was newly painted in 1898.

The observations have been taken both winter and summer by Dr. J. L. Prentiss, of Cañon City, Colorado.

LIST OF DISCHARGE MEASUREMENTS

MADE ON ARKANSAS RIVER AT CANON CITY, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
37	Apr. 16...	C. C. Babb.....	70	2.20	105	2.48	260
38	May 7...	F. Cogswell	63	3.10	169	4.89	827
39	May 26...	F. Cogswell	63	4.95	415	6.53	2,712
40	June 16...	F. Cogswell	63	5.25	451	6.81	3,071
41	July 14...	F. Cogswell	63	3.60	231	4.93	1,140
42	Aug. 11...	F. Cogswell	63	3.05	176	4.23	744
43	Nov. 5...	F. Cogswell	63	2.98	156	3.46	540
	1898						
44	May 21...	A. L. Fellows	60	3.05	156	3.90	608
45	June 25...	A. L. Fellows	60	4.82	417	6.78	2,830
46	July 28...	A. L. Fellows	60	3.05	140	4.37	611
47	Oct. 27 ..	A. L. Fellows	133	2.60	106	2.90	316

COMPARATIVE TABLE OF DISCHARGE

OF THE ARKANSAS RIVER AT CANON CITY, IN CUBIC FEET PER SECOND.

Month	Stage of Water	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
January	Maximum	.....	494	505	630	580	580	398	489	320	316
	Mean	300	310	431	496	507	413	344	454	240	270
	Minimum	.....	180	325	345	430	390	298	428	165	242
February	Maximum	.....	446	530	555	630	510	458	520	392	408
	Mean	300	363	474	480	537	420	361	438	292	350
	Minimum	.....	250	365	430	455	390	298	371	203	316
March	Maximum	.....	400	685	605	855	810	584	492	392	360
	Mean	300	320	586	527	555	505	471	472	305	338
	Minimum	.....	180	505	410	480	340	398	344	256	316
April	Maximum	438	980	1,600	715	800	1,080	1,774	864	502	560
	Mean	300	477	857	522	568	661	868	558	201	393
	Minimum	214	200	580	365	480	390	458	398	108	276
May	Maximum	1,910	3,270	3,370	2,250	3,210	4,400	2,404	2,778	3,305	1,682
	Mean	600	2,090	2,012	1,593	1,480	1,959	1,506	1,276	1,736	909
	Minimum	324	841	1,340	685	480	990	790	650	466	408
June	Maximum	2 010	3,260	4,230	4,750	4,750	4,400	2,588	2,496	3,452	3,245
	Mean	1 374	2,611	3,291	2 803	3,115	2,704	1,900	959	2,474	2 428
	Minimum	1,002	2,320	1,600	1,780	1,875	1,290	1,308	398	1,608	1,619

July	Maximum	1,150	2,132	2,810	3,050	2,810	2,315	2,224	1,988	1,794	2,744
	Mean	602	1,571	1,468	1,798	1,069	1,396	1,413	538	1,090	1,621
	Minimum	290	920	770	1,060	290	730	1,024	235	466	476
August	Maximum	2,620	1,425	1,925	1,130	1,715	810	2,143	2,876	1,140	869
	Mean	340	670	951	726	575	710	1,095	395	498	326
	Minimum	243	215	530	455	200	650	790	144	203	242
September	Maximum	258	450	715	530	810	810	942	520	320	213
	Mean	220	383	473	735	477	551	635	313	249	189
	Minimum	200	326	345	365	290	390	458	192	203	160
October	Maximum	258	470	825	605	----------	390	827	344	613	316
	Mean	223	862	624	511	--- ------	297	505	285	415	228
	Minimum	190	307	530	410	----------	245	398	235	256	160
November	Maximum	397	478	530	605	----------	290	520	344	613	360
	Mean	299	610	498	527	----------	256	499	267	488	302
	Minimum	243	345	430	505	----------	245	398	124	256	242
December	Maximum	438	565	605	---- - ---	580	----------	520	790	320	----------
	Mean	335	670	476	561	425	----------	414	490	288	----------
	Minimum	274	475	345	----------	390	----------	256	218	256	----------

PUEBLO STATION ON ARKANSAS RIVER.

This station was continued as described on page 468 of the eighth biennial report up to July 10, 1898, at which time a new gage rod was placed at the south end of the Main street bridge. The new gage rod is a two-inch by two-inch timber, fifteen feet long, well painted and bolted to the masonry wall. The intervals between spaces are .104 feet. This change became necessary owing to a change in the channel at the Santa Fe avenue bridge, and the present location is better, as being more convenient for the water commissioner, who is provided with a rating table of the river at this point, and being also the point at which all gagings have been made. The station is a most important one, being to a great extent the key by which the distribution of water in the lower Arkansas is controlled. In making up the rating table the readings of both gage rods were used, they being practically the same.

The observer, up to September 1, 1898, was Mr. R. L. Holden, of Pueblo. Mr. C. W. Reece, water commissioner of Water District No. 14, made observations after July 10 of that year. Readings are kept up throughout the year.

LIST OF DISCHARGE MEASUREMENTS

MADE ON ARKANSAS RIVER AT PUEBLO, COLO., OLD SANTA FE AVENUE GAGE ROD.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
21	Apr. 16...	C. C. Babb.....	70	0.20	107	2.02	216
22	May 6...	F. Cogswell.....	63	1.00	204	3.92	799
23	May 21...	F. Cogswell.....	63	2.00	379	4.90	1,856
24	June 18...	F. Cogswell.....	63	2.55	451	4.92	2,219
25	July 16...	F. Cogswell.....	63	1.15	252	3.89	981
26	Aug. 10...	F. Cogswell.....	63	0.95	220	3.66	805
27	Sept. 8...	P. J. Preston.....	21	0.10	84	2.18	184
28	Sept. 28...	P. J. Preston.....	21	0.45	140	2.81	394
29	Nov. 4...	F. Cogswell.....	63	0.75	174	3.45	601
	1898						
30	Apr. 5...	P. J. Preston.....	22	0.27	121	2.06	248
31	Apr. 29...	A. L. Fellows.....	60	0.60	146	3.50	513
32	May 5...	C. W. Beach.....	63	0.90	197	4.45	876
33	May 30...	C. W. Beach.....	63	1.00	238	4.81	1,144
34	June 3...	C. W. Beach.....	63	1.40	309	5.32	1,639
35	June 9...	A. L. Fellows.....	60	1.80	373	5.36	2,002
36	June 14...	C. W. Beach.....	63	1.90	348	5.70	1,987
37	July 8...	C. W. Beach.....	63	1.60	318	5.43	1,727

LIST OF DISCHARGE MEASUREMENTS

MADE ON ARKANSAS RIVER AT PUEBLO, NEW MAIN STREET GAGE ROD.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1898						
1	July 26	A. L. Fellows	60	0.85	206	3.97	816
2	July 28	C. W. Beach	63	0.81	185	4.01	743
3	Aug. 2	C. W. Beach	63	0.45	126	3.20	405
4	Aug. 11	C. W. Beach	63	0.50	131	3.57	468
5	Aug. 20	C. W. Beach R. W. Hawley.	------	0.15	92	2.30	211
6	Aug. 30	A. L. Fellows	13	0.00	60	2.24	134
7	Oct. 20	C. W. Beach	63	0.20	89	3.27	290
8	Oct. 29	A. L. Fellows	133	0.40	101	3.16	320
9	Nov. 3	C. W. Beach	63	0.30	103	3.34	344

COMPARATIVE TABLE OF DISCHARGE

OF THE ARKANSAS RIVER AT PUEBLO, COLO., IN CUBIC FEET PER SECOND.

Month	Stage of Water	1894	1895	1896	1897	1898
January	Maximum		740	601	436	425
	Mean		460	519	323	330
	Minimum		327	383	230	178
February	Maximum		670	536	402	470
	Mean		476	456	327	385
	Minimum		327	354	202	232
March	Maximum		412	472	364	425
	Mean		357	395	212	320
	Minimum		301	301	146	232
April	Maximum		1,790	1,172	616	620
	Mean		744	470	235	370
	Minimum		301	276	146	232
May	Maximum		2,490	2,352	3,470	1,258
	Mean		1,561	1,097	1,631	841
	Minimum		601	472	578	470
June	Maximum		3,564	2,096	3,750	3,290
	Mean		2,152	895	2,214	2,202
	Minimum		1,455	412	1,218	1,258
July	Maximum		5,000	2,835	1,848	5,385
	Mean		1,900	633	1,036	1,605
	Minimum		1,044	301	474	470
August	Maximum		3,112	3,438	1,170	948
	Mean		1,275	489	470	306
	Minimum		568	203	180	123
September	Maximum		888	441	436	266
	Mean		494	309	272	125
	Minimum		383	219	146	46
October	Maximum		705	340	544	425
	Mean		551	293	414	210
	Minimum		412	268	230	31
November	Maximum		601	486	578	402
	Mean		530	314	484	309
	Minimum		472	235	364	232
December	Maximum		568	420	436	----------
	Mean		462	333	357	----------
	Minimum		327	268	230	----------

NEPESTA STATION ON ARKANSAS RIVER.

This station was established September 8, 1897, by The Great Plains Water Storage Company. It is located about one thousand feet north of the town of Nepesta at a wagon bridge, which is used in making gagings. The location is a convenient one, as the Atchison, Topeka and Santa Fe railway crosses just above the rod, which may be seen from the train. The rod consists of a vertical two-inch by six-inch timber, twelve feet long, wired to a cylinder of the wagon bridge at the left bank of the stream.

The station was established so late in 1897 that but few gagings and ratings were made that year, and the observations were irregular in 1898. The station has been kept up by The Great Plains Water Storage Company, Mr. G. I. Boyd, of Nepesta, making the observations in 1897, and T. F. Hynes and S. M. Butts acting as observers in 1898.

The bed of the stream is sandy and shifting, and the discharges must be accepted as approximate only.

LIST OF DISCHARGE MEASUREMENTS

MADE ON ARKANSAS RIVER AT NEPESTA, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
1	Sept. 8..	P. J. Preston.....	21	2.00	82	2.04	168
2	Sept. 30..	P. J. Preston.....	21	2.34	132	2.12	181
	1898						
3	Apr. 27..	P. J. Preston.....	63	2.55	163	2.21	360
4	May 6..	C. W. Beach.....	63	3.05	239	3.29	746
5	May 10..	C. W. Beach.....	63	4.25	532	3.75	1,998
6	June 6..	C. W. Beach.....	63	3.03	324	3.27	1,060
7	July 28..	C. W. Beach.....	63	3.25	213	2.69	573
8	Aug. 20..	C. W. Beach.....	63	2.85	112	2.19	247

COMPARATIVE TABLE OF DISCHARGE

OF THE ARKANSAS RIVER AT NEPESTA, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month							
		April	May	June	July	Aug.	Sept.	Oct.	Nov.
1897	Maximum	.....	.....	.....	.....	.....	201	268	.....
	Mean	.....	.....	.....	.....	.....	*a* 168	*b* 198	.....
	Minimum	.....	.....	.....	.....	.....	134	84	.....
1898	Maximum	504	4,010	3,665	4 125	697	294	511	511
	Mean	*c* 414	1,122	2,005	1,309	311	232	279	366
	Minimum	350	350	918	130	115	160	160	260

a Ten days' record.

b Sixteen days' record.

c Five days' record.

MANZANOLA STATION ON ARKANSAS RIVER.

This station was established September 29, 1897, by Porter J. Preston, at a point about one-half of a mile north from Manzanola, at a wagon bridge across the river. The gage rod is a vertical two-inch by six-inch timber, twelve feet long, with a one-inch by six-inch scale, securely wired to down-stream side of lower right hand cylinder of wagon bridge. The river is curved both above and below. The channel is sandy and somewhat shifting, though subject to less change than most places east of Pueblo.

No observations and but one gaging were made in 1897, but in 1898 observations were kept up by Mr. M. D. Lyle, a ditch rider of the Catlin canal.

LIST OF DISCHARGE MEASUREMENTS

OF THE ARKANSAS RIVER AT MANZANOLA, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
1	Sept. 29...	P. J. Preston	21	2.00	116	1.80	208
	1898						
2	May 18	C. W. Beach.. ...	63	2.25	303	2.78	847
3	Sept. 15...	C. W. Beach	63	2.38	104	2.00	208

COMPARATIVE TABLE

OF GAGE HEIGHTS FOR 1898 AT ARKANSAS STATION AT MANZANOLA, COLO., IN FEET.

Note.—There being insufficient data for a rating table at this point, only the gauge heights are given.

GAGE HEIGHT IN FEET.

Year	Stage of Stream	Month							
		April	May	June	July	Aug.	Sept.	Oct.	Nov.
1898	Maximum	.....	4.55	5.20	6.00	3.00	2.80	2 60	.....
	Mean	.....	3.45	4.18	3.62	2.23	2.06	2 36	.....
	Minimum	.....	2.90	3.40	2.40	1.60	.80	1.90	.....

ROCKY FORD STATION ON ARKANSAS RIVER.

This station was established May 3, 1897, by S. W. Cressy, commissioner of Water District No. 15, at a wagon bridge across the Arkansas river at a point about two miles northeast of the town of Rocky Ford, Colorado. The rod consists of a vertical one-inch by three-inch board, marked in tenths, to a pile protection to abutment of wagon bridge. The river is straight for about three hundred feet above and about five hundred feet below, and the current has a fair velocity. The banks are high and not liable to overflow, but the bed is sandy and shifting. Not enough data were obtained for a rating table for 1897; therefore, only a comparative table of the gage heights is given for that year, while only enough measurements were made for a rough table in 1898. The discharge of 1898 must, therefore, be considered as merely approximate.

Mr. Cressy, above mentioned, has taken observations since the establishment of the station whenever it has been practicable.

LIST OF DISCHARGE MEASUREMENTS

OF THE ARKANSAS RIVER AT ROCKY FORD, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
1	Sept. 29...	P. J. Preston.....	21	0.37	72	1.94	140
	1898						
2	Apr. 17...	P. J. Preston.....	21	0.90	114	2.07	237
3	May 27...	C. W. Beach.....	63	1.83	582	2.90	1,692.

COMPARATIVE TABLE

OF GAGE HEIGHTS FOR 1897 AT ARKANSAS STATION AT ROCKY FORD, COLO., IN FEET.

Year	Stage of Stream	Month							
		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1897	Maximum	2.90	2.82	2.05	2.05	0.70	1.00	1.10	----------
	Mean	1.47	1.92	1.04	1.01	0.35	0.65	0.62	----------
	Minimum	0.50	1.17	0.35	0.20	0.15	0.25	0.35	----------

COMPARATIVE TABLE OF DISCHARGE FOR 1898

OF THE ARKANSAS RIVER AT ROCKY FORD, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Stream	Month											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898	Maximum	.....	193	393	550	3,832	3 363	3,754	706	393	550	862	.....
	Mean	.....	76	253	210	1,206	2,054	1,244	271	157	236	530	.....
	Minimum	.....	34	129	64	108	315	193	108	64	84	84	.....

LA JUNTA STATION ON ARKANSAS RIVER.

This station, as described on page 464 of the eighth biennial report, has not been kept up since 1895, but on September 12, 1897, a new station was established by P. J. Preston, engineer of The Great Plains Water Storage Company, at the dam of the Fort Lyons canal, located three miles northwest of La Junta.

The gage rod is a vertical one-inch by three-inch board, marked in tenths of feet, nailed to the left wing of the dam, five feet back from its crest. The channel is curved above and straight below, and excepting at the crest of the dam it is sandy and shifting. The only observations taken since the establishment of the station were in September and October, 1897, when they were made by Mr. S. Irwin, headgate keeper of the Fort Lyons canal. During this period all the water flowed through the Fort Lyons canal. The maximum for the last seventeen days of September was 293, the mean 189 and the minimum 131 cubic feet per second. In October these figures were respectively 599, 317 and 172.

No gagings were made at the dam, the amounts given being taken from the rating table of the Fort Lyons canal. It is hoped that by another year arrangements may have been made to keep the records of the amounts carried in the canal and the amounts left in the river at this point.

LAS ANIMAS STATION ON ARKANSAS RIVER.

This station was established May 13, 1898, by Mr. C. W. Beach, for The Great Plains Water Company. Observations were kept up through a part of May and from July 19 to November 12, inclusive.

No measurements of the river were made at this point, however, so that no discharge can be given. The highest gage height during this period was 5.50 and the lowest was 2.20.

COMPARATIVE TABLE OF GAGE HEIGHTS

AT THE LAS ANIMAS STATION OF THE ARKANSAS RIVER FOR 1898
IN FEET.

Year	Stage of Stream	Month						
		May	June	July	Aug.	Sept.	Oct.	Nov.
1898	Maximum	5.50		3.75	3.10	2.50	3.00	3.00
	Mean	3.12		2.98	2.62	2.38	2.48	2.94
	Minimum	2.40		2.60	2.25	2.20	2.30	2.90

LAMAR STATION ON ARKANSAS RIVER.

This station is located at the head of the Amity canal, seven miles west of Lamar, Colorado. The canal is taken out on the north side of the river at a point where there is a wooden dam extending clear across the stream. The dam is three hundred and eighty feet long, the last eighty feet of the crest on the south side being fourteen inches higher than the remaining three hundred feet, which latter is four feet and four inches above the floor of the headgate. The river at this point washes against a sandstone bluff on its north side, and the canal is taken out at the foot of the bluff. The dam renders the river channel unvarying, and taken in connection with the canal it furnishes an excellent place for obtaining the total discharge of the river at this point, particularly as the headgate keeper lives upon the spot.

During the past year, however, reports have been sent in for the canal alone, no record being kept of the amount passing down the river.

The observer is Mr. E. R. Bannister, headgate keeper of the Amity canal.

In the accompanying table the discharges are taken from the rating table of the canal and are only approximate.

COMPARATIVE TABLE OF DISCHARGE

OF THE ARKANSAS RIVER AT THE HEADGATES OF THE AMITY CANAL, NEAR LAMAR, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Stream	Month				
		Aug.	Sept.	Oct.	Nov.	Dec.
1898	Maximum	685	56	165	610	----
	Mean	211	23	54	265	----
	Minimum	56	6	6	77	----

GRANADA STATION ON ARKANSAS RIVER.

This station is located at the headgate of the Buffalo Creek canal, two miles northeast of Granada. The equipment consists of a bridge upon the headgate of the canal, there being an earth dam across the Arkansas at this point. This dam sometimes breaks during high water, however, and has to be repaired, thus making the gage readings of no great value excepting as showing the rise and fall of the water.

The gage rod is vertical and well painted, nailed to the gage rod. The channel is straight for about 2,600 feet above and for about eight hundred feet below, and the water is swift. The banks are high, but the channel is gravelly and liable to change.

The observer is Mr. Ben Riley, ditch rider of the Buffalo Creek ditch, who takes the observations once each day. No gagings have been made at this point, as the bed of the stream is so changeable that gagings would be of but little value. It is hoped that different arrangements, giving more valuable results, can be made during the next year.

Readings were taken from the rod from July 24 to November 19, 1898, inclusive, and ranged from 0.2 feet to 1.6 feet, but owing to the changes in the dam at different times, they are of little value and are therefore not given.

This is the lowest station in this state upon the Arkansas, and if it can be maintained properly it will be of great value.

TRINIDAD STATION ON PURGATOIRE RIVER.

This station has been maintained as described on page 460 of the eighth biennial report.

Mr. J. N. Turner, of Trinidad, has taken all readings, keeping up his observations throughout the irrigating seasons, none being taken in the winter. No discharges were computed prior to 1897.

LIST OF DISCHARGE MEASUREMENTS

MADE ON PURGATOIRE RIVER AT TRINIDAD, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
7	May 22	F. Cogswell	63	4.25	140	4.83	677
8	June 17	F. Cogswell	63	4.10	111	3.48	386
9	July 15	F. Cogswell	63	3.90	75	2.52	189
10	Sept. 23	P. J. Preston	21	3.60	31	1.57	49
11	Nov. 13	F. Cogswell	63	3.55	28	1.64	46
	1898						
12	Apr. 28	A. L. Fellows	60	3.90	50	2.97	150
13	July 27	A. L. Fellows	60	3.90	60	2.48	149
14	Aug. 29	A. L. Fellows	13	3.60	42	1.08	45
15	Aug 6	C. W. Beach	63	3.76	48	2.12	101
16	Oct. 28	A. L. Fellows	133	3.40	35	0.91	31

COMPARATIVE TABLE OF DISCHARGE

OF THE PURGATOIRE RIVER AT TRINIDAD, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month							
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1897	Maximum	327	1,412	1,534	1,657	2,016	386	104	54
	Mean	165	732	402	250	258	97	60	42
	Minimum	68	327	189	30	5	30	54	30
1898	Maximum	----------	882	1,282	1,147	752	1,282	58	42
	Mean	----------	266	377	259	181	173	39	42
	Minimum	----------	109	109	81	42	42	31	37

J. J. RANCH STATION ON PURGATOIRE RIVER.

This station was established June 13, 1898, by C. W. Beach, at the J. J. ranch, twenty-two miles south of La Junta, and about twenty-seven miles above the mouth of the Purgatoire river, and half a mile below the mouth of Smith cañon, a large tributary of the Purgatoire.

The gage rod is nailed to a pole, which is securely fastened by means of poles driven into the bank. The river channel is straight for a distance of four hundred feet above and two hundred feet below the road. The bed is gravelly and shifting.

Not enough measurements were made in 1898 to compute a rating table, so the discharges are not given.

Observations were taken from June 13 to July 2, inclusive, and again from August 7 to November 12, inclusive, the readings of the gage varying from 2.3 to 5.7, corresponding to discharge of from thirty to several hundred cubic feet per second, both the highest and the lowest stages being in August.

This station is of especial value to The Great Plains Water Storage Company, who have maintained it, being connected to their headquarters at Las Animas and La Junta by telephone.

The observer was Edward Sanborn, who lived at the J. J. ranch.

LIST OF MEASUREMENTS

OF THE PURGATOIRE RIVER AT J. J. RANCH IN 1898.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
1	June 13...	C. W. Beach.....	63	2.30	31	1.18	37
2	Aug. 5...	C. W. Beach.....	63	3.65	40	1.50	60

LAS ANIMAS STATION ON PURGATOIRE RIVER.

This station was established May 12, 1898, by C. W. Beach, under the directions of the Great Plains Water Company, but was kept up for only a part of the month of May, 1898, Mr. Beach taking all the observations and making two gagings from which an approximate rating table was made, giving 700 cubic feet per second as the maximum, 326 as the mean, and 31 for the minimum flow.

LIST OF DISCHARGE MEASUREMENTS

OF THE PURGATOIRE RIVER AT LAS ANIMAS, COLO., FOR 1898.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
1	May 12...	C. W. Beach.....	63	1.50	120	3.17	382
2	May 20...	C. W Beach.....	63	1.17	49	2.44	119

LAS ANIMAS STATION AT HORSE CREEK.

This station was established July 25 by the Great Plains Water Company, P. J. Crites being the observer. It was located at the point where the Fort Lyons canal crosses Horse creek, but no gagings were taken, and so few readings were made that no tables are given for this station.

GAGING OF STREAMS IN WATER DIVISION NO. 3.

DEL NORTE STATION ON RIO GRANDE.

This station has been maintained during the last two years as described on page 488 of the eighth biennial report, Mr. J. S. Regan, of Del Norte, continuing the observations both winter and summer.

This is the only station in Division No. 3, the one at Alamosa, described on page 494 of the eighth biennial report, having been closed on August 8, 1896. If it could be arranged, the establishment of gaging stations on some of the tributaries of the Rio Grande would be of great value.

LIST OF DISCHARGE MEASUREMENTS

MADE ON THE RIO GRANDE AT DEL NORTE, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
42	Apr. 26..	F. Cogswell.....	63	3.00	346	4.35	1,507
43	May 17..	F. Cogswell.....	63	4.05	529	5.70	3,014
44	May 29..	F. Cogswell.....	63	5.45	743	6.59	4,898
45	June 28..	F. Cogswell.....	63	3.30	382	4.63	1,769
46	July 26..	F. Cogswell.....	63	2.00	211	3.03	640
47	Aug. 30..	F. Cogswell.....	63	1.55	145	2.57	373
48	Oct. 25..	F. Cogswell.....	63	2.66	277	4.02	1,113
	1898						
49	Apr. 14..	A. L. Fellows.....	60	3.27	385	5.11	1,966
50	May 18..	A. L. Fellows.....	60	3.23	361	5.03	1,802
51	June 23..	A. L. Fellows.....	60	5.25	730	7.10	5,181
52	Aug. 25..	A. L. Fellows.....	13	1.86	173	3.01	521
53	Oct. 25..	A. L. Fellows.....	133	1.48	113	2.16	244

COMPARATIVE TABLE OF DISCHARGE

OF THE RIO GRANDE RIVER AT DEL NORTE, COLO., IN CUBIC FEET PER SECOND.

Month	Stage of Water	1890	1891	1892	1893	1894	1895	1896	1897	1898
January	Maximum	1,000	1,320	.....	1,113	1,113	894	1,428	1,150	1,442
	Mean	552	990	300	964	1,005	801	1,293	981	1,377
	Minimum	337	670	.....	862	896	680	1,172	548	1,249
February	Maximum	896	1,410	.....	.....	1,037	1,061	2,154	1,268	1,556
	Mean	796	1,294	300	.....	992	953	1,258	1,233	1,472
	Minimum	745	1,193	.....	.....	930	894	960	1,190	1,333
March	Maximum	842	1,460	.....	.....	1,113	960	1,336	1,444	1,897
	Mean	487	1,280	316	.....	840	638	1,081	953	1,470
	Minimum	353	930	.....	.....	404	403	830	650	1,168
April	Maximum	1,812	3,160	2,400	1,037	1,510	3 129	3,054	2,126	3,406
	Mean	913	1,410	1,047	533	655	1,883	1,484	1,064	1,912
	Minimum	404	796	345	326	404	650	594	604	890
May	Maximum	5,930	5,650	4 710	3,320	2,550	3,129	3,579	5,234	4,382
	Mean	4,331	3,285	2,605	1,944	1,708	2,116	2.374	3,545	2,722
	Minimum	1,990	1,860	1,510	732	1,704	1,382	1,212	1,645	2,152
June	Maximum	5,555	5,555	3,160	2,850	1,410	3,804	1,766	4,860	5,266
	Mean	3 807	4,146	2,187	1,749	802	2,209	821	3,398	4,390
	Minimum	2,550	2,190	1,152	670	345	1,172	430	1,675	2,824

July	Maximum	2,260	3,565	1,074	640	370	1,252	650	2,276	2,664
	Mean	1,515	1,693	740	395	292	958	403	1,106	1,616
	Minimum	765	862	554	290	245	770	322	582	358
August	Maximum	895	1,460	610	450	430	960	403	604	614
	Mean	612	663	444	324	309	720	261	477	509
	Minimum	450	404	308	274	245	566	214	354	384
September	Maximum	450	1,193	308	345	370	566	1,294	952	398
	Mean	383	527	262	273	286	454	477	632	319
	Minimum	326	308	243	228	230	376	268	342	260
October	Maximum	862	2,475	290	308	350	484	566	2,246	614
	Mean	470	844	259	259	289	435	469	1,474	322
	Minimum	307	450	243	243	260	403	403	772	221
November	Maximum	478	450	----	450	260	403	376	868	1,442
	Mean	404	374	360	279	236	353	310	666	741
	Minimum	345	308	----	214	200	322	268	536	221
December	Maximum	670	----	----	862	----	1,212	430	1,295	----
	Mean	565	326	922	641	----	1,008	375	1,004	----
	Minimum	475	----	----	228	----	403	322	743	----

GAGING OF STREAMS IN WATER DIVISION NO. 4.

ARBCLES STATION ON SAN JUAN RIVER.

This station has been maintained as described on page 498 of the eighth biennial report throughout the irrigating seasons, no observations being taken through the winters.

Mr. T. F. Burke acted as observer in the year 1897, and Mr. J. D. Lister occupied the position in 1898.

A flood washed away the foot bridge which was used in making the measurements, but it is expected that it will be replaced this winter.

LIST OF DISCHARGE MEASUREMENTS

MADE ON SAN JUAN RIVER AT ARBOLES, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
10	Apr. 25...	F. Cogswell.....	63	8.30	559	4.92	2,753
11	May 16...	F. Cogswell.....	63	8 80	621	5.34	3,316
12	June 27...	F. Cogswell.....	63	7.60	479	3.35	1.604
13	July 25...	F. Cogswell.....	63	6.50	293	1.52	446
14	Aug. 29...	F. Cogswell.....	63	5.80	284	0.74	209
15	Sept. 26...	F. Cogswell.....	63	8.00	451	4.54	2,048
16	Oct. 24...	F. Cogswell.....	63	6.90	395	2.01	795
	1898						
17	Apr. 12...	A. L. Fellows.....	60	7.30	416	3.38	1,403
18	May 17...	A. L. Fellows.....	60	7.42	491	3.05	1,497
19	June 21...	A. L. Fellows.....	60	8.10	576	4.48	2,579
20	Aug. 8...	G. H. Matthes, U. S. G. S.....	------	6.30	208	1.42	294
21	Aug. 21...	A. L. Fellows.....	13	6.05	230	0.92	213
22	Oct. 23...	A. L. Fellows.....	133	5 80	95	0.88	83

COMPARATIVE TABLE OF DISCHARGE

OF THE SAN JUAN RIVER AT ARBOLES, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month								
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895	Maximum	----------	----------	1,770	1,426	777	295	339	274	274
	Mean	----------	----------	1,261	646	422	219	206	197	240
	Minimum	----------	----------	970	388	254	174	174	135	214
1896	Maximum	2,250	2,615	1,298	444	584	1,032	484	244	----------
	Mean	1,123	1,635	444	255	189	309	250	210	----------
	Minimum	689	689	187	198	136	177	209	157	----------
1897	Maximum	3,464	4,423	3,759	1,324	404	1,998	2,210	534	----------
	Mean	1,937	3,393	2,311	685	303	607	1 018	396	----------
	Minimum	478	2,431	1,020	340	182	182	478	300	----------
1898	Maximum	3,780	3,105	3,255	2,579	408	216	216	83	----------
	Mean	1,538	1,884	2,385	1,012	255	123	99	83	----------
	Minimum	241	1,157	1,082	319	124	83	83	83	----------

NOTE—New measurements give the drainage area of the San Juan at this point as 1,320, instead of 1,394 square miles, as formerly given.

ARBOLES STATION ON PIEDRA RIVER.

This station has been maintained as described on page 504 of the eighth biennial report throughout the irrigating seasons, no observations being taken during the winters.

Mr. T. F. Burke acted as observer in the year 1897, and Mr. J. D. Lister occupied the position in 1898.

LIST OF DISCHARGE MEASUREMENTS

MADE ON PIEDRA RIVER AT ARBOLES, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
10	Apr. 24	F. Cogswell	63	5.20	317	4.51	1,429
11	May 15	F. Cogswell	63	5.65	352	4.63	1,629
12	June 26	F. Cogswell	63	4.20	212	3.19	677
13	July 24	F. Cogswell	63	3.10	104	2.21	230
14	Aug. 28	F. Cogswell	63	2.60	62	1.05	65
15	Sept. 25	F. Cogswell	63	4.15	202	3.34	675
16	Oct. 23	F. Cogswell	63	4.00	181	3.24	586
	1898						
17	Apr. 13	A. L. Fellows	60	4.80	248	4.66	1,158
18	May 16	A. L. Fellows	60	4.52	237	3.96	937
19	June 22	A. L. Fellows	60	5.10	288	4.56	1,315
20	Aug. 8	G. H. Matthes, U. S. G. S	------	3.10	116	1.68	195
21	Aug. 24	A. L. Fellows	13	3.05	95	1.96	186
22	Oct. 24	A. L. Fellows	133	2.60	34	1.56	52

COMPARATIVE TABLE OF DISCHARGE

OF THE PIEDRA RIVER AT ARBOLES, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month								
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895	Maximum	----------	----------	602	670	342	185	185	156	128
	Mean	----------	----------	440	346	200	115	125	93	118
	Minimum	----------	----------	303	216	141	74	87	60	114
1896	Maximum	1,660	2,066	677	190	266	3,000	235	176	----------
	Mean	804	1,048	229	111	59	347	175	121	----------
	Minimum	354	416	79	66	23	66	119	92	----------
1897	Maximum	2,190	2,398	2,051	586	168	799	1,772	364	----------
	Mean	1,460	2,025	1,189	296	105	399	840	235	----------
	Minimum	344	1,703	487	152	65	65	364	183	----------
1898	Maximum	1,599	1,564	1,564	1,390	247	165	165	52	----------
	Mean	978	966	1,211	585	149	89	71	37	----------
	Minimum	361	614	614	229	106	52	52	27	----------

NOTE — New measurements give the drainage area of the Piedra river at this point as 670 instead of 650 square miles, as formerly given.

DURANGO STATION ON ANIMAS RIVER.

This station has been maintained as described on page 510 of the eighth biennial report. Mr. Geo. Robertson, of Durango, acting as observer. Observations have been discontinued for the winter of 1898 and 1899, as the channel is much obstructed at the gaging station by the foundations of a new bridge which is being constructed at that point. It is hoped that this new bridge may furnish a much better means of gaging than the old one.

LIST OF DISCHARGE MEASUREMENTS

MADE ON THE ANIMAS RIVER AT DURANGO, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second	Discharge in cubic feet per second
	1897						
10	Apr. 23...	F. Cogswell	63	7.75	599	3.63	2,176
11	May 14...	F. Cogswell	63	9.20	936	5.11	4.786
12	June 25...	F. Cogswell	63	7.85	703	3.60	2.534
13	July 23...	F. Cogswell	63	6.10	393	2.54	997
14	Aug. 27...	F. Cogswell	63	5.10	237	1.38	328
15	Sept. 24...	F. Cogswell	63	6.05	385	2.35	905
16	Oct. 22...	F. Cogswell	63	6.50	457	2.45	1,121
	1898						
17	Apr. 11...	A. L. Fellows	60	6.50	466	2.91	1,355
18	May 15...	A. L. Fellows	60	7.25	555	3.24	1.797
19	June 20...	A. L. Fellows	60	8.55	812	4.28	3,475
20	Aug. 5...	G. H. Matthes, U. S. G. S.....	.....	5.20	252	1.60	414
21	Aug. 22...	A. L. Fellows	13	5.07	207	1.37	284
22	Oct. 22...	A. L. Fellows	133	4.70	150	1.07	160

COMPARATIVE TABLE OF DISCHARGE

OF THE ANIMAS RIVER AT DURANGO, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895	Maximum	.....	.....	.....	.....	.....	836	574	990	512	379	296	316
	Mean	.....	.....	.....	.....	.....	646	388	510	363	307	246	251
	Minimum	.....	.....	.....	.....	.....	574	278	208	278	259	224	208
1896	Maximum	.....	.....	.....	3,776	4,042	1,902	508	292	7,800	826	334	252
	Mean	.....	.....	.....	1,634	2,326	875	349	199	1,004	475	274	216
	Minimum	.....	.....	.....	869	956	334	272	138	218	334	203	188
1897	Maximum	492	218	492	4,786	5,703	5,110	1,741	812	1,366	2,272	748	442
	Mean	212	186	258	2,704	4,553	3,364	1,152	554	906	1,418	572	387
	Minimum	162	138	188	546	3,618	1,741	686	328	274	812	384	328
1898	Maximum	562	442	383	2,910	3,664	4,678	3,220	502	442	178	214	.....
	Mean	399	267	306	1,510	1,765	3,438	1,364	365	263	162	158	.....
	Minimum	278	195	278	412	1,292	2,125	502	328	160	160	128	.....

MANCOS STATION ON MANCOS RIVER.

This station was established April 9, 1898, by A. L. Fellows, at a point about one hundred feet below a wagon bridge, near the center of the town of Mancos. The wagon bridge can be used for gaging when the water is high, but ordinarily gagings are made by wading. The location of the station gives about the amount of water not used or stored, and the principal reason for its establishment was to ascertain the amount of water lost that might be stored for beneficial uses, the water supply running short usually by the first of July. The channel is of gravel and is not liable to change.

The observer was Mrs. K. D. Kelley, of Mancos, who took the observations for six months.

LIST OF DISCHARGE MEASUREMENTS

MADE ON THE MANCOS RIVER AT MANCOS, COLO., IN 1898.

No. of Gagging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
1	Apr. 9..	A. L. Fellows	60	1.80	31	3.32	102
2	May 14..	A. L. Fellows	60	2 20	38	4.91	185
3	June 18..	A. L. Fellows	60	2.00	33	4.88	159
4	Oct. 18..	A. L. Fellows	133	0.80	3	1.09	3

TABLE OF DISCHARGE

OF THE MANCOS RIVER AT MANCOS, COLO., IN CUBIC FEET PER SCEOND.

DRAINAGE AREA EQUALS 117 SQUARE MILES.

Year	Stage of Stream	Month					
		Apr.	May	June	July	Aug.	Sept.
1898	Maximum.....	375	270	249	333	12	12
	Mean	262	203	212	107	9	6
	Minimum.....	123	144	144	0	8	1

MISCELLANEOUS DISCHARGE MEASUREMENTS OF VARIOUS STREAMS IN WATER DIVISION NO. 4.

In August, 1898, a special trip was made by A. L. Fellows, accompanying Messrs. F. H. Newell and G. H. Matthes, of the United States geological survey, into southwestern Colorado, for the purpose of obtaining data in reference to supplying the Southern Ute Indians with water. A number of special gagings were made by Mr. Matthes at this time, which are given in the table below.

Name of Stream	Locality	Date	Area of Section	Mean Velocity	Discharge
		1898			
Pine River	6 miles above Ignacio	Aug. 6	72	3.42	246
Pine River	4 miles below Ignacio	Aug. 7	78	2.52	196
La Plata River	At Hesperus, above La Plata Ditch	Aug. 10	11	0.99	11
La Plata Ditch	At Hesperus	Aug. 10	4	0.76	3
San Juan River	Near Noland, Utah	Aug. 18	282	2.16	609
San Juan River	Near Noland, Utah	Sept. 21	----------	----------	383

GAGING OF STREAMS IN WATER DIVISION NO. 5.

SHOSHONE STATION ON GRAND RIVER.

This station was established in the spring of 1896 by The Denver and Rio Grande Railroad Company at Shoshone, opposite the telegraph station. The gage rod is a vertical three-inch by six-inch post, painted and graduated at each five-tenths of a foot. The channel is rocky and is not liable to change, and is straight for about five hundred feet above and two hundred feet below the rod. The banks are high and are not liable to overflow.

Reports of gage heights were furnished by The Denver and Rio Grande Railroad Company during a portion of 1897, but as no discharge measurements were made the tables are not given. No reports were made in 1898.

The maximum gage height was on June 1, 1897, being then 13.40 feet, and on August 17 the water had fallen, so that it was below the bottom of the gage rod, where it remained for the rest of the season.

GRAND JUNCTION STATION ON GRAND RIVER. ROD NO. 1. RIGHT CHANNEL.

This double station, fully described on page 534 of the eighth biennial report, has been maintained throughout the entire two years, Mr. B. W. Vedder, of Grand Junction, making the observations. No gagings were made in the right channel in 1898, as water was flowing through it but a short time, and as only two measurements were made in 1897, the tables given below must be considered as approximate only. The discharge is given for 1897 and 1898.

LIST OF DISCHARGE MEASUREMENTS

MADE ON GRAND RIVER AT GRAND JUNCTION, COLO., ROD NO. 1.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
4	Apr. 20--	C. C. Babb, U. S. G. S.	70	1.75	438	2.64	1,157
5	May 18--	W. B. Dougall, U. S. G. S.	7	4.80	1,336	8.18	10,927
	July 29--	F. Cogswell	------	----------	----------	Channel dry.	

COMPARATIVE TABLE OF DISCHARGE

OF THE GRAND RIVER AT GRAND JUNCTION, COLO., ROD NO. 1, IN CUBIC FEET PER SCEOND.

Year	Stage of Water	Month			
		April	May	June	July
1897	Maximum	*a* 3,399	12,692	12,371	*b* 972
	Mean	*a* 704	9,974	5,353	*b* 152
	Minimum	*a* 92	3,880	805	*b* 24
1898	Maximum	----------	*c* 137	887	----------
	Mean	----------	*c* 84	286	----------
	Minimum	----------	*c* 15	----------	----------

a From April 15, 1897.
b To May 14, 1897
c Beginning May 26

GRAND JUNCTION STATION ON GRAND RIVER. ROD NO. 2. LEFT CHANNEL.

This station has been maintained throughout the two years, and since 1896 all the flow of the river has been passing through this channel, excepting at high water. In May of 1897 the vertical gage was washed away, but was replaced by a weight with wire pulley and snap, the water level being read by means of a scale nailed to the side of the bridge at the 600-foot mark on bridge. This weight and wire were stolen in the spring of 1898, but were replaced at once, and have been used regularly since that time. The records being incomplete prior to 1897, only those for 1897 and 1898 are given. Mr. B. W. Vedder acted as observer.

LIST OF DISCHARGE MEASUREMENTS

MADE ON GRAND RIVER AT GRAND JUNCTION, COLO., ROD NO. 2.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
5	Apr. 20..	C.C.Babb, U.S.G S.	70	5.60	1,034	3.88	4,019
6	May 19..	W. B. Dougall, U. S. G. S..	7	10.20	1,805	12.05	21,759
7	July 29..	F. Cogswell	63	5.35	1,247	3.24	4,044
8	Sept. 29..	F. Cogswell	63	4.05	1,073	19.22	2,062
9	Oct. 28..	F. Cogswell	63	3.98	968	1.82	1,764
10	Nov. 23..	C.C.Babb, U.S.G.S.	74	3.90	993	1.44	1,423
	1898						
11	Apr. 25..	A. L. Fellows	60	5.15	1,250	3.84	4,802
12	May 23..	A. L. Fellows	60	5.85	1,351	4.50	6,087
13	June 27..	A. L. Fellows	60	7.40	1,570	7.14	11,215
14	Aug. 27..	A. L. Fellows	13	3.35	886	1.40	1,237
15	Oct. 15..	A. L. Fellows	133	3.20	811	1.17	949

COMPARATIVE TABLE OF DISCHARGE

OF THE GRAND RIVER AT GRAND JUNCTION, COLO., ROD NO. 2, IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1897	Maximum	440	591	2,101	8,017	23,642	23,077	14,041	5,570	2,856	2,403	1,950	1,648
	Mean	318	419	861	2,906	18,371	18,841	8,464	3,076	1,902	1,913	1,683	1,497
	Minimum	214	334	334	893	8,770	14,229	3,460	1,799	1,648	1,497	1,270	1,346
1898	Maximum	3,858	3,470	2,307	6,886	12,505	16,375	7,611	1,725	1,143	1,143	1,337	----
	Mean	2,888	3,792	2,113	4,039	7,114	13,417	4,445	1,127	907	915	1,072	----
	Minimum	2,500	2,113	1,919	1,725	4,633	8,279	1,725	949	561	561	755	----

ROUBIDEAU STATION ON GUNNISON RIVER.

This station is located at the west end of the railroad bridge at Roubideau. It was established by The Denver and Rio Grande Railroad Company and was maintained by them during a part of 1897, reports of the gage heights being furnished to this office from May 1 to August 19, inclusive, of that year. No gagings were made at this point, however, so that the discharge remains uncomputed and the tables are not given here.

The gage rod at this station is a vertical post, marked in feet and inches. The channel is straight and the current swift. The right bank is riprapped and not liable to overflow, but the left is low. The bed of the stream is of gravel and is not liable to material change.

The highest stage of the water given in 1897 was that of May 9, when the gage read 5.75 feet. The water fell gradually until August 20, when it went below the bottom of the gage rod and remained there for the remainder of the season.

WHITEWATER STATION ON GUNNISON RIVER.

This station is located at Whitewater, Colorado. It was established by The Denver and Rio Grande Railroad Company and was maintained by them during a part of 1897, reports of the gage heights being furnished to this office from May 1 to July 11, inclusive, that year. No gagings were made at this point, however, so that the discharge remains uncomputed and the tables are not given here.

The highest stage of the water given in 1897 was that of May 8, when the gage read 6.35 feet. The water fell gradually until it went below the bottom of the gage rod upon July 11, remaining there for the remainder of the season.

GRAND JUNCTION STATION ON GUNNISON RIVER.

This station, as described on page 544 of the eighth biennial report, has been maintained throughout the irrigating seasons of 1897 and 1898.

The observer is A. Lindquist, of Grand Junction. All records prior to those of 1897 being incomplete, only those of 1897 and 1898 are given.

LIST OF DISCHARGE MEASUREMENTS

MADE ON GUNNISON RIVER AT GRAND JUNCTION, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
5	Apr. 50..	C.C.Babb, U.S.G.S.	70	5.20	1,600	3.74	5,975
6	May 29..	W. B. Dougall, U. S. G. S.	7	7.30	2,054	8.10	16,644
7	July 28..	F. Cogswell	63	2.65	1,212	1.49	1,814
8	Sept 28..	F. Cogswell	63	2.40	1.025	1.22	1,246
9	Oct. 27..	F. Cogswell	63	2.50	1,014	1.25	1,270
10	Nov. 23..	C. C. Babb, U. S. G. S	74	2.30	994	0.83	828
	1898						
11	Apr. 26..	A. L. Fellows	60	4.65	1,595	3.72	5,932
12	May 23..	A. L. Fellows	60	4.50	1,464	3.17	4,647
13	June 28..	A. L. Fellows	60	4.62	1,481	3.56	5,274
14	Aug. 27..	A. L. Fellows	13	1.80	931	0.93	866
15	Oct. 15..	A. L. Fellows	133	1.50	856	0.67	578

COMPARATIVE TABLE OF DISCHARGE

OF THE GUNNISON RIVER AT GRAND JUNCTION, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month							
		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1897	Maximum	19,834	18,558	7,393	2,289	1,676	2,608	1 092	650
	Mean	16,282	12,263	4,410	991	482	1,598	742	458
	Minimum	12,816	7,393	1,676	172	172	828	212	262
1898	Maximum	8,996	11,361	3,965	968	578	672	672	----------
	Mean	5,318	8,850	2,543	689	479	533	496	----------
	Minimum	3,965	4,158	1,076	578	399	399	311	----------

UNCOMPAHGRE STATION ON UNCOMPAHGRE RIVER.

This station, as described on page 528 of the eighth biennial report, has been maintained throughout the irrigating seasons of the two years, 1897 and 1898. Mrs. Wm. Humphrey has taken the observations. The river bed is constantly changing at this point, making material changes in the rating tables from year to year.

LIST OF DISCHARGE MEASUREMENTS

MADE ON UNCOMPAHGRE RIVER AT UNCOMPAHGRE, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
11	Apr. 18	F. Cogswell	63	3.90	103	4.73	487
12	May 10	F. Cogswell	63	4.55	156	5.67	884
13	June 21	F. Cogswell	63	5.05	189	5.72	1,081
14	July 19	F. Cogswell	63	4.50	119	3.97	473
15	Aug. 23	F. Cogswell	63	3.45	47	1.49	70
16	Sept. 20	F. Cogswell	63	3.85	48	3.19	153
17	Oct. 18	F. Cogswell	63	4.00	54	3.61	195
	1898						
18	Apr. 5	A. L. Fellows	60	3.55	34	2.69	91
19	May 9	A. L. Fellows	60	3.92	51	3.97	203
20	June 15	A. L. Fellows	60	5.18	134	3.90	720
21	Aug. 12	A. L. Fellows	13	3.80	36	2.09	74
22	Oct. 16	A. L. Fellows	133	3.75	29	1.86	56

COMPARATIVE TABLE OF DISCHARGE

OF THE UNCOMPAHGRE RIVER AT UNCOMPAHGRE, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month								
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895	Maximum	.....	.....	1,535	835	740	167	99	99	274
	Mean	.....	.....	1,082	470	277	117	70	82	112
	Minimum	.....	.....	835	200	167	72	55	55	64
1896	Maximum	.....	3,375	1,920	207	115	426	174	115	.....
	Mean	.....	1 010	519	126	38	148	106	86	.....
	Minimum	.....	207	190	62	10	62	62	62	.....
1897	Maximum	757	1,082	1,467	1,412	274	274	360	179	.....
	Mean	386	787	994	527	136	146	204	127	.....
	Minimum	141	568	514	151	55	55	138	95	.....
1898	Maximum	478	521	985	892	274	110	92	110	.....
	Mean	327	306	704	430	111	67	58	54	.....
	Minimum	55	195	436	37	15	37	46	28	.....

DOLORES STATION ON DOLORES RIVER.

This station has been maintained as described on page 516 of the eighth biennial report.

The bed of the stream is very stationary and the rating table is quite constant.

Observations have been taken by Mrs. M. D. Smith, of Dolores, Colorado.

LIST OF DISCHARGE MEASUREMENTS

MADE ON DOLORES RIVER AT DOLORES, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
13	Apr. 21	F. Cogswell	63	5.10	343	6.22	2,133
14	May 12	F. Cogswell	63	5.15	337	6.57	2,216
15	June 23	F. Cogswell	63	4.20	237	4.60	1,089
16	July 21	F. Cogswell	63	3.00	117	2.33	273
17	Aug. 25	F. Cogswell	63	2.65	56	1.64	92
18	Sept. 22	F. Cogswell	63	3.32	144	2.80	404
19	Oct. 20	F. Cogswell	63	3.25	138	2.39	330
	1898						
20	Apr. 8	A. L. Fellows	60	3.15	129	2.53	325
21	May 12	A. L. Fellows	60	4.30	232	5.02	1,163
22	June 17	A. L. Fellows	60	4.80	275	6.79	1,870
23	Aug. 16	G. H. Matthes, U. S. G. S.	------	2.80	55	1.83	102
24	Sept. 11	G. H. Matthes, U. S. G. S.	------	2.70	----------	----------	72
25	Sept. 28	G. H. Matthes, U. S. G. S.	------	2.55	----------	----------	46
26	Oct. 21	A. L. Fellows	133	2.55	38	1.05	40

COMPARATIVE TABLE OF DISCHARGE

OF THE DOLORES RIVER AT DOLORES, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month									
		March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895	Maximum				848	490	548	177	97	405	605
	Mean				702	270	248	96	79	134	412
	Minimum				605	127	97	68	68	42	281
1896	Maximum	557	1,578	1,452	781	480	180	1,176	180	618	
	Mean	244	747	952	263	130	38	195	113	179	
	Minimum	96	144	373	44	44	8	28	96	36	
1897	Maximum		2,944	2,838	2,521	608	235	852	568	260	
	Mean		1,483	2,435	1,465	368	148	394	392	172	
	Minimum		235	1,991	568	186	76	76	235	108	
1898	Maximum		1,978	1,875	2,030	1,229	229	293	50	72	
	Mean		1,093	1,207	1,510	491	121	78	37	48	
	Minimum		198	912	784	144	102	34	34	34	

FALL CREEK STATION ON SAN MIGUEL RIVER.

This station has been maintained as described on page 522 of the eighth biennial report throughout the irrigating seasons of the past two years.

The channel is quite unchanging, so that the rating table is quite constant.

Mrs. H. H. Hart, of Saw Pit, Colorado, has acted as observer during both years.

LIST OF DISCHARGE MEASUREMENTS

MADE ON SAN MIGUEL RIVER AT FALL CREEK, COLO.

No. of Gaging	Date	Hydrographer	Meter number	Gage height (feet)	Area of section (square feet)	Mean velocity (feet per second)	Discharge in cubic feet per second
	1897						
10	Apr. 20..	F. Cogswell.....	63	3.40	74	4.11	304
11	May 11..	F. Cogswell.....	63	4.05	108	5.30	572
12	June 22..	F. Cogswell.....	63	4.45	133	6.10	811
13	July 20..	F. Cogswell.....	63	3.45	81	4.15	336
14	Aug. 24..	F. Cogswell.....	63	2.85	52	2.79	145
15	Sept. 21..	F. Cogswell.....	63	3.30	68	3.65	248
16	Oct. 19..	F. Cogswell.....	63	3.05	57	3.46	197
	1898						
17	Apr. 7..	A. L. Fellows.....	60	2.50	32	2.07	66
18	May 11..	A. L. Fellows.....	60	3.30	73	3.73	270
19	June 16..	A. L. Fellows.....	60	4.40	129	6.54	841
20	Aug. 13..	A. L. Fellows.....	13	2.80	51	2.61	133
21	Oct. 17..	A. L. Fellows.....	133	2.30	26	1.15	30

COMPARATIVE TABLE OF DISCHARGE

OF THE SAN MIGUEL RIVER AT FALL CREEK, COLO., IN CUBIC FEET PER SECOND.

Year	Stage of Water	Month								
		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895	Maximum	.....	.....	587	550	312	168	101	180	13
	Mean	.....	.....	556	341	227	100	64	45	7
	Minimum	.....	.....	512	219	145	60	42	6	6
1896	Maximum	531	2,404	684	320	113	1,069	135	147	.....
	Mean	281	770	349	157	65	176	82	57	.....
	Minimum	147	310	135	93	49	62	49	22	.....
1897	Maximum	433	962	997	621	288	304	273	132	.....
	Mean	213	627	774	375	183	215	184	96	.....
	Minimum	52	369	504	243	122	132	122	62	.....
1898	Maximum	448	545	1,335	760	183	121	66	66	.....
	Mean	273	296	813	380	133	89	50	40	.....
	Minimum	196	196	571	109	109	66	30	22	.....

GAGING OF STREAMS IN WATER DIVISION NO. 6.

SPECIAL GAGINGS.

The following report is taken from my report made to Mr. F. H. Newell, hydrographer of the United States geological survey, in October, 1898:

During the last half of the month of September, 1898, a trip was taken for the purpose of gaging the streams in northwestern Colorado, at the instance of Mr. Newell, of the United States geological survey. It was known that the water in the streams was at that time at the very lowest stage ever known; and the purpose of taking the flow at this particular time was to obtain these extremely low stages, it being a known fact that the lowest stage of a river being given, it is more readily possible to build up from that, and so find the other stages for earlier parts of the season, than starting at another point. Other objects were to investigate the resources of that part of the state, of which this office had no official data, to consider possible reservoir sites and to look up proposed systems of irrigation and any other data that might be obtainable. I was also furnished by Mr. Newell with a camera, for the purpose of taking photographs of the country; and in this connection I would urge the desirability of this state's securing, through the state engineer's office, as complete a set as may be possible of photographic views of scenery, irrigation works, state bridges and other improvements, views in mining sections and irrigated sections, as is done with success in other states and by the United States geological survey, and in a number of other countries. The uses to which these views might be put are many. It would be possible, for example, to make up sets of lantern slides from them for scientific purposes, for advertisement of the state, for illustration, and they could moreover be used to the greatest advantage in giving clear ideas to home seekers. I believe that many photographers, both professional and amateur, could be induced to coöperate with the office in this work.

as it would be of direct advantage not only to the state in general, but to themselves. Upon this trip many views were taken of that section of the state, which have been forwarded to the United States geological survey, but which, it seems to me, that the state itself should possess, as Wyoming, for example, does.

It had been my intention to start from Denver about the first of the month; but owing to a pressure of clerical work, all arrangements were not completed until the thirteenth. Upon the evening of that day I left Denver in company with Mr. Humphrey Jones, editor of the Craig Courier. As he was thoroughly acquainted with the roads and residents of that section of the state which I was about to visit, and as he had moreover a clear idea of the purpose of my visit and could give me such information as I might desire, I thought best to engage him as an assistant for the trip, or at least from Craig, which was the point I expected to make my headquarters. We reached Rifle upon the morning of September 14. There we took the stage for Meeker, a distance of forty-five miles. For a long distance the road runs up a dry water course to the top of the divide, between the Grand and White rivers; then follows another similar dry water course to the White river, which it reaches about four miles below the town of Meeker.

From a geological point of view, the country passed through is an extremely interesting one. The strata are tiled at an angle of from 0 degrees up to 90 from the horizontal, and are of almost every color imaginable. In general, the country is very rough and of not much value excepting for stock raising and for coal, which abounds everywhere. The valley of the White river, however, is a beautiful, broad valley, full of fine ranches, occupied generally by prosperous settlers, whose chief business is raising cattle and hay. The town of Meeker is the county seat and one town of Rio Blanco county, and is a very pretty and apparently prosperous place. It is to a considerable extent the outfitting point for tourists and sportsmen, and is near the site of the famous Meeker massacre.

At this point I measured the White river, a large and rather rapid stream. Its discharge was three hundred second-feet. In this stream, as well as in all others measured, the stage of the water was extremely low, being, according to all reports that I could obtain, not more than one-half of the normal low stage. This state of affairs is due, undoubtedly, to the extremely light snow fall of last winter and to the fact that no rain had fallen in that section prior to my measurements for about three months. I think it safe to say, therefore, that the normal low water stages would be at least two or three times as great as the stages which I found.

During the evening of the fourteenth Mr. Jones made me acquainted with a number of Meeker's citizens, from whom I received a good deal of information concerning Rio Blanco county, a part of which information is in printed form and is now on file in this office.

Upon the following day, the fifteenth, we again took the stage and traveled about fifty miles from Meeker, in Rio Blanco county, to Craig, in Routt county. The country passed through on this day was similar to that of the day before, although the last part of it was much less rough, but still quite rolling. On the way we made short stops at the postoffices of Axial and Hamilton, each settlement consisting entirely of one family, although the center for several; and at the streams Milk river and Morapos, I estimated the flow; the former at three second-feet, and the latter at one second-foot; but, judging from the amount of land irrigated from each one, they must be of considerable size earlier in the season. I understand, however, that in the case of each creek the supply of water is short for the land under it, and that, although there is a great deal of irrigable land along each one, particularly in what is known as the Axial basin, they can probably never be brought under cultivation unless some means of water storage is found. I was informed that there was an excellent reservoir site at the head of the Morapos, but I did not have time to investigate, although I made up my mind that there was sufficient flow in that stream earlier in the season to fill a large reservoir, and at some future time it may be possible to look the matter up.

At Hamilton I measured William's fork of the Yampa, along which are a number of ranches. The stream is a good sized one, although it contained but twenty-five second-feet at the time I measured it, and the country about its head is full of all kinds of game.

The town of Craig, which we reached about 6 p. m., has a beautiful location. There is a great deal of agricultural land in the vicinity, but up to the present time the residents have been trying to get along with the water furnished by Fortification creek, a small stream flowing in from the north, which usually drys up some time in June, or July at the latest. When I arrived there, however, plans had been made for the construction of a large ditch, to be taken from the Yampa about twenty miles above Craig, which was expected to supply the lands above and below town, on the north side of the river, with a perpetual water supply. Mr. Fred Cramer, an engineer of a good deal of experience in irrigation work, has since been appointed engineer in charge, and there is every reason to be-

lieve that the ditch, upon which work is now in progress, will be a great success. The undeveloped lands above the river bottom, however, are of a rolling nature, and not much of these lands can ever be brought into cultivation. Nearly all the people in the vicinity of Craig, as well as those of Routt county in general, are stock growers, and apparently the most of them are very prosperous.

I was obliged to remain over one day in Craig until my guide could arrange his business preparatory to an absence of about two weeks, and so had a good opportunity to familiarize myself with the country thereabouts. I found it to be singularly well adapted to stock growing, owing largely to the fact that the amount of tillable land bears such a very small proportion to the grazing country about it, and stock raising will probably always be the chief industry of this section, although at some future time the coal supply and the placer beds will receive their due share of attention.

Having hired a team of stout horses and a buggy to be used for the next ten days, and having made all other necessary preparations, we started on the morning of September 17 for Steamboat Springs, which is situated on the Yampa river, about forty-five miles above, or east, of Craig. The road winds along the river side, sometimes upon the edge of the mesas and sometimes upon the river bottom, through beautiful, well cultivated ranches. The principal products of the irrigated lands are hay and grain for the winter feed for the stock, and improved ranches with water rights are held at high figures.

About noon we passed through the little town of Hayden, which is nearly in the center of the best cultivated part of the Yampa valley. A number of ditches are taken out above the town, and the results of irrigation in that neighborhood are more than promising to the promoters of the Craig ditch. The river was measured at a point about three miles below Hayden, and there showed a discharge of 111 second-feet. It is at this point that the Craig ditch is to take out its water supply, and from the facts that no ditches of importance are taken out below this point and that this season is the dryest of which they have any record, there can be no doubt but that the Craig ditch, as well as any other ditches that may hereafter be constructed along the river, will have an abundant water supply.

We arrived in Steamboat Springs about 8 p. m., and were so fortunate as to secure a room in the hotel, although it was the last one in the house, all the others being taken by sportsmen and tourists. The town takes its name from two sulphur springs, which, in spouting from holes in the solid rock, make

a noise resembling the sounds from the exhaust pipes of a steamer. The town is beautifully located in the mountains, and is a mecca, not only for sportsmen, but for tourists and health seekers, who come to try the springs which abound in the vicinity. There are said to be over two hundred mineral spring in the immediate neighborhood, of which several are hot springs ranging from 103° to 150° F. At one of the hot springs comfortable bath houses have been erected. Near the town is an onyx mine, from which blocks of any desired size and of finest quality of onyx may be obtained, and the supply of which seems inexhaustible.

We had crossed the Elk Head river, which we found practically dry, although it is a good sized stream up to the first of September and a good deal of land is irrigated from it. Elk river was also crossed about a mile above where it discharges into the Yampa, near Trull postoffice, there being at that point sixty-three second-feet.

The eighteenth was spent in the vicinity of Steamboat Springs. The Yampa river was measured at this point, giving a discharge of sixty-five second-feet; and Fish creek, below Fish Creek falls, was estimated at ten second-feet. A number of photographs of Fish Creek falls and Steamboat Springs were taken, reports of rivers measured up to date were sent out, and considerable information in printed form was received from citizens of Steamboat Springs, which information is now on file in this office.

On the following day, the nineteenth, we left the Yampa river, and turned to the north for Honnold postoffice, on the Snake river, by way of Hahn's Peak and Columbine. During the morning we crossed Mad creek, estimated at six second-feet, Big creek at four and Beaver creek at two second-feet,—all tributaries of the Elk river, which also we crossed at a point about fifteen miles from Steamboat Springs, not far from where it has been suggested that a very large ditch might possibly, at some future time, be taken out to irrigate the lands along the divide for a hundred miles or more between the Snake and Yampa rivers. This project I had no time to investigate, although before I was through with the trip I saw a great deal of fine land which could probably be irrigated from such a ditch. No photographs, excepting one of Hahn's Peak, were taken upon this day, as the entire country was covered with smoke from forest fires, of which we could distinguish six at one point of our road, and at one place we passed along the edge of a fire which afterward consumed a large part of the town of Columbine. We took dinner at the town of Hahn's Peak, which is at

present the county seat of Routt county; but as it is in the extreme northeastern corner of the county, it is extremely difficult for residents of the western part of the county to reach it, requiring in many cases a three-day trip in wagons or on horse back, and an effort is being made to change the location of the county seat from Hahn's Peak to some more central point. A vote will be taken this fall upon its removal to Steamboat Springs; but people in the western part of the county are opposed to this change, as they would be but little better off than now, and they wish the change to be made either to Hayden or Craig, or some other more central point. It would seem, however, to a visitor to that section, that the probable solution of the difficulty would eventually be the division of the county into two, as the present county of Routt is a little larger than the state of Massachusetts.

Hahn's Peak itself is an imposing mountain and is the center of a large mining territory. It will be of considerable importance if the country is ever reached by railroad; at present, however, most of the ores are of too low a grade for shipment by wagon, and only a few mines can afford to freight out their ore.

We reached Honnold postoffice about 5 p. m., and found it a delightful place to stop, game and trout being abundant, and the owners of the ranch upon which the postoffice is situated, Mr. and Mrs. Gardner, being educated and cultivated people. The three forks of the Snake river unite upon the Gardner ranch. They are designated as the North, Middle and South forks, and are about in the ratio of three, five and two. The discharge of the Snake at a point below the union of the forks was only seventeen second-feet. At this time the stream, although not a large one, probably carries far more water than is necessary for all the irrigation that can be done from it during the average season.

On the following morning we started down the Snake river, which runs westerly along the boundary line between Colorado and Wyoming, sometimes in one state and sometimes in the other; crossed Battle creek, which we estimated at four second-feet, and Savory, which we found dry at the point of crossing, although water was running in two or three ditches taken from it. A good deal of land is irrigated from each one. We stopped at Slater to measure Slater fork, which contained nine second-feet. About five miles above the mouth of the fork is a herd of over one hundred fine elk kept under fence, which, however, I did not take time to visit.

From Slater postoffice we drove in the afternoon to Dixon, a little town in Wyoming, about two miles from the Colorado line, where we spent the night. This is in the vicinity of the so-called "Sheep Wars;" the sheep men of Wyoming sometimes endeavor to bring their sheep over the line into Colorado, the Colorado men driving them back again. Probably nothing of this kind will occur again, however, as it is well understood that all the stock men of northwestern Colorado have combined and sworn to keep all sheep out of that section. Mr. Jones, who was with me, was himself an active participant in these troubles, being the secretary of the stock growers' association, and was twice shot at from ambush; so he was able to give me full details of the various troubles.

On the morning of the twenty-first we measured the Snake river at Dixon, finding its discharge to be nineteen second-feet, that being not far from the place where it finally leaves the Colorado line, and started for the Yampa again. We made two or three stops, however, when just across the Colorado line, to look at a large tract of land which may perhaps be brought under cultivation; and again at a ranch belonging to a Mr. Perkins, familiarly known as "Big Perk," a terror to the cattle rustlers and outlaws of that vicinity. The roads traveled over upon that day were over the Four-Mile country, the country between the Snake and Yampa rivers, which, it has been suggested, might be covered with a ditch from Elk river. There is a great deal of fine land there, but most of it is very scattered. A ditch is at present being constructed from Slater fork and other tributaries of Snake river to cover a portion of the Four-Mile district with water, principally for placer properties.

The delays along the road made us so late that we did not get as far as we expected by about ten miles, and were compelled to stop at a ranch owned by a man named Emerson, at Lay creek, where we were hospitably entertained.

The next morning, the twenty-third, we drove from Emerson's by way of Lay postoffice to Maybell, upon the Yampa river, another postoffice, named for the two daughters of Mr. O. F. Barber, who lives there, whose names are May and Bell. The road runs down Lay creek and is surrounded by high mesas or plateaus, covered with sage brush and cedar trees. There are some attractive ranches upon this creek, but the supply of water is so limited that not very much can be done in the way of irrigation. Those who have water, however, are very fortunate in being located where they are surrounded by an immense grazing country, and most of them can raise enough hay to keep their stock during the winter.

We forded the Yampa river some distance below Maybell, two or three miles below the point where the Maybell Colonization company expects to take out a ditch to cover about eight thousand acres of land which borders the river upon both sides. This land when irrigated will prove very fertile. The cost of the ditch will undoubtedly be considerable, but in my opinion it will not be excessive as compared with the body of land to be irrigated.

After leaving Maybell, at about 2 p. m., we continued along the south side of the Yampa, crossing at the Thornburg bridge, which is near the location of the Thornburg massacre of several years since. At this point I measured the river, finding its discharge to be ninety-nine second-feet. This is about the center of the lands eventually to be taken by the Maybell colony. Crossing the river at the bridge, we drove several miles further to the house of Henry Templeton, where we spent the night.

Upon the morning of the twenty-fourth we drove first about nine miles to the Thompson crossing of the Snake river, a large part of the way being across a beautiful mesa, which lies well for irrigation, but which probably can never be irrigated owing to its sloping in the wrong direction, or against the general trend of the geologic strata. At the Thompson crossing we found, to our surprise, that the Snake river was practically dry, nearly all the flow that we found at Dixon having been lost in the sands between these two points. The crossing is upon the Thompson ranch, the buildings of which were burned down last fall by the Indians.

After leaving this point we drove northwesterly about thirty-five miles without water until we reached Vermilion creek, a small stream winding along between high sandstone walls, some of which are of a vermilion color, giving the creek its name. There was a small stream running here, which we estimated at four second-feet, and our horses, as well as ourselves, were glad of an opportunity to drink. Driving several miles further we arrived a little after dark at Ladore postoffice, where we found the Thompsons, owners of the above mentioned ranch, and other old-timers, from whom I gained a good deal of information concerning a possible reservoir site and irrigable lands of the vicinity. I was informed that there was a very fine reservoir site, which I think would well stand investigation, upon Beaver creek, about thirty miles distant from Ladore. This, however, I had no time to look into, although I would certainly have visited it if I could have spared two days. There is a fine body of land, consisting of several thousand acres, which

may perhaps be irrigated from this proposed site, but I think that the same land could very likely be covered by a ditch taken from Green river, which has an abundant water supply.

On the morning of the twenty-fourth I measured the Green river at Hoy's crossing, six miles below Ladore, finding the discharge to be 552 second-feet, and after taking the measurement we drove back to the Templeton ranch, where we arrived about 8 p. m.

The next morning Mr. Templeton took us to his dam and wheel for raising water from Yampa river, by means of which he can irrigate about sixty acres of land. He expects, however, to take water eventually from Maybell ditch. He showed us a fine garden, in which he raises vegetables for his family and his few neighbors. I secured good photographs of his water wheel and dam. After leaving him we drove again to Maybell, where we had dinner, after which Mr. Barber went with us to the head of the proposed Maybell ditch, which runs for about a mile along a rocky cañon. I suggested that a dam might be put across the river at a very favorable point, as being less expensive than the first mile of the ditch, and it is possible that the suggestion may be acted upon.

The Yampa river is different from any other stream of the west that I have ever seen. For long stretches of perhaps miles there will be practically no fall whatever, the water standing at this time of the year as in lakes, and when there is any rapidity of fall it being for short distances across bars, for longer distances through rocky cañons; and it is in such a cañon that it will be necessary to get the fall required for irrigating such lands as it is desired to cover; especially is this the case in the lower half of the Yampa valley.

We spent the night at the house of a ranchman near the site of the suggested dam, and on the following morning started on our return to Craig, where we arrived in time for a late dinner, having driven about thirty-five miles across what are known as the Sand Hills, a desolate country, the most of which is nearly devoid of vegetation excepting the sage brush. The remainder of the day was spent in gaging the Yampa near Craig, where we found a discharge of seventy-nine second-feet.

The remainder of the trip from Craig back to Rifle was over practically the same country as that covered twelve days before, and so needs no explanation here.

In addition to possible irrigation enterprises that have been suggested, there are others of more or less importance; one particularly at Lily Park, near the junction of the Snake and

Yampa rivers, which may at some time be of considerable importance.

The possibilities for development in this section of the country are very great, and I would recommend that an effort be made next year to have regular stations at Meeker, upon the White river, Craig and Steamboat Springs upon the Yampa river, Trull upon the Elk river, Honnold and Slater upon the Snake river, and possibly Hoy's upon Green river, with regular observers. The tour of these stations could be made in about the same time as other stations taken, particularly if the hydrographer goes from Slater to Rawlins, Wyoming, and takes the train from there back to Denver; for although the traveling would be done principally by stage, there would be sufficient time and opportunity to make one of these measurements each day, and I think the value of the data would warrant the expense. The streams mentioned, in general, have good cross sections and are not particularly liable to change at the points designated, and it would not be necessary, therefore, that discharge measurements be taken so often as upon the streams more liable to change. Observations upon the Yampa would, I think, be of especial value, as upon that stream the proportion of irrigable land to the water supply is greater than upon the others; and Slater I think to be an especially important point on account of the relation of the two neighboring states in having for some distance a common water supply.

It was in my plans to have taken the flow of streams in North park or Larimer county also, but this I was unable to do on account of the impossibility of leaving Denver at an earlier date.

Below will be found a summary of gagings and estimates:

Name of Stream	Locality	Date	Area of Section	Mean Velocity	Discharge
White river	Meeker	Sept. 14	110	2.73	300
Milk river	Axial	Sept. 15			3
Morapos river	Axial	Sept. 15			1
Williams fork	Hamilton	Sept. 15	18	1.41	25
Yampa river	Hayden	Sept. 17	55	2.02	111
Elk river	Trull	Sept. 17	44	1.44	63
Yampa river	Steamboat Springs	Sept. 18	43	1.51	65
Fish creek	Steamboat Springs	Sept. 18			10
Mad creek	Steamboat Springs	Sept. 19			6
Big creek	Steamboat Springs	Sept. 19			4
Willow creek	Hahn's Peak	Sept. 19			4
Beaver creek	Hahn's Peak	Sept. 19			2
Snake river	Honnold	Sept. 19	13	1.32	17
Battle creek	Slater	Sept. 20			4
Slater fork	Slater	Sept. 20	6	1.69	9
Snake river	Dixon, Wyo	Sept. 21	16	1.17	19
Willow creek	Dixon, Wyo	Sept. 21			3
Yampa	Maybell	Sept. 22	56	1.76	99
Snake river	Thompson's	Sept. 23			1
Vermilion creek	Ladore	Sept. 23			4
Green river	Ladore	Sept. 24	612	0.91	552
Yampa river	Craig	Sept. 26	68	1.16	79

Respectfully submitted,

A. L. FELLOWS,
Deputy State Engineer.

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